

**KERALA STATE ELECTRICITY BOARD LIMITED**



**CAPITAL INVESTMENT PLAN  
FY 2022-23 TO FY 2026-27**

**SUBMITTED TO  
HON'BLE KERALA STATE ELECTRICITY REGULATORY COMMISSION  
THIRUVANANTHAPURAM**

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**SUBMITTED BY  
KERALA STATE ELECTRICITY BOARD LIMITED  
VYDYUTHI BHAVANAM, PATTOM, THIRUVANANTHAPURAM – 695004**

**BEFORE THE HONOURABLE KERALA STATE ELECTRICITY REGULATORY  
COMMISSION**

at its office at C.V. Raman Pillai Road, Vellayambalam. Thiruvananthapuram.

**FILING NO**                      **/2021**

**CASE No.**

**IN THE MATTER OF:**

Application for approval of the Capital Investment Plan of KSEBL for the control period from FY 2022-23 to FY 2026-27 under Regulation 10, 54,67 and 71 of KSERC (Terms and Conditions for determination of Tariff) Regulations,2021.

And

**IN THE MATTER OF :**

Kerala State Electricity Board Ltd., Vidyuthi Bhavanam, Pattom, Thiruvananthapuram-695 004.

Applicant

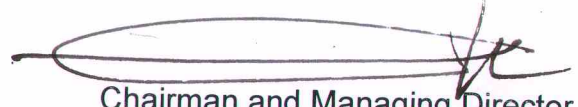
  
**Chairman and Managing Director,  
Kerala State Electricity Board Limited**

## AFFIDAVIT VERIFYING THE PETITION

I, Dr. B. Ashok, son of B. Balasundaram aged 48 years residing at D22, Pillaiveedu Nagar, Kesavadasapuram, Thiruvananthapuram -695004, do solemnly affirm and say as follows:

I am the Chairman and Managing Director of the Kerala State Electricity Board Ltd., Vidyuthi Bhavanam, Pattom, Thiruvananthapuram, and the Petitioner in the above matter and I am duly authorized by the Board to make this affidavit on its behalf. I solemnly affirm at Thiruvananthapuram on this the 10<sup>th</sup> day of January 2022 that the contents of the above submission are true to my information, knowledge and belief. I believe that no part of it is false and no material has been concealed there from. The statements made in paragraphs of the accompanying application are true to my knowledge and are derived from the official records made available to me and are based on information and advice received which I believe to be true and correct.

Deponent

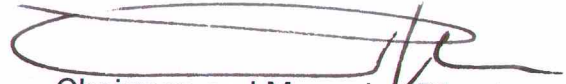


Chairman and Managing Director  
Kerala State Electricity Board Limited  
Vidyuthi Bhavanam, Pattom  
Thiruvananthapuram – 695 004.

## VERIFICATION

I, the above named deponent, solemnly affirm at Thiruvananthapuram on this, the 10<sup>th</sup> day of January 2022 that the contents of the affidavit are true to my information, knowledge and belief, that no part of it is false and that no material has been concealed there from.

Deponent



Chairman and Managing Director  
Kerala State Electricity Board Limited  
Vidyuthi Bhavanam, Pattom  
Thiruvananthapuram – 695 004.

Solemnly affirmed and signed before me.

*T. N. Omana*  
10-1-2022

Advocate and Notary

**T. N. OMANA**  
Advocate & Notary  
Thiruvananthapuram Revenue District  
Kerala State South India



**BEFORE THE HONOURABLE KERALA STATE ELECTRICITY REGULATORY  
COMMISSION**

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**IN THE MATTER OF:** Kerala State Electricity Board Ltd., Vydyuthi Bhavanam, Pattom, Thiruvananthapuram-695 004.

**The Petitioner named above respectfully submits as under:**

Hon'ble Commission has notified the regulation for determination of Tariff for the control period FY 2022-23 to FY 2026-27 viz. KSERC (Terms and Conditions for determination of Tariff) Regulations,2021 on 16-11-2021. The regulation requires the licensees to submit the petitions for Capital Investment Plan (CIP), Aggregate Revenue Requirement (ARR), and Expected Revenue from Charges (ERC) and the Tariff Revision Proposal for the five year control period stipulated in the regulation beginning from FY 2022-23 to FY 2026-27.

This petition submitted by the petitioner company, KSEBL, is in compliance with the provisions contained in the KSERC (Terms and Conditions for determination of Tariff) Regulations,2021, Electricity Act, 2003 and National Tariff Policy. This petition contains Capital Investment Plan (CIP) of all the SBUs. The Annexures and formats specified in the Regulation are attached to the related chapters. The Detailed Project Reports related to Capital Investment Plan and other reports, however, are submitted as separate books along with this petition.

A summary of the Capital Investment Plan of each SBU of KSEBL as submitted in the instant petition is given in the Table below.

<b>Capital Investment Plan of KSEBL (Rs.Cr.)</b>						
	<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	<b>Total</b>
SBU-G	512.75	798.11	1122.97	1483.83	1212.92	5130.58
SBU-T & SLDC	1304.14	2027.39	1673.21	1033.60	517.73	6556.08
SBU-D	3492.95	5351.03	4953.18	1501.54	1412.23	16733.03
<b>Total</b>	<b>5309.83</b>	<b>8176.53</b>	<b>7749.36</b>	<b>4018.97</b>	<b>3142.88</b>	<b>28419.69</b>

It is earnestly submitted before the Hon'ble Commission that, KSEBL has executed due diligence possible in preparing the Capital Investment Plan. KSEBL has submitted the relevant information related to the claims made in this petition in the body text of the petition, annexures and formats provided therein. However, it is appealed that should the Commission require any additional related information on these aspects, KSEBL may please be given the opportunity to submit such information before the Hon'ble Commission.

KSEBL is constantly pursuing its vision to become the best power utility in India as to provide quality electricity to consumers adequately, safely, sustainably at affordable cost. The Petitioner, therefore, seeks the support of the Hon'ble Commission in fulfilling its endeavor to achieve the mission and vision.

It is further submitted that KSEBL will be remitting the petition filing fee of ARR& ERC petition for FY 2022-23 to FY 2026-27 along with that petition. Therefore, no petition filing fee is attached in this instant petition.

### **Prayer**

KSEBL humbly pray before the Hon'ble Commission to admit this petition and approve the Capital Investment Plan for Generation, Transmission and Distribution Strategic Business Units of the Petitioner for the control period 2022-23 to 2026-27 as submitted in this petition.



Ashok B.  
Chairman and Managing Director  
Kerala State Electricity Board Limited  
Vydyuthi Bhavanam, Pattom  
Thiruvananthapuram – 695 004.

# KERALA STATE ELECTRICITY BOARD LIMITED

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## CHAPTER 1 CAPITAL INVESTMENT PLAN OF SBU - GENERATION

Kerala State Electricity Board Limited (KSEBL), is an integrated State Public Sector power utility in the State of Kerala, performing the three functions of Electricity Generation, Transmission, and Distribution through three Strategic Business Units (SBUs). The Generation Strategic Business Unit (SBU G) performs the function of generating electricity to meet the demand of the State.

### Power Position

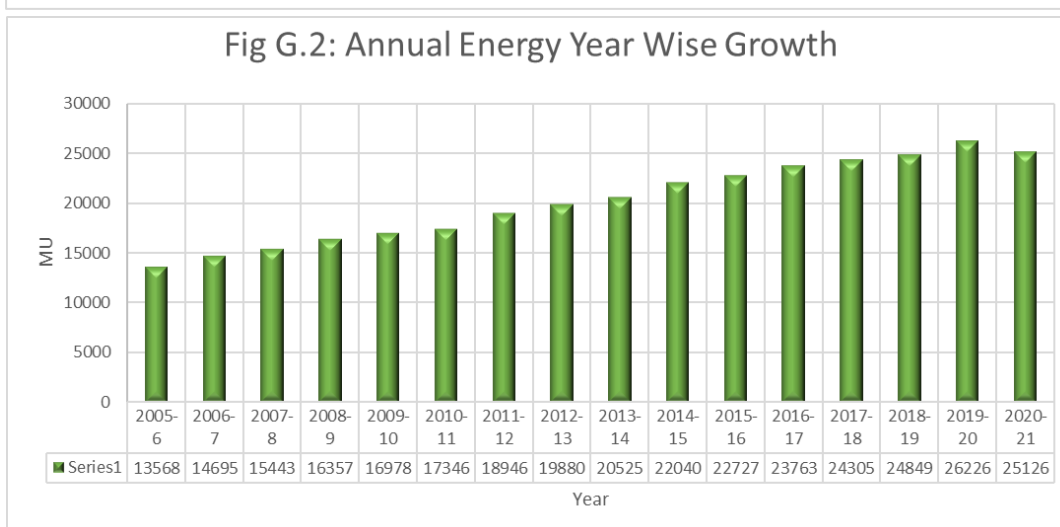
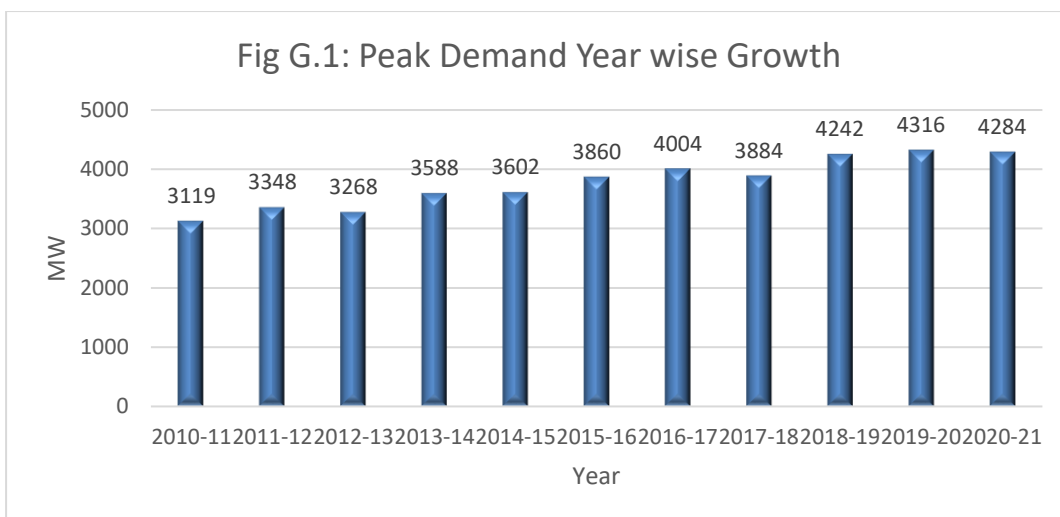
Kerala met an all-time peak demand of 4316 MW on 13/04/2019 and all-time high-energy consumption of 88.41 MU on 19/03/2021. The present demand of power in the State is around 4200-4300 MW. The year wise recorded annual peak demand and annual energy demand met by the State are shown in Fig G.1, Fig G.2 respectively. The average increase in peak demand and annual energy demand over the last ten years is 4.6% and 4.3% respectively, excluding the 2020 Covid period. Statistics of State also reveals that the demand of power in the State is increasing at an alarming rate whereas the capacity addition is disproportionate to the rate of increase of demand. The daily average consumption of Kerala varies around 80 to 85 million units. States internal generation varies from 25 to 30 million units. The balance met through CGS (around 30 million unit), LTA (around 25 million unit) and through Power exchanges.

### Energy Consumption Projection

CEA's Power survey forms the basis for determining future energy demand in the State. The accuracy of power surveys can greatly influence the effectiveness of planning. Based on this survey, future power demand for the domestic, commercial and industrial sector is outlined and internal generation or power purchase agreements are planned, after applying appropriate modifications, in order to meet the projected demand. Currently the 19<sup>th</sup> Power survey is being used for these projections.

The actual electrical energy consumption for FY 2018-19, FY 2019-20, FY 2020-21 are 21750.25 MU, 23058.91 MU and 22504.32 MU respectively. The energy consumption projection for the next control period as per 19<sup>th</sup> EPS published by CEA is shown in Table G1. In future, with electricity becoming the dominant energy carrier, in addition to normal growth in the electricity consumption, results to a large increase in electricity demand.

Table – G1: 19 <sup>th</sup> EPS Projection – Electrical Energy Consumption - Kerala					
FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25	FY 2025-26	FY 2026-27
26722 MU	28024 MU	29363 MU	30740 MU	32160 MU	33718 MU



## Installed Capacity

The source wise total installed capacity as on 31.03.2021 is 2240.22 MW, and are given in table G2.

<b>Table-G2: Source wise Generation Capacity as on 31.03.2021</b>	
Source	Installed Capacity (MW) as on 31.03.2021
Hydel	2058.76
Thermal	159.96
Wind	2.03
Solar	19.47
<b>Total (Generation)</b>	<b>2240.22</b>



During the financial year 2021-22, as on 30.11.2021, 19.25 MW added to the capacity. Out of this small hydro and solar projects contributed 8 MW and 11.25 MW respectively, and are given in table G3.

<b>Table-G3: Project Commissioned during 2021-22 as on 30.11.2021</b>			
Source	Name of the Project	MW	Date of Commissioning
Hydel	Chathankottunada II	6	21.06.2021
	Upper Kallar	2	30.09.2021
Solar	Soura Scheme	10.25	
	Agali	1	30.10.2021
<b>Total (Generation)</b>		<b>19.25</b>	

The 24 MW Poringalkuthu SHEP and 3 MW Kanjikode solar projects are expected to be completed during the financial year 2021-22. Hence the expected source wise generation capacity as on 31.03.2022 are given in table G4.

<b>Table-G4: Expected Source wise Generation Capacity as on 31.03.2022</b>	
Source	Installed Capacity (MW) as on 31.03.2022
Hydel	2090.76
Thermal	159.96
Wind	2.03
Solar	33.72
<b>Total (Generation)</b>	<b>2286.47</b>

The Energy generated by the petitioner's Generation Business Unit during 2020-21 period was 7109.09 MU (28.07%) out of which 7071.37 MU was from own Hydro-electric Stations and remaining 37.72 MU was generated from thermal, wind and solar stations. During the last five years, Kerala has been able to make significant strides in solar energy through projects implemented as part of its efforts to promote renewable energy. Source wise generation details for the financial year 20-21 are given in table G 5:

<b>Table -G5: Energy Generation from own stations for FY 2020-21 (MU)</b>	
<b>Gross Generation (MU)</b>	
Hydro	7071.37
BDPP	0
KDPP	7.845
Wind	1.14
Solar	28.73
<b>SubTotal</b>	<b>7109.09</b>

## Key Objectives of the Capital Investment Plan

As the present internal generation normally provides only around 30% of the total electricity energy requirement of the State, KSEBL has taken up development of a number of renewable projects in addition to the existing projects for meeting the future demand of electricity. This investment plan is prepared by analyzing and anticipating the future energy requirements and strategically planned the requisite capital investments by considering latest trends in power sector, ensuring optimal generation capacity mix in the electricity grid and to protect the interest of both KSEBL and stakeholders. This investment plan is also a journey towards the goal of achieving energy self-sufficiency.

## Approach and methodology

The Capital Plan for MYT Control Period considers the following:

1. The Present Capital Investment Plan has been prepared based on provisions of the Electricity Act, 2003, Policies made there under, KSERC MYT Regulations, 2021 and other applicable Regulations of Hon'ble KSERC;
2. The Capital Investment Plan has been prepared considering the recent changes in the power sector as well as the growth projections of electrical energy demand.
3. Special consideration for meeting peak energy demand in the State and steps for ensuring system energy requirement has been considered while preparing the Investment plan.
4. Ancillary services, such as operating reserves, imbalance energy, and frequency regulation, are necessary to support renewable energy integration, particularly the integration of intermittent resources. This is addressed in the proposed investment plan.
5. Capital Investment also aims to ensure the cyber security in power generation sector. Innovations revolutionizing the Power Industry are also considered in the investment.

## Classification of Capital Investment under SBU- G

The proposal submitted hereunder is for the approval of investment in respect of new hydel projects, new solar projects, new renovation and replacement work, advanced energy storage technologies, Dam rehabilitation projects.

The broad classification of capital investment under SBU G, for the control period FY 2022-23 to FY 2026-27 are as below,

### **New Projects**

- a. New Hydel Projects
- b. New Solar Projects
- c. New renovation/replacement work (Major work – 5 Cr and Above)
- d. New renovation/replacement work (Less than 5 Cr)
- e. Advanced Energy Storage Technology
- f. Dam Rehabilitation

## New Projects

It is essential for the State to enhance the generation from internal sources to the maximum possible extent to ensure the quality power at affordable price to the 131 lakhs consumers. It is amply clear that there is no fossil fuel reserve in our State also more importantly, the power generation has been transformed to climate friendly manner, hence possibility of implementing power projects relying on fossil fuel is remote. In a densely populated State like Kerala, scope for developing nuclear based power plant is also remote. Availability of good rainfall & favorable topography is advisable for establishing financially viable hydro based power plants. Due to various reasons like difficulty in getting forest/environmental clearance and resistance from various quarters, implementation of major hydroelectric projects is held up for the past few years. At this juncture, the alternatives for capacity addition are to implement small hydel projects, solar and wind, as far as possible at all favorable sites, which causes least impact to forest and environment.

## New Hydel Project

KSEBL is proposing to take up, the implementation of 14 new hydro projects during 2022-27. Out of 14 projects, two of them are storage-based projects and one is an extension project. The remaining 11 projects are run-of-the-river projects. These run of the river projects are intended to generate at monsoon, preserving the storage of large and medium storage schemes as far as possible for use during summer months. The environmental and resettlement impact are minimum for the run of the river projects. These schemes will lead to socioeconomic development of the locality.

A brief description of the proposed projects are as below:

### 1. Upper Sengulam HEP

The Upper Sengulam H.E Project envisages utilization of surplus water expected to be available at Sengulam Balancing Reservoir (SBR) of Sengulam H.E Project after commissioning of Sengulam Augmentation Scheme and 60MW Pallivasal Extension Scheme. Presently the main source of inflow to the reservoir is from the tail race of the existing Pallivasal HEP. The tail water of Pallivasal Power House is being conveyed to the Sengulam Balancing Reservoir through tunnel by pumping water up to tunnel inlet, thereafter by gravity flow. On completion of the Pallivasal Extension Scheme, the tail water of the existing Pallivasal scheme is to be pumped to the tail race pool of Pallivasal Extension Scheme and from there it is conveyed through a steel pipe to the existing tunnel inlet of Sengulam Balancing Reservoir by gravity flow. With the commissioning of Sengulam Augmentation Scheme under construction, water diverted from Western Kallar river would also be reaching the Sengulam Balancing Reservoir. The total catchment area of the scheme is 304.73 Sq km and design head is 330m. The installed capacity of the scheme is 24MW and the expected annual generation is 53.22 MU. The proposed power house is located at the upstream of existing Sengulam Power House in Vellathooval village of Devikulam taluk in Idukki district. The project comprises of power tunnel of diameter 3.3 m and length 2707 m, surge shaft of 10 m diameter, a low-pressure pipe of diameter 2.5m and length 18m, steel lined pressure shaft of finished diameter 2.5 m and

length 1032.7m, valve house, feeder pipes of 1.9 m and a surface power house with installed capacity of 1x 24 MW. The land requirement for the project is 10 Ha. Out of this, the forest land required is only 1 Ha and is used for Eucalyptus plantation by M/s HNL after executing agreement with forest department which was earlier under possession of KSE Board as a part of Sengulam HEP.

The Power house with 1x24 MW Pelton turbine is proposed during upper Sengulam first stage. Another 24 MW machine will be installed during second stage to make the ultimate installed capacity as 48 MW. The present project components are designed considering the future expansion. The tail race water is discharged to the Muthirapuzha river, which can be utilized by downstream projects.

**Power Evacuation:** Construction of 3 KM 220kV line to the nearest location of existing Idukki- Udumalpet 220 kV line.

## 2. Peechad SHEP

Peechad small hydroelectric scheme is a run-of-the-river scheme located in Devikulam Taluk, Idukki district. The Peechad HE schemes utilize the tail race discharge from upper Kallar HE schemes which in turn receives diverted waters from Pooyamkutty Basin with the aid of the existing diversion weir at Viripara and the upper Kallar tunnel in addition to the contribution from own catchment.

The scheme consists of small diversion structure of 8m height and 60m long across the western Kallar river 1.5 Km downstream of the existing western Kallar tunnel and a power house of installed capacity 3 MW for power generation under a net head of 61m. The Peechad HE schemes with 3 MW installed capacity when completed will add 7.733 MU to the state grid. The main component structures involve, an overflow type diversion weir of total length 60 m with an overflow portion of 30m, an intake of size 1.242m x 1.692m, single line penstock 1.2 m dia and 495 m long with shell thickness 8 mm which bifurcate near the power house to feed to 2 machines of 1.5 MW each, a power house of size 25.5m x 8m for housing two machines of 1.5 MW each, a tailrace channel of rectangular size.

**Power Evacuation:** The pooled Power from the upper Kallar SHEP and Peechad SHEP is stepped up to 33 kV and evacuated to western Kallar SHEP through 33 kV line. The entire power is stepped up to 66 kV and transmitted to Pallivasal Aluva line by drawing a 0.5 KM 66kV DC line.

The land acquisition, preliminary activities and tendering of the work are scheduled on 2022-23 and 2023-24 respectively. The civil and electrical works are scheduled from 2024-25 and the project will be completed by 2026-27.

## 3. Western Kallar SHEP

The Western Kallar scheme is a run – of – the-river scheme located at Kallar in Pallivasal grama Panchayath of Idukki district. The scheme envisages utilizing the water in western Kallar stream, a tributary of Mudirappuzha in Periyar basin, by constructing a weir across the western Kallar stream at about 400 m upstream of Kallar bridge in Aluva- Munnar road and a power house at just downstream of the Kallar falls. The Power House is proposed on the right bank of the river having installed capacity of 5 MW (2 x 2.5 MW) operating at a gross head of

63.95m and the tail race water after power generation will be let into the forebay of Sengulam Augmentation scheme in the same stream. The schemes with installed capacity of 5 MW can generate 17.41 MU of average energy per annum. The western Kallar small HE scheme is one of the series of small hydel schemes in Kallar stream. The Peechad and upper Kallar are at upstream side of the scheme and Sengulam augmentation scheme and Iruttukanam small HE scheme are at downstream side. Another small HE projects Viripara SHEP is at upstream side and is now under feasibility study.

The main component of the scheme includes, a gravity type concrete weir across the western Kallar river having a length of 83m and height of 12.5m with un gated spill way, a water conducting system consist of a surface penstock having a length of 311 m and 2m diameter, penstock feeder pipes 2 no's of diameter 1.6m and 13m length, a surface power house of size 29m x 15m x15m capable of housing 2 horizontal Francis turbine units of 2.5 MW each, totaling 5 MW, length of tailrace weir is 13m and crest level is +833.3m, a tail race channel of length 13.5m up to tailrace weir, a switch yard near the power house.

**Power Evacuation:** The power from the scheme can be fed into the existing 66kV line at 2.25Km away from the scheme area. A combined Power evacuation scheme is envisaged for the evacuation of power from western Kallar, Peechad and upper Kallar projects. As per this scheme, the power from these projects is evacuated through Pallivasal- Kothamangalam DC feeder through a tap point which is 2.75 Km away from the proposed western Kallar switchyard.

The land acquisition, preliminary activities and tendering of the work are scheduled on 2022-23 and 2023-24 respectively. The civil and electrical works are scheduled from 2024-25 and the project will be completed by 2026-27.

#### 4. Ladrum SHEP

The Ladrum Small HE Scheme is a run -of- the-river scheme proposed in the Periyar basin. The scheme proposes to utilize the water of Azhutha Diversion Scheme (Idukki Augmentation) and also the water from the Ladrum thodu, a tributary of Periyal which has 5.56 km<sup>2</sup> catchment area. The project is located near to Ladrum in Peerumedu village, Peerumedu panchayat & Taluk of Idukki district.

Utilizing a design head of 100m and average annual yield of 83 Mm<sup>3</sup> an average energy of 12.13 MU can be produced from this scheme with an installed capacity of 3.5 MW (2x1.75 MW). The tail race water is discharged in to the Ladrum Thodu itself and ultimately discharged into Idukki reservoir. The main component structures of the scheme include a concrete gravity overflow type diversion weir of height 5.5m, a concrete linked channel of length 15m, a free flow power tunnel of D shape having diameter 14 m, surplus channel, a single line penstock of 110m diameter for a length of 312.59m, a power house of size 24m x 15m x 21m for installing two machines of 1.75 MW each (Horizontal – Francis Turbines). About 10 Hectares of land is required for the implementation of this project and there is no adverse effect on the environment due to this project. Out of the 10 Hectares of land 0.285 Ha land is under possession of KSE Board and balance land to be acquired is 9.715 Ha private land.

**Power Evacuation:** The power generated from the scheme can be fed to the nearest 66 kV substation at Peerumedu which is 10 km from project site.

The land acquisition, preliminary activities and tendering of the work are scheduled on 2022-23 and 2023-24 respectively. The civil and electrical works are scheduled from 2024-25 and the project will be completed by 2026-27.

## 5. Marmala SHEP

The Marmala Small Hydro Electric Project is proposed as a run-of-the-river scheme in Marmala thodu, one of the main tributaries of Meenachil river in Poonjar village at Thalanadu Grama Panchayath of Meenachil Taluk in Kottayam District. The installed capacity of the scheme is 7 MW and the expected annual generation is 23.02 MU. The scheme contemplates the power development by utilizing the water of Marmala stream, a tributary of Meenachil river. This Meenachil basin is in receipt of good rainfall and humid atmosphere throughout the year.

The maximum utilizable discharge is 5.2 m<sup>3</sup>/sec and net head is 185m. This scheme will lead to the socio-economic development of the locality. No forest land is required for the scheme. The scheme is having a catchment area of 14.0Km<sup>2</sup>. A weir is proposed about 330m upstream of the Marmala waterfall and the water is diverted through the water conductor system to the PH located in the right bank of the stream and the tail water is proposed to be discharged in to the same river. The main components of the scheme are

The construction of a gravity overflow type diversion weir of height 12.00m and base width 11.495m for drawing a discharge of 5.2 cumecs, a circular tunnel of length 407.43m having diameter 2.8m, a surge tank 6.5m diameter, LPP having 2.10m diameter and 120.60m length, a single line penstock of 1.2m diameter having 494.7m length, a power house of size 27mX 12mx 19m.

**Power Evacuation:** The nearest substation is at Erattupetta and the power generated can be utilized at the nearby township. The power generated can be fed directly in to the existing 33 kV line at Erattupetta.

The land acquisition, preliminary activities and tendering of the work are scheduled on 2022-23 and 2023-24 respectively. The civil and electrical works are scheduled from 2024-25 and the project will be completed by 2026-27.

## 6. Pasukkadavu SHEP

The Pasukkadavu Small HEP is a run-of-the-river scheme with very small storage proposed in Kavilumpara Panchayat of Vadakara taluk, Kozhikode District. The scheme envisages development of power by utilizing the inflow from Meenpattypuzha, a tributary of Kuttiyadi river. A Gravity type weir, with a length of over flow section of 20 m and maximum height 19.50 m will be constructed across the stream to divert the water through an inclined tunnel, 307 m long and 3m diameter to a surge of diameter 8.5m and height 27 m. From the surge, the water is taken through a steel penstock of 1.25 m diameter which will branch in to two feeder pipes to feed two units of 2.0 MW each. The tail race water will be discharged into the same river.

The installed capacity of the scheme is fixed as 4 MW (2x2 MW). The average annual energy generation expected is 10.34 MU. The net head of the scheme is 122.7 m. An extent

of 5.79 hectares of land is required for the project, which includes 0.8 hectares of revenue land along river course and 4.99 hectares of private land. No forest land is involved.

**Powe Evacuation:** The generated Power is transmitted through the nearest substation at Kuttiyadi located about 13 km from the project site and power is evacuated through 110 kV substation at Kuttiyadi.

## 7. Valanthode SHEP

Valanthodu Small HE Scheme is proposed as a run - of - the -river scheme utilizing the inflow of Kurumanpuzha, in Chaliyar basin, with a net head of 85 m. The catchment area of the scheme is 18.90km<sup>2</sup>. The proposed installed capacity is 7.5 MW (3 x 2.50MW) and the annual generation expected from the scheme is about 14.751 Mu. The main component structures proposed for the scheme are a gravity diversion weir of length 101m (up to abutment) and top width 3m, A rectangular intake opening of 3.7m wide x 2.6m depth with Safety rack arrangements, A box culvert of length 62m from intake chamber to power channel, A rectangular channel of 3m length with surplus weir arrangements, A vertical lift gate arrangement near the entrance of the Box culvert for controlling the flow during maintenance/emergency, RCC rectangular power channel of 3.7m wide x 2.6m depth for a length of 449.8m ( excluding cross drainage works), An aqueduct of 20m length and vent way height 1.50m, at stream crossing, An emergency escape near natural stream, An escape weir near fore bay, A Circular rectangular fore bay tank of 25m dia and having live storage capacity 1471.88m<sup>3</sup>, A Single line penstock pipe of dia 1.8m for a length 386.9m, A surface Power house of size 40m x 15 x 12m, installing 3 Nos. of horizontal Francis Turbine, each of 2500 kW, A rectangular tail race pool of size 20 x 8m and a tail race leading channel of size 7.0m x 1.60m for a length of about 50m.

**Power Evacuation:** The Power generated from the scheme can be evacuated from switch yard adjacent to the power house to the 66 kV substation Nilambur by constructing 33 kV feeder bay at Nilambur and 33 kV line from Valanthode.

## 8. Maripuzha SHEP

Maripuzha small hydro Project (2 x 3 MW), in Chaliyar basin and is located in Nellipoyil village of Kodenchery Panchayath in Kozhikode district. The project is planned as run – of – the river scheme and envisages development of power by using the inflow of Iruvanjipuzha of Chaliyar basin. The river flow is proposed to be intercepted by a trench type weir and diverted to a fore bay tank through power channel. A surface pen stock carries the power draft to two horizontal type Francis turbines to generate 6 MW of Electricity. The average energy per annum expected is 15.31 MU under a net head of 118m and the annual generation for 90% dependable year comes to 14.84 MU. This scheme incorporating certain cost-effective design such as colgrout masonry concrete weir, trapezoidal power channel, spirally welded steel pipes for penstock etc. Maripuzha small H.E Scheme is such an environmentally friendly project in Chaliyar basin. The main component of the scheme includes, a diversion trench weir 18m long and 2 m wide, a small diversion weir across the stream and an open channel of length approximately 50m adjacent to intake chamber, a closed type free flow intake channel of length 9m and 2 m wide, an intake chamber of size 4m x 4m x 9m, an intake gate of size

1.7m x 1.7m, power duct of size 1.7m x 1.7m x length 80m, three no's surplus weirs, 355 m long R.C rectangular power channel and 240m of cut & cover channel of size 2.9m x 1.5m with 0.75 free board and 1 in 750 bed slope & 510m length of Trapezoidal open channel, base width of 1.4m, depth of flow 1.5m, side slope of channels, rectangular RC Forebay tank having live storage of 920m<sup>3</sup>, vertical trash racks, penstock gate of dimension 1.02m x 1.40, bell mouth entry, 1.4 dia single surface penstock of spirally welded steel pipe 319.02 m long bifurcates in to two feeder pipes of 1.1m dia and 14m long, a surface power house of size 29.5 x 10 m for housing 2 horizontal Francis Turbines each of 3MW, a rectangular tail race chamber of 15m x 12.5m and a tailrace channel of 3.7 m wide and 1 m water deep and 0.75m free board to lead the water let into the same river after power generation.

**Power Evacuation:** (1). Construction of 33 kV single circuit feeder from Maripuzha SHEP location to CKT 47 through Narungathodu and Anakampoyil for a length of 8.8 km. (2) Construction of 33 kV DC feeder from Thambalamanna substation to location CKT 47 along existing 33 KV Chembukadavu line route with 110 kV DC line parameters using existing RoW for a length of 7 Km (3) Dismantling of 7 Km single circuit line (4) Construction of 33 kV feeder bay in 110kV parameter at 33 kV substation Thambalamanna.

## 9. Chembukadavu III SHEP

Chembukadavu stage III SHE project is a run-of-the-river scheme and is proposed in Kodanchery/Nellipoyil villages of Kozhikode Taluk, Kozhikode District and the scheme envisages utilization of the tail water discharges of existing Chembukadavu I&II SHEP's and water from free catchment area. The installed capacity of the scheme is 6 MW (3 x 2 MW horizontal Francis Turbines) and the net head available is 116m. The scheme envisages power development by utilizing the inflow from 21.79 Sq. Km catchment area of Chalipuzha which is known as Murampathy thodu in its lower reaches, a tributary of Iruvanhi Puzha in Chaliyar basin. A concrete gravity overflow type diversion weir is constructed 230m downstream of the power house site of Stage II. Then the water is diverted through a head race tunnel of diameter 1.6m. The scheme can also be used as a peak load station during low inflow period. The various component of the scheme involves, a diversion weir 66m long and 17.05m high with an overflow spillway of 40m length, an approach channel of length 60m and width varying from 18 m to 6m, a silt cut – off weir to minimize the entry of silt laden water into power tunnel, a straight vertical trash rack with a central pier, a tunnel bell mouth of size 4.2m x 3.8m, a pair of 3m x 2m intake gates, A "D" shaped head race tunnel of size 2.5 m and length 1312.3m, a surge shaft of 6m inside diameter and 21.91m deep, a 1.6m dia medium pressure pipe of length 130.32 m with a shell thickness of 8mm, a 1.6 m dia single line surface penstock of length 221.13m, a surface power house of size 30m x 12m for housing 3 horizontal Francis Turbines of 2 MW each, a rectangular tail race channel of 3 m wide and 1.2 m deep to lead the tail race water into the same river after power generation. The annual energy generation being 14.92 MU.

The revised DPR incorporating the modifications to avoid acquisition of tribal land and alignment of tailrace shifted from residential area is prepared and approval is under consideration of KSEBL.

**Power Evacuation:** The generated Power at 11 kV is stepped up to 33 kV. The transmission line from Chembukadavu and Urumi schemes join the grid at 110 kV substation,



Agasthiamuzhi. KSEBL setting up a new 33/110 kV substation at Thambalamanna for the evacuation of energy developed from small hydro project.

## 10. Chathankottunada SHEP - Stage I

The proposed Chathankottunada Stage I Small HEP is a run-of-the-river scheme located in Kavilumpara Panchayat of Vadakara Taluk, Kozhikode District and is aimed to operate generally during monsoon, utilizing the inflow from two streams, Poothampara & Chappanthottam, which are the tributaries of Kuttiyadi river. A gravity type weir will be constructed across each stream, 83.5m long at Poothampara and 53.5m at Chappanthottam to divert water through separate rectangular canals(2mx2m) of total length 2524m to a forebay tank 20m diameter. From the forebay tank, the water is taken through a steel penstock of length 270 m and diameter 1.5m which will branch in to two feeder pipes to feed two units of 2.5 MW each. The total capacity of the Power House is 5MW operating at a net head of 90 m and average annual generation is 12.05 MU. There is an additional benefit of 2.48 MU in Chathankottunada Small HEP Stage II, due to the implementation of Chathankottunada Stage I, as water from Chappanthottam stream can also be utilized in the stage II Power house. Therefore, the total energy benefit from the scheme will be 14.54 MU. The tail water is discharged into the poothampara stream just upstream of Chathankottunada stage II weir. About 11 hectares of land is required for the project which includes 0.7 hectares of revenue land along river course and 10.3 hectares of private land. No forest land is involved. **Power Evacuation:** The generated Power is transmitted through the transmission system owned by KSEBL to the nearest substation at Kuttiyadi location 9 km from the project site. A 33 kV UG cable of 3.5 km long is proposed from the stage I to Stage II Scheme and from there to Kuttiyadi 110 kV substation.

## 11. Olikkal SHEP

The Olikkal small HE scheme is a run-of-the-river scheme proposed in Chaliyar basin. The scheme proposes to utilise the water resource from 14.14 km<sup>2</sup> catchment area of Poyilingapuzha, a tributary of Iruvanchipuzha in Chaliyar basin. The project site is located near Olikkal in Thiruvambady village, Thiruvambady Panchayath of Kozhikode Taluk & District. The average annual yield worked out from rainfall – run off co- relation is 77.62 Mm<sup>3</sup>. The water from Poyilingapuzha is diversion weir diverted to a power channel of length 480m, by constructing a diversion weir having FRL as +311.5m. The water is then led to a forebay having 2 minutes storage capacity and FSL +310.6m. A surplus channel is proposed from the forebay to discharge the excess water to the river, in the case of break down. A penstock of length 250m lead the water to the power house with 3 machines of 1.5 MW capacity each located in the right bank of the river. The power house will operate under a net head of 92m. The water after power generation is then discharged directly to the Urumi-I reservoir. The scheme consists of a concrete gravity weir of length 36.8m and height 4.15m, a power channel of length 480m and of bottom width 3m, a circular forebay with 18.5m dia with live storage capacity of 795m<sup>3</sup>, a penstock of 250m length and 1.4 m dia, a power house with 3 machines of 1.5MW (horizontal Francis turbine) with average annual energy of 10.18MU.

**Power Evacuation:** The Power generated from the scheme can be fed to the nearest 33 kV station at Thambalamanna which is 25 km from the project site. The length of 33 kV single circuit line required to be constructed is 9.6 km. A 33 KV feeder bay is to be constructed at the Thambalamanna substation.

## 12. Poovaramthodu SHEP

The Poovaramthodu small hydroelectric scheme is a run-of-the-river scheme proposed in Chaliyar basin. The scheme proposes to utilize the water resource from 13.48km<sup>2</sup> catchment area of Poyilingapuzha, a tributary of Iruvanchipuzha in Chaliyar basin. The project site is located near Poovaramthodu in Koodaranji village, Koodaranji Panchayath of Kozhikode Taluk & District. The average annual yield from rainfall – run off co-relation is assessed as 74 Mm<sup>3</sup>. The water from Poyilingapuzha is diverted to a power channel of length 405m, of which the first stretch is of rectangular section having a length 150m and the remaining length of 255m is having trapezoidal shape, by constructing a diversion weir having FRL as 370.5m. The water is then led to a forebay having 2 minutes storage capacity and FSL 369.7m. A surplus channel is proposed from the forebay to discharge the excess water to the river, in the case of break down. A penstock length 212m lead with the water to the power house with 3 machines of 900 KW capacity each, located in the left bank of the river. The Power House will operate under a net head of 53.5m. The water after power generation is then discharged directly to the Olikkal reservoir. The tail water level is 314m with the yield and net head, the scheme will contribute 5.88 MU of average annual energy to the grid.

**Power Evacuation:** The Power Generated from the scheme can be fed to the nearest 33 kV substation at Thambalamanna.

## 13. Mankulam HE Project

The Mankulam Hydro Electric Project 40 MW/82 MU (MHEP) is proposed in Mankulam village of Devikulam Taluk in Idukki District by utilizing the yield from 25.6 sq.km catchment of Melachery River (a tributary of Karinthiri River, which in turn is a tributary of Puyankutty River).

It is anticipated that the diversion of Kadalar and Rajamala river into Mankulam reservoir can be taken up at the later stage. The yield from this diversion is sufficient for one additional machine of 40 MW, as an extension scheme, thus increasing the total capacity to 80 MW. Hence the design of various components, equipment selection, power evacuation etc, have been made for this project by considering the total capacity of 80 MW.

The dams (Main dam and Saddle dam) proposed at Mankulam will create a reservoir of gross storage of 7.7 million Cubic Meter (MCM) with a water spread area of 64.83 Ha. The impounded water will be diverted through a water conductor system to a power house proposed at Kurathikkudy on the banks of Kurathi River, which in turn joins the Karinthiri River. This is a scaled down version of the Mankulam HEP (80 MW) which was part of the different cluster of projects included in the erstwhile Puyankutty HEP (750 MW). The land acquisition for the implementation of Mankulam Hydro Electric Project is in the final stage. Till now 90 % of the required land acquired from around 300+ land holders. The table G7, describes the present scenario of Mankulam land acquisition progress.

<b>Table G7: Mankulam HEP land acquisition progress.</b>		
Type of land	Land Required	Land Acquired
Forest Land	11.913	11.913
River Course	15.16	15.16
Private Land	52.94	45
Total land required	80.013	72.073
Percentage		90.08%

Power Evacuation: The present Lower Periyar – Trissur 220 kV feeder goes very close to the proposed Thottiyar power house. This line can be brought into the Thottiyar yard by stringing one or two spans. By this arrangement Thottiyar can be connected to both Lower Periyar and Madakkathara stations. From Mankulam a single circuit 220 KV line is proposed to be constructed to Thottiyar stations. The approximate length of line will be 17 km.

#### **14. Idukki (golden Jubilee) Extension Scheme**

The Idukki Extension Scheme H.E. Project (4 x 200 MW) is proposed as a hydroelectric peaking station by sharing the daily water drawl from the existing Idukki reservoir. The off-peak generation of the existing Moolamattom power station is planned to be reduced and the water thus saved will be utilized at the Idukki Extension scheme during peak hours. To implement the Extension scheme of IDUKKI HEP, Kerala State Electricity Board Limited has appointed WAPCOS for preparation of Feasibility Study Report (FSR)/ Detailed Project Report (DPR) obtaining all statutory clearances for Execution, Including preparation of Bid & Allied Documents for selection of EPC Contractor for the construction of IDUKKI Extension Hydro-Electric Project. As per the report submitted by M/s. WAPCOS, the power potential studies have been carried out for power potential with Idukki reservoir and can be optimized up to 1580 MW based on the 25 years of hydrological data. The carryover reservoirs simulation studies carried out for FRL at El. 732.43 m, MDDL at El. 694.94 m and maximum TWL of El 49.3 m. The studies indicate that the project would afford a firm power of 271.6 MW cont. on 90% dependable basis with an installed capacity of 1580 MW. Further, as existing Idukki Hydroelectric project is operating at 780 MW with 6 nos. of unit of 130 MW each. Therefore, Idukki Extension Scheme is proposed to have an Installed Capacity of 800 MW (Underground) wherein 4 nos. units is recommended with unit size of 200 MW each with Tecno-economic consideration. The proposed Idukki Extension Scheme comes under the Periyar River Basin. This region slopes towards the West, except the North-East where its slopes towards the East. The technical features of the Idukki Extension Scheme H.E. Project (4 x 200 MW) are as mentioned in table G8.

<b>Table G8: Mankulam HEP land acquisition progress</b>	
Installed Capacity (MW)	800
No of units	4
Unit Size (MW)	200
Head (min -m)	629.58
Net Rated Head (m)	654.57

Head (max -m)	677.07
Daily (min) Peaking hours in lean flow (for simultaneous operation of both existing and proposed scheme)	4 Hours 8 minutes (4.13 Hours)
Annual Energy Generation (GWh) from proposed scheme	1301.27
Annual Energy Generation (GWh) from both schemes	2569.7

The total land to be acquired for the project is approximately 127 Ha. Based on the site visit, most of the land required lies in forest area. The clearance and acquisition of land will be as per the land guidelines. The estimated project cost is ₹ 3698.02 Crores at January, 2021 price levels. The annual energy generation of 1301.27 GWh per year and is proposed to be completed in a period 5 years. The Levelized Tariff proposed by M/s. WAPCOS is (₹/kWh) 4.67. As per the study report of WAPCOS, board decided to prepare the Detailed project report and steps to get environmental clearance. The commencement of the project is expected by 2023-24.

The present status of new hydel projects, are in various stages. In particular, KSEBL is moving ahead with the land acquisition process with a major intervention to complete the projects on time.

Table G9: Current Status of New Hydel Proposals

Sl.No	Name of Scheme	Current Status
1	Upper Sengulam HEP	Land acquisition in progress. Forest clearance received.
2	Peechad SHEP	Land acquisition in progress. Work for demarcation of land is in progress.
3	Western Kallar SHEP	Land acquisition in progress
4	Ladrum SHEP	Government and Board have accorded revised AS. Survey by Revenue Department is completed and valuation is in progress.
5	Maramala SHEP	Government order for acquisition of 5.9099 Ha. Patta land was obtained on 08.01.2018. Land not acquired.
6	Pasukkadavu SHEP	Pre-construction survey works to be started.
7	Valanthode SHEP	All the pre-construction survey works and property survey for the project are completed
8	Marippuzha SHEP	1. Private land Acquisition (6.0896Ha) Survey work completed, Forest boundary marking completed and NOC for 21 plots received. 7 documents already registered in name of KSEBL and of 14 set approved by standing counsel for registration of land.
		2. Panchayath Land (0.2296 Ha)
		Panchayath Resolution obtained for transfer of 0.2296Ha of Panchayath land.
		c. Forest land (1.9801 Ha) & Tribal Land (0.2166 Ha) - In progress.
9	Chembukadavu III SHEP	The revised DPR incorporating the modifications to avoid acquisition of tribal land and alignment of tailrace shifted from residential area is under the consideration of Board.
10	Chathankottunada SHEP - Stage I	Pre-construction survey works to be started.
11	Olikkal SHEP	Private land Acquired through and registration completed.

12	Poovaramthodu SHEP	The total private lands required for the project have been purchased. The valuation of the trees and tree cutting sanction from the Social Forestry department had been received. Cutting and removing the trees from the project sites is progressing.
13	Mankulam HE Project	90% land acquisition completed
14	Idukki (golden Jubilee) Extension Scheme	DPR preparation in progress

## New Solar Projects

KSEBL has taken up development of several Solar PV plants in line with the existing policy of tapping the renewable energy potential to the maximum, in vacant land areas available with KSEBL and other Government agencies. As a part of Capital Investment for the period 2022-27 KSEBL is proposing to take up, the implementation of 4 new solar projects. A brief description of the projects are as below:

### 1. Ground mounted solar project at Ettumanoor

The project area is of 4.83 Acres of vacant land owned by KSEBL on the main road side of Ettumanoor - Pala Road in Kottayam District. This land was acquired in 1982 and is in possession of KSEBL for the earlier proposals for 220kVSubstation/pole casting unit and remaining idle. Board sanctioned to invite tenders for the selection of EPC contractor for the Installation and Commissioning of 1.0 MW Grid Tied Ground mounted Solar PV Power Project in Ettumanoor, Kottayam District on turn-key basis utilizing Boards own fund. The EPC contract involves the supply of the materials for the project such as PV modules of 230kWp capacity, inverters, Transformers, module mounting structures etc. As the project site is of marshy type and the work can be started only during summer season.

### 2. Ground mounted solar project at Nenmara

KSEBL had approved and accorded sanction to implement the 1.5MWp Solar Project in the land of KSEBL at Nenmara in Palakkad District through EPC contract by using KSEBL's own fund. The site for this SPV project is at Nenmara in Palakkad district having an area of 8.85 acres the entire premise is available for the SPV project. The solar insolation at this site is very good and grid connectivity can be done through the Nenmara 66KV substation situated very near to this site are the basic factors considered for the SPV project. The expected annual energy generation from the plant is more than 18 lakhs units per annum.

### 3. PM KUSUM -Component C (5 MW ground & 0.99 MW Roof)

Feeders having major load for agriculture can be considered for Solarization under the PM KUSUM component Scheme. The requirement of total annual power for an agriculture

feeder will be assessed and a solar power plant of capacity that can cater to the requirement of annual power for that agriculture feeder can be installed either through CAPEX mode.

As per the above, solar plants can be installed in the land nearby to the feeders having major load as agriculture pumps and plant capacity can be determined in order to meet the annual consumption on that feeder due to agriculture pumps. Central Finance Assistance of 30% of the benchmark cost or the tender cost, whichever is lower will be provided by Government of India. For the purpose of calculating CFA, the cost of installation of solar power plant has been estimated as Rs. 3.5 Cr/MW. CFA at 30% (Rs 1.05Cr/MW) is available under feeder level solarization. As part of the same, the own land of KSEBL can also be utilized and the solar plants can be constructed by availing 30% CFA which will become an asset to KSEBL if KSEBL invest in the scheme. The possibility of implementing this scheme utilizing the rooftops of KSEBL was taken up with MNRE.

The details of land and roof top of KSEBL identified for the project is as mentioned below,

Roof top area of KSEBL buildings available for installing solar roof top projects is 1.1 MW. As per the DPR prepared the approximate Probable Amount of Contract comes to Rs.5.5 Crore. These projects can be considered under PM KUSUM Component C only after getting the approval of MNRE, Government of India. If not permitted by MNRE the KSEBL will have to bear the financial burden of this Project.

Identified land of KSEBL for installing Ground Mounted Solar Projects at Mananthavady, Neyyattinkara, Balaramapuram, Methala, Anjangady, Valappad, Vadanapally, Mullassery, Kandassankadavu, Pudukkad, Kattoor, Payangadi, Kinaloor, Pookottupadam, Banks of Banasura Sagar dam reservoir. Total capacity proposed is 5.1 MW. Of these Mananthavady is having a capacity of 3 MW. As per DPR, total estimate amount is Rs.24.5 Cr.

#### 4. Soura Kerala Model

The Soura Kerala scheme consist of three models such as model IA, model IB, Model IC. Model IA – 2/3 kWp RTS plants- Eligible to consumers with monthly consumption up to 120 units. Customer Cost share will be 12 % of bid discovered price per kWp or Rs.6200/- per kWp (approx. 12 % of MNRE benchmark price) whichever is lower.

##### Share of stakeholders

Table G10: Soura Kerala Model IA				
Plant Capacity	MNRE CFA (%)	Consumer contribution	KSEBL investment	Energy Share - KSEBL
<b>2 kWp</b>	40%	12%	48%	75%
<b>3 kWp</b>	40%	12%	48%	

Consumer will be eligible to get 25% of energy generated from the plant as the consumer's contribution towards the project is 12% of the project cost.

- I. Model IB – 2/3 kWp RTS plants- Eligible to consumers with monthly consumption upto 150 units. Customer Cost share will be 20 % of bid discovered price per kWp or Rs.11000/- per kWp (approx. 20 % of MNRE benchmark price) whichever is lower.

Share of stakeholders

<b>Table G11: Soura Kerala Model IB</b>				
Plant Capacity	MNRE CFA (%)	Consumer contribution	KSEBL investment	Energy Share - KSEBL
<b>2 kWp</b>	40%	20%	40%	60%
<b>3 kWp</b>	40%	20%	40%	

Consumer will be eligible to get 40% of energy generated from the plant as the consumer's contribution towards the project is 20% of the project cost.

- II. Model I C – 2/3 kWp RTS plants- Eligible to consumers with monthly consumption upto 200 units. Customer Cost share will be 25 % of bid discovered price per kWp or Rs.14000/- per kWp (approx. 25 % of MNRE benchmark price) whichever is lower.

Share of stakeholders

<b>Table G12: Soura Kerala Model IB</b>				
Plant Capacity	MNRE CFA (%)	Consumer contribution	KSEBL investment	Energy Share - KSEBL
<b>2 kWp</b>	40%	25%	35%	50%
<b>3 kWp</b>	40%	25%	35%	

Consumer will be eligible to get 50% of energy generated from the plant as the consumer's contribution towards the project is 25% of the project cost. The Soura Kerala model will be considered only if the total plant cost is below 56,000/- per kWp.

**New renovation/ replacement work (Major work – 5 Cr and Above)**

The Reliability and availability of Generating units are of primary importance in the economic and safe operation of the power house. As the generators are getting older, the major equipment's need to be replaced and renovated for further usage in safely manner. Most of the hydroelectric projects of KSEBL were commissioned long ago and the generating units of these stations have surpassed their normative useful life. For extending the useful life

of these stations and for continued power generation, KSEBL has drawn a systematic plan to renovate and modernize the existing hydroelectric plants that have reached their normal life period.

Depending upon the nature of work, total work are classified as major work having investment 5Cr and above and work less than 5 Cr.

## **1. Rectification/Replacement of Penstock, butterfly valves and allied works at Sengulam HEP**

Sengulam Hydro Electric Project, 48 MW was commissioned in 1954 and it was renovated and re-commissioned with an enhanced capacity of 51.2 MW. The water conductor system of the project consists of one Low Pressure Penstock (LPP) of diameter 8.5 ft from tunnel exit to surge and two High Pressure Penstocks (HPP) of diameter 58 inches from valve house to the power house. The overall depth of surge shaft is 246 ft with diameter varying from 8'6" at sill to 30' at top. There are two butterfly valves installed in valve house and four gate valves attached to the feeder pipes of 42" diameter in front of the Main Inlet Valves of turbines installed in the Power House.

To assess the condition of existing penstocks, Central Power Research Institute (CPRI) was entrusted to carry out study on Remaining Life Assessment of Penstocks. The CPRI had reported that the civil structures such as anchor blocks, saddle supports are in good condition and recommended to replace some pipes immediately and other pipes in phased manner with close monitoring and condition assessment. Considering the overall safety and subsequent generation loss due to multiple shutdowns which may be very huge, it was decided to replace the penstock in full as a one-time replacement. KSEBL also decided to replace butterfly valves and gate valves as these valves were installed almost 65 years back.

## **2. Sabarigiri HEP Stator winding replacement for Generators**

Sabarigiri Hydro Electric power station, the second largest power station under Kerala State Electricity Board Limited plays a vital role in Kerala's Power grid with an annual generation of about 1300 to 1500 MU. The station is equipped with 6 numbers of Generator units. Unit #1, #2, #3 and #5 are of 55 MW each. Unit #4 and #6 are of 60 MW each. Original installed capacity of SGHEP was 6 X 50MW. These units were commissioned between 4/1966 and 11/1967 by M/s Alice Chalmers, United States. Subsequent to a blast in 1976, Unit #6 was totally damaged. The same was rebuilt by M/s Alice Chalmers, USA and put back to service in 1979. As the generators are getting older, windings become weaker and prone to fail. Failed windings will cause longer delays in bringing machine into services. Hence rewinding of older windings is very essential. Current status of each generator units is described below.

Unit#1: - Generator Unit#1 is commissioned on 18-04-1966 by M/s Allis Chalmers, USA. Stator winding replacement was done on 1997 by M/s BHEL. The machine was renovated by M/s VA Tech Hydro and recommissioned on 08-11-2009. The stator winding healthiness is deteriorated owing to aging. Buckling of stator core has been noticed in this unit.



Unit#2: - Generator Unit#2 is commissioned on 14-06-1966 by M/s Allis Chalmers, USA. Stator winding replacement was done on 1997 by M/s BHEL. The machine was renovated by M/s VA Tech Hydro and recommissioned on 07-02-2009. During 2011 and 2012, this unit underwent stator winding failure, subsequently repaired and put back in service. Again on 2021 the stator winding failure occurred and subsequently the machine put back in service after repair. Buckling of stator core has been noticed in this unit. The condition of stator winding is not generally good.

Unit#3: - Generator Unit#3 is commissioned on 29-12-1966 by M/s Allis Chalmers, USA. Stator winding replacement was done on 1997 by M/s BHEL. The machine was renovated by M/s VA Tech Hydro and recommissioned on 16-03-2008. The stator winding healthiness is deteriorated owing to aging. Buckling of stator core has been noticed in this unit.

Unit#4: - During 2008 a major accident was occurred in the Unit 4 Machine of and was rebuilt by 2013 by M/s Puissance De' Leau, Bangalore. Commissioned during the year 2014 with an uprated capacity. After the rebuilding of the Machine, a lot of problems were faced continuously and the vibration level increased drastically. The machine had a vibration level of about 250 at full load. The vibration level had recorded more than 270 microns when the machine is in service and sometimes hitting the shaft with the bearing pads could be observed. The Y phase 28 number of stator coils was replaced due to the stator winding failure on 9.7.2018. The winding failure was observed on the earlier occasion also during the 72 hrs. test period. Keeping in view the safety of the unit, the machine was shut down on 22.06.2020.

Unit#5: - Generator Unit#5 is commissioned on 17-10-1967 by M/s Allis Chalmers, USA. Stator winding replacement was done on 1997 by M/s BHEL. The machine was renovated by M/s VA Tech Hydro and recommissioned on 04-05-2006. The stator winding healthiness is deteriorated owing to aging. Buckling of stator core has been noticed predominantly in this unit. Loosening of wedges of stator winding was noticed in 2021 and was attended successfully.

Unit#6: - Generator Unit #6 is commissioned on 25-11-1967 by M/s Allis Chalmers, USA. The machine was renovated by M/s VA Tech Hydro after replacing stator core & winding and recommissioned on 01-07-2005. The machine was healthy running since initial commissioning. The machine undergone a stator winding failure on year 2020. 31 stator coils were fully damaged and are replaced. More over Partial discharge test conducted by M/s CPRI revealed that, partial discharges in all three phases of the stator are more than permissible level of 10000 pc, as per international practice. Also, M/s CPRI reported that insulation condition of the stator winding is not generally healthy.

In line with the above, Board decided to rewinding works of all generator units in a phased manner during coming financial years, considering the severity of weakness of machine.

### **3. Sabarigiri HEP Shaft replacement**

Except for Unit#6 & Unit#4 all main shafts are supplied by original manufactures M/s. Allies Chalmers, USA in 1960's. The shafts were designed and rated for 50MW power. Subsequent to renovation during 2002-2007, the machine capacity was enhanced to 55X 60 MW without enhancing the capacity of the shaft. If we examine the history of units, following observation can be noticed. Unit#6 was completely destroyed completely in 1976 and subsequently rebuilt in 1979. Unit#4 was destroyed in 2008. An enquiry conducted by central

Electricity Authority in 2008 conform that the material of the present shaft is not capable of impulse or shock loading. Crack were found in the shaft of Unit#2 and the work for replacing the shaft of Unit#2 has already been awarded to M/s. Voith Hydro Pvt. Ltd. While turbine and generator transformer capacities are enhanced to 60MW rating, the only components due for uprating if the shaft of the machine. From the above, the shaft has already completed service life of 55 years need to be replaced.

#### **4. Sabarigiri U#4 revamping**

The 50MW generator unit#4 of Sabarigiri HEP was originally supplied by M/s. Allis Chalmers and was renovated and uprated to 55 MW. The unit was totally destroyed in 2008 with fatalities. Subsequent to the accident, Unit #4 was uprated to 60 MW by M/s PDL. The vibration of U#4 increased alarmingly above the statutory limit. As M/s. PDL, the OEM, has not responded to rectify the same board directed to entrust M/s. NHPC to assessing the strength of concrete and conduct NDT (Nondestructive test) on stator frame foundation of U#4. M/s. NHPC recommended to replace existing insulating disc with new insulating disc. During the process of replacement of the insulating disc, various components of the generating unit (Including coupling bolt) should also be checked to eliminate any possibility of looseness or any component touching the shaft. Height of thrust pad also to be checked to ensure their equal loading. Simultaneously, all six existing pairs of tilting discs may be replaced with new pairs to minimize variations, The work shall also involve dismantling, reassembly, levelling, alignment, centering, pads-gap setting, balancing, re- alignment of nozzles. This work is very essential for stable machine restoration.

#### **5. Sabarigiri Renovation of Control system and runners**

Installation of supervisory control and data acquisition (SCADA) was completed during 2003-2007 period. PLC portion of the SCADA was updated during 2017. Protection and governor portions are not updated till now. Installed equipment's are becoming obsolete and technical supports is going down. Moreover, during the time of governor, protection system replacement SCADA system also to be compatible for smooth integration. Hence the need for updating these equipment's installed is essential. During the time of Sabarigiri renovation the runners are also need to be replaced as a part of life extension of project.

#### **6. Moozhiyar Additional Power House - preliminary study and preliminary work**

In order to meet the increased peak demand in the state, especially in the case of high solar penetration during off peak hours, importance of peaking stations are increasing. Under high solar penetration condition, the off-peak demand can be addressed with solar energy by keeping hydro power stations at plant minimum. The saved water in the off-peak period can be utilized more effectively during peak hour with extension projects. In the case of Sabarigiri Power house, the station is very old and need to be renovated. This additional power house will act as a backup power station during the time of Sabarigiri Power house renovation, thus this will give additional advantage. By considering all these factors, Board decided to conduct the preliminary study for identifying the feasibility of additional power house at Moozhiyar.

The extension schemes always have following advantages,

1. KSEB Ltd can increase the share of Peak Hour demand by in house hydro generation, thus reducing the expenditure for peak hour power purchase.
2. Since no additional reservoir is formed, the environmental issues are less and hence the statutory clearances will be a comparatively easier task.
3. The extension power house operation is in line with the Load Curve of the State Grid. Cost of head works is eliminated since existing dam and reservoir are used.
4. Less time for completion.
5. The proposed scheme does not affect the functioning of downstream dams.
6. More availability of machines for crisis management.
7. Gives flexibility for shut down for planned and forced shut downs
8. To meet the power demand during morning peak & evening peak.
9. To meet the requirement of flywheel effect during power system disturbances
10. To provide reactive power when the solar power generation increases considerably.
11. Easy variation of the power from 10 % to 100 % by using Pelton Wheel.
12. As a redundant station when main Station goes for total renovation

## **7. 110kV feeder bay & Transformer replacement at Sabarigiri Power House**

At present Sabarigiri, Kochupamba, Vandiperiyar, Peerumedu, Mundakkayam transmission line is evacuating power at 66kV. As a part of transmission system Upgradation plan, a new 110kV substation is proposed at Peerumedu and as a part of this Vandiperiyar, Peerumedu line is will be Upgraded to 110kV. Sabarigiri – Pallam – kanjirapalli- Mundakkayam line is already at 110kV hence for the total integration of the system, the 66kV substation at Sabarigiri Power Station need to be upgraded.

## **8. Design, Engineering, supply, Erection and Commissioning of 2 Nos of new Pressure Release Valve (PRVs) at Panniar HEP**

The installed capacity of Panniar HEP is 32 MW comprising two units, each of 16 MW capacity. The prime mover is Francis turbine. The first unit was commissioned on 29 December 1963 and the second unit on 26 January 1964. The units were renovated in 2002 and 2003. The turbine is of Hitachi, Japan makes with rated output of 17.16 MW. Net rated head is 231 m. the maximum head is 237 m. The maximum discharge is 7.9M<sup>3</sup> /sec. The power station suffered excessive damage due to bursting of penstock pipe # 2 on 17-09-2007, and rehabilitation works followed. But the PRVs were not replaced during rehabilitation works. PRV is safety equipment provided on the penstock end or at the starting of the spiral casing, for preventing pressure rise and to diffuse the water turbulence in the water conducting system.

The present condition of the two Pressure Relief Valves (PRV) attached to the water conducting system of Panniar Power House, is very critical. The PRV at Panniar power house is horizontal mount, 1962 model made by Hitachi Ltd, Japan. The PRV installed by the OEM M/s Hitachi, operates by physically sensing the wicket gate closing speed. The technical and safety audit report in 2014 & 2017 had suggested the replacement of the PRVS as they are indicating operational errors due to ageing. The power station suffered excessive damage due

to bursting of penstock pipe # 2 on 17-09-2007, and rehabilitation works followed. But the PRVs were not replaced during rehabilitation works. PRV is safety equipment provided on the penstock end or at the starting of the spiral casing, for preventing pressure rise and to diffuse the water turbulence in the water conducting system.

## **9. Renovation of Governor system at KAKKAD Power Station**

The Kakkad Hydro Electric Project has been evolved as a second stage development of the potential of Pampa River basin and is basically a tail race development of the Sabarigiri project. The project was officially dedicated to the nation on 14.10.1999. The station comprises two nos. of 35100 MHP (25.83MW) vertical shaft Francis turbines, two nos. of 29,412 KVA, 11 kV, 0.85 P.F Generators and two nos. of 33 MVA, 11/110 kV generator transformers. The 110 kV switch yard is situated on the tailrace side of the power house. There are two 110 kV feeders to Pathathamthitta 110 kV substation. Automatic mode operation of the governor is not working at present. Turbine control is achieved through manual operation. The present Governing system is old and obsolete. Spares and service for the electronic cards of governor is no longer available since the control cards are obsolete. Hence it is necessary to replace the control system of governor with modern type control system which has facilities like PLC control, (Human Machine Interface) HMI control, automatic start up sequence etc.

The existing MIV control system is of pure relay logic basis. The hydrated solenoid control valves of MIV operations are not functioning properly. An automatic operation is not working. Hence now the controlling of MIV operation done manually. Hence it is necessary to replace the control system and control valve of MIV along with replacement of governor system.

By integrating unit Auto-Sequencer, Auto Synchronizer, digital governor, the electrical protection system and excitation system vide SCADA system of the entire plant can be monitored and operated on a single screen or central location. Further, it opens up the possibility to have remote monitoring, and control, reduces efforts and increases the efficiency of manpower.

## **10. KDPP LNG Conversion -Preliminary study and preliminary works**

KDPP is a Thermal Power Plant having an installed capacity of 128 MW located at Nallalam of Kozhikode district which extends to an area of 26.8 acres of land in Beypore village of Kozhikode. The project started its commercial operation on 01-09-1999.4629 MU of power have already been generated from KDPP so far. A Fuel Supply Agreement was executed with M/s BPCL on 30-01-1999 which expired in,2016. Also, DG sets # 1 & 4 were decommissioned due to the failure of Crank pin and Alternator respectively in the year 2014. The last commercial operation in the plant was done during the months of December 2020 to February 2021, at present a bare minimum stock of fuel is only available at KDPP as the production of LSHS is completely stopped by the oil refineries in Kerala. The 6 Nos. of DG sets presently available at KDPP are in good working condition. M/s Wartsila, the OEM of the DG sets at KDPP was enquired about the feasibility of converting the existing DG sets into LNG based units. The firm has expressed their willingness to convert the existing DG sets into Single Gas

Fuel Engines without enhancing Alternator capacity and has submitted their proposal. With the commissioning of the GAIL project in India, the feasibility of converting the existing alternators at KDPP into LNG based power station, through external agencies also has to be explored. Hence KSEBL decided to conduct preliminary study of LNG conversion at KDPP.

### **11. 110/220 kV GIS Switching station at KHEP**

Kuttiady Hydro Electric Project (KHEP) is the main generating station in the Malabar area, with installed capacity of 225 MW. For evacuation of power, there are 4Nos of 110kV feeders viz KKKD (Kakkayam- Koduvally), KKKI (Kakkayam- Kinaloor), KKKU (Kakkayam-Kuttiady) & KKCK (Kakkayam Chakkittappara) at KHEP. In addition, 2Nos of 110kV feeders to Vadakara substation is under construction. 2Nos of 110/11kV 12.5 MVA transformers are also in service in the switchyard. All the six generators and the feeders as well as the 12.5MVA transformers are connected to a single 110 kV Bus bar. Due to the non-availability of adequate feeders for power evacuation the total generation capacity of KHEP machines cannot be utilized. Also due to the ageing of conductors the maximum loading in the existing wolf conductors is limited to 325 A. Thus, even in an ideal loading pattern of 110 kV feeders the maximum loading of KHEP is limited to almost 210 MW.

If a new 110kv AIS is constructed with double bus bar scheme for a reliable and steady power evacuation, the existing 110kv Switchyard shall be dismantle. This will completely or partially curtail power generation from the KHEP. KHEP is the only one major Hydro station in the Malabar area for catering power, other than KDPP & 400kv Areacode -Mysore ISTL' Hence' curtailment of generation from KHEP for construction of a new 110kV Switchyards in the existing area is technically and economically not viable' Moreover, there is no suitable land for construction of 110kV AIS and 220ky AIS in the project area for construction of switchyard without making interruption / curtailment of the power generation from KHEP But, land is available for the construction of the 1.0l0220kY Gas Insulated Switchgear (GIS) switchyard in the west side of the existing KAES 110kV yard. The area requirement for GIS & AIS is in the ratio of 1:30. Hence, a GIS switchyard can be easily accommodated in the above area.

### **12. Refurbishment of Main Inlet Valve of first stage machines at Idukki HEP**

The downstream service seal O- ring replacement and minor repairs to the seal seat area of Unit # 2 and Unit#3 of IHEP stage I, Spherical valves were done during the Annual maintenance. After that the seal system of Unit #2 spherical valve was functioning smoothly. Recently it is noticed that pieces of the 12mm O- rings inserted in the grooves of the moving seal started coming along with leakage water through the drain port. This happens due to the roughness in the seal seat area due to removal of metal putty used for finishing the damages in the brass overlay in the seal seat area.

In the event of a major leak in the Spherical Valves, the only option is to go for the Closure of the Butterfly Valves in the BVC. Even if speedy closure of BV is achieved, the quantity of water in the 3250 feet long and 12.5' dia Pressure Shaft is so enormous that it can create a catastrophe. As the protection of the entire system depends on the healthiness of the Spherical Valves, any defect occurring to the same has to be dealt with utmost importance.

Substantial leakage through the body of Spherical Valves is noticed in the case of Unit #1, #2 and #3. U#1 MIV replaced with new valve during Stage I renovation, no major work carried out in MIV of U#2, #3 during Stage I renovation. At present, the leakage is most severe in the case of Unit #2. All the Spherical Valves in the first stage are more than 35 Years old except U#1. If the water leak increases suddenly and dangerously, the safety of the entire system can be in jeopardy. Hence KSEBL decided to carry out the refurbishment of U#2, U#3 MIV,

From the General assembly drawing of the Spherical, the possibility of Leakage through the joint of the Valve Body can occur due to failure of Rubber Seal and due to damage to the WALCKER SEAL on both sides of the Plug. Access to these parts is possible only after taking out the Spherical Valve, and opening the Valve Body into two halves. Such works cannot be carried out without prolonged shut down of the Unit for a period of 60 Days.

### **13. Revamping of KSEBL colony Moolamattom**

Idukki Under Ground Power House is the largest power station owned by KSEB Ltd. with an installed capacity of 780 MW (6x130) which was commissioned with its first phase in 1976 and the second phase in 1986. About three hundred officers and staff are working in this power station which include the officers and staff engaging in the O & M activities of the Idukki Hydro Electric Project (IHEP). The total No. of quarters available in this colony are 383 Nos. Majority of the buildings are now in a dilapidated condition. The age of these buildings, beyond their natural lifespan of around 40 to 50years and the use of mud for the construction of the walls are the main causes of the deterioration of the buildings. The impracticability of continual maintenance over such long periods could have also contributed to the degradation of the structures.

### **14. RLA Study of II nd stage machines at Idukki Power Station**

Idukki underground hydroelectric power station is the largest power station in Kerala state owned by KSEBL. IHEP has been playing a vital role on the stability of southern grid ever since it was commissioned. This power house has six 130 MW generating units contributing to a total capacity of 780 MW. The first stage units (Unit#1, Unit#2 &Unit#3) were commissioned in 1976 and second stage units (Unit#4, Unit#5 &Unit#6) were commissioned in 1986. All the six units are functioning properly and maintaining the reliability by means of proper scheduled maintenance.

As per CEA regulation Chapter 7.2, the normative operative life of hydroelectric power plant is 30 to 35years after which it normally requires Life Extension through renovation based on RLA study. At IHEP, Stage-I R&M process is almost completed based on the report of RLA study conducted during 2011. In that report 10 years of more life to major equipment's like generator, turbine, Generator Transformers etc. was predicted and suggested RLA study again after 10 years. Thus, the RLA study of first stage machines has to be carried out again. The stage-II units have completed 34 years of service. The RLA study has to be carried out urgently to get a realistic picture about the residual life of the entire power station equipment, systems and sub systems for stage -II.

KSEBL is planning to conduct RLA studies on stage- II units through competent agencies for the preparation of Detailed Project Report (DPR) for Renovation and Modernization based on the findings in the RLA study. Scope of R&M works and life extension program in respect of generating units, having completed more than 30 years of service life, shall be decided based on RLA studies. Uprating, if feasible shall also be taken up along with life extension program. KSEBL has a plan to extend the RLA to the mechanical components of stage-I also as their life ascertained for 10 years during the previous RLA conducted in 2011 elapse during 2021.

The plan for RLA is based on Components specified in CEA guidelines Chapter-7 .4, such as

Category I-: Hydro turbines, generators, valves, governors, excitation system equipment and station auxiliaries

Category II: Main power transformers and switchyard equipment

The components, station auxiliary mentioned in category -I and switchyard equipment in category- II are excluded because they were renovated during R&M of Stage -I units and PSDF scheme works. However, KSEBL would like to conduct RLA study of 220 KV oil filled cable and its Out Door Pot head of both the stages along with the components mentioned in category -I & II under this scope. Some General Items such as study of the healthiness of existing earthing system, DC system and civil structure stability of some critical area are also included in the scope.

## 15. Purchase of spare runner for Stage I Idukki HEP

Idukki Hydro Electric Project (IHEP), owned by KSEBL, is the largest power station in Kerala and is contributing largest share of the internal generation in the state. It has 6 no's of 130MW generators working efficiently to meet the grid requirements. The first Stage Machines at IHEP were installed during 1975. All the machines have crossed two and a half lakh hours of operations. The RLA study of these machines was conducted during 2011 by M/s CPRI. As per the report the governing system, excitation system, control and protection system, cooling system etc were recommended for renovation and modernization and the work has been almost completed. After the renovation work the Remaining life of the unit will be extended. As per the RLA study the Turbines and jets could be continued for another 10 years. Hence turbines and jets were not included in the ongoing R & M works. The runners of these machines are Pelton wheel whose features are as detailed below.

<b>Table G 13: Features of Existing Runner of First stage Machines at IHEP</b>	
<b>Capacity</b>	180000 hp
<b>Average Head</b>	2185 Ft (2165 Ft net head )
<b>Number of Buckets</b>	20
<b>Material</b>	INOX 13%Cr, 4% Ni 13/4-80 Gr
<b>Weight</b>	13.5 Tonne
<b>Pitch Diameter</b>	110.236 inches
<b>Overall Diameter</b>	142.125 inches
<b>Number of Jets</b>	6
<b>Max. Discharge of Power Tunnel</b>	5400 Cusecs (152.91 Cumecs)

<b>Max. Discharge of each Penstock</b>	25.485 (152.91/6)
<b>Sy. Speed</b>	375 rpm
<b>Run Away Speed</b>	625 rpm
<b>Jet Dia</b>	8.464 inches

The runners are cast type runners and are periodically checked by Dye Penetrate Test (DPT) for every 1000 Hours of operations for identification of any cracks. The small pitting and crack repair works are being carried out in house. During annual maintenance runner repair has to be carried out regularly for first stage machines. Only one usable spare runner was available at IHEP for replacement for any major damage to the runner.

Among the first stage Runners the Runner fitted to U#1 experienced a major crack on the bucket NO: 17 on 02.07.2019. The in-situ repair was not possible due to the nature of the crack. Hence decided to replace the runner with the lone spare available. The replacement work was completed and machine put into service on 05.08.2019. Now there is no reliable spare runner available for the First Stage Machines. The runner which was detached from Unit # 1 had been in service for more than forty years and more than 2,88,000 hours of operation. So many welding repair works had been carried out the buckets for that runner throughout its service spell. Further repair and reuse of this runner is not recommended due to its mechanical fatigue and nature of the present crack. The runner of Unit#2 and Unit#3 was replaced in 2/2003 and 10/2002 respectively. At this stage it is proposed to procure a new runner for the first stage machine to keep as spare to meet any urgency due to major damages.

Idukki plays a vital role in Kerala's Power grid and the average annual generation for the last 4 years is above 2200 MU. Hence any outage of the units has serious consequences in power availability as well as on the economy of the Board.

The existing Runner is a cast Runner. But for the spare runner Forged Runner is proposed because of the advantages like longer trouble-free life, better performance over the life time and faster and reliable delivery.

The scope of work shall include Engineering, Procurement, Manufacturing, Supply, Transportation up to site and unloading at site etc. of new Pelton runner rated to deliver 130 MW continuously at Generator terminals with 5% overload for a short period.

## **16. Purchase of new 6no.s of transformers at Idukki HEP**

The Generator Transformers of Idukki HEP have a rating of 48 MVA, 11/220/√3kV, single phase. The 1974-75 TELK make Generator Transformers of stage 1 units have already completed 44 years of continuous service. There are ten (10) such type of transformers, out of these nine (9) numbers were installed in Units #1, #2 & #3 machines during commissioning and the remaining one (1) is currently in service in Unit#5 (A-phase). Out of these ten transformers, four (4) numbers were replaced with spare reconditioned GT / new GT during the course of time because of failure or decreasing trend in the insulation resistance values and increase in tan-delta values. Accordingly, an estimate for the replacement of the above six (6) numbers of 1974-75 make old 48MVA GTs by new ones is prepared.



## **17. Updation of Auto sequencer and implementation of SCADA system including SAS at LP**

Lower Periyar Power house is the fourth largest hydroelectric power station of KSEBL and is equipped with 3 x 60 MW vertical Francis type hydro generators, six numbers of 220 kV feeders, 3x66.667 MVA-11/220kV Generator Transformers, 220kV double bus arrangement and 220 kV bus coupler. The generators are being currently controlled by the ABB make P13 based Auto sequencer control system (PLC). This system was commissioned along with generators during 1997 by M/s BHEL and around 25 years old. Hence the Complete replacement of existing ABB make Pro control P13, PLC based sequencer system with modern control system is necessary for the efficient operation of the system. The renovation of SCADA system also ensures smooth integration of SCADA system with the governor system, protection system, and existing Voith make (2 numbers) and ABB make (1No) excitation systems. The ABB make Pro control P13 Auto sequencer equipment is utilized for the sequential start up and shut down of generating units at Lower Periyar HEP. There is no operator work station or HMI. The operations of the Generating units at LPHEP are done manually by issuing push button commands from the control desk to the Sequencer panel all these need to be renovated.

## **19. Renovation of Governor System at LP**

Lower Periyar Powerhouse is the fourth largest hydroelectric power station of KSEBL and one of the most important tie stations in the power grid of Kerala. Lower Periyar powerhouse is equipped with BHEL make 3 x 60 MW vertical Francis type hydro generators. The Governor control for the turbine is of electro hydraulic type. The model of electro hydraulic governor is BHEL make G40. Governor system has two control sections, one is hydro mechanical cabinet and other is control system panel consisting of several analogue control cards. Governor is designed to operate in Free Governor Mode of Operation (FGMO) and for this feature, electronic control cards are installed in the Governor Control panel. As per SRLDC and KSE Board direction, every generator of capacity above 10MW should be operated in FGMO mode of operation. Since the generators of Lower Periyar are of 60MW capacity each, FGMO operation of governor is to be ensured.

Presently the FGMO feature of the governing system is not working satisfactorily. The response of governor for sudden frequency variations is very poor. The electronic control cards related with FGMO are replaced with available spare cards, but no improvement is observed in the FGMO action of governor during grid frequency variations, which means the generator's contribution to the grid during frequency variation is not noticeable. SRLDC is monitoring each Generator which is above 10MW capacity for FGMO actions during grid frequency variations. Hence FGMO system is to be made functional urgently. Automatic mode operation of the governor is also making complaints frequently. During starting process of generator in manual mode, the governor has to be operated manually by the operator in the generator floor and the regulation of speed is highly difficult. There are frequent failures in the speed sensing devices. The mechanical over speed tripping is not functioning properly.

The electronic cards and its power supply modules were supplied by BHEL during the erection time of Generator in 1997. BHEL has stopped the production of these electronic cards since

the system became obsolete. Spares and service for the electronic cards of governor is no longer available. Any failure of electronic card in the governor will stop the operation of governor. This will lead to forced shutdown of Generator for long period. The generation loss which may arise due to failure of an electronic card is very high. To avoid such incidents, KSEBL decided to renovate immediately the existing control system of governor with new digital governor with control facilities like FGMO, SCADA control, (Human Machine Interface) HMI control etc.

## **20. Generator Transformer purchase at Sholayar Power House**

Renovation and modernization of 3X18MW Sholayar Hydroelectric Power station was carried out and during the renovation one number of 22MVA,11/110kV Three phase GT generator transformer replaced with new one. The Generator Transformers which are in service are old, the operational status is critical due to ageing. As per the test report of PET team, Unit No.1 and No.2 Generator Transformers are deteriorated and critical condition. This may lead to the Breakdown of Generator Transformers and Shutdown of Generators.

## **21. Replacement of Butterfly valves (4 nos) at Poringalkuthu Power House**

Poringalkuthu Generation division consists of several hydroelectric power plants which are spread over Sholayar, Poringalkuthu, Malampuzha, Peechi, Chimmomy and Adyanpara. One of the major Generating Station under Poringalkuthu Division is the Poringalkuthu Power House. The first machine was commissioned in the year 1957 and Generators 2, 3 and 4 were commissioned in the subsequent years. The total capacity of the station then was 32MW (4x8 MW). Recently all the Generators at this Power plant are renovated by replacing the old system completely. Now the capacity of the PLB Power House was increased to 36MW (4x9MW). Butterfly valves of these machines are not renovated yet, since its erection in the year 1956. These valves are of more than sixty years old and required replacement at the earliest for reliable and safety operation.

The Butterfly Valve (BV) consists of a circular ventricular plate, which can rotate about central axis perpendicular to pipe axis. When open, it aligns itself in the direction of flow. When closed, it blocks the flow passage completely. For very large conduits, butterfly valves are virtually the only type of valves that are suitable. The difficulty with the butterfly valve is that it is difficult to obtain complete water tightness and generally some leakage takes place past the valve in the closed position. The valve also has a by-pass line to fill the conduit on downstream side before it is opened. Butterfly valves are of self-closing automatic type. These 4 No Butterfly Valves of diameter 52 inch are manufactured by Boving and Co. Ltd. and more than sixty years old. An appreciable amount of water leakage is noticed through all these Valves under their closed condition. A detailed inspection of all Butterfly Valves was carried out after cleaning them thoroughly and the following defects were observed in all the Valves.

1. The external surface of the Valves is seen rusted.
2. Scales of rust and pitting are observed on the internal surface of the Valves.
3. Bend in Valve Disc is noticed and Discs are not closed properly causing excessive leakage of water.

4. The Hard Rubber Seal on the Valve Disc has been completely worn out and deteriorated.
5. The Seat of the Valve Disc has been partially deteriorated.
6. Alignment of Valve Disc trunnion has to be corrected.
7. Hydraulic components of the Valves do not function as per standards.

It is evident from the above facts, that these old Butterfly Valves have developed major complaints due to their ageing and for this reason these Valves need to be replaced with new Valves instead of re-conditioning them due to the safety reasons involved in the operation of these old Hydro Electric Plant equipment's.

## **22. Penstock renovation at Porigalkuthu Power House**

The renovation work of PLB was fully completed on 19.04.2018. The renovation of penstock pipe was limited to cutting and removing riveted joints for a length of 25 cm on either sides, and welding the pipe joints, i.e., replacing the riveted joints with welded joints. New pipes were added mainly for the riveted cut and removed portions and other critically laminated defect segments. During cutting rivets at the region of cutting face, serious spotted depressions were also observed. The critically damaged portions were also replaced with new ferrules. Major portion of the penstock pipe, all expansion joint, man holes etc were not replaced with new ferrules and specials. Almost 5 years have completed after the first renovated penstock. There for RLA study is required for ensuring the fitness of penstock. During the previous RLA study of penstock by CPRI, they have recommended to replace all the penstock pipes with new pipes, after 10 years after carrying out the repair work. So a RLA study will help us to assess the remaining life of penstock pipes, which is necessary as far safety is concerned.

## **23. Pallivasal Hydro Electric Project Penstock replacement**

The Pallivasal Power station is the oldest power station in Kerala. The first stage installations were completed by 1940 and its full-fledged operation was started in 1952. The R.A Head works of the existing Pallivasal Scheme often spills during the monsoon due to low storage capacity of the reservoir. For the effective utilization of available water at R.A Headworks. Pallivasal Extension Scheme is now under progress. The work of implementation of the Pallivasal extension Scheme includes laying 1600mm dia Penstock from the valve house at Meencut up to the anchor block A9. Both 1600 mm dia and 2000mm dia penstock pipe are laid parallel along the same penstock track up to A9. After this location the 1600 mm pipe has to take a different alignment, which is parallel to the existing penstock leading to the existing Pallivasal Power House. This work of laying 1600mm dia penstock from A9 to existing power house is envisaged in this proposal. The machines of existing Pallivasal scheme were renovated, but the water conductor system remains old. In order to utilize the full capacity of the water conductor system of PES, the work of extending new Penstock pipe from A9 to existing power house is to be completed when the water conductor system of Pallivasal becomes operational. The work includes penstock track formation, construction of the anchor blocks and rocker support foundation, design fabrication, supply and erection of penstock

pipes of different thickness, five bifurcation pieces to feed the 6 nos machines in the existing power house.

## **24. Construction of new wind farm at Kanjikode /Stage 1**

National Institute of Wind Energy (NIWE) as per the study conducted on the existing wind Farm at Kanjikode in 2015-16 has suggested 4 cases with an expected Maximum power generation of 4 MW by Re powering/Intercropping the wind turbine Generators (WTG), with the Technology available at that time. By Year 2020, all these existing WTG has met its life and the Generation records in the recent years show considerable reduction in generation due to increased frequency of Breakdown of machines and wind obstructions due to high rise buildings etc. In order to take care these constraints and to utilize the latest technological advancement in this field, M/s NIWE has agreed to associate with KSEBL as a consultant. The expected increase in power generation from the existing wind farm is approximately 6 MW which is an increase of approximately 4 MW from the existing capacity. The newly proposed WTGs would be using taller pole heights and more sophisticated technologies. Board had accorded sanction to appoint M/s NIWE as the consultant for this project. The scope of NIWE includes preparation of Tender documents, evaluation of the tender, selection of the qualified firm based on the merit and in line with the tender conditions, assisting KSEBL during implementation of the Project and monitoring of the project for 6 months post commissioning. Proposal is under preliminary study stage and hence the DPR of the same is under preparation.

## **25. KTR strengthening of Canal work**

Kuttiyadi Tail Race Project which was commissioned during October 2009 is a tail race project of Kuttiyadi Hydro Electric Project (3x25 MW) and Kuttiyadi Extension Scheme (1x50MW) approved with installed capacity (3x1.25MW) and probable annual generation of 15MU. The DPR approved in 1989 was for tail race water discharge of 14.86 Cumec from Kuttiyadi HEP with installed capacity of 2.50 MW. After commissioning of KES Power house(1x50MW), tail race water discharge increased to 24.36 Cumec and the installed capacity of KTR became 3.75 MW. The trapezoidal channel was designed for 14.86 Cumec and later to increase the capacity, canal berms formed on both sides were utilized to increase water discharge to 24.36 Cumec. As the power generation from KTR Project is not achieving the proposed generation as per the DPR, a detailed study was conducted on various measures to be taken for increasing the power generation of the project. This proposal is for implementing the recommendations were made by the committee to prevent the leakage.

Following recommendations were made by the committee

1. To raise the elevation of Forebay surplus crest from +88.000m to +88.95m by introducing new Ogee structure.
2. Surplus arrangement of 30m length to be made at uphill side of power channel close to Forebay.
3. Overall height of canal is to be increased by constructing RCC wall on berms of existing trapezoidal canal.

4. Waterproof surface treatment, 75mm thick shotcrete on modified trapezoidal section after rectification of existing damages in concrete lining. 5. Shifting of super passage at Ch:562m.

### **New Renovation/Replacement work (less than 5 Cr)**

Proposals under “New Renovation/Replacement work (less than 5 Cr)” can be classified in to three parts,

1. **Renovation** of (a) hydro power station equipment, (b) small hydro stations (c) office buildings etc.
2. **Implementation** of cyber security systems and safety systems at power stations.
3. **Procurement** of Governor, control, instrumentation and monitoring systems, Electro hydraulic valves, Intake /Main inlet valves and spares.

Circle wise, station wise, item wise classification of proposal and its financial outlay are listed in Annexure.

### **Advanced Energy Storage Technology**

A wide array of storage technologies has been developed so that the grid can meet everyday energy needs. Energy storage systems provide a wide array of technological approaches to managing our power supply in order to create a more resilient energy infrastructure and bring cost savings to utilities and consumers. The Advanced energy storage technology have divided them into five main categories such as Batteries, Thermal, Mechanical Storage, Hydrogen and Pumped Storage. The financial viability plays crucial role in selecting the category.

### **Grid Scale Battery Storage System (BSES)**

The emerging power plants in the state are predominantly of Variable Renewable Energy (VRE) which is widely distributed across the state. The generation capacity mix has undergone significant changes in the near decade and RE penetration and E mobility is expected to impound drastic changes to the energy grid in the state. Optimum generation mix of capacities shall be a need of the hour to be implemented to suit the emergency future load.

The grid scale energy storage is a technology that can store and then discharge electricity based on system operation requirements. In addition to storage, this innovative power storage system includes a power conversion system and a battery management system with software systems that make the storage work better and thereby improving the performance of the utility. The CEA Optimal generation mix report outlines the need for a 27 GW of grid scale battery energy storage systems by 2030 with four hours of storage. The MoP, vide order dated 21.06.2021, has announced waiver of Inter State Transmission charges on energy supplied to/from BESS projects commissioned before June 2025, if at least 70% of charging requirement is met through renewable sources.

The Grid Scale battery energy storage system is pursued to be implemented on pilot basis with a flexible storage system, to test the ability of KSEBL to integrate BESS into its future operational regime and enhance the reliability of the grid. In order to explore the

adaptive technologies of Grid scale BESS, a total capacity to meet a demand of 10 MW are proposed to operate at four hours on 2 cycles per day.

A letter of interest (EoI) has been invited from KSEBL on 08.11.2021 KSEBL is currently planning to set up pilot-based storage facilities with a total capacity of 10 MW/50 MWh at two or three locations depending upon the response received for EoI.

## Dam Rehabilitation

The objective of Dam rehabilitation work is to improve the safety, Operational performance and life extension of Dam. KSEBL is executing work under DRIP project which is a Government of India project, with financial assistance from the World Bank. The funding pattern is 80:20 with 80 percentage as loan amount from world bank and 20 percentage as government subsidy.

## Dam Safety work

Proposals under "The Dam safety" can be classified in to five parts,

1. **Structural Rehabilitation Works** – It includes the strengthening of Dam, replacement of valves, etc. at various dam site
2. **Non-Structural Measures** – it includes implementation of Integrated Reservoir Operation, Installation of Early Warning System, Integrated Reservoir Operation, Installation of Automatic Weather Station etc. at various dam site.
3. **Basic Facilities Enhancement** – It includes procurement of survey equipment, construction of Access Road etc.
4. **Instrumentation, SCADA, Surveillance system** – It includes procurement of Installation of Accelerographs, Installation of Inflow forecasting & Early warning system etc.
5. **Others** - It includes Hydrographic Study, Geophysical Investigation, Site specific seismic parameter estimation, Geological studies, other investigations etc.

The division wise proposals under Dam safety work are attached as Annexure.

## The summary of the proposed phasing of investment of the new projects

The summary of the proposed phasing of investment of the new projects are mentioned in the in table G14. The scheme wise classification includes

- a. New Hydel Projects – 14 Projects
- b. New Solar Projects – 4 Projects
- c. New renovation/replacement work (Major work – 5 Cr and Above) – 24 Proposals
- d. New renovation/replacement work (Less than 5 Cr)
- e. Advanced Energy Storage Technology
- f. Dam Rehabilitation

In the new projects, the provision for land acquisition and preliminary works are considered for FY 2022-23 the actual works will commence after major portion of project land acquisition is completed.

Table G14: Scheme wise Outlay for Capital Works												
No	Name of Scheme	Proposed year wise outlay (Rs. Cr.)					Commen- cement	Comple- tion	Project Cost (Rs Cr)	Capacity		
		2022-23	2023-24	2024-25	2025-26	2026-27				MW	MU	
A	NEW HYDEL PROJECTS											
1	Upper Sengulam	65	80	90	81		2022-23	2025-26	316	24	53.22	
2	Peechad	1	4	12	3	7.64	2022-23	2026-27	27.64	3	7.74	
3	Western Kallar	0.5	2.5	10	20	18.24	2022-23	2026-27	51.24	5	17.4	
4	Ladrum	1.5	4.5	12	18	12.81	2022-23	2026-27	48.81	3.5	12.13	
5	Maramala SHEP	2	6	15	24	27.28	2022-23	2026-27	74.28	7	23.02	
6	Pasukkadavu SHEP	0.5	3	5	15	27.5	2022-23	2026-27	51	4	10.34	
7	Valanthode SHEP	2.8	10	25	28	3.31	2022-23	2026-27	69.11	7.5	17.36	
8	Marippuzha SHEP	8	15	20	28	0.95	2022-23	2026-27	71.95	6	14.84	
9	Chembukadavu III SHEP	0.5	7	10	20	26.61	2022-23	2026-27	64.11	7.5	16.65	
10	Chathanokottunada SHEP - Stage I	0.75	10	20	20	20.84	2022-23	2026-27	71.59	5	12.06	
11	Olikkal SHEP	8	15	18	5		2022-23	2025-26	46	5	10.26	
12	Poovaramthodu SHEP	8	15	18	5		2022-23	2025-26	46	3	5.88	
13	Mankulam HE Project	100	200	200	200	50	2022-23	2026-27	750	40	102.85	
14	Idukki (golden Jubilee) Extension Scheme		168.38	522.63	868.37	862.23	2023-24	2028-29	3062.08	800	1301	
	Sub Total 1	198.55	540.38	977.63	1335.37	1057.41			4749.81	920.5	1604.75	

Table G14: Scheme wise Outlay for Capital Works											
No	Name of Scheme	Proposed year wise outlay (Rs. Cr.)				Comment	Completion	Project Cost (Rs Cr)	Capacity		
		2022-23	2023-24	2024-25	2025-26				2026-27	MW	MU
<b>B</b>	<b>NEW SOLAR PROJECTS</b>										
1	Ground mounted solar project at Ettumanoor	6.687		0			0	2022-23	6.687	1	1.31
2	Ground mounted solar project at Nenmara	6.35					0	2022-23	6.35	1.5	1.8
3	PM KUSUM -Component C(5 MW ground & 0.99 MW Roof)	9	13.75					2022-23	22.75	5.99	7.87
4	Soura Kerala Model	2.75	2.75	2.75					8.25	3	4.99
	<b>Sub Total 2</b>	<b>24.787</b>	<b>16.5</b>	<b>2.75</b>	<b>0</b>	<b>0</b>	<b>0</b>		<b>44.037</b>	<b>11.49</b>	<b>15.98</b>



**Table G14: Scheme wise Outlay for Capital Works**

N o	Name of Scheme	Proposed year wise outlay (Rs. Cr.)					Commencement	Completion	Project Cost (Rs Cr)	Capacity	
		2022-23	2023-24	2024-25	2025-26	2026-27				MW	MU
<b>C</b>	<b>NEW RENOVATION/REPLACEMENT WORK (MAJOR WORK -5 Cr AND ABOVE)</b>										
<b>Sengulam HEP</b>											
1	Rectification/Replacement of Penstock, butterfly valves and allied works at Sengulam HEP	33.205	16.603	47.192			2022-23	2024-25	97		
<b>Sabarigiri HEP</b>											
2	Sabarigiri HEP stator winding replacement for Generators	24	35	24	27.5		2022-23	2025-26	110.5		
3	Sabarigiri HEP Shaft replacement	8	8				2022-23	2023-24	16		
4	Sabarigiri U#4 revamping	5					2022-23	2022-23	5		
5	Sabarigiri renovation of control system and runners				42.5	15	2025-26	2026-27	57.5		
6	Moozhiyar Additional Power House - preliminary study and preliminary work	1	1	1	1	1	2022-23	2026-27	5		
7	110kV feeder bay & Transformer replacement at Sabarigiri Power House				9		2025-26	2025-26	9		

<b>Panniyar HEP</b>												
8	Design, Engineering, supply, Erection and Commissioning of 2 Nos of new Pressure Release Valve (PRVs) at Panniar HEP	8.81						2022-23	2022-23	8.81		
<b>KAKKAD HEP</b>												
9	Renovation of Governor system at KAKKAD Power Station		6					2023-24	2023-24	6		
<b>KDPP LnG</b>												
10	KDPP LNG Conversion - Preliminary study and preliminary works	1	1	1	1	1		2022-23	2026-27	5		
<b>KHEP</b>												
11	110/220 kv GIS Switching station at KHEP					40		2026-27	2027-28	40		
<b>Idukki HEP</b>												
12	Refurbishment of MIV of first stage machines at Idukki HEP	4.8	1.2					2022-23	2023-24	6		
13	Revamping of KSEBLcolony Moolamattom ` by providing new housing complex with modern amenities Phase I & II	8.43	2.1					2022-23	2023-24	10.53		
14	RLA Study of IInd stage machines at Idukki Power Station	5.5						2022-23	2022-23	5.5		

15	Purchase of spare runner for Stage I Idukki HEP		14				2023-24	2023-24	14		
16	Purchase of new 6no.s of transformers at Idukki HEP				3	27	2025-26	2026-27	30		
<b>Lower Periyar HEP</b>											
18	Updation of Auto sequenser and implementation of SCADA system including SAS at LP	2	2	1			2022-23	2024-25	5		
19	Renovation of Governor system at LP	2.7	2.7	3.6			2022-23	2024-25	9		
<b>Sholayar &amp; Porigalkuthu HEP</b>											
20	Generator Transformer purchase at Sholayar Power House	2.5	2.5	2.5			2022-23	2024-25	7.5		
21	Replacent of Butterfly valves (4 nos) at Porigalkuthu Power House	1.5	1.5	1.5	1.5		2022-23	2025-26	6		
22	Penstock renovation at Porigalkuthu Power House					9	2025-26	2025-26	9		
<b>Pallivasal HEP</b>											
23	Pallivasal Hydro Electric project Penstock replacement	39.75	7.92				2022-23	2023-24	47.67		
<b>Kanjikode Wind Farm</b>											
24	Construction of new wind farm at Kanjikode /Stage 1	15.5	16.2	3.15			2023-24	2024-25	34.85		

KTR											
25	KTR strengthening of Canal work		5.5				2023-24	2023-24	5.5		
	<b>Sub Total 3</b>	<b>163.695</b>	<b>123.223</b>	<b>84.942</b>	<b>85.5</b>	<b>93</b>	<b>0</b>	<b>0</b>	<b>550.36</b>	<b>0</b>	<b>0.00</b>

Table G14: Scheme wise Outlay for Capital Works											
No	Name of Scheme	Proposed year wise outlay (Rs. Cr.)					Commencement	Completion	Project Cost (Rs Cr)	Capacity	
		2022-23	2023-24	2024-25	2025-26	2026-27				MW	MU
<b>D</b>	<b>NEW RENOVATION/REPLACEMENT WORK ( LESS THAN 5 Cr)</b>										
	Attached Annexure	57.01	40.96	35.40	30.36	29.91					
	<b>Sub Total 4</b>	<b>57.01</b>	<b>40.96</b>	<b>35.40</b>	<b>30.36</b>	<b>29.91</b>			<b>193.63</b>	<b>0</b>	<b>0.00</b>
<b>E</b>	<b>ADVANCED ENERGY STORAGE TECHNOLOGY</b>										
	Grid Scale Battery Storage System (BSES)	50	55				2022-23	2023-24			
	<b>Sub Total 5</b>	<b>50.00</b>	<b>55.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>			<b>105.00</b>	<b>0</b>	<b>0.00</b>
<b>F</b>	<b>DAM REHABILITATION</b>										
	Dam Safety work	18.7	22.05	22.55	32.6	32.6			128.5		
	<b>Sub Total 6</b>	<b>18.70</b>	<b>22.05</b>	<b>22.55</b>	<b>32.60</b>	<b>32.60</b>	<b>0.00</b>	<b>0.00</b>	<b>128.50</b>	<b>0</b>	<b>0.00</b>
	<b>Total (A+B+C+D+E+F)</b>	<b>512.75</b>	<b>798.11</b>	<b>1123.27</b>	<b>1483.83</b>	<b>1212.92</b>					

### Financial Analysis of the new projects

As per prevailing order of MNRE, to promote development of Small hydro Electric Project, CFA @3.5 Cr/MW limited to Rs. 20 Cr for setting up new SHP up to 25 MW station capacity will be available for all these projects. The financial analysis is done as per SERC guide lines and hence it is carried out by considering equity ratio as 70:30. The Levelized tariff calculated with payback period and IRR for each project is mentioned in the table G15.

<b>Table G15: Scheme wise Financial Analysis for new Hydel projects</b>			
<b>Name of Scheme</b>	<b>Levelised tariff (Rs/kWh)</b>	<b>Payback period</b>	<b>IRR %</b>
Chinnar	4.52	9 years	24.85
Pervannamoozhi	3.59	9 years	21.54
Pazhassi Sagar	3.21	12 years	23.55
Anakkayam	4.13	16 years	12.74
Upper Sengulam	6.78	6 years	26.34
Peechad	2.75	12 Years	12.78
Western Kallar	4.15	8 Years	14.15
Ladrum	3.36	8 Years	15.59
Maramala SHEP	4.48	11 years	11.577
Pasukkadavu SHEP	4.4	11 years	12.14
Valanthode SHEP	4.2	12 years	11.09
Marippuzha SHEP	4.92	12 years	10.43
Chembukadavu III SHEP	4.92	12 Years	28.28
Chathankottunada SHEP - Stage I	4.09	12 years	12.65
Olikkal SHEP	3.51	8 Years	42.71
Poovaramthodu SHEP	4.41	11 Years	29.78
Mankulam HE Project	6.87	13 Years	10.33

Detailed project reports are prepared for each project (except Idukki (golden Jubilee) Extension Scheme, which is under preparation). DPR in respect to these projects are enclosed separately. The details of these Generation projects scheduled for the control period from 2022-23 to 2026-27 in the format prescribed by the Commission is enclosed as Annexure 1.

### **The Scheme wise total capital outlay**

Summary of allocation of Proposed capital expenditure, proposed capitalization and proposed closing capital work in progress for the Multi Year Tariff (MYT) control period of FY 2022-23 to FY 2026-27 in respect of SBUG are detailed below in the Table G16.

**Table G16: Scheme wise Outlay for SBU G Capital Works**

No	NAME OF SCHEME	PROPOSED YEAR WISE OUTLAY (RS. CR.)					Investment (Rs Cr)
		2022-23	2023-24	2024-25	2025-26	2026-27	
A	NEW HYDEL PROJECTS	198.55	540.38	977.63	1335.37	1057.41	4109.34
B	NEW SOLAR PROJECTS	24.787	16.5	2.75	0	0	44.037
C	NEW RENOVATION/REPLACEMENT WORK (MAJOR WORK -5 Cr AND ABOVE)	163.695	123.22	84.942	85.5	93	550.36
D	NEW RENOVATION/REPLACEMENT WORK ( LESS THAN 5 Cr)	57.01	40.96	35.4	30.36	29.91	193.634
E	ADVANCED ENERGY STORAGE TECHNOLOGY	50	55	0	0	0	105
F	DAM REHABILITATION	18.7	22.05	22.55	32.6	32.6	128.5
	<b>TOTAL OUTLAY</b>	<b>512.746</b>	<b>798.11</b>	<b>1123.27</b>	<b>1483.83</b>	<b>1212.92</b>	<b>5130.87</b>
	Rs. (Cr)						

**MW/MU Year wise addition**

The MW/MU addition based on the project proposal for the control period 2022-23 to 2026-27 is mentioned in the table 9,10 respectively. This includes, the MW/MU addition contributed by new proposals which is to be completed during this control period and Ongoing projects.

**Table G17: YEAR WISE MW ADDITION (ON GOING & NEW PROJECTS)**

Sl.No	Name of the Project	2022-23	2023-24	2024-25	2025-26	2026-27
1	Boothathenkettu	24				
2	Thottiyar HES	40				
3	Sengulam Aug. Scheme					
4	Pallivasal Ext Scheme	60				
5	Chinnar		24			
6	Peruvannamoozhi		6			
7	Pazhassi Sagar		7.5			
8	Anakkayam				7.5	
9	Kuttiyadi (7.5 MW upgradation)			7.5		
10	Upper Sengulam				24	
11	Peechad					3

12	Western Kallar					5
13	Ladrum					3.5
14	Maramala SHEP					7
15	Pasukkadavu SHEP					4
16	Valanthode SHEP					7.5
17	Marippuzha SHEP					6
18	Chembukadavu III SHEP					7.5
19	Chathankottunada SHEP - Stage I					5
20	Olikkal SHEP			5		
21	Poovaramthodu SHEP			3		
22	Mankulam HEP					40
23	Brahamapuram	4				
24	Kanjikkode	3				
25	Ground mounted solar project at Ettumanoor	1				
26	Ground mounted solar project at Nenmara	1.5				
27	PM KUSUM -Component C(5 MW ground & 0.99 MW Roof)		5.9			
28	Soura Kerala Model	1	1			
	<b>TOTAL (MW)</b>	<b>134.5</b>	<b>44.4</b>	<b>15.5</b>	<b>31.5</b>	<b>88.5</b>

<b>Table G18: YEAR WISE MW ADDITION (ON GOING &amp; NEW PROJECTS)</b>						
<b>Sl.No</b>	<b>Name of the Project</b>	<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>
1	Boothathenkettu	83.5				
2	Thottiyar HES	99				
3	Sengulam Aug. Scheme				85	
4	Pallivasal Ext Scheme	153.9				
5	Chinnar		76.45			
6	Peruvannamoozhi		24.7			
7	Pazhassi Sagar		25.16			
8	Anakkayam				22.83	
9	Kuttiyadi (7.5 MW upgradation)			61.17		
10	Upper Sengulam				53.22	
11	Peechad					7.74
12	Western Kallar					17.4
13	Ladrum					12.13
14	Maramala SHEP					23.02
15	Pasukkadavu SHEP					10.34
16	Valanthode SHEP					17.36
17	Marippuzha SHEP					14.84
18	Chembukadavu III SHEP					16.65

19	Chathankottunada SHEP - Stage I					12.06
20	Olikkal SHEP			10.26		
21	Poovaramthodu SHEP			5.88		
22	Mankulam HEP					102.85
23	Brahamapuram	5.606				
24	Kanjikkode	4.204				
25	Ground mounted solar project at Ettumanoor	1.314				
26	Ground mounted solar project at Nenmara	1.8				
27	PM KUSUM -Component C(5 MW ground & 0.99 MW Roof)		7.87			
28	Soura Kerala Model	1.6644	1.6644			
	<b>TOTAL (MU)</b>	<b>350.988</b>	<b>135.844</b>	<b>77.310</b>	<b>161.050</b>	<b>234.390</b>

It is humbly submitted that Capital Investment Plan submitted for SBU G includes the works to be necessarily executed during the control period. KSEBL will be submitting the actual capital expenditure such works during truing up. Several other projects are in initial stages. KSEBL will be submitting the capital investment proposal of these projects separately later.

#### GFA Addition for the control Period 2022-27

<b>Table:19 GFA Addition (Rs. Cr) corresponding to New Proposals</b>						
	2022-23	2023-24	2024-25	2025-26	2026-27	Total
NEW HYDEL PROJECTS	0	0	0	408	1279.73	1687.73
NEW SOLAR PROJECTS	13.04	22.75	8.25			44.04
NEW RENOVATION/REPLACEMENT WORK (MAJOR WORK -5 Cr AND ABOVE)	19.31	105.7	153.35	134.5	97.5	510.36
NEW RENOVATION/REPLACEMENT WORK (LESS THAN 5 Cr)	43.08	46.03	44.86	26.22	33.45	193.63
ADVANCED ENERGY STORAGE TECHNOLOGY	0.00	105.00	0.00	0.00	0.00	105
DAM REHABILITATION	18.70	22.05	22.55	32.60	32.60	128.5
<b>TOTAL GFA( Rs.Cr)</b>	<b>94.13</b>	<b>301.53</b>	<b>229.01</b>	<b>601.32</b>	<b>1443.28</b>	<b>2669.26</b>

The gross GFA addition expected during the control period including ongoing projects is mentioned in the table 19. The MNRE grant is not considered while calculating the GFA. As year wise allocation is not known at this point of time. The details of the same will be submitted to the Hon'ble commission as and when sanctioned by GoI.



DPR in respect to these projects are enclosed separately. For few projects whose DPRs are not enclosed, it is humbly submitted that KSEBL will be submitting the same without delay. This submission contains the available details of the Capital Investment proposal for the control period. Hon Commission may please condone any inadvertent error/omission that may have crept in this petition. The petitioner may be given an opportunity to rectify the same detected subsequently. The petitioner may also be allowed to make further submission, addition and alteration to this petition as may be necessary from time to time.

### **Prayer before the Hon'ble Commission**

KSEBL humbly request before the Hon'ble Commission to

1. To invoke the power conferred to it under Section 181 of Electricity Act 2003 to be read with Kerala State Electricity Regulatory Commission (Terms and Conditions for Determination of Tariff), 2021 and to approve the capital Investment plan for Generation SBU for the control period 2022-23 to 2026-27.
2. To pass any order as the Hon'ble Commission may deem fit and appropriate under the circumstances of the case and in the interest of justice.

### **List of Annexure and Enclosures**

1. Annexure 1A- Details of Capital works – New Projects
2. Annexure 1B- Details of Capital works – On going Projects
3. Annexure 2- Details of Capital works – Renovation/Replacement Major work above 5 Cr
4. Annexure 3- Details of Capital works -Renovation/Replacement work less than 5 Cr
5. Annexure 4- Details of Capital works – Advanced Energy Storage Technology
6. Annexure 5- Details of Capital works – Dam Rehabilitation
7. Copies of DPRs

### Annexure 1A: DETAILS OF CAPITAL WORKS

UPPER SENGULAM HEP				
1	Installed Capacity (MW)	24MW		
2	Annual Generation ( MU)	53.22 MU		
3	Project Cost including IDC as per DPR (Rs. Cr)	316 Cr		
	a) Civil (Rs. Cr )	209.88 Cr		
	Electrical, Mechanical , . (Rs. Cr )	66.32 Cr		
	d) Subtotal (Rs. Cr)	276.20Cr		
4	Levelised tariff as per DPR (Rs. /kWh)	Rs 6.78		
5	Project cost as per contract (Civil cost & Electrical cost together) Work <b>to be tendered.</b>			
	a) Civil (Rs. Cr )			
	b&c) Electrical & Mechanical (Rs. Cr )			
	d) Subtotal (Rs. Cr)			
6	Expected cost of completion (incl IDC and Estab cost)	Work to be tendered as per DSR 2018		
7	Date of Commencement	2022-23		
8	Date of agreement			
9	Details of Tender			
10	Name of contractor			
11	Original Target date of completion	2025-26		
12	Revised Target date of completion			
13	Source of funds			
	a) Debt (Rs. Cr)			
	b) Interest rate ( Rs.Cr)			
	c) Own fund (Rs. Cr)			
	d) Grants / subsidies etc.			
14	Loan availed up to the beginning of the year (Rs. Cr)			
15	Loan proposed to be availed during the year (Rs. Cr)			
16	Year wise Physical and Financial target proposed/achieved			
	Particulars of Work	Physical Target	Financial (Rs. Cr)	Achievement
		Achievement	Target	
	2022-23 :	20%	65 Cr	
	.....			
	2023-24	25%	80 Cr	
	2024-25 .....	30%	90 Cr	
	2025-26 : .....	25%	81 Cr	
2026-27.....		---		
Total				
17	Details of the Project Management Team AEE-1 No, AE- 1 No			
	a) Total in house employees	2 Nos		
	b) Monthly salary and other benefits	Rs. 3,78,152		
	c)Other establishment cost - monthly	Rs. 1,50,000		

Peechad Small Hydro-Electric Project(3MW, 7.7Mu)				
1	Installed Capacity (MW)	2x1.5MW		
2	Annual Generation ( MU)	7.74 Million Units		
3	Project Cost including IDC as per DPR (Rs. Cr)	RS.27.64 Cr. Incl IDC @ 2008 price level		
	a) Civil (Rs. Cr )			
	b &c) Electrical& Mechanical (Rs. Cr )			
	d) Subtotal (Rs. Cr)			
4	Levelised tariff as per DPR (Rs. /kWh)	Rs.2.75 as per 2008 price level		
5	Project cost as per contract (Civil cost & Electrical cost together)	<b>Yet to be tendered</b>		
	a) Civil (Rs. Cr )			
	b &c) Electrical & Mechanical (Rs. Cr )			
	d) Subtotal (Rs. Cr)			
6	Expected cost of completion (incl IDC and Estab cost)	Revision of estimate based on DSR 2016 is in progress; Approx. estimate amount would come around Rs.2450 Lakh(@2016 DSOR) without IDC; To be revised w.r.t.2018 DSOR		
7	Date of Commencement	2022-23		
8	Date of agreement	Expected 2022-23		
9	Details of Tender	Yet to be tendered		
10	Name of contractor	N.A.		
11	Original Target date of completion	N.A.		
12	Revised Target date of completion	2026-27		
13	Source of funds			
	a) Debt (Rs. Cr)			
	b) Interest rate ( Rs.Cr)			
	c) Own fund (Rs. Cr)			
	d) Grants / subsidies etc.			
14	Loan availed up to the beginning of the year (Rs. Cr)			
15	Loan proposed to be availed during the year (Rs. Cr)			
16	Year wise Physical and Financial target proposed/achieved			
	Particulars of Work	Physical Target	Financial (Rs. Cr)	
		Achievement	Target	Achvmt
	2022-23 : Land Acquisition & Preliminary activities	5%	1.0Cr.	
	2023-24: Tendering/Award/Works	20%	4.0 Cr.	
	2024-25:Civil & Electrical works	60%	12.0Cr.	
	2025-26 : Civil & Electrical Works	15%	3.0 Cr.	
	2026-27: Completion	5%	7.64 Cr.	
Total				
Details of the Project Management Team				
a) Total in house employees	Estt cost is loaded in the Upper Kallar SHEP as One Project Manager's office is working for Upper Kallar, Peechad& Western Kallar SHEP's. With same officers and staff of			

		UPKLR SHEP. Additionally, One AEE is presently working; A project team of 1 AEE, 2 AE, 3 SE required
	b) Monthly salary and other benefits	Rs. 1188536
	c) other establishment cost- monthly	Rs. 200000

Western Kallar Small Hydro-Electric Project(5MW, 17.41 Mu)				
1	Installed Capacity (MW)	2x2.5MW		
2	Annual Generation ( MU)	17.41 Million Units		
3	Project Cost including IDC as per DPR (Rs. Cr)	Rs.51.24 <a href="#">Cr.@2012</a> SOR		
	a) Civil (Rs. Cr )	Rs.32.59 Cr.		
	b &c) Electrical& Mechanical (Rs. Cr )	Rs.17.92 Cr.		
	d) Subtotal (Rs. Cr)	Rs.50.51 <a href="#">Cr.@2012</a> SOR; As per A.S.(rev.), (Rs.63.05Cr+3.74r.IDC)		
4	Levelised tariff as per DPR (Rs. /kWh)	Rs.4.15 @2012 SOR		
5	Project cost as per contract (Civil cost & Electrical cost together)	Yet to be tendered		
	a) Civil (Rs. Cr )	NA		
	b &c) Electrical & Mechanical (Rs. Cr )	NA		
	d) Subtotal (Rs. Cr)	NA		
6	Expected cost of completion (incl IDC and Estab cost)	Estimate of preliminary works sanctioned. Finalisation of alignment and location of salient features progressing. Adm. Sanction from Govt. yet to be obtained		
7	Date of Commencement	2022-23		
8	Date of agreement	2023		
9	Details of Tender	Yet to be tendered		
10	Name of contractor	NA		
11	Original Target date of completion			
12	Revised Target date of completion	2026-27		
13	Source of funds			
	a) Debt (Rs. Cr)			
	b) Interest rate ( Rs.Cr)			
	c) Own fund (Rs. Cr)			
	d) Grants / subsidies etc.	Rs.17.5Cr.MNRE grant expected		
14	Loan availed up to the beginning of the year (Rs. Cr)			
15	Loan proposed to be availed during the year (Rs. Cr)			
16	Year wise Physical and Financial target proposed/achieved			
	Particulars of Work	Physical Target	Financial (Rs. Cr)	
		Achievement	Target	Achvmt
	2022-23 :...Land Acquisition.		0.5 Cr	
	2023-24...Land Acquisition & Preliminary	5%	2.5 Cr.	
	2024-25 Civil Works	20%	10 Cr.	
	2025-26 : Civil & E-M	40%	20 Cr.	
	2026-27: Civil & E-M	30%	18.24 Cr.	
	Total			

17	Details of the Project Management Team	
	a) Total in house employees	Esttt cost is loaded in the Upper Kallar SHEP as One Project Manager's office is working for Upper Kallar, Peechad& Western Kallar SHEP's. With same officers and staff of UPKLR SHEP. Additionally 1AEE is now working; A separate team of 1 AEE, 2 AE, 3 SE required for execution
	b) Monthly salary and other benefits	Rs. 11,88,536
	c)Other establishment cost - monthly	Rs. 2,00,000

Ladrum Small Hydro Electric Project (2 1.75 MW)				
1	Installed Capacity (MW)	3.5 MW		
2	Annual Generation ( MU)	12.13 Mu		
3	Total Project Cost excluding IDC @ 2015 price level as per revised administration sanction.	48.81 Crore		
	Project Cost including IDC less MNRE subsidy @ 2015 price level	36.97 Crore		
	a) Civil (Rs. Cr )			
	b&c) Electrical& Mechanical (Rs. Cr )			
	d) Subtotal (Rs. Cr)			
4	Levelised tariff as per DPR (Rs. /kWh)	Rs3.36./unit		
5	Project cost as per contract (Civil cost & Electrical cost together)			
	a) Civil (Rs. Cr )			
	b&c) Electrical & Mechanical (Rs. Cr )			
	d) Subtotal (Rs. Cr)			
6	Expected cost of completion (incl IDC andEtab cost)			
7	Date of Commencement	2022-23		
8	Date of agreement			
9	Details of Tender			
10	Name of contractor			
11	Original Target date of completion			
12	Revised Target date of completion	2026-27		
13	Source of funds			
	a) Debt (Rs. Cr)			
	b) Interest rate ( Rs.Cr)			
	c) Own fund (Rs. Cr)			
	d) Grants / subsidies etc.	Rs.12.25 Crore MNRE grant expected		
14	Loan availed up to the beginning of the year (Rs. Cr)			
15	Loan proposed to be availed during the year (Rs. Cr)			
16	Year wise Physical and Financial target proposed/achieved			
	Particulars of Work	Physical Target	Financial (Rs. Cr)	
		Achievement	Target	Achvmt

	2022-23:Land acquisition		1.5 Crores	
	2023-24Land acquisition and preliminary	10%	4.5	
	2024-25 - Civil Works	25%	12	
	2025-26 : Civil &E-M	40%	18	
	2026-27Civil &E-M	25%	12.81	
	Total			
17	Details of the Project Management Team			
	a) Total in house employees	One Project Manager's office is working for the implementation of Ladrum and Marmala SHEP.1 EE,1 AEE,2 AEs,3 SEs are now working.In addition to this construction of new building for PETARC Moolamattom ,construction of Mini Vidyuthi Bhavanam at Nedumkandom and setting up of Polecasting yard at Moolamattom are entrusted with this office		
	b) Monthly salary and other benefits	Rs.627745/-		
	c)Other establishment cost - monthly	Rs.45000/-		

Marmala Small Hydro Electric Project (2 x3.5 MW)		
1	Installed Capacity (MW)	7 MW
2	Annual Generation ( MU)	23.02 Mu
3	Total Project Cost excluding IDC	74.28 Crores@ 2012 price level
	Total Project Cost including IDC and MNRE subsidy as per DPR (Rs. Cr)	56.10 Crores
	a) Civil (Rs. Cr )	35.50 Crore
	b&c) Electrical& Mechanical (Rs. Cr )	34.68 Crore
	d) Subtotal (Rs. Cr)	70.18 Crore
4	Levelised tariff as per DPR (Rs. /kWh)	Rs. 4.48/Unit
5	Project cost as per contract (Civil cost & Electrical cost together)Yet to be tendered	
	a) Civil (Rs. Cr )	
	b&c) Electrical & Mechanical (Rs. Cr )	
	d) Subtotal (Rs. Cr)	
6	Expected cost of completion (incl IDC andEstab cost)	
7	Date of Commencement	2022-23
8	Date of agreement	
9	Details of Tender	
10	Name of contractor	
11	Original Target date of completion	2026-27
12	Revised Target date of completion	
13	Source of funds	
	a) Debt (Rs. Cr)	
	b) Interest rate ( Rs.Cr)	
	c) Own fund (Rs. Cr)	
	d) Grants / subsidies etc.	Rs.20 Crore MNRE grant expected
14	Loan availed up to the beginning of the year (Rs. Cr)	
15	Loan proposed to be availed during the year (Rs. Cr)	

16	Year wise Physical and Financial target proposed/achieved			
	Particulars of Work	Physical Target	Financial (Rs. Cr)	
		Achievement	Target	Achvmt
	2022-23 -Land acquisition.		2 Cr.	
	2023-24-Land acquisition and preliminary.	10%	6 Cr	
	2024-25-Civil Works	25%	15 Cr	
	2025-26- Civil &E-M	40%	24Cr	
	2026-27- Civil &E-M	25%	27.28 Cr	
Total				
17	Details of the Project Management Team			
	a) Total in house employees	One Project Manager's office is working for the implementation of Ladrum and Marmala SHEP.1 EE,1 AEE,2 AEs,3 SEs are now working.In addition to this construction of new building for PETARC Moolamattom ,construction of Mini Vydyuthi Bhavanam at Nedumkandom and setting up of Polecasting yard at Moolamattom are entrusted with this office.		
	b) Monthly salary and other benefits	Rs6,23,948/-		
	c)Other establishment cost - monthly	Rs.45000/-		

Pasukkadavu Small Hydro Electric Project		
1	Installed Capacity (MW)	4 MW
2	Annual Generation ( MU)	10.34 Mu
3	Total Project Cost excluding IDC	
	Total Project Cost including IDC as per DPR (Rs. Cr)	51 Crores
	a) Civil (Rs. Cr )	
	b&c) Electrical& Mechanical (Rs. Cr )	
	d) Subtotal (Rs. Cr)	
4	Levelised tariff as per DPR (Rs. /kWh)	Rs. 4.4/Unit
5	Project cost as per contract (Civil cost & Electrical cost together)Yet to be tendered	
	a) Civil (Rs. Cr )	
	b&c) Electrical & Mechanical (Rs. Cr )	
	d) Subtotal (Rs. Cr)	
6	Expected cost of completion (incl IDC andEstab cost)	
7	Date of Commencement	2022-23
8	Date of agreement	
9	Details of Tender	
10	Name of contractor	
11	Original Target date of completion	2026-27
12	Revised Target date of completion	
13	Source of funds	
	a) Debt (Rs. Cr)	34.8069
	b) Interest rate ( Rs.Cr)	10%
	c) Own fund (Rs. Cr)	7.4966
	d) Grants / subsidies etc.	14



14	Loan availed up to the beginning of the year (Rs. Cr)			
15	Loan proposed to be availed during the year (Rs. Cr)			
16	Year wise Physical and Financial target proposed/achieved			
	Particulars of Work	Physical Target	Financial (Rs. Cr)	
		Achievement	Target	Achvmt
	2022-23	1.77 %	0.5 Cr.	
	2023-24	5.32 %	3 Cr	
	2024-25	17.7 %	5 Cr	
	2025-26	17.7 %	15 Cr	
	2026-27	47.95 %	27.5 Cr	
Total		51		
17	Details of the Project Management Team			
	a) Total in house employees			
	b) Monthly salary and other benefits			
	c) Other establishment cost - monthly			

Valanthode Small Hydro Electric Project				
1	Installed Capacity (MW)		7.5 MW	
2	Annual Generation ( MU)		17.36 Mu	
3	Total Project Cost excluding IDC			
	Total Project Cost including IDC as per DPR (Rs. Cr)		69.11 Crores	
	a) Civil (Rs. Cr )	34.95		
	b&c) Electrical& Mechanical (Rs. Cr )	34.16		
	d) Subtotal (Rs. Cr)	69.11		
4	Levelised tariff as per DPR (Rs. /kWh)		Rs. 4.2/Unit	
5	Project cost as per contract (Civil cost & Electrical cost together)Yet to be tendered			
	a) Civil (Rs. Cr )			
	b&c) Electrical & Mechanical (Rs. Cr )			
	d) Subtotal (Rs. Cr)			
6	Expected cost of completion (incl IDC and Estab cost)			
7	Date of Commencement		2022-23	
8	Date of agreement			
9	Details of Tender			
10	Name of contractor			
11	Original Target date of completion		2026-27	
12	Revised Target date of completion			
13	Source of funds			
	a) Debt (Rs. Cr)	34.38		
	b) Interest rate ( Rs.Cr)	13%		
	c) Own fund (Rs. Cr)	14.73		
	d) Grants / subsidies etc.	20		
14	Loan availed up to the beginning of the year (Rs. Cr)			
15	Loan proposed to be availed during the year (Rs. Cr)			
16	Year wise Physical and Financial target proposed/achieved			
	Particulars of Work	Physical Target	Financial (Rs. Cr)	
		Achievement	Target	Achvmt
	2022-23	1	2.8	

	2023-24	25	10	
	2024-25	36	25	
	2025-26	35	28	
	2026-27	3	3.31	
	Total	100	69.11	
17	Details of the Project Management Team			
	a) Total in house employees	Executive Engineer - 1 Asst.Executive Engineer -1 Assistant Engineer -2 Sub Engineer - 4                      Total- 8		
	b) Monthly salary and other benefits			
	c)Other establishment cost - monthly			

MARIPUZZHA SHEP - (2x3 MW)		
1	Installed Capacity (MW)	6MW
2	Annual Generation ( MU)	14.84 Mu
3	Project Cost including IDC as per DPR (Rs. Cr) *	71.95 Cr.
	a) Civil (Rs. Cr )	
	b&c) Electrical& Mechanical (Rs. Cr )	
	d) Subtotal (Rs. Cr) (Excluding IDC)	
4	Levelised tariff as per DPR (Rs. /kWh)	4.92
5	Project cost as per contract (Civil cost & Electrical cost together) - Work tendered, but not awarded	
	a) Civil (Rs. Cr )	
	b&c) Electrical & Mechanical (Rs. Cr )	
	d) Subtotal (Rs. Cr)	
	(e) Additional Contract Piling Works	
6	Expected cost of completion (incl IDC and Estab cost)	
7	Date of Commencement - Expected	2022-23
8	Date of agreement	....
9	Details of Tender	.....
10	Name of contractor	.....
11	Original Target date of completion	.....
12	Revised Target date of completion	FY 2026-27
13	Source of funds	.....
	a) Debt (Rs. Cr)	.....

	b) Interest rate ( Rs.Cr)	.....		
	c) Own fund (Rs. Cr)	.....		
	d) Grants / subsidies etc.	.....		
14	Loan availed up to the beginning of the year (Rs. Cr)	.....		
15	Loan proposed to be availed during the year (Rs. Cr)	.....		
* Total cost of project as per Revised Administrative Sanction dated 02.12.2019 comes to Rs. 80.9361 Cr.				
Year wise Physical and Financial target proposed/achieved				
16	Particulars of Work	Physical Target	Financial (Rs. Cr)	
		Achievement	Target	Achvmt
	2022-23	15.58%	8	
	2023-24	41.70%	15	
	2024-25	35.37%	20	
	2025-26	6.66%	28	
	2026-27	0.70%	0.95	
	<b>Total</b>	<b>100.00%</b>	<b>71.95</b>	
Details of the Project Management Team - Project Manager, Chembukadavu III & Maripuzha SHEPs.				
17	a) Total in house employees	I-Executive Engineer, I-Assistant Executive Engineer, I Assistant Engineer, I -Sub Engineer		
	b) Monthly salary and other benefits			
	c)Other establishment cost - monthly			

CHEMBUKADAVU-III SHEP - (3x2.5 MW)		
1	Installed Capacity (MW)	7.50 MW
2	Annual Generation ( MU)	16.65 Mu (Average)
3	Project Cost including IDC as per DPR (Rs. Cr)* [87.73+4.70 (IDC)]	64.11 Cr.
	a) Civil (Rs. Cr )	
	b&c) Electrical& Mechanical (Rs. Cr )	

	d) Subtotal (Rs. Cr) (Excluding IDC)			
4	Levelised tariff as per DPR (Rs. /kWh)	4.92		
5	Project cost as per contract (Civil cost & Electrical cost together) - Not tendered, only at land acquisition stage			
	a) Civil (Rs. Cr )	.....		
	b&c) Electrical & Mechanical (Rs. Cr )	.....		
	d) Subtotal (Rs. Cr)	.....		
	(e) Additional Contract Piling Works	.....		
6	Expected cost of completion (incl IDC and Estab cost)	.....		
7	Date of Commencement - Expected	2022-23		
8	Date of agreement	....		
9	Details of Tender	.....		
10	Name of contractor	.....		
11	Original Target date of completion	2026-27		
12	Revised Target date of completion	.....		
13	Source of funds	.....		
	a) Debt (Rs. Cr)	.....		
	b) Interest rate ( Rs.Cr)	.....		
	c) Own fund (Rs. Cr)	.....		
	d) Grants / subsidies etc.	.....		
14	Loan availed up to the beginning of the year (Rs. Cr)	.....		
		.....		
15	Loan proposed to be availed during the year (Rs. Cr)	.....		
	* The given details are as per modified DPR submitted in March-2018, but sanction not yet received.			
16	Year wise Physical and Financial target proposed/achieved			
	Particulars of Work	Physical Target	Financial (Rs. Cr)	
		Achievement	Target	Achvmt
	2022-23	6.40%	0.5	
	2023-24	15.60%	7	
	2024-25	7.80%	10	
2025-26	31.20%	20		

	2026-27	39.00%	26.61	
	<b>Total</b>	<b>100%</b>	<b>64.11</b>	
17	Details of the Project Management Team - Project Manager, Chembukadavu III & Maripuzha SHEPs.			
	a) Total in house employees	I-Executive Engineer, I-Assistant Executive Engineer, I Assistant Engineer, I-Sub Engineers		
	b) Monthly salary and other benefits			
	c) Other establishment cost - monthly			

Chathankottunada Stage I Small Hydro Electric Project				
1	Installed Capacity (MW)	Chathankottunada Stage I SHEP		
2	Annual Generation ( MU)	2X2.5 MW		
3	Total Project Cost excluding IDC	12.06		
	Total Project Cost including IDC as per DPR (Rs. Cr)	71.59		
	a) Civil (Rs. Cr )			
	b&c) Electrical& Mechanical (Rs. Cr )			
	d) Subtotal (Rs. Cr)			
4	Levelised tariff as per DPR (Rs. /kWh)	Rs. 4.09/Unit		
5	Project cost as per contract (Civil cost & Electrical cost together)Yet to be tendered			
	a) Civil (Rs. Cr )			
	b&c) Electrical & Mechanical (Rs. Cr )			
	d) Subtotal (Rs. Cr)			
6	Expected cost of completion (incl IDC and Estab cost)			
7	Date of Commencement	2022-23		
8	Date of agreement			
9	Details of Tender			
10	Name of contractor			
11	Original Target date of completion	2026-27		
12	Revised Target date of completion			
13	Source of funds			
	a) Debt (Rs. Cr)	34.38		
	b) Interest rate ( Rs.Cr)	13%		
	c) Own fund (Rs. Cr)	14.73		
	d) Grants / subsidies etc.	20		
14	Loan availed up to the beginning of the year (Rs. Cr)			
15	Loan proposed to be availed during the year (Rs. Cr)			
16	Year wise Physical and Financial target proposed/achieved			
	Particulars of Work	Physical Target	Financial (Rs. Cr)	
Achievement		Target	Achvmt	

	2022-23		0.75	
	2023-24		10	
	2024-25		20	
	2025-26		20	
	2026-27		20.84	
	Total	100	71.59	
17	Details of the Project Management Team			
	a) Total in house employees			
	b) Monthly salary and other benefits			
	c) Other establishment cost - monthly			

OLIKKAL SHEP						
Name of the Generation project			Olikkal SHEP			
Installed Capacity (MW)			2X2.5 MW			
Annual Generation (MU)			10.26 MU			
Project Cost as per DPR incl IDC (Rs.Cr)			46 Cr			
Expected cost of completion including IDC and in-house establishment cost (Employee cost, A&G expense etc.) (Rs.Cr)						
Levelised tariff as per DPR (Rs/kWh)			3.51			
Date of commencement			2022-23			
Target date of completion			2025-26			
<b>Details of Source of finance</b>			Tendering stage (Combined Civil & E&M) at the O/o of CE (CC-N)			
(a) Loan sanctioned (Rs.Cr)						
(b) Loan availed as on 31st March 2021 (Rs.Cr)						
(c) Interest rate						
(d) Other source of finance (own investment, Government grant etc.) Please specify			MNRE grant:17.5Cr.			
Physical and financial target proposed for the year (Substations and lines may be given separately)						
Particulars of the work	<b>Target for the financial year 2022-23</b>			<b>Target for the year 2023-24</b>		
	Physical target	Financial target (Rs.Cr)		Physical target	Financial target (Rs.Cr)	
	% of total works	Amount	Cumulative amount	% of total works	Amount	Cumulative amount
		8	8		15	23
Particulars of the work	<b>Target for the year 2024-25</b>			<b>Target for the year 2025-26</b>		
	Physical target	Financial target (Rs.Cr)		Physical target	Financial target (Rs.Cr)	
	% of total works	Amount	Cumulative amount	% of total works	Amount	Cumulative amount

			18	41	100		5	46
Particulars of the work	<b>Target for the year 2026-27</b>							
	Physical target	Financial target (Rs.Cr)						
	% of total works	Amount	Cumulative amount					

POOVARAMTHODE SHEP							
Name of the Generation project				Poovaramthode SHEP			
Installed Capacity (MW)				2X1.5 MW			
Annual Generation (MU)				5.88 MU			
Project Cost as per DPR incl IDC (Rs.Cr)				46			
Expected cost of completion including IDC and in-house establishment cost (Employee cost, A&G expense etc.) (Rs.Cr)							
Levelised tariff as per DPR (Rs/kWh)				4.41			
Date of commencement				2022-23			
Target date of completion				2024-25			
<b>Details of Source of finance</b>				Tendering stage (Combined Civil & E&M) at the O/o of CE (CC-N)			
(a) Loan sanctioned (Rs.Cr)							
(b) Loan availed as on 31st March 2021 (Rs.Cr)							
(c) Interest rate							
(d) Other source of finance (own investment, Government grant etc.) Please specify				MNRE grant:10.5Cr.			
Physical and financial target proposed for the year (Substations and lines may be given separately)							
Particulars of the work	<b>Target for the financial year 2022-23</b>				<b>Target for the year 2023-24</b>		
	Physical target	Financial target (Rs.Cr)			Physical target	Financial target (Rs.Cr)	
	% of total works	Amount	Cumulative amount		% of total works	Amount	Cumulative amount
			8	8		15	23
Particulars of the work	<b>Target for the year 2024-25</b>				<b>Target for the year 2025-26</b>		
	Physical target	Financial target (Rs.Cr)			Physical target	Financial target (Rs.Cr)	

	% of total works		Amount	Cumulative amount	% of total works		Amount	Cumulative amount
			18	41	100	5	46	
Particulars of the work	<b>Target for the year 2026-27</b>							
	Physical target		Financial target (Rs.Cr)					
	% of total works		Amount	Cumulative amount				

<b>MANKULAM HEP</b>								
1	Name of the Generation project				Mankulam			
2	Installed Capacity (MW)				2X20MW			
3	Annual Generation (MU)				102.85			
4	Project Cost as per DPR incl IDC (Rs.Cr)				750			
5	Expected cost of completion including IDC and in-house establishment cost (Employee cost, A&G expense etc.) (Rs.Cr)							
6	Levelised tariff as per DPR (Rs/kWh)				6.87			
7	Date of commencement				2022-23			
8	Target date of completion				2026-27			
9	<b>Details of Source of finance</b>							
	(a) Loan sanctioned (Rs.Cr)							
	(b) Loan availed as on 31st March 2021 (Rs.Cr)							
	(c) Interest rate							
	(d) Other source of finance (own investment, Government grant etc.) Please specify							
10	Physical and financial target proposed for the year (Substations and lines may be given separately)							
Particulars of the work	<b>Target for the financial year 2022-23</b>				<b>Target for the year 2023-24</b>			
	Physical target		Financial target (Rs.Cr)		Physical target		Financial target (Rs.Cr)	
	% of total works		Amount	Cumulative amount	% of total works		Amount	Cumulative amount
			100	100			200	300



Particulars of the work	Target for the year 2024-25			Target for the year 2025-26		
	Physical target	Financial target (Rs.Cr)		Physical target	Financial target (Rs.Cr)	
	% of total works	Amount	Cumulative amount	% of total works	Amount	Cumulative amount
		200	500		200	700
Particulars of the work	Target for the year 2026-27			Target for the year 2027-28		
	Physical target	Financial target (Rs.Cr)		Physical target	Financial target (Rs.Cr)	
	% of total works	Amount	Cumulative amount	% of total works	Amount	Cumulative amount
		50	750			

IDUKKI (GOLDEN JUBILEE) EXT. SCHEME		
1	Installed Capacity (MW)	4X200 MW
2	Annual Generation ( MU)	1301 Million Units
3	Project Cost including IDC as per DPR (Rs. Cr)	Rs.3062 Cr.
	a) Civil (Rs. Cr )	
	b&c) Electrical& Mechanical (Rs. Cr )	
	d) Subtotal (Rs. Cr)	
4	Levelised tariff as per DPR (Rs. /kWh)	Rs.4.67
5	Project cost as per contract (Civil cost & Electrical cost together)	
	a) Civil (Rs. Cr )	
	b&c) Electrical & Mechanical (Rs. Cr )	
	d) Subtotal (Rs. Cr)	
	(e) Additional Contract Piling Works	
6	Expected cost of completion (incl IDC and Estab cost)	
7	Date of Commencement	FY 2023-24
8	Date of agreement	FY 2028-29
9	Details of Tender	Not tendered
10	Name of contractor	NA
11	Original Target date of completion	FY 2028-29
12	Revised Target date of completion	
13	Source of funds	
	a) Debt (Rs. Cr)	
	b) Interest rate ( Rs.Cr)	
	c) Own fund (Rs. Cr)	
	d) Grants / subsidies etc.	
14	Loan availed up to the beginning of the year (Rs. Cr)	

15	Loan proposed to be availed during the year (Rs. Cr)			
16	Year wise Physical and Financial target proposed/achieved			
	Particulars of Work	Physical Target	Financial (Rs. Cr)	
		Achievement	Target	Achievement
	2022-23		NA	
	2023-24		168.38	
	2024-25		522.63	
	2025-26		868.37	
	2026-27		862.23	
	2027-28		440.47	
	2028-29		200.00	
Total		3062.08		
17	Details of the Project Management Team			
	a) Total in house employees			
	b) Monthly salary and other benefits			
	c) Other establishment cost - monthly			

Grid mounted solar Project at Ettumanoor		
1	Installed Capacity (MW)	1 MW
2	Annual Generation ( MU)	1.31 Million Units
3	Project Cost including IDC as per DPR (Rs. Cr)	Rs.6.687 Cr.
	a) Civil (Rs. Cr )	
	b&c) Electrical & Mechanical (Rs. Cr )	
	d) Subtotal (Rs. Cr)	Rs.6.687 Cr.(excluding IDC)
4	Levelised tariff as per DPR (Rs. /kWh)	
5	Project cost as per contract (Civil cost & Electrical cost together)	
	a) Civil (Rs. Cr )	
	b&c) Electrical & Mechanical (Rs. Cr )	
	d) Subtotal (Rs. Cr)	
	(e) Additional Contract Piling Works	
6	Expected cost of completion (incl IDC and Estab cost)	
7	Date of Commencement	FY 2022-23
8	Date of agreement	FY 2022-23
9	Details of Tender	Not tendered
10	Name of contractor	NA
11	Original Target date of completion	FY 2022-23
12	Revised Target date of completion	
13	Source of funds	
	a) Debt (Rs. Cr)	
	b) Interest rate ( Rs.Cr)	
	c) Own fund (Rs. Cr)	
	d) Grants / subsidies etc.	
14	Loan availed up to the beginning of the year (Rs. Cr)	

15	Loan proposed to be availed during the year (Rs. Cr)			
16	Year wise Physical and Financial target proposed/achieved			
	Particulars of Work	Physical Target	Financial (Rs. Cr)	
		Achievement	Target	Achievement
	2022-23		6.687	
	2023-24			
	2024-25			
	2025-26			
	2026-27			
Total		6.687		
17	Details of the Project Management Team			
	a) Total in house employees			
	b) Monthly salary and other benefits			
	c) Other establishment cost - monthly			

Grid mounted solar Project at Nenmara		
1	Installed Capacity (MW)	1.5 MW
2	Annual Generation ( MU)	1.8 Million Units
3	Project Cost including IDC as per DPR (Rs. Cr)	Rs.6.35 Cr.
	a) Civil (Rs. Cr )	
	b&c) Electrical& Mechanical (Rs. Cr )	
	d) Subtotal (Rs. Cr)	Rs.6.35 Cr.(excluding IDC)
4	Levelised tariff as per DPR (Rs. /kWh)	
5	Project cost as per contract (Civil cost & Electrical cost together)	
	a) Civil (Rs. Cr )	
	b&c) Electrical & Mechanical (Rs. Cr )	
	d) Subtotal (Rs. Cr)	
	(e) Additional Contract Piling Works	
6	Expected cost of completion (incl IDC and Etab cost)	
7	Date of Commencement	FY 2022-23
8	Date of agreement	FY 2022-23
9	Details of Tender	Not tendered
10	Name of contractor	NA
11	Original Target date of completion	FY 2022-23
12	Revised Target date of completion	
13	Source of funds	
	a) Debt (Rs. Cr)	
	b) Interest rate ( Rs.Cr)	
	c) Own fund (Rs. Cr)	
	d) Grants / subsidies etc.	
14	Loan availed up to the beginning of the year (Rs. Cr)	

15	Loan proposed to be availed during the year (Rs. Cr)		
16	Year wise Physical and Financial target proposed/achieved		
	Particulars of Work	Physical Target	Financial (Rs. Cr)
		Achievement	Target      Achievement
	2022-23		6.35
	2023-24		
	2024-25		
	2025-26		
	2026-27		
	Total		6.35
17	Details of the Project Management Team		
	a) Total in house employees		
	b) Monthly salary and other benefits		
	c) Other establishment cost - monthly		

PM KUSUM		
1	Installed Capacity (MW)	5.99 MW
2	Annual Generation ( MU)	7.87 Million Units
3	Project Cost including IDC as per DPR (Rs. Cr)	Rs. 22.75 Cr.
	a) Civil (Rs. Cr )	
	b&c) Electrical& Mechanical (Rs. Cr )	
	d) Subtotal (Rs. Cr)	Rs.6.687 Cr.(excluding IDC)
4	Levelised tariff as per DPR (Rs. /kWh)	
5	Project cost as per contract (Civil cost & Electrical cost together)	
	a) Civil (Rs. Cr )	
	b&c) Electrical & Mechanical (Rs. Cr )	
	d) Subtotal (Rs. Cr)	
	(e) Additional Contract Piling Works	
6	Expected cost of completion (incl IDC and Estab cost)	
7	Date of Commencement	FY 2022-23
8	Date of agreement	FY 2023-24
9	Details of Tender	Not tendered
10	Name of contractor	NA
11	Original Target date of completion	FY 2023-24
12	Revised Target date of completion	
13	Source of funds	
	a) Debt (Rs. Cr)	
	b) Interest rate ( Rs.Cr)	
	c) Own fund (Rs. Cr)	
	d) Grants / subsidies etc.	
14	Loan availed up to the beginning of the year (Rs. Cr)	

15	Loan proposed to be availed during the year (Rs. Cr)		
16	Year wise Physical and Financial target proposed/achieved		
	Particulars of Work	Physical Target	Financial (Rs. Cr)
		Achievement	Target      Achievement
	2022-23		9
	2023-24		13.75
	2024-25		
	2025-26		
	2026-27		
	Total		22.75
17	Details of the Project Management Team		
	a) Total in house employees		
	b) Monthly salary and other benefits		
	c) Other establishment cost - monthly		

Soura Kerala Model		
1	Installed Capacity (MW)	3 MW
2	Annual Generation ( MU)	4.99 Million Units
3	Project Cost including IDC as per DPR (Rs. Cr)	Rs. 22.75 Cr.
	a) Civil (Rs. Cr )	
	b&c) Electrical& Mechanical (Rs. Cr )	
	d) Subtotal (Rs. Cr)	Rs.8.25 Cr.(excluding IDC)
4	Levelised tariff as per DPR (Rs. /kWh)	
5	Project cost as per contract (Civil cost & Electrical cost together)	
	a) Civil (Rs. Cr )	
	b&c) Electrical & Mechanical (Rs. Cr )	
	d) Subtotal (Rs. Cr)	
	(e) Additional Contract Piling Works	
6	Expected cost of completion (incl IDC and Estab cost)	
7	Date of Commencement	FY 2022-23
8	Date of agreement	FY 2024-25
9	Details of Tender	Not tendered
10	Name of contractor	NA
11	Original Target date of completion	FY 2024-25
12	Revised Target date of completion	
13	Source of funds	
	a) Debt (Rs. Cr)	
	b) Interest rate ( Rs.Cr)	
	c) Own fund (Rs. Cr)	
	d) Grants / subsidies etc.	
14	Loan availed up to the beginning of the year (Rs. Cr)	

15	Loan proposed to be availed during the year (Rs. Cr)			
16	Year wise Physical and Financial target proposed/achieved			
	Particulars of Work	Physical Target	Financial (Rs. Cr)	
		Achievement	Target	Achievement
	2022-23		2.75	
	2023-24		2.75	
	2024-25		2.75	
	2025-26			
	2026-27			
	Total		8.25	
17	Details of the Project Management Team			
	a) Total in house employees			
	b) Monthly salary and other benefits			
	c) Other establishment cost - monthly			

## Annexure 1B: DETAILS OF ONGOING CAPITAL WORKS

BHOOTHATHANKETTU SHEP		
1	Installed Capacity (MW)	24MW
2	Annual Generation ( MU)	83.5MU
3	Project Cost including IDC as per DPR (Rs. Cr)	
	a) Civil (Rs. Cr )	109.51Cr.
	b) Electrical Rs. Cr )	108.76Cr
	c) Mechanical (Rs. Cr )	12.94 Cr
	d) Subtotal (Rs. Cr)	231.21Cr.
4	Levelised tariff as per DPR (Rs. /kWh)	Rs. 2.36
5	Project cost as per contract (Civil cost & Electrical cost together)	
	a) Civil (Rs. Cr )	108.04Cr. (revised)
	b&c) Electrical & Mechanical (Rs. Cr )	81.8 Cr.
	d) Subtotal (Rs. Cr)	189.84 Cr.
6	Expected cost of completion (incl IDC and Estab cost)	231.21 Cr.
7	Date of Commencement	15.02.2014
8	Date of agreement	Civil -07.3.2014, E&M -18.03.2015
9	Details of Tender	Civil -e-Tender No. 07/CCK/2013-14 (Re-tender) dtd 23.11.2013 --Tender no:CEPED/02/2013-14 dtd 23.01.2014(E&M Works)
10	Name of contractor	Civil Works - Sree Saravana Engineering Bhavani Pvt Ltd, RPP Infra Projects Ltd Joint Venture, 367A, Mettur Main Road, Bhavani, Erode. Tamilnadu
		E & M Works - - Sree Saravana Engineering Bhavani Pvt Ltd - ZHAOYANG Consortium, 367A, Mettur Main Road, Bhavani, Erode
11	Original Target date of completion	Civil works-14.02.2016 E& M Works 03.08.2016
12	Revised Target date of completion	Civil works – 30.11.2021
		E& M Works - 31.05.2022 (proposed)
13	Source of funds	REC Ltd:-149.32Cr,KSEBoard ltd-20.52Cr.
	a) Debt (Rs. Cr)	149.32Cr
	b) Interest rate ( Rs.Cr)	15 years; 10.16% with monthly interest( 1 year reset)
	c) Own fund (Rs. Cr)	KSEBoard ltd-20.52Cr
	d) Grants / subsidies etc.	Sanctioned MNRE grant 20 Cr. Availed 1 <sup>st</sup> , 2 <sup>nd</sup> and 3 <sup>rd</sup> installment amounting to Rs. 18 Cr.
14	Loan availed up to the beginning of the year (Rs. Cr)	114.69 cr

15	Loan proposed to be availed during the year (Rs. Cr)	34.63 Cr		
16	Year wise Physical and Financial target proposed/achieved			
	Particulars of Work	Physical Target	Financial (Rs. Cr)	
		Achievement	Target	Achvmt
	2022-23 :	3%	12 Cr	
	2024-25			
	2025-26 :			
2026-27				
	Total	3%	12 Cr	
17	Details of the Project Management Team			
	a) Total in house employees	Project Manager – 1No, AEE -2 nos, AE- 2 Nos, SE- 4 Nos		
	b) Monthly salary and other benefits	Rs. 15,51,183		
	c) Other establishment cost - monthly	Rs.2,00,000		

Poringalkuthu SHEP		
1	Name of the Generation project	Poringalkuthu SHEP
2	Installed Capacity (MW)	1x24MW
3	Annual Generation (MU)	14.84 MU
4	Project Cost as per DPR incl IDC (Rs.Cr)	171.42 Cr. (AS amount)
		E&M Contract amount - Rs. 41.10 Cr.
5	Expected cost of completion including IDC and in-house establishment cost (Employee cost, A&G expense etc.) (Rs.Cr)	
6	Levelised tariff as per DPR (Rs/kWh)	
7	Date of commencement	10.10.14
8	Target date of completion	31.03.21 (Extended upto 15.03.22)
9	<b>Details of Source of finance</b>	
	(a) Loan sanctioned (Rs.Cr)	
	(b) Loan availed as on 31st March 2021 (Rs.Cr)	
	(c) Interest rate	
	(d) Other source of finance (own investment, Government grant etc.) Please specify	MNRE grant
10	Physical and financial target proposed for the year (Substations and lines may be given separately)	



Particulars of the work	Target for the financial year 2022-23				Target for the year 2023-24			
	Physical target		Financial target (Rs.Cr)		Physical target		Financial target (Rs.Cr)	
	% of total works		Amount	Cumulative amount	% of total works		Amount	Cumulative amount
	100	100	6.5					
Particulars of the work	Target for the year 2024-25				Target for the year 2025-26			
	Physical target		Financial target (Rs.Cr)		Physical target		Financial target (Rs.Cr)	
	% of total works		Amount	Cumulative amount	% of total works		Amount	Cumulative amount

THOTTIYAR HEP			
1	Installed Capacity (MW)		40MW
2	Annual Generation ( MU)		99MU
3	Project Cost including IDC as per DPR (Rs. Cr)		217.54 Cr.
	a) Civil (Rs. Cr )		44.16 Cr.
	b)Electrical (Rs. Cr )		75.68 Cr
	c) Mechanical (Rs. Cr )		30.78 Cr
	D) Administration & Establishment (Rs. Cr)		22.67 Cr
	d) Subtotal (Rs. Cr)		217. 54 Cr.
	Revised Administrative sanction for the project		280.Cr
4	Levelised tariff as per DPR (Rs. /kWh)		Rs. 2.41
The original contract is foreclosed vide Foreclosure Agt dated 28.04.2017 to the Original Agt. No.04/CECC/2008-09 dated 22.12.2008 and the balance works are tendered vide E-Tender No.CECCS/02/2017-18 dtd.20.05.2017, Work Order for balance was issued vide Work Order No.CECCS/03/2017-18 dtd. 05.01.2018 and Agreement was executed on 05.04.2018 vide Agt. No.01/CECC/2018-19 dtd.05.04.2018.			
6	Project cost as per contract (Civil cost & Electrical cost togetehr	Work as per Original Agt.	Balance works as per present Contract
	(a) Civil (Rs.Cr.)	44.2 Crore	76.47 Crore
	(b) Electrical (Rs. Cr.)	75.7 Crore	101.1327 Cr
	(c) Mechanical works (Rs. Cr.)	24.10 Crore	21.30 Crore

	(d) Sub Total (Rs. Cr.)	144 Crore	198.9027Cr.
	Expected cost of completion including IDC and in house establishment cost employee cost, A&g expense etc)	217.54 Crores	Administrative Sanction - 280 Crores (As per BO (DB)No.3269 /2016 (DGC/AEIII/THYR/2014) dated 19.11.2016)
7	Date of Commencement	16.01.2009	09.04.2018
8	Date of agreement	22.12.2008	Agreement for balance works executed on 05.04.2018
9	Details of Tender	Work was tendered from the Office of the Chief Engineer (Civil Construction) South, Vydhyuthi Bhavanam, Thiruvananthapuram vide e-Tender No.CECCS/01/2007-08 dated 31.08.2007)	Balance Civil work was tendered from the Office of the Chief Engineer (Civil Construction) South, Vydhuthi Bhavanam, Thiruvananthapuram vide e-Tender No.CECCS/02/2017-18 dated 20.05.2017 and work order was issued on 05.01.2018 as per W.O No. CECCS/03/2017-18 dated 05.01.2018 of CE(CC)South, Tvpm. Agreement for balance works executed on 05.04.2018. The work is in progress. KSEBL has decided to execute the balance electro mechanical works departmentally. Accordingly tender for the erection of the supplied electro mechanical equipments were invited from the O/o CE (PED), and the work is awarded to Fitwell Constructions. The electrical works are in progress
10	Name of contractor	CPL -Chongqing JV. Tamilnadu E & M Works - SSEB-ZHAOYANG Consortium, 367A, Mettur Main Road, Bhavani, Erode Tamilnadu	PRIL-SSIPL Consortium, Shri Saravana Industries Pvt.Ltd, Trichy.
11	Original Target date of completion	19.05.2012. Extended upto 11.11.2015	Time extension granted upto 31.12.2021. Time of completion has to be extended based on the time of completion of E&M Works
12	Revised Target date of completion	Extended date was 11.11.2015. But the work could not be completed in time due to the delay in handing over of the land and	For civil works, the time of completion is to be extended based on the time of completion of E&M Works. Time extension

		financial stringency faced by the contractor. Work was foreclosed as per foreclosure agreement executed on 28.04.2017.	for civil works has been granted upto 31.12.2021.		
13	Source of funds	Rural Electrification Corporation Ltd	Own fund .		
	a) Debt (Rs. Cr)	165.44 Cr.			
	b) Interest rate ( Rs.Cr)	loan foreclosed			
	c) Own fund (Rs. Cr)	KSEBoard Ltd-20.52Cr			
	d) Grants / subsidies etc.	165.44 Cr.			
14	Loan availed up to the beginning of the year (Rs. Cr)	86.28Cr. (loan foreclosed)	86.28Cr. (loan foreclosed)		
15	Loan proposed to be availed during the year (Rs. Cr)				
16	Year wise Physical and Financial target proposed/achieved				
	Particulars of Work	Physical Target	Physical Target	Financial (Rs. Cr)	
			Achievement		Achvmt
	2022-23 : weir.....	Road to weir- intake structure finishing works- balance works		12 Cr	
	2022-23 – Power house	finishing works of power house ,yard etc fencing			
	2022-23- Penstock	Penstock track, painting retaining wall, drains track concreting , finishing works etc	5%		
	2022-23 E &M works	Balance E& M erection works – lighting cabling , air conditioning fire fighting etc		10 Cr	
17	Details of the Project Management Team - Project Manager – 1No, AEE-4 Nos, AE- 5 nos, SE-14 nOS				
	a) Total in house employees	24 Nos			
	b) Monthly salary and other benefits	Rs. 39,51, 289/-			
	c) Other establishment cost - monthly	Rs. 1,50,000/-			

SENGULAM AUGMENTATION SCHEME		
1	Installed Capacity (MW)	Augmenting the existing 48MW Sengulam Project
2	Annual Generation ( MU)	85 MU
3	Project Cost including IDC as per DPR (Rs. Cr)	
	a) Civil (Rs. Cr )	81.30 (Revised)
	Electrical, Mechanical , . Administration and establishment, Land& Interest during construction (Rs. Cr )	
	d) Subtotal (Rs. Cr)	<b>81.30 (Revised)</b>
4	Levelised tariff as per DPR (Rs. /kWh)	Rs. 1.52
5	Project cost as per contract (Civil cost & Electrical cost together)	
	a) Civil (Rs. Cr )	81.30 (Revised)
	b&c) Electrical & Mechanical (Rs. Cr )	
	d) Subtotal (Rs. Cr)	81.30 (Revised)
6	Expected cost of completion (incl IDC and Estab cost)	110 Cr.
7	Date of Commencement	06.07.2009
8	Date of agreement	15.07.2009.
9	Details of Tender	Tender No. CECCS/02/ 2008-09 dated 30.06.2008 - Execution of Sengulam Augmentation Scheme - Construction of a concrete gravity weir across Western Kallar, Intake arrangements, diversion tunnel, exit channel, access roads etc. Estimate cost Rs. 39 Crore. Quoted rate 9% above the estimate rate
10	Name of contractor	Dr. Sasi Eloor
		Engineering Contractor,
		Eloor House , UNIDEC JV.,
		Kolenchery P.O., Pin Code: 682311
11	Original Target date of completion	08.01.2013
12	Revised Target date of completion	17.03.2022
13	Source of funds	Own fund
	a) Debt (Rs. Cr)	
	b) Interest rate ( Rs.Cr)	
	c) Own fund (Rs. Cr)	
	d) Grants / subsidies etc.	
14	Loan availed up to the beginning of the year (Rs. Cr)	

15	Loan proposed to be availed during the year (Rs. Cr)		
16	Year wise Physical and Financial target proposed/achieved		
	Particulars of Work	Physical Target	Financial (Rs. Cr)
		Achievement	Target
	2022-23 :		5%- 15 Cr
	2023-24		5%- 15 Cr
	2024-25		5%- 15 Cr
	2025-26 :		5%- 15 Cr
	2026-27		
Total			
17	Details of the Project Management Team- Project Manager- 1 No, AEE- 3 Nos, AE – 1 No. SE- 1 No		
	a) Total in house employees	6 Nos	
	b) Monthly salary and other benefits	Rs. 11,58,190	
	c)Other establishment cost - monthly	Rs. 2,00,000	

PALLIVASAL EXTENSION SCHEME							
1	Name of the Generation project			Pallivasal Extension Scheme			
2	Installed Capacity (MW)			2x30MW			
3	Annual Generation (MU)			164.9			
4	Project Cost as per DPR incl IDC (Rs.Cr)			Rs.235.54Cr.(Civil-Rs.85.86Cr., E&M-Rs.90Cr, IDC Rs.59.68 Cr.)			
				Rs.69.66Cr.(balance of E&M works)			
5	Expected cost of completion including IDC and in-house establishment cost (Employee cost, A&G expense etc.) (Rs.Cr)						
6	Levelised tariff as per DPR (Rs/kWh)						
7	Date of commencement			03-09-2007			
8	Target date of completion			December 2022 (Tentative)			
9	<b>Details of Source of finance</b>						
	(a) Loan sanctioned (Rs.Cr)						
	(b) Loan availed as on 31st March 2021 (Rs.Cr)						
	(c) Interest rate						
	(d) Other source of finance (own investment, Government grant etc.) Please specify						
10	Physical and financial target proposed for the year (Substations and lines may be given separately)						
	Particulars of the work	<b>Target for the financial year</b>			<b>Target for the year 2023-24</b>		
		<b>2022-23</b>					
		Physical target	Financial target (Rs.Cr)		Physical target	Financial target (Rs.Cr)	
		% of total works	Amount	Cumulative amount	% of total works	Amount	Cumulative amount
			100	71.68			
		69.66 (E&M)					

Particulars of the work	Target for the year 2024-25			Target for the year 2025-26		
	Physical target	Financial target (Rs.Cr)		Physical target	Financial target (Rs.Cr)	
	% of total works	Amount	Cumulative amount	% of total works	Amount	Cumulative amount
Particulars of the work	Target for the year 2026-27					
	Physical target	Financial target (Rs.Cr)				
	% of total works	Amount	Cumulative amount			

CHINNAR SHEP				
1	Name of the Generation project	Chinnar SHEP		
2	Installed Capacity (MW)	2x12 MW		
3	Annual Generation (MU)	76.45 Mu		
4	Project Cost as per DPR incl IDC (Rs.Cr)	269.87 Cr.		
5	Expected cost of completion including IDC and in-house establishment cost (Employee cost, A&G expense etc.) (Rs.Cr)			
6	Levelised tariff as per DPR (Rs/kWh)	Rs.4.52/ kWh		
7	Date of commencement			
8	Target date of completion			
9	<b>Details of Source of finance</b>	Tendering stage (Combined Civil & E&M) at the O/o CE(CI&CC).		
	(a) Loan sanctioned (Rs.Cr)			
	(b) Loan availed as on 31st March 2021 (Rs.Cr)			
	(c) Interest rate			
	(d) Other source of finance (own investment, Government grant etc.) Please specify			
10	Physical and financial target proposed for the year (Substations and lines may be given separately)			
Particulars of the work	Target for the financial year 2022-23		Target for the year 2023-24	
	Physical target	Financial target (Rs.Cr)	Physical target	Financial target (Rs.Cr)

	% of total works		Amount	Cumulative amount	% of total works		Amount	Cumulative amount
				54				54.00
Particulars of the work	<b>Target for the year 2024-25</b>				<b>Target for the year 2025-26</b>			
	Physical target	Financial target (Rs.Cr)			Physical target	Financial target (Rs.Cr)		
	% of total works	Amount	Cumulative amount	% of total works	Amount	Cumulative amount		
Particulars of the work	<b>Target for the year 2026-27</b>							
	Physical target	Financial target (Rs.Cr)						
	% of total works	Amount	Cumulative amount					

<b>PERUVANNAMUZHI SHEP</b>		
1	Name of the Generation project	Peruvannamuzhi SHEP
2	Installed Capacity (MW)	6 MW
3	Annual Generation (MU)	24.70 Mu
4	Project Cost as per DPR incl IDC (Rs.Cr)	84.11 Cr. Contract Amount - 29.39Cr.
5	Expected cost of completion including IDC and in-house establishment cost (Employee cost, A&G expense etc.) (Rs.Cr)	92.61 Cr
6	Levelised tariff as per DPR (Rs/kWh)	Rs.3.59 / kWh
7	Date of commencement	25.05.2018
8	Target date of completion	31.03.2023
9	<b>Details of Source of finance</b>	
	(a) Loan sanctioned (Rs.Cr)	Rs. 49.8518 Cr
	(b) Loan availed as on 31st March 2021 (Rs.Cr)	Loan amount claimed is Rs.25.77 Cr. But not received by KSEB Ltd
	(c) Interest rate	1.5% less than RBI lending rate (NABARD Loan)

	(d) Other source of finance (own investment, Government grant etc.) Please specify				Govt. Contribution: Rs. 2.6238 Cr; MNRE Grant : Rs.20 Cr ; Own Contribution : Rs.40.1344 Cr				
10	Physical and financial target proposed for the year (Substations and lines may be given separately)								
Particulars of the work	<b>Target for financial year 2022-23</b>				<b>Target for the year 2023-24</b>				
	Physical target		Financial target (Rs.Cr)		Physical target		Financial target (Rs.Cr)		
	% of total works		Amount	Cumulative amount	% of total works		Amount	Cumulative amount	
	E&M Works	85	85%	38.1	38.1	15%	100%	23.72	67.49
	Particulars of the work	<b>Target for the year 2024-25</b>				<b>Target for the year 2025-26</b>			
		Physical target		Financial target (Rs.Cr)		Physical target		Financial target (Rs.Cr)	
		% of total works		Amount	Cumulative amount	% of total works		Amount	Cumulative amount
Particulars of the work	<b>Target for the year 2026-27</b>								
	Physical target		Financial target (Rs.Cr)						
	% of total works		Amount	Cumulative amount					

PAZHASSI SAGAR		
1	Name of the Generation project	Pazhassi Sagar
2	Installed Capacity (MW)	3x2.5
3	Annual Generation (MU)	26.5
4	Project Cost as per DPR incl IDC (Rs.Cr)	113.02Cr-Revised AS,E & M- 57.87Cr
		Contract Amount - 48.27Cr.
5	Expected cost of completion including IDC and in-house establishment cost (Employee cost, A&G expense etc.) (Rs.Cr)	
6	Levelised tariff as per DPR (Rs/kWh)	3.21
7	Date of commencement	10.02.2021
8	Target date of completion	10.09.2023



9	<b>Details of Source of finance</b>								
	(a) Loan sanctioned (Rs.Cr)								
	(b) Loan availed as on 31st March 2021 (Rs.Cr)								
	(c) Interest rate								
	(d) Other source of finance (own investment, Government grant etc.) Please specify								
10	Physical and financial target proposed for the year (Substations and lines may be given separately)								
	Particulars of the work	<b>Target for the financial year 2022-23</b>				<b>Target for the year 2023-24</b>			
		Physical target		Financial target (Rs.Cr)		Physical target		Financial target (Rs.Cr)	
		% of total works		Amount	Cumulative amount	% of total works		Amount	Cumulative amount
	E&M Works	37%	37	50.12	50.12	63%	100	17.88	68
	Particulars of the work	<b>Target for the year 2024-25</b>				<b>Target for the year 2025-26</b>			
		Physical target		Financial target (Rs.Cr)		Physical target		Financial target (Rs.Cr)	
		% of total works		Amount	Cumulative amount	% of total works		Amount	Cumulative amount
Particulars of the work	<b>Target for the year 2026-27</b>								
	Physical target		Financial target (Rs.Cr)						
	% of total works		Amount	Cumulative amount					

Anakkayam		
1	Name of the Generation project	Anakkayam
2	Installed Capacity (MW)	7.5
3	Annual Generation (MU)	22.83
4	Project Cost as per DPR incl IDC (Rs.Cr)	139.62

5	Expected cost of completion including IDC and in-house establishment cost (Employee cost, A&G expense etc.) (Rs.Cr)						
6	Levelised tariff as per DPR (Rs/kWh)		4.13				
7	Date of commencement						
8	Target date of completion		2025-26				
9	<b>Details of Source of finance</b>						
	(a) Loan sanctioned (Rs.Cr)						
	(b) Loan availed as on 31st March 2021 (Rs.Cr)						
	(c) Interest rate						
	(d) Other source of finance (own investment, Government grant etc.) Please specify						
10	Physical and financial target proposed for the year (Substations and lines may be given separately)						
	Particulars of the work	<b>Target for the financial year 2022-23</b>		<b>Target for the year 2023-24</b>			
		Physical target	Financial target (Rs.Cr)	Physical target	Financial target (Rs.Cr)		
		% of total works	Amount	Cumulative amount	% of total works	Amount	Cumulative amount
	E&M Works		30				
	Particulars of the work	<b>Target for the year 2024-25</b>		<b>Target for the year 2025-26</b>			
		Physical target	Financial target (Rs.Cr)	Physical target	Financial target (Rs.Cr)		
		% of total works	Amount	Cumulative amount	% of total works	Amount	Cumulative amount
	Particulars of the work	<b>Target for the year 2026-27</b>					
		Physical target	Financial target (Rs.Cr)				
		% of total works	Amount	Cumulative amount			

Kuttiyadi RMU								
1	Name of the Generation project			Kuttiyadi RMU				
2	Installed Capacity (MW)			3x25 MW to 3x27.5MW				
3	Annual Generation (MU)			272.8				
	Project Cost as per DPR incl IDC (Rs.Cr)			Rs.377.41 Cr.				
				Rs.327.20Cr. without IDC out of which Rs. 150Cr. for Penstock work, 169.55Cr. for E&M.				
				Contract Amount - Rs.89.82 Cr.				
5	Expected cost of completion including IDC and in-house establishment cost (Employee cost, A&G expense etc.) (Rs.Cr)							
6	Levelised tariff as per DPR (Rs/kWh)			1.4946				
7	Date of commencement			26.12.2019				
8	Target date of completion			25.03.2023				
9	<b>Details of Source of finance</b>							
	(a) Loan sanctioned (Rs.Cr)							
	(b) Loan availed as on 31st March 2021 (Rs.Cr)							
	(c) Interest rate							
	(d) Other source of finance (own investment, Government grant etc.) Please specify							
10	Physical and financial target proposed for the year (Substations and lines may be given separately)							
	Particulars of the work	<b>Target for the financial year 2022-23</b>			<b>Target for the year 2023-24</b>			
		Physical target	Financial target (Rs.Cr)		Physical target	Financial target (Rs.Cr)		
		% of total works	Amount	Cumulative amount	% of total works	Amount	Cumulative amount	
		65	65	3.2	3.7	35	100	76
	Particulars of the work	<b>Target for the year 2024-25</b>			<b>Target for the year 2025-26</b>			
		Physical target	Financial target (Rs.Cr)		Physical target	Financial target (Rs.Cr)		
		% of total works	Amount	Cumulative amount	% of total works	Amount	Cumulative amount	
				10.12	89.82			
	Particulars of the work	<b>Target for the year 2026-27</b>						
		Physical target	Financial target (Rs.Cr)					
		% of total works	Amount	Cumulative amount				

## Annexure 2: New Renovation/Replacement work (Major work 5 Cr and Above)

(Name of the work)					
1	Name of the Generation Project	Rectification/ Replacement of Penstocks , butterfly valves, gate valves and allied works of Sengulam HEP			
R	Installed Capacity (MW)				
3	Annual Generation (MU)				
4	Project Cost including IDC as per DPR ( Rs Cr)	97 Cr			
	a) Civil ( Rs. Cr )				
	b) Electrical ( Rs. Cr)				
	c) Mechanical ( Rs. Cr)				
	d) Sub Total ( Rs. Cr)				
5	Levelised tariff as per DPR ( Rs. /KWh)				
6	Project cost as per contract ( Civil & Electrical)	97 Cr			
7	Expected cost of completion (including IDC etc.)				
8	Date of Commencement	2022-23			
9	Date of Agreement				
10	Details of Tender				
11	Name of Contractor				
12	Original Target date of completion	2024-25			
13	Revised Target date of completion				
14	Source of funds	Own fund			
	a) Debt ( Rs. Cr )				
	b) Interest rate ( Rs. Cr)				
	c) Own fund ( Rs. Cr )				
	d) Grants/ subsidies etc.				
15	Loan availed till 2018-19 ( Rs. Cr)	NIL			
16	Loan proposed during 2018-19 ( Rs. Cr)				
17	Year wise Physical and Financial target proposed / achieved ( Each Civil work & Electrical work may be given separately)				
	Particulars of Work	Physical		Financial (Rs. Cr.)	
		Target	Achievement	Target	Achievement
	2022-23 :	50%		33.205	NIL
	2023-24	25%		16.603	NIL
	2024-25	25%		47.192	
	2025-26 :				

	2026-27				
	Total				
18	Details of Project Management Team				
	a) Total in house employees	No Project Management formed at present			
	b) Monthly salary and other benefits (Rs Cr.)				
	c) Other establishment cost - monthly (Rs Cr.)				

Stator winding replacement				
1	Name of the Generation Project	Sabarigiri HEP		
R	Installed Capacity (MW)			
3	Annual Generation (MU)			
4	Project Cost including IDC as per DPR ( Rs Cr)	110.5 Cr		
	a) Civil ( Rs. Cr )			
	b) Electrical ( Rs. Cr)			
	c) Mechanical ( Rs. Cr)			
	d) Sub Total ( Rs. Cr)			
5	Levelised tariff as per DPR ( Rs. /KWh)			
6	Project cost as per contract ( Civil & Electrical)			
7	Expected cost of completion (including IDC etc.)			
8	Date of Commencement	FY 2022-23		
9	Date of Agreement			
10	Details of Tender			
11	Name of Contractor			
12	Original Target date of completion	FY 2025-26		
13	Revised Target date of completion			
14	Source of funds	Own fund		
	a) Debt ( Rs. Cr )			
	b) Interest rate ( Rs. Cr)			
	c) Own fund ( Rs. Cr )			
	d) Grants/ subsidies etc.			
15	Loan availed till 2018-19 ( Rs. Cr)	NIL		
16	Loan proposed during 2018-19 ( Rs. Cr)			
17	Year wise Physical and Financial target proposed / achieved ( Each Civil work & Electrical work may be given separately)			
	Particulars of Work	Physical		Financial (Rs. Cr.)
		Target	Achievement	Target      Achievement
	2022-23 :			24              NIL
	2023-24			35              NIL

	2024-25			24	
	2025-26 :			27.5	
	2026-27				
	Total			110.5	
18	Details of Project Management Team				
	a) Total in house employees	No Project Management formed at present			
	b) Monthly salary and other benefits (Rs Cr.)				
	c) Other establishment cost - monthly (Rs Cr.)				

Shaft replacement				
1	Name of the Generation Project	Sabarigiri HEP		
R	Installed Capacity (MW)			
3	Annual Generation (MU)			
4	Project Cost including IDC as per DPR ( Rs Cr)	16 Cr		
	a) Civil ( Rs. Cr )			
	b) Electrical ( Rs. Cr)			
	c) Mechanical ( Rs. Cr)			
	d) Sub Total ( Rs. Cr)			
5	Levelised tariff as per DPR ( Rs. /KWh)			
6	Project cost as per contract ( Civil & Electrical)			
7	Expected cost of completion (including IDC etc.)			
8	Date of Commencement	FY 2022-23		
9	Date of Agreement			
10	Details of Tender			
11	Name of Contractor			
12	Original Target date of completion	FY 2023-24		
13	Revised Target date of completion			
14	Source of funds	Own fund		
	a) Debt ( Rs. Cr )			
	b) Interest rate ( Rs. Cr)			
	c) Own fund ( Rs. Cr )			
	d) Grants/ subsidies etc.			
15	Loan availed till 2018-19 ( Rs. Cr)	NIL		
16	Loan proposed during 2018-19 ( Rs. Cr)			
17	Year wise Physical and Financial target proposed / achieved ( Each Civil work & Electrical work may be given separately)			
	Particulars of Work	Physical		Financial (Rs. Cr.)
		Target	Achievement	Target      Achievement
	2022-23 :			8                      NIL

	2023-24			8	NIL
	2024-25				
	2025-26 :				
	2026-27...				
	Total			16	
18	Details of Project Management Team				
	a) Total in house employees	No Project Management formed at present			
	b) Monthly salary and other benefits (Rs Cr.)				
	c) Other establishment cost - monthly (Rs Cr.)				

U#4 Revamping					
1	Name of the Generation Project	Sabarigiri HEP			
R	Installed Capacity (MW)				
3	Annual Generation (MU)				
4	Project Cost including IDC as per DPR ( Rs Cr)	5Cr			
	a) Civil ( Rs. Cr )				
	b) Electrical ( Rs. Cr)				
	c) Mechanical ( Rs. Cr)				
	d) Sub Total ( Rs. Cr)				
5	Levelised tariff as per DPR ( Rs. /KWh)				
6	Project cost as per contract ( Civil & Electrical)				
7	Expected cost of completion (including IDC etc.)				
8	Date of Commencement	FY 2022-23			
9	Date of Agreement				
10	Details of Tender				
11	Name of Contractor				
12	Original Target date of completion	FY 2022-23			
13	Revised Target date of completion				
14	Source of funds	Own fund			
	a) Debt ( Rs. Cr )				
	b) Interest rate ( Rs. Cr)				
	c) Own fund ( Rs. Cr )				
	d) Grants/ subsidies etc.				
15	Loan availed till 2018-19 ( Rs. Cr)	NIL			
16	Loan proposed during 2018-19 ( Rs. Cr)				
17	Year wise Physical and Financial target proposed / achieved ( Each Civil work & Electrical work may be given separately)				
	Particulars of Work	Physical		Financial (Rs. Cr.)	
		Target	Achievement	Target	Achievement
	2022-23 :			5	NIL
	2023-24 ...				NIL

	2024-25 ...				
	2025-26 :				
	2026-27...				
	Total			5	
18	Details of Project Management Team				
	a) Total in house employees	No Project Management formed at present			
	b) Monthly salary and other benefits (Rs Cr.)				
	c) Other establishment cost - monthly (Rs Cr.)				

Renovation of control system and runners					
1	Name of the Generation Project	Sabarigiri HEP			
R	Installed Capacity (MW)				
3	Annual Generation (MU)				
4	Project Cost including IDC as per DPR ( Rs Cr)	57.5 Cr			
	a) Civil ( Rs. Cr )				
	b) Electrical ( Rs. Cr)				
	c) Mechanical ( Rs. Cr)				
	d) Sub Total ( Rs. Cr)				
5	Levelised tariff as per DPR ( Rs. /KWh)				
6	Project cost as per contract ( Civil & Electrical)				
7	Expected cost of completion (including IDC etc.)				
8	Date of Commencement	FY 2022-23			
9	Date of Agreement				
10	Details of Tender				
11	Name of Contractor				
12	Original Target date of completion	FY 2022-23			
13	Revised Target date of completion				
14	Source of funds	Own fund			
	a) Debt ( Rs. Cr )				
	b) Interest rate ( Rs. Cr)				
	c) Own fund ( Rs. Cr )				
	d) Grants/ subsidies etc.				
15	Loan availed till 2018-19 ( Rs. Cr)	NIL			
16	Loan proposed during 2018-19 ( Rs. Cr)				
17	Year wise Physical and Financial target proposed / achieved ( Each Civil work & Electrical work may be given separately)				
	Particulars of Work	Physical		Financial (Rs. Cr.)	
		Target	Achievement	Target	Achievement
	2022-23 :				NIL
	2023-24				NIL
	2024-25				



	2025-26 :			42.5	
	2026-27			15	
	Total			57.5	
18	Details of Project Management Team				
	a) Total in house employees	No Project Management formed at present			
	b) Monthly salary and other benefits (Rs Cr.)				
	c) Other establishment cost - monthly (Rs Cr.)				

110 kV Feeder Bay & Transformer replacement		
1	Name of the Generation Project	Sabarigiri HEP
R	Installed Capacity (MW)	
3	Annual Generation (MU)	
4	Project Cost including IDC as per DPR ( Rs Cr)	9 Cr
	a) Civil ( Rs. Cr )	
	b) Electrical ( Rs. Cr)	
	c) Mechanical ( Rs. Cr)	
	d) Sub Total ( Rs. Cr)	
5	Levelised tariff as per DPR ( Rs. /KWh)	
6	Project cost as per contract ( Civil & Electrical)	
7	Expected cost of completion (including IDC etc.)	
8	Date of Commencement	FY 2025-26
9	Date of Agreement	
10	Details of Tender	
11	Name of Contractor	
12	Original Target date of completion	FY 2025-26
13	Revised Target date of completion	
14	Source of funds	Own fund

	a) Debt ( Rs. Cr )			
	b) Interest rate ( Rs. Cr)			
	c) Own fund ( Rs. Cr )			
	d) Grants/ subsidies etc.			
15	Loan availed till 2018-19 ( Rs. Cr)	NIL		
16	Loan proposed during 2018-19 ( Rs. Cr)			
17	Year wise Physical and Financial target proposed / achieved ( Each Civil work & Electrical work may be given separately)			
	Particulars of Work	Physical		Financial (Rs. Cr.)
		Target	Achievement	Target
	2022-23 : .....			
	2023-24 .....			
	2024-25 .....			
	2025-26 : .....			9
	2026-27.....			
	Total			9
18	Details of Project Management Team			
	a) Total in house employees	No Project Management formed at present		
	b) Monthly salary and other benefits (Rs Cr.)			
	c) Other establishment cost - monthly (Rs Cr.)			

Replacement of PRV		
1	Name of the Generation Project	Panniyar HEP
R	Installed Capacity (MW)	
3	Annual Generation (MU)	
4	Project Cost including IDC as per DPR ( Rs Cr)	8.81 Cr
	a) Civil ( Rs. Cr )	

	b) Electrical ( Rs. Cr)				
	c) Mechanical ( Rs. Cr)				
	d) Sub Total ( Rs. Cr)				
5	Levelised tariff as per DPR ( Rs. /KWh)				
6	Project cost as per contract ( Civil & Electrical)				
7	Expected cost of completion (including IDC etc.)				
8	Date of Commencement	FY 2022-23			
9	Date of Agreement				
10	Details of Tender				
11	Name of Contractor				
12	Original Target date of completion	FY 2022-23			
13	Revised Target date of completion				
14	Source of funds	Own fund			
	a) Debt ( Rs. Cr )				
	b) Interest rate ( Rs. Cr)				
	c) Own fund ( Rs. Cr )				
	d) Grants/ subsidies etc.				
15	Loan availed till 2018-19 ( Rs. Cr)	NIL			
16	Loan proposed during 2018-19 ( Rs. Cr)				
17	Year wise Physical and Financial target proposed / achieved ( Each Civil work & Electrical work may be given separately)				
	Particulars of Work	Physical		Financial (Rs. Cr.)	
		Target	Achievement	Target	Achievement
	2022-23 : .....			8.81	NIL
	2023-24 .....				NIL
	2024-25 .....				
	2025-26 : .....				
	2026-27.....				
	Total			8.81	

18	Details of Project Management Team	
	a) Total in house employees	No Project Management formed at present
	b) Monthly salary and other benefits (Rs Cr.)	
	c) Other establishment cost - monthly (Rs Cr.)	

Renovation of Governor System		
1	Name of the Generation Project	KAKKAD HEP
R	Installed Capacity (MW)	
3	Annual Generation (MU)	
4	Project Cost including IDC as per DPR ( Rs Cr)	6 Cr
	a) Civil ( Rs. Cr )	
	b) Electrical ( Rs. Cr)	
	c) Mechanical ( Rs. Cr)	
	d) Sub Total ( Rs. Cr)	
5	Levelised tariff as per DPR ( Rs. /KWh)	
6	Project cost as per contract ( Civil & Electrical)	
7	Expected cost of completion (including IDC etc.)	
8	Date of Commencement	FY 2022-23
9	Date of Agreement	
10	Details of Tender	
11	Name of Contractor	
12	Original Target date of completion	FY 2022-23
13	Revised Target date of completion	
14	Source of funds	Own fund
	a) Debt ( Rs. Cr )	
	b) Interest rate ( Rs. Cr)	
	c) Own fund ( Rs. Cr )	
	d) Grants/ subsidies etc.	

15	Loan availed till 2018-19 ( Rs. Cr)	NIL			
16	Loan proposed during 2018-19 ( Rs. Cr)				
17	Year wise Physical and Financial target proposed / achieved ( Each Civil work & Electrical work may be given separately)				
	Particulars of Work	Physical		Financial (Rs. Cr.)	
		Target	Achievement	Target	Achievement
	2022-23 : .....			6	NIL
	2023-24 .....				NIL
	2024-25 .....				
	2025-26 : .....				
	2026-27.....				
	Total			6	
18	Details of Project Management Team				
	a) Total in house employees	No Project Management formed at present			
	b) Monthly salary and other benefits (Rs Cr.)				
	c) Other establishment cost - monthly (Rs Cr.)				

GIS Switching Station		
1	Name of the Generation Project	KHEP
R	Installed Capacity (MW)	
3	Annual Generation (MU)	
4	Project Cost including IDC as per DPR ( Rs Cr)	40 Cr
	a) Civil ( Rs. Cr )	
	b) Electrical ( Rs. Cr)	
	c) Mechanical ( Rs. Cr)	
	d) Sub Total ( Rs. Cr)	
5	Levelised tariff as per DPR ( Rs. /KWh)	
6	Project cost as per contract ( Civil & Electrical)	
7	Expected cost of completion (including IDC etc.)	
8	Date of Commencement	FY 2022-23
9	Date of Agreement	
10	Details of Tender	
11	Name of Contractor	
12	Original Target date of completion	FY 2022-23

13	Revised Target date of completion				
14	Source of funds	Own fund			
	a) Debt ( Rs. Cr )				
	b) Interest rate ( Rs. Cr)				
	c) Own fund ( Rs. Cr )				
	d) Grants/ subsidies etc.				
15	Loan availed till 2018-19 ( Rs. Cr)	NIL			
16	Loan proposed during 2018-19 ( Rs. Cr)				
17	Year wise Physical and Financial target proposed / achieved ( Each Civil work & Electrical work may be given separately)				
	Particulars of Work	Physical		Financial (Rs. Cr.)	
		Target	Achievement	Target	Achievement
	2022-23 :				NIL
	2023-24				NIL
	2024-25				
	2025-26 :				
	2026-27			40	
	Total			40	
18	Details of Project Management Team				
	a) Total in house employees	No Project Management formed at present			
	b) Monthly salary and other benefits (Rs Cr.)				
	c) Other establishment cost - monthly (Rs Cr.)				

Refurbishment of stage I MIV		
1	Name of the Generation Project	IHEP
R	Installed Capacity (MW)	
3	Annual Generation (MU)	
4	Project Cost including IDC as per DPR ( Rs Cr)	6 Cr
	a) Civil ( Rs. Cr )	
	b) Electrical ( Rs. Cr)	
	c) Mechanical ( Rs. Cr)	
	d) Sub Total ( Rs. Cr)	
5	Levelised tariff as per DPR ( Rs. /KWh)	
6	Project cost as per contract ( Civil & Electrical)	

7	Expected cost of completion (including IDC etc.)				
8	Date of Commencement	FY 2022-23			
9	Date of Agreement				
10	Details of Tender				
11	Name of Contractor				
12	Original Target date of completion	FY 2023-24			
13	Revised Target date of completion				
14	Source of funds	Own fund			
	a) Debt ( Rs. Cr )				
	b) Interest rate ( Rs. Cr)				
	c) Own fund ( Rs. Cr )				
	d) Grants/ subsidies etc.				
15	Loan availed till 2018-19 ( Rs. Cr)	NIL			
16	Loan proposed during 2018-19 ( Rs. Cr)				
17	Year wise Physical and Financial target proposed / achieved ( Each Civil work & Electrical work may be given separately)				
	Particulars of Work	Physical		Financial (Rs. Cr.)	
		Target	Achievement	Target	Achievement
	2022-23 : .....			4.8	
	2023-24 .....			1.2	
	2024-25 .....				
	2025-26 : .....				
	2026-27.....				
	Total			6	
18	Details of Project Management Team				
	a) Total in house employees	No Project Management formed at present			
	b) Monthly salary and other benefits (Rs Cr.)				
	c) Other establishment cost - monthly (Rs Cr.)				

Revamping of KSEBL Colony		
1	Name of the Generation Project	IHEP
R	Installed Capacity (MW)	
3	Annual Generation (MU)	
4	Project Cost including IDC as per DPR ( Rs Cr)	10.53Cr
	a) Civil ( Rs. Cr )	
	b) Electrical ( Rs. Cr)	

	c) Mechanical ( Rs. Cr)				
	d) Sub Total ( Rs. Cr)				
5	Levelised tariff as per DPR ( Rs. /KWh)				
6	Project cost as per contract ( Civil & Electrical)				
7	Expected cost of completion (including IDC etc.)				
8	Date of Commencement	FY 2022-23			
9	Date of Agreement				
10	Details of Tender				
11	Name of Contractor				
12	Original Target date of completion	FY 2022-23			
13	Revised Target date of completion				
14	Source of funds	Own fund			
	a) Debt ( Rs. Cr )				
	b) Interest rate ( Rs. Cr)				
	c) Own fund ( Rs. Cr )				
	d) Grants/ subsidies etc.				
15	Loan availed till 2018-19 ( Rs. Cr)	NIL			
16	Loan proposed during 2018-19 ( Rs. Cr)				
17	Year wise Physical and Financial target proposed / achieved ( Each Civil work & Electrical work may be given separately)				
	Particulars of Work	Physical		Financial (Rs. Cr.)	
		Target	Achievement	Target	Achievement
	2022-23 :			8.43	NIL
	2023-24			2.1	NIL
	2024-25				
	2025-26 :				
	2026-27				
	Total			10.53	
18	Details of Project Management Team				
	a) Total in house employees	No Project Management formed at present			
	b) Monthly salary and other benefits (Rs Cr.)				
	c) Other establishment cost - monthly (Rs Cr.)				

RLA of stage II machines		
1	Name of the Generation Project	IHEP
R	Installed Capacity (MW)	
3	Annual Generation (MU)	
4	Project Cost including IDC as per DPR ( Rs Cr)	5.5 Cr
	a) Civil ( Rs. Cr )	
	b) Electrical ( Rs. Cr)	
	c) Mechanical ( Rs. Cr)	



	d) Sub Total ( Rs. Cr)				
5	Levelised tariff as per DPR ( Rs. /KWh)				
6	Project cost as per contract ( Civil & Electrical)				
7	Expected cost of completion (including IDC etc.)				
8	Date of Commencement	FY 2022-23			
9	Date of Agreement				
10	Details of Tender				
11	Name of Contractor				
12	Original Target date of completion	FY 2022-23			
13	Revised Target date of completion				
14	Source of funds	Own fund			
	a) Debt ( Rs. Cr )				
	b) Interest rate ( Rs. Cr)				
	c) Own fund ( Rs. Cr )				
	d) Grants/ subsidies etc.				
15	Loan availed till 2018-19 ( Rs. Cr)	NIL			
16	Loan proposed during 2018-19 ( Rs. Cr)				
17	Year wise Physical and Financial target proposed / achieved ( Each Civil work & Electrical work may be given separately)				
	Particulars of Work	Physical		Financial (Rs. Cr.)	
		Target	Achievement	Target	Achievement
	2022-23 :			5.5	NIL
	2023-24				NIL
	2024-25				
	2025-26 :				
	2026-27				
Total			5.5		
18	Details of Project Management Team				
	a) Total in house employees	No Project Management formed at present			
	b) Monthly salary and other benefits (Rs Cr.)				
	c) Other establishment cost - monthly (Rs Cr.)				

Purchase of Spare runners		
1	Name of the Generation Project	IHEP
R	Installed Capacity (MW)	
3	Annual Generation (MU)	
4	Project Cost including IDC as per DPR ( Rs Cr)	14 Cr
	a) Civil ( Rs. Cr )	
	b) Electrical ( Rs. Cr)	
	c) Mechanical ( Rs. Cr)	
	d) Sub Total ( Rs. Cr)	
5	Levelised tariff as per DPR ( Rs. /KWh)	
6	Project cost as per contract ( Civil & Electrical)	

7	Expected cost of completion (including IDC etc.)				
8	Date of Commencement	FY 2023-24			
9	Date of Agreement				
10	Details of Tender				
11	Name of Contractor				
12	Original Target date of completion	FY 2023-24			
13	Revised Target date of completion				
14	Source of funds	Own fund			
	a) Debt ( Rs. Cr )				
	b) Interest rate ( Rs. Cr)				
	c) Own fund ( Rs. Cr )				
	d) Grants/ subsidies etc.				
15	Loan availed till 2018-19 ( Rs. Cr)	NIL			
16	Loan proposed during 2018-19 ( Rs. Cr)				
17	Year wise Physical and Financial target proposed / achieved ( Each Civil work & Electrical work may be given separately)				
	Particulars of Work	Physical		Financial (Rs. Cr.)	
		Target	Achievement	Target	Achievement
	2022-23 :				NIL
	2023-24			14	NIL
	2024-25				
	2025-26 :				
	2026-27				
	Total			14	
18	Details of Project Management Team				
	a) Total in house employees	No Project Management formed at present			
	b) Monthly salary and other benefits (Rs Cr.)				
	c) Other establishment cost - monthly (Rs Cr.)				

Purchase of 6 nos of GTs	
1	IHEP
R	Installed Capacity (MW)
3	Annual Generation (MU)
4	Project Cost including IDC as per DPR ( Rs Cr)
	a) Civil ( Rs. Cr )
	b) Electrical ( Rs. Cr)
	c) Mechanical ( Rs. Cr)
	d) Sub Total ( Rs. Cr)
	30 Cr

5	Levelised tariff as per DPR ( Rs. /KWh)					
6	Project cost as per contract ( Civil & Electrical)					
7	Expected cost of completion (including IDC etc.)					
8	Date of Commencement	FY 2025-26				
9	Date of Agreement					
10	Details of Tender					
11	Name of Contractor					
12	Original Target date of completion	FY 2026-27				
13	Revised Target date of completion					
14	Source of funds	Own fund				
	a) Debt ( Rs. Cr )					
	b) Interest rate ( Rs. Cr)					
	c) Own fund ( Rs. Cr )					
	d) Grants/ subsidies etc.					
15	Loan availed till 2018-19 ( Rs. Cr)	NIL				
16	Loan proposed during 2018-19 ( Rs. Cr)					
17	Year wise Physical and Financial target proposed / achieved ( Each Civil work & Electrical work may be given separately)					
	Particulars of Work	Physical		Financial (Rs. Cr.)		
		Target	Achievement	Target	Achievement	
	2022-23 :				NIL	
	2023-24				NIL	
	2024-25					
	2025-26 :			3		
	2026-27			27		
Total			30			
18	Details of Project Management Team					
	a) Total in house employees	No Project Management formed at present				
	b) Monthly salary and other benefits (Rs Cr.)					
	c) Other establishment cost - monthly (Rs Cr.)					

SCADA Implementation		
1	Name of the Generation Project	LP
R	Installed Capacity (MW)	
3	Annual Generation (MU)	
4	Project Cost including IDC as per DPR ( Rs Cr)	5 Cr

	a) Civil ( Rs. Cr )				
	b) Electrical ( Rs. Cr )				
	c) Mechanical ( Rs. Cr )				
	d) Sub Total ( Rs. Cr )				
5	Levelised tariff as per DPR ( Rs. /KWh)				
6	Project cost as per contract ( Civil & Electrical)				
7	Expected cost of completion (including IDC etc.)				
8	Date of Commencement	FY 2022-23			
9	Date of Agreement				
10	Details of Tender				
11	Name of Contractor				
12	Original Target date of completion	FY 2024-25			
13	Revised Target date of completion				
14	Source of funds	Own fund			
	a) Debt ( Rs. Cr )				
	b) Interest rate ( Rs. Cr )				
	c) Own fund ( Rs. Cr )				
	d) Grants/ subsidies etc.				
15	Loan availed till 2018-19 ( Rs. Cr)	NIL			
16	Loan proposed during 2018-19 ( Rs. Cr)				
17	Year wise Physical and Financial target proposed / achieved ( Each Civil work & Electrical work may be given separately)				
	Particulars of Work	Physical		Financial (Rs. Cr.)	
		Target	Achievement	Target	Achievement
	2022-23 :			2	NIL
	2023-24			2	NIL
	2024-25			1	
	2025-26 :				
	2026-27				
	Total			5	
18	Details of Project Management Team				
	a) Total in house employees	No Project Management formed at present			
	b) Monthly salary and other benefits (Rs Cr.)				
	c) Other establishment cost - monthly (Rs Cr.)				

Governor renovation		
1	Name of the Generation Project	LP
R	Installed Capacity (MW)	
3	Annual Generation (MU)	
4	Project Cost including IDC as per DPR ( Rs Cr)	9 Cr

	a) Civil ( Rs. Cr )					
	b) Electrical ( Rs. Cr )					
	c) Mechanical ( Rs. Cr )					
	d) Sub Total ( Rs. Cr )					
5	Levelised tariff as per DPR ( Rs. /KWh)					
6	Project cost as per contract ( Civil & Electrical)					
7	Expected cost of completion (including IDC etc.)					
8	Date of Commencement	FY 2022-23				
9	Date of Agreement					
10	Details of Tender					
11	Name of Contractor					
12	Original Target date of completion	FY 2024-25				
13	Revised Target date of completion					
14	Source of funds	Own fund				
	a) Debt ( Rs. Cr )					
	b) Interest rate ( Rs. Cr )					
	c) Own fund ( Rs. Cr )					
	d) Grants/ subsidies etc.					
15	Loan availed till 2018-19 ( Rs. Cr )	NIL				
16	Loan proposed during 2018-19 ( Rs. Cr )					
17	Year wise Physical and Financial target proposed / achieved ( Each Civil work & Electrical work may be given separately)					
	Particulars of Work		Physical		Financial (Rs. Cr.)	
			Target	Achievement	Target	Achievement
	2022-23 :				2.7	NIL
	2023-24				2.7	NIL
	2024-25				3.6	
	2025-26 :					
	2026-27					
	Total			9		
18	Details of Project Management Team					
	a) Total in house employees	No Project Management formed at present				
	b) Monthly salary and other benefits (Rs Cr.)					
	c) Other establishment cost - monthly (Rs Cr.)					

Purchase of GT		
1	Name of the Generation Project	Sholayar PH
R	Installed Capacity (MW)	
3	Annual Generation (MU)	
4	Project Cost including IDC as per DPR ( Rs Cr)	7.5 Cr
	a) Civil ( Rs. Cr )	

	b) Electrical ( Rs. Cr)				
	c) Mechanical ( Rs. Cr)				
	d) Sub Total ( Rs. Cr)				
5	Levelised tariff as per DPR ( Rs. /KWh)				
6	Project cost as per contract ( Civil & Electrical)				
7	Expected cost of completion (including IDC etc.)				
8	Date of Commencement	FY 2022-23			
9	Date of Agreement				
10	Details of Tender				
11	Name of Contractor				
12	Original Target date of completion	FY 2024-25			
13	Revised Target date of completion				
14	Source of funds	Own fund			
	a) Debt ( Rs. Cr )				
	b) Interest rate ( Rs. Cr)				
	c) Own fund ( Rs. Cr )				
	d) Grants/ subsidies etc.				
15	Loan availed till 2018-19 ( Rs. Cr)	NIL			
16	Loan proposed during 2018-19 ( Rs. Cr)				
17	Year wise Physical and Financial target proposed / achieved ( Each Civil work & Electrical work may be given separately)				
	Particulars of Work	Physical		Financial (Rs. Cr.)	
		Target	Achievement	Target	Achievement
	2022-23 :			2.5	NIL
	2023-24			2.5	NIL
	2024-25			2.5	
	2025-26 :				
	2026-27				
	Total			7.5	
18	Details of Project Management Team				
	a) Total in house employees	No Project Management formed at present			
	b) Monthly salary and other benefits (Rs Cr.)				
	c) Other establishment cost - monthly (Rs Cr.)				

Replacement of 4 nos of Butterfly Valve		
1	Name of the Generation Project	Porigalkuthu
R	Installed Capacity (MW)	
3	Annual Generation (MU)	
4	Project Cost including IDC as per DPR ( Rs Cr)	6 Cr
	a) Civil ( Rs. Cr )	
	b) Electrical ( Rs. Cr)	

	c) Mechanical ( Rs. Cr)				
	d) Sub Total ( Rs. Cr)				
5	Levelised tariff as per DPR ( Rs. /KWh)				
6	Project cost as per contract ( Civil & Electrical)				
7	Expected cost of completion (including IDC etc.)				
8	Date of Commencement	FY 2023-24			
9	Date of Agreement				
10	Details of Tender				
11	Name of Contractor				
12	Original Target date of completion	FY 2025-26			
13	Revised Target date of completion				
14	Source of funds	Own fund			
	a) Debt ( Rs. Cr )				
	b) Interest rate ( Rs. Cr)				
	c) Own fund ( Rs. Cr )				
	d) Grants/ subsidies etc.				
15	Loan availed till 2018-19 ( Rs. Cr)	NIL			
16	Loan proposed during 2018-19 ( Rs. Cr)				
17	Year wise Physical and Financial target proposed / achieved ( Each Civil work & Electrical work may be given separately)				
	Particulars of Work	Physical		Financial (Rs. Cr.)	
		Target	Achievement	Target	Achievement
	2022-23 :			1.5	NIL
	2023-24			1.5	NIL
	2024-25			1.5	
	2025-26 :			1.5	
	2026-27				
	Total			6	
18	Details of Project Management Team				
	a) Total in house employees	No Project Management formed at present			
	b) Monthly salary and other benefits (Rs Cr.)				
	c) Other establishment cost - monthly (Rs Cr.)				

Penstock renovation		
1	Name of the Generation Project	Porigalkuthu
R	Installed Capacity (MW)	
3	Annual Generation (MU)	
4	Project Cost including IDC as per DPR ( Rs Cr)	9 Cr
	a) Civil ( Rs. Cr )	
	b) Electrical ( Rs. Cr)	
	c) Mechanical ( Rs. Cr)	
	d) Sub Total ( Rs. Cr)	
5	Levelised tariff as per DPR ( Rs. /KWh)	
6	Project cost as per contract ( Civil & Electrical)	

7	Expected cost of completion (including IDC etc.)				
8	Date of Commencement	FY 2025-26			
9	Date of Agreement				
10	Details of Tender				
11	Name of Contractor				
12	Original Target date of completion	FY 2025-26			
13	Revised Target date of completion				
14	Source of funds	Own fund			
	a) Debt ( Rs. Cr )				
	b) Interest rate ( Rs. Cr)				
	c) Own fund ( Rs. Cr )				
	d) Grants/ subsidies etc.				
15	Loan availed till 2018-19 ( Rs. Cr)	NIL			
16	Loan proposed during 2018-19 ( Rs. Cr)				
17	Year wise Physical and Financial target proposed / achieved ( Each Civil work & Electrical work may be given separately)				
	Particulars of Work	Physical		Financial (Rs. Cr.)	
		Target	Achievement	Target	Achievement
	2022-23 :				NIL
	2023-24				NIL
	2024-25				
	2025-26 :			9	
	2026-27				
Total			9		
18	Details of Project Management Team				
	a) Total in house employees	No Project Management formed at present			
	b) Monthly salary and other benefits (Rs Cr.)				
	c) Other establishment cost - monthly (Rs Cr.)				

Penstock Replacement		
1	Name of the Generation Project	Pallivasal
R	Installed Capacity (MW)	
3	Annual Generation (MU)	
4	Project Cost including IDC as per DPR ( Rs Cr)	47.67 Cr
	a) Civil ( Rs. Cr )	
	b) Electrical ( Rs. Cr)	
	c) Mechanical ( Rs. Cr)	
	d) Sub Total ( Rs. Cr)	
5	Levelised tariff as per DPR ( Rs. /KWh)	
6	Project cost as per contract ( Civil & Electrical)	
7	Expected cost of completion (including IDC etc.)	
8	Date of Commencement	FY 2022-23



9	Date of Agreement				
10	Details of Tender				
11	Name of Contractor				
12	Original Target date of completion	FY 2023-24			
13	Revised Target date of completion				
14	Source of funds	Own fund			
	a) Debt ( Rs. Cr )				
	b) Interest rate ( Rs. Cr)				
	c) Own fund ( Rs. Cr )				
	d) Grants/ subsidies etc.				
15	Loan availed till 2018-19 ( Rs. Cr)	NIL			
16	Loan proposed during 2018-19 ( Rs. Cr)				
17	Year wise Physical and Financial target proposed / achieved ( Each Civil work & Electrical work may be given separately)				
	Particulars of Work	Physical		Financial (Rs. Cr.)	
		Target	Achievement	Target	Achievement
	2022-23 :			39.75	
	2023-24			7.92	NIL
	2024-25				
	2025-26 :				
	2026-27				
	Total			47.67	
18	Details of Project Management Team				
	a) Total in house employees	No Project Management formed at present			
	b) Monthly salary and other benefits (Rs Cr.)				
	c) Other establishment cost - monthly (Rs Cr.)				

REPOWERING KANJIKODE WIND FARM		
1	Name of the Generation project	<b>Repowering Kanjikode Wind Farm</b>
2	Installed Capacity (MW)	Approximately 6MW
3	Annual Generation (MU)	
4	Project Cost as per DPR incl IDC (Rs.Cr)	34.58Cr.
5	Expected cost of completion including IDC and in-house establishment cost (Employee cost, A&G expense etc.) (Rs.Cr)	
6	Levelised tariff as per DPR (Rs/kWh)	
7	Date of commencement	21-22
8	Target date of completion	23-24
9	<b>Details of Source of finance</b>	
	(a) Loan sanctioned (Rs.Cr)	
	(b) Loan availed as on 31st March 2021 (Rs.Cr)	
	(c) Interest rate	

	(d) Other source of finance (own investment, Government grant etc.) Please specify								
10	Physical and financial target proposed for the year (Substations and lines may be given separately)								
	Particulars of the work	<b>Target for the financial year 2022-23</b>				<b>Target for the year 2023-24</b>			
		Physical target		Financial target (Rs.Cr)		Physical target		Financial target (Rs.Cr)	
		% of total works		Amount	Cumulative amount	% of total works		Amount	Cumulative amount
		50	50	15	15.15	50	100	16.2	31.35
	Particulars of the work	<b>Target for the year 2024-25</b>				<b>Target for the year 2025-26</b>			
		Physical target		Financial target (Rs.Cr)		Physical target		Financial target (Rs.Cr)	
		% of total works		Amount	Cumulative amount	% of total works		Amount	Cumulative amount
	Particulars of the work	<b>Target for the year 2026-27</b>							
		Physical target		Financial target (Rs.Cr)					
		% of total works		Amount	Cumulative amount				
				3.15	34.5				

### Annexure 3: New Renovation/Replacement work (less than 5 Cr)

#### NEW RENOVATION/REPLACEMENT WORK (LESS THAN 5 Cr)

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
1	Meencut	Panniar Hydro Electric Project	Design, Engineering, Manufacture, Supply, Erection, Testing and Commissioning of 2 Nos. 18 MVA, 110/11 Kv, 3 Phase Generator Transformer at Panniar Hydro Electric Project	2022-23	2022-23	4.30					4.3
3		Neriamangalam Hydro Electric Project	Supply, Errection and commissioning of cooling water pump	2022-23	2022-23	0.05					0.05
4			Dewatering pump	2022-23	2022-23	0.03					0.03
5			Electro static filter for governer oil	2022-23	2022-23	0.04					0.036
6			Replacement of CTs	2022-23	2022-23	0.05					0.05
7			Replacement of power cable	2023-24	2023-24		0.05				0.05
8		Sengulam HEP	Replacement of 66kV CT	2022-23	2022-23		0.12				0.12

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
9			Replacement of 110kV Breaker (3 No.)	2023-24	2023-24		0.39				0.39
10			Replacement of 110/66 KV, 40 MVA Auto Transformer, TELK Make, Year of Manufacture;1975 with new 25 MVA 110 /66kV Power Transformer at Sengulam HEP, Vellathooval	2024-25	2024-25			2.64			2.64
11			Replacement of water pressure reducer	2024-25	2024-25			0.08			0.08
12			Replacement of stainer for cooling water system.	2025-26	2025-26				0.05		0.05
13			Replacement of water pressure reducer, cooling water pipes, valves	2026-27	2026-27					0.43	0.43
14	Moozhiyar	Sabarigiri	Materials / spares / maintenance works	2022-23	2022-23	0.50					0.5
15			Power house AC maintenance	2022-23	2022-23	0.03					0.03
16			Repairs to Plant & Machinery	2022-23	2022-23	3.00					3
17			Procurement of Air conditioner	2022-23	2022-23	0.10					0.1

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
18			Revamping of station emergency DC lighting	2022-23	2022-23	0.10					0.1
19			Revamping of station lighting system	2022-23	2022-23	0.05					0.05
20			Renovation of CO2 gas discharge station for Unit#1,#2,#3,#5 and #6	2022-23	2022-23	0.80					0.8
22			Battery	2022-23	2022-23	2.00					2
23			Fire Fighting	2022-23	2022-23	1.25					1.25
24			Material purchase of maintenance work	2022-23	2022-23	0.04					0.04
25			Replacement of 220KV Breakers (2 Nos)	2022-23	2022-23	0.40					0.4
26			Replacement of yard light	2022-23	2022-23	0.05					0.05
27			Maintenance and rewiring of quarters	2022-23	2022-23	0.05					0.05
28			Maintenancing HT &LT feeders , power supply to residential buildings and offices on contract	2022-23	2022-23	0.13					0.13

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
29			Materials, Poles, Cables etc.	2022-23	2022-23	0.10					0.1
30			Purchase of Safety Equipments, Tools & Plants	2022-23	2022-23	0.01					0.01
31			Procurement of critical spare cards for the existing AK3 DCS SCADA system	2022-23	2022-23	0.15					0.15
32			Spares , Tools and Computer System	2022-23	2022-23	0.75					0.75
33			Vibration Monitoring System	2022-23	2022-23	1.00					1
34			Condition Monitoring system	2022-23	2022-23	1.00					1
35			Personal Safety Equipments	2022-23	2022-23	0.02					0.02
36			R & M of Computer, Printer, water purifier etc	2022-23	2022-23	0.01					0.01
37			Furniture	2022-23	2022-23	0.01					0.01
38			T & P	2022-23	2022-23	0.03					0.03

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
40			Repair and Modernising cranes at PH, Main store, Kochupampa pump House and Valve House	2022-23	2022-23	0.10					0.1
42			Fabrication & Re-engineering works	2022-23	2022-23	0.25					0.25
43			Critical Spares & Auxiliary Equipments	2022-23	2022-23	0.45					0.45
44			Refurbishment of Butterfly Valve	2022-23	2022-23	0.15					0.15
45			Renovation and construction of offices, colony and colony maintenance	2022-23	2022-23	3.11					3.11
65			Installation of Elevator at Power House	2022-23	2022-23	0.26					0.26
66			Rock Protection work of PH	2022-23	2022-23	0.20					0.2
67			Civil renovation work at Moozhiyar House	2022-23	2022-23	0.70					0.695
70			SGHEP - R&M and Overhauling of 35 HP Pumps at Sayipinkuzhy, Lock out & School etc	2022-23	2022-23	0.03					0.03

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
76			SGHEP-Power House-Trasfomer Cooling water tank-rectification work	2022-23	2022-23	0.02					0.02
78			Materials / spares / maintenance works	2023-24	2023-24		0.60				0.6
79			Power house AC Replacement	2023-24	2023-24		0.05				0.05
80			Repairs to Plant & Machenery	2023-24	2023-24		2.25				2.25
81			Procurement of cooling water pump motor	2023-24	2023-24		0.10				0.1
82			Revamping of station emergency DC lighting	2023-24	2023-24		0.10				0.1
83			Motor control system	2023-24	2023-24		0.25				0.25
85			Power cables & Accessories	2023-24	2023-24		1.50				1.5
86			Replacement of 220KV Breakers (1 Nos)	2023-24	2023-24		0.50				0.5
87			Replacement of yard light	2023-24	2023-24		0.05				0.05



Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
88			Tools & Plant	2023-24	2023-24		0.30				0.3
89			Maintenance and rewiring of quarters	2023-24	2023-24		0.10				0.1
90			Emergency & other maintenance	2023-24	2023-24		0.07				0.07
91			Maintenancing HT &LT feeders , power supply to residential buildings and offices on contract	2023-24	2023-24		0.18				0.18
92			Materials, Poles, Cables etc.	2023-24	2023-24		0.25				0.25
93			Renewing of 11kv feeders	2023-24	2023-24		0.80				0.8
94			Drawing of LT ABC at colony	2023-24	2023-24		0.20				0.2
95			Procurement of critical spares	2023-24	2023-24		0.50				0.5
96			Spares , Tools and Computer System	2023-24	2023-24		0.30				0.3
97			Condition Monitoring system	2023-24	2023-24		1.00				1

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
99			Repair and Modernising cranes at PH, Main store, Kochupampa pump House and Valve House	2023-24	2023-24		0.10				0.1
101			Repairs to Plant & Machinery	2023-24	2023-24		0.75				0.75
102			Personal Safety Equipments	2023-24	2023-24		0.03				0.03
103			Club Renovation	2023-24	2023-24		0.05				0.05
104			Renovation of Hospital building at P.S Colony	2023-24	2023-24		0.05				0.05
105			Roofing & Ceiling of quarters	2023-24	2023-24		2.00				2
106			Construction of office building in PH Compound	2023-24	2023-24		2.00				2
107			Renovation of main store building at PH	2023-24	2023-24		0.25				0.25
108			Fencing of PS colony	2023-24	2023-24		0.10				0.1
109			Renovation and Painting of Dam Safety office building, Moozhiyar	2023-24	2023-24		0.15				0.15

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
110			Maintanace of Recreation club	2023-24	2023-24		0.05				0.05
111			Renovation of office building	2023-24	2023-24		0.25				0.25
112			Construction of Switch yard Sub division office building	2023-24	2023-24		0.30				0.3
113			Rock Protection work of PH	2023-24	2023-24		0.20				0.2
114			Retaining wall at PS Colony Moozhiyar	2023-24	2023-24		0.05				0.05
115			Maintenance of colony water supply	2023-24	2023-24		0.05				0.05
116			Supplying and laying GI pumping Pipe line work at colony	2023-24	2023-24		0.10				0.1
117			Maintenance of Steps in Penstock track.	2023-24	2023-24		0.05				0.05
118			SGHEP- Maintenance of Colony road	2023-24	2023-24		0.25				0.25
119			Beutification of Children's Park	2023-24	2023-24		0.02				0.02

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
120			Spreading 6 mm metal around workmen quarters at P.S Colony.	2023-24	2023-24		0.10				0.1
121			SGHEP-Power House-Trasfomer Cooling water tank-rectification work	2023-24	2023-24		0.02				0.02
122			Refurbishment of MIV Valve	2023-24	2023-24		0.25				0.25
123			Critical Spares & Auxilary Equipments	2023-24	2023-24		0.75				0.75
124			Fabrication & Reengineering works	2023-24	2023-24		0.25				0.25
125			Materials / spares / maintenance works	2024-25	2024-25			0.70			0.7
126			Power house Panel Replacement	2024-25	2024-25			0.15			0.15
127			Repairs to Plant & Machenery	2024-25	2024-25			2.55			2.55
128			Procurement of cooling water pump motor	2024-25	2024-25			0.10			0.1
129			Renovation of cabling	2024-25	2024-25			0.50			0.5

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
130			MCC & PCC	2024-25	2024-25			0.25			0.25
132			Insulation of 110kv Transformer and yard.	2024-25	2024-25			2.50			2.5
133			Furniture and Fixtures	2024-25	2024-25			0.05			0.05
134			Replacement of 220KV Breakers (1 Nos)	2024-25	2024-25			0.50			0.5
135			Replacement of yard equipment	2024-25	2024-25			0.50			0.5
136			Tools & Plant	2024-25	2024-25			0.51			0.51
137			Maintenance and rewiring of quarters	2024-25	2024-25			0.10			0.1
138			Emergency & other maintenance	2024-25	2024-25			0.10			0.1
139			Maintenancing HT &LT feeders , power supply to residential buildings and offices on contract	2024-25	2024-25			0.20			0.2
140			Materials, Poles, Cables etc.	2024-25	2024-25			0.35			0.35

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
141			Renewing of 11kv feeders	2024-25	2024-25			0.80			0.8
142			Drawing of LT ABC at colony	2024-25	2024-25			0.40			0.4
143			Purchase of Safety Equipments, Tools & Plants	2024-25	2024-25			0.04			0.04
144			Procurement of critical spares	2024-25	2024-25			0.75			0.75
145			Spares , Tools and Computer System	2024-25	2024-25			0.50			0.5
146			Condition Monitoring system	2024-25	2024-25			1.00			1
147			Personal Safety Equipments	2024-25	2024-25			0.06			0.06
148			Renovation of buildings	2024-25	2024-25			0.30			0.3
149			Roofing & Ceiling of quarters	2024-25	2024-25			2.00			2
150			Construction of office building in PH Campound	2024-25	2024-25			1.00			1
151			Construction of dormitory	2024-25	2024-25			2.00			2

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
152			Renovation of office building	2024-25	2024-25			0.10			0.1
153			OTHER CIVIL WORKS - Misellaneous	2024-25	2024-25			0.25			0.25
154			Refurbishment of Auxiliary pumps & Valves	2024-25	2024-25			0.50			0.5
155			Critical Spares & Auxiliary Equipments	2024-25	2024-25			1.00			1
156			Fabrication & Reengineering works	2024-25	2024-25			0.50			0.5
157			Repair and Modernising equipments at PH, Main store, Kochupampa pump House and Valve House	2024-25	2024-25			0.10			0.1
159			Repairs to Plant & Machenery	2024-25	2024-25			0.75			0.75
160			Materials / spares / maintenance works	2025-26	2025-26				0.80		0.8
161			Repairs to Plant & Machenery	2025-26	2025-26				2.75		2.75
162			Procurement of spares and accessories	2025-26	2025-26				0.30		0.3

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
163			Renovation of cabling & Panels	2025-26	2025-26				0.50		0.5
164			MCC & PCC	2025-26	2025-26				0.25		0.25
166			Installation of Auxilares Transformers & Panels	2025-26	2025-26				2.00		2
167			Replacement of 220KV Breakers (1 Nos)	2025-26	2025-26				0.50		0.5
168			Replacement of yard equipment	2025-26	2025-26				0.50		0.5
170			Maintenance and rewiring of quarters	2025-26	2025-26				0.20		0.2
171			Emergency & other maintenance	2025-26	2025-26				0.20		0.2
172			Maintenaning HT &LT feeders , power supply to residential buildings and offices on contract	2025-26	2025-26				0.25		0.25
173			Materials, Poles, Cables etc.	2025-26	2025-26				0.40		0.4
174			Purchase of Safety Equipments, Tools & Plants	2025-26	2025-26				0.10		0.1



Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
175			Renewing of 11kv feeders	2025-26	2025-26				0.50		0.5
176			Refurbishment of Auxiliary pumps & Valves	2025-26	2025-26				0.40		0.4
177			Critical Spares & Auxiliary Equipments	2025-26	2025-26				1.20		1.2
178			Drawing of LT ABC at colony	2025-26	2025-26				0.25		0.25
179			Procurement of critical spares	2025-26	2025-26				1.00		1
180			Spares , Tools and Computer System	2025-26	2025-26				0.50		0.5
182			Tools and Plants	2025-26	2025-26				0.65		0.65
183			Personal Safety Equipments	2025-26	2025-26				0.08		0.08
184			Furniture	2025-26	2025-26				0.05		0.05
185			Renovation of buildings and Quarters, Painting	2025-26	2025-26				0.60		0.6
186			Roofing & Ceiling of quarters	2025-26	2025-26				1.50		1.5

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
187			Construction of dormitory	2025-26	2025-26				1.50		1.5
188			Renovation of office building	2025-26	2025-26				0.25		0.25
189			OTHER CIVIL WORKS - Miscellaneous	2025-26	2025-26				0.25		0.25
190			Penstock painting and maintenance	2025-26	2025-26				1.25		1.25
191			Fabrication & Reengineering works	2025-26	2025-26				0.60		0.6
192			Repair and Modernising equipments at PH, Main store, Kochupampa pump House and Valve House	2025-26	2025-26				0.20		0.2
194			Repairs to Plant & Machinery	2025-26	2025-26				0.75		0.75
195			Materials / spares / maintenance works	2026-27	2026-27					0.80	0.8
196			Repairs to Plant & Machinery	2026-27	2026-27					3.50	3.5
197			Procurement of spares and accessories	2026-27	2026-27					0.30	0.3

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
198			Renovation of cabling & Panels	2026-27	2026-27					0.50	0.5
199			MCC & PCC	2026-27	2026-27					0.25	0.25
201			Installation of Auxilares Transformers & Panels	2026-27	2026-27					2.00	2
202			Replacement of 220KV Breakers (1 Nos)	2026-27	2026-27					0.50	0.5
203			Replacement of yard equipment	2026-27	2026-27					0.50	0.5
205			Maintenance and rewiring of quarters	2026-27	2026-27					0.20	0.2
206			Emergency & other maintenance	2026-27	2026-27					0.20	0.2
207			Maintenancing HT &LT feeders , power supply to residential buildings and offices on contract	2026-27	2026-27					0.25	0.25
208			Materials, Poles, Cables etc.	2026-27	2026-27					0.40	0.4
209			Purchase of Safety Equipments, Tools & Plants	2026-27	2026-27					0.05	0.05

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
210			Renewing of 11kv feeders	2026-27	2026-27					0.50	0.5
211			Purchase of Safety Equipments, Tools & Plants	2026-27	2026-27					0.05	0.05
212			Drawing of LT ABC at colony	2026-27	2026-27					0.25	0.25
213			Procurement of critical spares	2026-27	2026-27					1.00	1
214			Spares , Tools and Computer System	2026-27	2026-27					0.50	0.5
216			Renovation of buildings and Quarters, Painting	2026-27	2026-27					0.60	0.6
217			Roofing & Ceiling of quarters	2026-27	2026-27					1.50	1.5
218			Construction of dormitory	2026-27	2026-27					1.50	1.5
219			Renovation of office building	2026-27	2026-27					0.25	0.25
220			OTHER CIVIL WORKS - Misellaneous	2026-27	2026-27					0.25	0.25
221			Penstock painting and maintenance	2026-27	2026-27					1.25	1.25

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
222			T&P	2026-27	2026-27					0.65	0.65
223			Refurbishment of Auxiliary pumps & Valves	2026-27	2026-27					0.40	0.4
224			Critical Spares & Auxiliary Equipments	2026-27	2026-27					1.20	1.2
225			Fabrication & Reengineering works	2026-27	2026-27					0.60	0.6
226			Repair and Modernising equipments at PH, Main store, Kochupampa pump House and Valve House	2026-27	2026-27					0.20	0.2
228			Furniture	2026-27	2026-27					0.05	0.05
231			Implementation of SCADA	2023-24	2023-24		0.80				0.8
232			Renovation of existing cable system	2023-24	2023-24		1.00				1
233			Modernaization of OPU	2024-25	2024-25			0.90			0.9
234			Renovation of control and relay pannel with instrumentation	2024-25	2024-25			1.00			1

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
235			Implementation of Vibration monitor.	2024-25	2024-25			0.30			0.3
236		KALLADA Hydro Electric Project	Renovation, Modernization & Upgradation of Kallada HEP	2024-25	2024-25			1.00	4	4	9
239		PERUNTHENAR UVI SHEP	Providing floating trash near the intake of Weir	2022-23	2022-23	0.07					0.065
240		RANNI-PERUNAD - SHEP	Purchasing one new Gear Box for the use of Ranni-Perinad SHEP	2022-23	2022-23	1.00					1
241			Repairing two no Gear boxes for the use of Ranni-Perinad SHEP	2022-23	2022-23	2.00					2
242			Construction of a new store room for DG Set and other critical spares at Ranni-Perinad , Shiftind and installation of DG, Purchasing cables ETC.	2022-23	2022-23	0.03					0.03
243			Providing trash rack near the intake of weir	2022-23	2022-23	0.09					0.085
244	Kozhikode Division & KDPP	Vilangad SHEP	CCTV installation	2022-23	2022-23	0.03					0.025
245			LED Floodlight installation in power house yard and compound	2022-23	2022-23	0.01					0.005

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
246			Digging borwell and installation of submersible motor in power house compound	2022-23	2022-23	0.02					0.015
247			Purchase of spares	2022-23	2022-23	0.02					0.02
248			11KV spare VCB truck for incomer and feeder	2022-23	2022-23	0.03					0.03
249			Flood protection work	2022-23	2022-23	0.04					0.04
250			Installation of hand rail near GLOP plant, fore bay	2022-23	2022-23	0.02					0.02
251			Replace the barbed fencing of yard and compound	2022-23	2022-23	0.02					0.02
252			Tools and Plants	2022-23	2022-23	0.01					0.005
253			DG set panel / Cable laying	2022-23	2022-23	0.01					0.006
254			Construction of office /store	2023-24	2023-24		0.13				0.13

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
255			Providing station auxiliary transformer (in addition to the 3.3 KV/415 V transformer, install the 11KV/415v/250/KVA transformer	2023-24	2023-24		0.05				0.05
256			11 Kv feeder panel for auxiliary transformer	2023-24	2023-24		0.04				0.04
257			Purchase of spares	2023-24	2023-24		0.02				0.02
258			Dormetry renovation and provide fencing for dormetry compound	2023-24	2023-24		0.04				0.04
259			Renovation of cooling water system	2023-24	2023-24		0.05				0.05
260			Protective work to the canalside slope	2023-24	2023-24		0.04				0.04
261			Tools and Plants	2023-24	2023-24		0.01				0.005
262			Purchase of PPE	2023-24	2023-24		0.00				0.0025
263			Tools and Plants	2024-25	2024-25			0.01			0.005



Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
264			Purchase of spares	2024-25	2024-25			0.02			0.02
265			office equipments	2024-25	2024-25			0.00			0.001
266			Tools and Plants	2025-26	2025-26				0.01		0.005
267			Purchase of spares	2025-26	2025-26				0.02		0.02
268			Tools and Plants	2026-27	2026-27					0.01	0.005
269			Purchase of spares	2026-27	2026-27					0.02	0.02
270			office equipments	2026-27	2026-27					0.00	0.001
271			Purchase of PPE	2026-27	2026-27					0.00	0.0025
272		Urumi I	Tools & plants	2022-23	2022-23	0.10					0.1
273			Renovation of cooling water system	2022-23	2022-23	0.01					0.01
274			Retaing wall for the road to the power house	2022-23	2022-23	0.15					0.15

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
275			Renovation of excitation system	2023-24	2023-24		0.50				0.5
276			Replacement of Chinese make relays with static relays	2023-24	2023-24		0.02				0.02
277			Replacement of Chinese make relays with static relays	2024-25	2024-25			0.03			0.03
278		Urumi II	Replacement of Chinese make relays with static relays	2022-23	2022-23	0.01					0.01
279			Renovation of excitation system	2022-23	2022-23	0.10					0.1
280			Overhauling of 33kV SF6 Breaker	2022-23	2022-23	0.04					0.04
281			Installation of AC in control room	2022-23	2022-23	0.02					0.02
282			Renovation of yard equipments	2023-24	2023-24		0.10				0.1
283			Re-metalling of switchyard	2023-24	2023-24		0.05				0.05
284			Replacement of Chinese make relays with static relays	2023-24	2023-24		0.01				0.01
285			Renovation of earthing in switch yard	2023-24	2023-24		0.03				0.03

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
286			Renovation of yard equipments	2024-25	2024-25			0.10			0.1
287			Replacement of Chinese make relays with static relays	2024-25	2024-25			0.01			0.01
288			Renovation of yard equipments	2025-26	2025-26				0.10		0.1
289		Chembukadavu I	Purchase of Spares	2022-23	2022-23	0.02					0.02
290			Renovation of cooling water system	2022-23	2022-23	0.02					0.02
291			Providing streetlight	2022-23	2022-23	0.01					0.005
292			Renovation of excitation system	2023-24	2023-24		0.50				0.5
293			Purchase of Spares	2023-24	2023-24		0.02				0.02
294			Purchase of Spares	2024-25	2024-25			0.02			0.015
295			Purchase of Spares	2025-26	2025-26				0.02		0.015
296			Purchase of Spares	2026-27	2026-27					0.02	0.015

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
297		Chembukadavu II	Rehabilitation near power channel	2022-23	2022-23	0.35					0.35
298			Providing yard lights and street lights	2022-23	2022-23	0.01					0.005
299			Renovation of cooling water system	2022-23	2022-23	0.02					0.015
300			Renovation of yard equipments	2023-24	2023-24		0.10				0.1
301			Remettaling Switchyard	2023-24	2023-24		0.02				0.02
302			Purchase of Spares	2024-25	2024-25			0.02			0.02
303			Renovation of yard equipments	2024-25	2024-25			0.10			0.1
304			Renovation of yard equipments	2025-26	2025-26				0.10		0.1
305			Purchase of Spares	2025-26	2025-26				0.02		0.02
306			Purchase of Spares	2025-26	2025-26				0.02		0.02
307		Poozhithode	VCB Truck Spare	2022-23	2022-23	0.05					0.05

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
308			Internet connection	2022-23	2022-23	0.01					0.01
309			Air conditioner	2022-23	2022-23	0.01					0.01
310			spares	2022-23	2022-23	0.01					0.01
311			store cum office building	2022-23	2022-23	0.10					0.1
312			Cooling water Renovation work	2022-23	2022-23	0.01					0.01
313			Purchase of spares	2023-24	2023-24		0.02				0.02
314			Purchase of spares	2024-25	2024-25			0.02			0.02
315			Moog Valve Procurement	2024-25	2024-25			0.03			0.03
316			Purchase of spares	2025-26	2025-26				0.02		0.02
317			Purchase of spares	2025-26	2025-26				0.02		0.02
318		Barapole	Providing fencing for power house compound and an entry gate.	2022-23	2022-23	0.05					0.05

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
319			construction of vehicle shed	2022-23	2022-23	0.02					0.02
320			Dressing up the existing Control Room Building with GI channels and tile profile roofing sheets due to leakage in existing building. (Including partition of the same as Two Office Rooms, One Store Room and One Bathroom).	2023-24	2023-24		0.10				0.1
321			Passage in between machine-propose a fly over for emergency medical casualty	2023-24	2023-24		0.04				0.04
322			5HP set for cleaning cooling water pit	2023-24	2023-24		0.01				0.005
323			Renovation of cooling water system	2023-24	2023-24		0.02				0.02
324			Purchase of spares	2023-24	2023-24		0.02				0.02
325			Purchase of spares	2024-25	2024-25			0.02			0.02
326			Purchase of spares	2025-26	2025-26				0.02		0.02

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
327			Purchase of spares	2026-27	2026-27					0.02	0.02
			additional gate work/ Additional Land Acquisitions & Diversion arrangements:	2022-23	2022-23	0.72					
328		KDPP	DG building roofing	2022-23	2022-23	0.10					0.1
329			Generation Circle office renaovation including flooring	2022-23	2022-23	0.50					0.5
330			Dormitory renovation including painting and plumbing /sanitary work	2023-24	2023-24		0.03				0.03
331			DG building roofing	2023-24	2023-24		0.05				0.05
333			GT Transformers painting	2023-24	2023-24		0.07				0.07
334		Kakkayam Power House	Telephone, internet,intranet and CCTV connectivity between KHEP, valve house, division office and KSHEP through optic fibre.	2022-23	2022-23	0.10					0.1
335			Upgradation of excitation system of unit#4	2022-23	2023-24	1.00	1.00				2

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
336			Upgradation of PLC system of unit#4	2022-23	2023-24	0.15	1.35				1.5
337			Upgradation of old transducers and field devices with state of the art technologies	2022-23	2026-27	0.02	0.02	0.04	0.04	0.04	0.16
338			Video conferencing facility at KHEP control system	2022-23	2022-23	0.20					0.2
339			Installation and upgradation of cyber security devices, firewalls, upgradation of security softwares etc	2022-23	2026-27	0.02	0.04	0.04	0.04	0.04	0.18
340			Tools & Plant	2022-23	2022-23	0.01					0.01
341			Furniture and fixtures	2022-23	2022-23	0.01					0.005
342			HT Conductor changing 11KV	2022-23	2022-23	0.90					0.9
343			KHEP - Natural calamties- Permanent protection and diversion works Ist reach behind KAES-KES Power house- 2 nd reach behind KHEP Power House	2022-23	2022-23	0.85					0.85



SI No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
344			Drinking Water supply from Weir source to water tank at KSEB colony, Kakkayam	2022-23	2022-23	0.60					0.6
345			Colony Road Tarring - balance	2022-23	2022-23	0.45					0.45
346			11KV control room RMU	2022-23	2022-23	0.40					0.4
347			11KV control room KTR	2022-23	2022-23	0.14					0.14
348			New construction of Quarters - 4Nos	2022-23	2024-25	0.60	1.2	0.6			2.4
349			Indoor court recreation for club	2022-23	2022-23	0.14					0.14
350			Lightning Protection for KES Building	2022-23	2022-23	0.10					0.1
351			Replacement of Battery and its Charger of KHEP	2022-23	2022-23	0.17					0.17
352			110 kV Circuit Breaker Replacement (12.5 MVA Auxiliary Transformer&110 kV KKCK Feeder)	2022-23	2022-23	0.12					0.12

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
353			Replacement of existing 11 kV Switchgear Panel with new 14 Panel 11 kV Switch gear panel	2022-23	2022-23	0.60					0.6
354			Providing Ring Main Unit (7 Nos)	2022-23	2022-23	0.35					0.35
355			Providing an Independent 11 kV Feeder for KES	2022-23	2022-23	0.05					0.05
356			Replacement of 110 kV Bus coupler Isolator at Kozhikode Yard	2022-23	2022-23	0.03					0.03
357			Tools & Plant	2023-24	2023-24		0.01				0.01
358			Furniture and fixtures	2023-24	2023-24		0.002				0.002
359			Upgradation of SCADA system software and hardware	2023-24	2026-27		0.2	0.2	0.2	0.2	0.8
360			Tools & Plant	2023-24	2023-24		0.01				0.01
361			Furniture and fixtures	2023-24	2023-24		0.002				0.002
362			Tools & Plant	2024-25	2026-27			0.01	0.01	0.01	0.03

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
363			Furniture and fixtures	2024-25	2026-27			0.002	0.002	0.002	0.006
364			Replacement of Battery Charger of KES	2024-25	2024-25			0.02			0.02
365			Replacement of Circuit Breaker of 110 kV KKKU Feeder	2024-25	2024-25			0.06			0.06
367			110 V Battery Charger for KAES	2024-25	2024-25			0.02			0.02
368			Overhauling of Crane at KES Service Bay	2024-25	2024-25			0.05			0.05
369			Replacement of Buscoupler Isolater	2024-25	2024-25			0.03			0.03
370			Strengthening of Station Earthing of KES Yard	2026-27	2026-27					0.25	0.25
371			Renovation of Switch Yard Lighting- KES&KAES	2026-27	2026-27					0.1	0.1
372		KTR	KTR Strengthening of Canal	2022-23	2023-24	0.35					
372	Moolamattom	Moolamattom	Replacement of exciter transformer of unit #2	2022-23	2022-23	0.30					0.3
373			Cyber Security implementation for first stage units	2022-23	2023-24	0.05	0.495				0.545

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
374			Replacement of PTs(12 Nos.) 220 kV/ $\sqrt{3}/110/\sqrt{3}$ (3C)	2022-23	2022-23	0.30					0.3
375			Furnitures	2022-23	2022-23	0.01					0.01
377			Increasing the height of Existing boundary wall of Switchyard by providing solid block masonry and chain link fencing.	2022-23	2022-23	0.29					0.285
379			Installing & commissioning Arc Flash protection for Ist & Stage panels	2022-23	2023-24	0.46	1.84				2.3
380			Replacement of drain piping of 65 psi cooling water bus.	2022-23	2022-23	0.05					0.05
382			Replacement of second stage battery bank	2023-24	2023-24		0.25				0.25
383			Furnitures	2023-24	2023-24		0.01				0.01
384			Procurement of fire extinguishers	2023-24	2023-24		0.03				0.03
386			Replacement of 220 kV CB of U # 6	2024-25	2024-25			0.18			0.18

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
387			Replacement of 220 kV CB of U # 5	2025-26	2025-26				0.18		0.18
388			Replacement of 220 kV CB of U # 4	2025-26	2025-26				0.19		0.19
389			Replacement of IInd stage CTs (9 Nos), -/5A to -/1A(800-400/1A(5C)	2025-26	2025-26				0.2		0.2
390			Replacement of IInd stage CTs (9 Nos), -/5A to -/1A(800-400/1A(5C)	2025-26	2025-26				0.27		0.27
393			Replacement of Main Bus with Disc Insulator	2026-27	2026-27					1	1
394		Malankkara	Replacing of Nitrogen Bladders	2022-23	2022-23	0.05					0.05
395			Supply, erection and commissioning of One no. of AVR cum Excitation panel, by replacing the old panel, for the 3.5 MW Generator Unit # 2 and # 3			0.40					0.4
396			Replacing 3 nos. of 66kV Bushings of Transformer 1			0.10					0.1
397			Replacing 3 nos. of 66kV Bushings of Transformer 2			0.10					0.1

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
398			Replacing of 66kV Line isolators	2024-25	2024-25			0.03			0.03
399			Replacing of 6 Nos. of 66kV Lightning Arresters	2024-25	2024-25			0.015			0.015
400			Replacing of 15 Nos. of 11 kV Lightning Arresters	2025-26	2025-26				0.005		0.005
401			Replacing of 66kv Bus Insulators	2026-27	2026-27					0.07	0.07
402	Kothamangalam	Idamalayar	110kV bay extension work-298 lakhs	2022-23	2023-24	2.68	0.298				2.98
403			Renovation of 110kV Panels-50 lakhs	2022-23	2023-24	0.45	0.05				0.5
404			SAMAST- 100 Lakhs	2022-23	2023-24	0.90	0.1				1
405			Renovation of 110KV panels	2022-23	2023-24	0.45	0.05				0.5
406			Major Civil works	2022-23	2026-27	0.50	0.3	0.3	0.3	0.3	1.7
407			Lines and cables work	2022-23	2026-27	0.10	0.3	0.3	0.3	0.1	1.1
408			Generator panels	2024-25	2024-25			0.5			0.5

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
409			Renovation of 110KV switchyard equipments	2024-25	2025-26			0.25	0.25		0.5
410			SCADA implemetation at Idamalayar power house with modernasationof equipment and implementation of SAS	2024-25	2026-27			0.1	0.1	0.8	1
411		LP	Major hydraulics works at LP	2022-23	2026-27	0.10	0.09	0.1	0.1	0.1	0.49
412			Renovation and replacng of major equipments	2022-23	2023-24	1.20	2				3.2
414			Replacement of Transformer Oil	2022-23	2022-23	0.55					0.55
415			Major Civil works	2022-23	2026-27	0.50	0.5	0.3	0.3	0.5	2.1
416			Purchase of Electrtric Vehicle	2022-23	2022-23	0.16					0.16
417			Replacement of power cable	2023-24	2023-24		0.5				0.5
419	Thrissur	Sholayar	Butterfly valve of U # 1,U#2,U#3	2022-23	2024-25	1.30	1.5	1.5			4.3
421			Cooling Tower	2022-23	2023-24	1.50	0.5				2

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
422			Store Renovation	2022-23	2022-23	0.50					0.5
423			Conference hall	2022-23	2022-23	0.10					0.1
424			Addl spare for new machine	2022-23	2022-23	0.20					0.2
425			Replacing of side sheet of store	2022-23	2022-23	0.10					0.1
426			Handrail along penstock drain	2023-24	2023-24		0.25				0.25
427			IB Annex at Ambalappara	2024-25	2024-25			0.25			0.25
428		Poringalkuthu LEFT Bank	New Digital Governor Implementation	2022-23	2022-23	1.95					1.95
429			Fire Alarm System	2022-23	2022-23	0.10					0.1
430			SCADA implementation	2023-24	2023-24		1.1				1.1
431			Painting of building	2024-25	2024-25			0.25			0.25
432			Overhead water tank for emergency cooling	2025-26	2025-26				0.1		0.1



Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
433		Poringalkuthu HEP	Existing yard remetalling work	2022-23	2022-23	0.20					0.2
435			Yard lighting	2022-23	2022-23	0.25					0.25
436			Road work along the penstock route	2022-23	2023-24	1.00	1				2
437			Painting of penstock including sand blasting	2022-23	2022-23	0.25					0.25
438			Earthmat renewal of old yard	2022-23	2022-23	1.50					1.5
439			Painting of building	2022-23	2022-23	0.25					0.25
440			Old yard earthmat renewal	2023-24	2023-24		1.5				1.5
441			Drain along penstock route	2023-24	2024-25		0.5	0.5			1
442			Division Office maintenance	2024-25	2024-25			0.1			0.1
444		Chimmony SHEP	Outer Wall protection of Powerhouse	2022-23	2022-23	0.20					0.2
445			Spare VCB	2022-23	2022-23	0.08					0.08

SI No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
446			Construction of battery room	2023-24	2023-24		0.2				0.2
447			Spare runner	2023-24	2023-24		0.5				0.5
448			Procurement of spares	2024-25	2024-25			0.1			0.1
449			Tail Race Shutter motorising	2025-26	2025-26				0.1		0.1
450			Installation of additional valve before butter fly valve	2026-27	2026-27					0.5	0.5
451		Malampuzha SHEP	AVR work	2022-23	2022-23	0.25					0.25
452			Motorising of Tail Race shutter	2023-24	2023-24		0.2				0.2
453			Construction of Security Cabin	2023-24	2023-24		0.1				0.1
454			Building Renovation	2024-25	2024-25			0.1			0.1
455			Sub Division Building renovation	2024-25	2024-25			0.05			0.05

SI No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
456			Intake shutter motorising with new concrete structure - Stage I	2025-26	2026-27				1	1	2
457		Peechi SHEP	Construction of office room	2022-23	2022-23	0.20					0.2
458			Rectification of Tail Race leak	2023-24	2023-24		0.1				0.1
459		Adyanpara SHEP	Construction of new office building	2022-23	2022-23	0.20					0.2
460			Covering of Weir	2022-23	2022-23	0.20					0.2
461			Purchase of spare - proportional valve 420	2022-23	2022-23	0.03					0.03
462			Purchase of DE bearing	2022-23	2022-23	0.15					0.15
463			Penstock protection	2023-24	2023-24		0.15				0.15
464			Road to Weir	2024-25	2025-26			2	2		4
465		Kanjikode WF	Study of replacement with new WEG	2022-23	2022-23	1.35					1.35

Sl No	Name of Circle	Name of Station	Item Description	Date of Commencement	Date of Completion	2022-23	2023-24	2024-25	2025-26	2026-27	Total
466			Construction of new Wind Farm at Kottamala	2022-23	2022-23	1.00					1
468			Power Evacuation	2023-24	2023-24		1				1
469			Compound wall construction	2026-27	2026-27					0.2	0.2
470											
471	<b>TOTAL</b>					<b>57.01</b>	<b>40.96</b>	<b>35.40</b>	<b>30.36</b>	<b>29.91</b>	<b>193.63</b>

**Annexure 4: Details of Capital works – Advanced Energy Storage Technology**

Advanced Energy Storage Technology							
1	Name of the Generation project				<b>Grid Scale Battery Storage</b>		
2	Installed Capacity (MW)				10MW/50MWh		
3	Annual Generation (MU)						
4	Project Cost as per DPR incl IDC (Rs.Cr)				100.00 Cr.		
5	Expected cost of completion including IDC and in-house establishment cost (Employee cost, A&G expense etc.) (Rs.Cr)				105.00 Cr		
6	Levelised tariff as per DPR (Rs/kWh)				9.80		
7	Date of commencement				2023-24		
8	Target date of completion				2023-24		
9	<b>Details of Source of finance</b>						
	(a) Loan sanctioned (Rs.Cr)				100		
	(b) Loan availed as on 31st March 2021 (Rs.Cr)						
	(c) Interest rate				9		
	(d) Other source of finance (own investment, Government grant etc.) Please specify						
10	Physical and financial target proposed for the year (Substations and lines may be given separately)						
	Particulars of the work	<b>Target for the financial year 2022-23</b>			<b>Target for the year 2023-24</b>		
		Physical target	Financial target (Rs.Cr)		Physical target	Financial target (Rs.Cr)	
		% of total works	Amount	Cumulative amount	% of total works	Amount	Cumulative amount
			50		100	55	105
	Particulars of the work	<b>Target for the year 2024-25</b>			<b>Target for the year 2025-26</b>		
		Physical target	Financial target (Rs.Cr)		Physical target	Financial target (Rs.Cr)	
		% of total works	Amount	Cumulative amount	% of total works	Amount	Cumulative amount
	Particulars of the work	<b>Target for the year 2026-27</b>					
		Physical target	Financial target (Rs.Cr)				
		% of total works	Amount	Cumulative amount			

## Annexure 5: Details of Capital works – Dam Rehabilitation

<b>COST ESTIMATE PROPOSED WORKS DRIP II&amp;III</b>		
<b><u>IDAMALAYAR DIVISION</u></b>		
<b>IDAMALAYAR DAM</b>		
<b>Cost Estimates of Rehabilitation Proposal</b>		
<b><u>GENERAL ABSTRACT</u></b>		
<b>SLNO</b>	<b>DESCRIPTION OF WORK</b>	<b>AMOUNT in Million</b>
<b>1</b>	<b>Structural Measures</b>	
<b>i</b>	Restoration of right bank training wall upto bucket portion	2.00
	<b>Sub Total</b>	<b>2.00</b>
<b>2</b>	<b>Non Structural measures</b>	
<b>i</b>	Installation of Inflow forecasting system	1.00
	<b>Sub Total</b>	<b>1.00</b>
<b>2</b>	<b>Basic Facilities Enhancement</b>	
<b>i</b>	Protective works to the access road to dam top	18.00
<b>ii</b>	Providing roofing over the hoist platform	2.00
<b>iii</b>	Providing lighting arrangement at dam premises	0.30
<b>iv</b>	Procurement of Office Equipment	0.50
<b>v</b>	Construction of Control room	1.00
	<b>Sub Total</b>	<b>21.80</b>
<b>3</b>	<b>Instrumentation, SCADA, Surveillance system, etc.</b>	
<b>i</b>	Installation of Accelerograph	1.50
	<b>Sub Total</b>	<b>1.50</b>

<b>4</b>	<b>Others</b>	
<b>i</b>	Hydrographic Survey	4.00
<b>ii</b>	EAP(TierII)	10.00
<b>iii</b>	Construction of a building for establishing Quality Control Lab at Idamalayar	16.80
<b>iv</b>	Preparation of As built drawings	0.50
<b>v</b>	Testing of Water samples and other investigations	0.50
<b>vi</b>	Conducting feasibility study to ascertain the necessity of Filling valve	0.50
<b>vii</b>	Maintenance of valves at intake	0.50
<b>viii</b>	Conducting Seismic studies	0.50
<b>ix</b>	Providing lightning arresters	0.40
	<b>Sub Total</b>	<b>33.70</b>
	<b>GRAND TOTAL</b>	<b>60.00</b>

<b>PORINGALKUTHU DAM</b>		
<b>Abstract of Cost Estimates of Rehabilitation Proposal</b>		
<b><u>GENERAL ABSTRACT</u></b>		
<b>SLNO</b>		<b>AMOUNT</b>
	<b>DESCRIPTION OF WORK</b>	<b>Million</b>
		<b>INR</b>
<b>1</b>	<b>Structural Rehabilitation Works</b>	
<b>i</b>	Strengthening of Poringalkuthu Dam by providing concrete mass at downstream face	45.00
<b>ii</b>	Pointing of deteriorated masonry joints at upstream face	9.40
<b>iii</b>	Curtain grouting of Poringalkuthu Dam	7.00
<b>iv</b>	Construction of protection wall in the downstream of block 1 & rectification of damaged access road to dam top.	22.00
<b>v</b>	Repair works to Spillway bucket & vertical face of bucket	0.60

<b>vi</b>	Repairs to Parapet wall & light post	1.00
<b>vii</b>	Replacement of 2nos. Sluice Gates	5.00
<b>viii</b>	Maintenance to Hoist Mechanism	2.00
<b>ix</b>	Replacement of Emergency Gate filling valve	0.50
<b>x</b>	Providing regulatory arrangement for water discharge from 15 cm pipe at downstream portion	0.50
<b>xi</b>	Providing cable tray for fixing power cables at spillway Hoist Platform	0.50
	<b>SubTotal</b>	<b>93.5</b>
<b>2</b>	<b>Non Structural measures</b>	
<b>i</b>	Integrated Reservoir Operation	1.50
	<b>SubTotal</b>	<b>1.50</b>
<b>3</b>	<b>Basic Facilities Enhancement</b>	
<b>i</b>	Procurement of office Equipments and survey equipments	1.50
	<b>SubTotal</b>	<b>1.50</b>
<b>4</b>	<b>Instrumentation,SCADA,Surveillancesystem, etc.</b>	
<b>i</b>	Installation of Accelerographs (3Nos.)	4.50
<b>ii</b>	Installation of Inflow forecasting &Earlywarning system	1.50
	<b>SubTotal</b>	<b>6.00</b>
<b>5</b>	<b>Others</b>	
<b>i</b>	Hydrographic Survey	2.00
<b>ii</b>	Preparation of EAP (Tier II)	10.00
<b>iii</b>	Geophysical Investigation	4.00
<b>iv</b>	Testing of materials	0.30
<b>v</b>	Site specific seismic parameter estimation	1.00
<b>vi</b>	Conducting Model studies for construction of additional spillway	4.00
<b>vii</b>	Geological studies	1.00



<b>viii</b>	Preparation of built-up drawings	0.50
<b>ix</b>	Other investigations	0.70
	<b>SubTotal</b>	<b>23.5</b>
	<b>GRANDAMOUNT</b>	<b>126</b>

<b>SHOLAYAR DAM</b>		
<b>Cost Estimates of Rehabilitation Proposal</b>		
<b><u>NAME OF WORK:</u></b>		
<b><u>GENERAL ABSTRACT</u></b>		
<b>SLNO</b>	<b>DESCRIPTION OF WORK</b>	<b>AMOUNT in Million</b>
<b>1</b>	<b>Structural Rehabilitation Works</b>	
<b>i</b>	Grouting of Main dam and pointing of the upstream face of Main and Flanking dams	110.00
<b>ii</b>	Crack Repair of Spillway gate piers	2.00
<b>iii</b>	Providing roofing over the hoist platform of Sholayar Flanking Dam	2.00
<b>iv</b>	Providing Handrails in gallery	0.50
	<b>SubTotal</b>	<b>114.5</b>
<b>2</b>	<b>Non Structural measures</b>	
<b>i</b>	Installation of Early Warning System	2.00
<b>Ii</b>	Integrated Reservoir Operation	2.00
<b>iii</b>	Installation of Automatic Weather Station	1.00
	<b>SubTotal</b>	<b>5.00</b>
<b>3</b>	<b>Instrumentation, SCADA, Surveillance system, etc.</b>	

i	Installation of accelerograph, V Notch & Pressure gauges	5.00
	<b>SubTotal</b>	<b>5.00</b>
<b>4</b>	<b>Tourism/Fisheries/Hydro power Development</b>	
i	Construction of a small Hydro project using the tailwater	
	<b>SubTotal</b>	
<b>5</b>	<b>Others</b>	
i	Hydrographic Survey	2.00
ii	EAP(Tier II)	10.00
iii	Testing of materials etc.and other investigation works	1.00
iv	Conducting Seismic studies	0.50
v	Testing core samples	0.50
vi	Preparation of As built drawings	0.50
vii	Conducting Inspection of Emergency filling valve	0.50
viii	Procurement of Office equipment	0.50
	<b>SubTotal</b>	<b>15.50</b>
	<b>GRAND AMOUNT</b>	<b>140.00</b>

<b><u>VAZHATHOPE DIVISION</u></b>		
<b>IDUKKI, CHERUTHONI AND KULAMAVU DAMS</b>		
<b>Cost Estimates of Rehabilitation Proposal</b>		
<b>SLNO</b>	<b>DESCRIPTION OF WORK</b>	<b>AMOUNT Rs in Million</b>
<b>1</b>	<b>Structural Rehabilitation Works</b>	

<b>i</b>	Rectification works for controlling the seepage of diversion tunnel constructed on the left bank of Arch dam.	9.50
<b>ii</b>	Mesh reinforced shotcreting in conjunction with rock bolting at the downstream flank slopes of Idukki Arch Dam to control rock slip.	47.50
<b>iii</b>	Reaming of choked drain holes.	32.50
<b>iv</b>	Maintenance to the Radial gates and Vertical gates & Overhauling of hoist mechanism at Cheruthoni dam.	11.00
<b>v</b>	Providing roofing to the hoisting mechanism of Radial Gates at Cheruthoni dam	3.60
<b>vi</b>	Construction of catwalk bridge at Cheruthoni dam	6.50
<b>vii</b>	Repairs to the hoist mechanism and intake gate near Kulamavu.	3.70
<b>viii</b>	Providing pitching to the upstream slope & slope protection works at downstream of Kulamavu saddle dam.	21.00
	<b>Sub Total</b>	<b>135.30</b>
<b>2</b>	<b>Non Structural measures</b>	
<b>i</b>	Installation of Flood forecasting and Early Warning System	2.0
<b>ii</b>	Integrated Reservoir Operation	2.0
<b>iii</b>	Installation of Raingauges & Automatic Weather Station	2.0
	<b>Sub Total</b>	<b>6.00</b>
<b>3</b>	<b>Instrumentation, SCADA, Surveillance system, etc.</b>	
<b>i</b>	Installation of accelerographs	10.00
	<b>Sub Total</b>	<b>10.00</b>
<b>5</b>	<b>Others</b>	
<b>i</b>	Security fencing in the close premises of Arch dam to prevent unauthorized entry	43.50
<b>ii</b>	White reflective painting for the upstream face of Arch dam	4.20

iii	Investigation of cracks in Cheruthoni dam gallery	2.00
iv	Pressure washing downstream face of Kulamavu dam.	1.50
v	Conduct inspection of Bubbler system to check the performance status	1.00
vi	Hydrographic Survey	10.00
vii	EAP(TierII)	30.00
viii	Testing of material setc. and other investigation works	2.00
ix	Estimation of site specific seismic parameters	1.00
x	Conducting dynamic analysis of dams to ascertain the effect of the tremors on the structural performance of dams.	25.00
xi	Preparation of As-built drawings	0.50
xii	Evaluation of adequacy of existing seismic network and performance of the existing seismic station established in the Idukki project area	1.00
	<b>Sub Total</b>	<b>121.70</b>
	<b>TOTAL</b>	<b>273.00</b>

<b><u>KAKKAD DIVISION</u></b>		
<b>Anathode and Kakki dams</b>		
<b>Cost Estimates of Rehabilitation Proposal</b>		
<b>SLNo.</b>	<b>Description</b>	<b>AMOUNT</b>
		<b>Rs in Million</b>
<b>1</b>	<b>Structural Rehabilitation Works</b>	
i	Construction of Catwalk Bridge to access the trunnions of Radial Gates of Anathode spillway	2.40
ii	Painting of Radial gates and Hoist structures and repairs to the damaged embedded parts of Radial gateNo.3	1.10
iii	Repairs to the Hollow jet valve of Kakki dam	2.30

iv	Overhauling of Emergency Gate at Kakki dam	1.00
v	Maintenance to Intake gate and hoist structure of Intake Gate	3.10
vi	Carrying out the remedial measures for intake of emergency gate in the upstream of hollow jet valve at Kakki dam	4.00
	<b>Sub Total</b>	<b>13.90</b>
<b>2</b>	<b>Non Structural measures</b>	
i	Preparation of Tier II EAP of Dam	5.00
	<b>Sub Total</b>	<b>5.00</b>
<b>3</b>	<b>Basic Facilities Enhancement</b>	
i	Construction of Access road to the left bank of Anathode dam	3.40
ii	Maintenance to the Road to IC tunnel exit near Anathode	2.80
iii	Construction of field office cum dormitory at Anathode	7.60
iv	Protective works to the access road to gallery at right bank of Kakkidam	3.30
v	Maintenance of access road to Surge	6.50
vi	Procurement of four-wheel drive vehicle with hard top	1.00
	<b>Sub Total</b>	<b>24.60</b>
<b>4</b>	<b>Instrumentation, SCADA, Surveillance system, etc.</b>	
i	Installation of accelerographs (3nos.) at Kakkidam	5.00
ii	Installation of warning siren at Triveni Pamba	0.10
iii	Installation of river gauges at various locations in downstream region	1.00
	<b>Sub Total</b>	<b>6.10</b>
<b>5</b>	<b>Others</b>	
i	Detailed investigation of cracks in top level gallery in blockno.12 at Kakki Dam	0.50

ii	Geophysical investigations of Block no 10, 11 & 12 to detect the root cause of seepage at lift well at Kakkidam	3.00
iii	Pressure Washing the downstream face of Anathode Dam	0.57
iv	Pressure washing downstream of Kakki dam	1.40
v	Replacing the existing ladder to access the operating platform of intake gate at Kakki	0.40
vi	Hydrographic Survey	5.00
vii	Testing of materials and other studies	0.43
viii	Estimation of Site Specific Seismic Parameters and Evaluation of Structural Safety of the Dam	2.00
ix	Developing Project Specific Unit Hydrograph for Inflow Forecasting	0.50
x	Labelling Foundation drains, Vertical drains, Block joints and other salient features in Kakki and Anathode Dams	0.30
xi	Preparation of As-built drawings	0.30
	<b>Sub Total</b>	<b>14.40</b>
	<b>TOTAL</b>	<b>64.00</b>

<b>PAMBA DAM</b>		
<b>Cost Estimates of Rehabilitation Proposal</b>		
<b>SLNo.</b>	<b>DESCRIPTION OF WORK</b>	<b>AMOUNT</b>
		<b>Rs in Million</b>
<b>1</b>	<b>Structural Rehabilitation Works</b>	
i	Overhauling and repair of Gearbox of hoisting mechanism of radial gates no.2&4	0.52
ii	Painting on metal parts of the hoisting mechanism of spillway and works for protecting hoists from rain	1.00
iii	Overhauling and painting of emergency gate of lower level outlet and repairs to the electrical operating system of hollow jet valve	0.43
iv	Construction of Catwalk Bridge to access the trunnions of radial gates of Pamba Dam	2.25
v	Overhauling and painting of Ic tunnel intake gate and hoisting mechanism and repairs to the electrical operating systems of IC Tunnel Gate mechanism and repairs to the electrical operating systems of IC Tunnel Gate	0.73
vi	Providing protective roofing to the hoist structure of IC Tunnel Intake structure.	0.25
vii	Providing ladder to access the top of hoist structure of control shaft	0.51
	<b>Sub Total</b>	<b>5.69</b>
<b>2</b>	<b>Non Structural measures</b>	
i	Preparation of Tier II EAP of Dam	2.50
	<b>Sub Total</b>	<b>2.50</b>
<b>3</b>	<b>Basic Facilities Enhancement</b>	
i	Providing Fencing to the control shaft & Painting Control shaft and hoist	1.22
ii	Construction of box culvert in the access road to control shaft	1.00
	<b>Sub Total</b>	<b>2.22</b>
<b>5</b>	<b>Others</b>	
i	Pressure washing downstream of Pamba dam	0.50

ii	Replacing collapsible door in the gallery	0.05
iii	Procurement of 15KVA DG Set	0.40
iv	Conducting water loss test in Block 9 &10 A of Pamba Dam to ascertain the permeability properties	0.50
v	Hydrographic Survey	0.90
vi	Estimation of Site Specific Seismic Parameters and Evaluation of Structural Safety of the Dam	1.00
vii	Developing Project Specific Unit Hydrograph for Inflow Forecasting	0.50
ix	Labelling Foundation drains, Vertical drains, Block joints and other salient features in Pamba Dam	0.10
x	Preparation of As-built drawings	0.30
xi	Testing of materials and other studies	0.34
	<b>Sub Total</b>	<b>4.59</b>
	<b>TOTAL</b>	<b>15.00</b>

**WAYANAD DIVISION**

**KAKKAYAM DAM**

**Cost Estimates of Rehabilitation Proposal**

<b>SLNo.</b>	<b>DESCRIPTION OF WORK</b>	<b>AMOUNT Rs in Million</b>
<b>1</b>	<b>Structural Rehabilitation Works</b>	
i	Maintenance to the emergency/service gates of scour sluice and Overhauling of hoist mechanism	1.65
ii	Maintenance to the Intake Gate & Hoist mechanism	1.23
iii	Repairs to the spillway glacis	2.05
iv	Construction of catwalk bridge to access the trunnions of spillway gate	1.08



v	Replacing Collapsible Gate at intaketower with Rolling shutter	0.03
vi	Replacing Gratings on Intake Tower above FRL	0.03
vii	Replacing Rolling Shutter of Scour Gate Tower	0.07
	<b>SubTotal</b>	<b>6.14</b>
<b>2</b>	<b>Non Structural measures</b>	
i	Preparation of TierII EAP of Dam	5.00
ii	Integrated Reservoir Operation	0.50
iii	Installation of Early Warning System	1.00
	<b>SubTotal</b>	<b>6.50</b>
<b>3</b>	<b>Basic Facilities Enhancement</b>	
i	Maintenance of Bypass road to dam site	1.30
ii	Maintenance of access road to surge	1.25
iii	Construction of building at dam premises to accommodate security personnel and operating staff	3.80
iv	Purchasing Four wheel drive vehicle with hard top	1.50
	<b>SubTotal</b>	<b>7.85</b>
<b>4</b>	<b>Instrumentation,SCADA,Surveillance system,etc.</b>	
	Installation of Accelerographs	5.00
	<b>SubTotal</b>	<b>5.00</b>
<b>5</b>	<b>Others</b>	
i	Pressure Washing on the Dam Body	0.40
ii	Hydrographic Survey	1.00
iii	Detailed examination of Spillway radial shutter No2.	0.10
iv	Estimation of Site Specific Seismic Parameters and Evaluation of Structural Safety of the Dam	1.00
v	Developing Project Specific Unit Hydrograph for Inflow Forecasting	0.50
vi	Investigation of the cause / Seepage path in the blocks near Left abutment with the assistance of GSI	0.50
vii	Preparation of As-built drawings	0.50
viii	Testing of materials and other studies	0.51
	<b>SubTotal</b>	<b>4.51</b>
	<b>TOTAL</b>	<b>30.00</b>

<b>KAS DAM</b>		
<b>Cost Estimates of Rehabilitation Proposal</b>		
<b>SLNO</b>	<b>DESCRIPTION OF WORK</b>	<b>AMOUNT Rs in Million</b>
<b>1</b>	<b>Structural Rehabilitation Works</b>	
<b>i</b>	Repairs to surface drain and protective works to the downstream slope of dam near the confluence of toe drain	1.65
<b>ii</b>	Extension of Parapet wall near the left bank up to left abutment.	6.60
<b>iii</b>	Clearing downstream of spillway channel and construction of retaining wall to protect the left bank in continuation with the existing training wall at Spillway Dam	3.10
<b>iv</b>	Maintenance to Spillway Radial Gates & Hoist mechanism	1.85
<b>v</b>	Roofing to hoist mechanism of Radial Gates	3.00
<b>vi</b>	Maintenance to vertical gates	0.45
<b>vii</b>	Maintenance to Intake gate at control shaft & Hoist mechanism	0.80
<b>viii</b>	Protective Works to Control Shaft Structure	0.50
	<b>Sub Total</b>	<b>17.95</b>
<b>2</b>	<b>Non Structural measures</b>	
<b>i</b>	Installation of Early Warning System	1.00
<b>ii</b>	Preparation of Tier II EAP of Dam	5.00
	<b>Sub Total</b>	<b>6.00</b>
<b>3</b>	<b>Basic facilities Enhancement</b>	
<b>i</b>	Construction of Access road to the right bank of spillway dam	3.00
<b>ii</b>	Extension of Security fencing on the right bank of Spillway Dam	1.50
<b>iii</b>	Construction of office cum staff dormitory building	11.00
<b>iv</b>	Maintenance to replacement road II upto control shaft	25.00
	<b>Sub Total</b>	<b>40.50</b>
<b>3</b>	<b>Instrumentation, SCADA, Surveillance system, etc.</b>	

<b>i</b>	Installation of Automatic Water level recorder	0.20
	<b>Sub Total</b>	<b>0.20</b>
<b>5</b>	<b>Others</b>	
<b>i</b>	Preparation of contour drawings of the area downstream of the toe of the dam including stream downstream upto the confluence of spill channel	0.30
<b>ii</b>	Pressure washing downstream portion of the non-overflow portion of Spillway dam	0.20
<b>iii</b>	Investigation of cause of boil in the toe drain	0.50
<b>iv</b>	Profile survey of earth dam	0.20
<b>v</b>	Back water studies to ascertain extent of flooding near the toe of KA Main dam consequent to varying spillway releases	0.50
<b>vi</b>	Hydrographic Survey	3.90
<b>vii</b>	Estimation of Site Specific Seismic Parameters and Evaluation of Structural Safety of the Dam	1.00
<b>viii</b>	Monitoring&controlling Flood waterlevels in the downstream reaches of spill channel	1.00
<b>ix</b>	Developing Project Specific Unit Hydrograph for Inflow Forecasting	0.50
<b>x</b>	Detailed investigation to find out the causes of seepage through diaphragm wall between the service and emergency gates of control shaft with the assistance of expert agencies	1.00
<b>xi</b>	Preparation of As-built drawings	0.30
<b>xii</b>	Preparation of Tier II EAP of Dam	5.00
<b>xiii</b>	Testing of materials and other studies	0.95
	<b>Sub Total</b>	<b>10.35</b>
	<b>TOTAL</b>	<b>75.00</b>

<b><u>PAMBLA DIVISION</u></b>		
<b>ANAYIRANKAL DAM</b>		
<b>Cost Estimates of Rehabilitation Proposal</b>		
<b>SLNo.</b>	<b>DESCRIPTION OF WORK</b>	<b>AMOUNT Rs in Million</b>
<b>1</b>	<b>Structural Rehabilitation Works</b>	
i	Refurbishing the existing intake structure and providing new intake & service gates and hoisting arrangement	7.70
ii	Taking cross section of dam to check subsidence of section	0.20
	<b>Sub Total</b>	<b>7.90</b>
<b>2</b>	<b>Non Structural measures</b>	
i	Preparation of Tier II EAP of Dam	3.00
	<b>Sub Total</b>	<b>3.00</b>
<b>3</b>	<b>Basic Facilities Enhancement</b>	
i	Providing fencing to prevent unauthorised entry to downstream face of dam	1.00
ii	Improving lighting arrangement at dam premises	0.30
	<b>Sub Total</b>	<b>1.30</b>
<b>4</b>	<b>Others</b>	
i	Conducting study on the performance of relief wells	0.30
ii	Testing of materials and other studies	0.40
iii	Estimation of Seismic Parameters from seismic grid maps and Evaluation of Structural Safety of the Dam	0.30
iv	Preparation of As-built drawings	0.30
	<b>Sub Total</b>	<b>1.30</b>
	<b>TOTAL</b>	<b>13.50</b>

<b>MADUPETTY DAM</b>		
<b>Cost Estimates of Rehabilitation Proposal</b>		
<b>SLNo.</b>	<b>DESCRIPTION OF WORK</b>	<b>AMOUNT</b>
		<b>Rs</b> <b>inMillion</b>
<b>1</b>	<b>Structural Rehabilitation Works</b>	
i	Reaming foundation drain holes	1.30
ii	Rectification of cracks in the gallery	1.00
iii	Repainting of Radial Gates and metal parts of hoiststructure	0.60
iv	Roofing over the hoist structure of spillway gates	1.00
v	Overhauling the hollow jet valve	0.80
vi	Repairs to Emergency Gate of hollow jet valve and redesign of hoist mechanism and providing roofing to hoist	6.20
vii	Overhauling of intake gate of Power Outlet and roofing to hoist mechanism	2.00
	<b>Sub Total</b>	<b>12.90</b>
<b>2</b>	<b>Non Structural measures</b>	
i	Preparationof Tier II EAP of Dam	6.50
	<b>Sub Total</b>	<b>6.50</b>
<b>3</b>	<b>BasicFacilitiesEnhancement</b>	
i	Providing Protective works to prevent failure of the slope near the leftabutment	13.00
ii	Protective wall of access road to dam near its left abutment	0.40
	<b>Sub Total</b>	<b>13.40</b>
<b>4</b>	<b>Others</b>	
i	Geophysical investigation of Maduppetty dam	2.80

ii	Structural review of dam after modelling the dam to analyse the cause of development of cracks in the gallery	2.00
iii	Installation of crackmeters	0.05
iv	Repairs to the operating room for hollow jet valve	0.30
v	Estimation of seismic parameters	0.80
vi	Labelling Block joints and other salient features	0.10
vii	Preparation of As-built drawings	0.30
viii	Testing of materials and other studies	0.85
	<b>Sub Total</b>	<b>7.20</b>
	<b>TOTAL</b>	<b>40.00</b>

<b>PONMUDI DAM</b>		
<b>Cost Estimates of Rehabilitation Proposal</b>		
<b>SLNo.</b>	<b>DESCRIPTION OF WORK</b>	<b>AMOUNT</b>
		<b>Rs in Million</b>
<b>1</b>	<b>Structural Rehabilitation Works</b>	
i	Reaming of choked drain holes	4.50
ii	Providing Roofing to the hoist mechanism	1.20
iii	Repainting of Radial Gates and metal parts of hoist structure	0.70
	<b>Sub Total</b>	<b>6.40</b>
<b>2</b>	<b>Structural Measures for Ensuring Hydrological Safety</b>	
i	Construction of Additional Spillway	320.00
	<b>Sub Total</b>	<b>320.00</b>
<b>3</b>	<b>Non Structural measures</b>	
i	Preparation of Tier II EAP of Dam	5.00
	<b>Sub Total</b>	<b>5.00</b>

<b>4</b>	<b>Basic Facilities Enhancement</b>	
1	Providing steps from gallery road to access lowermost level of dam	0.20
ii	Providing hand rails for the steps in gallery	0.50
	<b>SubTotal</b>	<b>0.70</b>
<b>5</b>	<b>Instrumentation,SCADA,Surveillance system,etc.</b>	
i	Installation of accelerographs(3nos.)	5.00
	<b>SubTotal</b>	<b>5.00</b>
<b>6</b>	<b>Others</b>	
i	Pressure washing downstream of dam body	0.40
ii	Estimation of Site Specific Seismic Parameters and Evaluationof Structural Safety of the Dam	1.00
iii	Labelling Foundation drains,Vertical drains,Blockjoints and other alient features	0.10
iv	Preparation of As-built drawings	0.30
v	Investigating the causes of wetting in the gallery	0.50
vi	Testing of materials and other studies	0.60
	<b>SubTotal</b>	<b>2.90</b>
	<b>TOTAL</b>	<b>340.00</b>

<b>KUNDALA DAM</b>		
<b>Cost Estimates of Rehabilitation Proposal</b>		
<b>SLNo.</b>	<b>DESCRIPTIONOFWORK</b>	<b>AMOUNT Rs</b>
		<b>inMillion</b>
<b>1</b>	<b>Structural Rehabilitation Works</b>	

i	Rectification of deteriorated mortar joints in the upstream face of Kundala Dam	13.50
ii	Geophysical investigation of Kundala dam to trace out the weak zones in dam body and to identify seepage path.	2.50
iii	Repairs to spillway glaci with special mortars	0.55
iv	Replacing the spillway gates	17.50
v	Overhauling the gear system of the hoisting mechanism of spillway gate	0.50
vi	Overhauling of emergency gate in the upstream of hollow jet valve	0.75
vii	Overhauling of hollow jet valve	0.50
	<b>SubTotal</b>	<b>35.80</b>
<b>2</b>	<b>Non Structural measures</b>	
i	Preparation of Tier II EAP of Dam	0.50
	<b>SubTotal</b>	<b>0.50</b>
<b>3</b>	<b>Basic Facilities Enhancement</b>	
i	Conducting feasibility study and preliminary design for construction of new road in the downstream of Kundala dam.	1.50
	<b>SubTotal</b>	<b>1.50</b>
<b>4</b>	<b>Others</b>	
i	Removal of silt accumulation near the intake structure of hollow jet valve	0.30
ii	Pressure washing of downstream face of dam body	0.20
iii	Labelling Block joints and other salient features	0.10
iv	Evaluation of Structural Safety of the Dam	0.50
v	Preparation of As-built drawings	0.30
vi	Testing of materials and other studies	0.80
	<b>SubTotal</b>	<b>2.20</b>
	<b>TOTAL</b>	<b>40.00</b>



PST for LP and Kallarkutty Dam Not submitted yet		

<b>MOOZHIYAR DAM</b>		
<b>Cost Estimates of Rehabilitation Proposal</b>		
<b>SLNo.</b>	<b>DESCRIPTION OF WORK</b>	<b>AMOUNT Rs in Million</b>
<b>1</b>	<b>Structural Rehabilitation Works</b>	
i	RR Pitching Left and Right Bank for slope protection	0.57
ii	Repairs to the disintegrated concrete surface in the gallery walls	0.04
iii	Drilling new holes for formed drains	1.10
iv	Rectification of spillway bucket	2.60
v	Painting Radial Gates	0.42
vi	Painting catwalk bridge	0.05
vii	Painting exposed face of pipe leading to hollow jet valve inside the gallery	0.05
	<b>SubTotal</b>	<b>4.83</b>
<b>2</b>	<b>Non Structural measures</b>	
i	Preparation of TierII EAP	3.00
	<b>SubTotal</b>	<b>3.00</b>
<b>3</b>	<b>Basic Facilities Enhancement</b>	
i	Construction of Section office cum dormitory building	6.30
	<b>SubTotal</b>	<b>6.30</b>
<b>4</b>	<b>Others</b>	
i	Replacing Rolling shutter of valve house	0.05
ii	Providing arrangements to restrict entry of floating debris to power intake	0.50

iii	Providing gate to prevent unauthorised entry to the operating platform	1.00
iv	Bathymetric survey	0.08
v	Investigating cause of leakage around intake pipe	1.00
vi	Investigating cause of wetting in Block 3/4	0.20
vii	Estimation of Seismic Parameters from seismic grid maps and Evaluation of Structural Safety of the Dam	0.30
viii	Preparation of As-built drawings	0.30
ix	Testing of material sand other studies	0.44
	<b>SubTotal</b>	<b>3.87</b>
	<b>TOTAL</b>	<b>18.00</b>

Kerala State Electricity Board Limited (KSEBL), is an integrated State Public Sector power utility in the State of Kerala, performing the three functions of Electricity Generation, Transmission, and Distribution through three Strategic Business Units (SBUs) with SBU-T carrying out the function of State Transmission Utility and State Load Dispatch Centre.

As per the second transfer scheme, it is the function of the State Transmission Utility 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. Further, the second transfer scheme entrusts the responsibility on the STU to develop and execute long term plans for evacuation and supply of power at voltages of and above 33KV, in consultation and co-ordination with the other SBUs and under the policy framework developed by KSEB Ltd. so as to satisfy the present and future needs to the generation and distribution SBUs. The SBU-T handles the total energy sold to consumers and licensees within the State, power drawn by open access consumers and the small quantum of energy sold outside the State.

Transmission system is the backbone of the power system. The growth of transmission system should match with the growth of generation capacity in the State and ideally it must be ahead of generation both in time and capacity to avoid congestion or bottling up of power. Efficient operation of transmission system in terms of providing reliability, avoidance of disturbance, maintaining voltage level and reducing transmission losses requires continuous strengthening of transmission system.

The transmission planning by KSEBL is done for achieving the above objective and also to provide 24 x 7 power supply to all consumers with n-1 and n-1-1 and n-2 reliability. Further, the transmission planning inside the State has to move ahead synchronously with generation addition and development of regional and inter regional transmission planning. Development of transmission system must match with generating capacity on one side and growing demand on the other side. With Open Access in transmission, the role of transmission has changed from a mere infrastructure to an enabler in operation of a competitive power market.

Investments in transmission are made with prudence and benefits are socialized. In addition to the financial benefit as evaluated through IRR computation, there are other intangible benefits on account of realization of the planned elements including the benefits on account of better capacity utilization and consequently higher energy yield from generating stations, opportunity financial gains on account of transmitting additional power through the strengthened network to meet additional loads etc. which cannot be quantified.

Thus, for transmission projects, though the initial investment cost appears to be high and financial benefit lower, the benefit due to the project available in the long run including intangible benefits is manifold which spans for more than 35 years from the date of commissioning.

## Present Intra State Transmission Capacity

As per the second Transfer Scheme, SBU-T is entrusted with the construction of 33KV and above system of KSEBL. The voltage level wise capacity of Transmission system and number of substations and transmission lines within the State as on 31st March, 2021 is summarized below:

<b>Table-T1: Transmission System Statistics</b>			
No	Item	Unit	Quantity (as on 31-3-2021)
1	400 kV Lines	Ckt-km	1329.58*
2	220 kV Lines	Ckt-km	3141.40
3	110 kV Lines	Ckt-km	5030.86
4	66 kV Lines	Ckt-km	2004.79
5	33KV lines	Ckt-km	2108
6	400 kV Substations	Nos	5** + 1
7	220 kV Substations	Nos	27
8	110 kV Substations	Nos	173
9	66KV Substations	Nos	60
10	33 KV Substations	Nos	160
<b>11</b>	<b>Total transmission capacity (MVA)</b>	<b>MVA</b>	<b>21304.60</b>
	<i>*PGCIL owned + KSEBL owned Madakkathara-Malaparamba-Areekode line (177 ckt-km) and substations ** PGCIL owned</i>		

## Multi Year Capital Expenditure Plan 2022-23 to 2026-27

This application for approval of proposed Capital Investment Plan for the Transmission Strategic Business Unit for the control period FY 2022-23 to FY 2026-27 is based on Section 181(zp) of the Electricity Act 2003, read with Kerala State Electricity Regulatory Commission (Terms and Conditions for Determination of Tariff), 2021. Regulation 10 of the Kerala State Electricity Regulatory Commission (Terms and Conditions for Determination of Tariff), 2021 stipulates the following:

*"10. Filing under the Multi-Year Tariff (MYT) framework. – (1) Every generating business/ company or transmission business/ licensee or distribution business/ licensee or State Load Despatch Centre shall file, on or before the Thirty first day of December 2021, the following petitions for the Control Period:*

*(i) Petitions for approval of Aggregate Revenue Requirement and determination of tariff separately for each year of the Control Period, including capital investment plan for each year of the Control Period;*

***Provided that, in the case of Generation Business/ Company, Transmission Business/Licensee, Distribution Business/Licensee & SLDC of Kerala State Electricity Board Limited and Thrissur Corporation Electricity Department,***

***separate petition shall be filed on or before 20th December 2021 for the approval of the Capital Investment Plan for each year of the Control Period;***

As per Regulation 54 of the Tariff Regulations, 2021, the transmission business/ licensee shall, along with the petition for Aggregate Revenue Requirements for the Control Period, file to the Commission for its approval a detailed capital investment plan. Detailed Project Report (DPR) of each of the proposed projects, its financing plan, the physical targets sought to be achieved with relevant dates and the cost benefit analysis justifying the investment. Such investments may be undertaken for strengthening and augmenting the intra-State transmission system for meeting the requirement of power evacuation, load growth, reduction in transmission losses, improvement in the quality of supply, reliability, metering etc. for the Control Period, in accordance with the 'Guidelines for Provisional Clearance of Capital Investment Schemes' specified in Annexure 4 to these Regulations.

As per the guidelines for Provisional clearance of capital investment specified, the transmission businesses/licensees and State Load Despatch Centre shall submit the capital investment plan outlining the major schemes proposed in the manner directed by the Commission. Such plan shall be uniform and consistent with other relevant proposals, and supporting information as desired by the Commission shall be included in the submission.

In accordance with the above, SBU-T has evolved a multi year capital expenditure plan for the control period 2022-23 to 2026-27 which is grouped as follows:

- A. Projects costing below Rs.10Cr**
- B. Normal capital works above Rs.10Cr**
- C. RDSS Works**
- D. TRANSGRID works.**
- E. SLDC related capital works.**

As per Kerala State Electricity Regulatory Commission (Terms and Conditions for Determination of Tariff), 2021, for the capital investment schemes exceeding the amount of Rs. 10 Crore in the case of KSEB Ltd, detailed project report shall be submitted for the Commission's in-principle approval with a broad cost-benefit analysis and other details for substantiating the investment as specified.

In accordance with the above, SBU-T has prepared Detailed Project Report for all projects costing more than Rs.10 Crore. The DPR prepared includes the following:

- Need for investment.
- Technical justification
- Timing of the investment
- Prudence of the investment
- Cost benefits analysis.

About 75 new capital works are proposed for the control period exceeding Rs.10 Crore, for which DPR are prepared and enclosed. In addition, 14 new capital works come under

'Transgrid 2.0 scheme' and 1 new capital work under SLDC are planned for this control period, details of which are submitted in the succeeding paragraphs.

A summary of the Capital outlay for the control period 2022-23 to 2026-27 under SBU-T and SLDC for the capital works proposed are submitted below.

<b>Table T2: Capital Investment plan - Transmission</b>							
		<b>Capital outlay (Rs.Cr.)</b>					<b>Total</b>
		<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	
1	Works less than 10Cr	241.53	191.65	154.75	109.77	15.11	712.82
2	Normal works above 10 Cr	400.34	747.49	473.58	238.97	191.63	2052.01
3	RDSS Works	266.93	417.77	377.97			1062.66
3	Transgrid works	353.76	622.18	663.32	681.74	303.83	2624.84
4	SLDC works (>10 Cr)	27.00	40.00	0.00	0.00	0.00	67.00
5	SLDC works (<10 Cr)	14.58	8.30	3.60	3.13	7.15	36.75
<b>Grand Total</b>		<b>1304.14</b>	<b>2027.39</b>	<b>1673.21</b>	<b>1033.60</b>	<b>517.73</b>	<b>6556.08</b>

The details of the above works are submitted in the succeeding paragraphs.

#### **A. Projects costing below Rs.10Cr**

The details of capital works having individual project cost below Rs.10 Crore planned for the control period 2022-23 to 2026-27 are enclosed as **Annexure-T1**. The works are grouped circle wise. An abstract of the capital outlay of these projects for each year of the control period and GFA addition as on the year of CoD under various Transmission Circles and SLDC is summarized below.

<b>Table T3: Capital outlay – Projects costing below Rs.10Cr (Rs Cr)</b>						
<b>In Area Under</b>	<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	<b>Total</b>
Transmission Circle Thrissur	35.33	12.50	13.00	6.11	0.00	<b>66.94</b>
Transmission Circle, Poovanthuruthu	17.64	21.36	14.11	1.80	3.40	<b>58.30</b>
Transmission Circle, Thodupuzha	0.88	4.28	15.59	33.86	7.33	<b>61.94</b>
Transmission Circle, Kannur	26.71	44.47	27.86	11.77	0.00	<b>110.81</b>
Transmission Circle, Kalamassery	23.13	15.74	12.40	8.79	3.28	<b>63.35</b>
Transmission Circle, Kozhikode	53.48	28.13	7.80	4.40	0.00	<b>93.80</b>
Transmission Circle, Trivandrum	53.27	26.44	4.38	0.00	0.00	<b>84.09</b>
Transmission Circle, Kottarakara	14.07	0.05	0.00	0.01	0.04	<b>14.17</b>
Transmission Circle, Alapuzha	13.67	16.99	7.80	7.85	0.35	<b>46.66</b>
Transmission Circle, Palakkad	3.12	14.13	34.54	23.57	0.00	<b>75.36</b>
Trans Division, Pathanamthitta	0.00	3.80	3.60	0.00	0.00	<b>7.40</b>
Transmission Circle, Malappuram	0.23	3.78	13.67	11.60	0.71	<b>29.99</b>
<b>Total</b>	<b>241.53</b>	<b>191.65</b>	<b>154.75</b>	<b>109.77</b>	<b>15.11</b>	<b>712.82</b>
PSDF/Grant/Deposit work/IPDS for SBU-T	0	0	0	0	0	<b>0</b>
<b>SBU-T: KSEBL fund</b>	<b>241.53</b>	<b>191.65</b>	<b>154.75</b>	<b>109.77</b>	<b>15.11</b>	<b>712.82</b>
SLDC	14.58	8.3	3.6	3.13	7.15	<b>36.76</b>
PSDF grant for SLDC	0	0	0	0	0	<b>0</b>
<b>SLDC: KSEBL fund</b>	<b>14.58</b>	<b>8.3</b>	<b>3.6</b>	<b>3.13</b>	<b>7.15</b>	<b>36.76</b>

<b>Table T4: GFA Addition– Projects below Rs.10Cr (Rs Cr)</b>						
<b>In Area Under</b>	<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	<b>Total</b>
Transmission Circle Thrissur	15.64	20.90	15.52	14.89	0.00	<b>66.94</b>
Transmission Circle, Poovanthuruthu	0.60	12.30	38.40	0.00	7.00	<b>58.30</b>
Transmission Circle, Thodupuzha	0.40	0.00	12.25	40.78	8.50	<b>61.93</b>
Transmission Circle, Kannur	9.36	41.87	37.77	21.82	0.00	<b>110.81</b>
Transmission Circle, Kalamassery	8.63	16.70	11.00	23.74	3.28	<b>63.35</b>
Transmission Circle, Kozhikode	25.25	45.55	7.00	16.00	0.00	<b>93.80</b>
Transmission Circle, Trivandrum	50.30	25.04	8.76	0.00	0.00	<b>84.09</b>
Transmission Circle, Kottarakara	14.06	0.06	0.00	0.00	0.05	<b>14.17</b>
Transmission Circle, Alapuzha	6.91	21.75	5.75	10.50	1.75	<b>46.66</b>
Transmission Circle, Palakkad	0.00	0.00	39.10	36.26	0.00	<b>75.36</b>
Trans Division, Pathanamthitta	0.00	3.80	3.60	0.00	0.00	<b>7.40</b>
Transmission Circle, Malappuram	0.00	0.00	2.31	22.92	4.76	<b>29.99</b>
<b>Total</b>	<b>131.14</b>	<b>187.97</b>	<b>181.46</b>	<b>186.90</b>	<b>25.34</b>	<b>712.82</b>
PSDF/Grant/Deposit work/IPDS for SBU-T	0	0	0	0	0	<b>0</b>
<b>SBU-T : KSEBL fund</b>	<b>131.14</b>	<b>187.97</b>	<b>181.46</b>	<b>186.90</b>	<b>25.34</b>	<b>712.82</b>
SLDC	0	15.87	0	0	20.88	<b>36.75</b>
PSDF grant for SLDC	0	0	0	0	0	<b>0</b>
<b>SLDC : KSEBL fund</b>	<b>0</b>	<b>15.87</b>	<b>0</b>	<b>0</b>	<b>20.88</b>	<b>36.75</b>

### **B. Normal capital works above Rs.10 Cr**

These works are planned as part of normal transmission development and grouped under various Transmission circles. A brief summary of the capital works under this head coming under various Transmission Circles and SLDC are submitted below.

<b>Table T5 : Summary of capital outlay: Normal works</b>								
		<b>Capital outlay (Rs.Cr.)</b>						<b>Total capital outlay (Rs.Cr.)</b>
	<b>No.of works</b>	<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>		
1	<b>Transmission Circle Alapuzha</b>	12	121.49	181.36	61.06	36.09	0	<b>400.00</b>
2	<b>Transmission Circle, Kalamassery</b>	3	27.802	8.752	7.752	7.752	7.75	<b>59.81</b>
3	<b>Transmission Circle, Kottarakara</b>	11	37.25	101.21	58.89	52	163.08	<b>412.43</b>
4	<b>Transmission Division, Pathanamthitta</b>	6	22.77	43.8	19.092	6.93	0	<b>92.59</b>
5	<b>Transmission Circle, Poovanthuruthu</b>	5	28.98	40.74	29.3	0	0	<b>99.02</b>
6	<b>Transmission Circle, Palakkad</b>	3	1.83	16.125	25.0925	4.8	4.8	<b>52.65</b>
7	<b>Transmission Circle, Thiruvananthapuram</b>	4	36.6	84.49	76.1	0	0	<b>197.19</b>
8	<b>Transmission Circle, Kozhikode</b>	11	24.1	82.35	81.35	48.9	16	<b>252.70</b>

9	<b>Transmission Circle, Kannur</b>	3	31.4	45.87	9.85	0	0	<b>87.12</b>
10	<b>Transmission Circle, Thodupuzha</b>	8	56.44	92.56	54.15	48.2	0	<b>251.35</b>
11	<b>Transmission Circle, Malappuram</b>	7	6.7	32.76	40.94	28.3	0	<b>108.70</b>
12	<b>Transmission Circle, Thrissur</b>	1	4.98	7.47	0	0	0	<b>12.45</b>
13	<b>Providing bus bar protection at major 110KV Substations</b>	1		10	10	6	0	<b>26.00</b>
	<b>Sub Total</b>		<b>400.35</b>	<b>747.49</b>	<b>473.58</b>	<b>238.97</b>	<b>191.63</b>	<b>2052.01</b>
	<b>Less: PSDF</b>			10	10	3.4	0	<b>23.40</b>
	<b>Total</b>	<b>75</b>	<b>400.34</b>	<b>737.49</b>	<b>463.58</b>	<b>235.57</b>	<b>191.63</b>	<b>2028.61</b>

The details of capital works under various Transmission Circles are submitted in the succeeding paragraphs.

#### a. Capital works under Transmission Circle, Alapuzha

The list of normal capital works proposed under Transmission Circle, Alapuzha for the control period 2022-23 to 2026-27 are submitted below.

<b>Table T6 : Normal works under Transmission Circle, Alapuzha</b>								
		<b>Capital outlay (Rs.Cr.)</b>					<b>Total capital outlay (Rs.Cr.)</b>	<b>CoD</b>
		<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>		
	<b>Transmission Circle Alapuzha</b>							
1	Down stream works for the upcoming 220KV S/S, Thuravoor	14	64.2	5.7			83.90	2024-25
2	Construction of new 110kV S/S, Kollakadavu	6	7.5				13.5	2023-24
3	110KV S/S, Kotta	6	6.5				12.5	2023-24
4	Upgradation of 33kV S/S Mannar to 110 kV	10	11				21	2023-24
5	Upgradation of 66KV Mavelikara-Chakkuvally feeder & Kattanam line	13	14				27	2023-24
6	Edappon 110KV bay extension	3.85	6.16	5.39			15.4	2024-25
7	Upgradation of 66KV Edappon-Mavelikara to 110KV	10	12.5				22.5	2023-24
8	Upgradation of existing 66KV Punnapra – Karuvatta-Nangiarkulangara –Mavelikara DC line to 110kV DC line		6.09	30.45	24.36		60.9	2025-26
9	Upgradation of Pallom-Mavelikkara 66kV DC Feeder to 110kV DC, 110kV Bay extension at 110kV S/S Mavelikkara, 110kV Bay extension & Construction of 2 Nos of 110kV feeder bays at 220kV S/S Pallom & Upgradation of 66kV S/S Changannassery to 110kV	19.52	27.33	19.52	11.73		78.10	2025.26



10	Construction of new 110 kV GIS S/S at Kavalam	12.3	8.2				20.5	2023-24
11	Construction of 33 kV S/S, Kidangara	8.28	5.52				13.8	2023-24
12	Upgradation of 66kV S/S Alappuzha to 110kV	18.54	12.36				30.9	2023-24
	<b>Total</b>	<b>121.49</b>	<b>181.36</b>	<b>61.06</b>	<b>36.09</b>	<b>0</b>	<b>400</b>	

### 1. Downstream works for the upcoming 220KV S/S, Thuravoor

This project is proposed to evacuate the power received at the upcoming 220kV Thuravoor Substation to the nearby Substations Viz.Thycattuserry,SL Puram, Cherthala, Infopark, Eramalloor, Aroor, and Mattancherry substations.The works involved are:

- Providing 1 No additional 110 kV Feeder Bay at 110 kV Substation, Aroor.
- Construction/Upgradation of Downstream EHT lines including LILO arrangement to Infopark 110 kV Substation.
- Upgradation of 66kV Substation, Cherthala to 110 kV Substation with 4 Nos 110 kV FeederBays & Double bus arrangement.
- Providing 2 Nos additional 110 kV Feeder Baysat 110kV Substation, Thycattusery.

### 2. Construction of new 110kV S/S, Kollakadavu

This project is aimed at improving the transmission system in and around Kollakadavu in Alappuzha district. Construction of 0.7kM 110kV DC line also required for the completion of this project. The proposed substation is to feed the areas in Kollakadavu, Thazhakkara, Kunnam, Ennakkad, Thonakkad, Cheriyanad, Venmony, Kochalummodu, Industrial EState under SIDCO, Kodukulanji and Njajookkad.

### 3. 110KV S/S, Kotta

This project of construction of new 110kV Substation at Kotta is aimed at improving the transmission system in and around Kotta in Alappuzha and Pathanamthitta districts. The proposed substation has been mainly constructed for supplying uninterrupted and quality power to consumers spread in Mulakuzha, Kidagannur, Karakkad and Kulanada areas under Alappuzha and 5 Pathanamthitta districts which improves consumer satisfaction.

### 4. Upgradation of 33kV S/S Mannar to 110 kV

33 kV Substation, Mannar is situated in Chengannur Taluk of Alappuzha District. This substation is commissioned on 11-06-2009 with 2x5 MVA, 33/11 kV power transformers and energized through 11kM Chengannur - Mannar 33 kV Single Circuit line (3CGMA) from 110 kV Substation Chengannur. Alternate 33 kV source is not available at Mannar Substation and N-1 condition is not satisfied. In case of any breakdown in line causes total blackout of station and the distribution wing faces much difficulties for back feeding the 11 kV supply. A remedial measure to provide uninterrupted quality power to consumers is to upgrade the Mannar 33 kV substation to 110 kV standards.

## **5. Upgradation of 66KV Mavelikara- Chakkuvally feeder & Kattanam line**

The project upgradation of 66kV Substation Kattanam & 66kV Mavelikkara-Chakkuvally Line is aimed at improving the transmission system in Kattanam, Vallikunnam and Karunagappally areas spread in Alappuzha and Kollam districts. The project is expected to improve the system stability, quality and reliability of supply.

## **6. Edappon 110KV bay extension**

220kV Substation, Edappon is situated in Nooranad Village in Mavelikara Taluk in Alappuzha District. The 110kV Substation, Edappon was commissioned in 1980 and later, the upgradation to 220kV level was done in 2009. This station plays a vital role in the 110kV transmission network in the Central Travancore area. The one and only 110kV grid line that ties the majority of substations and small hydel stations in Pathanamthitta District with the 110kV grid is established through Edappon – Pathanamthitta No I & II feeders. This substation also acts as a reliable back up for alternative back feeding arrangement to nearby major stations, viz, 220kV Substation, Kundara, Pallom, Punnapra, through existing 110/66kV feeders, during emergency situation. With a view to reduce transmission loss, by eliminating 66kV level transmission elements from the existing EHT network in a phased manner, the proposed upgradation of existing 66kV feeders from Edappon Substation, new 110kV feeder bays are required at Edappon Substation to feed the upgraded lines.

## **7. Upgradation of 66KV Edappon-Mavelikara to 110KV**

The present project is aimed at improving the transmission system and reducing the transmission losses in and around Mavelikkara. The work involves construction of 110kV double circuit line from 220kV Substation Edappon to 110kV Substation Mavelikkara with a length of 10.8km. 220kV Substation Edappon is one of the major grid stations in the Central Travancore area. As part of system improvement works, the existing 66kV bus and 4 no. 66kV feeder bays feeding to Adoor and Mavelikkara are going to be upgraded to 110kV level.

## **8. Upgradation of existing 66KV Punnapra –Karuvatta-Nangiarkulangara – Mavelikara DC to 110kV DC line**

At present there are 2Nos 66kV feeder lines from Punnapra 220kV Substation to Mavelikkara side linking Punnapra , Karuvatta , Nangiarkulangara and Mavelikkara Substations. The names of these feeders are 6PUKV, 6PUNG, 6MVKV and 6MVNG respectively . Normally the Karuvatta Substation is availing supply from Punnapra end linking through 6PUKV feeder in LILO arrangement with 6MVKV feeder comes from Mavelikkara Substation. Likewise, Nangiarkulangara 66 kV Substation is availing supply from 6PUNG feeder in LILO arrangement with 6MVNG feeder comes from Mavelikkara Substation. Also there is additional tapping to Nangiarkulangara Substation from the 6MVKV feeder. As there is LILO provisions at both Karuvatta and Nangiarkulangara Substations for any supply feeding arrangement or permit works the feeders can be isolated suitably at the respective Substations. The scheme is proposed to overcome the above bottlenecks.

## **9. Upgradation of Pallom-Mavelikkara 66kV DC Feeder to 110kV DC, 110kV Bay extension at 110kV S/S Mavelikkara, 110kV Bay extension & Construction of 2 Nos of 110kV feeder bays at 220kV S/S Pallom & Upgradation of 66kV S/S Changannassery to 110kV**

The existing lines are very old and aged for 75 years. At present, both the Pallom-Mavelikkara Feeders (No. 1&2) are tapped to Changanacherry and Thiruvalla Substations, without LILO arrangement. Only Chumathra Substation has LILO arrangement from 6PLCU Feeder (No.1) Feeder. All the three stations fed through the feeders are on the verge of capacity addition and consequent load growth. Also, since there is no LILO arrangement for both the feeders in these stations, difficulties are faced for load rearrangement, during emergency works & outages. Therefore the scheme is proposed.

## **10.. Construction of new 110 kV GIS S/S at Kavalam**

The proposed project envisages construction of new 110 kV substation with an installed capacity of 25 MVA and drawing 2 km double circuit 110 kV line which links the existing 110 kV Kodimatha – Punnapra line at location 55 for LILO arrangement at Kavalam.

## **11.Construction of 33 kV S/S, Kidangara**

This Project is for constructing one 33 kV substation at Kidangara and is aimed at improving the reliability of electric supply in the east and south-east of Kuttanadu. The proposed project envisages constructing one 33 kV substation at Kidangara, and constructing 13 km 33 kV single circuit covered conductor line from 110 kV substation, Edathua. The whole southern part of the Kuttanad comprising Alappuzha and Pathanamthitta districts is depending on the existing 66kV Substation Kuttanad (at Moncombu) and the remote 110kV Substation, Edathua. The 11kV feeders are drawn from these substations in radial, to very long distance, through watery areas. Load of the existing two 11 kV feeders from Kuttanadu substation which are covering the Kidangara electrical section area cannot be fully transferred to adjacent station. Voltage at remote end of these feeders is low during pumping season. Therefore this scheme is proposed.

## **12. Upgradation of 66kV S/S Alappuzha to 110kV**

The proposed project envisages upgrading works of 66kV substation Alappuzha to 110kV, upgrading the Alappuzha –Pooppally portion of the existing SC Kuttanadu- Alappuzha feeder to 110kV DC feeder from the crossing point of 66kV Kuttanadu- Alappuzha and 110kV Kodimatha- Punnapra at Pooppally junction with LILO arrangement.

## **b. Capital works under Transmission Circle, Kalamassery**

The list of normal capital works proposed under Transmission Circle, Kalamassery for the control period 2022-23 to 2026-27 are submitted below.

<b>Table T7 : Normal works under Transmission Circle, Kalamassery</b>								
		<b>Capital outlay (Rs.Cr.)</b>						
		<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	<b>Total capital outlay (Rs.Cr.)</b>	<b>CoD</b>
1	Capacity enhancement at 110KV S/S, Mattanchery and bay extension	10.45					10.45	2022-23
2	Renewal of 220KV S/S, Brahmapuram	9.6	1				10.6	2023-24
3	Construction of 220/66kV S/s at Ambalamughal	7.75	7.75	7.75	7.75	7.75	38.76	2026-27
	<b>Total</b>	<b>27.80</b>	<b>8.75</b>	<b>7.75</b>	<b>7.75</b>	<b>7.75</b>	<b>59.81</b>	

### **1. Capacity enhancement at 110KV S/S, Mattanchery and bay extension**

The project involves capacity enhancement of 110kV Sub Station, Mattancherry by installing 2 x 20MVA, 110/11kV Transformers and associated bay equipments, construction of 1 No. 110kV Bus Coupler Bay and 1 no. 110kV Feeder Bay with take-off arrangement in Double Bus formation. The capacity enhancement will increase the Transformer Capacity of the Station from existing 30MVA to 50MVA and the newly constructed Feeder Bay shall ensure connectivity with proposed 220kV Sub Station, Thuravoor (under Transgrid 2.0 Scheme) which will significantly improve the capacity and reliability of Power Supply in south western Parts of Kochi City.

### **2. Renewal of 220KV S/S, Brahmapuram**

The project involves a comprehensive package for renewal of 220kV Substation, Brahmapuram. It includes Supply, Installation, Testing and Commissioning of 110kV Bus bar protection Scheme and Replacement of old 220kV & 110kV equipments of 220kV Substation, Brahmapuram with new one. There is no 110kV bus bar protection scheme available at 220kV Substation, Brahmapuram. In order to minimize interruptions due to Bus faults, it is proposed to install 110kV Bus bar protection scheme at 220kV Substation Brahmapuram in the S/S.

The 220kV Substation, Brahmapuram is situated in a heavily polluted atmosphere. Due to the industrial wastes from FACT, Kochi Refineries, HOC etc, the air is totally contaminated with oxides of Sulphur, Oxides of Nitrogen etc. The equipments of the substation are deteriorated due to the industrial air pollution. The Substation was commissioned during November1999. Hence it is proposed to replace the 220kV Pantograph Isolators, Circuit breakers, Isolators & 110kV equipments such as Isolators, Circuit breakers, CTs.

### **3. Construction of 220/66kV S/s at Ambalamughal**

It is proposed to install 220/66kV and 66/11kV transformers at Ambalamughal Substation. The Capacity addition in 66 kV voltage level is selected for the immediate power

evacuation after constructing the Substation. The 66kV Double Circuit line from 110kV Vyttila substation to 66kV substation, Puthencruz is passing near to the proposed area of substation.

The 66kV system of Vyttila Substation is now heavily loaded. With the addition of 66kV voltage level at 220kV Ambalamugal Substation, the load of Vyttila substation can be relieved. The proposed 66kV substation can supply power to 66kV GIS, Thripunithura, 66kV HOC substation, 66kV Puthencruz & 66kV PCBL. Thus, the load in Kalamassery-Vyttila lines can be controlled.

#### **b. Capital works under Transmission Circle, Kottarakara**

The list of normal capital works proposed under Transmission Circle, Kottarakara for the control period 2022-23 to 2026-27 are submitted below.

<b>Table T 8 : Normal works under Transmission Circle, Kottarakara</b>								
<b>Capital outlay (Rs.Cr.)</b>								
		<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	<b>Total capital outlay (Rs.Cr.)</b>	<b>CoD</b>
1	Construction of new 110kV Substation at Thevalakkara and Up gradation of 66kV Sasthamcotta-Chavara DC line to 110kV DC line	9	18	17.24			44.24	2024-25
2	Interlinking 110kV Substation Perinad and 110kV Substation Kavanad.	10	22				32	2023-24
3	Installation of new 200MVA 220/110KV transformer in BAY#2 at 220 kV Substation, Edamon.	10.25					10.25	2022-23
4	Modernisation of 110kV Feeder bays and SAS implementation at 220kV Substation Edamon	8	19.21				27.21	2023-24
5	Interlinking 110KV S/S Ayur and 110KV S/S Paripally				10	15.73	25.73	2026-27
6	Thenmala S/S and Edamon-Kallada line upgradation				7	10	34.4	2027-28
7	Chithara 110KV S/S				5	8.75	13.75	2026-27
8	Construction of new 33KV S/S at Kollam bypass, Peroor interlinking		12	21.4			33.4	2024-25
9	Alternate 33KV feeding to existing 33KV S/Ss		30	20.25			50.25	2024-25
10	Upgradation of 33KV S/S Oachira				10	86.1	96.1	2026-27
11	Conversion of Existing 110kV Edamon- Kundara SC feeder to 110kV DC Feeder from Edamon Kuzhimathicadu Kundara Portion.				20	42.5	62.5	2026-27
	<b>Total</b>	<b>37.25</b>	<b>101.21</b>	<b>58.89</b>	<b>52</b>	<b>163.08</b>	<b>412.43</b>	

### **1. Construction of new 110kV S/S at Thevalakkara & Up gradation of 66kV Sasthamcotta-Chavara DC line to 110kV DC line**

The Proposal for constructing an 110KV substation at Thevalakkara was prepared to meet the low voltage problem and frequent interruptions in areas under Thevalakkara and Mygapally electrical sections. These sections are the fag end of the 11 KV feeders from Chavara, Sasthamkotta and Karunagapally substations. The present project is aim for improving the transmission system in and around Kollam district. The proposed upgradation of Sasthamcotta - Chavara line will ensure two additional feeder for 110kV Chavara Substation, which in turn benefits to KMML and Kavanadu Substation. At present the 66KV Chavara - Sasthamcotta line has kept idle, since substations at both ends are now at 110KV level. With the present proposal of upgradation of 66kV SasthamkottaChavara DC line to 110kV, the system stability and reliability can be improved.

### **2. Interlinking 110kV S/S Perinad and 110kV S/S Kavanad.**

Presently 110kV Substation Kavanad is fed from 220kV Substation Kundara through Sasthamcotta & Chavara Substations. The total length of the feeder from Kundara to Kavanad is 33km. In this proposal, the line route of the new feeder is Kundara-PerinadKavanad and the length of the feeder will be 18 km. Hence the transmission losses will be reduced to the order of half and it is also possible to get an alternate feeder to 110kV Substation Kavanad and Perinad with minimum length and hence forming a 110kV ring circuit. Further to this 220kV Substation Kundara is the only source to feed 110kV Perinad Substation and Traction Substation, Perinad through 1KDPR and 1KDTR feeders respectively. This proposal helps to strengthen the 110kV grid through ring circuit there by helping to ensure redundancy and reliability to Traction Substation Perinad, 110kV Substation Perinad, 110kV Substation Kavanad, 110kV Substation Chavara and 110kV Substation KMML.

### **3. Installation of new 200MVA 220/110KV transformer in BAY#2 at 220 kV S/S, Edamon**

This project proposes Purchase, Installation and Commissioning of a new 200 MVA 220/110 kV Transformer in Bay#2 at 220 kV substation, Edamon. At present there is only one 200 MVA 220/110 kV Transformer. The second bay is kept vacant since 2015, with all switchgears installed. This project aims at provide n-1 condition and capacity enhancement of 220 kV substation, Edamon. With the installation of a second transformer at this important substation, the maintenance of the next transformer is can be taken-up without affecting the other grid sub stations in Thiruvanthapuram and Kollam Districts. All the feeding 110 kV and 66 kV substations will be benefitted by this capacity enhancement and redundancy of feeding.

### **4. Modernisation of 110kV Feeder bays and SAS implementation at 220kV S/S Edamon**

220 kV Edamon substation is one of the vital substations of KSEBL in South Kerala, which is an important import hub. The station is connected to interState feeders, Moozhiyar

hydro power house and Kallada hydro power station. The station is feeding various substations in three district and has a capacity of 400MVA. In 220 kV level there are 15 bays includes 9 feeders and 2 Nos of 200MVA transformers and at 110 kV level there are 7 feeders, 2 nos of 110/66 kV transformers, 1 no of capacitor bank. Also, there are 2 nos of 66 kV feeders, 2 nos of 66/11 kV transformers and 10 nos of 11 kV feeders are available. In 220kV, there are 2 interState feeders and two other 220kV feeders are belongs to PGCIL and part of southern grid. The 220kV feeder protection panels presently in service are more than 10 years old and subjected to several modifications. Most of the 220kV lines are drawn through forest area also. Hence the upgradation of protection system is necessary for accurate tripping and coordination.

#### **5. Interlinking 110KV S/S Ayur and 110KV S/S Paripally**

The present project is aimed at improving the transmission system in and around Paravoor municipality in Kollam district. Provide additional feeding to 33 KV Substation, Paravur. The distribution section offices in the areas of 11 KV feeding from 33 KV Substation, Paravur are requesting for alternate feeding source to Paravur Substation due to interruptions in these areas during the supply interruption in 33 KV Substation, Paravur or at 110 KV Substation, kottiyam. The project is expected to improve the system stability, quality and reliability of supply

#### **6. Thenmala S/S and Edamon-Kallada line upgradation**

This proposal is for the up gradation of 66kV Kallada -Edamon DC line to 110kV DC line using CICA and AL 59 type conductor, upgrading 66kV Substation, Thenmala, associated bays in KHEP Thenmala by 145 kV SBB Hybrid GIS and 2 No bays at 220 kV Substation, Edamon, The line works are planned to enhance the connectivity of the Thenmala Substation and KHEP through the following feeders. • 1No. 110kV feeder, to link with the KHEP, Thenmala and 220kV Substation Edamon and feeding Thenmala Substation by tapping arrangement. • 1No. 110kV feeder, to link with the 220kV Substation, Edamon and to KHEP, Thenmala. By the up gradation of this line and Substation, more system stability and reliability can be improved and can occupy more space in 220 kV Substation Edamon by dismantling the existing 66 kV yard. This space can be utilized for the future expansion and modernisation of 220 kV Substation Edamon, also leads smooth operation of substation

#### **7. Chithara 110KV S/S**

The present project is aimed at improving the transmission system in and around Kollam district. The proposed 110kV substation at Chithara located at Mankode village in Kottarakkara Taluk, Kollam District comes under the jurisdiction of TC Sub Division, Punalur under Transmission Division, Punalur. Proposal for constructing a 110KV substation at Chithara was prepared to meet the low voltage problem and high interruption rates of the area which is fed by 11 KV feeders from Kadakkal 33KV substation, Anchal 110KV substation and Thenmala 66KV substation. The project is expected to improve the system stability, quality and reliability of supply.

## **8. Construction of new 33KV S/S at Kollam bypass, Peroor interlinking**

The present project is aimed at improving the transmission system in and around areas of Kollam Corporation and nearby Panchayaths. Provide additional feeding to 33 KV Substation, Kannanalloor is an additional benefit of this inter linking project. The distribution section offices in the areas under the electrical section Kilikolloor, Kannanalloor, Kundara, Kadappakkada, Ayathil etc. will get benefit from the proposed project. The project is expected to improve the system stability, quality and reliability of supply.

## **9. Alternate 33KV feeding to existitng 33KV S/Ss**

From Ambalappuram 110kV substation under Transmission Circle, Kottarakkara, there are four 33kV feeders feeding to 33kV Chengamanadu ,Puthur, Ezhukone and Pooyappally Substations. These four substations meet a considerable extent of load demand in Kottarakara region. Interruption at 33KV level has become very frequent in this area. To resolve this issue it has been decided to replace the existing ACSR-Dog conductor of the 33kV Chengamanadu, Puthur, Pooyapally and Ezhukone feeder with 33kV, 120sq.mm Covered conductor and giving alternate 6 feeding to all 33kV substations for improving reliability.

## **10. Upgradation of 33KV S/S Oachira**

The present project is aimed at improving the transmission system in and around Karunagappally Town. The proposal consists of Upgradation of 33 kV Substation, Oachira to 110kV 2x12.5MVA, 110/11kV Transformers and construction of 20.3 KM DC line by laying 110 kV UG Cable and 4 feeder bays at Kayamkulam and Karunagappally Substation. The project is expected to facilitate the industrial development and meet future demand in Oachira and improve the quality and reliability of supply to customers in the Town and in nearby area and also provides an alternate supply to Karunagappally and Kayamkulam Substations.

## **11. Conversion of Existing 110kV Edamon- Kundara SC feeder to 110kV DC Feeder from Edamon Kuzhimathicadu Kundara Portion.**

The present project is aimed at improving the transmission system in and around Kollam district. The proposed conversion of the Single circuit portions of the 110kV Edamon \_Ambalappuram,Ambalappuram\_Kottiyam and Kottiyam\_Kundara feeders into Double Circuit feeder come under the jurisdiction of TC Sub Division, Punalur under Transmission Division, Punalur. Proposal for converting the existing 110kV Edamon-Kudara Single Circuit Feeder (via.110kV Sub Stations Ambalapuram and Kottiyam ) to 110kV Double Circuit Feeder from Edamon Ambalapuram Kuzhimathicadu and Kundara portion is intended for improving the reliability of the 110kV supply to 110kV Ambalapuram and Kottiyam Sub Stations from both 220kV Edamon and Kundara Substations independently without any delay.



### c. Capital works under Transmission Division, Pathanamthitta

The list of normal capital works proposed under Transmission Division, Pathanamthitta for the control period 2022-23 to 2026-27 are submitted below.

Table T 9: Normal works under Transmission Division, Pathanamthitta								
		Capital outlay (Rs.Cr.)					Total capital outlay (Rs.Cr.)	CoD
		2022-23	2023-24	2024-25	2025-26	2026-27		
1	Construction of 110kV Substation, Theodical	10.036	15.054				25.09	2023-24
2	Construction of 110kV Substation, Pallickal	4.608	6.912				11.52	2023-24
3	Upgradation of 110kV Substation, Konni	8.124	12.186				20.31	2023-24
4	Construction of 110kV Substation, Mannarakulanji near Mylapra		5.04	7.56			12.6	2024-25
5	Construction of 110kV Substation, Elavumthitta		4.608	6.912			11.52	2024-25
6	Construction of 110kV Substation, Kodumon			4.62	6.93		11.55	2025-26
	<b>Total</b>	<b>22.768</b>	<b>43.8</b>	<b>19.09</b>	<b>6.93</b>	<b>0</b>	<b>92.59</b>	

#### 1. Construction of 110kV Substation, Theodical

At present Theodical is situated at the fag end of feedings from Mallappally, Kozhencherry and Ranni substations. The 11kV feeder routes to Theodical are alligned through thickly vegetated areas and paddy fields as cross country lines. This situation leads to frequent power failures. More over, voltage problems are existing in these areas due to very lengthy and over loaded feeders that exist there. The proposed substation overcomes these difficulties as stable and reliable 110kV supply from Grid station of 220kV Edappone via Pathanamthitta would be available to the new station. The project is expected to facilitate the development by meeting future load growth in Theodical and surrounding areas and by improving the reliability of supply to customers.

#### 2. Construction of 110kV Substation, Pallickal

Construction of new 220kV/110kV Substations at Sasthamkotta, Pathanamthitta, Kakkad and upgradation of Padom-Koodal –Pathanamthitta –Adoor- Edapone MCMV line and associated work are part of the upcoming TRANSGRID project. In order to transfer the benefits of the TRANSGRID projects to consumers, one of the downstream proposals is a new 110/11KV substation at Thengamam Pallickal.

#### 3. Upgradation of 110kV Substation, Konni

At present only one single circuit 33 kV over head feeder, 8.5 km in length from 110 kV substation Pathanamthitta to Konni caters power to Konni 33kV substation through thickly

vegetated area and paddy field, in a cross country alignment, including one major river crossing. The line is prone to frequent power failure, due to the topographical condition and the cross country alignment. Moreover, during the flood and connected disasters in the month of August 2018, the water level in the line route rose to alarming levels which forced switch off of the 33kV line from the sending end substation. The entire line route is prone to flood. The proposed scheme overcomes these difficulties as stable and reliable 110 kV supply from different sources as Grid station of Edappon via Pathanamthitta and Edamon via Pathanapuram-Koodal to Konni substation can be made available. The project is expected to facilitate the present development requirements and shall meet future load growth in Konni Taluk headquarter areas and would improve the reliability of supply to the customers in Konni town and its surrounding area.

#### **4. Construction of 110kV S/S, Mannarakulanji near Mylapra**

110 kV Substation Pathanamthitta meets the power requirements of Pathanamthitta town, the District headquarters. Pathanamthitta and its nearby townships Konni, Kozhencherry and Ranni are fast developing and thereby increasing the power demand exponentially. Moreover, the penetration of e-vehicles would definitely increase the power consumption in near future. At present, 110kV substation, Pathanamthitta is loaded to about 60% of its installed capacity and addition of more transformers there would not solve the issue of a backup source. A more prudent option is a separate station in the vicinity of the Punalur-Muvattupuzha State highway that connects the proposed Erumely Airport to the major townships. Considering the Power demand growth and the importance of being the district headquarters, ensuring reliability of Power supply in Pathanamthitta town is absolutely essential. So a new 110/11kV substation to be the backup source to Pathanamthitta town is inevitability. Moreover, due to space constraints in the control room, there is difficulty in providing additional 11kV outlets at 110kV substation, Pathanamthitta as there exist 13nos of 11kV feeder outlets at present. Also effective 11kV back feeding for the nearby townships of Page 6 of 21 Kozhencherry and Ranni can be ensured through this proposal.

#### **5. Construction of 110kV Substation, Elavumthitta**

The substation can also provide an effective backup for the primary distribution network in the locality of 5 nearby Elavumthitta, Kulanada, Omalloor and Aranmula. The voltage profile at the proposed location which is at the fag end of the 11kV feeders from the nearby Adoor, Kozhencherry & Edappon substations is poor and hence the quality of power and availability is far from the desired benchmarks. Moreover, the new proposal would help in back feeding power to the nearby substation areas in events of outages at 66kV substation at Adoor, 110kV substation Pathanamthitta.

#### **6. Construction of 110kV Substation, Kodumon**

The substation can also provide an effective backup for the primary distribution network in the locality of 5 nearby Kodumon, Kaipattoor, Ezhamkulam, Angadickal and Vallikode. The voltage profile at the proposed location which is at the fag end of the 11kV

feeders from the nearby Adoor, Koodal & Pathanamthitta substations is poor and hence the quality of power and availability is far from the desired benchmarks. Moreover, the new proposal would help in back feeding power to the nearby substation areas in events of outages at 66kV substation at Adoor, 110kV substation Koodal.

#### d. Capital works under Transmission Circle, Poovanthuruthu

The list of normal capital works proposed under Transmission Circle, Poovanthuruthu for the control period 2022-23 to 2026-27 are submitted below.

Table T 10 : Normal works under Transmission Circle, Poovanthuruthu								
		Capital outlay (Rs.Cr.)					Total capital outlay (Rs.Cr.)	CoD
		2022-23	2023-24	2024-25	2025-26	2026-27		
1	Enhancing Transformer capacity at 110kV Substation, Vaikom	5.3	6.5				11.8	2023-24
2	Construction of new 110 kV G I S substation at Puthuppally	10.22	14.05	1.25			25.54	2024-25
3	220 kV double bus arrangement using G I S at 220 kV substation, Pallom		12	18			30	2024-25
4	Construction of new 33 kV substation at Kumarakom with associated lines		6.7	10.05			16.75	2024-25
5	Construction of new 110 kV substation at Vazhoor	13.46	1.49				14.95	2023-24
	<b>Total</b>	<b>28.98</b>	<b>40.74</b>	<b>29.3</b>	<b>0</b>	<b>0</b>	<b>99.02</b>	

#### 1. Enhancing Transformer capacity: 110kV S/S, Vaikom

Presently, the 110kV substation, Vaikom has 2Nos 110kV incoming feeders, 2Nos 66kV feeder bays, 2Nos 33kV feeder bays, 2Nos 110/11kV 10MVA Transformer bays, 1No. 110/11kV 12.5MVA Transformer, 2Nos. 110/66 40MVA Transformers and 1No. 110/33kV Transformer. All the above feeders and transformers are connected to 110kV single bus system. Any fault in the 110kV bus leads to the complete shutdown of the station. Moreover, for carrying out maintenance on the bus or on bus isolators, total shutdown of the station is required. Because of this, supply interruption has occurred in Vaikom municipality and nearby panchayat area as there is no substation near to Vaikom area for arranging back feeding facility at 11kV voltage level. It may please be noted that there is no enough space for proving bus sectionalizer by means of conventional/ hybrid type for splitting of bus for overcoming the above problem. Moreover, if any more 110kV feeders are connected to the 110kV single bus system, the problem Stated above is still persisting. Hence in order to overcome this bottle neck, this scheme is proposed.

## **2. Construction of new 110 kV GIS S/S at Puthuppally**

This downstream works project is aimed at improving the growing demands of Kottayam district especially in Puthupally area. At present Puthupally area is fed from 66kV Substation Kottayam which is 7 Kms away and 110kV substation Pampady which is 10km away. By the commissioning of 110kV GIS substation at Puthupally, the low voltage problem in Puthupally and nearby area can be solved. A new substation is inevitable to meet the future load growth in this area.

## **3. 220 kV double bus arrangement using GIS at 220 kV S/S, Pallom**

220kV Substation, Pallom is one of the most important 220kV Substations in the region. 110kV and 66kV sub-transmission systems in this region are also from Pallom 220kV Substation. 220kV Bus arrangements in this substation at present is 'Single bus with bus sectionalizer'. Double bus with bus coupler arrangement is mandatory for 220kV Substations now. Due to acute space constraints and practical impossibility of expanding the yard through land acquisition, outdoor double bus arrangement is not possible at this station. So Gas Insulated Switchgear Substation is proposed for the 220kV system

## **4. Construction of new 33 kV S/S at Kumarakom with associated lines**

At present Kumarakam and Thiruvarp area is fed from Chengalam 110kV Substation. A 33kV Substation exclusively for Kumarakam will reduce the interruption and voltage issues to a big extent.

## **5. Construction of new 110 kV S/S at Vazhoor**

The proposal for the construction of 110kV Substation at Vazhoor includes construction of 2 Nos. feeder bays and transformer bays at the proposed site for Vazhoor Substation beneath the 110kV line from Pampady to Kanjirappally. Major areas of Electrical Section, Vazhoor under Electrical Division, Ponkunnam is presently fed from the 11kV feeders viz. Kappukadu & Nedumavu from 110kV Substation, Pampady having a feeder circuit length of more than 15 km. Rest of the area under Vazhoor Section is fed from 110kV Substation, Kanjirappally and 33kV Substation, Karukachal. All the above three substations are located beyond the geographical boundary of this section. Hence all the 11kV feeders to Vazhoor Section are crossing the nearby Electrical Sections causing multiple interruptions in several occasions. The proposed substation is to be fed from 220kV Substation, Pallom through Pallom – Kanjirappally DC feeder. Thus quality power can be made available in Vazhoor area which improves consumer satisfaction.

## **e. Capital works under Transmission Circle, Palakkad**

The list of normal capital works proposed under Transmission Circle, Palakkad for the control period 2022-23 to 2026-27 are submitted below.

<b>Table T11 : Normal works under Transmission Circle, Palakkad</b>								
		<b>Capital outlay (Rs.Cr.)</b>						
		<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	<b>Total capital outlay (Rs.Cr.)</b>	<b>CoD</b>
1	Reconductoring of 110kV SHOT feeder & replacing old and rusted MS tower (13.6Km)		1.6	4.8	4.8	4.8	16	2026-27
2	Capacity enhancement and 110kV bus extension at 110kV Kanjikode substation	0.88	8.83	7.94			17.65	2024-25
3	Construction of new 110KV Substation, Padinjarangadi	0.95	5.7	12.35			19	2024-25
	<b>Total</b>	<b>1.83</b>	<b>16.13</b>	<b>25.09</b>	<b>4.8</b>	<b>4.8</b>	<b>52.65</b>	

### **1. Reconductoring of 110kV SHOT(Shornur-Ottapalam) feeder & replacing old and rusted MS tower (13.6Km)**

The existing 110kV SHOT feeder is around 50 years old and consist of MS towers which have to be painted frequently. Hence it is proposed to replace the MS towers with GI towers. The conductor used is ACSR wolf conductor with ampere capacity of 343A. The above said double circuit line feeding the load of 110kV Substation Ottppalam, Cherpulassery , Pazhayannur and Vadakkenchery is overloaded during peak summer. Hence the conductor capacity has to be increased. It is proposed to re conductor the line with HTLS conductor having 600A ampacity

### **2. Capacity enhancement and 110kV bus extension at 110kV Kanjikode substation**

The 110kV Substation Kanjikode is one of the oldest substations in Palakkad district. The existing 110kV Substation Kanjikode is situated inside the industrial development area at Kanjikode. the existing substation was augmented with installation of additional equipment from time to time. Even though the additional installations resulted in increased capacity of the substation, the reliability and operational flexibility of the substation has not improved. With the advent of the proposed Kochi – Coimbatore industrial corridor, the power demand in the area is likely to burgeon in the immediate future. It is learnt that an Industrial hub, which is a part of the Kochi – Coimbatore industrial corridor is proposed to be setup at Pudussery, which lies in the immediate vicinity of the Kanjikode Substation. This fact alone is sufficient to corroborate the urgent need of revamping the station.

### **3. Construction of new 110KV Substation, Padinjarangadi**

Padinjarangadi and Kumbidi Electrical Sections are situated at the far end of all 11kV feeders. Every interruption to any of the 11kV feeders affect the power supply of these sections. All 11kV feeders are reaching these sections crossing one or more electrical sections passing through hilly and jungle area where tree falling and other interruptions are regular.

The new proposal intends to construct a 110kV substation at Padinjarangadi. This proposal helps to reduce the loss and improve reliability & redundancy of the supply at Padinjarangadi and Kumaranellur areas. Also the proposal is beneficial to nearly Fifty thousand consumers under Padinjarangadi, Kumbidi, and Chalissery Electrical Sections. This proposal is beneficial to Changaramkulam Section also, which is at the fag end of long 11kV feeders.

#### **f. Capital works under Transmission Circle, Thiruvananthapuram**

The list of normal capital works proposed under Transmission Circle, Thiruvananthapuram for the control period 2022-23 to 2026-27 are submitted below.

<b>Table T 12 : Normal works under Transmission Circle, Thiruvananthapuram</b>								
		<b>Capital outlay (Rs.Cr.)</b>					<b>Total capital outlay (Rs.Cr.)</b>	<b>CoD</b>
		<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>		
1	Up gradation of 33kV Substation Poovar to 110kV		41.75	41.75			83.5	2024-25
2	Construction of new 110kV AIS Substation at Nemom.		11.34	11.35			22.69	2024-25
3	Construction of 110kV GIS Substation at Kudappanakunnu	10	20	23			53	2024-25
4	Construction of 110KV GIS, Thirumala	26.6	11.4				38	2023-24
	<b>Total</b>	<b>36.6</b>	<b>84.49</b>	<b>76.1</b>	<b>0</b>	<b>0</b>	<b>197.19</b>	

#### **1. Up gradation of 33kV S/S Poovar to 110kV**

The proposed scheme would offer Poovar with 110kV substation with connectivity to 220kV GIS Vizhinjam under construction also could extend Parassala supply through the proposed upgradation of 16km of 33kV SC OH line from Parassala Substation to Poovar to 110kV level. This would improve the voltage profile in South-East area of Vizhinjam Sea Port and the developing areas around Poovar.

#### **2. Construction of new 110kV AIS S/S at Nemom**

The proposed scheme would offer Nemom 110kV substation with connectivity from 110kV Substation, Thirumala and 110kV Substation, Balaramapuram. This would improve the voltage profile in area of Nemom, Pappanamcode, Industrial eState, Vellayani, Kalliyoor, Mookunnumala etc. the fast developing areas around Nemom under Tvpm corporation area and Pallichal panchayath area.

### 3. Construction of 110kV GIS S/S at Kudappanakunnu

The project involves construction of GIS Substation with 2 nos 110/11kV 12.5MVA Transformers. The proposed scheme would improve the voltage at kudappanakunnu Peroorkada Kowdiar etc.and can ensure uninterrupted power supply to Trivandrum city.. The 11kV load from Nedumangad, Aruvikkara, Vattiyoorkav and Paruthippara can be reduced once this substation becomes operational.

### 4. Construction of 110KV GIS, Thirumala

Construction of 110 kV GIS Substation at Thirumala and connecting the 110kV feeders can strengthen the supply position both in terms of availability and reliability in and around Thiruvananthapuram City area and connected semi urban / rural areas thereby achieving the N-1 contingency criteria. This project will also enhance the overall system stability in the region.

### g. Capital works under Transmission Circle, Kozhikode

The list of normal capital works proposed under Transmission Circle, Kozhikode for the control period 2022-23 to 2026-27 are submitted below.

Table T13 : Normal works under Transmission Circle, Kozhikode								
		Capital outlay (Rs.Cr.)					Total capital outlay (Rs.Cr.)	CoD
		2022-23	2023-24	2024-25	2025-26	2026-27		
1	Construction of 110KV S/S Adivaram ( Included in MPR CAPEX, but not approved)	5	9.5				14.5	2023-24
2	Construction of 110KV S/S at Kalpetta	0	0	6	6		12	2025-26
3	110KV AIS S/S Maniyur		5.1	5			10.1	2024-25
4	Up gradation of 66kV GIS S/S Puthiyara to 110kV		20.75	20.75			41.5	2024-25
5	Upgradation of 220/66kV S/S Kaniyambetta to 220/110kV S/S	5	18	10	5		38	2025-26
6	Upgradation and conversion of Kuthumunda - Thamaarassery SC line to 110kV DC line			5	10	10	25	2026-27
7	Conversion of 66kV SC Ambalaparamba tap line into DC line in 110kV parameters and upgradation of substation		5	5	15		25	2025-26
8	110KV Substation,Panthalayani	5	10	5.6			20.6	2024-25
9	110KV Substation,Pantheeramkave		5	5	6.9		16.9	2025-26
10	Upgradation of 66 kV S/S Thamarassery and Kunnamangalam – Thamarassery line and Substation	9.1	9	9			27.1	2024-25
11	Upgradation of 33kV Ramanattukara S/S to GIS in 110kV voltage level			10	6	6	22	2026-27
	<b>Total</b>	<b>24.1</b>	<b>82.35</b>	<b>81.35</b>	<b>48.9</b>	<b>16</b>	<b>252.7</b>	

## **1. Construction of 110KV S/S Adivaram**

The proposed 110 kV substation at Adivaram is located in Kaithapoyil, Kodenchery village in Thamarassery Thaluk, Kozhikode district. 66 kV Substation, Thamarassery is the nearby substation and the load at Thamarassery substation is approximately 75% of the station capacity. The 11 kV feeders of this substation are over loaded. Distribution wing has requested to put up a substation at Adivaram to meet the growing demand . New 110kV substation at Adivaram envisages an integral development of the transmission & distribution system in this area. This project was already submitted before Hon'ble Commission along with the Mid Term Performance Review petition filed by KSEBL in 2020. However, approval for the same was not accorded in the order dated 28-5-2021. Therefore, the project is being resubmitted.

## **2. Construction of 110KV S/S at Kalpetta**

The 33KV substation kalpetta is situated in a flood prone area and road to the substation submerges during monsoon. In each year , when the monsoon is heavy ,the substation goes to shutdown till the rain stops and water recedes. Many times this issue raised in the District development committee meetings and strict directions were issued by the district authorities to ensure uninterrupted power supply in district head quarters especially during monsoon season. To overcome this ,it is imparitive to construct a new substation specifically to meet the power requirement of Kalpetta town during the absence of 33KV substation Kalpetta and to meet growing power demands in kalpetta town ship.

## **3. 110KV AIS S/S Maniyur**

The project is aimed at improving the Transmission system in and around areas under Vatakara Taluk The proposal envisages construction of 110KV AIS Substation Maniyur at Keezhal under Vatakara Taluk with the installation of 2 line bays, 2 Transformer bays and buscoupler bay and installation of 110KV/11KV, 2X12.5MVA Transformers by availing 110KV supply through a LILO arrangement on 110KV OR-MP Line by installing a Tapping tower between tower location 40 to 42. The project is expected to ensure uninterrupted and quality power supply to the areas under Vatakaratown, Karimbanapalam, Memunda, Puthuppanam, Mandharathur, Cherandathur, Maniyur, Keezhal etc.

## **4. Up gradation of 66kV GIS S/S Puthiyara to 110kV**

This proposal envisages the upgradation of 66kV GIS Substation, Puthiyara to 110kV level. The work involves- • Replacing the existing 66kV GIS equipment with 110kV GIS equipment having five bays. • Replacing two numbers 66/11kV, 16MVA transformers with 110/11kV 20MVA transformers. • Replacing Control & Relay panel of feeders, transformers and bus coupler panel, Battery and charger, LT AC panel, DC DB. • Installation 2 KM of 110kV double circuit UG cable in LILO arrangement. • Installation of Air conditioning system and renovation of Control room, GIS room and other civil works. • Implementation of SAS



## **5. Upgradation of 220/66kV S/S Kaniyambetta to 220/110kV S/S**

220kV Substation, Kaniyambetta the main source of supply that feeds the entire Wayanad district. Also 66kV supply gets extended to neighbouring districts as and when required. Therefore, it is very essential to upgrade the existing 220/66kV feeding arrangement at Kaniyambetta substation to 220/110kV, to feed 110-kV supply to these substations, getting upgraded to 110-kV and to maintain the stability and reliability of the network. The proposed scheme is envisaged for this purpose.

## **6. Upgradation and conversion of Kuthumunda -Thamarassery SC line to 110kV DC line**

Thamarassery and Kuthumunda substations are vital substations considering the present load flow as well as the future load expansions. Hence maintaining an alternate reliable source is extremely important for these stations. When these works are completed, both Thamarassery and Kuthumunda substations will be 110kV and the interconnection feeding arrangement also need to be changed. Hence for utilizing the complete benefits of the above mentioned works, it very much essential to convert the existing 66kV SC Thamarassery – Kuthumunda feeder (20.6km) to 110 kV DC feeder. Also the present 66kV Thamarassery – Kuthumunda feeder was commissioned long back in the 1940s. This feeder, as per the latest survey is having a route length of 20.6 Kms with 85 locations, constructed with ACSR Dog conductor. Considering the future load growth and the scope of capacity enhancement at both substations, the present line will be inadequate in the case of urgency. Moreover, this line passes through Ghat and forest area for a considerable length and the ground clearance is not sufficient in many locations. Hence the line needs to be raised which is an urgent requirement.

## **7. Conversion of 66kV SC Ambalaparamba tap line into DC line in 110kV parameters and upgradation of substation**

The upgradation of Kunnamangalam Substation to 220kV level with 2 number 100MVA transformer under Transgrid project is completed in 2021. With the upgradation of the Substation to 220kV level, the major source of power to the Substation will be from Areakode or Kaniyampetta through 220kV feeder. Under this scenario, the substation has to evacuate power through 110kV feeders. At present there are 4 numbers of existing 110kV feeders, viz. to Nallalam, Koduvally and 7 Agasthyamuzhi (DC) and proposed 110 KV feeder to Thamarassery is will also come in the picture. With the accomplishment of the upgradation of 66 kV Kunnamangalam –Kuttikattur – T- Ambalaparamba feeder and substation, another 110kV connectivity can be materialized for meeting the increased power evacuation requirement and load demand of Ambalaparamba Substation.

## **8. 110KV Substation, Panthalayani**

The present project is aimed at improving the Transmission system in and around Koyilandy town. The proposal consists of two parts. The first part consists of construction of

110KV AIS Substation at Panthalayani in Koyilandy Municipality Limits with the installation of 2 line bays, 2 Transformer bays and buscoupler bay with double bus arrangement and installation of 110KV/11KV, 2X12.5MVA Transformers and the second part is Construction of 6.5 KM 110KV DC Line from Urallur between a Tower location 76 to 84 on 110KV QLVD (110KV Koyilandy Vatakara) feeder in Koyilandy Municipality Limits.

#### **9. 110KV Substation, Pantheerankave**

This proposal envisages the construction of 110kV Pantheerankavu substation with installed capacity of 2x12.5 MVA and making LILO arrangement of 110kV Nallalam- Chelari feeder as first phase of the project and making LILO arrangement of 110kV Nallalam-Kizhseery feeder as second phase of the project. With growing demand, the bulk power requirement in the coming years cannot be met from the existing substations. Moreover all the existing 11kV feeders in these areas are the fag end of those feeders with lot of back feeding constraints. So the construction of new substation at Pantheerankavu is essential.

#### **10. Upgradation of 66 kV S/S Thamarassery and Kunnamangalam – Thamarassery line and Substation**

The upgradation of Kunnamangalam Substation to 220kV level with 2 number 100MVA transformers is progressing under Transgrid project which is envisaged for completion in January 2020. With the upgradation of the Substation to 220kV level , the major source of power to the Substation will be from Areakode or Kaniyampetta through 220kV feeder. Under this scenario , the substation has to evacuate power through 110kV feeders. At present there are 4 numbers of 110kV feeders to Nallalam , Koduvally and Agasthyamuzhi(DC) .With the commissioning of the upgraded 66 kV Kunnamangalam –Thamarassery feeder , another 110kV connectivity can be materialized for meeting the increased power evacuation requirement and load demand of Thamarassery Substation.

#### **11. Upgradation of 33kV Ramanattukara S/S to GIS in 110kV voltage level**

The present 33kV transmission system in this area of Kozhikode district has several constraints and will not be sufficient to meet the distribution capability requirement of immediate future. The capability of the system has to be sufficiently augmented to relieve present constraints and to meet future requirements. It is found that sub-transmission and distribution system in Ramanattukara, Feroke and KINFRA area can be considerably improved by upgrading 33kV Substation, Ramanattukara to 110kV voltage level. Therefore, this project is proposed.

#### **h. Capital works under Transmission Circle, Kannur**

The list of normal capital works proposed under Transmission Circle, Kannur for the control period 2022-23 to 2026-27 are submitted below.

<b>Table T 14 : Normal works under Transmission Circle, Kannur</b>								
		<b>Capital outlay (Rs.Cr.)</b>						
		<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	<b>Total capital outlay (Rs.Cr.)</b>	<b>CoD</b>
1	Construction of 220kV Substation, Vidyanagar	6.4	20	5.6			32	2024-25
2	Construction of 110 kV substation Kuttikol	15	15	4.25			34.25	2024-25
3	Construction of 110kV Substation at Thimiri (Included in MPR CAPEX, but not approved)	10	10.87				20.87	2023-24
	<b>Total</b>	<b>31.4</b>	<b>45.87</b>	<b>9.85</b>	<b>0</b>	<b>0</b>	<b>87.12</b>	

### **1. Construction of 220kV Substation, Vidyanagar**

The project is aimed to meet the incident demand, to reduce the system losses and to keep the Transmission system reliability and security at par with the international standards, transmission network in Kannur Kasaragode area, shall be strengthened by constructing new 220kV transmission lines and new 220kV Substations. The proposed new 220kV/110kV substation at Vidyanagar can meet the increased demand in this region to a great extent. Also the proposal feeders can satisfy N-1 criteria to have system stability in the region

### **2. Construction of 110 kV substation Kuttikol**

A 400 kV DC line from Uduppi to Cheemeni is proposed and is to be constructed in TBCB system with 400 kV Substation at Cheemeni. The present available intra-State transmission system will not be sufficient for catering the additional transmission capacity acquired by this DC feeder. From Cheemeni to Mylatty, power can be evacuated through the existing 220KV line route. Upgradation of 110KV single circuit line between Mylatty to Vidyanagar and Mylatty to Mundayad to 220/110KV MCMV line through the existing route are already awarded. Presently on the eastern side of Mylatty, there is no substation and those areas are fed from 220kV Substation, Mylatty, 110kV substation, Mulleria and 33kV Belur substation through 11kV feeders. All these 11kV feeders are overloaded. Hence to meet the incident demand and to reduce the system losses so as to keep the transmission system reliable and secure at par with the standards, construction of 110kV Kuttikol substation is absolutely necessary.

### **3. Construction of 110kV Substation at Thimiri**

This project aims to reduce the supply interruptions in Alakode and Nadukani regions by constructing 5.5km of 110kV DC LILO line from existing 1PYCP-1 feeder at Thattummal to Thimiri and constructing a 110 Substation at Thimiri. The 110kV Supply is proposed as LILO from existing 1PYCP-1 feeder. Since 1PYCP-1 is presently under loaded, LILO from this feeder ensures utilization of the existing 110kV line. Also, this project aims to provide alternate 11kV feeders to Cherupuzha, Alakode, Padiyottuchal, Mathamangalam area which ensures reliable and quality supply. It is also proposed to provide an alternative 33kV interlinking between proposed 110kV Substation Thimiri and 33kV Substation Alakkode in future, by laying 12.5km

of 33kV XLPE UG cable from proposed 110kV Substation, Thimiri to 33kV Substation, Alakode. This 33kV link will also provide 33kV alternative feeding arrangement to 33kV Substation, Nadukani. This project was submitted before Hon'ble Commission along with the Mid Term Performance Review petition, but approval was not granted.

#### **i. Capital works under Transmission Circle, Thodupuzha**

The list of normal capital works proposed under Transmission Circle, Thodupuzha for the control period 2022-23 to 2026-27 are submitted below.

<b>Table T 15 : Normal works under Transmission Circle, Thodupuzha</b>								
		<b>Capital outlay (Rs.Cr.)</b>					<b>Total capital outlay (Rs.Cr.)</b>	<b>CoD</b>
		<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>		
1	Upgradation of 66kV Substation Thodupuzha to 110kV at 66kV Substation Thodupuzha along with upgradation of 66kV Thodupuzha - Koothattukulam to 110KV	15	29.2	0	0	0	44.2	2023-24
2	Upgradation of 66kV S/s Peerumade to 110kV		5.63	5.63	11.25		63.5	2025-26
3	Upgradation of 66kV Nedumkandam S/s to 110kV & Construction of 17kms Kuthumkal-Nedumkandam 110kV DC feeder	18	18	18.25			54.25	2024-25
4	Upgradation of 66 kV Sub Station, Kattappana to 110kV standard	3	3	4			10	2024-25
5	Construction of 36km Peerumade -Kattappana 110kV DC feeder	0.1	15.78	15.78	31.95		63.6	2025-26
6	110 kV Substation Keezhillam	6	8	10	5		29	2025-26
7	Upgradation of 110 kV Substation Odakkali from 10 MVA to 12.5 MVA	2.74	12.96	0.5			16.2	2024-25
8	Construction of 110kV Substation at Murickassery and allied 110kV DC line from Konnathady	11.6					11.6	2022-23
<b>Total</b>		56.44	92.56	54.15	48.2	0	<b>251.35</b>	

#### **1. Upgradation of 66kV Substation Thodupuzha to 110kV at 66kV Substation Thodupuzha along with upgradation of 66kV Thodupuzha - Koothattukulam to 110KV**

The present project is aimed at improving the transmission system in and around Thodupuzha Municipality by upgrading the present Thodupuzha 66kV Air-Insulated Substation (AIS) using 110kV AIS with an installed capacity of 2X20MVA 110/11kV and 1x40MVA 110/66kV.

#### **2. Upgradation of 66kV S/s Peerumade to 110kV**

The project involves construction of new 110 kV Substation Peermade by constructing two Nos 110 kV feeder bays, one no 66kv feeder bay by installing one no 50MVA 110/66 kV transformer, one no 110 kV transformer bay by installing one no 16MVA ,110/33 kV

transformer and two nos 110/11 kV 12.5 MVA transformer bays without disturbing the existing 66 kV Substation Peermade and upgrading existing 66 kV Mundakkayam-Peermade to 110kV DC line using AL 59 conductor.. The proposed scheme is expected to provide more power stability to Highrange areas in Idukki District by constructing new 110 kV feeders to existing Substations from the proposed new Peermade Substation, besides reducing the losses. Also upgradation of Peermade Substation to 110 kV will bring power stability to Sabarimala pilgrim areas and a new feeding facility to Pallom area.

### **3. Upgradation of 66kV Nedumkandam S/s to 110kV & Construction of 17kms Kuthumkal-Nedumkandam 110kV DC feeder**

The project involves Construction of 17.275km 110 kV DC LILO line from Kuthunkal Neriamangalam 110 kV DC line to Nedumkandam Substation & construction of 2 Nos 110 kV feeder bays , replacing existing 66/ 11 kV 10 MVA & 8 MVA with 2 nos 12.5 MVA 110/11 kV transformers, one new 110/33 kV 25 MVA transformer bay and replacing existing 20MVA 66/33 kV transformer with one 25 MVA 110/33 kV transformer for windfarm & Vandanmedu 33 kV Substation. The proposed scheme expected to provide more power stability to Highrange areas in Idukki District by constructing new 110 kV feeders to existing Substations from the proposed Newly upgraded Nedumkandam 110 kV Substation, besides reducing the losses and improved voltage at the fag end substations.

### **4. Upgradation of 66 kV Sub Station, Kattappana to 110kV standard**

The project involves construction of new 110 kV Substation Kattappana by constructing Two Nos 110 kV feeder bay and two nos 110/11 kV 12.5 MVA transformer bay without disturbing the existing 66 kV Substation Kattappana.The total project cost of the work is 10.00 Crores. The project cost includes provision for various statutory fees. The targeted project completion period is 3 Years. The proposed scheme expected to provide more power stability to Highrange areas in Idukki District by upgrading 66kv substation Kattappana to 110kv substation

### **5. Construction of 36km Peerumade -Kattappana 110kV DC feeder**

The project involves construction of 36 km 110kV Double circuit line from 66 kV Substation Kattappana to 66 kV Substation Peermade & construction of 2nos 110 kV feeder bays at Kattappana & Peermade 66 kV Substations . The proposed scheme expected to provide more power stability to Highrange areas in Idukki District by constructing new 110 kV feeders to existing Substations from the Peermade & Kattappana 66 kV Substation, besides reducing the losses and improved voltage at the fag end substations.

### **6. 110 kV Substation Keezhillam**

The project consists of the construction of 110 kV Substation at Keezhillam by installing 2x12.5 mva 110/11kv transformers and 2x16 mva 110/33kv transformers and constructing 8km 110kv DC line from 110kv Odakkali substation. The proposed area for 110kv substation

is at border of Perumbavur , Vengola,Kuruppampady and Valayanchirangara electrical sections. At present feeding to this area is from 110kV Substation Perumbavur, 110kV Substation Muvattupuzha, 110 kV Substation Rayonpuram, 33 kV Substation Vengola, 33 kV Substation Mazhuvannur, and 33 kV Substation Kuruppampady.The 11kv feeders from this substations are very lengthy and also it passes through other sections before reaching there. There is frequent Supply interruption as these feeders go through many sections. The overloading and interruption makes a huge loss including revenue loss. Being an Industrial area, maintaining uninterrupted supply is very difficult in the present situation. In the coming years we have to meet an anticipated demand of about 3000KVA per year. Presently the 110KV Perumbavoor Substation is overloaded and the renovation is in progress. But in the present condition, when a supply failure at Perumbavoor occurs there is no proper back feeding available to Perumbavoor Town, resulting in huge interruption. Hence this proposal.

## 7. Upgradation of 110 kV Substation Odakkali from 10 MVA to 12.5 MVA

Currently Odakkaly substation is being constructed at 110kv standard and installed 2x10MVA 66/11KV Transformers and is now fed by two numbers of 66 kV feeders namely 6KMOD and 6ODAL. By upgrading Kothamangalam – Odakkali portion of 6KMAL DC feeder (7.1km) to 110kV DC feeder, the system voltage at Odakkali substation will upgrade to 110 kV from 66 kV. So it is necessary to replace existing 2x10MVA 66/11KV transformer with 2X12.5MVA Transformers.

## 8. Construction of 110kV Substation at Murickassery and allied 110kV DC line from Konnathady

At present feeding to Murickassery area is from Neryamangalam power house. Also back feeding facility is available from Vazhathoppe 66kV substation and Nedumkandam 66 kV substation. The whole areas are fed by lengthy 11 kV feeders resulting in poor voltage regulation and increased interruption due to presence of trees. A load growth of 8 % is expected in this area. The 11kV feeder from Neryamangalam power house is nearing to full load during summer season due to agricultural pumping. In order to improve the above mentioned barriers it is proposed to set up a 110 kV substation at Murickassery.

### a. Capital works under Transmission Circle, Malappuram

The list of normal capital works proposed under Transmission Circle, Malappuram for the control period 2022-23 to 2026-27 are submitted below.

Table T 16 : Normal works under Transmission Circle, Malappuram								
		Capital outlay (Rs.Cr.)					Total capital outlay (Rs.Cr.)	CoD
		2022-23	2023-24	2024-25	2025-26	2026-27		
1	Construction of 110kV Substation Vazhakkad with 2x12.5 MVA Transformers in the Areekkode –Kizhissery proposed 110kV DC line with LILO arrangements	2.5	4	3.8			10.3	2024-25

2	Construction of 110kV Substation Myladi with 2x12.5 MVA Transformers in the Kizhissery-Malappuram 110kV DC line with LILO arrangements	2	4.5	3.8			10.3	2024-25
3	Construction of 110kV Substation Anakayam with 2x12.5 MVA Transformers in the Elankoor-Malappuram 110kV DC line with LILO arrangements	2.2	4.1	4			10.3	2024-25
4	Construction of 110kV Substation Venniyur with 2x12.5 MVA Transformers in the Construction of 5.0 km 110kV double circuit line	0	2.14	8.58	10.78		21.7	2025-26
5	Construction of 110kV Substation, Thiruvai by installing 2 X 12.5 MVA, 110 /11 kV Transformers		12.5				12.5	2023-24
6	Construction of 110kV Substation, Kadampuzha by installing 2x12.5MVA Transformers and Construction of new 110kV DC line 4.5km from Malapamba- Kuttippuram 110kV line to the proposed Kadampuzha 110kV Substation with LILO arrangements		2.76	9.12	7.92		19.8	2025-26
7	Construction of 110kV Substation, Vengara as LILO(8km) of Kizhissery-Malappuram 110kV line and installing 2x12.5 MVA, 110/11kV Transformers		2.76	11.64	9.6		24	2025-26
	<b>Total</b>	6.7	32.76	40.94	28.3	0	<b>108.70</b>	

## 1. Construction of 110kV Substation Vazhakkad

There are three 220kV Substations Malaparamba Areekode and Elankoor which are feeding most of the 110kV Substations in Malappuram district. Among all the regions of Malappuram District, northern region, including Vettilappara, Pulikkal, Cheekcode, Areekkode, Urangattiri, Perakamanna, Edavanna and Vazhakkad etc. under Eranadu Thaluk is the most affected area in the case of threat of low voltage profile, power shortage and load shedding in the peak hours. As far as the feeding pattern in the eastern region of the district is concerned, it is fed with 220kV Substation Areekkode, and 66kV Ambalaparambu. The main advantage of this project is to recover power failure occurred at 110kV SS Kizhisseri and also provide back up supply to 220kV SS Areekkode.

## 2. Construction of 110kV Substation Myladi

There are three 220kV Substations Malaparamba Areekode and Elankoor which are feeding most of the 110kV Substations in Malappuram district. Among all the regions of Malappuram District, northern region, including Valluvabram, East Malappuram, Pokkottur, Myladi, Arimbra etc. under Eranadu Thaluk is the most affected area in the case of threat of low voltage profile, power shortage and load shedding in the peak hours. As far as the feeding pattern in the eastern region of the district is concerned, it is fed with two 110kV Substations Kizhissery and Malappuram, 33kV Substation Valluvabram. Upgrading of 110kV feeder from Kizhissery to Nallalam has been completed. The main advantage of this project is to recover power failure occurred at 110kV SS Malappuram and also provide back up supply to 110kV SS Malappuram.

### **3. Construction of 110kV Substation Anakkayam**

There are three 220kV Substations Malaparamba Areekode and Elankoor which are feeding most of the 110kV Substations in Malappuram district. Among all the regions of Malappuram District, northern region, including Pandikkad, Mankada, Vazhayur, Anakkayam, Cherukavu etc. under Eranadu Thaluk is the most affected area in the case of threat of low voltage profile, power shortage and load shedding in the peak hours. As far as the feeding pattern in the eastern region of the district is concerned, it is fed with two 110kV Substations Manjeri and Mankada. 220kV Elankoor substation has been charged in the last year. The proposal The main advantage of this project is to recover power failure occurred at 110kV SS Manjeri and also provide back up supply to 110kV SS Malappuram.

### **4. Construction of 110kV Substation Venniyur**

The project includes construction of 110kV Substation with installed capacity of 2x12.5MVA, 110/11kV transformers and 2No. 110kV feeder bays Project- B: Construction of 5.0 km 110kV double circuit line. The project is expected to facilitate the commercial and industrial development of the area and to meet future demand, improve the quality and reliability of supply to about 6.0 Lakh customers in and around Venniyur, Thiruragadi, Kakkad, and Vengara areas.

### **5. Construction of 110KV Substation, Thiruvalli**

There are two 220kV Substations Malaparamba and Areekode which are feeding most of the 110kV Substations in Malappuram district. Among all the regions of Malappuram District, eastern region including Edavanna, Thiruvalli, Wandoor, Vaniyambalam, Nilambur, Edakkara Vazhikkadavu etc. under Eranadu Thaluk is the most affected area in the case of threat of low voltage profile, power shortage and load shedding in the peak hours. As far as the feeding pattern in the eastern region of the district is concerned, it is fed with 110kV Substation Melattur, two 66kV Substations Nilambur and Edakkara and four 33kV substations Edavanna, Wandoor, Pookkottumpadam and Kalikavu. Adyanpara SHEP is also connected to 66 kV Substation, Nilambur in which the generation of power only in rainy season. Because 66kV Malappuram-Manjeri- Nilambur-Edakkara SC feeder (36KM) from 110kV Substation Malappuram is the main source of feeding power to this area. At present this feeder is in overloaded condition with no back feeding facility. Therefore this project is proposed.

### **6. Construction of 110kV Substation, Kadampuzha**

"KADAMPUZHA MARAVATTOM" project contains construction of 110/11kV substation with 2 x 12.5 MVA transformers and the construction of 4.5 km 110 kV LILO line from Malaparamba - Kuttippuram 110 kV line to the proposed Kadampuzha substation site. The project is expected to facilitate the industrial and commercial development of Kottakkal Municipality and nearby areas Marakkara and Edayur grama panchayath and to meet future demand, improve the quality and reliability of supply to about 3.75 Lakh customers.



## 7. Construction of 110KV Substation, Vengara

“VENGARA KILINAKKODE” project contains construction of 110/11kV substation with 2 x 12.5 MVA transformers and the construction of 8 km 110 kV LILO line from Kizhissery-Malappuram 110 kV line to the proposed Vengara substation site.. The project is expected to facilitate the industrial and commercial development of Vengara and Oorakam grama panchayaths and nearby areas and to meet future demand, improve the quality and reliability of supply to about 3.5 Lakh peoples.

## k. Capital works under Transmission Circle, Thrissur

The list of normal capital works proposed under Transmission Circle, Thrissur for the control period 2022-23 to 2026-27 are submitted below.

Table T 17 : Normal works under Transmission Circle, Thrissur								
		Capital outlay (Rs.Cr.)					Total capital outlay (Rs.Cr.)	CoD
		2022-23	2023-24	2024-25	2025-26	2026-27		
1	Bay Addition and Interlinking of 110/33kV Kodakara and Vellikulangara for N-1 Standard	4.98	7.47				12.45	2023-24
	<b>Total</b>	<b>4.98</b>	<b>7.47</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>12.45</b>	

### 1. Bay Addition and Interlinking of 110/33kV Kodakara and Vellikulangara for N-1 Standard

33KV Substation, Vellikulangara is presently feeding from 16MVA, 110/33KV of 220KV Substation Chalakudy and Chalakudy substation is overloaded on 33KV Kalletumkara, Koratty, Vellikulangara and Pariyaram feeders. Hence it is essential to limit the loading for stability and flexibility. Construction of 1 no. 16MVA, 110/33KV Transformer at existing 110KV S/S Kodakara is already proposed and by interlinking this new 33KV feeder to 33KV Vellikulangara will help the system stability, minimize interruption and assure 'N-1 standard'.

## l. Other transmission capital works

### 1. Providing bus bar protection at major 110KV Substations

In most of the existing AIS Substations in KSEBL there is no Bus bar protection provided at 110 KV level. However, with the expansion of the transmission network at 400kV and 220kV level and increase in the power handling capability of the Kerala grid with the commissioning of HVDC system, the fault level at 110kV busses has increased substantially. In order to improve system reliability, it is imperative to provide busbar protection at 110KV bus level. Faster clearance of fault facilitates reduction of post fault damages and thereby ensure faster restoration. Bus differential scheme is provided for 110kV busses in the newly constructed 220 kV AIS and 110kV GIS substations. 2.2CBIP Manual on Power System

Protection (Research Publication No.328) has recommended that "Bus Bar protection must be provided in all new 765 kV, 400 kV, 220 kV and 132 kV substations as well as generating station switchyards". 2.3By providing bus differential scheme for 110kV busses, the reliability of the grid increases substantially. Hence, this work qualifies for grant from PSDF. 90% of the project amount may be funded through PSDF.

<b>Table T18 :Other Capital works</b>								
		<b>Capital outlay (Rs.Cr.)</b>						
		<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	<b>Total capital outlay (Rs.Cr.)</b>	<b>CoD</b>
1	Providing bus bar protection at major 110KV Substations (90% PSDF Fund = Rs.23.4 Cr)		10	10	6		26	2023-24
	Less: PSDF funding for Bus bar protection work		<b>10</b>	<b>10</b>	<b>3.4</b>		<b>23.4</b>	
	<b>Total other works less PSDF</b>		<b>0</b>	<b>0</b>	<b>2.6</b>	<b>0</b>	<b>2.6</b>	
<b>Table T19 : Other Capital works</b>								
		<b>GFA Addition (Rs.Cr.)</b>						
		<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	<b>Total Project cost (Rs.Cr.)</b>	<b>CoD</b>
1	Providing bus bar protection at major 110KV Substations (90% PSDF Fund = Rs.23.4 Cr)				26		26	2023-24
	Less: PSDF funding for Bus bar protection work		<b>0</b>		<b>23.4</b>		23.4	
	<b>Total other works less PSDF</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2.6</b>	<b>0</b>	<b>2.6</b>	

### Summary of capital addition under Normal Works

A summary of the Capital outlay and GFA for the normal works under SBU-T exceeding Rs.10 Crore under various Transmission Circles for the control period 2022-23 to 2026-27 are submitted below:

<b>Table T20 : Summary of capital outlay: Normal works</b>								
			<b>Capital outlay (Rs.Cr.)</b>					
		<b>No.of works</b>	<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	<b>Total capital outlay (Rs.Cr.)</b>
1	<b>Transmission Circle Alapuzha</b>	12	121.49	181.36	61.06	36.09	0	<b>400.00</b>
2	<b>Transmission Circle, Kalamassery</b>	3	27.802	8.752	7.752	7.752	7.752	<b>59.81</b>

3	Transmission Circle, Kottarakara	11	37.25	101.21	58.89	52	163.08	<b>412.43</b>
4	Transmission Division, Pathanamthitta	6	22.768	43.8	19.092	6.93	0	<b>92.59</b>
5	Transmission Circle, Poovanthuruthu	5	28.98	40.74	29.3	0	0	<b>99.02</b>
6	Transmission Circle, Palakkad	3	1.8325	16.125	25.0925	4.8	4.8	<b>52.65</b>
7	Transmission Circle, Thiruvananthapuram	4	36.6	84.49	76.1	0	0	<b>197.19</b>
8	Transmission Circle, Kozhikode	11	24.1	82.35	81.35	48.9	16	<b>252.70</b>
9	Transmission Circle, Kannur	3	31.4	45.87	9.85	0	0	<b>87.12</b>
10	Transmission Circle, Thodupuzha	8	56.44	92.56	54.15	48.2	0	<b>251.35</b>
11	Transmission Circle, Malappuram	7	6.7	32.76	40.94	28.3	0	<b>108.70</b>
12	Transmission Circle, Thrissur	1	4.98	7.47	0	0	0	<b>12.45</b>
13	Providing bus bar protection at major 110KV Substations	1		10	10	6	0	<b>26.00</b>
<b>Sub Total</b>			<b>400.34</b>	<b>747.49</b>	<b>473.58</b>	<b>238.97</b>	<b>191.63</b>	<b>2052.01</b>
<b>Less: PSDF</b>				10	10	3.4	0	<b>23.40</b>
<b>Total</b>		<b>75</b>	<b>400.34</b>	<b>737.49</b>	<b>463.58</b>	<b>235.57</b>	<b>191.63</b>	<b>2028.61</b>

<b>Table T21 : Summary of GFA addition: Normal works</b>								
			<b>GFA addition (Rs.Cr.)</b>					<b>Total project cost (Rs.Cr.)</b>
		<b>No.of works</b>	<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	
1	Transmission Circle Alapuzha	12	0	161.7	160.2	78.1	0	<b>400.00</b>
2	Transmission Circle, Kalamassery	3	10.45	10.6	0	0	38.76	<b>59.81</b>
3	Transmission Circle, Kottarakara	11	10.25	59.21	127.89	0	198.08	<b>395.43</b>
4	Transmission Division, Pathanamthitta	6	0	56.92	24.12	11.55	0	<b>92.59</b>
5	Transmission Circle, Poovanthuruthu	5	0	26.75	72.27	0	0	<b>99.02</b>
6	Transmission Circle, Palakkad	3	0	0	36.65	0	16	<b>52.65</b>
7	Transmission Circle, Thiruvananthapuram	4	0	38	159.19	0	0	<b>197.19</b>
8	Transmission Circle, Kozhikode	11	0	14.5	99.3	79.9	59	<b>252.7</b>
9	Transmission Circle, Kannur	3	0	20.87	66.25	0	0	<b>87.12</b>
10	Transmission Circle, Thodupuzha	8	11.6	44.2	80.45	115.1	0	<b>251.35</b>
11	Transmission Circle, Malappuram	7	0	12.5	30.9	65.3	0	<b>108.7</b>
12	Transmission Circle, Thrissur	1	0	12.45	0	0	0	<b>12.45</b>
13	Providing bus bar protection at major 110KV Substations	1				26		<b>26</b>
<b>Sub Total</b>			<b>32.3</b>	<b>457.7</b>	<b>857.22</b>	<b>349.95</b>	<b>311.84</b>	<b>2035.01</b>
<b>Less: PSDF</b>			<b>0</b>	<b>0</b>	<b>0</b>	23.4	0	<b>23.4</b>
<b>Total</b>		<b>75</b>	<b>32.3</b>	<b>457.7</b>	<b>857.22</b>	<b>326.55</b>	<b>311.84</b>	<b>2011.61</b>

### C. Transmission Projects under RDSS:

Govt. of India had notified through Office Memorandum dated 20.07.2021, the implementation of "Revamped Distribution Sector Scheme (RDSS) – A Reforms based and Results linked Scheme" with the objective of improving the quality and reliability of power supply to consumers, through a financially sustainable and operationally efficient Distribution sector by providing conditional financial assistance (on achievement of benchmark based on agreed Action plan/ evaluation framework) for strengthening the electricity supply infrastructure based on meeting pre-qualifying criteria and achieving basic minimum benchmarks in reforms. At present 33KV systems are constructed by SBU-T. Therefore 33KV System construction including 33KV new Substations and new lines, augmentation works in 33KV systems etc are carried out by SBU-T under RDSS scheme. An outlay of Rs.1062.38 Cr is proposed under RDSS works, the details of which are enclosed as **Annexure-T2**. A summary of circle wise segregation of works is submitted below.

Table T22: RDSS - Transmission Works - Circle wise (Amount Rs.Cr.)							
Name of Transmission Circle	Category of works						Total
	New Substations -33 kV	Augmentation of SS	R&M of SS 11 kV & 33 kV	New 33 kV line	Aug 33 kV lines	New 11 kV Outlets	
Thiruvananthapuram	28.31	4.48	5.37	38.36	12.48	0.00	89.01
Kottrakkara	14.30	22.01	2.32	43.87	27.48	0.00	109.98
Alappuzha	0.00	20.32	8.07	15.90	14.00	0.00	58.29
Poovanthuruthu	3.65	15.83	2.80	39.12	0.00	1.66	63.06
Pathanamthitta	12.00	0.00	1.40	10.65	16.02	0.88	40.95
Thodupuzha	16.40	14.81	8.44	40.20	18.91	0.79	99.56
Kalamassry	24.00	35.30	10.21	42.59	0.00	4.96	117.06
Thrissur	27.88	18.24	5.16	41.91	12.09	3.52	108.80
Palakkad	11.20	26.98	0.75	29.09	0.00	3.88	71.90
Malappuram	13.96	24.41	12.41	29.03	18.37	0.00	98.18
Kozhikode	12.73	13.58	5.19	49.61	19.75	2.34	103.20
Kannur	8.84	14.65	12.79	43.90	22.23	0.00	102.41
<b>TOTAL</b>	<b>173.27</b>	<b>210.61</b>	<b>74.90</b>	<b>424.23</b>	<b>161.33</b>	<b>18.03</b>	<b>1062.38</b>

RDSS works are funded by Government of India upto 60% of the total project cost as grant. The works are to be completed within 3 years. The capital outlay of the RDSS works for the FY 2022-23 to FY 2026-27 is submitted below.

Table T23: RDSS Works : Capital outlay (Rs.Cr.)							
Particulars of the work	2022-23		2023-24		2024-25		Cumulative amount
	Physical target	Financial target (Rs Cr)	Physical target	Financial target (Rs Cr)	Physical target	Financial target (Rs Cr)	
	Target for the year(%)*	Amount	Target for the year(%)*	Amount	Target for the year(%)*	Amount	
<b>New 33kV S/s</b>	20%	33.68	40%	67.35	40%	72.26	<b>173.29</b>
<b>Augmentation of Substation</b>	25%	59.08	40%	102.227	35%	49.30	<b>210.61</b>
<b>New 33kV Line</b>	25%	81.14	35%	153.34	40%	189.75	<b>424.23</b>
<b>Augmentation of 33kV line</b>	30%	48.40	40%	64.53	30%	48.40	<b>161.33</b>

<b>R&amp;M of substation 11kV and 33kV</b>	45%	34.347	32%	27.98	23%	13.85	<b>74.91</b>
<b>New 11kV Feeder Outlet</b>	57%	10.28	13%	2.34	30%	5.41	<b>18.03</b>
<b>Total</b>		<b>266.93</b>	<b>0.00</b>	<b>417.77</b>	<b>0.00</b>	<b>377.97</b>	<b>1062.40</b>
<b>Less : GoI fund (@60%)</b>		<b>160.16</b>		<b>250.66</b>		<b>226.78</b>	<b>637.44</b>
<b>Net Capital outlay</b>		<b>106.77</b>		<b>167.11</b>		<b>151.19</b>	<b>424.96</b>

## TRANSGRID WORKS

The overall objective of the TRANSGRID 2.0 program is to relieve the system constraints and reduce losses to the maximum extent. The specific objectives are relieve the system of its present constraints, building sufficient import capability for the future, facilitate complete power evacuation from generating stations within the State and to reduce the losses to the maximum possible.

Following Transgrid works are planned for the control period 2022-23 to 2026-27. The DPR of 9 works are attached. The DPRs of remaining works are under preparation and will be submitted without delay. Hon'ble Commission may kindly consider the same.

<b>Table T 24 : Transgrid works</b>								
		<b>Capital outlay (Rs.Cr.)</b>						
		<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	<b>Total capital outlay (Rs.Cr.)</b>	<b>CoD</b>
1	Travancore Lines Package I	11.84	16.36	0.00	0.00	0.00	28.2	2023-24
2	Travancore Lines Package II	38.80	58.20	0.00	0.00	0.00	97	2023-24
3	Quilon Package	32.19	98.65	14.54	0.00	0.00	145.37	2024-25
4	North Green Corridor Package	62.45	175.65	253.75	269.40	136.75	898.00	2026-27
5	Attapady Green Corridor Package	29.80	48.56	78.36	84.75	41.04	282.5	2026-27
6	Ramakkelmedu Green Corridor Package	28.99	37.86	66.85	73.46	37.71	244.875	2026-27
7	North South interlink Package II	92.66	88.55	102.08	102.08	0.00	385.38	2025-26
8	Valluvanad Package	37.17	61.48	62.62	47.47	0.00	208.73	2025-26
9	Thrissivaperur Lines Package III	19.86	36.89	85.12	85.12	56.75	283.74	2026-27
10	North Malabar Lines Package II	0.00	0.00	0.00	0.00	5.24	5.24	Next control period
11	Edamon 400kV Substation	0.00	0.00	0.00	19.46	19.46	38.92	Next control period
12	Travancore Lines Package III	0.00	0.00	0.00	0.00	3.00	3.00	Next control period
13	Panjaj 220kV Switching Station	0.00	0.00	0.00	0.00	2.10	2.10	Next control period

14	North South interlink Package III	0.00	0.00	0.00	0.00	1.79	1.79	Next control period
	<b>Total</b>	<b>353.76</b>	<b>622.18</b>	<b>663.32</b>	<b>681.74</b>	<b>303.83</b>	<b>2624.84</b>	
	Less : MNRE fund Green Energy Corridor -II Scheme							
	North Green Corridor Package		20.34			8.7	<b>29.04</b>	
	Attapady Green Corridor Package		65.26			27.97	<b>93.23</b>	
	Ramakkelmedu Green Corridor Package		56.57			24.24	<b>80.81</b>	
	<b>Capital outlay</b>	<b>353.76</b>	<b>480.01</b>	<b>663.32</b>	<b>681.74</b>	<b>242.92</b>	<b>2421.76</b>	

## 1. Travancore Lines Package I :

The proposed project involves laying 9 km 110kV 630mm<sup>2</sup> single core Underground Cable of three runs for interlinking 110 kV Thiruvananthapuram Medical College and TERLS Substations for improving connectivity. In the event of outage of Paruthippara substation, no effective back feeding is possible at present in Medical college substation. Like that in the event of outage of Kazhakootam substation, no effective back feeding is possible at present in TERLS and VELI/ VSSC substations. If connectivity is established between TERLS and medical college substations (Annexure-1 key map), both the stations become in ring main system. So considering the importance of the different organizations feeding from these substations the proposed interlinking between TERLS and Medical college substations is very urgent. 110 kV Traction substation of Railway and 110 kV Techno park substation are feeding from 110 kV substation Kazhakootam. In the event of an outage of 110 kV supply to Kazhakootam from Pothencode, the proposed interlinking from Medical college to TERLS can act as a back-feeding source to Kazhakootam via TERLS. Even the planned maintenance work in any of these substations on holidays is also becoming very difficult on day by day; on account of the lack in back feeding facility. The proposed interlinking work will solve all these problems.

## 2. Travancore Lines Package II

The project involves a comprehensive Travancore Lines package for improving the connectivity of 110 KV Muttathara Substation under construction and 110 KV Veli/TERLS/Kazhakootam substations in Thiruvananthapuram city. The work involves laying 12 km 110kV 630 mm<sup>2</sup> single core Underground Cable of three runs from proposed 220KV Gas insulated substation Vizhinjam to 110 KV Muttathara substation under construction and laying 19.5 km 110kV 630 mm<sup>2</sup> single core Underground Cable of three runs from GIS Vizhinjam to 110 KV Veli substation. The estimated project cost is 97Crore. This scheme is the downstream works of proposed 220 KV Gas insulated substation Vizhinjam and would offer ring main connectivity to 110k KV Muttathara substation under construction and 110 KV Veli/TERLS/Kazhakootam substations.

### **3. Quilon Package**

The project involves a comprehensive Lines and Substations package with a 220/110kV SCADA enabled GIS substation at Sasthamkotta which would receive power at 220kV level from Kayamkulam-Kundara (2KYKD) line with LILO arrangement at Sasthamkotta. The work involves the construction of a new 220/110kV SCADA enabled GIS substation by decommissioning the existing 110kVAIS substation Sasthamkotta and construction of 6.5km 220/110kV MCMV line from East Kallada to Sasthamkotta with LILO arrangement. The 220kV double circuit line would receive Power at 220kV voltage level at Sasthamkotta from Kayamkulam Kundara-Edamon 220kV Line (2KYKD) line from East Kallada and the 110kV Double Circuit line is intended to be fed the proposed 110kV Substation at East Kallada from Sasthamkotta Substation. The existing Right of Way of the abandoned Kundara-Sasthamkotta 66kV Line can be utilised for the construction of the proposed 220/110kV MCMV line.

### **4. North Green Corridor Package**

This project envisages in establishing the green power highway between Wayanad and Kasaragode districts interconnecting the renewable energy source to Mysore - Areacode 400kV link. This project is for establishing a 400kV Double Circuit line from Cheemeni(Ksaragode) 400kV substation (New 400/220kV substation under construction through TBCB) to the newly proposed 400kV Substation at Wayanad (Proposed in the existing Mysore-Areacode line), preferably with the special lattice towers with V-string arrangement to reduce the RoW as minimal as possible. The work includes:  
Construction of 400kV Twin HPC (Quad Moose equivalent) DC line with Lattice towers with minimal RoW, along with OPGW for communication link. ii. Construction of 5.25km 220kV MC line for making 220kV LILO arrangement of Kaniyampetta Mysore line to 400kV Substation at Payyampally in Wayanad District iii. 400/220kV GIS Substation in Payyampilly at Wayanad with 2Nos 400kV feeders to Cheemeni side and 2Nos 400kV feeders to Mysore side and 2Nos 400kV feeders to Areacode side, with 4NosX167MVA, 400/220kV single phase Transformer units. The project is funded by MNRE under Green Corridor package.

### **5. Attappady Green Corridor Package**

The sole link between the Attappady area and the Kerala power grid is a 26km long, double circuit, 33kV feeder from Agali to Mannarkkad. The maximum power carrying capacity of this feeder is limited to 23MW. The energy generated from the presently working 18.6MW wind farm in Attappady (31 machines rated 600kW each operated by by IPP (M/s Suzlon) is evacuated to Kerala power grid through this 33kV feeder. Therefore, the spare capacity presently available in this feeder is very small. This feeder is not reliable also, since about 7kM of the feeder is through the Attappady Ghat section, which is prone to frequent faults, especially during monsoons. The power loss in this 33kV DC feeder is about 10.95%, which is very high. To overcome this bottleneck and to promote production of clean, green power, it is proposed to construct a power transmission corridor capable of flawlessly transporting with minimum loss, 200MW of power from Attappady region to the proposed new Mannarkkad

220kV GIS Substation in Palakkad district which in turn will be connected to Kerala grid by constructing 220kV corridor from new Mannarkad to Vettathur tap point in Malappuram district. The project is funded by MNRE to the tune of 33% of the project cost.

## **6. Ramakkalmedu Green Corridor Package**

This project aims at removing this bottle neck by constructing a reliable power transmission corridor capable of transporting up to 130MW of power from the Ramakkalmedu area to the existing grid of KSEB Limited by Constructing a 33/110kV Step-up substation at Anakkaramedu and constructing 9km 110kV DC line with HPC conductor to the nearby Nedumkandom 66kV S/S which is already constructed with 110kV parameters and thereby connecting to Kerala grid. The project is funded by MNRE to the tune of 33% of the project cost.

## **7. North South interlink Package II**

The power requirement for northern region of Kerala viz Thrissur, Malappuram, Kozhikode, Wayanad, Kannur, Kasaragode and Palakkad Districts has been growing continuously. The present regional peak demand in the northern region is 1800 MW. There are 10x220kV Substations in the regions (Kaniyambetta, Areacode, Nallalam, Orkattery, Kanhirode, Taliparamba, Ambalathara and Mylatty, Madakkathara and Kanjikode) supplying power to this region, mainly brought from Areacode 400kV & Madakkathara 400kV substations. In addition, 2x110 kV Substations (Manjeswaram and Kubanur) are receiving power from Karnataka (Konaje) through SC 110 kV Line. In order to improve the power stability and reliability in the regions, some projects have already been taken up by KSEBL like Eranad Project, Kolathunadu project and also the construction of 220kV AIS/GIS at Manjeri, Kunnamangalam, Thalassery, Kunnamkulam, Chalakudy etc. Hence it has become mandatory that an alternative power corridor is necessary to connect the north-central regions of the State for the effective, smooth and uninterrupted flow of power. The North–South interlink line Package (NSIP) and Thrissivaperur Line Strengthening Packages intent to construct coastal power corridor from [Aluva-North Paravur-Kodungallur-Irinjalakuda- Page 10 Kunnamkulam-Vengallur]. This DPR is prepared for construction of 220KV GIS at Irinjalakuda and associated connecting lines viz Aluva-North Paravur-Kodungallur (NSIP Phase II) and Irinjalakuda – Kunnamkulam under (TLSP Phase II).

## **8. Valluvanad Package**

“ValluvanadLines & Substation Package (VLSP)” is one of the lines& substation packages of the TransGrid 2.0project.The total package is divided into two phases based on the sequence of construction with minimum supply interruption. In the first phase, Project A is planned for the up-gradation of 110 kV Vennakkara substation to 220 kV and Project B for Page 8 establishing of one important transmission line connectivity from 400 kV substations, Elappuly and Madakkathara with 220kV link. In Phase II of the Package, up-gradation of the existing 110kV SC Vennakkara – Mannarkkad feeder via Kalladikode substation is planned as three Subprojects. As the part of the Attappadi Green Corridor Project, new 220kV GIS



substation is proposed at Mannarkkad, adjacent to the existing 110 kV substation along with 220 kV LILO line from Madakkathara Areekode feeder and a new AIS substation at Kottathara near Attappadi is planned with 220kV interlink from Mannarkkad for green power evacuation. The proposed 220kV Substation at Mannarkkad will have 2 Nos outlets to Vennakkara also. The Kottathara substation will evacuate the non conventional energy planned at Attappady belt as the part of the Green Energy Corridor project. This will establish a ring main between Areekode, Madakkathara, Kottathara and Elappully substations in 220kV voltage level and improve the reliability and availability of power in Mannarkkad Taluk and the Eastern and Northern parts of Palakkad and Malappuram districts.

## **9. Thrissivaperur Lines Package III**

The power requirement for northern region of Kerala viz Thrissur, Malappuram, Kozhikode, Wayanad, Kannur, Kasaragode and Palakkad Districts has been growing continuously. The present regional peak demand in the northern region is 1800 MW. There are 11 Nos 220kV Substations in the regions (Kaniyambetta, Areacode, Nallalam, Orkattery, Kanhirode, Thaliparamba, Ambalathara, Mylatty, Madakkathara, Manjeri and Kanjikode). The supply of power to this region is mainly brought from Areacode 400kV & Madakkathara 400kV substations and also from HVDC, Mannuthy. In addition to this 2 Nos 110 kV Substations (Manjeswaram and Kubanur) are also receiving power from Karnataka (Konaje) through SC 110 kV Line. In order to improve the power stability and reliability in the regions, some projects have already been taken up by KSEBL like Eranad Line Project, Kolathunadu Line project etc. This project is proposed with an objective to build strong downstream infrastructures to evacuate power from PGCIL HVDC station at Mannuthy. Kunnamkulam substation is directly connected to the PGCIL HVDC station and hence construction of 220kV line between Kunnamkulam & Irinjalakuda substation will support the power evacuation from HVDC station to southern regions. This project will offer improved stability and reliability in both Central – North regions and essential.

## **10. Projects whose DPR are under preparation:**

Following projects under Transgrid package are proposed for the control period 2022-23 to 2026-27, however, the DPRs are under preparation only. KSEBL will be submitting the same once it is ready. It is requested that these projects may also be considered for approval.

1. North Malabar Lines Package II
2. Edamon 400kV Substation
3. Travancore Lines Package III
4. Panjal 220kV Switching Station
5. North South interlink Package III

## **Summary of Capital works under Transgrid**

Total capital outlay and GFA addition due to Transgrid works for the control period 2022-23 to 2026-27 is submitted below.

<b>Table T 25 : Transgrid works</b>							
		<b>Capital outlay (Rs.Cr.)</b>					
		<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	<b>Total capital outlay (Rs.Cr.)</b>
1	Travancore Lines Packege I	11.84	16.36	0.00	0.00	0.00	28.2
2	Travancore Lines Packege II	38.80	58.20	0.00	0.00	0.00	97
3	Quilon Package	32.19	98.65	14.54	0.00	0.00	145.37
4	North Green Corridor Package	62.45	175.65	253.75	269.40	136.75	898.00
5	Attapady Green Corridor Package	29.80	48.56	78.36	84.75	41.04	282.5
6	Ramakkalmedu Green Corridor Package	28.99	37.86	66.85	73.46	37.71	244.875
7	North South interlink Package II	92.66	88.55	102.08	102.08	0.00	385.38
8	Valluvanad Package	37.17	61.48	62.62	47.47	0.00	208.73
9	Thrissivaperur Lines Package III	19.86	36.89	85.12	85.12	56.75	283.74
10	North Malabar Lines Package II	0.00	0.00	0.00	0.00	5.24	5.24
11	Edamon 400kV Substation	0.00	0.00	0.00	19.46	19.46	38.92
12	Travancore Lines Package III	0.00	0.00	0.00	0.00	3.00	3.00
13	Panjaj 220kV Switching Station	0.00	0.00	0.00	0.00	2.10	2.10
14	North South interlink Package III	0.00	0.00	0.00	0.00	1.79	1.79
<b>Total for Transgrid new works</b>		<b>353.76</b>	<b>622.18</b>	<b>663.32</b>	<b>681.74</b>	<b>303.83</b>	<b>2624.84</b>
<b>Less: MNRE Fund</b>							
	North Green Corridor Package		20.34			8.7	<b>29.04</b>
	Attapady Green Corridor Package		65.26			27.97	<b>93.23</b>
	Ramakkalmedu Green Corridor Package		56.57			24.24	<b>80.81</b>
<b>Total for Transgrid new works less MNRE fund</b>		<b>353.76</b>	<b>480.01</b>	<b>663.32</b>	<b>681.74</b>	<b>242.92</b>	<b>2421.76</b>
<b>Total Transgrid (less MNRE fund)</b>		<b>353.76</b>	<b>480.01</b>	<b>663.32</b>	<b>681.74</b>	<b>242.92</b>	<b>2421.76</b>
<b>Table T 26 : Transgrid works</b>							
		<b>GFA Addition (Rs.Cr.)</b>					
		<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	<b>Project Cost (Rs.Cr.)</b>
1	Travancore Lines Packege I		28.2				<b>28.2</b>
2	Travancore Lines Packege II		97				<b>97</b>
3	Quilon Package			145.37			<b>145.37</b>
4	North Green Corridor Package					898	<b>898</b>
5	Attapady Green Corridor Package					282.5	<b>282.5</b>
6	Ramakkalmedu Green Corridor					244.875	<b>244.875</b>
7	North South interlink Package II				385.38		<b>385.38</b>
8	Valluvanad Package				208.73		<b>208.73</b>
9	Thrissivaperur Lines Package III					283.74	<b>283.74</b>
10	North Malabar Lines Package II						<b>0</b>
11	Edamon 400kV Substation						<b>0</b>

12	Travancore Lines Package III							<b>0</b>
13	Panjaj 220kV Switching Station							<b>0</b>
14	North South interlink Package III							<b>0</b>
<b>Total for Transgrid new works</b>		<b>0.00</b>	<b>125.20</b>	<b>145.37</b>	<b>594.11</b>	<b>1709.12</b>		<b>2573.80</b>
<b>Less: MNRE Fund</b>								
North Green Corridor Package							<b>29.04</b>	<b>29.04</b>
Attapady Green Corridor Package							<b>93.23</b>	<b>93.23</b>
Ramakkelmedu Green Corridor Package							<b>80.81</b>	<b>80.81</b>
<b>Total for Transgrid new works less MNRE fund</b>		<b>0.00</b>	<b>125.20</b>	<b>145.37</b>	<b>594.11</b>	<b>1506.04</b>		<b>2370.72</b>
<b>Total Transgrid ( less MNRE fund)</b>		<b>0.00</b>	<b>125.20</b>	<b>145.37</b>	<b>594.11</b>	<b>1506.04</b>		<b>2370.72</b>

### Capital works of SLDC

Following capital works are planned for the control period 2022-23 to 2026-27 under SLDC.

<b>Table T 27 : Capital works under SLDC</b>								
		<b>Capital outlay (Rs.Cr.)</b>						
		<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	<b>Total capital outlay (Rs.Cr.)</b>	<b>CoD</b>
1	Upgradation of SCADA	27	40				67	2023-24
<b>Total of SLDC works less PSDF</b>		<b>27</b>	<b>40</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>67</b>	

<b>Table T 28 : Capital works under SLDC</b>								
		<b>GFA Addition (Rs.Cr.)</b>						
		<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	<b>Total capital outlay (Rs.Cr.)</b>	<b>CoD</b>
1	Upgradation of SCADA		67				67	2023-24
<b>Total of SLDC works less PSDF</b>		<b>0</b>	<b>67</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>67</b>	

### Upgradation of SCADA

The project of Upgradation/Replacement of Existing SCADA/EMS system through Unified Implementation across Southern region is aimed to incorporate future requirements of high RE penetration and essential data analytics requirements and addressing all other issues. A common DPR is being prepared by SRLDC. It is submitted that KSEBL will be submitting the DPR without delay. KSEBL is also exploring the possibility of getting PSDF fund for the project.

### Total capital outlay and GFA Addition for capital works planned for the control period 2022-23 to 2026-27 under SBU-T

The total capital outlay and GFA addition proposed for the control period 2022-23 to 2026-27 under all the heads by SBU-T is summarized below.

<b>Table T29: Capital Investment plan - Transmission</b>							
		<b>Capital outlay (Rs.Cr.)</b>					<b>Total</b>
		<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	
1	Works less than 10Cr	241.53	191.65	154.75	109.77	15.11	712.82
2	Normal works	400.34	747.49	473.58	238.97	191.63	2052.01
3	RDSS Works	266.93	417.77	377.97			1062.66
3	Transgrid works	353.76	622.18	663.32	681.74	303.83	2624.84
4	SLDC works (>10 Cr)	27.00	40.00	0.00	0.00	0.00	67.00
5	SLDC works (<10 Cr)	14.58	8.30	3.60	3.13	7.15	36.75
	<b>Grand Total</b>	<b>1304.14</b>	<b>2027.39</b>	<b>1673.21</b>	<b>1033.60</b>	<b>517.73</b>	<b>6556.08</b>

<b>Table T30: Capital Investment plan - Transmission</b>							
		<b>GFA Addition (Rs.Cr.)</b>					<b>Total</b>
		<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	
1	Works less than 10Cr	131.14	187.97	181.46	186.90	25.34	712.81
2	Normal works	32.30	457.70	857.22	375.95	311.84	2035.01
3	RDSS Works	266.93	417.77	377.97			1062.66
4	Transgrid works	0.00	125.20	145.37	594.11	1709.12	2573.80
5	SLDC works (>10 Cr)	0.00	67.00	0.00	0.00	0.00	67.00
6	SLDC works (<10 Cr)	0.00	15.87	0.00	0.00	20.88	36.75
	<b>Grand Total</b>	<b>430.37</b>	<b>1271.50</b>	<b>1562.02</b>	<b>1156.96</b>	<b>2067.18</b>	<b>6488.03</b>

<b>Table T31: Capital Investment plan - Transmission</b>							
		<b>GFA Addition (Rs.Cr.) (Excl Grant/RDSS)</b>					<b>Total</b>
		<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	
1	Works less than 10Cr	131.14	187.97	181.46	186.90	25.34	712.81
2	Normal works	32.30	457.70	857.22	352.55	311.84	2011.61
3	RDSS Works	106.77	167.11	151.19			425.07
4	Transgrid works	0.00	125.20	145.37	594.11	1506.04	2370.72
5	SLDC works (>10 Cr)	0.00	67.00	0.00	0.00	0.00	67.00
6	SLDC works (<10 Cr)	0.00	15.87	0.00	0.00	20.88	36.75
	<b>Grand Total</b>	<b>270.21</b>	<b>1020.84</b>	<b>1335.23</b>	<b>1133.56</b>	<b>1864.10</b>	<b>5623.95</b>

The DPR in respect to these projects are enclosed separately. **For few projects whose DPRs are not enclosed, it is humbly submitted that KSEBL will be submitting the same without delay.**

This submission contains the available details of the Capital Investment proposal for the control period. Hon Commission may please condone any inadvertent error/omission that may have crept in this petition. The petitioner may be given an opportunity to rectify the same detected subsequently. The petitioner may also be allowed to make further submission, addition and alteration to this petition as may be necessary from time to time.

KSEBL humbly request before the Honourable Commission to

1. To invoke the power conferred to it under Section 181 of Electricity Act 2003 to be read with Kerala State Electricity Regulatory Commission (Terms and Conditions for Determination of Tariff),2021 and to approve the capital Investment plan for Transmission SBU and SLDC for the control period 2022-23 to 2026-27.
2. To pass any order as the Hon'ble Commission may deem fit and appropriate under the circumstances of the case and in the interest of justice.

#### **List of Annexure and Enclosures**

- Annexure T1 (Projects below Rs.10 Cr)
- Annexure-T2 (RDSS Works)
- Detailed Project Reports

## Annexure-T1: New works less than 10 Crore

No	Project	AS Amount/Project Cost (Rs.Lakhs)	Date of Commencement	Target date of completion	Physical & Financial target for the year (Substations and Lines may be given separately)										Capital outlay (Rs.Cr.)					GFA Addition (Rs.Cr.)					
					2022-23		23-24		24-25		25-26		26-27		2022-23	2023-24	2024-25	2025-26	2026-27	2022-23	2023-24	2024-25	2025-26	2026-27	
					Physical (%) of total Works	% of total amount	Physical (%) of total Works	% of total amount	Physical (%) of total Works	% of total amount	Physical (%) of total Works	% of total amount	Physical (%) of total Works	% of total amount	Physical (%) of total Works	% of total amount	Physical (%) of total Works	% of total amount	Physical (%) of total Works	% of total amount	Physical (%) of total Works	% of total amount	Physical (%) of total Works	% of total amount	
<b>1 Thodupuzha Circle</b>																									
1	Changing the 110kV tapping arrangement to Piravom Substation into LIL0 arrangement under Transmission Circle Kalamassery	25	01.06.2023	31.03.2025	Total			20%		80%		100%													
					Substation			20%		80%		100%													
					Line																				
2	Upgradation of Sengulam Pallivasal line to 110kV	950	01.04.2024	31.03.2025	Total					50%		30%		50%		70%									
					Substation																				
					Line																				
3	Upgradation of 66kV S/s Vazhathope	900	01.04.2024	31.12.2025	Total					50%		20%		50%		80%									
					Substation																				
					Line																				
4	Construction of 33kV S/s Kanjoor by Providing 33kV supply from Rayonpuram and interlinking to Kalady 33kV S/s	950	01.06.2025	31.12.2025	Total					35%		5%		65%		95%									
					Substation																				
					Line																				
5	Construction of 14km 33kV line from 110kV S/s Nedumkandam to Udumbanchola	500	01.06.2025	31.03.2026	Total									50%		20%		50%		80%					
					Substation																				
					Line																				
6	Interlinking of 33kV S/s Senapathy & Udumbanchola	350	01.06.2025	31.12.2027	Total									30%		5%		70%		95%					
					Substation																				
					Line																				
7	Erection of one 110/33kV 16MVA Transformer at 110kV S/s Myloor for 33 kV feeding to 33 kV Substation Kalloorkkad & Vannappuram	410	01.04.2023	31.12.2025	Total																				
					Substation																				
					Line																				
8	Erection of one 110/33kV 16MVA Transformer at 110kV S/s Keezhillam for providing alternate feeding arrangement to Vengola and Mazhuvannoor	250	01.04.2024	30.09.2024	Total																				
					Substation																				
					Line																				
9	Construction of 2 Nos 11kV feeder outlets at 33kV S/s Kalloorkkad	40	01.04.2022	2022-23	Total	100%	100%																		
					Substation	100%	100%																		
					Line																				
10	33kV Interlinking between 110kV Substation Keezhillam and 33kV Substation Mazhuvannoor using 3x300 mm2 XLPE Cable	868	01.04.2024	31.09.2025	Total																				
					Substation																				
					Line																				
11	Upgradation of 66kV Sengulam - Moolamattom feeder to 110kV DC	950		2024-25	Total																				
					Substation																				
					Line																				
		5243	<b>Sub Total</b>																						
<b>2 Alapuzha Circle</b>																									
Works under Transmission Division, Mavelikkara																									
1	Construction of 2Nos of 220kV feeder bays at 220kV Substation, Edappon for 220kV Edappon-Pathanamthitta double circuit line as part of Transgrid project	850	01-04-2022	31-03-2024	Total	60	45	40	55	0	0	0	0	0	0	0	0	0	0	0	0				
					Substation	60	45	40	55	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
					Line	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2	Construction of office room on upstairs of 110kV control room at 220kV Substation, Edappon	15	01-04-2022	31-03-2023	Total	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
					Substation	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
					Line	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3	Construction of new building to accommodate Relay,PET, Communication Sub Divisions and Transmission Sub Division and LMS Office at 220kV Substation, Edappon	100	01-04-2023	31-03-2026	Total	0	0	15	10	50	50	35	40	0	0	0	0	0	0	0	0	0			
					Substation	0	0	15	10	50	50	35	40	0	0	0	0	0	0	0	0	0	0	0	
					Line	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4	Replacing existing 4nos of 110kV pneumatic type SF6 Breaker year of manufacture-1998 at 110kV Substation, Kayamkulam	29.5	01-04-2022	31-03-2023	Total	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
					Substation	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
					Line	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5	Replacing existing 2nos of 110kV feeder panel with SIMPLEX type at 110kV Substation, Kayamkulam	16.5	01-04-2022	31-03-2023	Total	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
					Substation	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
					Line	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6	Upgradation of 6TVMV1&2 feeder bays to 110kV at 110kV Substation,	200	01-02-2022	31-03-2023	Total	100	80	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0			
					Substation	100	80	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
					Line																				



17	Providing indoor control for 11kV feeders at 33 kV Substation, Thakazhy	10	10-04-2022	30-12-2022	Total	100	100											0.10	0.00	0.00	0.00	0.00	0.10											
					Substation	100	100																											
					Line																													
<b>Sub Total</b>																	<b>13.67</b>	<b>16.99</b>	<b>7.80</b>	<b>7.85</b>	<b>0.35</b>	<b>6.91</b>	<b>21.75</b>	<b>5.75</b>	<b>10.50</b>	<b>1.75</b>								
<b>3 Poovanthuruthu Circle</b>																																		
1	Upgradation of 66 kV substation Kuruvilingadu to 110 kV level	425	2021	31.12.2022	Total	100	90												3.83	0.43	0.00	0.00	0.00				4.25							
					Substation	100	90	0	10																									
					Line	0																												
2	Capacity enhancement at Pala 110 kV substation by replacing 2 nos 110/66 kV transformer with 110/11 kV 20 MVA transformers	490	2021	31.3.2023	Total	100	90													4.41	0.49	0.00	0.00	0.00			4.90							
					Substation	0																												
					Line	0	100																											
3	Replacing old 11 kV ODC with indoor panels at 33 kV substation Kidamgoor	60	2022	31.3.2023	Total	100	100													0.60	0.00	0.00	0.00	0.00	0.60									
					Substation	100	100																											
					Line	0																												
4	Upgradation of 66 kV substation Kottayam to 110 kV level	835	2022	31.12.2024	Total	20	20	50	50	30	30									1.67	4.18	2.51	0.00	0.00			8.35							
					Substation	20	40	50	60	30	30																							
					Line	0																												
5	Upgradation of Mundakkayam Peermedu 66 kV line to 110 kV level	935	2022	31.12.2024	Total	20	20	60	50	20	30									1.87	4.68	2.81	0.00	0.00			9.35							
					Substation																													
					Line	20	20	60	50	20	30																							
6	Construction of 2 nos 110 kV feeder bays by upgrading Pallom Ettumanur 66 kV feeder bays and installation of 20 MVA transformer at 220 kV substation Pallom	900	2023	31.12.2024	Total	20	20	50	40	30	40									1.80	3.60	3.60	0.00	0.00			9.00							
					Substation																													
					Line	20	20	50	40	30	40																							
7	Construction of 2 nos 110 kV feeder bays by upgrading Pallom - Mavelikkara 66 kV feeder bays at 220 kV substation Pallom	220	2023	31.3.2025	Total	20	20	40	30	40	50									0.44	0.66	1.10	0.00	0.00			2.20							
					Substation	20	20	40	30	40	50																							
					Line																													
8	Construction of 2 nos 110 kV feeder bays by upgrading Pallom Kuttanadu 66 kV feeder bay and installation of 12.5 MVA transformer at 220 kV substation Pallom	850	2023	31.3.2025	Total	20	20	50	40	30	40									1.70	3.40	3.40	0.00	0.00			8.50							
					Substation	20	20	50	40	30	40																							
					Line																													
9	Construction of Sub Division office at 110 kV SS Kanjirappally	100	2022-23	2023-24	Total	40	30	60	60		10									0.30	0.60	0.10	0.00	0.00			1.00							
					Substation	40	30	60	60		10																							
					Line																													
10	Construction of 2 nos 110 kV feeder bays for Thodupuzha at 110 kV SS Koothattukulam	400	2025-26	2026-27	Total							40	30	60	70					0.00	0.00	0.00	1.20	2.80			4.00							
					Substation											40	30	60	70															
					Line																													
11	Replacement of existing 66/110kV control and relay panel and renovation of control room (flooring false ceiling etc.)	40	23-24	23-24	Total															0.00	0.40	0.00	0.00	0.00		0.40								
					Substation																													
					Line																													
12	Purchase of safety equipments & fire fighting equipments in various substations under circle	150	2022-23	2026-27	Total	20	20	20	20	20	20	20	20	20	20	20	20	20	20	0.30	0.30	0.30	0.30	0.30			1.50							
					Substation	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20													
					Line																													
13	Implementation of Substation automation system at 220 kV SS Pallom	105	2022-23	2023-24	Total	50	40	50	60											0.42	0.63	0.00	0.00	0.00		1.05								
					Substation	50	40	50	60																									
					Line																													
14	Repair works at 110 kV SS Kodimatha subsequent to land settlement	150	22-23	2026-27	Total	20	20	20	20	20	20	20	20	20	20	20	20	20	20	0.30	0.30	0.30	0.30	0.30			1.50							
					Substation	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20													
					Line																													
15	Replacing existing 110kV LA with composite type LA including alterations of foundations at 110 kV SS Kodimatha	20	23-24	23-24	Total			100	100											0.00	0.20	0.00	0.00	0.00		0.20								
					Substation																													
					Line			100	100																									
16	Enhancement of 10MVA Transformer with 20MVA at 110 kV SS Kodimatha	150	23-24	23-24	Total			100	100											0.00	1.50	0.00	0.00	0.00		1.50								
					Substation																													
					Line			100	100																									
<b>Sub Total</b>																	<b>17.64</b>	<b>21.36</b>	<b>14.11</b>	<b>1.80</b>	<b>3.40</b>	<b>0.60</b>	<b>12.30</b>	<b>38.40</b>	<b>0.00</b>	<b>7.00</b>								
<b>4 Malappuram Circle</b>																																		
1	Construction of 33kV SS Adyanpara and construction of 33kV UG Cable (0.5km) from Adyanpara SHEP to 33kV SS Adyanpara	321	01.12.2022	01.04.2025	Total	5	0	25	5	50	30	20	65							0.00	0.16	0.96	2.09	0.00			3.21							
					Substation	5	0	25	5	50	30	20	65																					
					Line	5	0	25	5	50	30	20	65																					
2	Construction of 33kV Indoor substation at Civil Station, Malappuram with 2 nos. 33/11kV 5 MVA transformers and 4 nos. 11kV feeder outlets and 3.5Km 33kV UG cable.	735	01.12.2022	31.12.2024	Total	5	0	15	5	70	40	0	55							0.00	0.37	2.94	4.04	0.00			7.35							
					Substation	5	0	15	5	70	40	0	55																					
					Line	5	0	15	5	70	40	0	55																					



3	Construction of 33kV substation at Kavanur by LILoing the 33kV line between Kizhissyery & Edavanna. (3Km)	491	01.12.2022	31.12.2024	Total	5	0	25	15	70	60	0	25	0.00	0.74	2.95	1.23	0.00		4.91			
					Substation	5	0	25	15	70	60	0	25										
					Line	5	0	25	15	70	60	0	25										
4	Construction of New 33 kV Substation, AMU at Cherukara and Construction of 3 km 33 kV DC Line from Substation to existing Koppam Thazhekode Line	370	01.04.2023	01.08.2025	Total	0	0	10	5	30	30	60	50	0.00	0.19	1.11	1.85	0.56		3.70			
					Substation	0	0	10	5	30	30	60	50	0	15								
					Line	0	0	10	5	30	30	60	50	0	15								
5	Constructing 33 kV SC line to 110 kV Substation Thazhekode and proposed 33kV substation at AMU	106	01.04.2023	01.08.2025	Total	0	0	10	5	30	30	60	50	0.00	0.05	0.32	0.53	0.16		1.06			
					Substation																		
					Line	0	0	10	5	30	30	60	50	0	15								
6	Conversion of 33kV S.C line - 7 km from Edarikkode Ssn to Kooriyad to D.C line-	231	01.04.2022	01.03.2023	Total	25	10	75	50	0	40			0.23	1.16	0.92	0.00	0.00		2.31			
					Substation																		
					Line	25	10	75	50	0	40												
7	33kV Substation, Changaramkulam	505	01.04.2022	31.12.2024	Total	5	0	25	15	70	60	0	25	0.00	0.76	3.03	1.26	0.00		5.05			
					Substation	5	0	25	15	70	60	0	25										
					Line																		
8	33kV Edappal - Changarakulam line*	240	01.04.2022	31.12.2024	Total	5	0	25	15	70	60	0	25	0.00	0.36	1.44	0.60	0.00		2.40			
					Substation																		
					Line	5	0	25	15	70	60	0	25										
<b>Sub Total</b>														<b>0.23</b>	<b>3.78</b>	<b>13.67</b>	<b>11.60</b>	<b>0.71</b>	<b>0.00</b>	<b>0.00</b>	<b>2.31</b>	<b>22.92</b>	<b>4.76</b>
<b>5 Palakkad Circle</b>																							
1	New proposal of Construction of 33 kV Substation, Vallapuzha	350	04-23	03-25	Total	10	5	60	30	30	65			0.18	1.05	2.28	0.00	0.00		3.50			
					Substation	10	5	40	20	50	75												
					line	10	5	80	40	10	55												
2	New proposal of Construction of 33 kV Substation, Thootha	350	04-23	03-25	Total	10	5	60	30	30	65			0.18	1.05	2.28	0.00	0.00		3.50			
					Substation	10	5	40	20	50	75												
					line	10	5	80	40	10	55												
3	New proposal of Construction of 33 kV Substation, Industrial Estate , Kapoor, Parakulam.	400	04-23	03-26	Total			10	5	60	30	30	65	0.00	0.20	1.20	2.60	0.00		4.00			
					Substation			10	5	40	20	50	75										
					line			10	5	80	40	10	55										
4	33kV Substation Kuzhalmannam / Periyapalam	500	03-24	03-25	Total	10	5	60	30	30	65			0.25	1.50	3.25	0.00	0.00		5.00			
					Substation	10	5	40	20	50	75												
					line	10	5	80	40	10	55												
5	Construction of 33kV Substation at Kumarampuzha and connected line	498	March of 2023	March of 2025	Total	10	5	60	30	30	65			0.25	1.49	3.24	0.00	0.00		4.98			
					Substation	10	5	40	20	50	75												
					line	10	5	80	40	10	55												
6	Construction of 33kV Substation at Chandranagar and connected line	450	March of 2024	March of 2026	Total			10	5	60	30	30	65	0.00	0.23	1.35	2.93	0.00		4.50			
					Substation			10	5	40	20	50	75										
					line			10	5	80	40	10	55										
7	Construction of 33kV Substation at Mukkai, Malampuzha	450	March of 2024	March of 2026	Total			10	5	60	30	30	65	0.00	0.23	1.35	2.93	0.00		4.50			
					Substation			10	5	40	20	50	75										
					line			10	5	80	40	10	55										
8	Construction of 110kV Substation at Mundur	970	March of 2024	March of 2026	Total			10	5	60	30	30	65	0.00	0.49	2.91	6.31	0.00		9.70			
					Substation			10	5	40	20	50	75										
					line			10	5	80	40	10	55										
9	Construction of 110kV Substation at Kodunthirapully	970	March of 2024	March of 2026	Total			10	5	60	30	30	65	0.00	0.49	2.91	6.31	0.00		9.70			
					Substation			10	5	40	20	50	75										
					line			10	5	80	40	10	55										
10	Upgradation of 66 kV Substation, Kannampully to 110 kV	584	2021	2023	Total	30	25	60	40	10	35			1.46	2.34	2.04	0.00	0.00		5.84			
					Substation	30	25	60	40	10	35												
					line	0																	
11	Construction of 110kV line DC for LILo arrangement from 1PKKE feeder for Upgradation of 66kV Sub Station Chittur to 110kV	159	2022	2024	Total	10	5	60	30	30	65			0.08	0.48	1.03	0.00	0.00		1.59			
					Substation	10	5	40	20	50	75												
					line	10	5	80	40	10	55												
12	Upgradation of 66kV substation Chittur to 110kV level	528	2022	2024	Total	10	5	60	30	30	65			0.26	1.58	3.43	0.00	0.00		5.28			
					Substation	10	5	40	20	50	75												
					line	10	5	80	40	10	55												
13	Upgradation of Palakkad Medical College 66kV Sub Station to 110kV	360	2022	2025	Total	10	5	60	30	30	65			0.18	1.08	2.34	0.00	0.00		3.60			
					Substation	10	5	40	20	50	75												
					line	10	5	80	40	10	55												
14	110 kV LILo arrangement from proposed Venmakara-Kollengode line	581	2022	2025	Total	10	5	60	30	30	65			0.29	1.74	3.78	0.00	0.00		5.81			
					Substation	10	5	40	20	50	75												
					line	10	5	80	40	10	55												
	Construction newly proposed containerised 33				Total			10	5	60	30	30	65	0.00	0.19	1.16	2.51	0.00		3.86			



21	33kv UG cable laying from thambalamanna for evacuation power from Olikkal & Poovaram thodu SHEP	400	3/2022	3/2024	Total	10.00%	80.00%	90.00%							0.40	3.60	0.00	0.00	0.00		4.00					
					Substation																					
					Line	20.00%	10.00%	80.00%	90.00%																	
22	SAS at 220kV Substation, Orkattery	283	03/22	03/23	Total	100.00%	100.00%								2.83	0.00	0.00	0.00	0.00		2.83					
					Substation	100.00%	100.00%																			
					Line	0																				
<b>Sub Total</b>														53.48	28.13	7.80	4.40	0.00		25.25	45.55	7.00	16.00	0.00		
<b>7 Pathanamthitta Division</b>																										
1	upgradation of 66kV s/s Chumatra to 110kV standards	360	Feb-24	Jan-25	Total				100	100%					0.00	0.00	3.60	0.00	0.00			3.60				
					Substation				100	100																
					Line																					
2	upgradation of 2Nos 66kv transformer bays with 2x12.5MVA transformers & Upgradation of 2 Nos 66kv feeder bays at 110kV s/s Tiruvalla	380	Apr-23	Jan-25	substation				100	100%					0.00	3.80	0.00	0.00	0.00			3.80				
					Substation																					
					Line																					
<b>Sub Total</b>														0.00	3.80	3.60	0.00	0.00		0.00	3.80	3.60	0.00	0.00		
<b>8 Thrissur Circle</b>																										
1	Reconductoring of 110kV POCH I & II feeder from loc. 1 to 90.	570	2021-22	2022-23	Total	100	85	0	15						4.85	0.86	0.00	0.00	0.00			5.70				
					Substation																					
					Line																					
2	Interlinking of 110 KV Mala and 33KV Puthenvilkara substations	700	2023-24	2024-25	Total			30	20	70	80				0.00	1.40	5.60	0.00	0.00				7.00			
					Substation																					
					Line				30	20	70	80														
3	33KV Bay addition at Kalletumkara and Parappukara S/s for 33KV line for interlinking	350	2021-22	2022-23	Total	100	100								3.50	0.00	0.00	0.00	0.00			3.50				
					Substation	100	100																			
					Line	100	100																			
4	Providing 110/33KV, 16MVA Transformer and allied works and one no.33KV feeder bay for connecting Vellikulangara SS	350	2022-23	2023-24	Total	100	100								3.50	0.00	0.00	0.00	0.00			3.50				
					Substation	100	100																			
					Line																					
5	Enhancement of 110/11kV 12.5 MVA Transformer No.1 to 20MVA at Chalakudy	185	2021-22	2022-23	Total	100	100								1.85	0.00	0.00	0.00	0.00			1.85				
					Substation																					
					Line																					
6	Enhancement of 110/11kV 12.5 MVA Transformer No. 2 to 20MVA Chalakudy	185	2022-23	2022-23	Total	100	100								1.85	0.00	0.00	0.00	0.00			1.85				
					Substation																					
					Line																					
7	Construction of Pazhayannur-Chelakkara 33KV SC line	805	01.04.2022	31.12.2022	Total	80	80	20	20						6.44	1.61	0.00	0.00	0.00			8.05				
					Substation																					
					Line	80	80	20	20																	
8	Construction of 33 KV SC line for Vatanappilly-Blangad interlinking	440	01.04.2022	01.03.2023	Total	75	75	25	25						3.30	1.10	0.00	0.00	0.00			4.40				
					Substation																					
					Line	75	75	25	25																	
9	Athani-Poomala 33 kv SC line	500	10.06.2023	30.12.2024	Total	10	10	31	31	30	30	29	29		0.50	1.55	1.50	1.45	0.00				5.00			
					Substation																					
					Line	10	10	31	31	30	30	29	29													
10	New 33 KV SC Line from Guruvayur Substation to Chavakkad / Blangad Substation	485	01.08.2023	30.08.2027	Total	15	15	20	20	30	30	25	25	10	0.73	0.97	1.46	1.21	0.00				4.37			
					Substation																					
					Line	15	15	20	20	30	30	25	25	10												
11	Construction of 33KV Container substation at Kuriyachira after drawing 6KM 33KV covered conductor from 110kV substation, Ollur	852	1.12.2025	30.03.2025	Total	20	20	40	40	40	40				1.70	3.41	3.41	0.00	0.00			8.52				
					Substation																					
					Line	20	20	40	40	40	40															
12	supply and stringing 10KM 33KV SC line by using 99mm <sup>2</sup> ACSR covered conductor from 110kV substation Punneyoorukulam to 33KV substation Chavakkad and construction of 23KV	690	28.02.2022	30.12.2027	Total	5	5	10	10	15	15	50	50	20	0.35	0.69	1.04	3.45	0.00			5.52				
					Substation																					
					Line	5	5	10	10	15	15	50	50	20												
13	Construction of 7KM 33kv line from Viyyur to Poomala	300	44567	31-03-23	Total	100	100								3.00	0.00	0.00	0.00	0.00			3.00				
					Substation																					
					Line	100	100																			
14	replacement of the existing high impedance 110kV Bus Bar Protection Scheme at 400kV Substation Madakkathara with new Low Impedance Centralized Bus Bar Protection	105	2021-22	2022-23	Total	100	100								1.05	0.00	0.00	0.00	0.00			1.05				
					Substation																					
					Line	100	100																			
15	Replacement of existing high impedance bus bar protection scheme at 400kV SS Madakkathara with new Low Impedance Centralized Scheme Bus Bar Protection	88.5	2022-23	2022-23	Total	100	100								0.89	0.00	0.00	0.00	0.00			0.89				
					Substation																					
					Line	100	100																			
16	Providing Nitrogen Injection fire protection system for 105 MVA transformers at 400 kv substation Madakkathara.	275	2021-22	2022-23	Total	100	66.6	100	33.4						1.83	0.92	0.00	0.00	0.00			2.75				
					Substation																					
					Line	100	66.6	100	33.4																	
<b>Sub Total</b>														35.33	12.50	13.00	6.11	0.00		15.64	20.90	15.52	14.89	0.00		
<b>9 Thiruvananthapuram Circle</b>																										
1	Constructing new control room & Erecting new 11KV indoor 20 panel set at Medical college s/s	257	1.3.22	31.12.22	Total				100	100					0.00	2.57	0.00	0.00	0.00			2.57				
					Substation				100	100																
					Line																					

2	Replacing the existing 2 nos of 12.5 MVA transformers with 2 nos of 20MVA at MEDICAL COLLEGES/S	99			Total										0.00	0.99	0.00	0.00	0.00					0.99					
					Substation																								
					Line																								
3	Work related to the conversion of existing OH feeder to UG at 110KV substation,Balaramapuram	36			Total										0.00	0.36	0.00	0.00	0.00						0.36				
					Substation																								
					Line																								
4	Construction of 8KM 33 KV OH feeder from 33KV Substation,Vellarada to proposed 330KV substation,Ottasekharamangalam	450			Total										0.00	4.50	0.00	0.00	0.00						4.50				
					Substation																								
					Line																								
5	Upgradation of 66KV Substation Vattiyoorkavu to 110KV by replacing 2*10MVA,66/11 KV Transformer with 2*12.5 MVA 110/11 KV Transformer	250			Total										0.00	2.50	0.00	0.00	0.00						2.50				
					Substation																								
					Line																								
6	Providing SCADA facility at 33KV S/S,Patoor	30			Total										0.00	0.30	0.00	0.00	0.00						0.30				
					Substation																								
					Line																								
7	Providing SCADA facility at 33KV S/S,Vaidyuthibhavan	26			Total										0.00	0.26	0.00	0.00	0.00						0.26				
					Substation																								
					Line																								
8	Upgradation of 66KV PPRA-Thirumala feeder to 110KV	807			Total	100	100									8.07	0.00	0.00	0.00	0.00					8.07				
					Substation																								
					Line	100	100																						
9	Constructing a compound wall at east side of 110 kV substation compound Paruthippara	5	1.3.22	30.6.22	Total										0.05	0.00	0.00	0.00	0.00						0.05				
					Substation																								
					Line																								
10	Control room extension with new panel and mac road At Medical college	256			Total										0.00	2.56	0.00	0.00	0.00						2.56				
					Substation																								
					Line																								
11	Upgradation of 66 kv TVT feeder to 110 kv from PPRA to Thirumala	807	1.1.22	31.3.23	Total	100	100									8.07	0.00	0.00	0.00	0.00					8.07				
					Substation																								
					Line	100	100																						
12	New control room at Kattakada S/S and replacing 11kv old panels with new panel and connected works	293	10.2.22	30.3.23	Total										2.93	0.00	0.00	0.00	0.00						2.93				
					Substation																								
					Line																								
13	11kv Panel replacement at 110kV Substation Parassala	100	1.4.22	31.5.22	Total										1.00	0.00	0.00	0.00	0.00						1.00				
					Substation																								
					Line																								
14	AB&YARD METALLING WORK IN CONNECTION WITH NEW 11kv feeders at 110KV S/S Parassala	14			Total										0.00	0.14	0.00	0.00	0.00						0.14				
					Substation																								
					Line																								
15	Construction of vehicle shed	3			Total										0.03	0.00	0.00	0.00	0.00						0.03				
					Substation																								
					Line																								
16	Replacing 11kv old panels with new panels and connected works AT Vattiyoorkavu	75			Total										0.75	0.00	0.00	0.00	0.00						0.75				
					Substation																								
					Line																								
17	Upgradation of 66 kv substation vattiyoorkavu to 110kv by replacing 2*10MVA 66/11 KV Transformer with 2*12.5 MVA 110/11 KV Transformer	250			Total										0.00	2.50	0.00	0.00	0.00						2.50				
					Substation																								
					Line																								
18	New panel, and other civil works at Vizhinjam	128	1.10.21	30.8.22	Total										1.28	0.00	0.00	0.00	0.00						1.28				
					Substation																								
					Line																								
19	Replacing 33kv and 11kv old panels with new panels and connected works at 33KV S/S Peyad	89			Total										0.89	0.00	0.00	0.00	0.00						0.89				
					Substation																								
					Line																								
20	Replacement of existing 200 MVA No.1, 220/110 kv , BHEL make Transformer with new 200 MVA, 220/110 kv Transformer at 220 kv substation, Pothencode	876	01-04-2023	31-10-2024	Substation											0.00	4.38	4.38	0.00	0.00					8.76				
21	Replacement of 2 Nos of old 220 kv circuit breakers and 5 Nos of old 110 kv circuit breakers with new ones at 220 kv Substation, Pothencode	60	29-08-2021	30-04-2022	Substation	29	45	71	55							0.27	0.33	0.00	0.00	0.00					0.60				
21	Providing new earth mat at 110 kv lower yard at 220 kv Substation, Pothencode	105	01-12-2021	30-04-2022	Substation											1.05	0.00	0.00	0.00	0.00					1.05				





14	Construction of new control room at 66kV S/s Panampilly nagar.	175		2023-24	Total	0.00	0.00	0.00	0.00	50.00	25.00	50.00	75.00	0.00	0.00	0.00	0.00	0.44	1.31	0.00						1.75					
					Substation	0.00	0.00	0.00	0.00	50.00	25.00	50.00	75.00	0.00	0.00																
					Line	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																
15	Enhancing station capacity by replacing 2 nos. of 66/11kV, 10MVA with 16MVA Transformers at 66kV S/s Panampilly nagar	328		2025-26	Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	100.00	0.00	0.00	0.00	0.00	3.28							3.28				
					Substation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	100.00																
					Line	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																
<b>Sub Total</b>																	<b>23.13</b>	<b>15.74</b>	<b>12.40</b>	<b>8.79</b>	<b>3.28</b>	<b>8.63</b>	<b>16.70</b>	<b>11.00</b>	<b>23.74</b>	<b>3.28</b>					
12	<b>Kannur Circle</b>																														
1	Up gradation of 6.3km 66kV single circuit line to 110kV DC line from Kadachira to Chovva	452	12-21	10-22	Total	100%	75%		100%									3.39	4.52	0.00	0.00	0.00				7.91					
					Substation																										
					Line	100%	75%		100%																						
2	Conversion of 6.5km 110kV single circuit line to 110kV DC line from Pinarayi Substation to Kadachira	365	03-22	05-23	Total	50%	30%	100%	100%									1.10	3.65	0.00	0.00	0.00				4.75					
					Substation																										
					Line	50%	30%	100%	100%																						
3	Upgradation of 33kV Substation, Pariyaram to 110kV Substation	990	04-22	12-23	Total	35%	30%	100%	70%									2.97	6.93	0.00	0.00	0.00				9.90					
					Substation	40%	30%	100%	70%																						
					Line	30%	15%	100%	70%																						
4	33kV Substation, Payyanur town - Capacity enhancement by replacing existing 2 Nos 5 MVA Transformers with 2 Nos new 8 MVA Transformers	170	01-12-2021	31-03-2023	Total	100.00%	100.00%											1.70	0.00	0.00	0.00	0.00				1.70					
					Substation	100.00%	100.00%																								
					Line																										
5	33kV SS, Puthiyatheru - Capacity addition by installation of 3rd 5MVA Transformer.	110	01-01-2022	31-12-2022	Total	100.00%	100.00%											1.10	0.00	0.00	0.00	0.00				1.10					
					Substation	100.00%	100.00%																								
					Line																										
6	33kV SS, Nadukani - Capacity enhancement by replacing existing 5 MVA Transformer with 8 MVA Transformer.	85	01-04-2022	31-07-2022	Total	100.00%	100.00%											0.85	0.00	0.00	0.00	0.00				0.85					
					Substation	100.00%	100.00%																								
					Line																										
7	220kV Substation Taliparamba: Transgrid downstream works- construction 220kV feeder bays, 110kV bays & other associated works	800	01-01-2022	31-12-2023	Total	20%	40%	100%	60%									3.20	4.80	0.00	0.00	0.00				8.00					
					Substation	20%	40%	100%	60%																						
					Line																										
8	110kV SS, Mangad-Replacing old LT Panel	6	01-05-2022	30-06-2022	Total	100.00%	100.00%											0.06	0.00	0.00	0.00	0.00				0.06					
					Substation																										
					Line																										
9	220kV Substation Taliparamba: Capacity addition of by adding 3rd 12.5MVA, 110/11kV Transformer	200	01-23	30-05-2024	Total					100.00%	100.00%						0.00	0.00	2.00	0.00	0.00				2.00						
					Substation					100.00%	100.00%																				
					Line																										
10	220kV Substation Taliparamba: Replacing 110 kV CB of capacitor bank	10	01-04-2023	31-05-2023	Total			100.00%	100.00%								0.00	0.10	0.00	0.00	0.00				0.10						
					Substation			100.00%	100.00%																						
					Line																										
11	Providing water hydrant at 220 kV substation, Taliparamba	20	01-01-2023	31-03-2023	Total	100.00%	70.00%	100.00%	100.00%									0.14	0.20	0.00	0.00	0.00				0.34					
					Substation	100.00%	70.00%	100.00%	100.00%																						
					Line																										
12	110kV Substation, Payangadi - Providing new 11kV outlet	10	01-04-2022	31-03-2023	Total	100.00%	60%	100.00%	100.00%									0.06	0.10	0.00	0.00	0.00				0.16					
					Substation																										
					Line																										
13	110kV SS Payangadi - Erection of yard lights	6	01-04-2022	31-12-2022	Total	100.00%	100.00%											0.06	0.00	0.00	0.00	0.00				0.06					
					Substation																										
					Line																										
14	110V SS Payyanur - Replacing 110kV CB of 1PYCP II feeder	7	01-04-2022	31-03-2023	Total	100%	90%	100%	100%									0.06	0.07	0.00	0.00	0.00				0.13					
					Substation																										
					Line																										
15	110kV SS Payyanur - Providing chainlink fencing with RR masonry at the north- east side of 110kV Yard	5	01-04-2022	31-03-2023	Total	100%	50%	100%	100%									0.03	0.05	0.00	0.00	0.00				0.08					
					Substation																										
					Line																										
16	110kV SS Cherupuzha - Renovation of fencing and barbed wire	7	01-04-2022	31-03-2023	Total	100%	50%	100%	100%									0.04	0.07	0.00	0.00	0.00				0.11					
					Substation																										
					Line																										
17	110kV SS Ezhimala - Renovation of 11kV DP's including re-cabaling (2Nos.)	5	01-04-2022	31-03-2023	Total			100%	50%	100%	100%							0.00	0.03	0.05	0.00	0.00				0.08					
					Substation																										
					Line																										
18	220kV Substation Mylatty: construction of 220 kv feeder bays and 110 kv feeder bays under transgrid down stream	400	09-22	06-23	Total	70%	50%	100%	80%		100%							2.00	3.20	4.00	0.00	0.00				9.20					
					Substation	70%	50%	100%	80%		100%																				
					Line																										
19	220kV Substation Mylatty: capacity enhancement of 2x10 mva transformer with 2x20mva	330	06-22	02-24	Total	50%	30%	100%	70%		100%							0.99	2.31	3.30	0.00	0.00				6.60					
					substation	50%	30%	100%	70%		100%																				
					Line																										
20	Enhancement of 2 Nos of 12.5 MVA TR to 20 MVA TR at 110kV SS, Kanhangad	370	06-22	02-25	Total	20%	10%	60%	60%																						

22	33 kV Substation, Belur- Conversion of 11kV outdoor to indoor	60	04-22	08-22	Substation	100%	100%								0.60	0.00	0.00	0.00	0.00	0.60				
23	33 kV Substation, West Eleri- Conversion of 11kV outdoor to indoor	60		02-24	Substation			100%	100%						0.00	0.60	0.00	0.00	0.00		0.60			
24	Capacity enhancement by replacing 1*5MVA 33/11kV transformers with 1*8MVA 33/11kV transformers.	85	12-24	02-25	Total				100%	100%					0.00	0.00	0.85	0.00	0.00			0.85		
					Substation				100%	100%														
25	New 33kV SC line using 10KMM covered conductor + 2KM UG from 220kV Solar Substation Ambalathara to 33kV Substation Belur	750	04-22	04-24	Total	20%	10%	70%	60%	100%	100%				0.75	4.50	7.50	0.00	0.00			12.75		
					Substation	20%	10%	70%	60%	100%	100%													
26	Construction of 33kV Substation Padanakkad, 2X5MVA 33/11kV Transformer	592	04-23	03-26	Total			20%	20%	40%	40%	70%	40%		0.00	1.18	2.37	2.37	0.00				5.92	
					Substation			20%	20%	40%	40%	70%	40%											
27	110kV Substation Manjeshwar-yard fencing and remetaling-	15	06-22	09-22	Total	100%	100%								0.15	0.00	0.00	0.00	0.00	0.15				
					Substation	100%	100%																	
28	110kv Substation Kubannur- Cpacity addition- Replacement of 110/11kv 10MVA Transformer with 12.5 MVA	120	04-22	06-22	Total	100%	100%								1.20	0.00	0.00	0.00	0.00	1.20				
					Substation	100%	100%																	
29	110kv Substation, Kubanoor-Construction of 33kv Substation, Uppala	990	09-24	12-25	Total				10%	5%	60%	95%		0.00	0.00	0.50	9.41	0.00				9.90		
					Substation				10%	5%	60%	95%												
30	33kV Substation Badiadka - Conversion of 11kV outdoor autoreclosure into Indoor Panel	75	04-22	09-22	Total	100%	100%								0.75	0.00	0.00	0.00	0.00	0.75				
					Substation	100%	100%																	
31	Construction of 4KM Z20KV Multi circuit line from proposed 400kV substation Karinthalam to existing 220kV Kanhirode - Ambalathara line	600	04-23	03-25	Total	5%	5%	40%	35%	100%	60%				0.30	2.10	3.60	0.00	0.00			6.00		
					Substation																			
32	Providing 220kV Low impedance bus bar Protection at 220kV SS Kanhirode	32	04-22	09-22	Total	100%	100%								0.32	0.00	0.00	0.00	0.00	0.32				
					Substation	100%	100%																	
33	Providing 220kV Low impedance bus bar Protection at 220kV SS Kanhirode	32	04-22	09-22	Total	100%	100%								0.32	0.00	0.00	0.00	0.00	0.32				
					Substation	100%	100%																	
34	110KV Substation Panoor - Capacity Enhancement by Addition of 1x 10/12.5 MVA, 110/11kV Transformer	225	04-22	03-23	Total	100%	100%								2.25	0.00	0.00	0.00	0.00	2.25				
					Substation	100%	100%																	
34	Line				Total																			
					Substation																			
<b>Sub Total</b>														<b>26.71</b>	<b>44.47</b>	<b>27.86</b>	<b>11.77</b>	<b>0.00</b>	<b>9.36</b>	<b>41.87</b>	<b>37.77</b>	<b>21.82</b>	<b>0.00</b>	
<b>13</b>	<b>System Operation</b>																							
1	Circle level purchases/works under Modernisation of Communication	290	01-04-2022	31-03-2027	Total	22	22	29	29	20	20	14	14	15	15	0.64	0.84	0.58	0.41	0.44				2.90
2	Proving line differential relays for PGCL feeders at 220 kv Areekode, Palakkad and Pothencode Substations	225	15-03-2022	15-03-2024	Total	40	40	40	40	0	0	0	0	0	0	0.90	0.90	0.00	0.00	0.00		1.80		
3	Implementation of integrated protection management system with work flow automation	40	15-08-2022	15-08-2023	Total	30	50	70	50	0	0	0	0	0	0	0.20	0.20	0.00	0.00	0.00		0.40		
4	Purchase of 11kV Overcurrent and Earth fault relays with SEF	825	22-04-2022	22-05-2023	Total	85	85	15	15						7.01	1.24	0.00	0.00	0.00		8.25			
5	Purchase of Numerical relays Purchase of numerical relays for the replacement of old statis relays phase II	40	05-05-2022	12-05-2022	Total	50	37	50	63	0	0	0	0	0	0	0.15	0.25	0.00	0.00	0.00		0.40		
6	Purchase of Testing kit	1000	20-12-2021	20-12-2026	Total	15	15	10	10	15	15	10	10	50	50	1.50	1.00	1.50	1.00	5.00				10.00
7	Vehicle	192	01-03-2022	15-12-2023	Total	50	50	50	50	0	0	0	0	0	0	0.96	0.96	0.00	0.00	0.00		1.92		
8	Circle level purchases/works under Modernisation of Protection	500	01-04-2022	31-03-2027	Total	20	20	20	20	20	20	20	20	20	20	1.00	1.00	1.00	1.00	1.00				5.00
9	Backup LD buiding at Paruthippara	310	02-08-2021	20-12-2023	Total	60	55	40	45	0	0	0	0	0	0	1.71	1.40	0.00	0.00	0.00		3.10		
10	Cyber security	150	01-04-2022	31-03-2027	Total	20	20	20	20	20	20	20	20	20	20	0.30	0.30	0.30	0.30	0.30				1.50
11	Civil works	102	01-04-2022	31-03-2027	Total	12	12	12	12	12	12	32	32	32	32	0.12	0.12	0.12	0.33	0.33				1.02
12	MT&SOC works	1.8	01-04-2022	31-03-2027	Total	20	20	20	20	20	20	20	20	20	20	0.00	0.00	0.00	0.00	0.00				0.02
13	Purchase of computers and printers	44.5	01-04-2022	31-03-2027	Total	20	20	20	20	20	20	20	20	20	20	0.09	0.09	0.09	0.09	0.09				0.45
<b>Sub Total System Operation Circle</b>														<b>14.58</b>	<b>8.30</b>	<b>3.60</b>	<b>3.13</b>	<b>7.15</b>	<b>0.00</b>	<b>15.87</b>	<b>0.00</b>	<b>0.00</b>	<b>20.88</b>	
<b>Transmission Circles</b>														<b>241.53</b>	<b>191.65</b>	<b>154.75</b>	<b>109.77</b>	<b>15.11</b>	<b>131.14</b>	<b>187.97</b>	<b>181.46</b>	<b>186.90</b>	<b>25.34</b>	
<b>Grand Total</b>														<b>256.11</b>	<b>199.95</b>	<b>158.35</b>	<b>112.89</b>	<b>22.26</b>	<b>131.14</b>	<b>203.84</b>	<b>181.46</b>	<b>186.90</b>	<b>46.22</b>	



**Annexure-T2: RDSS - Transmission Works - Circle wise**

(Amounts in Rs. Lakh)

Name of Transmission Circle	Category of works						
	New Substations - 33 kV	Augmentation of SS	R&M of SS 11 kV & 33 kV	New 33 kV line	Aug 33 kV lines	New 11 kV Outlets	Total
Thiruvananthapuram	2831.46	448	536.9	3836.31	1248		<b>8900.67</b>
Kottrakkara	1430	2201	232	4387	2748		<b>10998</b>
Alappuzha		2032	806.6	1590	1400		<b>5828.6</b>
Poovanthuruthu	365	1583	280	3912.25		166	<b>6306.25</b>
Pathanamthitta	1200		140	1065	1601.6	88	<b>4094.6</b>
Thodupuzha	1639.8	1481	844	4020	1891.475	79.4	<b>9955.675</b>
Kalamassry	2400	3530	1021.4	4259		495.7	<b>11706.1</b>
Thrissur	2788	1824	516	4191	1208.55	352.25	<b>10879.8</b>
Palakkad	1120	2698.04	75	2908.82		388	<b>7189.86</b>
Malappuram	1396	2441	1240.701	2903.00	1837		<b>9817.701</b>
Kozhikode	1273	1357.70	519	4961	1975	234	<b>10319.7</b>
Kannur	884	1465	1278.7	4390	2223		<b>10240.7</b>
<b>TOTAL</b>	<b>17327.26</b>	<b>21060.74</b>	<b>7490.301</b>	<b>42423.38</b>	<b>16132.625</b>	<b>1803.35</b>	<b>106237.66</b>

**RDSS - Abstract of Transmission works - proposed**

<b>Sl. No.</b>	<b>Details</b>	<b>Amount in Rs. Lakhs</b>
<b>1</b>	<b>33kV Substations</b>	<b>17327.26</b>
<b>2</b>	<b>New 33kV Line</b>	<b>42423.38</b>
<b>3</b>	<b>Augmentation of Substations for 33kV feeder</b>	<b>21060.74</b>
<b>4</b>	<b>Augmentaion of 33kV Lines</b>	<b>16132.63</b>
<b>5</b>	<b>R&amp;M of 11kV &amp; 33kV feeder outlets</b>	<b>7490.30</b>
<b>6</b>	<b>New 11kV feeder outlets</b>	<b>1803.35</b>
<b>7</b>	<b>SEF Relays proposed from CESO - 1651 Nos. @50,000/E</b>	
	<b>Total</b>	<b>106237.66</b>

Modernization: Proposed New Power Sub-Station -New 33 kV Substations													
S. No	Electrical Circle	Transmission Circle / Division	Name of sub-station	Type of sub-station (GIS / conventional etc)	Power transformer details (MVA)			Total capacity (MVA)	Status of availability of Land	Rate in Lakhs	Amount in Lakhs	Priority of work	Targetted year
					Type of Transformer	No. of Transformers	Power transformer details (MVA)						
1	EC Thiruvananthapuram	TC Thiruvananthapuram	33 Kv Substation Chirayinkeezh	33/11KV	Outdoor	2	5 MVA	10	Land identified. Can be made available		616.89	61	24-25
2	EC Thiruvananthapuram	TC Thiruvananthapuram	33 Kv condainerised Substation Menamkulam	33/11KV	Outdoor	2	5MVA	10	Land identified. Can be made available		550	63	24-25
3	EC Kattakada	TC Thiruvananthapuram	33 Kv Substation Kallara	33/11KV	Outdoor	2	5 MVA	10	Land identified. Can be made available		694.57	47	23-24
4	EC Thiruvananthapuram	TC Thiruvananthapuram	33 Kv Substation at Thonakkal	33/11KV	Outdoor	2	5 MVA	10	Land identified. Can be made available		520	57	23-24
5	EC Kattakada	TC Thiruvananthapuram	33 Kv Substation at Ottasekharamangalam	33/11KV	Outdoor	2	8MVA	16MVA	Land identified. Can be made available		450	49	23-24
											<b>2831.46</b>		
1	Kollam	TC Kottarakkara/Trans Div. Kundara	Peroor 33kV	Conventional -33/11		2	8	16	Can be made available	NIL	430	12	23-24

2	Kottarakkara	TC Kottarakkara/Trans Div. Punalur	Valakom 33kV	Conventional -33/11	PTR-1	2	8	16	Can be made available	Nil	500	11	23-24
3	Kottarakkara	TC Kottarakkara/Trans Div. Kundara	East Kallada 33kV	Conventional -33/11				16	Available		500	13	24-25
											<b>1430</b>		
1	Pala	TC Poovanthuruthu	Pinnakkanadu	33/11KV	33/11 kV out door	2	5	10	Identified(purchase proposal submitted for sanction)		365	1	2023-24
											<b>365</b>		
1	Pathanamthitta	TD PATHANAMTHITTA	Mepral	AIS: 33/11kV	33/11kV	2	6	10	Being identified	Row	600	2	24-25
2	Pathanamthitta	TD PATHANAMTHITTA	Kunnanthanam	AIS: 33/11kV				10	Available		600	1	24-25
											<b>1200</b>		
1	Thodupuzha	TC Thodupuzha	33kV S/s Udumbanchola	33/11kV	33/11	1	5	5	Revenue Land identified, Steps for transferring land to be initiated	359.8	359.8	1	31.12.2022
2	Thodupuzha	TC Thodupuzha	33/11kV Container Substation, Anakkara	33/11kV	33/11kV	1	5	5	Lease Land From Anakkara Panchayathu identified	400	400	3	31.12.2023
3	Perumbavoor	TC Thodupuzha	33 kV Substation, Vengoor	Conventional -33/11	33/11kV	2	5	10	Can be made available	880	880	2	2024-25
											<b>1639.8</b>		
1	Perumbavoor	TC Kalamassery / TD Kalamassery	CHOWARA ALUVA	33/11 KV CONVENTIONAL	PTR	2	5	10	Available	900	900	7	25 - 26

2	Perumbavoor	TC Kalamassery /TD Kalamassery	INDUSTRIAL ESTATE KALAMASSERY	33/11KV GIS	PTR	2	5	10	Available	900	900	5	25 - 26
3	Ernakulam	TC Kalamassery/Transmission Division Ernakulam	33kV GIS Substation, Palarivattom	GIS(33/11KV )	PTR	2	5	10	Available	600	600	2	2024-25
											<b>2400</b>		
1	Irinjalakuda	TC Thissur /TD Irinjalakuda	Thumbur S/s	33/11KV AIS	Outdoor	2	5	10	Available	393	393	1	22-23
2	Irinjalakuda	TC Thissur /TD Irinjalakuda	Varatharapilly S/s	33/11KV AIS	Outdoor	2	5	10	Available	1535	1535	2	23-24
3	Thrissur	TC Thissur /TD Thissur	Choolissery S/s	33/11KV AIS	Outdoor	2	5	10	Available	475	475	3	24-25
4	Irinjalakuda	TC Thissur /TD Irinjalakuda	Perinjanam S/s	Container	Outdoor	1	3	3	Available	385	385	4	24-25
											<b>2788</b>		
1	EC Palakkad	TC Palakkad/TD Chittur	Construction of 33kV containerised Substation at Thathamagalam	Container type	2	2	5 MVA	10	Available	420	420	1	2023-25
2	EC Shoranur	TC Palakkad/TD Palakkad	33kV SS Mukkali	Conventional	1	2	5	10	Yes	350	350	2	2023-25
3	EC Palakkad	TC Palakkad/TD Palakkad	33kV Substation Kadampazhippuram	Conventional	1	2	5	10	Land (under Irrigation department ) to be handed over to KSEBL.	350	350	5	2023-25
											<b>1120</b>		
1	Nilambur	TC Malappuram /TD Malappuram	Karuvarakundu	Conventional	PTR	2	5	10	Identified Under process	418	418	22	2023-24

2	Manjeri	TC Malappuram /TD Malappuram	Kondotty	Conventional	PTR	2	5	10	To be identified. Expect suitable land can be procured	478	478	20	2023-24
3	Tirur	TC Malappuram /TD Tirur	Kunnumpuram	Conventional	PTR	2	5	10	Available (Procurement in progress)	500	500	16	2022-23
											<b>1396</b>		
1	Kozhikode	TC, Kozhikode	33kV SS at Beypore	33/11kV containerised	Power Transformer	2	5MVA	10MVA	YES	480	480	2	2023-2024
2	Kozhikode	TC, Kozhikode	33kV Substation Nellikaparamba	33/11kV		2	5	10	M/s Poabs Rocks given willingness	393	393	1	2022-2023
3	Kalpatta	TC, Kozhikode	33 kV SS Vellamunda	conventional 33/11kV	Outdoor	2	5	10	Land identified	200	400	3	2023-2024
											<b>1273</b>		
1	Kannur	TC Kannur	33kV Substation Pappinissery	33/11kV Container	Outdoor	2		10	Not available	No	442	1	2023
2	Breekandapuram	TC Kannur	33kV Substation Koonam(Kurumathur)	33/11kV conventional				10	Revenue Land identified		442	3	2024
											<b>884</b>		
											<b>17327.26</b>		

**Modernisation: Augmentation of Power Sub-Stations and Associated Works**

SI.No.	Ele.Circle	Tran Circle/Division	Name of the Sub-Station	Description of works	Quantity (Nos.)	Rate	Amount in Lakhs	Estimated Amount	Priority of work	Targetted year	Remarks
1	EC Kattakada	TC Thiruvananthapuram	110KV s/s Parassala	Enhancing 2x12.5 MVA(110/11KV) Transformer to 2x20MVA(110/11KV)	2		323	323	18	22-23	
2	EC Thiruvananthapuram	TC Thiruvananthapuram	220 kV Substation, Pothencode	Capacity enhancement of old inferior 10 MVA, 110/11 kV transformer with 12.5 MVA at 220 kV Substation, Pothencode	1		125	125	60	23-24	
								448			
1	Kollam	TC Kottarakkara/Kundara	AYATHIL 110KV S/S	AUGMENTATION OF 110KV S/s AYATHIL – PROVIDING NEW 16MVA, 110/33KV TRANSFORMER AT AYATHIL S/S FOR FEEDING PEROOR & BY PASS 33KV S/S	2	380	760	760	8	23-24	
2	Kollam	TC Kottarakkara/Kundara	110 kV Substation, Sasthamkotta	AUGMENTATION OF 110KV S/s Sasthamkotta – PROVIDING NEW 25MVA, 110/33KV TRANSFORMER FOR FEEDING 33 kV Puthur Substation and Proposed 33kV East Kallada S/s	1	410	410	410	9	23-24	
3	Kottarakkara	TC Kottarakkara/Punalur	Ayur	AUGMENTATION OF 110kV AYOOR S/S - INSTALLATION OF ADDITIONAL 16 MVA ,110/33kV TR TWO ADDITIONAL 110kV and 33kV BAY AND CONTROL ROOM EXTENSION	1	500	500	500	10	24-25	Only One Transformer is required
4	Kottarakkara	TC Kottarakkara/Punalur	110kV S/s Ambalapuram	AUGMENTATION OF POWER TRANSFORMER FROM 16 MVA, 110/33kV TO 25 MVA,110/33kV at 110kV Substation Ambalapuram	2	265.5	531	531		23-24	
								2201	22.01	Rs. In Cr	
1	Haripad	Alappuzha/Mavelikara	110kV Substation, Kayamkulam	Enhancing the capacity of Existing 2Nos. Of 110/11kV 10MVA Transformers to 12.5MVA each at 110kV Substation, Kayamkulam	2		248	248	13	2022-23	
2	Alappuzha	TC Alappuzha	110 kV SS Aroor	Installation of additional 110/11 kV, 20 MVA transformer	LS	191	191	191	13	2022-23	
3	Alappuzha	TC Alappuzha	33 kV SS Kalarcode	Capacity enhancement through replacing existing 2x5MVA transformers with 2X8MVA 33/11kV Transformers at 33kV S/S Kalarcode	LS	169	169	169	14	2023-24	
4	Haripad	Alappuzha/Mavelikara	33kV Substation, Vallikunnam	Enhancing the capacity of Existing 2Nos. of 33/11kV 5MVA Transformers to 8MVA each at 33kV Substation, Vallikunnam	2		176	176	4	2023-24	For getting increased Load and also to get savings in losses
5	Haripad	Alappuzha/Mavelikara	220kV Substation Edappon	Installing 3 Nos of. 110/11kV, 20MVA Transformer & other bay equipments including the erection of new 11kV Switchgear at 220kV Substation, Edappon	3		882	882	14	2023-24	For getting increased Load and also to get savings in losses

6	Alappuzha	TC Alappuzha	220 kV SS Punnappara	INSTALLATION OF ADDITIONAL 12.5 MVA transformer	1		350	350	15	2022-23	
7	Alappuzha	TC Alappuzha	110kV Substation, Edathua	NEW 33KV FEEDER BAY FOR MEPRAL SUBSTATION at 110 kV Substation, Edathua	1		16	16	16	2023-24	
								2032			
1	Kottayam	TC Poovanthuruthu	33 kV SS Kaduthuruthy	Second 5MVA 33/11kV transformer at 33 kV SS Kaduthuruthy and allied works including control room extension and replacing old ODCs to indoor panels	1	310	310	310	2	2024-25	
2	Pala	TC Poovanthuruthu	110 kV SS Koothattukulam	Installation of 1 X 16 MVA,110/33 kV & 33 kv feeder outlet for Ramapuram at 110 kV Substation Koothattukulam	1	290	290	290	4	2023-24	
3	Pala	TC Poovanthuruthu	110 kV SS Erattupetta	Installation of 1 X 16 MVA,110/33 kV transformer & 33 kv feeder outlet for Pinnakkanadu	1	250	250	250	2	2023-24	
4	Kottayam	TC Poovanthuruthu	110 kV Substation, Erumely	Installation of 1 X 16 MVA,110/33 kV transformer & 33 kv feeder outlet for Manimala	1	250	250	250	1	2023-24	
5	Kottayam	TC Poovanthuruthu	110 kV Substation, Ettumanoor	Installation of 1 X 16 MVA,110/33 kV transformer & 33 kv feeder outlet for Kidangoor and Kallara includign GIS bay at Ettumanoor	1	425	425	425	1	2024-25	
6	Pala	TC Poovanthuruthu	33 kV SS Paika	Construction of 33 kV feeder bay	1	58	58	58	2	2023-24	
								1583			
1	Thodupuzha	TC Thodupuzha	33kV S/s Kumily	Capacity Enhancement of 33kV Substation, Kumily by replacing 2x5MVA ,33/11kV Transformer with 2x8MVA, 33/11kV Transformer	2	90	180	180	1	31.03.2022	
2	Perumbavoor	TC Thodupuzha	33 kV Kalady	Augmentation of of 33kV Substation Kalady from 5MVA to 8MVA	3	147	441	441	3	31.12.2022	
3	Thodupuzha	TC Thodupuzha	110kV S/s Udumbannoor	Capacity Enhancement: Replacing the 33/11kV,2 x 5 MVA transformers with 2x8 MVA transformers at 110kV Substation, Udumbannoor	2	67	134	134	5	31.12.2024	
4	Thodupuzha	TC Thodupuzha	33kV S/s Vannappuram	Capacity Enhancement: Replacing the 33/11kV,2 x 5 MVA transformers with 33/11kV,2 x 8 MVA transformers at 33KV Substation, Vannappuram	2	67	134	134	4	31.12.2023	
5	Perumbavoor	TC Thodupuzha	110 kV Malayattoor	Augmentation of 110 kV Substation Malayattoor from 10 MVA to 20 MVA	2	151	302	302	2	31.03.2023	



6	Perumbavoor	TC Thodupuzha	110kV Rayonpuram	Augmentation of 110 kV Substation Rayonpuram by the erection of additional 110/33kV 16 MVA Transformer	1	290	290	290	7	31.03.2025	
								1481			
1	Perumbavoor	TC Kalamassery	ALUVA	NEW 33KV FEEDER BAYS AND BUS RE-ARRANGEMENT	2	110	220	220	5	2023-24	To provide supply to 33kV substations proposed Chowara and Thottakkattukara . (1 each)
2	Perumbavoor	TC Kalamassery	EDATHALA	NEW 33KV FEEDER BAYS	3	50	150	150	1	2023-24	To provide supply to 33kV substations proposed Chowara (1) and IDA, Edathala(2)
3	Ernakulam	TC Kalamassery	Alangad	NEW 33KV FEEDER BAYS	1	35	35	35		2023-24	
4	Ernakulam	TC Kalamassery	Vadakkekkara	NEW 33KV FEEDER BAYS	1	35	35	35		2023-24	
5	Ernakulam	TC Kalamassery	EDAYAR	NEW 33KV FEEDER BAYS	4	50	200	200	2	2023-24	To provide supply to 33kV substation near Binani Zinc (2) at Edayar Industrial Area & Alangad and Thotakattukara each
6	Ernakulam	Transmission circle Kalamassery/Transmission Division Ernakulam	Varapuzha	capacity enhancement by replacing 2No of 33/11kV 5MVA Transformers by 2Nos, 33/11kV ,8MVA Transformers at 33kV Substation Varapuzha	2		150	150	1	2023-24	addition of 6MVA to meet load requirement of Varapuzha area.Substation will get flexibility in availing shutdowns without major interruption
7	Ernakulam	Transmission circle Kalamassery/Transmission Division Ernakulam	Alangad	capacity enhancement by replacing 1No of 33/11kV 5MVA Transformers by by 33/11kV ,8MVA Transformers at 33kV Substation Alangad	1		75	75	2	2023-24	addition of 3MVA to meet load requirement of Varapuzha area.Substation will get flexibility in availing shutdowns without major interruption
8	Perumbavoor	TC Kalamassery	ALUVA	INSTALLATION OF ADDITIONAL 16 MVA , 110/33kV X'MER & PANELS	1	400	400	400		2024-25	
9	Perumbavoor	TC Kalamassery	EDATHALA	INSTALLATION OF ADDITIONAL 16 MVA , 110/33kV X'MER & PANELS	1	420	420	420		2024-25	

10	Perumbavoor	TC Kalamassery	ALUVA	Capacity enhancement by replacing one 110/11kV, 12.5MVA Transformers by one 110/11kV 20MVA Transformer at 220kV Substation,Aluva	1	200	200	200	7	2023-24	Addition of 7.5 MVA to meet load requirement of Aluva area. The substation will get flexibility in availing shutdowns without major interruption or backfeeding
11	Perumbavoor	TC Kalamassery	EDAYAR	Capacity enhancement by replacing one 110/11kV, 12.5MVA Transformers by one 110/11kV 20MVA Transformer at 110kV substation Edayar	1	200	200	200	1	2023-24	Distribution wing requestd for 4 nos 11 kv feeder cubicle
12	Ernakulam	Transmission circle Kalamassery/Transmission Division Ernakulam	110kV SS Mattancherry	Enhancing 2 Nos 10MVA 66/11kV Transformer to 2 Nos 20MVA 110/11kV Transformers including installation of Bay Equipments and bay extension work at 110kV Substation Mattancherry	2	550	1100	1100		2023-24	As per LFS peak load system loss reduction to the extent of 315.7kW
13	Ernakulam	Transmission circle Kalamassery/Transmission Division Ernakulam	110kV SS Edappally	Capacity enhancement of one No.12.5MVA 110/11KV power Transformer (TrFr No.1) to 20MVA tfr at 110kV substation Edappally	1		245	245		2023-24	Peak load system loss reduction of 24.51kW with equal load sharing between 2*20MVA Transformers
14	Ernakulam	TC Kalamassery	110 kV Substation, Vytilla	Enhancing station capacity by replacing 1 no. of 110/11 kV 12.5 MVA transformer with 20 MVA transformer at 110 kV Substation, Vytilla		100	100	100		2023-24	Annual plan 21-22
							3530				
1	Thrissur	TC, Thrissur / Thrissur	110 KV S/S Mannuthy	110 KV S/S Mannuthy 110/33kv 16MVA Tr.& Bay	1 No	273	273	273	1	23-24	Capacity Enhancement of S/s
2	Irinjalakuda	TC, Thrissur / Chalakudy	110kV substation, Mala	110 KV S/S Mala 110/33kv 16MVA Tr.& Bay	1	380	380	380	1	22-23	Capacity Enhancement of S/s
3	Irinjalakuda	TC, Thrissur / Chalakudy	110kV substation, Kodakara	110 KV S/S Kodakara 110/33kv 16MVA Tr.& Bay	1	345	345	345	2	22-23	Capacity Enhancement of S/s
4	Thrissur	TC, Thrissur / Chalakudy	110kV substation, Vellikulangara	33kv S/S Vellikulangara 5MVA to 8 MVA	2	91	91	182	3	24-25	Capacity Enhancement of S/s
5	Irinjalakuda	TC, Thrissur / Irinjalakuda	33kV substation, Vadanappilly	33kV S/S Vadanappilly new 5 MVA transformer	1	75	75	75	4	24-25	Capacity Enhancement of S/s
6	Irinjalakuda	TC, Thrissur / Irinjalakuda	33kV substation, Kaipamangalam	33kV S/S Kaipamangalam new 5 MVA transformer	1	75	75	75	5	24-25	Capacity Enhancement of S/s
7	Irinjalakuda	TC, Thrissur / Thrissur	110kV substation, Punnayurkulam	110 KV Punnayurkulam new 16MVA 110/33 KV Transformer	1	312	312	312	6	24-25	Capacity Enhancement of S/s

8	Irinjalakuda	TC, Thrissur / Chalakudy	33kV substation, Pariyaram	33kv S/S Pariyaram 5MVA to 8 MVA	2	91	91	182	7	24-25	Capacity Enhancement of S/s
								1824			
1	EC Shoranur	TC Palakkad/ TD Palakkad	33 kV Substation Alanallur	Capacity enhancement of 33kV Substation Alanallur by Replacing 2 X 5 MVA, 33/11kV Transformers with 2 X 8 MVA, 33/11kV Transformers at 33kV Substation Alanallur	2		180	180	1	2022-23	Capacity Enhancement of S/s
2	EC Palakkad	TC Palakkad/ TD Chittur	66 KV Substation CHITTUR ( to be upgraded to 110KV level in the future )	Capacity enhancement by installing 16MVA, 110/33 KV transformer & 33KV 4 panel set for feeding 33 KV Substations Thathamangalam, Meenakshipuram and Vannamada ( with the upgradation of 66 KV S/S Chittur to 110KV level)	1		450	450	5		Providing 33 KV supply to Tattamangalam substation and alternate 33 KV supply to Meenakshipuram & Vanamada Substations
3	EC Palakkad	TC Palakkad/ TD Palakkad	33 kV Substation Vidyuthibhavanam, Palakkad	Capacity enhancement by installing 2 Nos of 33/11 kV 8MVA Transformer at 33kV Substation Vidyuthibhavanam, Palakkad	2		300	300	2	2022-23	Capacity Enhancement of S/s
4	EC Shoranur	TC Palakkad/ TD Shoranur	110 KV Substation Cherpulassey	Capacity Enhancement by installing 1 No. 16 MVA, 110/33 MVA Transformer by extending 1 No. 110KV Bus bay and 1 No. 33 KV feeder outlet for the 33 KV Line to 33 KV Substation Sreekrishnapuram	1		293.17	293.17	4	2022-23	For giving an interlink to existing 33KV Substation by augmenting 110KV S/S Cherpulassery
5	EC Shoranur	TC Palakkad/ TD Shoranur	33kV Substation Chaliserry	Capacity addition by providing 1 No. 33/11kV 5MVA Transformer at 33kV Substation Chaliserry and construction of New Control Room.	1		120	120	7	2022-25	Capacity Enhancement of S/s
6	EC Palakkad	TC Palakkad/ TD Palakkad	110kv Substation, Malampuzha	Capacity enhancement at 110kv Substation Malampuzha by replacing 2x10MVA 110/11kV Transformers with 2x20MVA 110/11kV Transformers including replacing of existing 11kV 12 panel set with 11kV 15 panel set	2		280	280	8	2022-23	Capacity Enhancement of S/s
7	EC Palakkad	TC Palakkad/ TD Palakkad	110kV substation, Walayar	Capacity enhancement of 110kV substation, Walayar by Erecting 1 no of 16 MVA, 110/33kV Transformer and Interlinking of 33kV substation Velanthavalam with 110kV substation Walayar	1		240	240	9	2022-25	New 33KV Level for alternate supply to Velanthavalam S/s
8	EC Palakkad	TC Palakkad/ TD Palakkad	110 KV Walayar	33KV OUT -DOOR YARD EXTENSION FOR ADDITIONAL BAY BY PROVIDING H-BEAM STRUCTURE	1		28	28	9	2022-25	For alternate supply to Velanthavalam S/s
9	EC Palakkad	TC Palakkad/ TD Chittur	33 KV Velanthavalam	33KV OUT -DOOR YARD EXTENSION FOR ADDITIONAL BAY BY PROVIDING H-BEAM STRUCTURE	1		28	28	9	2022-25	For alternate supply to Velanthavalam S/s
10	EC Palakkad	TC Palakkad/TD Chittur	33kV substation, Alathur	AUGMENTATION OF POWER TRANSFORMER FROM 5 MVA TO 8 MVA	2		160	160	10	2022-23	Capacity Enhancement of S/s

11	EC Palakkad	TC Palakkad/ TD Chittur	110kV substation, Nenmara	110 kV NENMARA INSTALLATION OF 16 MVA , 110/33 kV X'MER WITH 33 KV INDOOR 3 PANEL SET FOR 1 INCOMER FROM X'MER AND 2 Nos 33 KV OG FEEDERS	1		350	350	11	2022-25	New 33KV Level for alternate supply to Chittadi & Alathur S/s
12	EC Shoranur	TC Palakkad/ TD Palakkad	33kV Substation Sreekrishnapuram	Construction of NEW 33kV Feeder BAY AT 33kV Substation SREEKRISHNAPURAM.	1		44.87	44.87	3	2022-23	Taken from item No. 203 of sheet R&M os SS 11 & 33KV
13	EC Palakkad	TC Palakkad/TD Chittur	33 KV ALATHUR	33KV OUT -DOOR YARD EXTENSION FOR ADDITIONAL BAY BY PROVIDING H-BEAM STRUCTURE (For Nemmara& Koduvayur)	2		56	56	12	2023-24	Taken from item No. 204 of sheet R&M os SS 11 & 33KV
14	EC Palakkad	TC Palakkad/ TD Chittur	33 KV KODUVAYUR	33KV OUT -DOOR YARD EXTENSION FOR ADDITIONAL BAY BY PROVIDING H-BEAM STRUCTURE	1		28	28	13	2023-24	Taken from item No. 205 of sheet R&M os SS 11 & 33KV
15	EC Palakkad	TC Palakkad/ TD Chittur	33 KV CHITTADI	33KV OUT -DOOR YARD EXTENSION FOR ADDITIONAL BAY BY PROVIDING H-BEAM STRUCTURE	1		28	28	14	2023-24	Taken from item No. 208 of sheet R&M os SS 11 & 33KV
16	EC Palakkad	TC Palakkad/ TD Chittur	33 KV MEENAKSHIPURAM	33KV OUT -DOOR YARD EXTENSION FOR ADDITIONAL BAY BY PROVIDING H-BEAM STRUCTURE for alternate 33 KV Feeders from Muthalamada and Chittur 33 KV Substations	2		56	56	15	2025-26	Taken from item No. 209 of sheet R&M os SS 11 & 33KV
17	EC Palakkad	TC Palakkad/ TD Chittur	33 KV VANNAMADA	33KV OUT -DOOR YARD EXTENSION FOR ADDITIONAL BAY BY PROVIDING H-BEAM STRUCTURE for alternate 33 KV Feeder Proposed 110KV S/S Chittur	1		28	28	16	2025-26	Taken from item No. 210 of sheet R&M os SS 11 & 33KV. Presently Vannamada 33 KV S/S is fed from 110KV S/S Chittur and no other back feeding facility is available now
18	EC Palakkad	TC Palakkad/ TD Chittur	33 KV MUTHALAMADA	33KV OUT -DOOR YARD EXTENSION FOR ADDITIONAL BAY BY PROVIDING H-BEAM STRUCTURE for alternate 33 KV Feeder form 33KV S/S Muthalamada	1		28	28	17	2025-26	Taken from item No. 211 of sheet R&M os SS 11 & 33KV
								2698.04			
1	Tirur	TC, Malappuram	33kV Substation, Tirunavaya	AUGMENTATION OF POWER TRANSFORMER WITHOUT ADDL. BAY ON 11KV SIDE 5 MVA TO 8 MVA	2 Xmers	175	175	175	37	2024-25	
2	Tirur	TC, Malappuram	33kV Substation , Othukkungal	INSTALLATION OF Third 5 MVA TRANSFORMER AT OTHUKKUNGAL S/S	1	150	150	150	31	2022-23	
3	Tirur	TC, Malappuram	110kV Substation, Edappal	INSTALLATION OF ADDITIONAL 16 MVA 110/33kV X'MER USING NEW X-MER WITH TWO ADDITIONAL BAY ON 33KV SIDE	1 Xmer 2 bays	320	320	320	26	2022-23	

4	Tirur	TC, Malappuram	110kV Substation, Chelari	INSTALLATION OF ADDITIONAL 12.5 MVA X'MER USING NEW X-MER WITH TWO ADDITIONAL BAY ON 11KV SIDE	2 feeders, 1 Xmer	330	330	330	27	2022-23	
5	Tirur	TC, Malappuram	110kV Substation, Tirur	AUGMENTATION OF POWER TRANSFORMER WITHOUT ADDL. BAY ON 11KV SIDE 12.5 MVA TO 20 MVA	1 No	180	180	180	35	2022-23	
6	Tirur	TC, Malappuram	33kV Substation, Tavanur	REPLACING AUTORECLOSURES USING PC VCBs TO REDUCE INTERRUPTIONS	2 Nos	15	15	15	8	2022-23	
7	Tirur	TC, Malappuram	110KV Substation, Ponnani	AUGMENTATION OF POWER TRANSFORMER WITHOUT ADDL. BAY ON 11KV SIDE 12.5 MVA TO 20 MVA	2 Xmer	350	350	350	24	2023-24	
8	Tirur	TC, Malappuram	110kV Substation, Edappal	AUGMENTATION OF POWER TRANSFORMER WITHOUT ADDL. BAY ON 11KV SIDE 12.5 MVA TO 20 MVA	2 Xmer	360	360	360	25	2022-23	
9	Nilambur	TC, Malappuram	110KV SS NILAMBUR	AUGMENTATION OF POWER TRANSFORMER WITHOUT ADDL. BAY ON 33KV SIDE SECOND 16 MVA	1	348.75	349	349	33	2023-24	
10	Manjeri	TC, Malappuram	110kV SS Malappuram	AUGMENTATION OF POWER TRANSFORMER WITHOUT ADDL. BAY ON 33KV SIDE 16 MVA	1	212	212	212	21	2023-24	
								2441			
1	Kozhikode	TC, Kozhikode	33KV Sub-Station Balussery	Capacity enhancement at 33KV S/s Balussery by replacing 2X5 MVA Transformer with 2X8 MVA Transformer.	1	240	240	240.00	1	2022-2023	2X5 MVA 33/11KV Transformer with 2X8 MVA 33/11KV Transformer with panels & 2Nos Numerical Transformer Differential relay
2	Vaakara	TC, Kozhikode	33KV Sub-Station Perambra	Capacity enhancement at 33KV S/s Perambra by replacing existing 2X5 MVA Transformer with 2X8 MVA Transformer.	1	220	220	220.00	6	2023-2024	2X5 MVA 33/11KV Transformer with 2X8 MVA 33/11KV Transformer with panels & 2Nos Numerical Transformer Differential relay
3	Vaakara	TC, Kozhikode	33KV Sub-Station Thiruvallur	Capacity enhancement at 33KV S/s Thiruvallur by replacing existing 1X5 MVA Transformer with 1X8 MVA Transformer.	1	102	102	102.00	3	2023-2024	2X5 MVA 33/11KV Transformer with 2X8 MVA 33/11KV Transformer
4	Vaakara	TC, Kozhikode	110KV Substation Kinalur	Construction of 110/33KV Bay and erection 110/33KV, 16 MVA Transformer at 110KV Substation Kinalur for facilitating an alternate 33KV feeding arrangement to 33KV Substation Balussery	1	310	310	310.00	12	2023-2024	For Interlinking 110KV Substation Kinalur to 33KV Substation Balussery

5	Kozhikode	TC, Kozhikode	Agasthyamuzhy	INSTALLATION OF ADDITIONAL 110/11 kV ,12.5 MVA X'MER WITH ADDITIONAL BAY	1	170	170	170.00	5	2023-2024	New FIVE nos 11 kV feeders Proposed by PMU. Load Growth expected
6	Kozhikode	TC, Kozhikode	Agasthyamuzhy	33kV feeder bay at Agasthyamuzhy	1	32	32	32.00	2	2022-2023	for Nellikkaparamba
7	Kozhikode	TC, Kozhikode	Thambalamanna	Additional 33kV feeder bay for 33kV UG cable to Urumi ss	1	53.7	53.7	53.70	16	2023-2024	
8	Kalpatta	TC, Kozhikode	33kV SS Pulpally	33kV additional feeder bay at 33kV SS Pulpally	1	25.00	25.000	25.00	23	2024-2025	
9	Kalpatta	TC, Kozhikode	33kV SS Vellamunda	33kV additional feeder bay at 33kV SS Padinjarathara	1	25.00	25.000	25.00	4	2022-2023	
10	Kalpatta	TC, Kozhikode	33kV SS Padinjarathara	AUGMENTATION OF POWER TRANSFORMER FROM 5 MVA TO 8 MVA AT 33kV SS PADINJARATHARA	2	90.00	180.000	180.00	8	2022-2023	
								1357.70			
1	Kannur	TC, Kannur	33kV SS Kodiyeeri	Capacity enhancement by replacing 2*5MVA 33/11kV transformers with 2*8MVA 33/11kV transformers.	2	85	170	170	3	2025	
2	Kannur	TC, Kannur	33kV SS Dharmadam	Capacity enhancement by replacing 2*5MVA 33/11kV transformers with 2*8MVA 33/11kV transformers.	2	85	170	170	6	2025	
3	Sreekanthapuram	TC, Kannur	33kV Substation, Alakode	Capacity enhancement by replacing 2*5MVA 33/11kV transformers with 2*8MVA 33/11kV transformers.	2	85	170	170	5	2025	
4	Sreekanthapuram	TC, Kannur	110 kV substation Cherupuzha	Capacity enhancement by addition of 1x16MVA 33/11kV transformer.	1	275	275	275	2	2024	
5	Kasaragod	TC, Kannur	33 KV BELUR SUBSTATION:	Capacity enhancement by replacing 2*5MVA 33/11kV transformers with 2*8MVA 33/11kV transformers.	2	85	170	170	7	2023	
6	Kasaragod	TC, Kannur	33 KV KANHANGAD TOWN SUBSTATION	Capacity enhancement by replacing 2*5MVA 33/11kV transformers with 2*8MVA 33/11kV transformers	2	85	170	170	1	2023	
7	Kasaragod	TC, Kannur	33 KV TRIKARIPUR SUBSTATION	Capacity enhancement by replacing 2*5MVA 33/11kV transformers with 2*8MVA 33/11kV transformers.	2	85	170	170	4	2024	
8	Kasaragod	TC, Kannur	33KV SUBSTATION BADIADKA:	Capacity enhancement by replacing 2*5MVA 33/11kV transformers with 2*8MVA 33/11kV transformers.	2	85	170	170	8	2025	
								1465			
								21060.74			

**Modernisation: R&M of Power Sub-Stations and Associated Works**

Sl. No.	Ele. Circle	Trans Circle/Division	Name of the Sub-Station	Description of works	Quantity (Nos.)	Rate	Amount in Lakhs	Estimated amount	Targetted year
1	EC Kattakada	TC Thiruvananthapuram	33 kV Substation, Chullimanoor	Construction of additional 11 kV feeder bay with 11 kV PCVCB at 33 kV Substation, Chullimanoor	1		12	12	22-23
2	EC Kattakada	TC Thiruvananthapuram	110 KV Substation, Neyattinkara	Errection of 4 pole structure,providing AB and yard metalling work in connection wih the 3 nos of new 11KV feeders at 110kv substation ,Neyattinkara.	3		44.11	44.11	22-23
3	EC Kattakada	TC Thiruvananthapuram	110KV s/s Parassalsa	Errection of 4 pole structure,providing AB 2nos and yard metalling work in connection wih the new 11KV feeders at 110kv substation ,Parassala	2		14.09	14.09	23-24
4	EC Kattakada	TC Thiruvananthapuram	110kV Substation, Nedumangad	Replacement of old electromechanical relays with numerical relays in 11 kV feeder panels at 110kV Substation, Nedumangad	12	0.2	2.4	2.4	22-23
5	EC Kattakada	TC Thiruvananthapuram	110 kV Substation, Aruvikara	Replacement of old electromechanical relays with numerical relays in 11 kV feeder panels at 110 kV Substation, Aruvikara	10	0.2	2	2	22-23
6	EC Kattakada	TC Thiruvananthapuram	110 kV Substation, Kilimanoor	Replacement of old electromechanical /static relays with numerical relays in C&R panel (4 Nos) of Transformers and in feeder panel (2 Nos) at 110 kV Substation, Kilimanoor	6	0.2	1.2	1.2	22-23
7	EC Kattakada	TC Thiruvananthapuram	33 kV Substation, Kadakkal	Replacement of old electromechanical / static relays with numerical relays in C&R panel of Transformers (6Nos) and in feeder panel(1 No)at 33 kV Substation, Kadakkal	6	0.2	1.4	1.4	22-23
8	EC Kattakada	TC Thiruvananthapuram	33 kV Substation, Chullimanoor	Replacement of old electromechanical relays with numerical relays in C&R panel of Transformers at 33 kV Substation, Chullimanoor (2 no)	2	0.2	0.4	0.4	22-23

9	EC Kattakada	TC Thiruvananthapuram	33 kV Substation, Vithura	Replacement of old electromechanical relays with numerical relays in C&R panel of Transformers at 33 kV Substation, Vithura (2 no)	2	0.2	0.4	0.4	22-23
10	EC Kattakada	TC Thiruvananthapuram	33 kV Substation, Venjaramoodu	Replacement of old electro mechanical / Static relay with numerical relay in 33kV Feeder panel at 33 kV Substation, Venjaramoodu – 1 No.	1	0.2	0.2	0.2	22-23
11	EC Kattakada	TC Thiruvananthapuram	110KV Balaramapuram	Replacement of 11 kV ,10 panel set with spares suitable for transformer of capacity upto 16 MVA (2000A)			75	75	21-22
12	EC Kattakada	TC Thiruvananthapuram	33KV Substation Vellarada	Replacing existing 10 panel set with new 11KV 10 panel set	1		70	70	22-23
13	EC Thiruvananthapuram	TC Thiruvananthapuram	110 KV Substation, Attingal	Replacement of old Megawin make 11 kV panels of 16 MVA, 66/11 kV transformer with new 11 kv 10 panel set at 110 kV Substation, Attingal and control room extension and strengthening of battery room at 110 Kv Substation Attingal			115	115	21-22
14	EC Thiruvananthapuram	TC Thiruvananthapuram	33 kV Substation, Kadakkavur	Replacement of existing old 11 kV 7 panel set (EASUN REYROLLE) with new 10 panel set at 33 kV Substation, Kadakkavoor for providing station auxiliary panel and additional feeder panel for distribution.			70	70	22-23
15	EC Thiruvananthapuram	TC Thiruvananthapuram	220kV Substation, Pothencode	Replacement of 19 nos. old electromechanical relays with numerical relays in 11 kV feeder panels at 220kV Substation, Pothencode	19	0.2	3.8	3.8	24-25
16	EC Thiruvananthapuram	TC Thiruvananthapuram	110kV Substation, Attingal	Replacement of old electro mechanical / Static relays with numerical relays in C & R panel of Transformers (3 Nos) and 33 Kv feeder panel (2 Nos)at 110kV Substation, Attingal	5	0.2	1	1	22-23
17	EC Thiruvananthapuram	TC Thiruvananthapuram	110kV Substation, Varkala	Replacement of old electro mechanical / Static relays with numerical relays in C & R panel of Transformers at 110kV Substation, Varkala (3 nos)	3	0.2	0.6	0.6	22-23



18	EC Thiruvananthapuram	TC Thiruvananthapuram	33kV Substation, Kallambalam	Replacement of old electro mechanical / Static relays with numerical relays in C & R panel of Transformers and 33kv feder panel at 33kV Substation, Kallambalam (3 nos)	3	0.2	0.6	0.6	22-23
19	EC Thiruvananthapuram	TC Thiruvananthapuram	33 kV Substation, Kadakkavoor	Replacement of old electro mechanical / Static relay with numerical relay in 33kV Feeder panel at 33 kV Substation, Kadakkavoor	1	0.2	0.2	0.2	22-23
20	EC Thiruvananthapuram	TC Thiruvananthapuram	110KV Substation, Paruthippara	Replacing Electromechanical relays on 11 kV panel with numerical relays	20		4.15	4.15	22-23
21	EC Thiruvananthapuram	TC Thiruvananthapuram	110kv ss Thirumala	Replacement of OC/EF Electromechanical type relays with 3 OC+1EF, Low/High set Numerical relays	17		3.55	3.55	22-23
22	EC Thiruvananthapuram	TC Thiruvananthapuram	66KV GIS Substation ,LA Complex	Replacement of 11kV panel set at 66kV GIS, L A Complex			82	82	21-22
23	EC Thiruvananthapuram	TC Thiruvananthapuram	33KV Substation , Pattoor	Providing auxiliary LT change over panel with metering at 33kV Substation, Pattoor	1		2	2	23-24
24	EC Thiruvananthapuram	TC Thiruvananthapuram	33KV Substation, Karamana	Replacement of 33kV 4 panel set At 33kV Substation, Karamana.	1		30.8	30.8	22-23
								536.9	
1	Kollam	TC Kottarakkara/Kundara Div	33KV Substation, Paravoor	AUGMENTATION OF 33kV S/s PARAVOOR – INSTALLATION OF NEW 11KV FEEDER PANEL	1	8	8	8	22-23
2	Kollam	TC Kottarakkara/Kundara Div	110 KV Substation, Kottiyam	AUGMENTATION OF 110KV S/s KOTTIYAM – INSTALLATION OF NEW 11KV FEEDER PANEL	1	8	8	8	22-23
3	Kollam	TC Kottarakkara/Kundara Div	110KV S/S Perinadu	AUGMENTATION OF 110KV S/s PERINAD – INSTALLATION OF NEW 11KV FEEDER PANEL	2	8	16	16	22-23
4	Kottarakkara	TC Kottarakkara/Punalur Division	110KV Substation, AYUR	AUGMENTATION OF 110KV AYOOR SUBSTATION BY PROVIDING NEW 11KV CUBICLE FOR 11KV FEEDER SEGREGGATION	1	8	8	8	22-23

5	Kottarakkara	TC Kottarakkara/Punalur Division	110KV Substation, ANCHAL	AUGMENTATION OF 110KV ANCHAL SUBSTATION BY PROVIDING NEW 11KV CUBICLE FOR 11KV FEEDER SEGREGGATION	1	8	8	8	22-23
6	Kottarakkara	TC Kottarakkara/Punalur Division	66KV Substation, THENMALA	AUGMENTATION OF 66KV THENMALA SUBSTATION BY PROVIDING NEW 11KV CUBICLE FOR 11KV FEEDER SEGREGGATION	1	8	8	8	22-23
7	Kottarakkara	TC Kottarakkara/Punalur Division	110KV Substation,PATHANAPURAM	Augmentation of 110kv Pathanapuram substation by providing new 11kv cubicle for 11kv feeder segregation	1	8	8	8	22-23
8	Kottarakkara	TC Kottarakkara/Punalur Division	33KV Substation, PUTHOOR	Augmentation of Puthoor substation – providing feeder control and protection to existing 33kv feeder	1	24	24	24	23-24
9	Kottarakkara	TC Kottarakkara/Punalur Division	33KV Substation, POOYAPPALLY	Augmentation of Pooyappally substation – providing feeder control and protection to existing 33kv feeder	1	24	24	24	23-24
10	Kottarakkara	TC Kottarakkara /TD Punalur	33KV Substation, EZHUKONE	Replacement of existing feeder and transformer control panel at 33kv substation Ezhukone	2	15	30	30	24-24
11	Kottarakkara	TC Kottarakkara /TD Punalur	33KV Substation, CHENGAMANAD	Replacement of existing feeder and transformer control panel at 33kv substation Chengamand	2	15	30	30	23-24
12	Kottarakkara	TC Kottarakkara /TD Punalur	33KV Substation, POOYAPPALLY	Replacement of existing transformer control panel at 33kv substation Pooyappally	1	15	15	15	23-24
13	Kottarakkara	TC Kottarakkara /TD Punalur	33KV Substation, PUTHOOR	Replacement of existing transformer control panel at 33kv substation Puthoor	1	10	10	10	23-24
14	Kottarakkara	TC Kottarakkara /TD Kundara	33kv S/s Adichanalloor	Replacement of existing 11kv ARC/ODC with indoor 11kv VCB Panel having Incomer 2 Nos, Outgoing 6 Nos and Bus coupler	1	35	35	35	22-23
								<b>232</b>	
1	Haripad	Alappuzha/Mavelikara	110kv Substation Kayamkulam	Installation of new 11kv 10 panel set at 110kv Substation, Kayamkulam	1		85	85	2023-24
2	Haripad	Alappuzha/Mavelikara	110kv Substation, Chengannur	Replacing existing old 11kv feeder panels with new 23 Panel set at 110kv Substation, Chengannur.	1		180	180	2023-24
3	Haripad	Alappuzha/Mavelikara	66kv Substation, Karuvatta	Replacing existing old 11kv feeder panels with new 12 Panel set at 66kv Substation, Karuvatta	1		100	100	2023-24

4	Haripad	Alappuzha/ Mavelikara	66kV Substation, Nangiarkulangara	Replacing old OC&EF Relays of 11kV Panels with new OC&EF Relays with SEF Facility at 66kV Substation, Nangiarkulangara	1		5	5	2022-23
5	Alappuzha	TC Alappuzha	110kV Substation, Eramallur	Adding new 11KV panel to existing 11KV indoor panel	1	10	10	10	2022-23
6	Alappuzha	TC Alappuzha	33kV Substation, Kuthiyathode	Adding new 11KV panel to existing 11KV indoor panel	1	10.5	10.5	10.5	2022-23
7	Alappuzha	TC Alappuzha	110 kV Substation SL Puram	Adding new 11KV panel to existing 11KV indoor panel	1	9.5	9.5	9.5	2022-23
8	Alappuzha	TC Alappuzha	110 kV Substation, Aroor	Adding new 11KV panel to existing 11KV indoor panel	1	10.5	10.5	10.5	2022-23
9	Alappuzha	TC Alappuzha	33 Substation, Thakazhy	Adding new 11KV panel to existing 11KV indoor panel	1	7.5	7.5	7.5	2021-22
10	Ernakulam	TC Alappuzha	110 kV Substation, Thycattussery	Adding new 11KV panel to existing 11KV indoor panel	4	9.5	38	38	2021-23
11	Alappuzha	TC Alappuzha	110 kV Substation, Edathua	Providing 1 No. additional feeder to Tkakazhy ES from Edathua SS	1	18	18	18	2023-24
12	Alappuzha	TC Alappuzha	110 kV Substation, Chellanam	Adding new 11KV panel to existing 11KV indoor panel	3	20.2	60.6	60.6	2023-24
13	Haripad	Alappuzha/ Mavelikara	33kV Substation, Vallikunnam	Installing of 11kV 12 Panel set and extension of existing 33kV control room for installing 12 panel set at 33kV Substation, Vallikunnam	1		181	181	2023-24
14	Haripad	Alappuzha/ Mavelikara	66kV Substation, Kattanam	Providing 3 Nos. of new 11kV feeder outlet at 66kV Substation, Kattanam.	3			50	2022-23
15	Haripad	Alappuzha/ Mavelikara	66kV Substation, Nangiarkulangara	Providing 3 Nos. of new 11kV feeder outlet at 66kV Substation,Nangiarkulangara	3			41	2022-23
								806.6	

1	Kottayam	TC Poovanthuruthu	110 kV SS Chengalam	Replacing 11kV ODC with 7 panel 11kV indoor cubicle and Providing 1no additional 11kV feeder outlet at 110kV substation Chengalam	1	80	80	80	2022-23
2	Pala	TC Poovanthuruthu	110 kV SS Pampady	Replacing old and outdated 11kV panels at 110kV Substation Pampady	1		70	70	2022-23
3	Pala	TC Poovanthuruthu	110 kV SS Pala	Providing new 15 panel set for 110/11KV 20MVA transformers	1		115	115	2022-23
4	Pala	TC Poovanthuruthu	33 kV SS Ramapuram	Replacement of BHEL ODC of 11KV CBM& Kollapiily feeders with new ones	2		15	15	2022-23
								280	
1	Pathanamthitta	TD, Pathanamthitta	66kV Substation, Adoor	Renovation of 11kV feeder panel	1	20	20	20	22 -23
2	Pathanamthitta	TD, Pathanamthitta	110kV Substation, Ranni	Renovation of 11kV feeder panel	1	45	45	45	22 - 23
3	Pathanamthitta	TD, Pathanamthitta	110kV Substation, Koodal	Renovation of 11kV feeder panel	1	45	45	45	22 - 23
4	Pathanamthitta	TD, Pathanamthitta	66kV Substation, Kochupampa	Renovation of 11kV feeder panel	1	30	30	30	22 - 23
								140	
1	Perumbavoor	TC Thodupuzha	33kVS/s Kaloorkkad	Installation of 33kv indoor panel at 33kV substation Kaloorkkad	1	147	147	147	2021-22
2	Thodupuzha	TC Thodupuzha	33kV S/s Kumily	Providing alternate 33kV Incoming Bay at 33kV Substation, Kumily from Vandanmedu	1	75	75	75	2022-23
3	Thodupuzha	TC Thodupuzha	33kVS/s Mazhuvannoor	Installation of 33kv indoor panel at 33kV substation Mazhuvannoor	1	147	147	147	2021-22
4	Thodupuzha	TC Thodupuzha	33kV S/s Upputhara	Control Room Extension and providing indoor panels at 33kV Substation, Upputhara	1	208	208	208	2023-24
5	Thodupuzha	TC Thodupuzha	33kV S/s Vandanmedu	Providing 33kV Incoming Bay at 33kV Substation, Vandanmedu	1	30	30	30	2023-24

6	Thodupuzha	TC Thodupuzha	33kV S/s Vannappuram	Installation of 33kv indoor panel with control room Extension and providing 3 Nos 11kv feeder outlets at 33kV substation Vannappuram	1	217	217	217	2021-22
7	Thodupuzha	TC Thodupuzha	66kV S/s Kulamavu	Construction of 1 nos of 11KV feeder outlet at 66kV substation Kulamavu	1	20	20	20	2021-22
								844	
1	Perumbavoor	TC Kalamassery / TD Kalamassery	110 kV Substation, Edayar	Providing new 11kV 10 Panel set at 110kV Substation, Edayar	1	70	70	70	2023-24
2	Perumbavoor	TC Kalamassery / TD Kalamassery	110 kV Substation, Aluva	Construction of 2 Nos. 11KV feeder outlets from Aluva Substation	2	20	40	40	2023-24
3	Perumbavoor	TC Kalamassery / TD Kalamassery	110 kV Substation, Kizhakkambalam	Construction of 2 Nos. 11KV feeder outlets from Kizhakkambalam substation	2	20	40	40	2023-24
4	Perumbavoor	TC Kalamassery / TD Kalamassery	110 kV Substation,, Edathala	Construction of 2 Nos. 11KV feeder outlets from 110kV Edathala Substation and control room extension	2	45	90	90	2023-24
5	Perumbavoor	TC Kalamassery / TD Kalamassery	110 kV Substation, Aluva	Installation C-C type RMU ,SAS compactable at the begining of Existing 11kV Feeder line and for new feeder (Aluva SS)	1	45	45	45	2023-24
6	Perumbavoor	TC Kalamassery / TD Kalamassery	110 kV Substation, Edathala	Installation C-C type RMU and changing existing DP Structures with RMU at Edathala Substation	1	45	45	45	2023-24
7	Ernakulam	TC Kalamassery/TD Ernakulam	33 kV Substation, Alangad	Providing 11kV Outlet from 33kV Ss Alangad	1		12	12	
8	Ernakulam	TC Kalamassery/TD Ernakulam	110kV Substation, Edappally	Providing 11kV Outlet from 110kV SsEdappally	1		12	12	
9	Ernakulam	TC Kalamassery/TD Ernakulam	110kV Substation, N.Paravur	Providing 11kV Outlet from110kV Ss North Paravur	1		12	12	

10	Ernakulam	TC Kalamassery/TD Ernakulam	33kV Substation, Vadakkekara	Providing 11kV Outlet from 33kV Ss Vadakkekara	1		12	12	
11	Ernakulam	TC Kalamassery/TD Ernakulam	110kV Ss Mattancherry	Providing 11kV Outlet from 110kV Ss Mattancherry	1		12	12	
12	Ernakulam	TC Kalamassery/TD Ernakulam	33kV Ss Varapuzha	Providing 11kV Outlet from 33kV Ss Varapuzha	1		12	12	
13	Ernakulam	TC Kalamassery/TD Ernakulam	110kV Ss W.Island	Providing 11kV Outlet from 110kV Ss W.Island	2		24	24	
14	Ernakulam	TC Kalamassery/TD Ernakulam	66kV Ss Njarakkal	Providing 11kV Outlet from 66kV Njarakkal	2		24	24	
15	Ernakulam	TC Kalamassery	220kV Substation, Brahmapuram	11kV, 1250AVCB truck for Incomer	2	3.85	7.7	7.7	
16	Ernakulam	TC Kalamassery	220kV Substation, Brahmapuram	11kV, 630A VCB Truck for incomer	2	2.1	4.2	4.2	
17	Ernakulam	TC Kalamassery	66kV Substation Puthencruz	Replacement of 11KV feeder panels with 16nos outgoing feeder panel (11KV , 630A ,26.2kA Switchgear),3 Incomer feeder panels(11KV , 1250A ,26.2kA Switchgear) and 2 bus coupler panels (11KV , 1250A ,26.2kA Switchgear) at 66KV Substation Puthencruz	21	7.15	150	150	
18	Ernakulam	TC Kalamassery	110 kV Substation, Vytilla	providing 5 nos additional 11kV feeder panel, RMU, laying 3x300 sq mm XLPE UG cable, replacing and relocating existing 160 kVA auxiliary transformer and procuring 2 no spare 11 kV VCB truck at 110 kV Substation, Vytilla			100	100	

19	Ernakulam	TC Kalamassery	110 kV S/s New Vyttila	replacing existing 10panel set compatible for 20MVA,adding additional Feeder panels along with RMU and connecting 11kv UG cable,including spare trucks at 110 kV S/s New Vyttila	1		75	75	
20	Ernakulam	TC Kalamassery	110 kV substation, Panangad	Addition of 11kV panels , RMU and connected electrics at 110 kV substation, Panangad	2	30	60	60	
21	Ernakulam	TC Kalamassery	110 kV Substation, Kadavanthra	Replacing 5 nos of Megawin make &11 nos of ABB make 11 kV indoor VCB Panels at 110 kV Substation, Kadavanthra			83	83	
22	Ernakulam	TC Kalamassery	66 kV GIS Thripunithura	Erection of One no 11kV feeder panel , 1 no RMU and laying 50 mtr UG cable at 66KV GIS THRIPUNITHURA			14.5	14.5	
23	Ernakulam	TC Kalamassery	66 kV Kakkanad	Erection of Two nos 11kV feeder panel , 2 nos RMU and laying 120 mtr UG cable at 66KV Substation, Kakkanad			33	33	
24	Ernakulam	TC Kalamassery	66 kV Kakkanad	Erection of Three 3 nos RMU on existing feeder at 66 kv ss kakkanad.			15	15	
25	Ernakulam	TC Kalamassery	66 kV Thrikkakara	Installing CCC type RMU & Laying 220 M, 3X300 sq mm UG cable for NPOL & BDPP feeders at 66 KV S/s Thrikkakara			9	9	
26	Ernakulam	TC Kalamassery	110 kV substation Kandanad	Installation of RMU by replacing existing yard AB's on 11 kV feeders ( 5 nos) at 110 kV Substation , KANDANAD			20	20	
								1021.4	
1	Irinjalakuda	TC, Thrissur / Chalakudy	220 KV S/S Chalakudy(11 kv) 20 panel set	Old station. complete 11kV panel changing for accomodating new feeders.	1 set	120		120	22-23
2	Irinjalakuda	TC, Thrissur / Chalakudy	110 KV S/S Kodakara(33kv) including distance protection relays	Installation of New 33KV out door Feeder Panels	3	5		15	23-24

3	Perumbavur	TC, Thrissur / Chalakudy	66 KV S/S Karukutty(11 kv) 20 panel set	Old station. complete 11kV panel changing for accomodating new feeders.	1 set	120		120	23-24
4	Irinjalakuda	TC, Thrissur / Irinjalakuda	110kV S/s Pudukad 11kv 13 panel set	Old station. Changing complete pannel and addition of 11kV feeder panel as per the request of distribution wing.	1	53		53	23-24
5	Irinjalakuda	TC, Thrissur / Irinjalakuda	33kV S/s Methala 11kV	New complete 11kV panel set.	3	8.5		25.5	23-24
6	Irinjalakuda	TC, Thrissur / Irinjalakuda	33kV S/s Methala 33kv	New ODC outdoor panels	4	5		20	23-24
7	Irinjalakuda	TC, Thrissur / Chalakudy	110 KV S/S Mala (33kV) including distance protection relays	New ODC 33kV outdoor panels	3	5		15	23-24
8	Irinjalakuda	TC, Thrissur / Irinjalakuda	110kV S/s Valapad 33kv	New ODC 33kV outdoor panels	6	5		30	23-24
9	Irinjalakuda	TC, Thrissur / Irinjalakuda	110kV S/s Irinjalakuda 33 kV	New ODC 33kV outdoor panels	6	5		30	23-24
10	Irinjalakuda	TC, Thrissur / Irinjalakuda	33kVs/s Vellangallur-33kV	New complete 11kV feeder panels.	5	8.5		42.5	23-24
11	Irinjalakuda	TC, Thrissur / Irinjalakuda	33kv S/s Parappukara-33kv	New ODC 33kV outdoor panels	5	5		25	23-24
12	Irinjalakuda	TC, Thrissur / Chalakudy	33 KV S/S Annamanada(33kv ) including distance protection relays	New ODC 33kV outdoor panels	2	5		10	23-24
13	Irinjalakuda	TC, Thrissur / Chalakudy	33 KV S/S Vellikulangara(33kv) including distance protection relays	New ODC 33kV outdoor panels	2	5		10	23-24



								516	
1		TC Palakkad	33kV Substation Maruthur	Modernisation of 11kV side at 33kV Substation Maruthur by replacing 8 Nos of old 11kV ODCB with RMU, under Transmission Division Shoranur.	8		75	75	22-24
								75	
1	Nilambur	TC Malappuram	110kV SS Nilambur	11kV OUT-DOOR YARD EXTENSION FOR ADDITIONAL BAY H-BEAM STRUCTURE	2	14.5	29	29	2022-23
2	Nilambur	TC Malappuram	33kV SS Wandoor	11kV OUT-DOOR YARD EXTENSION FOR ADDITIONAL BAY H-BEAM STRUCTURE	2	4	8	8	2022-23
3	Manjeri	TC Malappuram	220kV SS Elankur	11kV OUT-DOOR YARD EXTENSION FOR ADDITIONAL BAY H-BEAM STRUCTURE	1	4	4	4	2022-23
4	Nilambur	TC Malappuram	110kV SS Melattur	11kV OUT-DOOR YARD EXTENSION FOR ADDITIONAL BAY H-BEAM STRUCTURE	1	14.5	14.5	14.5	2022-23
5	Nilambur	TC Malappuram	33kV SS Edavanna	11kV OUT-DOOR YARD EXTENSION FOR ADDITIONAL BAY H-BEAM STRUCTURE	2	4	8	8	2022-23
6	Manjeri	TC Malappuram	110kV SS Malappuram	11kV OUT-DOOR YARD EXTENSION FOR ADDITIONAL BAY H-BEAM STRUCTURE	3	5	15	15	2022-23
7	Manjeri	TC Malappuram	110kV SS Perinthalmanna	11kV OUT-DOOR YARD EXTENSION FOR ADDITIONAL BAY H-BEAM STRUCTURE	2	14.5	29	29	2022-23
8	Nilambur	TC Malappuram	110 kV SS Edakkara	11kV OUT-DOOR YARD EXTENSION FOR ADDITIONAL BAY H-BEAM STRUCTURE	1	4	4	4	2022-23
9	Manjeri	TC Malappuram	33 kV Velluambaram	11kV OUT-DOOR YARD EXTENSION FOR ADDITIONAL BAY H-BEAM STRUCTURE	1	5	5	5	2022-23
10	Manjeri	TC Malappuram	220 kV SS Areakode	11kV OUT-DOOR YARD EXTENSION FOR ADDITIONAL BAY H-BEAM STRUCTURE	2	14.5	29	29	2022-23
11	Manjeri	TC Malappuram	110kV SS Manjeri	11kV OUT-DOOR YARD EXTENSION FOR ADDITIONAL BAY H-BEAM STRUCTURE	2	14.5	29	29	2022-23
12	Tirur	TC Malappuram	33kV Substation, Tirunavaya	11kV OUT-DOOR YARD EXTENSION FOR ADDITIONAL BAY H-BEAM STRUCTURE AND 11kV 10 PANEL SET	2 feeders	100	100	100	2022-23
13	Tirur	TC Malappuram	110kV Substation, Parappanangadi	11kV OUT-DOOR YARD EXTENSION FOR ADDITIONAL BAY H-BEAM STRUCTURE	2 feeders	30	30	30	2022-23

14	Tirur	TC Malappuram	110kV Substation, Chelari	11kV OUT-DOOR YARD EXTENSION FOR ADDITIONAL BAY H-BEAM STRUCTURE AND 11kV PANELS	2 feeders	71	71	71	2022-23
15	Tirur	TC Malappuram	110kV Substation, Edappal	11kV OUT-DOOR YARD EXTENSION FOR ADDITIONAL BAY H-BEAM STRUCTURE AND 11kV 17 PANEL SET	4 feeder	125	125	125	2022-23
16	Manjeri	TC Malappuram	220kV Substation, Malaparamba	11kV OUT-DOOR YARD EXTENSION FOR ADDITIONAL BAY H-BEAM STRUCTURE AND 11kV 17 PANEL SET	1 feeder	110	110	110	2022-23
17	Manjeri	TC Malappuram	110kV Substation, Mankada	11kV OUT-DOOR YARD EXTENSION FOR ADDITIONAL BAY H-BEAM STRUCTURE AND 11 kV PANEL	1 feeder	12	12	12	2022-23
18	Tirur	TC Malappuram	33kV Substation, Kalpakanchery	11kV OUT-DOOR YARD EXTENSION FOR ADDITIONAL BAY H-BEAM STRUCTURE	2 feeders	25	25	25	2022-23
19	Tirur	TC Malappuram	33kV Substation, Tirunavaya	ADDITIONAL 33kV FEEDER CIRCUIT BAYS	1 No	25	25	25	2022-23
20	Nilambur	TC Malappuram	33kV SS Wandoor	STANDARDISATION BY REPLACING 33KV AND 11KV OUTDOOR EQUIPMENTS BY INDOOR SWITCH GEAR PANELS	1	335	335	335	2022-23
21	Nilambur	TC Malappuram	110kV SS Edakkara	RENOVATION OF OLD 11KV 10PANEL SET BY NEW 11KV PANEL SET .	1	91	91	91	2022-23
22	Manjeri	TC Malappuram	110kV SS Perinthalmanna	RENOVATION OF 11KV (2000MAKE) SWITCH GEAR 10 PANEL SET BY NEW 11KV 10 PANEL SET BY NEW 11KV 10 PANEL SET.	1	84	84	84	2022-23
23	Manjeri	TC Malappuram	Various SS	REPLACING FAULTY AND OR NONCOMMUNICABLE METERS	53	0.407	21.571	21.57	2022-23
24	Tirur	TC Malappuram	Various SS	REPLACING FAULTY ENERGY METERS OF ALL EHT AND HT FEEDERS OF SUBSTATIONS UNDER TRANSMISSION DIVISION, TIRUR	90	0.407	36.63	36.63	2022-23
								1240.701	
1	Vatakara	TC, Kozhikode	33kV SS Thiruvallur	Construction of 33kV Bay for interlinking 33kV Thiruvallur with 110kV Substation Nadapuram.	1	34	34	34	2023-2024
2	Vatakara	TC, Kozhikode	110kV Substation Chakkittapara	Construction of 33kV Bay for interlinking 33kV s/s Perambra with 110kV Substation Chakkittapara	1	80	80	80	2024-25

3	Vatakara	TC, Kozhikode	33kV SS Perambra	Extension of controll room and installation of feeder panel and Bus coupler		45	45	45	2024-25
4	Kalpatta	TC, Kozhikode	33kV SS MEENANGADY	INSTALLATION OF NEW 11KV INDOOR 10 PANEL SET AT 33kV SS MEENANGADY	1	100.00	100.000	100	2022-2023
5	Kalpatta	TC, Kozhikode	33kV SS PULPALLY	INSTALLATION OF NEW 11KV INDOOR 10 PANEL SET AT 33kV SS PULPALLY	1	100.00	100.000	100	2023-2024
6	Kozhikode	TC, Kozhikode	110kV Substation Koduvalli	INSTALLATION OF NEW 11KV INDOOR 16 PANEL SET AT 110kV SS Koduvalli	1	160.00	160.000	160	2023-2024
								519	
1	Kannur	TC, Kannur	220 kV Kanhirode	New 11kV indoor feeder outlet and asociated works	1	34	34	15	2023-2024
2	Kannur	TC, Kannur	110 kV Thalassery	New 11kV indoor feeder outlet and asociated works	1	80	80	15	2024-25
4	Kannur	TC, Kannur	110kV Panoor	New 11kV indoor feeder outlet and asociated works	2	45	45	30	2024-25
5	Kannur	TC, Kannur	110kV Pinarayi	New 11kV indoor feeder outlet and asociated works	1	100.00	100.000	15	2022-2023
6	Kannur	TC, Kannur	33kV Puthur	New 11kV indoor feeder outlet and asociated works	2	100.00	100.000	30	2023-2024
7	Kannur	TC, Kannur	33kV Dharmadam	New 11kV indoor feeder outlet and asociated works	2	160.00	160.000	30	2023-2024
8	Kannur	TC, Kannur	110kV SS Chovva	New 11kV indoor feeder outlet and asociated works	1			10	
9	Kannur	TC, Kannur	110kV SS Mundayad	New 11kV indoor feeder outlet and asociated works	2	15	45	30	2022
10	Kannur	TC, Kannur	110kV SS Mangad	New 11kV indoor feeder outlet and asociated works	2	15	15	30	2023
11	Kannur	TC, Kannur	33kV Substation Puthiyatheru	New 11kV indoor feeder outlet and asociated works	1	15	15	15	2024
12	Sreekandapuram	TC, Kannur	110kV Iritty	New 11kV indoor feeder outlet and asociated works	6	15	45	90	2024
13	Sreekandapuram	TC, Kannur	33kV Tholambra	New 11kV indoor feeder outlet and asociated works	1	15	60	15	2025

14	Sreekandapuram	TC, Kannur	110kV Mattannur	New 11kV indoor feeder outlet and associated works	3	15	30	45	2025
15	Sreekandapuram	TC, Kannur	110kV Sreekandapuram	New 11kV indoor feeder outlet and associated works	2	15	30	30	2025
16	Sreekandapuram	TC, Kannur	110kV SS Mangad	New 11kV indoor feeder outlet and associated works	1	10	30	15	2023
17	Sreekandapuram	TC, Kannur	220kV SS Taliparmaba	New 11kV indoor feeder outlet and associated works	2	15	75	30	2024
18	Sreekandapuram	TC, Kannur	110kV SS Payyanur	New 11kV indoor feeder outlet and associated works	1	15	30	15	2023
19	Sreekandapuram	TC, Kannur	110kV SS Cherupuzha	New 11kV indoor feeder outlet and associated works	1	15	30	10	2024
20	Sreekandapuram	TC, Kannur	110kV SS Pazhayangadi	New 11kV indoor feeder outlet and associated works	1	15	15	15	2025
21	Sreekandapuram	TC, Kannur	33kV Pariyaram	New 11kV indoor feeder outlet and associated works	3	15	90	45	2023
22	Sreekandapuram	TC, Kannur	33kV SS Alakode	New 11kV indoor feeder outlet and associated works	2	15	15	30	2023
23	Sreekandapuram	TC, Kannur	33kV SS Nadukani	New 11kV indoor feeder outlet and associated works	1	15	45	15	2023
24	Kasaragod	TC, Kannur	110 KV MANJESHWAR	New 11kV indoor feeder outlet and associated works	2	15	30	30	2022
25	Kasaragod	TC, Kannur	110 KV KUBANOOR	New 11kV indoor feeder outlet and associated works	1	15	15	15	2022
26	Kasaragod	TC, Kannur	33 KV ANANTHAPURAM	New 11kV indoor feeder outlet and associated works	1	15	30	15	2023
27	Kasaragod	TC, Kannur	33 KV KASARAGOD TOWN	New 11kV indoor feeder outlet and associated works	1	15	15	15	2023
28	Kasaragod	TC, Kannur	110 KV VIDYANAGAR	New 11kV indoor feeder outlet and associated works	2	10	10	30	2024
29	Kasaragod	TC, Kannur	33 KV BADIADKA	New 11kV indoor feeder outlet and associated works	2	15	15	30	2024

30	Kasaragod	TC, Kannur	220 KV MYLATTY	New 11kV indoor feeder outlet and asociated works	2	15	45	30	2026
31	Kasaragod	TC, Kannur	110 KV CHERUVATHUR SUBSTATION	New 11kV indoor feeder outlet and asociated works	1	15	30	15	2025
32	Kasaragod	TC, Kannur	33 KV NEELESHWARAM	New 11kV indoor feeder outlet and asociated works	1	15	15	15	2025
33	Kasaragod	TC, Kannur	33 KV TRIKARIPUR SUBSTATION	New 11kV indoor feeder outlet and asociated works	1	15	30	15	2022
34	Kasaragod	TC, Kannur	33 KV KANHANGAD TOWN SUBSTATION	New 11kV indoor feeder outlet and asociated works	2	15	15	30	2022
35	Kasaragod	TC, Kannur	33 KV BELUR SUBSTATION	New 11kV indoor feeder outlet and asociated works	1	15	15	15	2023
36	Kasaragod	TC, Kannur	33 KV WEST ELERI SUBSTATION	New 11kV indoor feeder outlet and asociated works	1	15	15	15	2024
37	Kannur	TC, Kannur	110kV Substation Chovva	Replacement of 11kV 10panel set with 20 Panel set	1	15	30	140.2	2024
38	Sreekandapur am	TC, Kannur	110kV Substation Mattannur	Replacement of 11kV 10panel set with new 10 Panel set	1	15	30	60	2024
39	Sreekandapur am	TC, Kannur	110kV Substation Cherupuzha	Replacement of 11kV 10panel set with 13 Panel set	1	15	30	73.5	2025
40	Kasaragod	TC, Kannur	220kV Substation Mylatty	Replacement of 11kV 15panel set with 20 Panel set	1	15	15	160	2024
								1278.7	2024
									2025
								7490.30	

**Modernisation: Proposed New 66 KV or 33 KV Line**

Sl. No.	Ele Circle	Trans Circle/Division	Name of Source Sub-Station	Name of Destination Sub-Station	Line type	Total Length (Ckt. Kms)/Quantity	No. of bay (If required) at source SS	Rate	Amount	Estimated Amount	Remarks	Priority of work	Targetted year
1	EC Kattakada	TC Thiruvananthapuram	110 kV Substation, Kilimanoor	33 kV Substation, Kallara	constructing 12 km long 33 kV OH line with covered conductor from 110 kV Substation, Kilimanoor to 33 Kv Substation Kallara	12			1326.34	1326.34	Deducted Right of way of 0.8 lakhs Revised amount – 1326.34 (1327.14-0.8)		23-24
2	EC Kattakada	TC Thiruvananthapuram	110 kV Substation, Kattakkada	33 Kv Substation Ottasekharamangalam	Construction of 12km 33kv line from 110 kV Substation Kattakkada to 33 kV substation Ottasekharamangalam				600	600	Deducted Tree cutting amount of 50 lakhs – Revised amount – 600 lakhs ( 650-50)		23-24
3	EC Thiruvananthapuram	TC Thiruvananthapuram	110 kV Substation, Attingal	33 kV Substation, Chirayinkeezh	Laying 13 km 33 kV UG Cable from 110kV Substation, Attingal to proposed 33kv Substation Chirayinkeezh	13	1		639.97	639.97	Deducted Road cutting restoration charge of 400 lakhs – Revised amount – 639.97 lakhs (1039.97 – 400)	62	24-25
4	EC Thiruvananthapuram	TC Thiruvananthapuram	110 kV Substation, Kazhakuttom	33 kV Substation, Menamkulam	laying 5 km 33 kV UG Cable from 110kV Substation, Kazhakuttom to Menamkulam	5	1		440	440	Deducted restroation charge of 10 lakhs – Revised amount – 440 lakhs ( 450-10)	64	24-25
5	EC Thiruvananthapuram	TC Thiruvananthapuram	110 kV Substation, Kazhakuttom	33 kV Substation, Thonnakkal	Laying 12 km 3x300 sqmm 33kv UG Cable from 33 kV Substation, Menamkulam to Thonnakkal and 13 km from Thonnakkal to Chirayinkeezh	25	2		830	830	Deducted restroation charge of 250 lakhs – Revised amount – 830 lakhs ( 1080-250)	58	23-24
										<b>3836.31</b>			
1	Kollam	TC Kottarakkara/Kundara Division	PARIPPALLY 110KV S/S	PARAVOOR 33KV S/S	LAYING 33KV UG CABLE FOR INTERLINKING PARAVOOR 33KV S/S WITH PARIPPALLY 110KV S/S	9.5	1		577	577	For interlinking Paravoor 33kv S/s and Parippally 110kv S/s	14	22-23
2	Kollam	TC Kottarakkara/Kundara Division	AYATHIL 110KV S/S	PEROOR 33KV (PROPOSED)	LAYING 33KV UG CABLE TO THE PROPOSED PEROOR 33KV S/S	7	1		650	650	Peroor 33kv S/S is proposed in RDSS	15	23-24

3	Kollam	TC Kottarakkara/ Kundara Division	KANANALLO OR 33KV S/S	PEROOR 33KV (PROPOSED)	LAYING 33KV UG CABLE FROM KANANALLOOR 33KV S/S TO THE PROPOSED PEROOR 33KV S/S	5	1		380	380	Interlinking Kannanalloor and Peroor 33kv S/s	16	23-24
4	Kollam	TC Kottarakkara/ Kundara Division	SATHAMCOT TA 110kV S/s	PUTHOOR 33KV	33kv 120 sq.mm Covered conductor with A pole	15	1		740	740	Enhancement of Sasthamcottta is under Transgrid	17	24-25
5	Kottarakkara	TC Kottarakkara/ Punalur Divison	AYOOR 110kV S/s	POOYAPPALLY 33KV	33kv 120 sq.mm Covered conductor with A pole	15	1		740	740	Augumentation works at Ayoor is proposed in RDSS	18	24-25
6	Kottarakkara	TC Kottarakkara/ Punalur Divison	AYOOR 110kV S/s	VALAKOM 33KV	33kv 120 sq.mm Covered conductor with A pole	12	1		740	740		19	24-25
7	Kottarakkara	TC Kottarakkara/ Punalur Divison	VALAKOM 33kv	CHENGAMANA D 33KV	33kv 120 sq.mm Covered conductor with A pole	10	1		560	560	New 33kv S/s at Valakom is proposed in RDSS	20	23-24
										4387			
1	Haripad	TC Alappuzha	110kV Substtion, Kattanam ( New)	33kv Substation, Vallikunnam	33 KV LINE WITH COVERED CONDUCTOR ON EXISTING APOLE/LATTICE TOWER	9	0		450	450		6	2024-25
2	Alappuzha	TC Alappuzha	110 kV Substation, Edathuva	33kv Substation, Thakazhy	33 KV LINE ON COVERED CONDUCTOR	10	1	LS	620	620	Alternate feeder	2	2022-23
3	Haripad / pathanamthit ta	TC Alappuzha	33kv substation Mannar	33kv substation, Kadapra	Construction of 7.0km, 33 kV S/C OH Line with covered conductor from 33kv substation Mannar to 33kv substation, Kadapra	7	2		520	520		7	2024-25
										1590			
1	Kottayam	TC Poovanthuruthu	110 kV Substation, Erumeli	Manimala 33 kV SS	Construction of 33kv line Over Head 10.5Km line using covered conductor to Manimala substation and to facilitate double 33 kV feeding to Manimala substation	10.5	1		424	424		3	2023-24

2	Kottayam	TC Poovanthuruthu	33 kV SS Vakathanam	33 kV SS Karukachal	Interconnecting 33kV Substation Karukachal & 33kV substation Vakathanam	10	1		410	410		2	2024-25
3	Pala	TC Poovanthuruthu	110 kV Substation, Koothattukulam	33 kV Substation, Ramapuram	Alternate feeding to Ramapuram Substation using covered conductor	10			400	400			
4	Pala	TC Poovanthuruthu	110 kV Substation, Pala	33 kV Substation, Paika	Reconductoring pala - Paika 33 kV line using covered conductor	8			300	300			2023-24
5	Pala	TC Poovanthuruthu	110kV Substation Pala	33 kV Substation Kidangoor	Reconductoring pala - Kidangoor 33 kV line using covered conductor	9.5			356.25	356.25		1	2023-24
6	Pala	TC Poovanthuruthu	110kV Substation Pala	33 kV substation ramapuram	Reconductoring pala - Ramapuram 33 kV line using covered conductor	12			450	450		2	2023-24
7	Kottayam	TC Poovanthuruthu	110 kV Substation, Ettumanoor /Gandhinagar	33 kV Substation, Kallara/ Kidangoor	Alternate feeding to Kidangoor and Kallara Substation Substation using covered conductor	20			900	900			
8	Pala	TC Poovanthuruthu	110 kV SS Erattupetta	33 kV SS Pinnakkanadu	Construction of 33 kV lines for the proposed 33 kV Substation at Pinnakkanadu including bay work at 110 kV SS Erattupetta and 33 kV line to Paika	8.8	1		672	672		1	2023-24
									3912.25				
1	Pathanamthitta	TD, Pathanamthitta	110 kV Substation, Edathua	33KV SUBSTATION MEPRAL	33 KV LINE ON LATTICE STRUCTURE WITH COVERED CONDUCTOR	11	1	550	550	550		6	22-24
2	Pathanamthitta	TD, Pathanamthitta	110kV Substation Thrikkodithanam	33 kV Kunnnanthanam	34 KV LINE ON LATTICE STRUCTURE WITH COVERED CONDUCTOR	8	1	515	515	515		7	22-24
									1065				
1		TC Thodupuzha	110kV S/s Kuthumkal	33kV s/s Udumbanchola	33kV Line from 110kV Substation, Kuthumkal to proposed 33kV Substation, Udumbanchola ACSR OH	3	2	100		300		1	31.09.2022



2		TC Thodupuzha	33kV S/s Vandanmedu	33kV S/s Kumily	Interconnection between 33kV Substation, Vandanmedu & 33kV Substation, Kumily	24	1			690		2	31.12.2023
3		TC Thodupuzha	66kV S/s Kattappana	33kV S/s Vandanmedu	Inerlinking between 66kV S/s Kattappana and 33kV S/s Vandanmedu	10	1			250		3	31.09.2024
4		TC Thodupuzha	66kV S/s Kattappana	33kV S/s Upputhura	Interconnection between proposed 33kV Bay of 66kV Substation, Kattappana & 33kV Substation, Upputhara	20	1			576		8	31.09.2023
5		TC Thodupuzha	33 kV Kurupampady	33 kV Vengoor	33kV Interlinking between 33 kV Substation Kurupampady to 33 kV Substation Vengoor using 3x300 mm2 XLPE Cable	8	1	62		496		4	31.09.2023
6		TC Thodupuzha	110 kV Keezhillam	33 kV Vengola	33kV Interlinking between 110kV Substation Keezhillam and 33kV Substation Vengola using 3x300 mm2 XLPE Cable	5	1			310		5	31.09.2024
7		TC Thodupuzha	110kV S/s Myloor	33kV S/s Kalloorkkadu	Interlinking of 33kV Substation Kalloorkkad to 33kV Substation Vannappuram by drawing 23km 33kV SC line	23	2	852	852	852		6	31.12.2024
8		TC Thodupuzha	33kV S/s Koovappady	33kV S/s vengoor	33kV Interlinking between 33kV Substation Koovappady and 33kV Substation Vengoor using 3x300 mm2 XLPE Cable	8	1		546	546		7	31.12.2023
										4020			
1	Perumbavoor	TC Kalamassery	110kV S/s Edathala	33 kV SS, Chowara	Laying 6 km 3Cx300,33kV Single circuit UG cable feeder from 110kV SS Edathala to Proposed 33kV GIS Substation at Chowara remote area (Edathala SS)	6	1	60	360	360			2024-25

2	Perumbavoor	TC Kalamassery	220kV SS Aluva	33 kV SS, Chowara	Laying 6 km 3Cx300, 33kV Single circuit UG cable feeder from 220kV SS Aluva to the proposed 33kV Outdoor substation at Chowara Aluva	6	1	60	360	360			2024-25
3	Ernakulam	TC Kalamassery	110kV SS Edappally	33kV GIS Substation at Industrial Estate	Laying 3 km 3Cx300, 33kV Double Circuit UG cable feeder from 110kV SS Edappally to Proposed 33kV GIS Substation at Industrial Estate Kalamassery	6	1	60	240	360			2024-25
4	Ernakulam	TC Kalamassery	110kV Mannam	33kV Alangad	Rerouting existing 33kV Alangad Fdr by providing 33 kV UG cable from 110 kV Mannam Sustation to 33 kV Alangad s/s through PWD and Panchayath Road	7.1		63.5	451	451			2024-25
5	Ernakulam	TC Kalamassery	110kV Mannam	33kV Varappuzha	Replacing existing 33kV Varappuzha Fdr by providing 33 kV covered conductor from 110 kV Mannam Sustation to 33 kV Varappuzha s/s	9		63.5	572	572			2024-25
6	Ernakulam	TC Kalamassery	33kV Alangad	33kV Varappuzha	Interlinking Alangad and Varappuzha Substation using 33kVUG Cable	9.5		63.5	603	603			2024-25
7	Ernakulam	TC Kalamassery	110kV Edayar	33kV Alangad	Construction of alternate 33 kV Feeder from 110 kV Edayar Substation to 33 kV Alangad s/s	9.5	1	63.5	603	603			2024-25
8	Ernakulam	TC Kalamassery	110kV N Paravur	33kV Vadakkekara	Rerouting existing 33kV Alangad Fdr by providing 33 kV UG cable from 110 kV Mannam Sustation to 33 kV Alangad s/s through PWD and Panchayath Road	9.7		33.18	323	323			2024-25
9	Ernakulam	TC Kalamassery	110kV Kodungallur	33kV Vadakkekara	Construction of alternate 33 kV Feeder from 110 kV Kodungallur Substation to 33 kV Vadakkekara s/s	9.85	1	33.18	327	327			2024-25

10	Ernakulam	TC Kalamassery	220kV GIS ss Kaloor	33kV GIS Substation, Palarivattom	3x400 sqmm XLPE cable(3*300 SqmmXLPE Cable) DC UG cable	5	2	60	300	300	1		2024-25
										4259			
1	Irinjalakuda	TC Thrissur // Irinjalakuda	110KV Kodugallur	33 KV Methala	33 KV Single Circuit Covered Conductor			6.6	1+1	205		1	22-23
2	Irinjalakuda	TC Thrissur // Chalakudy	110 KV S/S Mala	33 KV S/S Annamanada	33 KV Single Circuit line Covered Conductor			6.5	1+1	355		2	22-23
3	Thrissur	TC Thrissur // Irinjalakuda	110 KV S/S Kadassankadavu	33 KV S/S Vadanapilly	33kV Alternate feeder from another S/s to the existing 33/11kV S/s			4.26	1+1	406	Providing new 11kV Feeder outlets from Kaloor Substation is not possible in future .So it is better to construct a 33kV GIS Substation at Palarivattom for taking 11kV feeders . Land available	3	22-23
4	Thrissur	TC Thrissur // Thrissur	110 KV S/S Mannuthy	33 KV S/S Pattikkad	33kV Alternate feeder from another S/s to the existing 33/11kV S/s			14	1+1	490		4	23-24
5	Thrissur	TC Thrissur // Thrissur	110 KV S/S Punnayurkulam	33 KV S/S Kongannur	33kV Alternate feeder from another S/s to the existing 33/11kV S/s			15	1+1	695		5	24-25
6	Thrissur	TC Thrissur // Thrissur	110 KV S/S Wadakkanchery	33 KV S/S Poomala	33kV Alternate feeder from another S/s to the existing 33/11kV S/s			13	1+1	690		6	23-24
7	Thrissur	TC Thrissur // Thrissur	110 KV S/S Kunnamkulam	33 KV S/S Erumapetty	33kV Alternate feeder from another S/s to the existing 33/11kV S/s			14	1+1	900		7	24-25
8	Thrissur	TC Thrissur // Thrissur	110 KV S/S Mannuthy	33 KV S/S Puthur	33kV Alternate feeder from another S/s to the existing 33/11kV S/s			11	1+1	450		8	24-25
										4191			
1	EC Palakkad	TC Palakkad/ TD Palakkad			Alternate feeding to 33kV Substation Vydhuthibhavanam	2	1			50.00	2nd feeder supply to Vydhuthibhavanam	1	2022-23

2	EC Shoranur	TC Palakkad/ TD Shoranur	110kV Substation, Cherpulasser y	33kV Substation, Sreekrishnapur am	Construction of 11 km 33kV Single circuit Feeder OH line ACSR Dog conductor from 110 kV substation Cherpulaser y to Existing 33 kV substation Sreekrishnapuram.	11	Already included in Substatio n			245.97	Alternate supply to 33 kV substation Sreekrishnapuram.	2	2022-23
3	EC Palakkad	TC Palakkad/ TD Palakkad	110kV Substation Walayar	33kV Velanthavalam Substation	10 km 33 kV SC line with ACSR DOG conductor using A type poles.	10	2			235.00	Alternate supply to 33 kV substation Velanthavalam.	7	2022-24
4	EC Palakkad	TC Palakkad/ TD Chittur	110kV Nemmara	33kV Alathur	33 KV LINE ON VARIOUS TYPES OF POLES WITH DOG CONDUCTOR	12	1			270.00	Alternate supply to 33 kV substation Alathur.	8	2022-25
5	EC Palakkad	TC Palakkad/ TD Chittur	110kV Nemmara	33kV Chittadi	33 KV LINE ON VARIOUS TYPES OF POLES WITH DOG CONDUCTOR	15	1			335.00	Alternate supply to 33 kV substation Chittadi.	9	2022-25
6	EC Palakkad	TC Palakkad/ TD Chittur	110kV Chittur	33kV Thathamagala m	33 KV LINE ON VARIOUS TYPES OF POLES WITH DOG CONDUCTOR	11	1			250.00	Supply to 33 kV substation Tattamangalam.	10	2023-25
7	EC Palakkad	TC Palakkad/ TD Chittur	33KV Alathur Substation	33kV Koduvayoor	Interlinking 33KV Alathur and Koduvayoor Substations	13	1			290.00	Alternate supply to 33 kV substation Koduvayur.	11	2023-25
8	EC Palakkad	TC Palakkad/ TD Chittur	110kV Chittur	33kV Meenakshipura m	33 KV LINE ON VARIOUS TYPES OF POLES WITH DOG CONDUCTOR	14	1			320.00	Alternate supply to 33 kV substation Meenakshipuram	12	2023-26
9	EC Palakkad	TC Palakkad/ TD Chittur	33 KV Meenakshipu ram	33kV Muthalamada	33 KV LINE ON VARIOUS TYPES OF POLES WITH DOG CONDUCTOR	8.5	1			190.00	Alternate supply to 33 kV substation Muthalamada.	13	2023-26
10	EC Palakkad	TC Palakkad/ TD Chittur	110KV Chittur	33kV Vannamada	33 KV LINE ON VARIOUS TYPES OF POLES WITH DOG CONDUCTOR for providing back feeding to Vannamada 33KV S/S	16	1			360.00	Presently Vannamada 33 KV S/S is fed from 110KV S/S Kozhinjampara and no other back feeding facility is available now	14	2023-26
11	EC Shoranur	TC Palakkad/ TD Palakkad	110kV Substation Vattalakki	33kV substation Agali	33kV Single circuit OH line	15	1			335.00	This is possible only after the construction of 110KV Vattalakki Substation	15	2024-26
12	EC Shoranur	TC Palakkad/ TD Palakkad	110 kV substation Mannarkkad	33kV SS Mukkali	33kV Single circuit line	0.1	Nil			1.85	Supply to 33 kV substation Mukkali.	6	2023-25

13	EC Palakkad	TC Palakkad/ TD Palakkad	33 kV substation Kongad	33kV Substation Kadampazhipp uram	33kV Single circuit line	1.4	Nil			26.00	Supply to 33 kV substation Kadampazhippuram	5	2023-25
										2908.82			
1	Tirur	TC Malappuram	Tap point of Chelari - Kizhissery 33kV line	33kV Substation, Kunnumpuram	33 KV LINE ON RSJ POLES WITH DOG CONDUCTOR	10	No	310	310	310	Work proposed for providing new 33kV Substation at Kunnumpuram	16	2022-23
2	Tirur	TC Malappuram	33kV Substation, Kunnumpura m	33kV Substation, Kooriyad	33 KV LINE ON RSJ POLES WITH DOG CONDUCTOR	6	No	231	231	231	Work proposed for alternate feeding to 33kV Substation, Kooriyad	16	2022-23
3	Tirur	TC Malappuram	33kV Substation, Tavanur	110kV Substation, Edappal	33 KV LINE ON RSJ POLES WITH DOG CONDUCTOR	10	1 Bay	290	290	290	Work proposed for alternate feeding to 33kV Substation, Tavanur	23	2022-23
4	Nilambur	TC Malappuram	110kV Substation, Melattur	33kV Substation, Karuvarakundu	33 KV LINE ON RSJ POLES WITH ACSR DOG CONDUCTOR	14	1	494.00	494	494	Construction of 33kV SC line from Melattur SS to 33kV SS Karuvarakundu	22	2023-24
5	Nilambur	TC Malappuram	110 kV SS Thiruvaly	33kV Substation, Edavanna	33 KV LINE ON RSJ POLES WITH DOG CONDUCTOR	1.5	1	49	49	49	Construction of 33kV DC line from Thiruvaly to Edavanna line	29	2023-24
6	Nilambur	TC Malappuram	33kV Substation, Kalikavu	33kV Substation, Karuvarakundu	33 KV LINE ON RSJ POLES WITH Covered CONDUCTOR	11	1	484	484	484	Construction of 33kV SC line between 33kV Kalikavu & Karuvarakundu substation.	22	2023-24
7	Manjeri	TC Malappuram	110kV Substation, Chelari and Kizhissery	33kV Substation, Kondotty	UG cable	2.5x2	1	445	445	445	Manjeri	20	2023-24
8	Manjeri	TC Malappuram	110kV Substation malappuram	33kV Substation, Othukkungal	33 KV LINE ON RSJ POLES WITH Covered CONDUCTOR	10	1	600	600	600	Construction of 33kV SC line	17	2023-24
										2903			

1	Kozhikode	TC, Kozhikode	220kV Substation Nallalam	Proposed 33kV containarised substation Beypore	33kV cable feeders from 220kV SS Nallalam and 33kV SS Feroke to proposed 33kV containarized SS at Beypore	13	1		850	850		1	2023-2024
2	Vatakara	TC, Kozhikode	110KV Substation Kinalur/ Nadapuram/ Chakkittapara	33KV Substation Balussery, Thiruvallur and Perambra	Alternate feeding to nn kV Substations Balussery, Thiruvallur and Perambra using covered conductor/UG cable	30	Transformer Bay - 1 Feeder Bay - 1		1871	1871	1871	8	2024-2025
3	Kozhikode	TC, Kozhikode	Agasthyamuzhy	Nellikaparamba	3x300 sqmm XLPE cable/covered conductor	13	1	60.3	784	734	For new 33kV ss Nellikaparamba	2	2022-2023
4	Kozhikode	TC, Kozhikode	Thambalamanna	Urumi	3x300 sqmm XLPE cable	7	1	66.7	467	417		3	2023-2024
5	Kalpatta	TC, Kozhikode	110/33/11kV SS Anjukunnu	33kV SS Vellamunda	33kV Covered Conductor	18	1	1100	1100	1089	33kV UG Cable	4	2023-2024
										4961			
1	Kannur	TC, Kannur	10kV Substation, Azhikode	Proposed 33kVPappinisseriy	33kV XLPE UG cable	0.25	-		20	20	For new 33kV Substation	1	2023
2	reekandapuram	TC, Kannur	220kV Substation Taliparamba	33kV Substation Kurumathur	33kV covered conductor	15	-	65		975	For new 33kV Substation	3	2024
3	reekandapuram	TC, Kannur	110kV Substation, Payyanur	33kV Substaion, Payyanur Town	33kV XLPE UG cable	5.5	1	70	413	385	Alternate feeder	6	2025
4	reekandapuram	TC, Kannur	110kV Substation, Cherupuzha	33kV Substation, Alakode	33kV XLPE UG cable/covered conductor	18	1	70	1350	1260	Alternate feeder	8	2025
5	Kasaragod	TC, Kannur	220kV SS Solar Ambalathara	33kVSS Belur	33kV SC line using Covered conductor+ 2km UG	12	2		750	750	Alternate feeder	1	2024
6	Kasaragod	TC, Kannur	110kV SS Cherupuzha	33kV SS West Eleri	33kV SC line using Covered conductor	17	2		1000	1000	Alternate feeder	7	2025
										4390			
										<b>42423.38</b>			

Modernisation: Proposed Augmentation of 33KV LINE															
Sl. No.	Ele. Circle	Trans. Circle/Division	Existing Load in overload Section (In MW)	Section Start From	Section Upto	Length (in Kms.)	Existing Conductor	Total Length of Existing (Ckt. Kms)/Quantity	Renovated Conductor	Total Length of Proposal (Ckt. Kms)/Quantity	Rate	Amount	Remarks	Priority of work	Targetted year
1	EC Kattakada	TRIVANDRUM/KAZ HAKUTTOM		110kV S/s Kilimanoor	33kV S/s Kadakkal		DOG	9.5	Reconductoring the existing OH line from Kilimanoor Substation to Kadakkal using 120sqmm 33kV Covered conductor	9.5	13	123.5			22-23
2	EC Kattakada	TRIVANDRUM/TRIVANDRUM		110 KV Substation,Parassala	33 kV Sub station, Vellarada		DOG	15	Reconductoring 33kV OH with covered conductor from 110kV Substation Parassala to 33 kV Substation, Vellarada	15	13	195			22-23
3	EC Kattakada	TRIVANDRUM/TRIVANDRUM		110 KV Substation,Parassala	33 kV S/s Poovar			15	33kV 3PRPV line strengthening – Parassala Substation to Poovar substation	15	13	195			22-23
4	EC Kattakada	TRIVANDRUM/KAZ HAKUTTOM		110kV Substation Nedumangad	33 kV Substaiton, Aryanad			11	Reconductoring 33kV OH with covered conductor from 110kV Substation Nedumangad to 33 kV Substation, Aryanad	11	13	143			25-26
5	EC Kattakada	TRIVANDRUM/KAZ HAKUTTOM		110kV Substation Nedumangad	33 kV Substaiton, Chullimanoor			12	Reconductoring 33kV OH with covered conductor from 110kV Substation Nedumangad to 33 kV Substation, Chullimanoor	12	13	156			22-23
6	EC Kattakada	TRIVANDRUM/KAZ HAKUTTOM		110kV Substation Nedumangad	33 kV Substaiton, Vithura			8	Reconductoring 33kV OH with covered conductor from 110kV Substation Nedumangad to 33 kV Substation, Vithura	8	13	104			22-23
7	EC Trivandrum	TRIVANDRUM/KAZ HAKUTTOM		110 KV Substation,Kilimanoor	33 kV Substation, Kallambalam			15	Reconductoring the existing OH line from 110kV Kilimanoor Substation to 33 kV Substation Kallambalam using 120sqmm 33kV Covered conductor	15	13	195			22-23
	EC Kattakada	TRIVANDRUM/KAZ HAKUTTOM		110kV Substation Attingal	33kV Substation Venjaramood			10.5	Reconductoring 33kV OH with covered conductor from 110kV Substation Attingal to 33 kV Substation, Venjaramood	10.5	13	136.5			22-23
									<b>Total</b>			<b>1248</b>			

1	Kottarakkara	Kottarakkara/Punalur		110kV S/s Ambalapuram	33kV S/s Ezhukone	5km	DOG	5	Reconductoring with 33kV 120 sq.mm Covered conductor and additional A pole	5	56	280			22-23
2	Kottarakkara	Kottarakkara/Punalur		110kV S/s Ambalapuram	33kV S/s Chengamanad	13km	DOG	13	Reconductoring with 33kV 120 sq.mm Covered conductor and additional A pole	13	56	728			22-23
3	Kottarakkara	Kottarakkara/Punalur		110kV S/s Ambalapuram	33kV S/s Poyappally	11km	DOG	11	Reconductoring with 33kV 120 sq.mm Covered conductor and additional A pole	11	56	616			22-23
4	Kottarakkara	Kottarakkara/Punalur		110kV S/s Ambalapuram	33kV S/s Puthoor	10.5km	DOG	10.5	Reconductoring with 33kV 120 sq.mm Covered conductor and additional A pole	10.5	56	588			22-23
5	Kottarakkara	Kottarakkara/Kundara		110kV S/s Kottiyam	33kV S/s Kannanalloor	6.5km	DOG	6.5	Reconductoring with 33kV 120 sq.mm Covered conductor and additional A pole	6.5	37	240.5			22-23
6	Kottarakkara	Kottarakkara/Kundara		110kV S/s Kottiyam	33kV S/s Adichanalloor	9.85km	DOG	9.85	Reconductoring with 33kV 120 sq.mm Covered conductor and additional A pole	9.85	30	295.5			22-23
												2748			
1	Alappuzha	Alappuzha		Thycattusery	Kuthiyathode		DOG	6.5	33 kV line, Covered conductor	7	LS	800	DC Feeder	1	2022-23
2	Alappuzha	Alappuzha		Punnapra	Thakazhy		DOG	11.3	33 kV line, Covered conductor	11.3	LS	600	SC Feeder	2	24-25
												1400			
1	Pathanamthitta	TD, PATHANAMTHITTA		110kV substation, Ranni	Mukkam	10.5	ACSR DOG	10.5	33kV line Re-Conductoring with ACSR Covered conductor 99Sqmm	10.5	35	367.5	SC Feeder	1	22-23
2	Pathanamthitta	TD, PATHANAMTHITTA		110kV substation, Edathua	33kV Substation, Kadapra	9.2	ACSR DOG	9.2	33kV line Re-Conductoring with ACSR Covered conductor 99Sqmm	9.2	35	322	SC Feeder	2	22-23
3	Pathanamthitta	TD, PATHANAMTHITTA		110kV substation, Mallappally	33kV substation, Kumbanad	9.56	ACSR DOG	9.56	33kV line Re-Conductoring with ACSR Covered conductor 99Sqmm	9.56	35	334.6	SC Feeder	3	23 - 24
4	Pathanamthitta	TD, PATHANAMTHITTA		110kV substation, Pathanamthitta	33kV Substation, Ranni-Perunad	16.5	ACSR DOG	16.5	33kV line Re-Conductoring with ACSR Covered conductor 99Sqmm	16.5	35	577.5	SC Feeder	4	23 - 24
												1601.6			



1	EC Perumbavoor	Tr.Circle Thodupuzha		110V Substation Perumbavoor	33 kV Substation Kuruppampady		DOG		Reconductoring the existing OH line from Perumbavoor Substation to 33 kV S/s Kuruppampady using 120sqmm 33kV Covered conductor the existing OH line from Perumbavoor Substation to 33 kV S/s Kuruppampady	7.5	24.8	186			
2	EC Perumbavoor	Tr.Circle Thodupuzha		110V Substation Perumbavoor	33kV Substation Kuruppampady		DOG		Replacement of psc pole with A pole the existing OH line from Perumbavoor Substation to 33 kV S/s Kuruppampady	125	0.351	44			
3	EC Perumbavoor	Tr.Circle Thodupuzha		110V Substation Muvattupuzha	33 kV Substation Kallorkkad		DOG		Reconductoring the existing OH line from Muvattupuzha Substation to 33 kV S/s Kallorkkad using 120sqmm 33kV Covered conductor	14.5	24.8	360			
4	Thodupuzha	TD TDPA		66kV Substation, Nedumkandam	33kV Substation, Vandanmedu	21 Kms	DOG	21 Kms	33kV UG Cable	21 Kms	62	1302			2023-24
												1891.475			
1	Thrissur	TC Thrissur // Thrissur		110 KV S/S Guruvayur	33kV S/S Chavakkad and to 33 KV S/S Blangad	12 KM	ACSR DOG	12	Covered conductor	12	485	485	Very old line	1	24-25
2	Irinjalakuda	TC Thrissur // Irinjalakuda		110 KV Irinjalakuda S/S	33 KV S/S Parapookkara	23km DC	ACSR DOG	23km DC	Changing old tower		523.55	523.55	Very old tower	2	24-25
3	Irinjalakuda	TC Thrissur // Irinjalakuda		110 KV Valappad	33 KV Anchangadi	11km SC	ACSR DOG	11km SC	Changing old tower		200	200	Very old tower	3	24-25
												1208.55			
1	Nilambur	TC, Malappuram		110kV Substation, Nilambur	33kV Substation, Pothukallu	1.5	Dog	1.5	33kV DC line with DOG conductor	1.5	97	97	Conversion of 33kV SC to 33kV DC from Muttiyal to Adyanpara and providing control at Adyanpara using RMU	43	2024-25

2	Nilambur	TC, Malappuram		33kV Substation, Wandoor	33kV Substation, Pookkottumpadam	10	Dog	10	33kV DC line with DOG conductor	10	203	203	Conversion of 33kV SC line (Wandoor-Kalikavu-Pookkottumpadam tap) to 33kV DC using 14m A poles and lattice poles.	46	2023-24
3	Tirur	TC, Malappuram		110kV Edarikkode Substation	33kV Kooriyad Substation	7 km SC line	ACSR DOG	7	33kV DC line with DOG conductor	7 km SC line	200	200	Work proposed for improving incomer capacity of 33kV Kooriyad Substation for improving voltage profile and sale of power.	32	2023-24
4	Tirur	TC, Malappuram		Vairamkode	33kV Tirunavaya Substation	3.6 km SC line	ACSR DOG	3.6	33kV DC line with DOG conductor	3.6 km SC line	95	95	Work proposed for improving incomer capacity of 33kV Tirunavaya Substation for improving voltage profile and for enabling capacity enhancement.	34	2023-24
5	Nilambur	TC, Malappuram		110kV SS Melattur	33kV SS, Wandoor	19km	ACSR Dog	19	ACSR Dog Conductor	19	513	513	Standardisation of 33kV Melattur- Wandoor line by replacing existing PSC poles	47	2024-25
6	Manjeri	TC, Malappuram		110kV SS, Kizhissery	33kV SS, Valluvambram	16	ACSR Dog	16	ACSR Dog Conductor	16	319	319	Standardisation of 33kV Single circuit to line to Double circuit Line. 33kV Feeder. 110 KV SS Kizhissery to 33kV SS Valluvambram	48	2024-25
7	Nilambur	TC, Malappuram		33kV Substation, Edavanna	33kV Substation, Wandoor	13.5km	ACSR Dog	13.5	ACSR Dog Conductor	13.5	290	290	Standardisation of 33kV Edavanna- Wandoor line by replacing existing PSC poles	49	2024-25

8	Nilambur	TC, Malappuram		110kV SSNilambur	Akambadam Jn	1	ACSR Doig	1	UG Cable	1	120	120	Reconductoring of 33kV line from Nilambur to Akampadam junction ( Nilambur-Adyanpara line) with UG cable	53	2024-25
				Nilambur	1223							1837			
1	Kasaragod	TC Kannur		110kV Substation Mulleriya	33kV Substation Badiyadkka	ckm	ACSR DOG	12.5	33KV line, Covered conductor	12.5	65	812.5	Replacing psc poles with lattice/A pole included	1	2024
2	Kannur	TC Kannur		110kV Substation Panoor	110kV Substation Puthur	ckm	ACSR DOG	7.2	33KV line, Covered conductor	7.2	65	468	Changing 9m PSC Poles with A poles and Lattice	2	2024
3		TC Kannur		110kV Substation Mundayad	33kV Substation Puthiya theru	ckm	ACSR DOG	6.5	33KV line, Covered conductor	6.5	65	422.5	Changing 9m PSC Poles with A poles and Lattice	3	2024
4		TC Kannur		110kV Substation Azhikode	33kV Substation Kannur Town	ckm	ACSR DOG	8	33KV line, Covered conductor	8	65	520	Changing 9m PSC Poles with A poles and Lattice	5	2025
												2223			
1	Vatakara	Kozhikode		110kV Substation Meppayur	33kV Substation Meladi	9.6	ACSR DOG	9.6	33kV Covered conductor	9.6	62.5	600			
2	Vatakara	Kozhikode		110kV Substation Quilandi	33kV Substation Balussery	12	ACSR DOG	12	33kV Covered conductor	12	62.5	750			
3	Kozhikode	Kozhikode		33kV Substation Kinfra Chelari	33kV Substation Ramanattukara	7	ACSR DOG	7	33 kv UG Cable	7	89.28	625			
												1975			
												16132.63			

Modernisation: Proposed Augmentation of /Renovation of 11KV or 22KV Line															
Sl. No.	Elec. Circle	Trans. Circle /Division	Name of Emanating Sub-Station	Type (11kv/22KV)	Name of New Feeder	From Location	To Location	Line type	Total Length Proposed (Ckt. Kms)/Quantity	No. of bay (if required)	Rate	Amount	Priority	Target date	Remarks
1	Ele Circle Kottayam	T C Poovanthuruth	66 Kv ss Kottayam	11 kv	Details will be furnished by Distribution Wing					1	10	10		2023-24	
2	Ele Circle Kottayam	T C Poovanthuruth	Kodimatha	11 kv	Details will be furnished by Distribution Wing					1	15	15		2022-23	
3	Ele Circle Kottayam	T C Poovanthuruth	Ettumanur	11 kv	Details will be furnished by Distribution Wing					1	13	13		2023-24	
4	Ele Circle Pala	T C Poovanthuruth	Mundakkayam	11 kv						1	15	15		2022-23	
5	Ele Circle Pala	T C Poovanthuruth	Erattupetta	11 kv	Details will be furnished by Distribution Wing					1	13	13		2022-23	
6	Ele Circle Kottayam	T C Poovanthuruth	33 kv Vakathanam	11 kv	Details will be furnished by Distribution Wing					1	17	17		2023-24	
7	Ele Circle Kottayam	T C Poovanthuruth	33 kv Kaduthuruthy	11 kv	Details will be furnished by Distribution Wing					1	20	20		2022-23	
8	Ele Circle Pala	T C Poovanthuruth	33 kv SS Paika	11 kv	Details will be furnished by Distribution Wing					1	15	15		2025-26	
9	Ele Circle Kottayam	T C Poovanthuruth	Thrikkodithanam	11 kv	Details will be furnished by Distribution Wing					1	15	15		2022-23	
10	Ele Circle Pala	T C Poovanthuruth	Koothattukulm	11 kv	Details will be furnished by Distribution Wing					1	21	21		2022-23	
11	Ele Circle Pala	T C Poovanthuruth	Pampady	11 kv	Details will be furnished by Distribution Wing					1	12	12		2023-24	
												166			
1	Pathanamthitta	TD, Pathanamthitta	110kv Substation, Kozhenchery	11kv	Details will be furnished by Distribution Wing					3	8	24	2	22-23	
2	Pathanamthitta	TD, Pathanamthitta	110kv Substation, Koodal	11kv	Details will be furnished by Distribution Wing					1	8	8	13	22-23	
3	Pathanamthitta	TD, Pathanamthitta	110kv Substation, Thiruvalla	11kv	Details will be furnished by Distribution Wing					2	8	16	5	22-23	

4	Pathanamthitta	TD, Pathanamthitta	110kV Substation, Pathanamthitta	11kV	Details will be furnished by Distribution Wing					2	8	16	8	22-23	
5	Pathanamthitta	TD, Pathanamthitta	66kV Substation, Enathu	11kV	Details will be furnished by Distribution Wing					1	8	8	14	22-23	
6	Pathanamthitta	TD, Pathanamthitta	66kV Substation, Chumatra	11kV	Details will be furnished by Distribution Wing					1	8	8	4	22-23	
7	Pathanamthitta	TD, Pathanamthitta	33kV Substation, Kadapra	11kV	Details will be furnished by Distribution Wing					1	8	8	3	22-23	
												88			
1		TC, Thodupuzha	33kV Substation Kalady	11kV	Details will be furnished by Distribution Wing					1	9.2	9.2	1	31.06.2022	
2		TC, Thodupuzha	66kV Substation Odakkali	11kV	Details will be furnished by Distribution Wing					1	9.2	9.2	2	31.09.2022	79.4
3		TC, Thodupuzha	66kV Substation, Nedumkandam	11kV		66kV S/s Nedumkandam	Thoakkupalam Section	11kV Line with Raccoon Conductor	15 Km	1	15	15	5	31.03.2023	
4		TC, Thodupuzha	33kV Substation vengola	11kV	Details will be furnished by Distribution Wing					1	9.2	9.2	3	31.12.2022	
5		TC, Thodupuzha	33kV Substation Koovappady	11kV	Details will be furnished by Distribution Wing					1	9.2	9.2	4	31.06.2023	#NAME?
6		TC, Thodupuzha	110kV Substation Malayattoor	11kV	Details will be furnished by Distribution Wing					1	9.2	9.2	6	31.12.2023	
7		TC, Thodupuzha	110kV Substation Perumbavoor	11kV	Details will be furnished by Distribution Wing					1	9.2	9.2	7	31.09.2023	
8		TC, Thodupuzha	220kV Substation Kothamangalam	11kV	Details will be furnished by Distribution Wing					1	9.2	9.2	8	31.12.2022	
												79.4			
1	Perumbavoor	Kalamassery		110kV S/s N.Paravur	33kV S/s Vadakkekara	10		10	33kV Covered conductor	10	27.52	275.2			
2	Perumbavoor	Kalamassery		110kV S/s N.Paravur	33kV S/s Varappuzha	9		10	33kV Covered conductor	10	24.5	220.5			
												495.7			

1	Perumbavur	TC, Thrissur / Chalakudy	110 KV S/S Angamaly(11 kv)	New 11kV feeder panels as per request of distribution wing.							3	8.5	25.5	2	23-24
2	Thrissur	TC, Thrissur / Thrissur	110 KV S/S Ollur 11 KV	Adding new 11kV feeder panel and associated works including 11kV cable.							1	18	18	5	23-24
3	Thrissur	TC, Thrissur / Thrissur	110 KV S/S Pullazhy 11 KV	Adding new 11kV feeder panel and associated works including 11kV cable.							1	22.75	22.75	9	23-24
4	Irinjalakuda	TC, Thrissur / Irinjalakuda	110kV SS/s Kodungallur-11kV	New complete 11kV feeder panels.							3	8.5	25.5	15	23-24
5	Perumbavur	TC, Thrissur / Chalakudy	110 KV S/S Ayyampuzha(11kv)	New 11kV feeder panels as per request of distribution wing.							1	8.5	8.5	18	23-24
6	Thrissur	TC, Thrissur / Thrissur	110 KV S/S Viyyur 11 KV	Adding new 11kV feeder panel and associated works including 11kV cable.							1	14	14	19	23-24
7	Irinjalakuda	TC, Thrissur / Chalakudy	110 KV S/S Kodakara(11kv)	New 11kV feeder panels .							2	8.5	17	20	23-24
8	Irinjalakuda	TC, Thrissur / Chalakudy	33 KV S/S Kallettumkara(11kv)	New 11kV feeder panels .							10	8.5	85	21	23-24
9	Irinjalakuda	TC, Thrissur / Chalakudy	33 KV S/S Vellikulangara(11kv)	New 11kV feeder panels .							10	8.5	85	22	23-24
10	Irinjalakuda	TC, Thrissur / Chalakudy	110 KV S/S Mala(11Kv)	New 11kV feeder panels .							1	8.5	8.5	23	23-24
11	Irinjalakuda	TC, Thrissur / Irinjalakuda	110 KV S/S Valapad(11Kv)	New 11kV feeder to ground							1	8.5	8.5	24	23-24
12	Irinjalakuda	TC, Thrissur / Irinjalakuda	110kV S/s Irinjalakuda 11 kv	For New 11kV UG Cable to town, Vellangallu branch							2	8.5	17	25	23-24

13	Irinjalakuda	TC, Thrissur / Irinjalakuda	33 kV S/sPalakkal - 11 kV	For New 11kV ABC feeder						1	8.5	8.5	26	23-24	
14	Irinjalakuda	TC, Thrissur / Irinjalakuda	33kVs/s Vellangallur-11 KV	New 11kV feeder panels .						1	8.5	8.5	27	23-24	
												352.25			
1	TC Palakkad, EC Shoranur	Shoranur/ Shoranur	110kV Substation, Ottappalam	11kV	Meetna (SILK)	110kV Substation, Ottappalam	Meetna(SILK), Kayarampara	11 KV VCB		1	27	27	1	2022-23	
2	TC Palakkad, EC Shoranur	Shoranur/ Shoranur	110kV Substation, Ottappalam	11kV	Pazhayannur	110kV Substation, Ottappalam	Mayannur Bridge to Thrissur DT	11 KV VCB		1	27	27	10	2022-23	
3	TC Palakkad, EC Shoranur	Shoranur/ Shoranur	110kV Substation, Cherpulassery	11kV	Karalmanna	110kV Substation, Cherpulassery	Karalmanna	11 KV VCB		1	20	20	2	2022-23	
4	TC Palakkad, EC Shoranur	Shoranur/ Shoranur	110kV Substation, Cherpulassery	11kV	Marayamankalam	110kV Substation, Cherpulassery	Marayamankalar	11 KV VCB		1	20	20	11	2022-23	
5	TC Palakkad, EC Shoranur	Shoranur / Shoranur	110kV Substation, Cherpulassery	11kV	Thrikkaderi	110kV Substation, Cherpulassery	Thrikkaderi	11 KV VCB		1	20	20	12	2022-23	
6	TC Palakkad, EC Shoranur	Shoranur/ Pattambi	33kV Substation, Thrithala	11kV	Thrithala Town	33kV Substation, Thrithala	Thrithala Town	11 KV VCB		1	18	18	3	2022-23	
7	TC Palakkad, EC Shoranur	Shoranur/ Pattambi	33kV Substation, Thrithala	11kV	Thalakkassery	33kV Substation, Thrithala	Thalakkassery	11 KV VCB		1	18	18	4	2022-23	
8	TC Palakkad, EC Shoranur	Shoranur/ Pattambi	110kV Substation, Koottanad	11kV	Koottanad Town	110kV Substation, Koottanad	Koottanad Town	11 KV VCB		1	18	18	5	2022-23	
9	TC Palakkad, EC Shoranur	Shoranur/ Pattambi	110 KV Substation Koppam	11KV	Koppam Town	110KV Substation Koppam	Koppam Town	11KV VCB			18	18	13	2022-23	

10	TC Palakkad, EC Palakkad	Palakkad/ Alathur	110kV KANNAMPULLY	11kV	Alathur Town	110kV KANNAMPULLY	Alathur Town	ADDITIONAL BAY - NEW 11KV FEEDER OUT LET WITH INDOOR 11KV OUT GOING FEEDER PANEL, DP STUCTURE & XLPE 11KV UG CABLE		1	15	15	14	2022-23	
11	TC Palakkad, EC Palakkad	Palakkad/ Chittur	110kV KOZHJAMPAR A	11kV	New RV Pudur	110kV KOZHJAMPAR A	RV Pudur	ADDITIONAL BAY - NEW 11KV FEEDER OUT LET WITH INDOOR 11KV OUT GOING FEEDER PANEL, DP STUCTURE & XLPE 11KV UG CABLE		1	15	15	9	2022-23	
12	TC Palakkad, EC Palakkad	Palakkad/Chittur	110kV KOLLENGODE	11kV	Feeder 1	110kV KOLLENGODE	Panagattiri	ADDITIONAL BAY - NEW 11KV FEEDER OUT LET WITH INDOOR 11KV OUT GOING FEEDER PANEL, DP STUCTURE & XLPE 11KV UG CABLE		1	15	15	7	2022-23	
13	TC Palakkad, EC Palakkad	Palakkad/ Chittur	33kV VELANTHAVAL AM	11kV	Feeder 2	33kV VELANTHAVAL AM	Ozhalapathy	ADDITIONAL BAY - NEW 11KV FEEDER OUT LET WITH INDOOR 11KV OUT GOING FEEDER PANEL, DP STUCTURE & XLPE 11KV UG CABLE		1	19	19	8	2021-22	
14	TC Palakkad, EC Palakkad	Palakkad/ Palakkad	33kV Substation Kongad	11kV	Kongad	33kV substation Kongad	Kongad	11 KV VCB	5kms	1	13.8	13.8	6	2021-22	



15	TC Palakkad, EC Shoranur	Palakkad/ Mannarkkad	33kV SS Mukkali	11 kV	Thavalam	proposed 33kV substation Mukkali	Thavalam	11 KV VCB	15 kms	1	13.8	13.8	15	2024-25	
16	TC Palakkad, EC Shoranur	Palakkad/ Mannarkkad	33kV SS Mukkali	11 kV	Kallamala	proposed 33kV substation Mukkali	Kallamala	11 KV VCB	10 kms	1	13.8	13.8	16	2024-25	
17	TC Palakkad, EC Shoranur	Palakkad/ Mannarkkad	33kV SS Mukkali	11 kV	Chindakki Anavai	proposed 33kV substation Mukkali	Chindakki Anavai	11 KV VCB	15 kms	1	13.8	13.8	17	2024-25	
18	TC Palakkad, EC Palakkad	Palakkad/ Palakkad	33kV Substation Kadampazhippuram	11kV	Feeder No.1	33kV Substation Kadampazhippuram	Punchappadam	11 KV VCB	7 kms	1	13.8	13.8	18	2024-25	
19	TC Palakkad, EC Palakkad	Palakkad/ Palakkad	33kV Substation Kadampazhippuram	11kV	Feeder No.2	33kV Substation Kadampazhippuram	Peringode	11 KV VCB	8 kms	1	13.8	13.8	19	2024-25	
20	TC Palakkad, EC Shoranur	Palakkad/ Mannarkkad	33kV Substation Kumaramputhur	11kV	Aryambavu	Proposed 33kV substation Kumaramputhur	Aryambavu	11 KV VCB	9 kms	1	13.8	13.8	20	2024-25	
21	TC Palakkad, EC Shoranur	Palakkad/ Mannarkkad	33kV Substation Kumaramputhur	11kV	Ambazhakode	Proposed 33kV substation Kumaramputhur	Ambazhakode	11 KV VCB	11 kms	1	13.8	13.8	21	2024-25	
22	TC Palakkad, EC Shoranur	Palakkad/ Mannarkkad	110kV Substation Vattalacki	11kV	Feeder No.1	110kV Substation Vattalacki	Anakkatti	11 KV VCB	6	1	13.8	13.8	22	2024-25	
23	TC Palakkad, EC Shoranur	Palakkad/ Mannarkkad	110kV Substation Vattalacki	11kV	Feeder No.2	110kV Substation Vattalacki	Kottathara	11 KV VCB	6	1	13.8	13.8	23	2024-25	
												388			
1	Kozhikode	TC, Kozhikode	110kV Substation Koduvally	11kV		Koduvally	Koduvally Town	Providing new 11kV outlet at various substations - 10 numbers				11.5	5	2023-2024	
2	Kozhikode	TC, Kozhikode	66kV GIS Substation Puthiyara	11kV		Central	Tanishq RMU					11.5	17	2023-2024	
3	Kozhikode	TC, Kozhikode	110kV Substation Chevayur	11kV		Karaparamba	Civil station					11.5	4	2023-2024	

4	Kozhikode	TC, Kozhikode	66kV Substation Cyber Park	11kV		Perumanna	Pantheerankavu junction RMU					11.5	8	2022-2023	
5	Kozhikode	TC, Kozhikode	33kV substation Feroke	11kV		Feroke	Petta RMU					11.5	16	2022-2023	
6	Kozhikode	TC, Kozhikode	220kV Substation Nallalam	11kV		Beyepore	Mini stadium RMU					11.5	3	2023-2024	
7	Vatakara	TC, Kozhikode	110KV Sub-Station Nadapuram	11kV			110 kV Substation Nadapuram- Providing Additional 3Nos. of 11 kV Feeder outlet					13	7	2022-2023	Using PSC Pole
8	Vatakara	TC, Kozhikode	110KV Sub-Station Kuttiadi	11kV			110 kV Substation Kuttiadi- Providing Additional 2 Nos. of 11 kV Feeder outlet					12	11	2022-2023	Using PSC Pole
9	Vatakara	TC, Kozhikode	110KV Sub-Station Vadakara	11kV			110 kV Substation Vadakara- Providing Additional 2 nos. of 11 kV Feeder outlet					20	15	2022-2023	Using 4Nos PSC Pole & 2Nos New 11KV VCB outgoing feeder panel
10	Vatakara	TC, Kozhikode	220KV Sub-Station Orkkatteri	11kV			220 kV Substation Orkkatteri- Providing Additional 2 nos. of 11 kV Feeder outlet					20	19	2022-2023	Using 8Nos PSC Pole & 4Nos New 11KV VCB outgoing feeder panel
11	Vatakara	TC, Kozhikode	110KV Sub-Station Chakkittapara	11kV			110KV Substation Chakkittapara – Providing 2 Nos additional 11KV feeder outlets					20	2	2022-2023	Using 4Nos PSC Pole & 2Nos New 11KV VCB outgoing feeder panel

12	Vatakara	TC, Kozhikode	110KV Sub-Station Meppayur	11kV		110KV Substation Meppayur – Providing 3 Nos additional 11KV feeder outlets						30	6	2022-2023	Using 6Nos PSC Pole & 3Nos New 11KV VCB outgoing feeder panel
13	Vatakara	TC, Kozhikode	110KV Sub-Station Koyilandy	11kV		110KV Substation Koyilandy – Providing 2 Nos additional 11KV feeder outlets						20	10	2022-2023	Using 4Nos PSC Pole & 2Nos New 11KV VCB outgoing feeder panel
14	Vatakara	TC, Kozhikode	33KV Sub-Station Melady	11kV		33KV Substation Melady – Providing additional 11KV feeder outlet						10	20	2022-2023	Using 2Nos PSC Pole & 1 Nos New 11KV VCB outgoing feeder panel
15	Vatakara	TC, Kozhikode	33KV Sub-Station Perambra	11kV		33KV Substation Perambra – Providing 2 Nos additional 11KV feeder outlets						20	14	2022-2023	Using 6Nos PSC Pole & 3Nos New 11KV VCB outgoing feeder panel
												234			
												1803.35			

## CHAPTER III

### CAPITAL INVESTMENT PLAN OF SBU - DISTRIBUTION

The petitioner, Kerala State Electricity Board Limited (KSEBL), is an integrated State Public Sector Power Utility in the State of Kerala, performing the three functions of Electricity Generation, Transmission, and Distribution through three Strategic Business Units (SBUs). The Distribution Strategic Business Unit (SBU D) performs the function of the distribution of electricity across the entire State except in few pocket areas where other distribution licensees operate. The SBU-D supplies electricity to nearly 99% of the consumers in the State.

This is an application for approval of proposed Capital Investment Plan for the Distribution Strategic Business Unit for the control period 2022-23 to 2026-27 under Section 181(zp) of the Electricity Act 2003, read with Kerala State Electricity Regulatory Commission (Terms and Conditions for Determination of Tariff), 2021. Kerala State Electricity Board Limited (henceforth referred to as "KSEBL" or "Petitioner") is submitting its proposed Investment Plan Petition for the control period 2022-23 to 2026-27.

The distribution network in the State has been developed over a period of several decades. The petitioner has taken earnest efforts in expediting the network and providing supply to all consumers in the State. In 2017, the petitioner achieved the mission of 100% electrification of households in the State and continues to maintain the status.

The distribution network consists of the following elements as detailed below:

<b>Table 1.1 -Distribution Network (2020-21)</b>			
<b>No</b>	<b>Components</b>	<b>Unit</b>	<b>Quantity</b>
1	33 KV lines	Km	2124
2	11 KV lines& 22 KV lines	Km	64540
3	LT lines	Km	295697
4	Distribution Transformers	Nos	83399
5	Energy sales	MU	22151
6	Consumer	Nos	1.33 Cr

As mentioned earlier, May 2017 brought Kerala a remarkable honor of being the first State in the country to achieve total electrification of all of its households. However, access to electricity was only a part of the mission to establish the right to electricity to every consumer of the State. Availability of uninterrupted quality power is what the people ultimately need from the utility. The situation demanded a relook into our distribution system management. In addition to building up of infra structure, better maintenance of the prevailing system was essential. The field level offices with smaller jurisdictional area have accessibility to the locality concerned. However quality of power in any locality is not linked to factors limited to that area alone but involves the larger network beyond the perception of the local offices. Hence a

network based approach, along with comprehensive remodeling of functions was envisaged during the control period 2018-22.

Because of the evenly spread habitation pattern in Kerala, unlike in other States, the length of LT lines were substantially high in our State. The ratio of HT to LT line which was 1:4.75 during 2017-18 has been improved to 1: 4.44.

Prior to 2018, a major portion of the Distribution network in the State except in the cities were radial in topology. This configuration distributed power from a substation in a radial fashion without sufficient back feeding facility, which caused reliability issues. Hence a comprehensive plan for improving the network redundancy by infusing capital investment was proposed and is being executed during the control period 2018-2022 (Dyuthi 2021) .

## **2. Dyuthi 2021**

With a grand vision to uplift the distribution system of the State to the best in the nation and also to achieve international standards in the distribution services, KSEBL had decided to implement a comprehensive network-based distribution plan 'Dyuthi 2021'. The focus of this project was to provide uninterrupted, quality power to all, with lowest technical and commercial losses, maintaining best safety standards and to develop a system capable of integrating renewable energy sources.

The Petitioner, constituted a special team called Project Management Unit (PMU) in all 25 Electrical Distribution Circles, by pooling Engineers with experience, assigned the task for preparation of the detailed plan and project at the Circle level for augmenting the distribution network and implementation of the same. The task of preparation of a geo referenced network map of HT distribution network was successfully completed by PMU team as part of Dyuthi Project. Identification of the load centres and feeding arrangements, analysing the weakness of the grid, failure prone segments based on data from software tool - Outage Management System (OMS), identification of works to meet the set goals, preparation of Detailed Project Report, preparation of estimates, tendering and award of work, progress monitoring etc are also vested with PMU.

Detailed low tension network planning in Dyuthi project was done through Power Management Sub Units (PMsU). For the sake of convenience, jurisdictional area of PMsUs were made coextensive with that of Electrical Sub Divisions. Project Management Sub Unit is headed by the Assistant Executive Engineer of the respective Subdivision.

The project envisaged works worth Rs.4036.30 crore in the Distribution sector during the four year period from 2018 to 2022. The Dyuthi plan envisioned for the control period from 2018-19 to 2021-22, was targeted for completion by 31 st March 2022. A year wise summary of the capital investment plan, Dyuthi – 2021 for the control period 2018-22 submitted before the Honorable Commission vide petition dated 31.10.2018 is given below.

<b>Table 2.1- Capital Investment Plan (Summary ) of Dyuthi (Rs. Cr.)</b>					
<b>Financial Year</b>	<b>Normal development</b>	<b>Faulty Meter Replacement</b>	<b>Continued Electrification</b>	<b>Special Projects</b>	<b>Total</b>
2018-19	723.64	60.00	5.00	5.00	<b>793.64</b>
2019-20	1221.06	54.49	20.00	20.00	<b>1315.64</b>
2020-21	1066.65	47.61	20.00	20.00	<b>1154.26</b>
2021-22	720.68	42.18	5.00	5.00	<b>772.86</b>
<b>Total</b>	<b>3732.03</b>	<b>204.27</b>	<b>50.00</b>	<b>50.00</b>	<b>4036.30</b>

### **Implementation of Dyuthi Project**

KSEBL had carried out the 4-year plan Dyuthi 2021. Despite the paradigm shift in approaches and results, there has been a slippage in the set schedules of the project. During the initial year of Dyuthi 2021, Centrally Aided Projects like IPDS, RAPDRP and DDUGJY were given preference over Dyuthi 2021 as there was an obligation for timely completion of those projects. This resulted slippage of schedules of Dyuthi-2021 during the initial period . The devastating floods in 2018 and 2019 also slowed down the Dyuthi works during the financial year 2018-19 and 2019-20 as the men and material had to be diverted for arranging the restoration works during the calamity situations. There were several instances of mitigation activities and works related to various State Disaster Management Authority (SDMA) warnings in Kerala during the said period, especially Ockhi, Tauktae, Burevi etc.

The COVID 19 pandemic and subsequent lockdown had also affected the timely execution of Dyuthi works of the Distribution sector on a large scale. The restrictions imposed during various periods, shortage of contracted manpower especially migrant labor, delay in receipt and non-receipt of sufficient materials due to closure of firms and transportation issues etc. during the pandemic period had upset the scheduled works.

### **Dyuthi 2021 - Achievements**

The main works carried out under Dyuthi 2021 is as follows

- Construction of HT lines for forming rings and thereby ensuring 100 % high tension supply redundancy
- Special solutions like construction of/ conversion to ABC (Aerial Bunched Cables), UG (Under Ground) cables, Covered conductors etc., for reliability.
- Relocating existing switching points and installing new switching points for flexibility and for ensuring the highest extent of High Tension supply redundancy.
- Works incorporating innovating concepts such as like Fault Pass Indicators sectionalisers etc, for improving system reliability and faster supply restoration.
- Works for improving High Tension to Low Tension line length ratio,

- Re-conductoring with optimal alternatives for reducing losses planned based on network information and data from field.
- Standardisation of lines and transformer stations for ensuring compliance to regulations, reducing losses and ensuring safety,
- Installation of spacers and line mounted guarding in LT lines to avoid line swinging and prevention of accidents due to conductor snapping

KSEBL had allotted Rs.100 Crores for “continued electrification” in the Dyuthi Project for providing free service connections to BPL households with a maximum of 1000W connected load (WP with support posts / post insertion plus a maximum of 200 m OH) till the end of the plan period 2018-22 . This helped in sustaining the remarkable achievement of 100 % electrification in the State.

The Dyuthi-2021 initiated many remarkable changes in the distribution development approaches through introduction of network based planning, adoption of new technologies and in-house products like Communicating Fault Passage Detector (CFPD). Despite, encountering unprecedented natural calamities and unaccustomed pandemics during the above control period, amounting to Rs. 1968.60 crore were completed in Dyuthi projects as on 30th December 2021.

Dyuthi 2021 made decisive strides towards achieving the project goals. During the period, the HT lines increased by 5100 Km resulting in the improvement of HT:LT ratio 1:4.43 and 5675 nos of new transformers were installed. The most tangible achievement among goals being the drastic reduction in power system T&D losses from 13.07 % in 2017 – 2018 to 10.32 % in 2020 – 2021, which translates to savings of more than 700 MU on that front. The frequency and severity of the natural disasters are on the rise in Kerala. KSEB Ltd showed remarkable resilience in these demanding periods. The Mission Reconnect launched for speedy supply restoration during floods-2018 and the efforts to ensure round the clock availability of power to consumers during the Covid pandemic bear testimony to this.

The financial achievement of Capital works , including Dyuthi (excluding Central Aided Projects) during the FY18-19 – FY 2021-22( as on December 2021) is as follows

<b>Table 2.1:- Achievement as per audited accounts</b>				
<b>Particulars</b>	<b>FY 18-19</b>	<b>FY19-20</b>	<b>FY 20-21</b>	<b>FY 21-22 *</b>
Capital works	329.14	901.85	1018.31	711.11

\*Provisional figure

### **3. Multi Year Capital Investment Plan for 2022-23 to 2026-27**

The Multi Year Capital Investment Plan proposed for the control period 2022-23 to 2026-27 comprises of the following

- Dyuthi 2.0 amounting to Rs. 4316.10 Cr
- GoI assisted Revamped Distribution Sector Scheme (RDSS) amounting to Rs. 11061.08 Cr
- IT plan under own fund amounting to Rs. 147.37 Cr
- Safety Plan amounting to Rs. 181.35 Cr
- Other funded works amounting to Rs. 1000 Cr
- E-mobility amounting to Rs. 27.13 Cr

## **Need for investment**

### **A. Scope to achieve standards of global competence**

Despite all the achievements in Dyuthi, KSEB Ltd as a distribution utility has got enough scope to achieve standards of global competence in certain areas of performance, which the organisation had envisaged to accomplish. The shortcomings observed were:-

- Long periods of outages in certain areas during natural disasters, mainly due to snapping of high tension / low tension (HT/LT) conductors, damages to poles and other installations, inundation of crucial infrastructure, forced shutdowns for ensuring safety during floods etc.
- Supply interruptions of short durations in one area for carrying out back feeding arrangements and switch offs for supply restoration and for de-energisation of spur / branch lines etc. to other areas.
- Change in prioritisation and selection of areas / networks due to change in local network requirements, mitigation activities and slow progress of adopting new technologies like HT & LT Aerial Bunched Cables (ABC), delay/ stringent conditions for laying underground (UG) cables, Ring Main Units(RMU), Load break switches etc.

### **B. Statutory Requirements**

#### **ELECTRICITY ACT 2003**

Section 42 of Electricity Act 2003 mandates that It shall be the duty of a distribution licensee to develop and maintain an efficient, co-ordinated and economical distribution system in his area of supply and to supply electricity in accordance with the provisions contained in the Act.

#### **Tariff Regulations 2021**

Section 71 of Tariff Regulations stipulates that It is the primary responsibility of the distribution business/ licensee to ensure optimum utilization of the capital expenditure in its projects to enhance economy, efficiency and productivity and to meet the Performance Standards specified by the Commission. The distribution business/ licensee shall, along with the petition for determination of aggregate revenue requirements for the Control Period, file to the Commission for its approval, a detailed yearly capital investment plan, financing plan



and the physical targets for meeting the requirement of load growth, reduction in distribution losses, improvement in the quality of supply, reliability, metering, consumer services etc., in accordance with the 'Guidelines for Provisional Clearance of Capital Investment' specified in Regulation

### **Electricity (Rights of Consumers) Rules, 2020**

Government of India gazette notification dated 31<sup>st</sup> December 2020 G.S.R.818 E lays down Rights to the Electricity consumers by notifying "Electricity (Rights of Consumers) Rules, 2020" as a beginning of an era of empowering Power Consumers in a paradigm shift bringing Consumers to Centre Stage.

#### **Following key areas are covered in the Electricity (Rights of consumers) Rules:**

- a) Rights of consumers and Obligations of Distribution licensees
- b) Release of new connection and modification in existing connection
- c) Metering arrangement
- d) Billing and Payment
- e) Disconnection and Reconnection
- f) Reliability of supply
- g) Consumer as Prosumer
- h) Standards of Performance of licensee
- i) Compensation Mechanism
- j) Call Centre for Consumer Services
- k) Grievance redressal mechanism

#### **Rights and Obligations.-**

- Every distribution licensee to supply electricity on request made by an owner or occupier of any premises in line with the provisions of Act.
- Consumer has the right to have minimum standards of service for supply of electricity from the distribution licensee.

#### **Metering –**

- No connection shall be given without a meter
- Meter shall be the smart pre-payment meter or pre-payment meter.
- Provision of Testing of meters
- Provisions for replacement of defective or burnt or stolen meters specified

#### **Reliability of supply**

1. The distribution licensee has to supply 24x7 power to all consumers.
2. Following parameters as specified by the Commission has to be maintained for reliability of supply by the distribution licensee; :-
  - (a) total duration and frequency of outages per consumer in a year – (SAIFI and SAIDI).
  - (b) the minimum outage time (in minutes) for calculating reliability indices

The distribution licensee has to put in place a mechanism, preferably with automated tools to the extent possible, for monitoring and restoring outages.

**Standards of performance:-** The Commission may notify the amended standards of performance for the distribution licensees based on the conditions specified in Indian Electricity Rules,2020.

Distribution licensee has to comply with the statutes stipulated in the Indian Electricity Rules.

Accordingly, to meet modified standards of performance, adequate investment is needed for system strengthening and system modernization.

### **C. Development of infrastructure to meet the rising Energy requirement**

The actual electrical energy consumption for FY 2018-19, FY 2019-20, FY 2020-21 were 21750.25 MU, 23058.91 MU and 22540.32 MU respectively and the corresponding energy requirement was 24849.15 MU, 26226.08 MU, 23058.91 MU and 25132.32 MU respectively. The reduction in energy sales during 2020-21 was as a result of the restrictions imposed during various periods due to COVID pandemic and its subsequent lockdown. There is an annual growth of around 4 % increase in energy consumption is expected during the next control period by taking CAGR of last 3 years (2017-18 to 2019-20).

Electricity consumption is considered one of the important indices that decides the development level of a nation. Globally it is estimated that over 50% of the total energy requirement will be met from electricity by 2050; it was 21% in 2018. Advancement in electric mobility will be the key driver of enhanced demand. With the evolution of e-mobility, the energy requirement of the State may increase significantly.

Keeping in view the climate change commitments made by Government of India during the COP21 Summit held at Paris to reduce emission intensity by 33- 35% by 2030 from 2005 levels, it is pertinent to introduce alternative means in the transport sector which can be coupled with India's rapid economic growth, rising urbanization, travel demand and country's energy security. Electric mobility presents a viable alternative in addressing these challenges, when packaged with innovative pricing solutions, appropriate technology and support infrastructure and thus, has been on the radar of Government of India.

Electric mobility will also contribute to balancing energy demand, energy storage and environmental sustainability. The International Renewable Energy Agency (IRENA) study reports indicate that transport would see the most accelerated electrification in the coming decades with the share of electricity reaching 49% in 2050, up from just 1% today. In the long run, requirement in transport sector will play a significant role in the total power demand. It is expected that in a scenario when the population of eV in the State matches with existing number of ICE vehicles, the daily energy requirement for eV will be approximately 50 MU. It is expected that majority of 2W, 3W & other light eVs will be undergoing home / office charging. It is estimated that near to 100% of electric 2Ws, and 70% of 3Ws and 4Ws will be resorting to home/ office charging – which will have a significant roll on the distribution grid especially during late evening hours. Thus taken in account of energy requirement for e

mobility , the overall energy requirement is expected to have an average Annual Growth Rate of 6.15% in Kerala.

Lack of adequate charging infrastructure was raised as a concern in proliferation of eVs; at the same time, shortage of vehicle population prevented investors from coming forward to set up EVCI. To break the ice, State Government and KSEB has taken steps to set up pilot stations at selected locations. It is estimated that about 1200 Fast Charging Stations will be required additionally in next 5 years. Fast Charging Stations may often require installation of Distribution Transformers, UG cables, RMU etc. Considerable capital investment is required to meet the demand.

In order to fulfill the above requisites SBU-D of KSEBL has devised a five year capital investment proposal for the next control period. The abstract of the same is given below.

<b>Table 3.1:-Capital Investment Plan of SBU-D (Amount in Rs Crores)</b>		
<b>SI No</b>	<b>Particulars</b>	<b>Total</b>
A	Dhyuthi 2.0	4316.1
B	Central Aided Project (RDSS) PART A excluding Prepaid Smart metering	2811.08
C	Central Aided Project (RDSS) Prepaid Smart metering	8200.00
D	Central aided Project-Part B-Capacity Building	50.00
E	IT projects under Board fund	147.37
F	Safety Works	181.35
G	Other Funded Works- Contribution, MLA Fund etc	1000.00
H	Electric vehicles and charging stations	27.13
<b>Total capital outlay of SBU-D</b>		<b>16733.03</b>

### **3.1. Dyuthi-2.0**

In continuation to Dyuthi 2021, Dyuthi2.0 has been envisaged with the following objectives

#### **GOALS**

1. Enhance the reliability & quality of power supplied – ensure uninterrupted supply
2. Improve energy efficiency & reduce system losses
3. Ensure standard, resilient and safe installations
4. Ensure that the State remains totally electrified during the plan period
5. Ensure hassle free integration of renewables (green energy)
6. Ensure a revamped, smart, technologically equipped and adaptable network
7. Facilitate the growth of electric mobility
8. Ensure geo-mapping of all network assets

As part of formation of plan for the control period 2022 - 2027, the power zone / subzone / area was divided into the following six categories, depending on the nature of the terrain and importance of the area involved.

1. Coastal areas
2. Hilly terrains / thickly vegetated areas
3. Flood prone areas
4. Waterlogged areas
5. Critical areas (Towns / Cities / industrial areas / other areas where supply redundancy is extremely critical)
6. Plains / midland areas (Areas not included in the above categories)

The power Zone level Planning & Power Sub Zone level planning in the existing Dyuthi projects are continued in the Dyuthi 2.0 project also. The Power Zone plan is for comprehensive development of the high tension (11/ 22 / 33 kV) network and Power Sub Zone planning or low tension network planning is carried out at the Subdivision level as done in Dyuthi 2021. The guidelines are same as the Dyuthi 2021. The plan include works for standardisation and modernisation of the existing HT and LT networks . As part of reducing interruptions, the vulnerable segments in the high tension grid and Low Tension networks are identified , by using all available data including interruption data in Substations, Outage Management System and those from the field offices and the areas and networks affected during the recent natural calamities and floods.

Works are planned for the following

- i. To ensure 100 % high tension supply redundancy at all points of the network.
- ii. To ensure connectivity between Substations. Feeders that emanate from one Substation and extend to another Substation or transformer station, together with its branches is to be considered as one feeder for the purpose of planning.
- iii. To reduce system losses,
- iv. Ensuring feasibility of hurdle free integration of renewable sources
- v. Facilitating electric mobility at any point of the network
- vi. Installing Communicable fault pass detectors (CFPD) for all spur / branch lines and along the main feeder at intermittent and critical points.

The details of work identification and obtaining optimal solutions are detailed in respective DPR. On analysing the identified works, substantial capital investment will be required to achieve the set goals, especially for improving reliability & safety and for containing the technical losses.

The progress of Distribution works as per this can be monitored through the ERP software SAMAGRA and the same is used for preparing the DPR of this plan. It was used to capture tangible benefits of technical loss reduction, additional sales by improved reliability etc. These data was used in analysis of the financial benefits like IRR, pay back etc. along with the Supply Chain Management (SCM) software for the purpose.

There would also be certain tangible feedback such as reduction in R&M expenses because of the project. These benefits are difficult to be estimated and are not considered in financial analysis. Similarly intangible benefits like customer satisfaction which are subjective in nature, are also not considered.

Detailed project reports were prepared for Project area of each PMU (i.e. Electrical Circle). Six copies of DPR in respect to all PMUs are enclosed separately. The general structure of all DPR are the same but differ only in

- a. Features and particulars of projects proposed pertaining to that project area
- b. Case studies covering problem statement, detailed analysis of the problem, various options considered & criteria for selection of optimal solution, benefits of the project, financial analysis and JOSM image of the network elements
- c. Detailed financial analysis of the projects

A task wise consolidation of works for each Financial Year is appended as **Annexure 3.1.1**. The circlewise capital outlay is enclosed as **3.1.2**. A total of Rs 4016.10 Cr is envisaged under Normal Developmental works for Five years under this scheme. The taskwise consolidation of works reveal that the plan is mainly focused on network reliability, loss reduction and safety. New and innovative works like installation of fault detectors, SCADA, HVDS etc. extensive deployment of switching devices to improve operational flexibility of network, extensive use of Insulated or Covered conductors, significantly higher HT:LT ratio in proposed works, extensive deployment of standard earthing for existing network elements, standardisation of transformer structures, lines, extensive replacement of worn out and old bare conductors etc. finds place in the project evolved by all the PMUs. A consolidated list of task wise details of work planned is given in the table below.

<b>Table 3.2 :Taskwise consolidation under Dyuthi from 2022-23 to 2026-27</b>								
<b>SI No</b>	<b>Task Group</b>	<b>Unit</b>	<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	<b>Total</b>
1	Construction - HT line - OH	km	316.5	273.2	252.4	601.7	468.78	1912.6
2	Construction - HT line - ABC	km	343.1	288.7	309.6	624.5	510.21	2076.1
3	Construction - HT line - CC	km	19.3	13.5	43.3	22.7	24.95	123.8
4	Construction - HT line - UG	km	76.6	79.4	89.7	238.8	208.81	693.3
5	Construction - LT Line - OH	km	131.6	95.2	130.1	170.2	214.10	741.2
6	Construction - LT Line - ABC	Each	389.5	424.9	526.8	1009.0	1025.78	3376.0
7	Construction - Transformer - 15/25 kVA	Each	9.0	6.0	9.0	10.0	27.00	61.0
8	Construction - Transformer - 100 kVA	Each	526.0	465.0	440.0	605.0	583.00	2619.0

SI No	Task Group	Unit	2022-23	2023-24	2024-25	2025-26	2026-27	Total
9	Construction - Transformer - 160 kVA	Each	36.0	20.0	22.0	27.0	26.00	131.0
10	Construction - Transformer - 250 kVA	Each	11.0	2.0	3.0	10.0	6.00	32.0
11	Miscellaneous - Replacement DTR - 100 kVA	Each	219.0	165.0	122.0	149.0	185.00	840.0
12	Miscellaneous - Replacement DTR - 160 kVA	Each	18.0	19.0	12.0	25.0	32.00	106.0
13	Miscellaneous - Replacement DTR - 250 kVA	Each	2.0	5.0	0.0	4.0	4.00	15.0
14	Miscellaneous - Replacement DTR - 500 kVA	Set	0.0	0.0	0.0	1.0	0.00	1.0
15	Construction - FPI	Each	1541.0	1136.0	650.0	735.0	730.00	4792.0
16	Construction - Switches - AB Switch	LS						
17	Construction - Switches - LBS	Each	3.0	7.0	5.0	68.0	5.00	88.0
18	Construction - Switches - RMU	Each	152.0	194.0	174.0	295.0	358.00	1173.0
19	Construction - Others	km	49345.6	32207.2	31391.6	43851.6	44326.28	201122.3
20	Conversion - SP to TP OH	km	443.5	360.4	338.5	653.5	697.98	2494.0
21	Reconductoring - HT line - HT OH Line	km	938.6	724.0	775.2	1658.8	1543.62	5640.2
22	Reconductoring - LT Line - LT OH Line	Each	3986.0	4003.1	4707.4	8784.5	8242.70	29723.7
23	Standardisation - HT line	km	5632.4	5169	4788	10109	10513	36211.4
24	Standardisation - LT line	km	1060.7	569.5	500.9	874.9	1017.29	4023.3
25	Standardisation - Transformer Station	Each	2239.4	2464.0	1958.5	3344.0	3507.00	13512.9
26	Loss Reduction - Metering - DTR Meter	Each	7.0	1.0	0.0	0.0	0.00	8.0
27	Loss Reduction - Pipe Earthing	km	1644.0	2070.0	1176.0	2340.0	2245.00	9475.0
28	Miscellaneous - Dismantling - Lines	Each	501.5	265.0	284.4	447.0	377.36	1875.2

SI No	Task Group	Unit	2022-23	2023-24	2024-25	2025-26	2026-27	Total
29	Miscellaneous - Dismantling - DTR/ Structure	Each	91.0	63.0	70.0	68.0	66.00	358.0
30	Miscellaneous - New Connection	Each	0.0	30.0	0.0	0.0	0.00	30.0
31	Replacing old / faulty 63kVA Transformer	Each	20.0	11.0	19.0	25.0	15.00	90.0
32	Standardisation of Structures - HT	Each	3056.0	3148.0	2570.0	3737.0	3436.40	15947.4
33	Dismantling - Others		13.0	27.0	18.0	23.0	0.00	81.0

### Goalwise consolidation of works

The overall goals envisaged from the project include enhancing reliability of the power supplied, reducing the AT&C losses and also ensuring supply on demand.

The goal wise consolidation is given in table below:

Table 3.3 – Goal wise consolidation of works -PMU Total											
SI.No	Goals	2022-23		2023-24		2024-25		2025-26		2026-27	
		Works	Cost (Rs Cr)	Works	Cost (Rs Cr)	Works	Cost (Rs Cr)	Works	Cost (Rs Cr)	Works	Cost (Rs Cr)
1	System strengthening	536	53.05	473	40.57	430	43.57	605	76.14	537	75.43
2	Reliability	456	36.84	356	36.93	378	41.63	487	91.39	488	69.57
3	Loss Reduction	453	49.52	378	47.85	409	47.59	608	97.45	696	99.29
4	Safety	469	28.09	355	21.17	340	25.56	480	46.84	436	51.49
5	Connecting RE Sources	0	0.00	0	0.00	1	0.04	1	0.13	2	0.09
6	Total Electrification	45	2.43	32	1.58	40	1.42	39	2.33	34	6.27
7	Multiple goals	3788	404.27	3385	379.00	3563	439.25	5405	877.26	5051	822.06
	<b>Total</b>	<b>5747</b>	<b>574.20</b>	<b>4979</b>	<b>527.11</b>	<b>5161</b>	<b>599.07</b>	<b>7625</b>	<b>1191.54</b>	<b>7244</b>	<b>1124.18</b>

The detailed goal wise and taskwise consolidation of works is enclosed as **Annexure-3.1.3**.

## Methodology for Calculation of IRR

The IRR of each project is calculated by considering the factors like total cost of the project, benefit of the project.

**Total cost of the project:** It is assumed that the entire project cost is spend at the end of the Financial Year. For calculating project cost, the material cost, labour & transportation (including contractor's profit) and supervision charges are taken as per methodology approved by KSERC.

**Material cost:** For calculating project cost, the weighted average rate of purchase at different offices at different periods is considered. In addition to the above, the cost of materials, proposed to be used for standardisation and which has not been purchased by KSEB in the recent past, is derived through market enquiry.

**Labour & Transportation charges:** The labour & transportation charges is generally taken from the Uniform Labour Data. In cases where the approved rates are not available, man hour requirement was assessed based on field study and labour rates as per DSR is considered.

**Benefit of the project.** It is assumed that the benefit is uniform throughout the life of the project, starting from the financial year next to the one in which project is completed. In normal case the life of the project is assumed as 25 years. Benefit from the following aspects only are considered for calculation of IRR.

- Savings due to reduction in technical loss (I<sup>2</sup>R loss):** I<sup>2</sup>R loss in the entire system (HT network, Distribution Transformer & LT network) before and after the modification is considered. For arriving technical loss in feeders, the Voltage level, Conductor type & Specification (e.g. ACSR Rabbit, AAAC 7/3.15 etc), Conductor length & Peak Load in the feeder as obtained from site inspection data were considered. In the case of transformers, condition of the transformer (whether repaired / with star rating / without star rating etc), capacity and peak load is considered. To calculate the average load, load factor is applied, which is calculated taking in to account the loss load factor. As per standard practice, Loss Load Factor (LLF) for feeder is taken as  $(0.8 \times LF^2 + 0.2 \times LF)$  where LF is the load factor. For simplicity, the Load Factor in urban feeder is 0.7 and that in rural feeder is 0.5. LLF for transformer is taken as  $(0.7 \times LF^2 + 0.3 \times LF)$ . The savings in energy (in kWh) is first calculated, which is subsequently converted to money value considering the average realisation in the particular Section.
- Additional sale due to improved reliability:** Many projects will considerably improve the reliability of the system. This in turn will enable KSEBL to provide uninterrupted supply to consumers which in turn increases the energy consumption. The impact is assessed based on previous experience of field officers and considering different aspects such as number of consumers benefitted (HT & LT separately), average energy consumption of the section, type of HT system like availability of HT back feeding, bare OH multi circuit line, availability of functional DTR ABs etc, and type of LT system in the present and post



modification scenarios. Probable additional energy consumption in kWh is first calculated considering possibility of deferred consumption and this is later converted to money equivalent considering the average realisation for the section and average power purchase cost.

The IRR of each work is calculated based on the factors noted above which is shown in the respective DPR. All capital Investments covered under a project management unit (Electrical Circle) is grouped together as a scheme and cost benefit analysis is conducted accordingly. Detailed financial analysis for each project area are available in the respective DPRs. A case study of the project is enclosed as **Annexure 3.1.4.**

A total amount of Rs 150 Cr towards faulty meter replacement, Rs 100 Crore towards 100 % electrification and Rs 50 Cr for installing LT spacers as part of safety aspect is included in the said plan.

A year wise summary of the capital investment plan, Dhyuthi – 02 for the control period 2022-23 to 2026-27 is given below

<b>Table 3.4- Capital Investment Plan (Summary ) of Dyuthi-2.0 (Rs. Cr.)</b>					
<b>Financial Year</b>	<b>Normal development</b>	<b>Faulty Meter Replacement</b>	<b>Total Electrification</b>	<b>Installation of LT spacers</b>	<b>Total</b>
2022-23	574.20	30	20	10	634.20
2023-24	527.11	30	20	10	587.11
2024-25	599.07	30	20	10	659.07
2025-26	1191.14	30	20	10	1251.54
2026-27	1124.18	30	20	10	1184.18
<b>Total</b>	<b>4016.10</b>	<b>150</b>	<b>100</b>	<b>50</b>	<b>4316.10</b>

### **3.2. CENTRALLY AIDED PROJECTS**

#### **Revamped Distribution Sector Scheme (RDSS)**

“Revamped Distribution Sector Scheme (RDSS) – A Reforms based and Results linked Scheme” is a new scheme announced by the Government of India for the development and modernization of the power supply sector vide Office Memorandum 20/09/2019-IPDS dated 20.07.2021 of the Ministry of Power, Government of India. The objective of the scheme is to improve the quality and reliability of power supply to consumers, through a financially

sustainable and operationally efficient Distribution sector by providing conditional financial assistance (on achievement of benchmark based on agreed Action plan/ evaluation framework) for strengthening the electricity supply infrastructure based on meeting pre-qualifying criteria and achieving basic minimum benchmarks in reforms.

The scheme aims to reduce the AT&C losses to pan India levels of 12-15% and ACS-ARR gap to zero by 2024-25. Ministry of Power has also notified vide Govt. of India Gazette no. CG-DL-E-19082021-229126 dated 19.08.2021 that all consumers shall be supplied electricity with Smart Meters working in prepayment mode.

The total outlay of the scheme amounts to Rs 3 lakh Crore with a duration of 5 years from FY 2021-22 to 2025-26. The project is envisaged to implement in urban and rural areas. Power finance Corporation has been nominated as nodal agencies for implementing the Scheme for Kerala.

The project preparation is in budding stage and the project cost and preliminary action plan is yet to be sanctioned. Hence KEBL is preparing the estimate of RDSS based on the preliminary action plan furnished to the nodal agency for approval. KSEBL will submit the detailed capital investment plan for RDSS alongwith the detailed project reports on obtaining approval from GoI.

**The Revamped Distribution Sector Scheme** includes the following components as per the detailed guidelines of the scheme:.

#### **Part A: Metering & Distribution Infrastructure Works**

- a. **Metering-** Facilitating in installing Prepaid Smart meters for all consumers along with associated AMI, communicable meters for DTs & Feeders ICT including Artificial Intelligence (AI), Machine Learning (ML), etc. based solutions for power Sector and a unified billing and collection system to facilitate reduction of Distribution losses and enable automatic measurement of energy flows and energy accounting as well as auditing. Govt. of India vide Gazette no. CG-DL-E-19082021-229126 dated 19.08.2021, has notified that all consumers (other than agricultural consumers), shall be supplied electricity with Smart Meters working in prepayment mode, conforming to relevant IS within the specified time lines so as to convert the entire meters by March 2025. All feeders and distribution transformers shall also be covered under AMI (Advanced Metering Infrastructure) by March 2025.

Metering projects are envisaged to implement in TOTEX mode (Total expenditure includes both capital and operational expenditure) with the following options:

- Installation and commissioning of meters and cost recoveries in equated monthly instalments by PPP or implementation partner (or service provider) with no upfront payment by DISCOM.
- Some initial payment shall be made to the service provider upon installation and commissioning of the meters, with the rest of the payments made on equated monthly / quarterly instalments over the operational period.

Funding under this Part will be available only if the DISCOM agrees to the operation of smart meters in prepayment mode for consumers, and in accordance with the uniform approach indicated by the Central Government, with implementation in TOTEX mode. Under this mode, a single agency will be contracted for supplying, maintaining and operating the metering infrastructure for the purpose of meter related data and services to the DISCOM. It will make both capital and operational expenditure under DBFOOT (Design Build Fund Own Operate & Transfer) or similar modes and will be paid for a portion of its capital expenditure initially and the remaining payment over the O&M period.

**b. Distribution infrastructure works**

This includes **system strengthening works** and **modernisation works** as required for strengthening and modernizing the system as well as measures for loss reduction.

- **Infrastructure strengthening work** :- Loss reduction works, separation of agriculture feeders to enable solarization under PM- KUSUM scheme implementation, Armoured /Aerial Bunch cable/HVDS for loss reduction, segregation and bifurcation of feeders and allied works for loss reduction/system strengthening, replacement of existing all feeders as required, underground cabling works in disaster prone areas, construction of new/ upgradation of substations, IT/OT works, ERP, Billing software, etc
- **Modernisation works** - works to improve Reliability which includes SCADA with DMS / FPI etc. in urban areas, New Substations & Augmentation of Lines & substations, Additional lines/ feeders, and other Distribution works which improves reliability of the Power Sector.

The projects is envisaged to implement normally on turnkey basis. However, certain works can be taken up on partial turnkey basis or departmentally with the approval of DRC and consent of Nodal Agency, subject to, overall guidance of the Monitoring Committee. The reasons for the change shall be recorded.

- c. Project Management Agency- (PMA) has to be appointed by Utility for project formulation and management which includes -Preparation of Action plan, DPR, tender documents etc., Monitoring works, Quality Assurance & Material inspection, Results evaluation etc.

**Part B - Training & Capacity Building and other Enabling & Supporting Activities**

Part B focuses on the softer parts – up-gradation of human skills; supporting and enabling components, such as Nodal Agency fee, enabling components of MoP(Communication plan, publicity, consumer awareness, consumer survey and other associated measures such as third-party evaluation etc), augmentation of Smart Grid Knowledge Centre including AI, training and capacity building for personnel involved in execution of the Scheme at field level, awards and recognition etc. An amount of Rs 50 crores is envisaged under this part.

### **Implementation period**

The sunset date for the scheme is 31-3-2026, the works executed beyond which will not be eligible for release of Central Government grant. The base year for fixing of targets is the latest year for which audited annual accounts are available (FY 2019-20 or FY 20-21).

### **Scheme Outlay and Funding Pattern as per the guidelines**

The pan India total estimated outlay for the entire scheme is Rs 3,03,758 crore with an estimated grant from Central Government to Rs 97,631crore. The funding pattern is as below:

<b>Table 3.5 Funding Pattern of RDSS Scheme</b>	
<b>Item Description</b>	<b>Govt. Budgetary Support % Max</b>
Prepaid Smart metering solution including at consumer, DT, and feeder level including integration of existing infrastructure	15% /22.5% as the case may be (limited upto Rs.900 or Rs.1350 respectively per meter for Consumer metering)*
Other costs including encumbrance free standardized billing modules for all states, data management, data analytics and support to implementation etc.	100%
Distribution Infrastructure works including SCADA, DMS, AB Cables, feeder segregation etc.	60%
Part-B	100%

\*A provision for additional incentive @ 7.5% of the cost per consumer meter worked out for the whole project or Rs. 450 per consumer meter, whichever is lower over and above this has been made, for Prepaid Smart Meters installed within targeted timelines of first phase mission i.e.December 2023. The funds for prepaid Smart Metering will be made available to the DISCOMs only after installation, commissioning and demonstration of at least one prepaid recharge in the area specified by the DISCOM in the DPR approved by the Monitoring Committee.

For consumer metering, feeder and DT metering to be carried out in TOTEX mode, the balance cost other than grant, is envisaged to finance either through enhanced revenue as a result of improvement in billing and collection due to prepaid metering(self financing) or through Budgetary support from State Government/DISCOM. Since the implementation of the metering scheme is proposed through PPP on TOTEX mode, KSEBL do not consider any upfront payment for all the capital expenditure.

## Loan

For works other than metering works under Part A, DISCOM/State needs to raise counterpart funding through REC, PFC, Banks & other FIs. Further, counterpart funding from bilateral/multilateral funding agencies can also be leveraged for which the Government of India would extend benefits of reduced Government Guarantee fee. The loan can be drawn at any stage of the project, whenever grant funds are not available to meet the obligations of the project. DISCOM has the provision to prepay the loan component to the extent of the grant disbursed, for which no prepayment shall be levied by REC and PFC, in case loan is taken from them.

## Release of grant for Metering and Distribution Infrastructure Works

### a. Metering

Grant for metering works will be released on successful installation and commissioning of meter and essential services and data related to it are provided for a period of one month.

### b. Distribution Infrastructure Works

**Phase I:** 10% of the grant for Loss Reduction part of the project will be released as advance after approval of the DPR for Loss Reduction -5% on sanction and further 5% on award of works.

**Phase II:-** A total of 30% (including the advance 10%) of the grant component of the project cost of Loss Reduction part will be released and 30% of the grant component of the project cost of DPR for Modernization (- 10 % on sanction and 20% on award of works) will be released on the qualification of Results Evaluation Framework of the Action Plan for FY 2021-22 .

**Phase III:-** Cumulative release of 60% (including the earlier release) of grant component of the project cost of DPRs ) will be released on the qualification of Results Evaluation Framework of the Action Plan for FY 2022-23 .

**Phase IV:** A cumulative release of 100% of the grant component of the project cost of DPRs will be released on the qualification of Results Evaluation Framework of the Action Plan for FY 2023-24 . Out of the eligible 40%, 35% will be released on meeting the conditions prescribed in the guidelines and balance 5% will be released on submission of project completion report as per clause 4.8.1 of guidelines.

## Action Plan Formulation

Action plan includes two parts; the first part is the analysis of the reasons for losses, the steps which will be taken for reducing the AT&C losses and ACS-ARR gap along with the timeframe for taking these steps. Action Plan should also contain the activities and reforms expected to undertake to improve performance, reform measures for financial viability and operational efficiency as well as Annual Results, Outcomes and Evaluation framework for the entire scheme period. Need assessment and the work plan for loss reduction is the second part of action plan. Major works for components of Part A of the scheme, namely metering

including energy accounting and Distribution infrastructure works along-with their estimated cost based on the analysis is included in this part. **Action Plan** (including Part-I & Part-II) cleared by the Nodal Agency is to be recommended by Distribution Reforms Committee (DRC) chaired by Chief Secretary and approved by State Cabinet before submission to Nodal Agency for its approval by Monitoring Committee.

## **Results Evaluation Framework**

As part of the action plan of the State, a result evaluation framework comprising of pre-qualifying criteria and evaluation matrix would be formulated. The sanction of DPR for modernisation and release of grant for both loss reduction and modernisation works will be based on DISCOM meeting the prequalification criteria and achieving specified marks in the evaluation matrix. The indicative reform activities for result evaluation matrix is as follows.

- Mechanism to ensure prompt payment from Govt. Departments.
- Proper energy accounting of Subsidized category and this subsidy released to Utility in advance.
- Tariff reforms- annual tariff fixation, no creation of Regulatory Assets etc.
- Cost reflective tariffs - timely filing of tariff petitions, Multi Year Tariff and timely issuance of tariff orders
- Roadmap for funding accumulated and current financial losses clearance of part or whole of Regulatory assets through tariff or State funding.

### **a. Prequalification criteria to be met by DISCOM as per guidelines**

- DISCOMs would publish quarterly un-audited accounts within 60 days of the end of each quarter during first two years of operation of the Scheme (i.e. for FY 2021-22 and FY 2022-23) and thereafter audited quarterly accounts within 45 days from 3rd year onwards.
- Further, DISCOMs would publish audited annual accounts by end of December of the following year during first two years of operation of the Scheme (i.e. for FY 2021-22 and FY 2022-23) and thereafter audited annual accounts by end of September of the following year from 3rd year onwards.
- DISCOMs will have ensured that no new Regulatory Assets have been created in latest tariff determination cycle.
- State Government to ensure 100% payment of subsidy for the previous year and advance payment of subsidy up to current period in line with section 65 of EA2003 and wipe out the remaining subsidy amount by the end of the project period.
- All Government Department/ Attached Offices/ Local Bodies have made 100% payment of current electricity dues for the year under evaluation.
- Progress commensurate to commitment in putting Govt. Offices on prepaid meters.

- No. of days Payables to Creditors / suppliers for the year under evaluation is equal to or less than the projected trajectory as per results evaluation framework.
- Tariff order for the current year in which evaluation is being done and true up of penultimate year has been issued and implemented w.e.f. 1st April of current FY.

Utilities clearing the pre-qualifying criteria would be eligible for evaluation against the result evaluation matrix, which would determine their eligibility for release of funds for a particular year. The result evaluation framework would be fixed for each year depending on the cumulative performance as well as the annual performance.

Four basic categories of Results Parameters have been identified and weightage has been assigned to each of the category as under:

Table 3.6 Weightage for parameters of Result Evaluation Matrix		
Sl no	Category	Weightage
1	Financial Sustainability	60
2	Operational	20
3	Infrastructure works	10
4	Policy & structural reforms, Capacity building and IT/OT Enablement	10
	Total	100

A minimum score of 60 marks is needed for qualifying result evaluation matrix.

### Action Plan submitted by KSEBL to GOI

As per Clause 3.1.4 of the guidelines, Action Plan for implementation of the scheme is formulated by the DISCOM in consultation with the Nodal Agency / Ministry of Power. The action plan has been submitted by the DISCOM to the Nodal Agency for approval on the recommendation of the Distribution Reforms Committee (DRC) and with the approval of the State Cabinet on for approval. The details pertaining to KSEBL was analysed taking 2019-20 as the base year. The details pertaining to 2020-21 were not taken since the parameters do not represent the actual due to the pandemic. Accordingly Loss reduction and Modernisation works were identified to bring down the losses to less than 12% by 2025.

The Infrastructure action plan includes – plan for Loss Reduction, Modernisation & System Augmentation (which includes Transmission works, IT/OT, SCADA & other reliability improving Distribution works) . SCADA control centre with DMS have been considered in Kollam, Thrissur and Kannur. Upgradation of the existing city schemes in

Thiruvananthapuram, Kochi and Kozhikode and control centres at all districts have been included. The major proposed IT/OT works include Energy audit for the entire DISCOM, GIS and network Analysis etc.

The abstract of details of distribution infrastructure plan under RDSS is given below

<b>Table 3.7 - Proposed Distribution infrastructure works under RDSS scheme</b>				
Sl. No.	Targeted interventions for loss reduction	Units	Proposed Quantity)	Amount
				Rs Cr
<b>I</b>	<b>Loss reduction works</b>			
<b>1</b>	<b>Replacement of old/ frayed conductors</b>			
<b>A</b>	<b>11 kV line (Reconductoring)</b>			
<b>a</b>	OH	km	455.48	10.90
<b>b</b>	Covered Conductor	km	771.57	107.86
<b>c</b>	ABC	km	1579.88	205.02
<b>d</b>	<b>UG</b>	km	136.10	28.25
<b>B</b>	<b>LT line (Reconductoring)</b>			
<b>a</b>	ABC 3PH	km	6588.23	570.75
<b>b</b>	ABC 1 PH	km	51.09	1.82
<b>c</b>	Covered Conductor	km	67.16	17.46
<b>d</b>	OH	km	907.40	16.26
<b>2</b>	<b>Segregation of agricultural/ overloaded/lengthy feeders</b>			
<b>a</b>	Agriculture Feeder	Number	1.00	2.99
		km	18.50	
<b>b</b>	Lengthy / Overloaded feeder	Number	15.00	5.54
		km	33.90	
<b>3</b>	<b>Provision of ABC cables</b>		0.00	
<b>a</b>	<b>11 kV line (new)</b>		0.00	
	ABC		229.60	36.31
<b>b</b>	<b>LT line new</b>			



Sl. No.	Targeted interventions for loss reduction	Units	Proposed Quantity)	Amount
				Rs Cr
	ABC	km	99.90	11.84
<b>4</b>	<b>Provision/ Replacement of UG Cables</b>			
<b>a</b>	UG (New)	km	164.75	45.93
<b>5</b>	<b>HVDS Installation</b>			
	<b>HVDS ,(various kVA ratings)</b>	Number	35.00	0.92
<b>6</b>	<b>Additional HT lines</b>			
	<b>11 kV line (new)</b>			
<b>a</b>	OH	km	94.05	6.96
<b>b</b>	Covered Conductor	km	14.60	3.58
<b>8</b>	<b>Capacitor bank installation/ Others</b>	Number	22.00	0.11
<b>9</b>	<b>Any other work</b>			
<b>a</b>	Other works (LT Line works/ OH Conversion, Transformer Installation/ Replacement/ Enhancement etc.)	LS		167.08
<b>II</b>	<b>Total (LOSS REDUCTION WORKS )</b>			1239.58
<b>MODERNISATION &amp; SYSTEM AUGMENTATION WORKS</b>				
1	Additional HT & LT works to improve the quality of supply	As applicable		769.18
2	Any other works for improving reliability and quality of supply	As applicable		
	<b>Total Distribution infrastructure works</b>			2008.76

The yearwise outlay of estimate for infrastructure works- loss reduction and modernization under PART A Scheme is attached as **Annexure 3.2.1** . In addition to the above, Rs 595.32 Cr and Rs 200 Cr has been proposed for SCADA and associated IT /OT works. The details are provided in IT PLAN detailed as item 3 of this petition.

**Table 3.8 :- Estimate submitted to GoI for infrastructure works (excluding metering) under RDSS**

SI No	Category	Proposed Amount (Rs Cr)
1	Distribution Infrastructure works	2008.76
2	Transmission works	970
3	SCADA	595.32
4	IT/OT	207
5	Total	3781.08
<b>Total under RDSS for SBU-D</b>		<b>2811.08</b>

Prepaid Smart meter installation works for Rs 8200 Crore including installation of Smart meters in HT/EHT consumer premises, Government consumers, LT consumers with monthly average consumption above 200 units & with Smart metering with AMI for feeders, Division Borders and DTRs have been considered for implementation in the first phase by 31.12.2023. The timeline proposed for prepaid metering is proposed to be completed by March 2025.

The implementation of pre-paid smart meters for all consumers of KSEBL is being proposed in 3 phases as detailed below:

**Table 3.9 Proposal for implementation of smart meters**

SI. No	Phase of the Scheme	Smart meter	Estimated amount (Rs. Crore)	Scheduled completion
1	Phase I - Feeder & border (5,999), DTR meters (87,133), HT/EHT consumers (7,000) and Govt. consumers (1,65,095), all industrial (1,35,897) & commercial (22,68,621) consumers and domestic consumers having monthly average consumption above 200 units (10,45,613)	37,15,358	2,424	By end of December 2023
2	Phase II - RAPDRP & IPDS towns (63 towns) - for replacement of remaining LT consumer meters	40,50,000	2,430	By end of December 2025
3	Phase III - replacement of remaining LT consumer meters	55,76,697	3,346	By end of December 2025
	Total	1,33,42,055	8,200	

The year wise out lay of prepaid metering is enclosed as **Annexure 3.3.1.**

Thus the total estimate proposed under RDSS for SBU-D is given in table below

<b>Table 3.10 Estimate submitted as part of action plan under RDSS scheme</b>		
<b>SI No</b>	<b>Category</b>	<b>Proposed Amount (Rs Cr)</b>
1	Distribution Infrastructure works	2008.76
2	Transmission works	970
3	SCADA	595.32
4	IT/OT	207
<b>Total Infrastructure-RDSS</b>		<b>3781.08</b>
5	Sub Total under RDSS for SBU-D	2811.08
6	Prepaid metering works	8200
7	RDSS-Part B- Capacity Building	50
<b>8</b>	<b>Total under RDSS for SBU-D incl prepaid metering</b>	<b>11061.08</b>

The year wise abstract under RDSS scheme for SBU-D as per the action plan submitted to the Nodal Agency, PFC is given in table below.

<b>Table 3.11 Proposed estimate under RDSS action plan of SBU-D</b>					
<b>SI No</b>	<b>Category</b>	<b>Proposed Amount (Rs Cr)</b>			
	<b>Particulars</b>	<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>Total</b>
I	Distribution Infrastructure works	918.52	709.9	380.34	2008.76
1	Loss reduction	594.43	406.69	238.47	1239.58
2	Modernisation	324.09	303.21	141.87	769.18
II	SCADA	148.8	238.13	208.39	595.32
III	IT/OT	62.1	82.8	62.1	207
	Sub Total(I+II+III)	1129.42	1030.83	650.83	2811.08
IV	Prepaid Smart Metering Works	1429	3425	3346	8200
V	RDSS-Part B-Capacity Building	10	20	20	50
	<b>Total(I+II+III+IV+V)</b>	<b>2568.42</b>	<b>4475.83</b>	<b>4016.83</b>	<b>11061.08</b>

Honorable Commission may please note that the estimate given in table above is only a provisional figure as sanction for the same is yet to be received from Government of India. After receiving approval from Government of India, KSEBL will submit the project details along with Detailed Project Report based on the sanctioned amount, before Honorable Commission for approval. For the time being Honorable Commission may kindly approve the estimate as given in table above.

### **3.3 IT Plan**

#### **Initiative in information Technology -IT Wing**

KSEB Ltd is in the process of transforming in to a fully automated Power Utility for becoming one of the model Utilities in India. Completing the process of building up a solid IT infrastructure which includes Data Centre, Data Receiving Centre, Wide Area Network connecting all offices etc. along with necessary Software Applications for the core functional areas of the Utility is the primary objective. As part of the above, the following activities are being carried out.

1. Software development, testing, implementation and maintenance related to the automation of various functional areas.
2. Setting up and maintaining IT infrastructure including Enterprise class Servers, Storage, Backup Units, LAN/WAN, Network Security devices etc.
3. Assessing hardware requirements, providing technical specifications and conducting technical evaluations for procurement for various offices
4. Providing complete technical support for running and up keeping of IT Systems
5. Arranging IT based training for KSEB employees.
6. Implementation of various IT and SCADA Projects under RAPDRP scheme.

#### **Major IT Projects implemented in KSEBL**

The primary focus of computerization activities is given to the automation of core functional areas of the Organization. Thus considerable achievements in the automation of billing of LT & HT/EHT consumers, Corporate Accounting, Supply Chain Management, Human Resource Management etc were attained. The major projects carried out are noted in the table below:

<b>Table 3.12 Major IT works Major IT Projects</b>		
<b>No</b>	<b>Projects</b>	<b>Application</b>
1	ORUMA	LT Billing Application Software
2	ORUMANET	Centralised LT Billing Application software-
3	ORUMA WEB	Online Portal for LT Consumers
4	HRIS	Human Resource Management System
5	Energize	HT/EHT Billing System
6	SARAS	ARU Accounting System
7	SCM	Supply Chain Management System
8	RAPDRP/IPDS	IT infrastructure (Data Centre, WAN etc) for 43 towns
9	PROMOS	Capital Works Monitoring software

In addition to the above, the following IT related projects was also envisaged with financial support under Central Aided Schemes through RDSS scheme as well as own fund for the next control period. Capital Investment Plan of IT -under Distribution SBU for the control period is also submitted as under for approval.

### **I. IT works under Centrally Aided projects**

#### **A. Revamped Distribution Sector Scheme (RDSS)**

Revamped Distribution Sector Scheme – A Reforms based and Results linked Scheme” is a scheme envisaged by Government of India with the objective of improving the quality and reliability of power supply to consumers through a financially sustainable and operationally efficient Distribution Sector. The scheme is detailed as item 2 of this petition. The IT works envisaged under RDSS scheme includes the following

- Prepaid Smart Metering and System Metering
- SCADA/DMS Works
- IT/OT works

#### **a. Prepaid Smart Metering & System Metering**

Part – A of the scheme is intended for Prepaid Smart Metering which includes the following.

- Consumer metering- Smart metering with prepaid functionality
- System Metering(Feeder meter, DT & Border meter) –Communicable with AMI features along with unified billing & collection system) and upgradation of the Distribution Infrastructure.

Vide Govt. of India Gazette no.CG-DL-E-19082021-229126 dated 19.08.2021, Ministry of Power has notified that all consumers (other than agricultural consumers), shall be supplied electricity with Smart Meters working in prepayment mode, conforming to relevant IS within the specified time lines so as to convert the entire meters by March 2025. All feeders and distribution transformers shall also be covered under AMI (Advanced Metering Infrastructure) by March 2025.

KSEBL has prepared a proposal for the implementation of Smart Meters working in prepayment mode (as mandated by Government of India) in various phases which is detailed under item 2 of this petition.

The implementation of pre-paid smart meters for all consumers of KSEBL is being proposed in 3 phases as detailed below:

<b>Table3.13 Proposal for implementation of smart meters</b>				
<b>Sl. No.</b>	<b>Scheme</b>	<b>Estimated no. of smart meter nodes</b>	<b>Estimated amount (Rs. Crore)</b>	<b>Scheduled completion</b>
1	Phase I - Feeder & border (5,999), DTR meters (87,133), HT/EHT consumers (7,000) and Govt. consumers (1,65,095), all industrial (1,35,897) & commercial (22,68,621) consumers and domestic consumers having monthly average consumption above 200 units (10,45,613)	37,15,358	2,424	By end of December 2023
	Phase II - RAPDRP & IPDS towns (63 towns) - for replacement of remaining LT consumer meters	40,50,000	2,430	By end of December 2025
3	Phase III - replacement of remaining LT consumer meters	55,76,697	3,346	By end of December 2025
	<b>Total</b>	<b>1,33,42,055</b>	<b>8,200</b>	

The year wise split details is given in table below.

<b>Table 3.3 Yearly outlay for prepaid smartmetering under RDSS scheme</b>				
<b>Particulars</b>	<b>FY-23</b>	<b>FY-24</b>	<b>FY-25</b>	<b>Total</b>
<b>Prepaid metering-DBFOOT basis</b>	1429	3425	3346	8200

The details of project are enclosed as **Annexure 3.3.1** of this petition

The investment plan for prepaid smart metering is not yet finalized. KSEBL will file a separate petition on installation of prepaid metering on finalizing the investment plan of prepaid metering. KSEBL is not considering any expenditure under Board's fund in this petition and is expecting to implement the same in TOTEX mode.

## **b. SCADA /DMS**

This is included in **Distribution infrastructure** works under PART A Scheme of R-APDRP Scheme which comprises of **Modernisation works** to improve Reliability – which includes SCADA with DMS / FPI etc. in urban areas, New Substations & Augmentation of Lines & substations, Additional lines/ feeders, and other Distribution works which improves reliability of the Power Sector under RDSS scheme.

### **SCADA/DMS system**

As part of RAPDRP Part-A Scheme, SCADA/DMS Control Centers are already established in Trivandrum, Ernakulam & Kozhikode Towns. Now, as part of RDSS scheme, the implementation of SCADA/DMS system is proposed in three towns viz. Kollam, Thrissur and Kannur Towns (Group-A towns). SCADA/DMS system includes installation of FRTU integrated RMUs, integrating substations and installation of FPIs & integrating with the new SCADA control centers in each town. The scheme envisages the real time monitoring and control of the distribution system through SCADA/DMS system from SCADA/DMS control centers in each town, encompassing all distribution Substations and HT distribution network.

### **SCADA with Fault Pass indicator(FPI) in 53 Towns**

RDSS also includes implementation of SCADA with FPI scheme in 53 statutory towns (Municipalities – Group-B towns) in Kerala. In Group B Towns, 4 Nos. new Zonal control centers has been proposed for the real time monitoring of the HT distribution system including all the feeding substations and installation of FPIs in HT network & integrating with the new Zonal SCADA control centers.

As per the Standard Bidding document for SCADA, FPI included under RDSS scheme should be equipped to detect phase to phase and phase to earth fault currents on HV network, to detect voltage presence interruptions to time stamp faults and voltage dips, to transmit information to control center spontaneously, to provide local light indication of fault, to provide operators with all useful information for fault finding and preventive maintenance and to be self-equipped at all the times including outages. FPIs sends the monitoring data to the SCADA server and receives the control command sent by the SCADA server to achieve bidirectional controllable operation (Set/Reset of fault signal). Seven years FMS/AMC of FPI is envisaged in the scheme.

Installations of 8 to 9 nos of FPIs are anticipated in each HT feeder. The cost of one FPI as per the DPR template forwarded by PFC, including communication system & integration

with SCADA control Center is Rs. 1.64 Lakhs. With seven year AMC, the cost per FPI is expected to be Rs. 1.8 Lakhs.

Under RDSS scheme, FPIs are proposed to be installed in the 11 KV feeders emanating from the substations feeding the selected 53 towns. Approximately 13,500 FPIs are proposed to be installed under RDSS and will be integrated with the new Zonal Distribution Control Centers. The total amount envisaged for SCADA works is Rs 595.32 Cr. The yearwise outlays given in table below

<b>Table 3.14 Yearly outlay for prepaid smart metering under RDSS scheme</b>				
<b>Particulars</b>	<b>FY-23</b>	<b>FY-24</b>	<b>FY-25</b>	<b>Total</b>
SCADA implementation in 3 towns, SCADA implementation in 53 statutory towns & OMS upgradation works in 3 existing SCADA towns in Kerala	148.80	238.13	208.39	595.32

The details are enclosed as **Annexure 3.3.2** of this petition

### **C. IT/OT works**

IT/OT works are also envisaged under PART A of RDSS scheme. An estimate amount of Rs 207 Crore is envisaged for IT/OT works under this scheme. This includes enterprise asset management solutions, document management system, customer relationship management, energy audit, GIS and network analysis, Software tools for Cyber security, testing etc., meter data acquisition system, In-Memory Computation for Business Intelligence Wares housing (BW) etc. MoP, GoI is encouraging Big Data Analytics initiatives in various sectors including Electric Power Utilities. It is envisaged to develop a system for Big Data Analytics with an objective to transform large amount of raw data from the Core Applications of KSEB to a knowledge base for analytical purpose. The yearwise outlay of works is given in table below.

<b>Table 3.15 Yearwise outlay of IT/OT works under RDSS Scheme</b>					
<b>SI No</b>	<b>Particulars</b>	<b>22-23</b>	<b>23-24</b>	<b>24-25</b>	<b>Total (Rs. Cr)</b>
1	e-Bidding (SRM)	0.3	0.4	0.3	1.00
2	Enterprise Asset Management (EAM or PM)	1.5	2	1.5	5.00
3	Document Management System (DMS)	0.3	0.4	0.3	1.00
4	Customer Relationship Management (CRM)	0.6	0.8	0.6	2.00
5	Energy Audit	0.6	0.8	0.6	2.00
6	BW/MIS	1.5	2	1.5	5.00



SI No	Particulars	22-23	23-24	24-25	Total (Rs. Cr)
7	GIS and Network Analysis	24	32	24	80.00
8	Meter Data and Acquisition System (MDAS)	0.9	1.2	0.9	3.00
9	Centralised Customer Care Center (CC)	1.5	2	1.5	5.00
10	Web Self Service (WSS) (and Centralized Customer database - CCDB)	1.5	2	1.5	5.00
11	Spot Billing	0.3	0.4	0.3	1.00
12	Network Management System (NMS) & Enterprise Management System(EMS)	0.9	1.2	0.9	3.00
13	Employee Self Service (Implementation of ESS MSS system)	0.3	0.4	0.3	1.00
14	Replacement of servers in system and upgradation of storage	4.2	5.6	4.2	14.00
15	In-Memory Computation for Business Intelligence Wares housing (BW)	3	4	3	10.00
16	Software tools for Cyber security, testing etc.	3	4	3	10.00
17	Mail / messaging System	1.2	1.6	1.2	4.00
18	Spot Billing machines	4.2	5.6	4.2	14.00
19	Replacement of Core/Distribution/Access Switches and Core Routers in DC & DR	3.6	4.8	3.6	12.00
20	Replacement of PC/Printer/networking equipment in 776 Section offices	7.5	10	7.5	25.00
21	License for operating system	1.2	1.6	1.2	4.00
	<b>Sub Total</b>	<b>62.1</b>	<b>82.8</b>	<b>62.1</b>	<b>207.00</b>

The details of works is given as **Annexure 3.3.3** of this petition.

## **II. IT Plan under Board fund**

### **i. Civil works and associated works for SCADA implementation**

The infrastructure cost for construction of Building/Civil works of control centres, setting up Physical Infrastructure for SCADA/DMS is not providing under RDSS scheme. An amount of Rs 5.80 Cr is included under own fund for the construction of Building/Civil works of control centres in Ten Districts under RDSS (including DRR Centre) and Rs 9.12 Cr is included under own fund for setting up Physical Infrastructure including AC- DG installation, Electrical work , false ceiling , Fire fighting ETC for 10 District wise Control centres [Kollam,

Thrissur, Kannur, Idukki, Pathanamthitta, Alappuzha, Kottayam, Malappuram, Palakkad & DRR Center at EKM).

In addition to the above, an amount of Rs 4 crore is included under own fund for establishing optical fibre connectivity to RMUs & Substations in existing SCADA DMS Towns. The yearwise outlay is given in table below.

<b>Table 3.16 Yearly outlay under SCADA/DMS implementation under own fund (Amount Rs Cr)</b>							
<b>SI No</b>	<b>Particulars</b>	<b>FY-23</b>	<b>FY-24</b>	<b>FY-25</b>	<b>FY-26</b>	<b>FY-27</b>	<b>Total</b>
1	Construction of Building/Civil works of control centres in Ten Districts under RDSS (including DRR Centre)	4.35	1.45				5.80
2	Setting up Physical Infrastructure including AC-DG installation, Electrical work, false ceiling, Fire fighting ETC for 10 District wise Control centres [Kollam, Thrissur, Kannur, Idukki, Pathanamthitta, Alappuzha, Kottayam, Malappuram, Palakkad & DRR Center at EKM)	4.56	4.56				9.12
3	Establishing optical fibre connectivity to RMUs & Substations in existing SCADA DMS Towns, through KFON Network.			1.20	1.60	1.20	4.00
	<b>Sub Total Board fund</b>	<b>8.91</b>	<b>6.01</b>	<b>1.20</b>	<b>1.60</b>	<b>1.20</b>	<b>18.92</b>

The details of works is enclosed as **Annexure 3.3.4**

## **ii. IT enabled services**

This includes implementation of various IT Projects associated with the automation of Core functional areas. Migration of Disaster Recovery Centre to Cloud, implementation of e office, implementation of videoconferencing, enhancement of KSEB WAN using KFON and SDWAN Technology, Implementation of ISO-27001 Security standards for various IT/OT implementations, Implementation of Supply Chain Management in Transmission & Generation Wing, Biometric Attendance System in KSEBL offices, IT Implementation for Renewable Energy Projects etc are some of the services. MoP has directed to develop a Crisis Management Plan at State/utility level in consultation with Sectoral CERT and CERT-In by September, 2017. Also it is directed to give utmost importance to cyber security. A Crisis

Management Plan at State/Utility level is being developed and will be approved soon. In order to ensure various cyber security aspects for the IT and OT systems at Distribution, Transmission and Generation sectors, KSEBL has decided to appoint a Cyber Security Consultant for development and implementation of a comprehensive cyber security policy for the whole Organization. Accordingly, tender works are in progress to appoint a Cyber Security Consultant. The scope of the Consultant is as follows

- To evaluate the IT security system of existing IT infrastructure and software Applications
- To develop a comprehensive cyber security policy for the Organization and handhold KSEBL for implementation of the policy
- Information security audit for availing ISO 27001 Certification for the Critical IT assets

The following projects will be implemented in KSEBL with the handholding support of the Cyber security Consultant

- Implementation of various advanced cyber security measures for improving the overall IT security landscape of the Organisation
- Availing ISO Certification for the Data Centre/DR Centre and other critical IT/OT assets.

An amount of Rs 5 crore is proposed for the formation of cyber Security Cell/Security Operations Centre.

A total amount of Rs 114.5 crores is proposed for the different IT enabled services during the control period 2022-2027. The details of works is enclosed as **Annexure 3.3.5**. The yearwise outlay is given in table below

<b>Table 3.17 Yearly outlay(Rs Cr) of IT enabled services</b>							
No.	Particulars	22-23	23-24	24-25	25-26	26-27	Total
1	Migration of Disaster Recovery Centre to Cloud	1	1	1	1	1	5
2	LT Billing - Replacement of computers and accessories in Electrical Sections	5	5	5	5	5	25
3	Procurement of Servers and accessories for various IT Projects not included under RDSS	1	1	1	1	1	5
4	Rollout of handheld devices in new Electrical Sections	0.5	0.5	0.5	0.5	1	3
5	Implementation of video conferencing System	0.5	0.5	0.5	0.5	1	3
6	Implementation of e-Office	1	1	1	1	1	5
7	Revamping of KSEB WAN using KFON and SDWAN Technology	2	2	2	2	1	9
8	Purchase of Computer Systems /other IT Systems for various offices	1	1	1	1	1	5
9	Rollout of new smart devices like Tablets/Smart phones to field offices/employees	1	1	1	1	1	5

10	Implementation fo ISO-27001 Security standards in various IT/OT Systems	1	1	1	1	1	5
11	Implementation of Supply Chain Management in Transmsision & Generation Wing	1	1	1	1	1	5
12	Biometric Attendance Management System in KSEBL offices	0.5	0.5	1	1	1	4
13	Formation of Cyber Security Cell/Security Operations Centre	1	1	1	1	1	5
14	Replacement of damages IT Systems in flood affected offices (Distribution, Transmission & Generation)	1	1	1	1	1	5
15	IT Implementation for Renewable Energy Projects	1	1	1	1	1	5
16	Software Application development through Startup firms	0.5	0.5	0.5	0.5	0.5	2.5
17	Installation of Commercial Display System in front of HQ building for advertisement purpose	3	3				6
18	Digitization of libray and record room	0.5	0.5				1
19	Implementation of mission-critical PTT/PTV radio communication System	3	3				6
20	Other anticipated IT Projects	1	1	1	1	1	5
	<b>Sub Total</b>	<b>26.5</b>	<b>26.5</b>	<b>20.5</b>	<b>20.5</b>	<b>20.5</b>	<b>114.50</b>

### **iii. Extending OFC connectivity & Sensor devices in LT network**

The project envisages the following

#### **i. Establishing optical fibre connectivity to RMUs & Substations in existing SCADA DMS Towns, through OFC Network.**

The project envisages establishing optical fibre connectivity to RMUs & Substations in existing SCADA DMS Towns, through OFC Network. 2994 Nos. FRTU fitted RMUs are integrated with SCADA/DMS control centers in Trivandrum, Ernakulam & Kozhikode. Around 50% of RMUs are being remotely operated from Control centers. At present 2G/3G SIMs are provided in RMU locations (through M/s.Vodafone). The main hurdle being faced for remote operation of RMUs is unstable/fluctuating 2G/3G signals. It is expected that by the end of year 2022, OFC Network along major routes (~32,000 kms. through distribution poles) will be available free of cost from KFON. An amount of Rs. 3.55 crores will be required for extending OFC connectivity from KFON OFC routes to the RMU locations & Substations in existing SCADA/DMS Towns, through OFC Network.

**ii. Providing Intranet connectivity to 1500 KSEBL Offices including Section Offices with Data Center using OFC Network by replacing hardware requirement by replacing MPLS links.**

At present MPLS connectivity (from Airtel & BSNL) are being provided in KSEBL Offices for stabling intranet connectivity from Data Center for availing applications such as Orumanet, etc. As per the Joint Venture Agreement for KFON project, intranet connectivity will be provided by KFON OFC free of cost in all the KSEBL Offices including Section Offices with Data Center. However, the networks Router & Switches available in Section offices is more than 7 years old and are to be replaced with new one. An amount of Rs. 9 crores is estimated for replacing the end equipments in KSEBL offices such as Routers, for the effective utilization of OFC network. Once OFC connectivity is established, MPLS links can be removed in a phased manner.

**iii. Implementation of projects with CDAC/GoI funding: Digital substation architecture, AMI solutions, Battery Energy Storage System, Solid State Transformer, Power Quality Devices and Intelligent devices for LT Distribution Monitoring & Control.**

National Mission on Power Electronics Technology (NaMPET) is a mission programme of Ministry of Electronics & Information Technology (MeitY) Govt. of India. C-DAC Trivandrum is the nodal agency of NaMPET programme. C-DAC(T) proposed a project 'Smart Power Quality Centre (SPQC) in Distribution Grid' to be funded by NaMPET Phase III programme, for the implementation of Smartgrid technologies in electric distribution network. This scheme includes projects such as Implementation of digital substation architecture, Advanced Metering Infrastructure (AMI) Solutions, Implementation of Battery Energy Storage System (BESS), Installation of Solid State Transformer, Power Quality Devices and Intelligent Sensor network for Distribution system Monitoring & Control. The overall budget outlay is Rs. 15.00 Crores. An MoU is executed with CDAC in this regard. The KSEBL contribution for the project is to provide existing infrastructure, spares, communication facilities, man power support for testing & monitoring, etc. and the above in-kind contribution value is quantified as Rs. 147 lakhs. This amount of Rs. 1.4 Cr. was sanctioned vide BO (FTD) No. 726/2020 dated 01.12.2020. The details of works are enclosed as **Annexure 3.3.6.**

The year wise capital outlay is given in table below

<b>Table 3.18 Yearwise outlay for extending OFC connectivity (Amount Cr)</b>					
		<b>FY-23</b>	<b>FY-24</b>	<b>FY-25</b>	<b>Total</b>
1	Providing Intranet connectivity to 1500 KSEBL Offices including Section Offices with Data Center using KFON Network (for replacing MPLS links)	1.8	3.6	3.6	9
2	Providing Intranet connectivity to Substations (~465 Nos.), Generating Stations (~42 Nos.), CPPs (~20), etc. with SLDC using KFON Network.	0.71	1.42	1.42	3.55

3	Implementation of projects with CDAC/GoI funding: Digital substation architecture, AMI solutions, Battery Energy Storage System, Solid State Transformer, Power Quality Devices and Intelligent devices for LT Distribution Monitoring & Control.	0.28	0.56	0.56	1.4
<b>Sub Total</b>		<b>2.79</b>	<b>5.58</b>	<b>5.58</b>	<b>13.95</b>

The summary of yearwise capital outlay of IT projects is given in table below

<b>Table 3.19 Capital outlay for IT under SBU-Distribution</b>							
Particulars	Type of project	22-23	23-24	24-25	25-26	26-27	Total Amount (Cr)
<b>IT enabled services</b>	KSEBL	26.5	26.5	20.5	20.5	20.5	114.5
<b>OFC connectivity &amp; Sensor devices LT network</b>	KSEBL	2.79	5.58	5.58		0	13.95
<b>SCADA/DMS implementation in three towns, SCADA with FPI implementation in 53 statutory towns &amp; OMS upgradation works in 3 existing SCADA towns in Kerala</b>	KSEBL	8.91	6.01	1.2	1.6	1.2	18.92
	RDSS	148.8	238.13	208.39	0	0	595.32
	Sub total	<b>157.71</b>	<b>244.14</b>	<b>209.59</b>	<b>1.60</b>	<b>1.20</b>	<b>614.24</b>
<b>IT/OT works - Loss reduction &amp; modernization other than RDSS in KSEBL</b>	RDSS	62.1	82.8	62.1	0	0	207
<b>Prepaid metering-DBFOOT basis</b>	RDSS	1429	3425	3346	0	0	8200
<b>Total IT Plan outlay</b>	<b>KSEBL</b>	<b>38.197</b>	<b>38.09</b>	<b>27.28</b>	<b>22.1</b>	<b>21.7</b>	<b>147.37</b>
	<b>RDSS</b>	<b>1639.90</b>	<b>3745.93</b>	<b>3616.49</b>	<b>0</b>	<b>0</b>	<b>9002.32</b>
<b>Total IT plan</b>		<b>1678.10</b>	<b>3784.02</b>	<b>3643.77</b>	<b>22.1</b>	<b>21.7</b>	<b>9149.69</b>

### **3.4. Safety Plan**

The main objective of safety wing in KSEB Ltd is to maintain a persistent and systematic safety culture in the organization by reducing the accidents to zero level. With this view, KSEBL has announced to make 2022 "ZERO ACCIDENT YEAR".

The major proposals for improving the safety culture of employees and adopting new technologies for reducing the number of accidents from KSEB Ltd installations are listed below:

1. **Installation of LT spacers:** To avoid accidents to public due to conductor snapping, it is decided to provide spacers on war footing basis as a special drive in prioritized locations. Targets have been fixed for all Electrical Circles with the aim of completion of installation of 23 Lakh spacers in LT lines during the six month period from October 2021 to March 2022. Also installation of spacers has to be continued as the 2<sup>nd</sup> phase for the remaining areas also; from April 2022 till 100% completion is achieved. Total spacers to be installed for the financial year from April 2022 to March 2026 is 3.2 Cr approximately and financial commitment towards this is calculated as Rs.368 Cr. An amount of Rs 19.55 Cr is to be provided under safety wing for the financial year 2022-23 and Rs 44.55 Cr for each of the financial years 2023-24, 2024-25, and 2025-26.
2. **Providing safety kit to all line staff in Distribution wing:** KSEBL is issuing safety kit containing 14 safety equipment such as gloves, helmet, Safety belt, safety shoes, rain coat, jacket, L.T tester, L.T Earth rod etc to every lineman in distribution wing by accounting it through HRIS. The objective is to ensure the usage of personal protective equipments as per Regulation 19 of CEA Safety regulation 2010, by all line staff in Electrical section offices. Safety kits are to be provided to all line staff in Electrical section offices and around 14,000 numbers of kits are required. Torn out and damaged items in the safety kit have to be replaced as and when required for ensuring safety. Expenditure for this is estimated as Rs 3 Cr every year.
3. **MIDEA:** KSEBL has accorded sanction for establishing a new unit named MIDEA (Manufacturing unit for Innovative Devices, Equipment and Accessories) for driving innovations within KSEBL, manufacturing useful devices to enhance workplace safety, for assessing whether concepts from outside the KSEBL hold potential for the utility etc. In the initial phase, MIDEA will be manufacturing ACSR Detector, AB switch Flags, Special Line shorting Clips, Earth spikes, Voltage Detector B-Alert, Special type ladders etc. The total financial commitment will be Rs 5 Cr for 5 year period.
4. **Innovative Pilot Projects on Safety:** Several innovative safety proposals are being received from KSEBL staff as well as external agencies offering electrical safety to human as well as animals by isolating electric supply effectively in case of faults, tripping and alert systems to avoid accidents due to conductor snapping etc and also for loss reduction and ensuring safety to Board Installations. An amount of Rs.20 Lakh per annum is estimated for the pilot implementation of such proposals/projects if seen valid, on scrutiny by MIDEA.
5. **Safety awareness:** An expenditure of Rs. 5 Lakh every annum is estimated for imparting electrical safety awareness to public through various means such as conducting awareness programmes, issuing safety booklets, brochures etc every year.
6. **Purchase of Safety Vest:** A financial commitment of Rs.1.1 Cr every annum is estimated for procuring safety vests for the use of distribution field staff (both workmen and Officers up to the level of Executive Engineer) every year.
7. **Miscellaneous Safety Works:** An expenditure of Rs 0.1 Cr is estimated for each of the financial years 2022-23, 2023-24, 2024-25, 2025-26 for Miscellaneous Safety

Works. An expenditure of Rupees 1 Cr is to be provided under the financial year 2026-27.

The yearwise capital outlay for safety plan is as shown in table below:

<b>Table: 3.20 Capital Outlay for Safety Plan</b>							
<b>SI No</b>	<b>Particulars</b>	<b>Amount (Rs in Cr)</b>					
		<b>FY-23</b>	<b>FY-24</b>	<b>FY-25</b>	<b>FY-26</b>	<b>FY-27</b>	<b>Total</b>
1	Providing LT Spacers	19.55	44.55	44.55	44.55	nil	153.2
2	Safety Innovative Pilot Proposals.	0.2	0.2	0.2	0.2	0.2	1.0
3.	Public awareness Programmes on Safety	0.05	0.05	0.05	0.05	0.05	0.25
4.	Purchase of Safety Kit.	3	3	3	3	3	15
5.	Safety Project MIDEA	1	1	1	1	1	5
6.	Purchase of Safety Vest	1.1	1.1	1.1	1.1	1.1	5.5
7.	Miscellaneous Safety Works	0.1	0.1	0.1	0.1	1.0	1.4
	Total	25.00	50.00	50.00	50.00	6.35	181.35

**The details are enclosed as Annexure 3.4.1**

### **3.5. Other funded works**

In addition to the above, the other funded works such as Consumer contribution works and MP,MLA ,Local body funded works has to be carried out on priority basis. A tentative outlay of Rs 200 crores is proposed for each year of the control period 2022-27.



### 3.6. E-Mobility Plan

Kerala aims to be one of the front-runners in the adoption of Electric Mobility and has been among the earliest States in India to adopt an approved Electric vehicles Policy. Government of Kerala vide order dated 10.03.2019 has approved Electric Vehicle Policy. The vision of the Policy is "to embrace electric mobility as a tool to promote shared mobility and clean transportation and ensure environmental sustainability, pollution reduction, energy efficiency and conservation, and to create an ecosystem for manufacturing EV components in Kerala." The Policy targets to have 1 million EVs on the road by 2022 including a Pilot Fleet of 200,000 two-wheelers, 50,000 three wheelers, 1000 goods carriers, 3000 buses and 100 ferry boats by 2020. As part of the Policy, the Kerala State Electricity Board Ltd. (KSEB) has been appointed as the State Nodal Agency for establishing a charging infrastructure for electric vehicles (EVs). KSEBL vide Mid Term petition dated 27.03.2021 submitted the initiatives taken by KSEB Ltd, towards adoption of EV policy in the State of Kerala for approval. The following initiatives have been taken by KSEB so far.

#### 1. **E-Mobility Promotion Fund**

The project includes establishment of 32 charging stations. The work of 6 stations completed and the work of 26 stations is ongoing. Government of Kerala vide GO (Rt) No 473/2019/TRANS dated Tvm 15.10.2019 has sanctioned Rs 8.20 Cr through E- mobility Promotion fund, for the establishment of 32 EV charging stations . Rs 5 Crore was received on 08.06.2020.

##### **i. 6 Pilot stations**

In the first phase, KSEBL has established 6 Pilot EV charging stations in the corporation area with a view to build public awareness on E-Mobility. The details of locations and expenditure incurred are given in Table below. The expenditure for setting up of EV charging stations include supply, Installation, testing and commissioning of chargers ,civil works for site development and electrical downstream works.

Sl No	District	Location	Amount(Rs in Lakhs)
1	Thiruvananthapuram	Electrical Section, Nedom	12.90
2	Kollam	Electrical Section,Olai	18.62
3	Ernakulam	Vydyuthi Bhavanam ,Palarivattom	15.81
4	Thrissur	110kV Substation,Viyyur	15.32
5	Kozhikkode	220 kV substation,Nallalam	22.80
6	Kannur	110kV Substation,Chovva	16.52
Total			101.97
			1.0197 cr

Thus the total expenditure for installation of 6 electric vehicle charging stations amounting to Rs 1.02 crores. The above stations become operational on 07.11.2021 and the expenditure towards the same has been met through E-mobility promotion fund.

In order to implement the payment integration for the above charging stations, Letter of Award for Supply and Implementation of Cloud based Charging Station Management Application ElectreeFi through Mass tech Controls Pvt Ltd for the use of Electric Vehicle charging stations at six locations in Kerala amounting to Rs 458784 was issued and the work completed.

ii. **26 ongoing stations**

Tenders were floated for setting up of remaining 26 stations as phase-II and the works are in progress. The work involves associated civil works like platform, canopy, bollard, marking of area, name board etc and supply, installation and testing and commissioning of 26 charging stations with 5 year warranty. The expenses towards civil and electrical works per site is expected Rs 50000/- and Rs 30000/- respectively. The anticipated total expenditure is Rs 5.41 cr.

iii. **Establishing a statewide network of Pole mounted Charging stations for Two wheelers / Three wheelers**

There has been enquiries and requests from the e- rickshaw/ 2 wheeler segment for establishing suitable charging points. Pole mounted charging points in appropriate locations of the city geographical area can surely improve the mobility of e –rickshaw and a pilot project in the most e – 3 wheeler penetrated area will be ideal in further expanding the charge –points.

**A pilot project** of pole mounted EV charging stations for 2 wheelers and 3 wheelers has been implemented successfully in Kozhikkode city for 10 pole mounted EV charging stations which was inaugurated by Honorable Minister of Electricity on 09.10.2021. The expenditure incurred for the project is 2.52 Lakhs. Honorable Minister of Electricity in the meeting held on 12.10.2021 has directed to set up pole mounted charging points for 2 and 3 wheelers pan Kerala with minimum one in all the 140 LA constituencies. KSEBL has requested Government of Kerala to provide sanction for utilizing the balance of sanctioned amount of E-Mobility Promotion Fund.

The charging points are proposed in the city as well as suburban regions across the State . Availability of sufficient charging points in all parts of State can impact the choice of potential EV buyers which will inturn lead to wide spread adoption of E mobility in the State as envisaged in the EV policy.

KSEBL has floated tenders to implement upto 1140 Nos of pole mounted EV charging stations and nearing to work .The total expenditure is estimated as Rs 3.99 crores. KSEBL has requested Government of Kerala to provide sanction for utilizing the balance of sanctioned amount of E-Mobility Promotion Fund and also requested to sanction an additional amount of Rs 1.92 Cr in the E-mobility promotion fund for implementing the project.

The details are given in table below:

Table 3.22 Expenditure through EMobility Promotion fund			
Sl No	Project	Expenditure	Remarks
		(Rs cr)	
1	6 EV Charging stations(EVCS)	1.02	
2	Cloud based Charging station Management Application for the 6 EVCS	0.0458	
3	26 EV charging stations	5.41	
4	Pole mounted EVCS Pilot-10 Nos	0.0252	
5	Proposed Pole mounted EV charging network across the state(1140 Nos)	3.99	Requests sanction to utilise E-mobility promotion fund
	<b>Sub total</b>	<b>10.49 Cr</b>	

### 3. **EVCS – FAME II – GoI Funding**

The Department of Heavy Industries, Government of India has invited EoI under FAME II (Capital Subsidy Scheme) inviting proposals for availing incentives under Faster Adoption and Manufacturing of Electric Vehicles phase II (FAME II scheme) for the deployment of Electric Vehicle charging infrastructure in selected cities in India during August 2019. The incentive ranges from 50% to 100% capital cost, depending on the category, specifically defined in this respect in the EoI. With Kerala having seven cities coming under the category of cities prescribed in the EoI, KSEBL has applied for 211 charging stations under the scheme. DHI issued preliminary in principle approval to all the above stations which includes 58 proposals on KSEBL land and 153 proposals on non KSEBL land. The final fund approval by DHI is subjected to the submission of consent letters from land owners of the EV charging stations

DHI has issued fund approval to 58 locations owned by KSEBL after giving consent letter by KSEBL. Being the nodal agency for EVCS within the State , KSEBL has taken an initiative by establishing the work of 30 EVCS on KSEBL land. Out of this, final permission granted for 30 nos. Work of this 30 stations progressing. The total expenditure amounts to Rs 8.72 Cr. as given in table below.

Table 3.23 Estimate Details for 30 stations under Fame II		
Particulars	Amount (Rs)	
Supply Installations and testing of Equipment	63283203	
Power Extension & Earthing and Name Board (Rs)	9000000	
Civil Works (Rs)	15000000	
Total(Rs)	87283200	Rs 8.728 cr

70 % of the benchmark cost of the equipment can be availed under FAME II subsidy scheme and balance shall be borne by KSEBL. The financial burden of KSEBL considering the non-subsidy component of the equipment and other works amounts to Rs 4.9 Cr.

#### 4. **Procurement of Electric vehicles**

As the State Power Utility, KSEBL came forward with the adaption to the environment by replacement of the conventional IC Engine vehicles with electric vehicles for official purposes. KSEBL decided to execute the replacement of hired vehicles in a phased manner. An amount of Rs 9 crores is included in the capex plan for procurement of electric vehicles.

The capital outlay for Electric vehicle for the next control period is detailed in table below.

<b>Table 3.24 Capital outlay for electric charging Stations</b>			
<b>Particulars</b>	<b>Project cost</b>	<b>Capital outlay during the control period (2022-27)</b>	<b>Remarks</b>
	(Rs Cr)	(Rs Cr)	
6 Pilot EV Charging stations (EVCS)	1.02	0	Already completed
Cloud based Charging station Management Application for the 6 EVCS	0.0458	0	
26 EV charging stations	5.41	5.41	
Pole mounted EVCS Pilot-10 Nos	0.0252	0	Already completed
Proposed Pole mounted EV charging network across the state(1140 Nos)	3.99	3.99	
30 EVCS under Fame-II	8.728	8.728	
Procurement of electric vehicles	9	9	
<b>Total</b>		<b>27.128</b>	

The year wise details of works are attached as Annexure 3.6.1 .

#### 4. Summary of capital Investment Plan of SBU-D for FY 2022-27

The summary of capital investment plan for FY 2023-27 is included in the table below

<b>Table 4.1 : Capital Investment Plan for Approval (Summary ) in (Rs. Cr.)</b>							
<b>No.</b>	<b>Particulars</b>	<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	<b>Total</b>
A	Dhyuthi 2.0						
I	Normal development works	574.20	527.11	599.07	1191.54	1124.18	4016.10
II	Faulty meter replacement	30	30	30	30	30	150
III	Total electrification	20	20	20	20	20	100
IV	Provision for implementing LT spacers as part of reliability	10	10	10	10	10	50
	<b>Subtotal(I+II+III+IV)</b>	<b>634.20</b>	<b>587.11</b>	<b>659.07</b>	<b>1251.54</b>	<b>1184.18</b>	<b>4316.10</b>
B	Central aided Project-RDSS						
I	Distribution infrastructure works	918.52	709.90	380.34			2008.76
	System strengthening	594.43	406.69	238.47			1239.58
	Modernisation	324.09	303.21	141.87			769.18
II	IT/OT works	62.1	82.8	62.1			207
III	SCADA	148.8	238.13	208.39			595.32
IV	Prepaid metering	1429	3425	3346			8200
V	Part-B- RDSS	10	20	20			50
	<b>Subtotal(I+II+III+IV+V)</b>	<b>2568.42</b>	<b>4475.83</b>	<b>4016.83</b>			<b>11061.08</b>
C	Other Funded Works- Contribution, MLA Fund etc	200	200	200	200	200	1000
D	IT projects under Board fund	38.197	38.09	27.28	22.10	21.70	147.37
E	Safety	25	50	50	50	6.35	181.35
F	Electric Vehicle Charging stations	27.13					27.13
	<b>Total Distribution capital outlay</b>	<b>3492.95</b>	<b>5351.03</b>	<b>4953.18</b>	<b>1523.64</b>	<b>1412.23</b>	<b>16733.03</b>

A summary of GFA addition projection for the control period 2022-23 to 2026-27.

<b>Table 4.2 : GFA Addition during 2022-27(Summary ) in (Rs. Cr.)</b>							
<b>No.</b>	<b>Particulars</b>	<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	<b>Total</b>
A	Dhyuthi 2.0						
	Normal development works	574.1991	527.111	599.0663	1191.541	1124.1795	4016.10
	Faulty meter replacement	30	30	30	30	30	150
	Total electrification	20	20	20	20	20	100
	Provision for implementing LT spacers as part of safety	10	10	10	10	10	50
	<b>Sub Total</b>	<b>634.20</b>	<b>587.11</b>	<b>659.07</b>	<b>1251.541</b>	<b>1184.18</b>	<b>4316.10</b>
B	Central aided Project-RDSS						
I	Distribution infrastructure works						
	System strengthening			1239.58			1239.58
	Modernisation			769.18			769.18
II	IT/OT works			207.00			207.00
III	SCADA			595.32			595.32
IV	Prepaid metering	1429	3425	3346			8200.00
V	Part-B- RDSS	10	20	20.00			50.00
	<b>Sub Total</b>	<b>1439.00</b>	<b>3445.00</b>	<b>6177.08</b>	<b>0.00</b>	<b>0.00</b>	<b>11061.08</b>
C	Other Funded Works- Contribution, MLA Fund	200	200	200	200	200	1000.00
D	IT projects under Board fund	26.5	41.417	34.45	20.5	24.5	147.37
E	Safety	25	50	50	50	6.35	181.35
F	Electric Vehicle Charging stations	27.13					27.13
	<b>Total Distribution capital outlay</b>	<b>2351.83</b>	<b>4323.53</b>	<b>7120.60</b>	<b>1522.04</b>	<b>1415.03</b>	<b>16733.03</b>
	<b>Government grant and contributions</b>						
	Central aided Project-RDSS @ 60 %						
	Distribution infrastructure works						
	System strengthening			743.75			743.75
	Modernisation			461.51			461.51
	IT/OT works			124.20			124.20
	SCADA			357.19			357.19

No.	Particulars	2022-23	2023-24	2024-25	2025-26	2026-27	Total
	Smart Prepaid metering (DBFOOT)	1429.00	3425.00	3346.00			8200.00
	Part-B- RDSS	10.00	20.00	20.00			50.00
	Other Funded Works	200.00	200.00	200.00	200.00	200.00	1000.00
	IT projects under Board fund						0.00
	Safety						0.00
	Electric Vehicle Charging stations	10.96					10.96
	<b>Sub Total Grant</b>	<b>1649.96</b>	<b>3645.00</b>	<b>5252.65</b>	<b>200.00</b>	<b>200.00</b>	<b>10947.61</b>
	Net GFA for depreciation & IF charges	<b>701.86</b>	<b>678.53</b>	<b>1867.95</b>	<b>1322.04</b>	<b>1215.03</b>	<b>5785.41</b>

Honorable Commission may kindly note that estimate for RDSS scheme is yet to be sanctioned by Government of India. Deviations if any from the estimate proposed above while sanctioning will be carried out under own fund of KSEBL. KSEBL humbly requests that Honorable Commission may kindly allow to submit the deviation as part of Mid Term Review Petition. Further KSEBL will file a separate petition on installation of Smart prepaid metering on finalizing the investment/financing plan of the same.

The submission contains the available details of Capital Investment proposal for the control period. Hon'ble Commission may please condone any inadvertent error /omission that may have crept in this petition. The petition may be given an opportunity to rectify the same detected subsequently. The petitioner may also be allowed to make further submission, addition, and alteration to this petition as may be necessary from time to time.

KSEBL humbly requests before Honorable Commission to

1. To invoke the power conferred to it under Section 181 of Electricity Act 2003 to be read with Kerala State electricity Regulatory Commission (Terms and Conditions for Determination of Tariff,2021 and to approve the capital investment plan for Distribution Strategic Business Unit for the control period 2022-23 to 2026-27.
2. To pass any order as the Honorable Commission may deem fit and appropriate under the circumstances of the case and in the interest of justice.

## ANNEXURES

<b>Annexure 3.1.1 (a): Normal Development works under Dhyuthi 2.0- proposed for FY-23</b>				
<b>SI No</b>	<b>Task Group</b>	<b>Unit</b>	<b>Normal works under Dyuthi</b>	
			<b>Quantity</b>	<b>Amount (Rs Cr)</b>
1	Construction - HT line - OH	km	316.5	50.01
2	Construction - HT line - ABC	km	343.1	61.95
	Construction - HT line - CC	km	19.3	0.93
4	Construction - HT line - UG	km	76.6	31.88
5	Construction - LT Line - OH	km	131.6	4.56
6	Construction - LT Line - ABC	Each	389.5	26.38
7	Construction - Transformer - 15/25 kVA	Each	9.0	0.08
8	Construction - Transformer - 100 kVA	Each	526.0	8.94
9	Construction - Transformer - 160 kVA	Each	36.0	0.89
10	Construction - Transformer - 250 kVA	Each	11.0	0.37
11	Miscellaneous - Replacement DTR - 100 kVA	Each	219.0	5.21
12	Miscellaneous - Replacement DTR - 160 kVA	Each	18.0	0.59
13	Miscellaneous - Replacement DTR - 250 kVA	Each	2.0	0.14
14	Miscellaneous - Replacement DTR - 500 kVA	Set		
15	Construction - FPI	Each	1541.0	2.69
16	Construction - Switches - AB Switch	LS		5.12
17	Construction - Switches - LBS	Each	3.0	0.06
18	Construction - Switches - RMU	Each	152.0	7.69
19	Construction - Others	km	49345.6	53.16
20	Conversion - SP to TP OH	km	443.5	13.98
21	Reconductoring - HT line - HT OH Line	km	938.6	39.38
22	Reconductoring - LT Line - LT OH Line	Each	3986.0	190.76
23	Standardisation - HT line	km	5632.4	2.74
24	Standardisation - LT line	Each	1060.7	28.48
25	Standardisation - Transformer Station	Each	2239.4	23.90
26	Loss Reduction - Metering - DTR Meter	Each	7.0	0.13
27	Loss Reduction - Pipe Earthing	km	1644.0	0.57
28	Miscellaneous - Dismantling - Lines	Each	501.5	5.59
29	Miscellaneous - Dismantling - DTR/ Structure	Each	91.0	0.04
30	Miscellaneous - New Connection	Each	0.0	0.00
31	Replacing old / faulty 63kVA Transformer	Each	20.0	0.34
32	Standardisation of Structures - HT	Each	3056.0	7.64
33	Dismantling - Others		13.0	0.00
<b>Total</b>				<b>574.20</b>



**Annexure 3.1.1 (b) Normal Developmental works under Dyuthi Project - proposed during FY 2023-24**

SI No	Task Group	Unit	Normal works under Dyuthi	
		km	Quantity	Amount (Rs Cr)
1	Construction - HT line - OH	km	273.2	43.0
2	Construction - HT line - ABC	km	288.7	52.6
3	Construction - HT line - CC	km	13.5	0.6
4	Construction - HT line - UG	km	79.4	31.6
5	Construction - LT Line - OH	km	95.2	3.2
6	Construction - LT Line - ABC	Each	424.9	27.7
7	Construction - Transformer - 15/25 kVA	Each	6.0	0.1
8	Construction - Transformer - 100 kVA	Each	465.0	8.0
9	Construction - Transformer - 160 kVA	Each	20.0	0.5
10	Construction - Transformer - 250 kVA	Each	2.0	0.1
11	Miscellaneous - Replacement DTR - 100 kVA	Each	165.0	3.9
12	Miscellaneous - Replacement DTR - 160 kVA	Each	19.0	0.6
13	Miscellaneous - Replacement DTR - 250 kVA	Each	5.0	0.3
14	Miscellaneous - Replacement DTR - 500 kVA	Set		
15	Construction - FPI	Each	1136.0	2.0
16	Construction - Switches - AB Switch	LS	0.0	3.4
17	Construction - Switches - LBS	Each	7.0	0.2
18	Construction - Switches - RMU	Each	194.0	9.6
19	Construction - Others	km	32207.2	40.0
20	Conversion - SP to TP OH	km	360.4	11.3
21	Reconductoring - HT line - HT OH Line	km	724.0	33.2
22	Reconductoring - LT Line - LT OH Line	Each	4003.1	204.0
23	Standardisation - HT line	km	5169.0	1.8
24	Standardisation - LT line	Each	569.5	17.2
25	Standardisation - Transformer Station	Each	2464.0	20.3
26	Loss Reduction - Metering - DTR Meter	Each	1.0	0.0
27	Loss Reduction - Pipe Earthing	km	2070.0	0.5
28	Miscellaneous - Dismantling - Lines	Each	265.0	3.0
29	Miscellaneous - Dismantling - DTR/ Structure	Each	63.0	0.0
30	Miscellaneous - New Connection	Each	30.0	0.0
31	Replacing old / faulty 63kVA Transformer	Each	11.0	0.2
32	Standardisation of Structures - HT	Each	3148.0	8.3
33	Dismantling - Others		27.0	0.0
<b>Total</b>				<b>527.11</b>

3.1.1(c) : Normal Developmental works under Dyuthi Project - proposed during FY 2024-25				
SI No	Task Group	Unit	Normal works under Dyuthi	
		km	Quantity	Amount (Rs Cr)
1	Construction - HT line - OH	km	252.4	43.16
2	Construction - HT line - ABC	km	309.6	55.50
3	Construction - HT line - CC	km	43.3	2.08
4	Construction - HT line - UG	km	89.7	36.52
5	Construction - LT Line - OH	km	130.1	4.39
6	Construction - LT Line - ABC	Each	526.8	35.03
7	Construction - Transformer - 15/25 kVA	Each	9.0	0.08
8	Construction - Transformer - 100 kVA	Each	440.0	7.48
9	Construction - Transformer - 160 kVA	Each	22.0	0.54
10	Construction - Transformer - 250 kVA	Each	3.0	0.13
11	Miscellaneous - Replacement DTR - 100 kVA	Each	122.0	2.96
12	Miscellaneous - Replacement DTR - 160 kVA	Each	12.0	0.37
13	Miscellaneous - Replacement DTR - 250 kVA	Each		
14	Miscellaneous - Replacement DTR - 500 kVA	Set		
15	Construction - FPI	Each	650.0	1.13
16	Construction - Switches - AB Switch	LS	0.0	3.30
17	Construction - Switches - LBS	Each	5.0	0.11
18	Construction - Switches - RMU	Each	174.0	8.88
19	Construction - Others	km	31391.6	46.22
20	Conversion - SP to TP OH	km	338.5	10.65
21	Reconductoring - HT line - HT OH Line	km	775.2	37.63
22	Reconductoring - LT Line - LT OH Line	Each	4707.4	249.79
23	Standardisation - HT line	km	4788.0	2.20
24	Standardisation - LT line	Each	500.9	16.15
25	Standardisation - Transformer Station	Each	1958.5	24.21
26	Loss Reduction - Metering - DTR Meter	Each	0.0	0.00
27	Loss Reduction - Pipe Earthing	km	1176.0	0.53
28	Miscellaneous - Dismantling - Lines	Each	284.4	3.44
29	Miscellaneous - Dismantling - DTR/ Structure	Each	70.0	0.02
30	Miscellaneous - New Connection	Each	0.0	0.00
31	Replacing old / faulty 63kVA Transformer	Each	19.0	0.33
32	Standardisation of Structures - HT	Each	2570.0	6.23
33	Dismantling - Others		18.0	0.00
<b>Total</b>				<b>599.07</b>

**Annexure 3.1.1(d) : Normal Developmental works under Dyuthi Project - proposed during FY 2025-26**

SI No	Task Group	Unit	Normal category under Dyuthi	
		km	Quantity	Amount (Rs Cr)
1	Construction - HT line - OH	km	601.7	111.6
2	Construction - HT line - ABC	km	624.5	113.0
3	Construction - HT line - CC	km	22.7	1.1
4	Construction - HT line - UG	km	238.8	97.2
5	Construction - LT Line - OH	km	170.2	6.3
6	Construction - LT Line - ABC	Each	1009.0	65.4
7	Construction - Transformer - 15/25 kVA	Each	10.0	0.1
8	Construction - Transformer - 100 kVA	Each	605.0	10.3
9	Construction - Transformer - 160 kVA	Each	27.0	0.7
10	Construction - Transformer - 250 kVA	Each	10.0	0.3
11	Miscellaneous - Replacement DTR - 100 kVA	Each	149.0	3.5
12	Miscellaneous - Replacement DTR - 160 kVA	Each	25.0	0.8
13	Miscellaneous - Replacement DTR - 250 kVA	Each	4.0	0.3
14	Miscellaneous - Replacement DTR - 500 kVA	Set	1.0	0.1
15	Construction - FPI	Each	735.0	1.3
16	Construction - Switches - AB Switch	LS	0.0	4.0
17	Construction - Switches - LBS	Each	68.0	1.5
18	Construction - Switches - RMU	Each	295.0	14.6
19	Construction - Others	km	43851.6	67.2
20	Conversion - SP to TP OH	km	653.5	20.5
21	Reconductoring - HT line - HT OH Line	km	1658.8	85.1
22	Reconductoring - LT Line - LT OH Line	Each	8784.5	506.1
23	Standardisation - HT line	km	10109.0	3.0
24	Standardisation - LT line	Each	874.9	27.3
25	Standardisation - Transformer Station	Each	3344.0	33.8
26	Loss Reduction - Metering - DTR Meter	Each	0.0	0.0
27	Loss Reduction - Pipe Earthing	km	2340.0	0.7
28	Miscellaneous - Dismantling - Lines	Each	447.0	5.4
29	Miscellaneous - Dismantling - DTR/ Structure	Each	68.0	0.0
30	Miscellaneous - New Connection	Each	0.0	0.0
31	Replacing old / faulty 63kVA Transformer	Each	25.0	0.4
32	Standardisation of Structures - HT	Each	3737.0	10.0
33	Dismantling - Others		23.0	0.0
<b>Total</b>				<b>1191.54</b>

**Annexure3.1.1(e) : Distribution Projects - proposed during FY 2026-27**

SI No	Task Group	Unit	Normal category under Dyuthi	
		km	Quantity	Amount (Rs Cr)
1	Construction - HT line - OH	km	468.8	92.93
2	Construction - HT line - ABC	km	510.2	94.70
3	Construction - HT line - CC	km	25.0	1.20
4	Construction - HT line - UG	km	208.8	85.51
5	Construction - LT Line - OH	km	214.1	9.03
6	Construction - LT Line - ABC	Each	1025.8	68.48
7	Construction - Transformer - 15/25 kVA	Each	27.0	0.23
8	Construction - Transformer - 100 kVA	Each	583.0	9.91
9	Construction - Transformer - 160 kVA	Each	26.0	0.64
10	Construction - Transformer - 250 kVA	Each	6.0	0.18
11	Miscellaneous - Replacement DTR - 100 kVA	Each	185.0	4.44
12	Miscellaneous - Replacement DTR - 160 kVA	Each	32.0	0.98
13	Miscellaneous - Replacement DTR - 250 kVA	Each	4.0	0.28
14	Miscellaneous - Replacement DTR - 500 kVA	Set	0.0	0.00
15	Construction - FPI	Each	730.0	1.27
16	Construction - Switches - AB Switch	LS	0.0	3.67
17	Construction - Switches - LBS	Each	5.0	0.11
18	Construction - Switches - RMU	Each	358.0	18.19
19	Construction - Others	km	44326.3	68.68
20	Conversion - SP to TP OH	km	698.0	21.93
21	Reconductoring - HT line - HT OH Line	km	1543.6	78.05
22	Reconductoring - LT Line - LT OH Line	Each	8242.7	476.67
23	Standardisation - HT line	km	10513.0	2.94
24	Standardisation - LT line	Each	1017.3	31.33
25	Standardisation - Transformer Station	Each	3507.0	38.66
26	Loss Reduction - Metering - DTR Meter	Each	0.0	0.00
27	Loss Reduction - Pipe Earthing	km	2245.0	0.79
28	Miscellaneous - Dismantling - Lines	Each	377.4	4.31
29	Miscellaneous - Dismantling - DTR/ Structure	Each	66.0	0.02
30	Miscellaneous - New Connection	Each	0.0	0.00
31	Replacing old / faulty 63kVA Transformer	Each	15.0	0.26
32	Standardisation of Structures - HT	Each	3436.4	8.80
33	Dismantling - Others		0.0	0.00
<b>Total</b>				<b>1124.18</b>

**Annexure 3.1.1(f): Consolidation of Normal Developmental works under Dyuthi Project - proposed during the control period( Amount (Rs Cr)**

SI No	Task Group	Unit	Total 2022-27	
			Quantity	Amount
1	Construction - HT line - OH	km	1912.58	340.73
2	Construction - HT line - ABC	km	2076.09	377.74
3	Construction - HT line - CC	km	123.75	5.95
4	Construction - HT line - UG	km	693.32	282.72
5	Construction - LT Line - OH	km	741.18	27.44
6	Construction - LT Line - ABC	Each	3376.04	223.01
7	Construction - Transformer - 15/25 kVA	Each	61.00	0.51
8	Construction - Transformer - 100 kVA	Each	2619.00	44.56
9	Construction - Transformer - 160 kVA	Each	131.00	3.22
10	Construction - Transformer - 250 kVA	Each	32.00	1.06
11	Miscellaneous - Replacement DTR - 100 kVA	Each	840.00	20.07
12	Miscellaneous - Replacement DTR - 160 kVA	Each	106.00	3.33
13	Miscellaneous - Replacement DTR - 250 kVA	Each	15.00	1.05
14	Miscellaneous - Replacement DTR - 500 kVA	Set	1.00	0.07
15	Construction - FPI	Each	4792.00	8.36
16	Construction - Switches - AB Switch	LS	0.00	19.39
17	Construction - Switches - LBS	Each	88.00	1.89
18	Construction - Switches - RMU	Each	1173.00	58.96
19	Construction - Others	km	201122.31	275.34
20	Conversion - SP to TP OH	km	2493.95	78.42
21	Reconductoring - HT line - HT OH Line	km	5640.21	273.35
22	Reconductoring - LT Line - LT OH Line	Each	29723.71	1627.30
23	Standardisation - HT line	km	36211.41	12.62
24	Standardisation - LT line	Each	4023.32	120.47
25	Standardisation - Transformer Station	Each	13512.90	140.92
26	Loss Reduction - Metering - DTR Meter	Each	8.00	0.15
27	Loss Reduction - Pipe Earthing	km	9475.00	3.04
28	Miscellaneous - Dismantling - Lines	Each	1875.22	21.71
29	Miscellaneous - Dismantling - DTR/ Structure	Each	358.00	0.13
30	Miscellaneous - New Connection	Each	30.00	0.02
31	Replacing old / faulty 63kVA Transformer	Each	90.00	1.57
32	Standardisation of Structures - HT	Each	15947.40	40.98
33	Dismantling - Others		81.00	0.03
<b>Total</b>				<b>4016.10</b>

<b>Annexure-3.1.2 Plan proposals-Normal development works under Dyuthi2.0-Circlewise outlay (Rs Cr)</b>							
<b>Sl No.</b>	<b>Name of Circle</b>	<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>	<b>Total</b>
1	Electrical Circle(Urban)TVPM	28.63	29.14	32.26	55.59	51.02	196.64
2	Kattakada (Rural)	26.70	22.20	24.22	58.07	34.79	165.98
3	Kollam	25.66	21.72	25.02	43.89	41.77	158.05
4	Kottarakkara	12.95	12.91	15.02	43.50	44.12	128.51
5	Pathanamthitta	47.83	32.08	30.68	61.65	59.61	231.85
6	Kottayam	43.21	25.57	25.41	49.00	52.46	195.65
7	Alappuzha	21.23	20.92	22.86	47.94	48.09	161.04
8	Ernakulam	28.33	28.75	30.78	57.11	50.34	195.30
9	Perumbavoor	30.97	42.46	51.41	84.59	80.28	289.71
10	Thodupuzha	26.42	9.49	15.70	30.65	31.28	113.53
11	Pala	6.04	6.02	6.60	28.58	27.78	75.00
12	Irinjalakuda	31.25	25.37	29.74	41.73	37.44	165.53
13	Thrissur	38.96	44.47	49.90	77.15	73.63	284.11
14	Palakkad	28.46	21.42	28.03	53.41	48.19	179.51
15	Manjeri	21.59	12.14	21.53	40.98	36.41	132.65
16	Kalpetta	3.37	3.28	3.22	22.03	26.37	58.27
17	Kozhikode	31.35	36.47	38.49	61.14	54.43	221.89
18	Kannur	19.14	19.94	28.16	40.72	40.53	148.49
19	Kasaragod	30.20	40.11	38.84	69.23	61.40	239.78
20	Tirur	18.66	20.27	25.10	56.70	54.07	174.80
21	Vadakara	10.73	11.32	13.26	38.03	40.85	114.19
22	Shoranur	5.71	7.65	9.65	40.59	41.86	105.46
23	Sreekandapuram	23.05	19.44	18.79	35.25	35.24	131.77
24	Nilambur	4.65	4.96	5.41	25.83	24.96	65.81
25	Harippad	9.12	9.00	8.98	28.19	27.27	82.57
	<b>Total</b>	<b>574.20</b>	<b>527.11</b>	<b>599.07</b>	<b>1,191.54</b>	<b>1,124.18</b>	<b>4,016.10</b>

Annexure 3.1.3 Goalwise consolidation of works Amount (Rs cr)												
Goals	2022-23		2023-24		2024-25		2025-26		2026-27		Total	
	Count	Amount	Count	Amount	Count	Amount	Count	Amount	Count	Amount	Count	Amount
Connecting Renewable Sources	0	0.00	0	0.00	1	0.04	1	0.13	2	0.09	4	0.26
Connecting Renewable Sources, System Strengthening	0	0.00	0	0.00	0	0.00	0	0.00	1	0.02	1	0.02
Loss Reduction	453	49.52	378	47.85	409	47.59	608	97.45	696	99.29	2544	341.70
Loss Reduction, Connecting Renewable Sources, System Strengthening	0	0.00	0	0.00	0	0.00	0	0.00	1	0.03	1	0.03
Loss Reduction, Safety	218	24.53	203	26.73	229	32.89	317	54.63	267	48.93	1234	187.72
Loss Reduction, Safety, Connecting Renewable Sources, System Strengthening	0	0.00	0	0.00	0	0.00	1	0.09	0	0.00	1	0.09
Loss Reduction, Safety, System Strengthening	105	17.91	107	12.63	112	11.95	163	25.81	150	24.41	637	92.71
Loss Reduction, Safety, Total Electrification	0	0.00	1	0.08	1	0.00	0	0.00	0	0.00	2	0.09
Loss Reduction, System Strengthening	131	14.71	127	14.29	117	11.59	206	28.93	204	24.59	785	94.11
Loss Reduction, Total Electrification	0	0.00	0	0.00	1	0.16	1	0.02	0	0.00	2	0.19
Loss Reduction, Total Electrification, System Strengthening	0	0.00	1	0.03	1	0.26	0	0.00	0	0.00	2	0.30
Reliability	456	36.84	356	36.93	378	41.63	487	91.39	488	69.57	2165	276.35
Reliability, Connecting Renewable Sources, System Strengthening	5	0.05	4	0.72	2	0.06	3	0.08	1	0.03	15	0.94
Reliability, Loss Reduction	392	40.67	367	44.10	361	40.73	518	92.48	497	75.64	2135	293.63
Reliability, Loss Reduction, Connecting Renewable Sources	0	0.00	0	0.00	0	0.00	1	0.71	0	0.00	1	0.71
Reliability, Loss Reduction, Connecting Renewable Sources, System Strengthening	0	0.00	0	0.00	0	0.00	4	1.38	1	0.02	5	1.40
Reliability, Loss Reduction, Safety	594	68.40	533	70.43	580	91.67	1030	193.14	959	162.37	3696	586.02
Reliability, Loss Reduction, Safety, Connecting Renewable Sources	0	0.00	0	0.00	0	0.00	0	0.00	4	0.17	4	0.17
Reliability, Loss Reduction, Safety, Connecting Renewable Sources, System Strengthening	1	0.17	0	0.00	2	0.09	1	0.92	2	0.62	6	1.81
Reliability, Loss Reduction, Safety, System Strengthening	447	56.61	500	65.90	606	83.44	842	157.21	826	145.61	3221	508.77
Reliability, Loss Reduction, Safety, Total Electrification	3	0.47	0	0.00	2	0.23	1	0.17	1	0.13	7	1.00
Reliability, Loss Reduction, Safety, Total Electrification, Connecting Renewable Sources	0	0.00	0	0.00	0	0.00	0	0.00	1	0.09	1	0.09
Reliability, Loss Reduction, Safety, Total Electrification, Connecting Renewable Sources, System Strengthening	0	0.00	0	0.00	0	0.00	0	0.00	1	0.06	1	0.06
Reliability, Loss Reduction, Safety, Total Electrification, System Strengthening	4	0.62	0	0.00	0	0.00	0	0.00	3	9.85	7	10.48
Reliability, Loss Reduction, System Strengthening	326	36.86	283	31.78	298	39.99	533	86.96	471	82.66	1911	278.25
Reliability, Loss Reduction, Total Electrification	1	0.07	1	0.02	1	0.35	0	0.00	2	1.41	5	1.85
Reliability, Loss Reduction, Total Electrification, Connecting Renewable Sources	0	0.00	0	0.00	0	0.00	1	0.87	0	0.00	1	0.87
Reliability, Loss Reduction, Total Electrification, Connecting Renewable Sources, System Strengthening	0	0.00	0	0.00	0	0.00	3	0.06	4	0.13	7	0.18
Reliability, Loss Reduction, Total Electrification, System Strengthening	3	0.11	1	0.01	2	0.03	2	0.18	0	0.00	8	0.33
Reliability, System Strengthening	0	0.00	0	0.00	0	0.00	0	0.00	1	0.03	1	0.03
Reliability, Safety	382	36.36	311	28.10	341	34.11	457	62.65	392	54.31	1883	215.53
Reliability, Safety, Connecting Renewable Sources	0	0.00	0	0.00	0	0.00	0	0.00	2	1.34	2	1.34
Reliability, Safety, Safety	0	0.00	0	0.00	0	0.00	1	0.09	0	0.00	1	0.09
Reliability, Safety, System Strengthening	432	44.31	335	32.94	344	36.62	481	62.88	435	70.09	2027	246.84
Reliability, Safety, Total Electrification	0	0.00	1	0.03	1	0.16	0	0.00	0	0.00	2	0.18
Reliability, System Strengthening	505	45.98	406	34.21	383	39.79	540	79.66	565	88.64	2399	288.28
Reliability, Total Electrification	3	0.11	1	0.04	1	0.16	3	0.92	0	0.00	8	1.23
Reliability, Total Electrification, System Strengthening	1	0.02	3	0.77	5	0.33	1	0.17	0	0.00	10	1.29

To be continued

Annexure 3.1.3 Continued

Annexure 3.1.3 Goalwise consolidation of works (Amount Rs cr)												
Goals	2022-23		2023-24		2024-25		2025-26		2026-27		Total	
	Count	Amount	Count	Amount	Count	Amount	Count	Amount	Count	Amount	Count	Amount
Safety	469	28.09	355	21.17	340	25.56	480	46.84	436	51.49	2080	173.14
Safety, System Strengthening	234	16.28	197	15.63	172	14.19	292	27.13	257	30.82	1152	104.04
Safety, Total Electrification	0	0.00	1	0.07	1	0.43	0	0.00	0	0.00	2	0.50
Safety, Total Electrification, System Strengthening	0	0.00	1	0.01	0	0.00	0	0.00	0	0.00	1	0.01
System Strengthening	536	53.05	473	40.57	430	43.57	605	76.14	537	75.43	2581	288.77
Total Electrification	45	2.43	32	1.58	40	1.42	39	2.33	34	6.27	190	14.04
Total Electrification, System Strengthening	1	0.03	1	0.47	0	0.00	3	0.12	3	0.06	8	0.68
<b>Grand Total</b>		<b>574.20</b>	<b>4979</b>	<b>527.11</b>	<b>5161</b>	<b>599.07</b>	<b>7625</b>	<b>1191.54</b>	<b>7244</b>	<b>1124.18</b>	<b>30756</b>	<b>4016.10</b>



## 4 POWER ZONE PLANNING

(a) Description of project area

Geographical Highlights : The Project area under PMU, Electrical Circle, Kollam covers an area of 628.39 sq.km. This project area includes :

- i Coastal plane (coastal length -44km)
- ii Uneven mid land
- iii Two Rivers viz; Ithikkara & Kallada
- iv Backwaters & water bodies viz; Edava- Nadayara kayal, Malakayal & Ashtamudi,
- v Sasthamkotta fresh water lake – the only fresh water lake of Kerala
- vi Fishing harbours- viz; Vady, Neendakara, Azheekkal
- vii Inland Water ways – TS canal
- viii Kollam port
- ix Eastern part of the area is thick with vegetation mainly constituting of coconut and Rubber plantations

Typical Kerala climate is experienced all over this project zone. In general, the rural population depends largely on agriculture, plantation industry, cashew processing, fishing and allied activities, small scale industries (manufacturing masonry bricks, roofing tiles, match box, furniture and ice plants) for their livelihood, whereas urban population is mostly occupied in service sector (including banks, hospitals and commercial activities), small scale industries and its allied activities.

This Project area is predominantly within the Revenue district of Kollam but certain areas extend to neighbouring districts, Alappuzha and Thiruvananthapuram. It includes Kollam Corporation, two municipalities (viz; Karunagappally & Paravoor) and 31 Grama Panchayaths covering 50 Villages. The project hereunder benefits three Parliament Constituencies viz; Alappuzha, Kollam and Mavelikkara. The three Electrical Divisions viz; Kollam, Karunagappally & Chathannoor under Electrical Circle, Kollam comes under the jurisdiction of PMU, Electrical Circle, Kollam. There are a total of 27 Electrical Sections in this area.

Places of Importances :

Major Government Institutions - Collectorate, Jilla Panchayath, District Police Head Quarters, Kollam Port, Vady, Neendakara and Azheekkal harbours, Government Guest House, ESI Super speciality Hospital, Asramam, Government Ayurveda Hospital, Asramam, Government Arts College, Chavara, Indian Rare Earths Ltd, Kerala Minerals and Metals Ltd, Chavara

Educational Institutions :

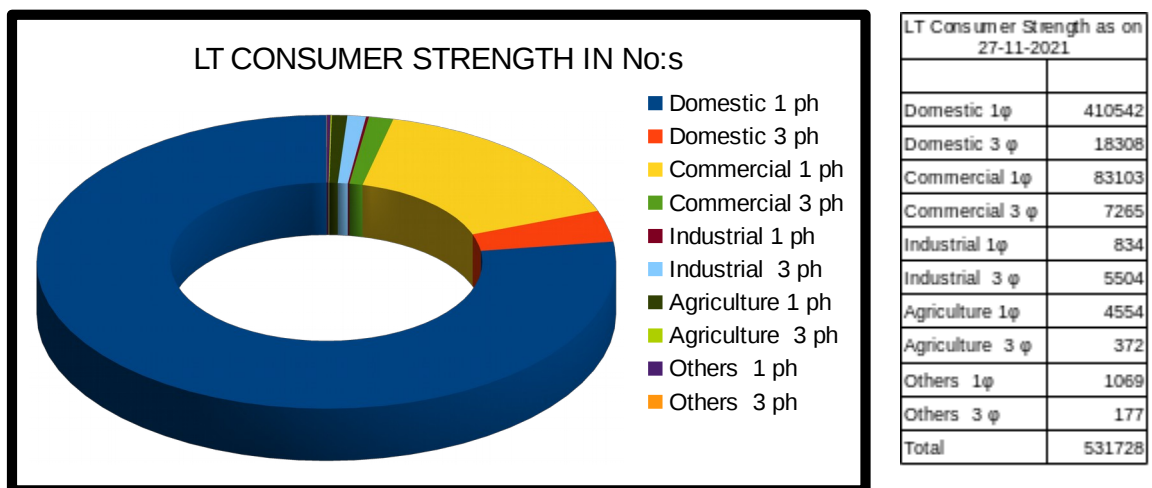
Government Medical College, Parippally, Government Arts College, Chavara, TKM College of Engineering, Karicode, SN College, Kollam, Fathima Mata National College, Kollam, TKM Arts College, Karikode, Azeezia Medical college, Travancore Medical College, NSS College, Kottiyam, SN College, Chathannoor, DB College, Sasthamkotta, SN Trust Law College, Kollam, NSS Law college, Kottiyam, Mata Amrithanandamayi Institution, Karunagappally

Major Private organisations- Several sea food and cashew processing centers and back water tourism centers

This project area hosts festival like Kollam Pooram, Oachira Kali, Pullichira Church pilgrimage which attract mass pilgrims. The scenic beauty of eight mudies of Astamudi kayal attracts tourists even from far off places. Also the beaches in Kollam attract tourists. Another place of tourist attraction is the heritage monuments like Thangassery Light House & Cheena Kottaram. Along the Neendakara to Alappad coastal belt , the sand in the seashore is rich in heavy minerals like Ilmenite, Rutile, Zircon, Silimnite, Garnet and Monozite. Thorium, which is an extract from Monozite is identified as a potential fuel for nuclear plants. Rare earth elements are also extracted from these minerals.

Consumer perspective on Electrical Distribution in Project Area : Urban consumers in the region are mostly a satisfied lot in terms of quality. However, despite having an adequate network, in the urban area, consumers have to face supply outages – both scheduled and unscheduled – and also several momentary interruptions as part of scheduling of shut down works. Consumers in rural area face even more frequent interruptions when compared with their urban counterparts as restoration of power supply after fault rectifications are delayed considerably due to delay in identifying fault location in remote areas and also due to lack of back feeding facilities. In the Dyuthi 2018-22 scheme considerable quantum of backfeeding facilities , renewing damaged installations, new transformers, 11kV underground cables have been provided, but still there is scope for even lot more improvement.

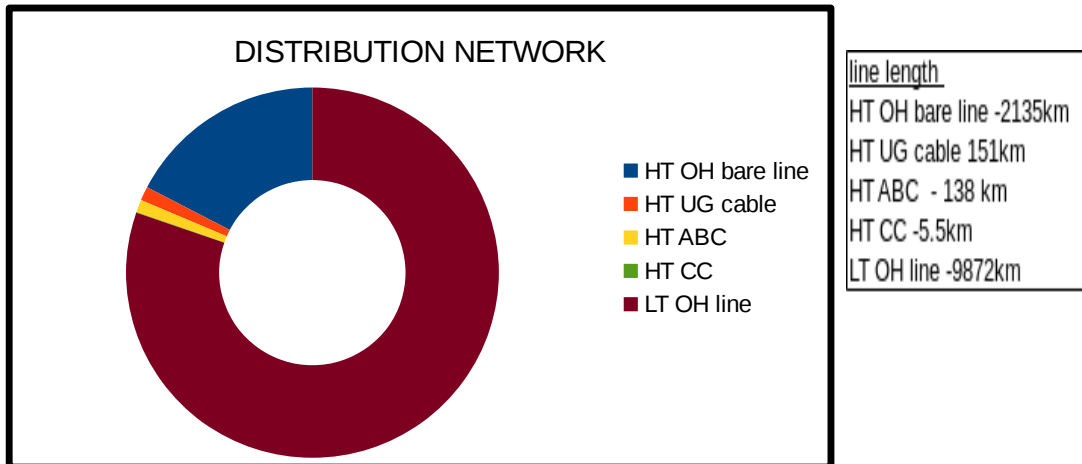
Existing Distribution system : One EHT consumer (KMML) exits this region. There are in all 268 HT consumers . The LT consumer strength is 531728 . (as on 27-11-2021).



Electrical Distribution Network of this region consists of :

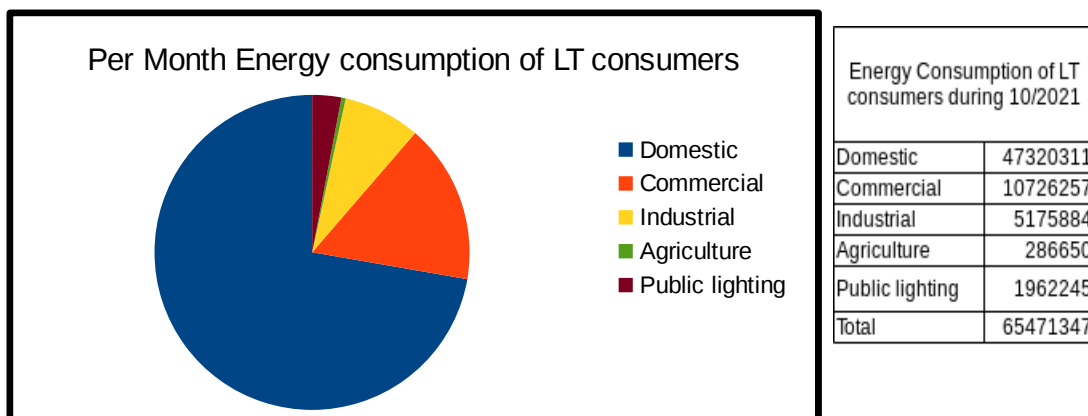
- 1 2429kms of HT line (2135+151+138+5)( 2135km – OH bare condn, 151km- UG cable, 138km – ABC & 5km- Covered Conductor )
- 2 3125 Distribution transformers  
Total transformation capacity- 372MVA
- 3 9872km of LT OH line

HT : LT ratio existing is 1: 4



Annual Billed Energy in the project area in HT and LT sector is around 114MU and 786 MU respectively . Monthly Energy generated from Solar projects 3.1 lakh units. There are 715 solar plants having a capacity of 4.638MW under Electrical Circle, Kollam

Per month Consumption in various sectors during 2021 is as follows



System Forecast for 2026-27 – The load growth as predicted during 2018 for 2022 was a rise of 34% putting together all the sectors. But due to the covid pandemic the load growth was drastically affected. The actual growth was only 12.2% during these four years (from 2018 to 2022). The Industrial sector was severely impaired by the lockdowns imposed. The industrial sector is now striving to get back on its track although the threat of the pandemic is still prevailing.

The load growth for 2026-27 is estimated to a rise of 23% for domestic consumers, 31% for Commercial consumers, 16% for Industrial and Agriculture and 26% for public lighting. There will be considerable rise in the Commercial load along the Kollam NH Bypass, nearby Kollam port and near Azheekkal harbour.

Sufficiency of System – at present and in future : The present step down (11kV /433V) transformation capacity in the project area is 372MVA. This existing transformation capacity is insufficient to meet the present demand and is mainly of a concern in Electrical sections under Electrical Division, Karunagappally. There is a proposal for a 110kV substation at Mynagappally, which is to be materialised at the earliest. The 11kV feeders to these areas is running over 25km from the substation and there is very poor facility for backfeeding and so whenever a feeder goes faulty the power supply restoration to whole feeding area elongates to several hours and even to a few days in case of severe natural disaster.

Challenged Unique to the region :

- 1 Due to the vast stretch of coastal area, the bare conductors get easily deteriorated (corroded). Also the gusty wind in the coastal region destroys the overhead lines and its structures. Along the Azheekkal coast 5km of 11kV UG cable work is progressing under the Dyuthi 2018-22 scheme.
- 2 Substantial lengths of HT/LT lines are drawn cross country, which causes the maintenance risky and hazardous due to inaccessibility. Earlier when these lines were drawn there were no compound wall causing hindrances. The land was fully open and could easily be accessed, but now these lands have been partitioned and compound wall and buildings constructed. In the Dyuthi 2018-22 scheme several cross country lines have been dismantled after constructing alternate lines along road. Yet there are many more cross country lines which are to be done away with.
- 3 For laying UG cable prior approval from concerned road authorities will have to be obtained. Obtaining the approval from road authorities is an herculean task. Also obtaining approval from Railway authorities is another laborious task. There were instance when the 11kV UG cable have been damaged by works in the water pipe line. If a duct is provided when new roads/ bridges/ railway lines are constructed these obstacles can be avoided.

- 4 In certain cases whenever a new Distribution transformer is to be installed objections arise from general public by not permitting to install the transformer at the load center, at such instances, KSEBL will be forced to install the transformer suitably away from the load centre and at certain times the transformer installation works will have to be cancelled due to objections from all suitable locations. This difficulty is faced even while providing a stay or any structure.

(b) Analysis of Distribution Network in the Project Area

Substation Details: There are 17 Substations feeding the area under PMU, Kollam out of which only 13 substations are existing within the project area. The aggregate transformation capacity to 11kV level of substations within the project area is 311MVA. There are Nine EHV substations out of which two substations have only a single feeding

Table 4.1 Substations and Transformation Capacity under PMU, Kollam

No:	Substation	Voltage level	Transformation Capacity in MVA	Whether the substation is within the PMU area or outside
1	Sasthmkotta	110kV/11kV	32.5	Within
	sasthamkotta	110kV/66kV	70	Within
2	Chavara	110kV/11kV	25	Within
3	Kavanad	110kV/11kV	25	Within
4	GIS, Kollam.	110kV/11kV	40	Within
5	Ayathil	110kV/11kV	37.5	Within
6	Perinad	110kV/11kV	25	Within
7	Kottiyam	110kV/11kV	25	Within
	Kottiyam	110kV/33kV	32	Within
8	Parippally	110kV/11kV	25	Within
	Parippally	110kV/33kV	16	Within
9	Karunagappally	66kV/11kV	30	Within
10	Oachira	33kV/11kV	16	Within
11	Kannanalloor	33kV/11kV	10	Within
12	Adichanalloor	33kV/11kV	10	Within
13	Paravoor	33kV/11kV	10	Within
14	Kundara	220kV / 110kV	200	Outside
	Kundara	110kV/11kV	37.5	outside
15	Varkala	110kV/11kV	32.5	outside
	Varkala	110kV/33kV	16	outside
16	Vallikunnam	33kV/11kV	16	outside
17	Vilakulam (Edawa)	33kV/11kV	5	outside

HT Feeders : Total number of 11kV feeders available to this project area is 108, of which 6 originate from substations outside the project area. The task of equibalancing the load of the 11kV feeders is progressing excepting for dedicated feeders.

LT Feeders : The project area has 4199 km of single phase LT lines and 5673km of three phase lines (including 178km of LT ABC)

## Distribution Infrastructure

HT Lines : Out of the total 2424km of HT lines, 2135km is of bare OH ACSR line, 151km of HT UG cable, 138km of HT ABC and 5km of HT covered conductor. The reconductoring works of very old and deteriorated conductors is being carried out in a phased manner under Dyuthi .1 and thus the system loss and reliability is being improved. But due to the fund limitation the reconductoring works proposed are by prioritising the most essential works first. Although Reconductoring using covered conductor is preferred, due to its high cost the proposed number of reconductoring works using covered conductor is restricted. The advantages of covered conductor is that the conductor is drawn on insulators and each phase is separate and not bundled as in ABC.

LT Lines: The project area has 5851km of three phase OH line (including 178Km of LT ABC ) and 4199km of single phase line. Reconductoring works of LT lines are also being accomplished in the Dyuthi.1 . The ACSR LT lines are now being converted to LT ABC gradually.

Distribution Transformers : A total number of 3125 Distribution transformers are there in the project area. The Distribution transformation capacity comes to 372MVA. The new transformers installed are star rated transformers. Almost all the DTRs have been provided with an AB switch other than a few under Electrical Division, Karunagappally.

Sl No:	Capacity of Distribution Transformer in kVA	No: DTRs in the system under PMU, kollam
1	25	2
2	63	13
3	100	2418
4	160	510
5	315	1
6	250	172
7	500	9

### (c) Goals and Objectives

The works proposed in Dyuthi 2 are considering the following overall goals

- i. Enhancing reliability and quality of the power supplied
- ii. Improving energy efficiency and reducing system losses
- iii. Ensuring safe installations
- iv. Ensuring that the state remains totally electrified
- v. Ensuring integration of energy from renewal sources

Goal i) Enhancing reliability and quality of the power supplied

For ensuring reliability every HT line should have backfeeding facility,. Although lot many Feeder interlinking works were executed in the Dyuthi .1 scheme, there is a lot more to achieve. The substation capacity in and around Karunagappally, Thevalakkara, Mynagappally and sooranad is insufficient to meet the growing load in that region. There is a proposal for new 110kV substation near Mynagappally, if this materialises, this issue can be solved to great extent. With upgradation and capacity enhancement of Karunagappally substaion the issue can be totally solved. Another drawback is that many feeders originating from Karunagappally, Chavara, oachira and sasthamkotta are drawn as cross country lines from the substaion itself affeting the reliability. Two feeders f(cross country ) rom Sastahmkotta substaion to ES, sooranad will be converted to UG cable along road in Dyuthi.1 scheme. All such feeders will have to be brought to the road.

Goal ii) Improving energy efficiency and reducing system losses

The existing Distribution losses comes to 12.5%. This has to be brought down to 10%. The technical losses in the project area are due to :

- 1 HT feeders over 12kms of length and LT line lengths over 1km from Distrution transformer. LT Single phase two wire OH line drawn for kilimeters.
- 2 Load on the LT line being unbalanced in the three phases
- 3 Contact losses due to high contact resistances in the jumper connections, connecting lugs due improper crimping etc
- 4 Transformers installed are not of the sufficient capacity or in some cases of excess capacity
- 5 Low conductor sizing of the distribution lines

Activities proposed for improving energy efficiency and los reduction

- a Reconductoring LT deteriorated, AAC, ACSR squirrel lines with ACSR Rabbit or with LT ABC
- b Conversion of two wire / three wire single phase lines to four / five wire three phase line
- d Providing a new transformer at locations where the existing transformers are loaded to 80% of its capacity
- e Reconductoring HT lines using ACSR Raccoon or HT covered conductor or by using HT UG cable.

Goal iii) Ensuring safe installations

Works for ensuring safety to general public as well as to KSEB staff are included in the Dyuthi 2.0 scheme. The works include transformer station standardisation, transformer yard metalling and fencing, Inserting poles under OH lines to maintain statutory clearance, Dismantling cross country lines after constructing alternate lines along road, Dismantling unused lines, Providing line AB switches, Providing transformer AB switches, Reconductoring deteriorated distribution lines with ACSR/ ABC/ Covered conductors

Goal iv) Ensuring that the region remains totally Electrified

The totally electrified status is being sustained

Goal v) Ensuring integration of energy from renewal sources

Renewable Purchase Obligation (RPO) mandates that all electricity distribution licensees should purchase or produce a minimum specified quantity of their requirements from Renewable Energy Sources. For this the KSEB has envisaged the Soura subsidy scheme. The main objective of the Kerala Soura Subsidy Scheme is to encourage the usage of Solar Energy among the people in the state by installing solar panels on roof tops of houses to utilise sunlight to generate solar power and this power is injected into the KSEB LT grid. Under PMU, Electrical Circle, Kollam the installed Capacity of ongrid solar plants is 4.638MW from 715 plants.

But while injecting the solar power to the LT grid complexities arise in the quality of power such as :

1. a voltage swell at power injection point when the voltage in the grid is 250V – under this condition the power gets cut off from the plant to the grid
2. Harmonics and DC injection causes an increase in the DTR losses and also affects the quality of power which in turn affects electrically controlled equipments. A detailed study on this is to be conducted.



## Case Study 1

Name of Work : Enhancement of Radiopark distribution transformer under Electrical section Olai– work Amount Rs.247583.97

Problem statement : The 100kVA Radiopark transformer is loaded to 80% of full load. A distribution transformer has its maximum efficiency at 70% full load. Thus in order to reduce the transformer losses the Radiopark transformer is to be enhanced to 160kVA. Hence this proposal is made in Dyuthi2.0 scheme

Analysis : The load of this transformer comes to 105A . The load is mainly comprising of domestic consumers. This area is thickly populated. The transformer is located in the load centre. The load is almost uniform during day and during night peak. The 11kV feeder feeding this transformer is AVM feeder from 110kV substation, Kavanad.

Optimal solution : Since the existing transformer is in the load centre the proposal made is for enhancing the transformer capacity from 100kVA to 160kVA. Also this area being thickly populated and congested, finding another suitable location for the installation of a new 100kVA transformer will be difficult.

### Benefits of the project :

- i) The transformer losses can be reduced.
- ii) The transformer will be susceptible to fail due to overloading and thus Unscheduled interruption can be avoided.
- iii) Additional new service connections, if any can be provided without delay due to availability of sufficient capacity after capacity enhancement.

Financial Analysis : The estimated cost of the work is Rs.2,47,584/-

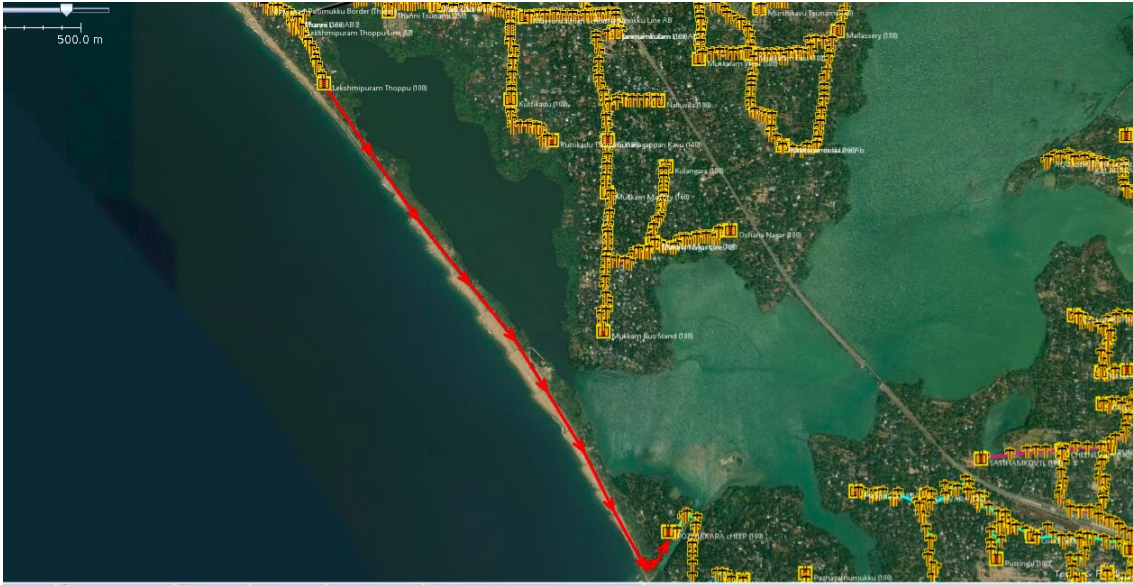
There is both tangible and intangible benefits. Only the tangible benefits can be quantified

100KVA				160KVA				LOSS REDUCED IN WATTS [A]-[B]
TRFR WORKING AT ___ KVA	NO LOAD LOSS (IRON LOSS)	LOAD LOSS (COPPER LOSS)	TOTAL LOSS	TRFR WORKING AT ___ KVA	NO LOAD LOSS (IRON LOSS)	LOAD LOSS (COPPER LOSS)	TOTAL LOSS	
40	250	282	532	40	460	169	629	-97
50	250	440	690	50	460	264	724	-34
60	250	634	884	60	460	380	840	44
70	250	862	1112	70	460	517	977	135
80	250	1126	1376	80	460	675	1135	241
90	250	1426	1676	90	460	854	1314	362
100	250	1760	2010	100	460	1055	1515	495
120				120	460	1519	1979	
140				140	460	2067	2527	
160				160	460	2700	3160	
160				160	480	2800	3280	

The loss reduced from 1376watts to 1135watts at 80kVA load in 160kVA transformer. i.e; a reduction in 241 watts at 80kVA. The savings will come to 2111units per year Considering the average per unit realisation, annual savings will amount to Rs.11399/-. Assuming that the life of the project is 25years, the IRR for the project is worked out to be 1.1%.

## Case Study 2

Name of Work : Interlinking Pozhikkara feeder from Paravoor SS & Nedungolam feeder from Kottiyam Sub Station by laying 11kV UG cable from Lakshmpuram Thoppe transformer to Pozhikkara cheep transformer– work Amount Rs.72,15,434/-



Analysis : This thin strip of land lying between Malakayal and the Arabian Sea is situated in the farthest end of the two feeders viz; Nedungolam and Pozhikkara 11kV feeders and so in case of any fault in the 11kV feeders this area will be deprived of electricity. Hence to ensure backfeeding power supply to this region these two feeders have to be interlinked.. In no other way another feeding arrangement can be provided to this area.

Options and Optimal Solution : This region is fast developing in due to its long, clean and scenic beach and upcoming backwater tourism. The two regions on either side of the Malakayal are thickly populated mainly comprising of domestic consumers. On the northern side of the Malakayal the consumers are fed from Lakshmpuram Thoppe transformer under Electrical Section, Mayyanad and the southern side is fed from Pozhikkara cheep transformer under Electrical Section, Paravoor. The Nedungolam feeder from 110kV substation, Kottiyam is feeding the Lakshmpuram Thoppe transformer and Pozhikkara feeder from 33kV substation, Paravoor is feeding the Pozhikkara cheep transformer.

### Benefits out of the project

- 1 Total Electrification : The government has developed several colonies in and around this region to rehabilitate families who were to be evacuated from their original dwelling locality as part of Infrastructure development or due to natural disasters. And so new service connections will have to be provided every year as even more families will be rehabilitated in housing colonies (flats) constructed for this purpose.
- 2 Reliability and Redundancy : The interlinking proposed is by providing 3.5 km UG cable and 80m Covered conductor on 4 numbers of four legged lattice structure suitable for 33kV at the Pozhikkaram (estuary) area. So that the line will be reliable and thus maintaining redundancy.
- 3 Additional sales : There will be additional sales due to reduction in interruption.

Financial Analysis: The estimated cost of this project is Rs.72,15,434/-

- Only the tangible benefits can be quantified
- The intangible benefits outweigh the tangible benefits. The families residing in these areas are facing a lot of power supply interruptions and the time taken for the power supply restoration is high. With the execution of this project this problem can be solved.. The region is also having to face the fury of the sea when rough.

The tangible benefit is the savings calculated with the increase in sales. An additional sales of 275940 units and thus the increase in revenue will be Rs.15.17 lakhs. Assuming the life of the project is 25 years, IRR for the project is worked out to be 6.75%

### Case Study 3

Name of Work : L T Reconductoring work ( 8 km ) at Various locations of Alappadu using ABC under Electrical section Karunagappally South– work Amount Rs.5354027/-

Problem statement : The Alappad area is a coastal area. On the eastern side there is the Kollam Kottapuram water way and on the west is the Arabian sea. And so the ACSR conductor gets easily get corroded. Hence reconductoring of these LT OH lines with LT ABC is proposed.

Analysis : The LT lines (8 km ) under the Distribution transformers – Kakka thuruthu bund, Kakka thuruthu & Madathil mukku which is situated in the Alappad area is proposed for reconductoring. The existing conductor is becoming brittle and powdered with the strong sea breeze. To overcome this corrosion reconductoring with ABC is considered.

Optimal solution : The normal life of an infrastructure is taken as 25 years but in the coastal area the 25 years of life cannot be expected. The cross arms , Nut and bolt, A poles, and all other metallic hard wares requires replacement frequently due to corrosion. To increase the life of the OH lines, reconductoring with ABC will be optimum

#### Benefits of the project :

- i) The line losses can be reduced as the conductor (ABC) is fully insulated and so the conductor will not become brittle .
- ii) The life of the LT OH lines will be 3 times more than that of bare conductors
- iii) In the case of bare conductors, the instances of conductor snapping will be more after the conductor turns brittle and also due the strong sea breeze. The conductor snapping instances will almost nil in the case of ABC. Hence there is the benefit of safety and also lesser interruption.
- iii) As the interruption is lesser, the power sales will increase and thus the good will of the consumers can be improved

Financial Analysis : The estimated cost of the work is Rs.5354027/-

There is both tangible and intangible benefits. Only the tangible benefits can be quantified

The existing conductor is ACSR Weasal

The Resistance of weasal – 0.905 ohms / km

Loss on the existing OH line ( weasal for the first 1km of the 3 transformers) assuming load to be 50A (one km of each transformer)

$$\begin{aligned} &= 3 \text{ phase} \times 1 \text{ km} \times 50^2 \times 0.905 \text{ ohms} \times 3 \text{ transformers} \\ &= 3 \times 1 \times 50^2 \times 0.905 \times 3 = 20362.5 \text{ watts } \boxed{A} \end{aligned}$$

Loss on the existing OH line ( weasal for the next 1km of the 3 transformers) assuming load to be 30A (one km of each transformer)

$$= 3 \times 1 \times 30^2 \times 0.905 \times 3 = 7330.5 \text{ watts } \boxed{B}$$

Loss on the existing OH line ( weasal for the next 0.66 km of the 3 transformers) assuming load to be 10A (one km of each transformer)

$$= 3 \times 0.66 \times 10^2 \times 0.905 \times 3 = 537.57 \text{ watts } \boxed{C}$$

$$\text{I}^2\text{R loss due to existing conductor(weasal)} = \boxed{D} = \boxed{A} + \boxed{B} + \boxed{C} = 28230.6 \text{ watts}$$

Reconductoring is proposed with LT ABC

Resistance of LT ABC  $3 \times 70 + 1 \times 16 + 1 \times 50 = 0.443$  ohms/ km ( phase condr )

Loss on the OH line after reconductoring with ABC ( of the first 1km of the 3 transformers) assuming load to be 50A (one km of each transformer)

$$= 3 \text{ phase} \times 1 \text{ km} \times 50^2 \times 0.443 \text{ ohms} \times 3 \text{ transformers}$$

$$= 3 \times 1 \times 50^2 \times 0.443 \times 3 = 9967.5 \text{ watts} \quad \boxed{E}$$

Loss on the OH line after reconductoring with ABC ( of the next 1km of the 3 transformers) assuming load to be 30A (one km of each transformer)

$$= 3 \times 1 \times 30^2 \times 0.443 \times 3 = 3588.3 \text{ watts} \quad \boxed{F}$$

Loss on the OH line after reconductoring with ABC ( of the next 0.66km of the 3 transformers) assuming load to be 30A (0.66 km of each transformer)

$$= 3 \times 0.66 \times 10^2 \times 0.443 \times 3 = 263.142 \text{ watts} \quad \boxed{G}$$

$$\text{I}^2\text{R loss arrived after reconductoring with ABC} = \boxed{H} = \boxed{E} + \boxed{F} + \boxed{G} = 13818.9 \text{ watts}$$

$$\text{Loss Reduction in I}^2\text{R} = \boxed{D} - \boxed{H}$$

$$= 28230.6 - 13818.9$$

$$= 14411.628 \text{ watts}$$

$$\text{Annual Loss Reduction in I}^2\text{R} = 14411.628 \times 365 \times 24$$

$$= 126245861.28 \text{ watt Hr}$$

$$= 126245.86 \text{ kWh}$$

$$\text{Annual savings} = \text{Rs. } 694352.237 \times 0.75 \text{ (diversity factor)}$$

$$= \text{Rs. } 520764.178$$

Assuming that the life of the project is 15years, the IRR for the project is worked out to be 5.14%.

**Annexure 3.2.1 Projectwise details - Distribution Infrastructure works under RDSS scheme**

1	Name of the Distribution project	Loss reduction & Modernization under RDSS scheme (Central Aided Scheme) in KSEBL
2	Project details	Loss reduction & modernization under RDSS in KSEBL
3	Length of Distribution line (Ckt-km)/No of transformers/ Transformer capacity (MVA)/others	Details attached
4	Objective	For providing 24 x 7uninterrupted, quality, reliable and affordable power supply
5	Project Cost as per DPR incl IDC (Rs. Cr)	Rs. 2007.86 Crore
6	Date of commencement	DPR yet to be finalized
7	Target date of completion	2024-25
8	IRR Details	Will be furnished on receiving approval from Government of India
9	Energy savings (MU)	
10	Additional sales(MU)	
11	Other benefits if any	
12	Details of Source of finance	
	(a) Loan sanctioned (Rs. Cr)	Project amount yet to be sanctioned
	(b) Loan availed as on 31st March 2021 (Rs.Cr)	
	(c) Other source of finance (own investment, Government grant etc.) Please specify	

## Annexure 3.2.1 Continued.....

Annexure 3.2.1 Continued.....										
13 Physical and financial target proposed for the year-Targetted interventions of loss reduction										
Sl. No	Particulars of work	Units	Proposed Quantity	Year wise Physical target						Estimated Cost (Rs. Cr)
				FY 2022-23		FY 2023-24		FY 2024-25		
				Qty	Amt (Rs Cr)	Qty	Amt (Rs Cr)	Qty	Amt (Rs Cr)	
<b>1</b>	<b>Replacement of old/ frayed conductors</b>									
<b>A</b>	<b>11 kV line (Reconductoring)</b>									
<b>a</b>	OH	km	<b>455.48</b>	202.90	4.85	148.95	3.58	103.63	2.48	<b>10.90</b>
<b>b</b>	Covered Conductor	km	<b>771.57</b>	324.24	45.22	303.28	42.67	144.05	19.97	<b>107.86</b>
<b>c</b>	ABC	km	<b>1579.88</b>	787.97	103.51	510.24	66.21	281.67	35.29	<b>205.02</b>
<b>d</b>	UG	km	<b>136.10</b>	81.75	27.63	36.95	12.46	17.40	5.87	<b>45.96</b>
<b>B</b>	<b>LT line (Reconductoring)</b>									
<b>a</b>	ABC 3PH	km	<b>6588.23</b>	3011.03	261.91	2181.97	189.71	1395.24	119.13	<b>570.75</b>
<b>b</b>	ABC 1 PH	km	<b>51.09</b>	11.56	0.34	23.75	0.94	15.78	0.54	<b>1.82</b>
<b>c</b>	Covered Conductor	km	<b>67.16</b>	25.76	6.70	30.80	8.01	10.60	2.76	<b>17.46</b>
<b>d</b>	OH	km	<b>907.40</b>	461.78	8.05	319.92	6.16	125.71	2.05	<b>16.26</b>
<b>2</b>	<b>Segregation of agricultural/ overloaded/lengthy feeder</b>									
<b>a</b>	Agriculture Feeder	No	<b>1</b>							
		km	<b>18.5</b>	18.50	2.99	0	0	0.00	<b>2.99</b>	
<b>b</b>	Lengthy / Overloaded feeder	No	<b>15</b>							
		km	<b>34</b>	5.50	0.89	24	4	4	0.65	<b>5.54</b>
<b>3</b>	<b>Provision of ABC cables</b>									
<b>a</b>	<b>11 kV line</b>									
	ABC	km	<b>229.6</b>	135.58	21.56	62.65	9.7	31.37	5.05	<b>36.31</b>
<b>b</b>	<b>LT line new</b>									
	ABC	km	<b>99.9</b>	48.70	5.83	26.5	3.1	24.7	2.92	<b>11.84</b>
<b>4</b>	<b>Provision/ Replacement of UG Cables</b>									
<b>a</b>	UG (New)	km	<b>164.745</b>	122.14	33.04	25.85	7.85	16.76	5.05	<b>45.93</b>
<b>5</b>	HVDS Installation	No	35.00	14.00	0.38	14.0	0.39	7.00	0.15	0.92
<b>6</b>	<b>Additional HT line</b>									
	<b>11 kV line (new)</b>									
<b>a</b>	OH	km	<b>94.045</b>	58.38	4.37	23.22	1.73	12.45	0.86	<b>6.96</b>
<b>b</b>	Covered Conductor	km	<b>14.60</b>	4.60	1.13	8.50	2.08	1.50	0.37	<b>3.58</b>

<b>Physical and financial target proposed for the year-Targeted interventions of loss reduction</b>										
Sl. No	Particulars of work	Units	Proposed Quantity	Year wise Physical target						Estimated cost
				FY 2022-23		FY 2023-24		FY 2024-25		
				Qty	Am (Rs Cr)	Qty	Amt Rs Cr	Qty	Amt (Rs cr)	Amt (Rs cr)
7	<b>Capacitor bank installation/ Others</b>	No	22	21.00	0.00	1	0.00	0	0.00	0.00
8	<b>Any other work (Unit as applicable)</b>									
a	Other works (LT Line works/ OH Conversion, Transformer Installation/ Replacement/ Enhancement etc.)	LS			66.05		48.10		35.33	149.48
	<b>Total (LOSS REDUCTION WORKS )</b>				594.43		406.69			1239.58
<b>Physical and financial target proposed for the year-Targeted interventions of MODERNISATION &amp; SYSTEM AUGMENTATION WORKS (Except Transmission works)</b>										
Sl. No	Particulars	Units	Proposed Quantity	Year wise Financial target (Rs cr)						Estimated Cost ( Rs. Cr)
				FY 2022-23		FY 2023-24		FY 2024-25		
1	<b>Additional HT &amp; LT works to improve the quality of supply (As applicable)</b>									
2	<b>Any other works for improving reliability and quality of supply (As applicable)</b>			324.09		303.21		141.87		769.18
	<b>Sub Total System Strengthening and Modernisation Works</b>			918.52		709.90		177.20		2008.76

### Annexure 3.3.1 Projectwise details of Prepaid Smart Metering under RDSS scheme

Annexure 3.3.1 Projectwise details of Prepaid Smart Metering under RDSS scheme									
1	Name of the Distribution project				RDSS - Implementation of prepaid Smart meter				
2	Project details				Implementation of prepaid Smart metering as per RDSS in KSEBL				
3	Length of Distribution line (Ckt-km)/No of transformers/ Transformer capacity (MVA)/others				5999 feeder/border meters, 87133 DTR meters & 1.3 crore consumer meters				
4	Objective				Installing prepaid smart meters for energy auditing & accounting and thereby reducing AT&C loss.				
5	Project Cost as per DPR incl IDC (Rs. Cr)				Rs. 8200 Crore (DPR yet to be finalized)				
6	Date of commencement				DPR yet to be finalized. Awaiting appointment of PMA				
7	Target date of completion				36 months from the date of sanction.				
12	<b>Details of Source of finance</b>								
	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned				
	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)				NA				
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA				
13	<b>Physical and financial target proposed for the year</b>								
	Phase I - Feeder & border (5,999), DTR meters (87,133), HT/EHT consumers (7,000) and Govt. consumers (1,65,095), all industrial (1,35,897) & commercial (22,68,621) consumers and domestic consumers having monthly average consumption above 200 units (10,45,613) Phase II - RAPDRP & IPDS towns (63 towns) - for replacement of remaining LT consumer meters Phase III - replacement of remaining LT consumer meters								
	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>				
	Physical target			Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)	
	<b>Target (%)*</b>	<b>Cumulative % of total works</b>	<b>Amount</b>	<b>Cumulative amount</b>	<b>Target (%)*</b>	<b>Cumulative % of total works</b>	<b>Amount</b>	<b>Cumulative amount</b>	
	17%	17%	1429	1429.00	42%	59%	3425	4854.00	
	<b>Financial year 2024-25</b>				<b>Financial year 2025-26 *</b>				
	Physical target			Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)	
	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	
	41%	100%	3346	8200.00					



Annexure 3.3.2 Implementation of SCADA/DMS under RDSS Scheme									
1	Name of the Distribution project				RDSS- SCADA				
2	Project details				SCADA/DMS implementation in three towns, SCADA with FPI implementation in 53 statutory towns & OMS upgradation works in 3 existing SCADA towns in Kerala as per RDSS				
3	Objective				For providing 24 x 7 uninterrupted, quality, reliable and affordable power supply				
4	Project Cost as per DPR incl IDC (Rs. Cr)				Project amount yet to be sanctioned				
5	Date of commencement				Draft Bidding document prepared				
6	Target date of completion				36 months from the date of sanction.				
<b>Details of Source of finance</b>									
7	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned				
	(b) Loan availed as on 31st March 2021 (Rs. Cr)				NA				
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA				
<b>Physical and financial target proposed for the year</b>									
8	Particulars of the work	Financial year 2022-23				Financial year 2023-24			
		Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)	
		Target (%)*	Cumulative %	Amount	Cumulative amount	Target (%)*	Cumulative %	Amount	Cumulative amount
	Implementation of SCADA/DMS project in 3 Corporations, 53 Statutory Towns & upgradation of existing SCADA in 3 towns. The cost incl control centre Hardware& Software, RTUs in substations, FRTU integrated RMUs, FPIs in HT OH lines, communication system, integration, etc)	25%	25%	148.8	148.80	40%	65%	238.13	386.93
	Financial year 2024-25				Financial year 2025-26				
	Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)		
	Target (%)	Cumulative %	Amount	Cumulative amount	Target (%)	Cumulative %	Amount	Cumulative amount	
	25%	100%	208.39	595.32					
	Financial year 2026-27								
	Physical target		Financial target (Rs. Cr)						
Target (%)*	Cumulative %	Amount	Cumulative amount						

**Annexure 3.3.3(i) Projectwise Details of IT /OT works**

<b>1</b>	<b>Name of the Distribution project</b>				e-Bidding (SRM)			
<b>2</b>	Project details				IT/OT works under RDSS			
<b>3</b>	Objective				Modernization of system			
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)				Rs. 1 Crore			
<b>5</b>	Date of commencement				DPR yet to be finalized. Awaiting appointment of PMA			
<b>6</b>	Target date of completion				36 months from the date of sanction.			
<b>Details of Source of finance</b>								
<b>7</b>	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned			
	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)				NA			
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA			
<b>8</b>	<b>Physical and financial target proposed for the year</b>							
<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>			
	Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)	
	Target (%)*	Cumulative %	Amount	Cumulative amount	Target (%)*	Cumulative %	Amount	Cumulative amount
e-Bidding (SRM)	30%	30%	0.3	0.3	40%	70%	0.4	0.7
<b>Particulars of the work</b>	<b>Financial year 2024-25</b>							
	Physical target		Financial target (Rs. Cr)					
	Target (%)*	Cumulative %	Amount	Cumulative amount				
e-Bidding (SRM)	30%	100%	0.3	1				

**Annexure 3.3.3(ii) Projectwise Details of IT /OT works**

<b>1</b>	<b>Name of the Distribution project</b>	Enterprise Asset Management							
<b>2</b>	Project details	IT/OT works under RDSS scheme							
<b>3</b>	Objective	Modernisation of system							
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)	Rs.5 Crore							
<b>5</b>	Date of commencement	DPR yet to be finalized. Awaiting appointment of PMA							
<b>6</b>	Target date of completion	36 months from the date of sanction.							
<b>Details of Source of finance</b>									
<b>7</b>	(a) Loan sanctioned (Rs. Cr)	Project amount yet to be sanctioned							
	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)	NA							
	(c) Other source of finance (own investment, Government grant etc.) Please specify	NA							
<b>8</b>	<b>Physical and financial target proposed for the year</b>								
	<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>			
		Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)	
		Target (%)*	Cumulative %	Amount	Cumulative amount	Target (%)*	Cumulative % of total works	Amount	Cumulative amount
	Enterprise Asset Management (EAM or PM)	30%	30%	1.5	1.5	40%	70%	2	3.5
	<b>Particulars of the work</b>	<b>Financial year 2024-25</b>							
		Physical target		Financial target (Rs. Cr)					
		Target (%)*	Cumulative % of total works	Amount	Cumulative amount				
	Enterprise Asset Management (EAM or PM)	30%	100%	1.5	5				

\* Project scheduled to be completed by 2024-25

**Annexure 3.3.3(iii) Projectwise Details of IT /OT works**

<b>1</b>	<b>Name of the Distribution project</b>	Document Management System (DMS)							
<b>2</b>	Project details	IT/OT works under RDSS scheme							
<b>3</b>	Objective	Modernisation of system							
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)	Rs 1 Crore							
<b>5</b>	Date of commencement	DPR yet to be finalized. Awaiting appointment of PMA							
<b>6</b>	Target date of completion	36 months from the date of sanction.							
<b>Details of Source of finance</b>									
<b>7</b>	(a) Loan sanctioned (Rs. Cr)	Project amount yet to be sanctioned							
	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)	NA							
	(c) Other source of finance (own investment, Government grant etc.) Please specify	NA							
<b>8</b>	<b>Physical and financial target proposed for the year</b>								
	<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>			
		Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)	
		Target (%)*	Cumulative %	Amount	Cumulative amount	Target (%)*	Cumulative %	Amount	Cumulative amount
	Document Management System (DMS)	30%	30%	0.3	0.3	40%	70%	0.4	0.7
	<b>Particulars of the work</b>	<b>Financial year 2024-25</b>							
		Physical target		Financial target (Rs. Cr)					
		Target (%)*	Cumulative %	Amount	Cumulative amount				
	Document Management System (DMS)	30%	100%	0.3	1				

\* Project scheduled to be completed by 2024-25

### Annexure 3.3.3(iv) Projectwise Details of IT /OT works

<b>1</b>		<b>Name of the Distribution project</b>		Customer Relationship Management (CRM)					
<b>2</b>		Project details		IT/OT works - under RDSS scheme					
<b>3</b>		Objective		Modernisation					
<b>4</b>		Project Cost as per DPR incl IDC (Rs. Cr)		Rs. 2 Crore					
<b>5</b>		Date of commencement		DPR yet to be finalized. Awaiting appointment of PMA					
<b>6</b>		Target date of completion		36 months from the date of sanction.					
<b>7</b>		<b>Details of Source of finance</b>							
		(a) Loan sanctioned (Rs. Cr)		Project amount yet to be sanctioned					
		(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)		NA					
		(c) Other source of finance (own investment, Government grant etc.) Please specify		NA					
<b>8</b>		<b>Physical and financial target proposed for the year</b>							
<b>Particulars of the work</b>		<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>			
		Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)	
		Target (%)*	Cumulative %	Amount	Cumulative amount	Target (%)*	Cumulative %	Amount	Cumulative amount
Customer Relationship Management (CRM)		30%	30%	0.6	0.6	40%	70%	0.8	1.4
<b>Particulars of the work</b>		<b>Financial year 2024-25</b>							
		Physical target		Financial target (Rs. Cr)					
		Target (%)*	Cumulative %	Amount	Cumulative amount				
Customer Relationship Management (CRM)		30%	100%	0.6	2				

\* Project scheduled to be completed by 2024-25

**Annexure 3.3.3(v) Projectwise Details of IT /OT works**

<b>Annexure 3.3.3(v) Projectwise Details of IT /OT works</b>									
<b>1</b>	<b>Name of the Distribution project</b>				Energy Audit				
<b>2</b>	Project details				IT/OT works - under RDSS				
<b>3</b>	Objective				Modernisation of system				
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)				Rs. 2 Crore				
<b>5</b>	Date of commencement				DPR yet to be finalized. Awaiting appointment of PMA				
<b>6</b>	Target date of completion				36 months from the date of sanction.				
<b>Details of Source of finance</b>									
<b>7</b>	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned				
	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)				NA				
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA				
<b>8</b>	<b>Physical and financial target proposed for the year</b>								
<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>				
	Physical target		Financial target (Rs Cr)		Physical target		Financial target (Rs Cr)		
	Target (%)*	Cumulative	Amount	Cumulative amount	Target (%)*	Cumulative %	Amount	Cumulative amount	
Energy Audit	30%	30%	0.6	0.6	40%	70%	0.8	1.4	
<b>Particulars of the work</b>	<b>Financial year 2024-25</b>				<b>Financial year 2025-26 *</b>				
	Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)		
	Target (%)*	Cumulative %	Amount	Cumulative amount	Target (%)*	Cumulative %	Amount	Cumulative amount	
Energy Audit	30%	100%	0.6	2					

\* Project scheduled to be completed by 2024-25

**Annexure 3.3.3(vi) Projectwise Details of IT /OT works under RDSS Scheme**

<b>1</b>	<b>Name of the Distribution project</b>				Business Intelligent warehousing/MIS			
<b>2</b>	Project details				IT/OT works - Loss reduction & modernization under RDSS in KSEBL			
<b>3</b>	Objective				Modernisation			
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)				Rs. 5 Crore			
<b>5</b>	Date of commencement				DPR yet to be finalized. Awaiting appointment of PMA			
<b>6</b>	Target date of completion				36 months from the date of sanction.			
<b>Details of Source of finance</b>								
<b>7</b>	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned			
	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)				NA			
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA			
<b>8</b>	<b>Physical and financial target proposed for the year</b>							
<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>			
	Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)	
	Target (%)*	Cumulative %	Amount	Cumulative amount	Target (%)*	Cumulative %	Amount	Cumulative amount
BW/MIS	30%	30%	1.5	1.5	40%	70%	2	3.5
<b>Particulars of the work</b>	<b>Financial year 2024-25</b>				<b>Financial year 2025-26 *</b>			
	Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)	
	Target (%)*	Cumulative %	Amount	Cumulative amount	Target (%)*	Cumulative %	Amount	Cumulative amount
BW/MIS	30%	100%	1.5	5				

\* Project scheduled to be completed by 2024-25

**Annexure 3.3.3.(vii) Projectwise Details of IT /OT works under RDSS Scheme**

<b>1</b>	<b>Name of the Distribution project</b>				GIS and Network Analysis			
<b>2</b>	Project details				IT/OT works - Modernisation works			
<b>3</b>	Objective				Modernisation of system			
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)				Rs. 80 Crore			
<b>5</b>	Date of commencement				DPR yet to be finalized. Awaiting appointment of PMA			
<b>6</b>	Target date of completion				36 months from the date of sanction.			
<b>Details of Source of finance</b>								
<b>7</b>	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned			
	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)				NA			
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA			
<b>8</b>	<b>Physical and financial target proposed for the year</b>							
<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>			
	Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)	
	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount
GIS and Network Analysis	30%	30%	24	24	40%	70%	32	56
<b>Particulars of the work</b>	<b>Financial year 2024-25</b>				<b>Financial year 2025-26 *</b>			
	Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)	
	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount
GIS and Network Analysis	30%	100%	24	80				

\* Project scheduled to be completed by 2024-25



### Annexure 3.3.3.(viii) Projectwise Details of IT /OT works under RDSS Scheme

<b>Annexure 3.3.3.(viii) Projectwise Details of IT /OT works under RDSS Scheme</b>									
<b>1</b>	<b>Name of the Distribution project</b>				Meter Data and Acquisition System (MDAS)				
<b>2</b>	Project details				IT/OT works - under RDSS in KSEBL				
<b>3</b>	Objective				Modernisation				
<b>4</b>	Project Cost as per DPR incl IDC ( <b>Rs. Cr</b> )				Rs. 3 Crore				
<b>5</b>	Date of commencement				DPR yet to be finalized. Awaiting appointment of PMA				
<b>6</b>	Target date of completion				36 months from the date of sanction.				
<b>Details of Source of finance</b>									
<b>7</b>	(a) Loan sanctioned ( <b>Rs. Cr</b> )				Project amount yet to be sanctioned				
	(b) Loan availed as on <b>31st March 2021 (Rs. Cr)</b>				NA				
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA				
<b>8</b>	<b>Physical and financial target proposed for the year</b>								
<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>				
	Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)		
	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	
Meter Data and Acquisition System (MDAS)	30%	30%	0.9	0.9	40%	70%	1.2	2.1	
<b>Particulars of the work</b>	<b>Financial year 2024-25</b>				<b>Financial year 2025-26 *</b>				
	Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)		
	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	
Meter Data and Acquisition System (MDAS)	30%	100%	0.9	3					
* Project scheduled to be completed by 2024-25									

### Annexure 3.3.3.(ix) Projectwise Details of IT /OT works under RDSS Scheme

<b>Annexure 3.3.3.(ix) Projectwise Details of IT /OT works under RDSS Scheme</b>									
<b>1</b>	<b>Name of the Distribution project</b>				Centralised Customer Care Center (CC)				
<b>2</b>	Project details				IT/OT works - under RDSS scheme				
<b>3</b>	Objective				Modernisation				
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)				Rs. 5 Crore				
<b>5</b>	Date of commencement				DPR yet to be finalized. Awaiting appointment of PMA				
<b>6</b>	Target date of completion				36 months from the date of sanction.				
<b>Details of Source of finance</b>									
<b>7</b>	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned				
	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)				NA				
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA				
<b>8</b>	<b>Physical and financial target proposed for the year</b>								
<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>				
	Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)		
	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year (%)*	Cumulative % of total works	Amount	Cumulative amount	
Centralised Customer Care Center (CC)	30%	30%	1.5	1.5	40%	70%	2	3.5	
<b>Particulars of the work</b>	<b>Financial year 2024-25</b>				<b>Financial year 2025-26 *</b>				
	Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)		
	Target for the year (%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year (%)*	Cumulative % of total works	Amount	Cumulative amount	
Centralised Customer Care Center (CC)	30%	100%	1.5	5					

\* Project scheduled to be completed by 2024-25

### Annexure 3.3.3.(x) Projectwise Details of IT /OT works under RDSS Scheme

<b>1</b>	<b>Name of the Distribution project</b>				Web Self Service (WSS) (and Centralized Customer database - CCDB)				
<b>2</b>	Project details				IT/OT works - under RDSS				
<b>3</b>	Objective				Modernisation of system				
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)				Rs. 5 Crore				
<b>5</b>	Date of commencement				DPR yet to be finalized. Awaiting appointment of PMA				
<b>6</b>	Target date of completion				36 months from the date of sanction.				
<b>Details of Source of finance</b>									
<b>7</b>	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned				
	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)				NA				
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA				
<b>8</b>	Physical and financial target proposed for the year								
<b>Particulars of the work</b>		<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>			
		Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)	
		Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount
Web Self Service (WSS) (and Centralized Customer database - CCDB)		30%	30%	1.5	1.5	40%	70%	2	3.5
<b>Particulars of the work</b>		<b>Financial year 2024-25</b>				<b>Financial year 2025-26 *</b>			
		Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)	
		Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount
Web Self Service (WSS) (and Centralized Customer database - CCDB)		30%	100%	1.5	5				

\* Project scheduled to be completed by 2024-25

Annexure 3.3.3.(xi) Projectwise Details of IT /OT works under RDSS Scheme								
1	Name of the Distribution project				Spot Billing			
2	Project details				IT/OT works - under RDSS scheme			
3	Objective				Modernisation of system			
4	Project Cost as per DPR incl IDC (Rs. Cr)				Rs.1 Crore			
5	Date of commencement				DPR yet to be finalized. Awaiting appointment of PMA			
6	Target date of completion				36 months from the date of sanction.			
<b>Details of Source of finance</b>								
7	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned			
	(b) Loan availed as on 31st March 2021 (Rs. Cr)				NA			
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA			
8	<b>Physical and financial target proposed for the year</b>							
Particulars of the work	Financial year 2022-23				Financial year 2023-24			
	Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)	
	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount
Spot Billing	30%	30%	0.3	0.3	40%	70%	0.4	0.7
Particulars of the work	Financial year 2024-25				Financial year 2025-26 *			
	Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)	
	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount
Spot Billing	30%	100%	0.3	1				

\* Project scheduled to be completed by 2024-25

### Annexure 3.3.3.(xii) Projectwise Details of IT /OT works under RDSS Scheme

<b>Annexure 3.3.3.(xii) Projectwise Details of IT /OT works under RDSS Scheme</b>								
<b>1</b>	<b>Name of the Distribution project</b>				Network Management System (NMS) & Enterprise Management System(EMS)			
<b>2</b>	Project details				IT/OT works - under scheme in KSEBL			
<b>3</b>	Objective				Modernisation of system			
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)				Rs. 3 Crore			
<b>5</b>	Date of commencement				DPR yet to be finalized. Awaiting appointment of PMA			
<b>6</b>	Target date of completion				36 months from the date of sanction.			
<b>Details of Source of finance</b>								
<b>7</b>	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned			
	(b) Loan availed as on 31st March 2021 (Rs. Cr)				NA			
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA			
<b>8</b>	<b>Physical and financial target proposed for the year</b>							
<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>			
	Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)	
	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount
Network Management System (NMS) & Enterprise Management System(EMS)	30%	30%	0.9	0.9	40%	70%	1.2	2.1
<b>Particulars of the work</b>	<b>Financial year 2024-25</b>				<b>Financial year 2025-26 *</b>			
	Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)	
	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount
Network Management System (NMS) & Enterprise Management System(EMS)	30%	100%	0.9	3				

\* Project scheduled to be completed by 2024-25

**Annexure 3.3.3.(xiii) Projectwise Details of IT /OT works under RDSS Scheme**

<b>1</b>	<b>Name of the Distribution project</b>	Employee Self Service (Implementation of ESS system)							
<b>2</b>	Project details	IT/OT works - under RDSS scheme							
<b>3</b>	Objective	Modernisation							
<b>4</b>	Project Cost as per DPR incl IDC ( <b>Rs. Cr</b> )	Rs. 1 Crore							
<b>5</b>	Date of commencement	DPR yet to be finalized. Awaiting appointment of PMA							
<b>6</b>	Target date of completion	36 months from the date of sanction.							
<b>Details of Source of finance</b>									
<b>7</b>	(a) Loan sanctioned ( <b>Rs. Cr</b> )	Project amount yet to be sanctioned							
	(b) Loan availed as on <b>31st March 2021 (Rs. Cr)</b>	NA							
	(c) Other source of finance (own investment, Government grant etc.) Please specify	NA							
<b>8</b>	<b>Physical and financial target proposed for the year</b>								
	<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>			
		Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)	
		Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount
	Employee Self Service (Implementation of ESS system)	30%	30%	0.3	0.3	40%	70%	0.4	0.7
	<b>Particulars of the work</b>	<b>Financial year 2024-25</b>				<b>Financial year 2025-26 *</b>			
		Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)	
		Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount
	Employee Self Service (Implementation of ESS system)	30%	100%	0.3	1				

\* Project scheduled to be completed by 2024-25

### Annexure 3.3.3.(xiv) Projectwise Details of IT /OT works under RDSS Scheme

<b>1</b>	<b>Name of the Distribution project</b>				Replacement of servers in system and upgradation of storage			
<b>2</b>	Project details				IT/OT works - modernization under RDSS scheme			
<b>3</b>	Objective				Modernisation of system			
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)				Rs. 14 Crore			
<b>5</b>	Date of commencement				DPR yet to be finalized. Awaiting appointment of PMA			
<b>6</b>	Target date of completion				36 months from the date of sanction.			
<b>Details of Source of finance</b>								
<b>7</b>	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned			
	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)				NA			
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA			
<b>8</b>	<b>Physical and financial target proposed for the year</b>							
<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>			
	Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)	
	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount
Replacement of servers in system and upgradation of storage	30%	30%	4.2	4.2	40%	70%	5.6	9.8
<b>Particulars of the work</b>	<b>Financial year 2024-25</b>				<b>Financial year 2025-26 *</b>			
	Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)	
	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount
Replacement of servers in system and upgradation of storage	30%	100%	4.2	14				

\* Project scheduled to be completed by 2024-25

### Annexure 3.3.3.(xv) Projectwise Details of IT /OT works under RDSS Scheme

<b>1</b>	<b>Name of the Distribution project</b>				In-Memory Computation for Business Intelligence Wares housing (BW)			
<b>2</b>	Project details				IT/OT works - under RDSS			
<b>3</b>	Objective				Modernisation			
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)				Rs. 10 Crore			
<b>5</b>	Date of commencement				DPR yet to be finalized. Awaiting appointment of PMA			
<b>6</b>	Target date of completion				36 months from the date of sanction.			
<b>Details of Source of finance</b>								
<b>7</b>	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned			
	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)				NA			
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA			
<b>8</b>	<b>Physical and financial target proposed for the year</b>							
<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>			
	Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)	
	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount
In-Memory Computation for Business Intelligence Wares housing (BW)	30%	30%	3	3	40%	70%	4	7
<b>Particulars of the work</b>	<b>Financial year 2024-25</b>				<b>Financial year 2025-26 *</b>			
	Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)	
	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount
In-Memory Computation for Business Intelligence Wares housing (BW)	30%	100%	3	10				

\* Project scheduled to be completed by 2024-25



**Annexure 3.3.3.(xvi) Projectwise Details of IT /OT works under RDSS Scheme**

<b>1</b>	<b>Name of the Distribution project</b>	Software tools for Cyber security, testing etc.						
<b>2</b>	Project details	IT/OT works - under RDSS scheme						
<b>3</b>	Objective	Modernisation works						
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)	Rs. 10 Crore						
<b>5</b>	Date of commencement	DPR yet to be finalized. Awaiting appointment of PMA						
<b>6</b>	Target date of completion	36 months from the date of sanction.						
<b>Details of Source of finance</b>								
<b>7</b>	(a) Loan sanctioned (Rs. Cr)	Project amount yet to be sanctioned						
	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)	NA						
	(c) Other source of finance (own investment, Government grant etc.) Please specify	NA						
<b>8</b>	<b>Physical and financial target proposed for the year</b>							
<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>			
	Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)	
	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount
Software tools for Cyber security, testing etc.	30%	30%	3	3	40%	70%	4	7
<b>Particulars of the work</b>	<b>Financial year 2024-25</b>				<b>Financial year 2025-26 *</b>			
	Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)	
	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount
Software tools for Cyber security, testing etc.	30%	100%	3	10				

\* Project scheduled to be completed by 2024-25

### Annexure 3.3.3.(xvii) Projectwise Details of IT /OT works under RDSS Scheme

<b>1</b>	<b>Name of the Distribution project</b>				Mail / messaging System			
<b>2</b>	Project details				IT/OT works - under RDSS scheme			
<b>3</b>	Objective				Modernisation			
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)				Rs. 4 Crore			
<b>5</b>	Date of commencement				DPR yet to be finalized. Awaiting appointment of PMA			
<b>6</b>	Target date of completion				36 months from the date of sanction.			
<b>Details of Source of finance</b>								
<b>7</b>	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned			
	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)				NA			
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA			
<b>8</b>	<b>Physical and financial target proposed for the year</b>							
<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>			
	Physical target		Financial target (Rs Cr)		Physical target		Financial target (Rs Cr)	
	Target (%)*	Cumulative %	Amount	Cumulative amount	Target (%)*	Cumulative %	Amount	Cumulative amount
Mail / messaging System	30%	30%	1.2	1.2	40%	70%	1.6	2.8
<b>Particulars of the work</b>	<b>Financial year 2024-25</b>				<b>Financial year 2025-26 *</b>			
	Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)	
	Target (%)*	Cumulative %	Amount	Cumulative amount	Target (%)*	Cumulative %	Amount	Cumulative amount
Mail / messaging System	30%	100%	1.2	4				

\* Project scheduled to be completed by 2024-25

**Annexure 3.3.3(xviii) Projectwise Details of IT /OT works under RDSS Scheme**

<b>1</b>	<b>Name of the Distribution project</b>				Spot Billing machines			
<b>2</b>	Project details				IT/OT works -under RDSS			
<b>3</b>	Objective				Modernisation			
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)				Rs. 14 Crore			
<b>5</b>	Date of commencement				DPR yet to be finalized. Awaiting appointment of PMA			
<b>6</b>	Target date of completion				36 months from the date of sanction.			
<b>7</b>	<b>Details of Source of finance</b>							
	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned			
	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)				NA			
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA			
<b>8</b>	<b>Physical and financial target proposed for the year</b>							
<b>Partiulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>			
	Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)	
	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount
Spot Billing machines	30%	30%	4.2	4.2	40%	70%	5.6	9.8
<b>Particulars of the work</b>	<b>Financial year 2024-25</b>				<b>Financial year 2025-26 *</b>			
	Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)	
	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount
Spot Billing machines	30%	100%	4.2	14				
* Project scheduled to be completed by 2024-25								

**Annexure3.3.3(xix) Projectwise details of IT OT works**

<b>Annexure3.3.3(xix) Projectwise details of IT OT works</b>									
<b>1</b>	<b>Name of the Distribution project</b>				Replacement of Core/Distribution/Access Switches and Core Routers in DC & DR				
<b>2</b>	Project details				IT/OT works - Loss reduction & modernization under RDSS in KSEBL				
<b>3</b>	Objective				Modernisation				
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)				Rs. 12 Crore				
<b>5</b>	Date of commencement				DPR yet to be finalized. Awaiting appointment of PMA				
<b>6</b>	Target date of completion				36 months from the date of sanction.				
<b>Details of Source of finance</b>									
<b>7</b>	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned				
	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)				NA				
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA				
<b>8</b>	<b>Physical and financial target proposed for the year</b>								
<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>				
	Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)		
	Target for the year(%) *	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%) *	Cumulative % of total works	Amount	Cumulative amount	
Replacement of Core/Distribution/Access Switches and Core Routers in DC & DR									
30%	30%	3.6	3.6	40%	70%	4.8	8.4		
<b>Particulars of the work</b>	<b>Financial year 2024-25</b>				<b>Financial year 2025-26 *</b>				
	Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)		
	Target for the year(%) *	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%) *	Cumulative % of total works	Amount	Cumulative amount	
Replacement of Core/Distribution/Access Switches and Core Routers in DC & DR									
30%	100%	3.6	12						

\* Project scheduled to be completed by 2024-25

### Annexure3.3.3(xx) Projectwise details of IT OT works

Annexure3.3.3(xx) Projectwise details of IT OT works									
<b>1</b>	<b>Name of the Distribution project</b>				Replacement of PC/Printer/networking equipment in 776 Section offices				
<b>2</b>	Project details				IT/OT works - Loss reduction & modernization under RDSS in KSEBL				
<b>3</b>	Objective				For providing 24 x 7uninterrupted, quality, reliable and affordable power supply				
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)				Rs. 25 Crore				
<b>5</b>	Date of commencement				DPR yet to be finalized. Awaiting appointment of PMA				
<b>6</b>	Target date of completion				36 months from the date of sanction.				
<b>Details of Source of finance</b>									
<b>7</b>	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned				
	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)				NA				
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA				
<b>8</b>	<b>Physical and financial target proposed for the year</b>								
<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>				
	Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)		
	Target (%)*	Cumulative %	Amount	Cumulative amount	Target (%)*	Cumulative %	Amount	Cumulative amount	
Replacement of PC/Printer/networking equipment in 776 Section offices	30%	30%	7.5	7.5	40%	70%	10	17.5	
<b>Particulars of the work</b>	<b>Financial year 2024-25</b>				<b>Financial year 2025-26 *</b>				
	Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)		
	Target (%)*	Cumulative %	Amount	Cumulative amount	Target (%)*	Cumulative %	Amount	Cumulative amount	
Replacement of PC/Printer/networking equipment in 776 Section offices	30%	100%	7.5	25					
* Project scheduled to be completed by 2024-25									

**Annexure 3.3.3(xx1) Projectwise details of IT OT works**

<b>1</b>	<b>Name of the Distribution project</b>				License for operating system			
<b>2</b>	Project details				IT/OT works - under RDSS scheme			
<b>3</b>	Objective				Modernisation			
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)				Rs. 4 Crore			
<b>5</b>	Date of commencement				DPR yet to be finalized. Awaiting appointment of PMA			
<b>6</b>	Target date of completion				36 months from the date of sanction.			
<b>Details of Source of finance</b>								
<b>7</b>	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned			
	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)				NA			
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA			
<b>8</b>	<b>Physical and financial target proposed for the year</b>							
<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>			
	Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)	
	Target (%)*	Cumulative % of total works	Amount	Cumulative amount	Target (%)*	Cumulative %	Amount	Cumulative amount
License for operating system	30%	30%	1.2	1.2	40%	70%	1.6	2.8
<b>Particulars of the work</b>	<b>Financial year 2024-25</b>				<b>Financial year 2025-26 *</b>			
	Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)	
	Target (%)*	Cumulative %	Amount	Cumulative amount	Target (%)*	Cumulative %	Amount	Cumulative amount
License for operating system	30%	100%	1.2	4				

\* Project scheduled to be completed by 2024-25

**Annexure 3.3 .3(consolidated ) IT /OT works**

Annexure 3.3 .3(consolidated ) IT /OT works									
<b>1</b>	<b>Name of the Distribution project</b>				<b>IT / OT woks</b>				
<b>2</b>	Project details				IT/OT works - Loss reduction & modernization under RDSS in KSEBL				
<b>3</b>	Objective				Modernisation				
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)				Rs. 207 Crore				
<b>5</b>	Date of commencement				DPR yet to be finalized. Awaiting appointment of PMA				
<b>6</b>	Target date of completion				36 months from the date of sanction.				
<b>7</b>	<b>Details of Source of finance</b>								
	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned				
	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)				NA				
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA				
<b>8</b>	<b>Physical and financial target proposed for the year</b>								
<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>				
	Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)		
	Target (%)	Cumulative %	Amount	Cumulative amount	Target (%)	Cumulative %	Amount	Cumulative amount	
	30%	30%	62.1	62.1	40%	70%	82.8	144.9	
	<b>Financial year 2024-25</b>				<b>Financial year 2025-26 *</b>				
Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)			
Target (%)	Cumulative %	Amount	Cumulative amount	Target (%)	Cumulative %	Amount	Cumulative amount		
30%	100%	62.1	207						

\* Project scheduled to be completed by 2024-25

### Annexure 3.3.4(i) SCADA/DMS works through own fund

<b>Annexure 3.3.4(i) SCADA/DMS works through own fund</b>									
<b>1</b>	<b>Name of the Distribution project</b>				<b>Construction of Building/Civil works of control centres Ten Districts under RDSS (including DRR Centre)</b>				
<b>2</b>	Project details				SCADA/DMS implementation in three towns, SCADA with FPI implementation in 53 statutory towns & OMS upgradation works in 3 existing SCADA towns in Kerala as per RDSS				
<b>3</b>	Objective				For providing 24 x 7 uninterrupted, quality, reliable and affordable power supply				
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)				Rs 5.797 Cr				
<b>5</b>	Date of commencement				Draft Bidding document prepared				
<b>6</b>	Target date of completion				36 months from the date of sanction.				
<b>Details of Source of finance</b>									
<b>7</b>	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned				
	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)				NA				
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA				
<b>Physical and financial target proposed for the year</b>									
<b>8</b>	<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>			
		Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)	
		<b>Target (%)</b>	<b>Cumulative %</b>	<b>Amount</b>	<b>Cumulative amount</b>	<b>Target (%)</b>	<b>Cumulative %</b>	<b>Amount</b>	<b>Cumulative amount</b>
		75%	75%	4.347	4.35	25%	100%	1.45	5.79
	Construction of Building/Civil works of control centres Ten Districts under RDSS (including DRR Centre)								



**Annexure 3.3.4(ii) SCADA/DMS works through own fund**

<b>Annexure 3.3.4(ii) SCADA/DMS works through own fund</b>									
<b>1</b>	<b>Name of the Distribution project</b>				<b>Setting up Physical Infrastructure including AC-DG installation, Elctrical work , false ceiling , Fire fighting ETC for 10 District wise Control centres</b>				
<b>2</b>	Project details				SCADA/DMS implementation in three towns, SCADA with FPI implementation in 53 statutory towns & OMS upgradation works in 3 existing SCADA towns in Kerala as per RDSS				
<b>3</b>	Objective				For providing 24 x 7 uninterrupted, quality, reliable and affordable power supply				
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)				Rs 9.12 Cr				
<b>5</b>	<b>Details of Source of finance</b>								
	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned				
	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)				NA				
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA				
<b>6</b>	<b>Physical and financial target proposed for the year</b>								
	<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>			
		Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)	
		<b>Target (%)</b>	<b>Cumulative %</b>	<b>Amount</b>	<b>Cumulative amount</b>	<b>Target for the year(%)*</b>	<b>Cumulative % of total works</b>	<b>Amount</b>	<b>Cumulative amount</b>
	Setting up Physical Infrastructure including AC-DG installation, Elctrical work , false ceiling , Fire fighting ETC for 10 District wise Control centres [Kollam, Thrissur, Kannur, Idukki, Pathanamthitta, Alappuzha, Kottayam, Malappuram, Palakkad & DRR Center at EKM)	50%	50%	4.56	4.56	50%	100%	4.56	9.12

### Annexure 3.3.4(iii) SCADA/DMS works through fund

Name of the Distribution project		Establishing optical fibre connectivity to RMUs & Substations							
Project details		Establishing optical fibre connectivity to RMUs & Substations in existing SCADA DMS Towns, through KFON Network.							
Objective		For providing 24 x 7 uninterrupted, quality, reliable and affordable power supply							
Project Cost as per DPR incl IDC (Rs. Cr)		Rs 4 Cr							
Year of commencement		2024-25							
Year of completion		2026-27							
<b>Physical and financial target proposed for the year</b>									
Particulars of the work	Financial year 2022-23				Financial year 2023-24				
	Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)		
	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	
Establishing optical fibre connectivity to RMUs & Substations in existing SCADA DMS Towns, through KFON Network.									
	Financial year 2024-25				Financial year 2025-26				
	Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)		
	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount	
	30%	30%	1.2	1.20	40%	70%	1.60	2.80	
	Financial year 2026-27								
	Physical target		Financial target (Rs. Cr)						
	Target for the year(%)*	Cumulative % of total works	Amount	Cumulative amount					
30%	100%	1.2	4.0						

### Annexure 3.3.5 IT enabled Services

Annexure 3.3.5 IT enabled Services									
1	Name of the Distribution project				IT enabled services				
2	Project details				Implementation of various IT Projects associated with the automation of Core functional areas				
4	Objective				IT Automation of various functional areas in Distribution, Transmission & Generation Wing				
5	Project Cost as per DPR incl IDC (Rs. Cr)				Rs 114.5 Cr				
6	Year of commencement				2022-23				
7	Target date of completion				2026-27				
<b>Details of Source of finance</b>									
8	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned				
	(b) Loan availed as on 31st March 2021 (Rs. Cr)				NA				
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA				
9	<b>Physical and financial target proposed for the year</b>								
10	<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>			
		Physical target		Financial target (Rs Cr)		Physical target		Financial target (Rs Cr)	
		Target (%)	Cumulative %	Amount	Cumulative amount	Target (%)	Cumulative %	Amount	Cumulative amount
	IT Automation of various functional areas in Distribution, Transmission & Generation Wing including Implementation of ISO-27001 Security standards in various IT/OT Systems	23%	23%	26.50	26.50	23%	46%	26.50	53.00
		<b>Financial year 2024-25</b>				<b>Financial year 2025-26</b>			
		Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)	
		Target (%)	Cumulative %	Amount	Cumulative amount	Target (%)	Cumulative %	Amount	Cumulative amount
		18%	64%	20.50	73.50	18%	82%	20.50	82.00
		<b>Financial year 2026-27</b>							
		Physical target		Financial target (Rs. Cr)					
Target (%)		Cumulative %	Amount	Cumulative amount					
18%	100%	20.50	114.50						

**Annexure 3.3 .6(i) Extending OFC connectivity to KSEBL offices**

Annexure 3.3 .6(i) Extending OFC connectivity to KSEBL offices									
<b>1</b>	<b>Name of the Distribution project</b>				<b>OFC connectivity to 1500 KSEBL offices</b>				
<b>2</b>	Project details				Establishing OFC connectivity through KFON network				
<b>3</b>	Objective				For providing 24 x 7uninterrupted, quality, reliable and affordable power supply				
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)				Rs 9 Cr				
<b>5</b>	Date of commencement				2022-23;				
<b>6</b>	Date of completion				2024-25				
<b>Details of Source of finance</b>									
(a) Loan sanctioned (Rs. Cr)									
<b>6</b>	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)				NA				
(c) Other source of finance (own investment, Government grant etc.) Please specify									
NA									
<b>7</b>	<b>Physical and financial target proposed for the year</b>								
	<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>			
		<b>Physical target</b>		<b>Financial target(Rs Cr)</b>		<b>Physical target</b>		<b>Financial target(Rs Cr)</b>	
		<b>Target for the year(%)*</b>	<b>Cumulative % of total works</b>	<b>Amount</b>	<b>Cumulative amount</b>	<b>Target for the year(%)*</b>	<b>Cumulative % of total works</b>	<b>Amount</b>	<b>Cumulative amount</b>
Providing Intranet connectivity to 1500 KSEBL Offices including Section Offices with Data Center using KFON Network (for replacing MPLS links)		20%	20%	1.80	1.80	40%	60%	3.60	5.40
	<b>Financial year 2024-25</b>				<b>Financial year 2025-26</b>				
	<b>Physical target</b>		<b>Financial target (Rs. Cr)</b>		<b>Physical target</b>		<b>Financial target (Rs. Cr)</b>		
	<b>Target for the year(%)*</b>	<b>Cumulative % of total works</b>	<b>Amount</b>	<b>Cumulative amount</b>	<b>Target for the year(%)*</b>	<b>Cumulative % of total works</b>	<b>Amount</b>	<b>Cumulative amount</b>	
	40%	100%	3.6	9.00					

### Annexure 3.3 .6(ii) Extending OFC connectivity to generating stations and substations

<b>1</b>	<b>Name of the Distribution project</b>	<b>OFC connectivity to substations and generating stations</b>							
<b>2</b>	Project details	Establishing OFC connectivity through KFON network							
<b>3</b>	Objective	For providing 24 x 7 uninterrupted, quality, reliable and affordable power supply							
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)	Rs 3.55 Cr							
<b>5</b>	Date of commencement	Implementation of KFON in progress.							
<b>Details of Source of finance</b>									
(a) Loan sanctioned (Rs. Cr)									
<b>6</b>	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)	NA							
(c) Other source of finance (own investment, Government grant etc.) Please specify									
NA									
<b>7</b>	<b>Physical and financial target proposed for the year</b>								
	Particulars of the work	Financial year 2022-23				Financial year 2023-24			
		Physical target		Financial target (Rs Cr)		Physical target		Financial target (Rs Cr)	
		Target (%)	Cumulative %	Amount	Cumulative amount	Target for (%)	Cumulative %	Amount	Cumulative amount
	Providing Intranet connectivity to Substations (~465 Nos.), Generating Stations (~42 Nos.), CPPs (~20), etc. with SLDC using KFON Network.	20%	20%	0.71	0.71	40%	60%	1.42	2.13
		<b>Financial year 2024-25</b>				<b>Financial year 2025-26</b>			
		Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)	
		Target (%)	Cumulative %	Amount	Cumulative amount	Target (%)	Cumulative %	Amount	Cumulative amount
		40%	100%	1.42	3.55				

## Annexure 3.3.6(iii)

## Implementaton of CDAC projects with Gol funding

1		Name of the Distribution project		Implementaton of CDAC projects with Gol funding							
2		Project details		Implementaton of CDAC projects with Gol funding							
3		Objective		For providing 24 x 7uninterrupted, quality, reliable and affordable power supply							
4		Project Cost as per DPR incl IDC (Rs. Cr)		Rs 1.4 Cr							
5		Year of commencement		2022-23							
		Year of commencement		2024-25							
<b>Details of Source of finance</b>											
6		(a) Loan sanctioned (Rs. Cr)									
		(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)									
		(c) Other source of finance (own investment, Government grant etc.) Please specify									
<b>Physical and financial target proposed for the year</b>											
Particulars of the work		Financial year 2022-23				Financial year 2023-24					
		Physical target		Financial target (Rs Cr)		Physical target		Financial target (Rs Cr)			
		Target (%)	Cumulative %	Amount	Cumulative amount	Target (%)*	Cumulative	Amount	Cumulative amount		
7		Implementation of projects with CDAC/Gol funding: Digital substation architecture, AMI solutions, Battery Energy Storage System, Solid State Transformer, Power Quality Devices and Intelligent devices for LT Distribution Monitoring & Control.		20%	20%	0.28	0.28	40%	60%	0.56	0.84
		<b>Financial year 2024-25</b>				<b>Financial year 2025-26</b>					
		Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)			
		Target (%)	Cumulative %	Amount	Cumulative amount	Target for (%)*	Cumulative % of total works	Amount	Cumulative amount		
		40%	100%	0.56	1.40						

Annexure 3.4.1 Safety									
1	Name of the Distribution project				Safety Projects				
2	Project details				Various safety projects for 2022-27				
3	Objective				For providing 24 x 7 uninterrupted, quality, reliable and affordable power supply				
4	Project Cost as per DPR incl IDC (Rs. Cr)				Rs. 181.35 Crore				
5	Year of commencement				2022				
6	Year of completion				2027				
<b>Details of Source of finance</b>									
7	(a) Loan sanctioned (Rs. Cr)				NIL				
	(b) Loan availed as on 31st March 2021 (Rs. Cr)				NA				
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA				
<b>Physical and financial target proposed for the year</b>									
8	Particulars of the work	Financial year 2022-23				Financial year 2023-24			
		Physical target		Financial target (Rs Cr)		Physical target		Financial target (Rs Cr)	
	Target (%)*	Cumulative %	Amount	Cumulative amount	Target (%)*	Cumulative %	Amount	Cumulative amount	
	13%	13%	25	25	28%	41%	50	75	
	Financial year 2024-25				Financial year 2025-26 *				
	Physical target		Financial target (Rs. Cr)		Physical target		Financial target (Rs. Cr)		
	Target (%)*	Cumulative %	Amount	Cumulative amount	Target (%)*	Cumulative %	Amount	Cumulative amount	
	28%	69%	50	125	28%	97%	50	175	
	Financial year 2026-27								
	Physical target		Financial target (Rs. Cr)						
Target (%)*	Cumulative % of	Amount	Cumulative amount						
3%	100%	6.35	181.35						

### Annexure 3.6.1 E mobility

Annexure 3.6.1 E mobility									
<b>1</b>	<b>Name of the Distribution project</b>				<b>E-mobility</b>				
<b>2</b>	Project details				Electric vehicle charging stations and purchase of e vehicle				
<b>3</b>	Objective				To aid achieve target set for 2030 e mobility mission				
<b>4</b>	Project Cost as per DPR incl IDC (Rs. Cr)				Rs.27.13 Crore				
<b>5</b>	Year of commencement				2022				
<b>6</b>	Year of completion				2023				
<b>Details of Source of finance</b>									
<b>7</b>	(a) Loan sanctioned (Rs. Cr)				Project amount yet to be sanctioned				
	(b) Loan availed as on <b>31st March 2021</b> (Rs. Cr)				NA				
	(c) Other source of finance (own investment, Government grant etc.) Please specify				NA				
<b>Physical and financial target proposed for the year</b>									
<b>8</b>	<b>Particulars of the work</b>	<b>Financial year 2022-23</b>				<b>Financial year 2023-24</b>			
		Physical target		Financial target(Rs Cr)		Physical target		Financial target(Rs Cr)	
		Target (%)	Cumulative %	Amount	Cumulative amount	Target (%)	Cumulative %	Amount	Cumulative amount
	Installing e vehicle charging station, pole mounted charging stations for e rickshaw and purchase of e vehicle	100%	100%	27.13	27.13				