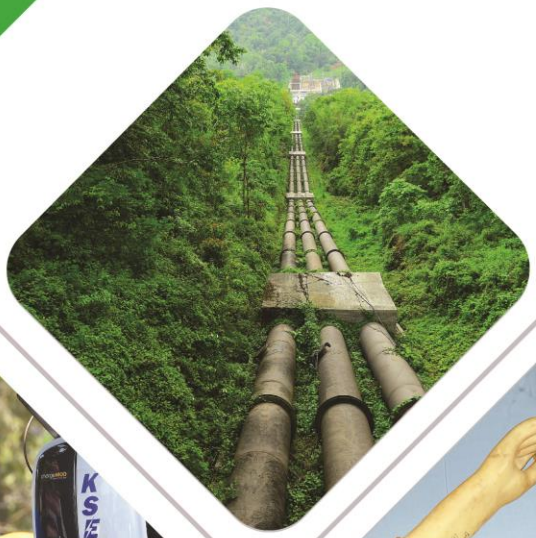
KSEB
കേരളത്തിന്റെ ഊർജ്ജം

ANNUAL ADMINISTRATION REPORT 2021-22



KERALA STATE ELECTRICITY BOARD LTD.

CIN:U40100KL2011SGC027427

REG. OFFICE : VYDYUTHI BHAVANAM, THIRUVANANTHAPURAM
KERALA

Preface

The Annual Administration Report 2021-22 of Kerala State Electricity Board Ltd., is presented herewith highlighting the noteworthy and creditable accomplishments in the Generation, Transmission, Distribution, Finance and Administration Wings of the organisation. This is the Ninth Annual Administration Report after the reconstitution of KSEBL as a company, and the 65th report as an integrated Public Sector Power Utility in the state since original constitution in 1957. KSEB is a company incorporated under the Indian Companies Act, 1956, and is fully owned by the Government of Kerala. It is the State Transmission Utility (STU) and the Distribution Licensee in the State of Kerala which also owns Generation assets.

It owns 40 Hydro Generating Stations, 2 thermal stations and a few non-conventional stations and is having a total installed capacity of 3145.98 MW. The transmission asset of the company includes 430 numbers substations and 14397.4 circuit km lines, varying from 400 kV to 33 kV levels. The distribution network carries 2.99 Lakh km line and more than 85,500 Distribution Transformers.

After witnessing a lean period in the Electricity Sector primarily due to Covid pandemic, the year 2021 has placed high demands on electricity which is continued in the year 2022 with more pace. The State of Kerala became 100% electrified in 2017 and KSEB continues to provide Power on Demand. It is directly supplying electricity to 99% of the consumers in the State (134.23 lakh consumers as on 31.03.2022). With the limited internal resources capable of meeting only about 30% of the energy requirement, KSEB manages to meet the power requirement of the entire state without imposing any power restrictions by procuring power from other agencies and power exchange.

'Oorjja Kerala Mission' launched by the State Government in 2018, is progressing and has started yielding results. Through Transgrid 2.0 project and Dyuthi scheme a robust, reliable, power transmission and distribution network is envisaged. The other three projects under the Mission - Soura, Filament Free Kerala and eSafe are targeted to make Kerala environmental friendly and safe.

During 2021-22, substantial reduction in T&D loss to 10.19 % from 10.32%, was achieved. This was achieved despite the addition of 3983 km of LT lines for maintaining Total Electrification Status. 3,61,712 new consumers were connected to the grid.

A concern drew forth out of the floods and Covid lockdowns was the inability of consumers to pay for their electricity dues and like many other utilities KSEB also faced a financial re-traction but recuperated to a great extent. Outstanding debts could be reduced and there was a reduction in interest and finance charges.

Higher peak demands will necessitate high pricing which may not be always viable. Consumers should be motivated to shift their peak load hours to off-peak periods, which would be of net economic and environmental benefits to society. To address the infirm nature of Renewable Power, Pumped Storage Plant /Battery Energy Storage Systems are becoming an immediate necessity and their viability might have to be explored. It is hoped that steps in the right

direction would be built on, in a systematic and effective manner to ensure that the operational and environmental risks are reduced.

I wish to express my gratitude to Government of Kerala, Kerala State Electricity Regulatory Commission, State Planning Board and Directors of the Board of KSEBL for their wholehearted support and encouragement.

I take this opportunity to express my appreciation for the committed efforts put in by one and all in the organization in accomplishing the above tasks. I hope that KSEBL officials will continue to work with the same zeal, dedication and co-operation for the benefit of the society.

Sd/-

Thiruvananthapuram
Date: 24.08.2023

(DR. RAJAN N KHOBRAGADE, IAS)
Chairman & Managing Director, KSEBL

Contents

1 Corporate Management

Kerala State Electricity Board Limited (KSEBL) was incorporated under the Indian Companies Act, 1956 on 14.01.2011 and Certificate of Commencement of Business was obtained on 06.06.2013. The Government of Kerala, following the Section 131 and 133 of Electricity Act 2003, revested the assets and liabilities of former Kerala State Electricity Board (KSEB) with KSEBL which was vested with the Government by the first transfer scheme notification dated 25.09.2008, by a notification called the 'second transfer scheme' on 31.10.2013.

The Company functions as integrated electricity utility and carries out the business of generation, transmission and distribution of electricity and serves almost 99% of consumers in the state of Kerala.

1.1 The Board of Directors

The Company is managed at the corporate level by the Board of Directors of the company headed by the Chairman and Managing Director. The full-time directors of the company take decisions on routine affairs related to each strategic business unit and departments. The List of directors, their portfolio and term are given in the Table below.

Board of Directors	Name	Term
Chairman & Managing Director	Sri.N.Sivasankara Pillai, IA & AS	29.1.2018 to 31.07.2021
	Dr. B. Ashok IAS	1.08.2021 to 31.03.2022
Director (Finance)	Sri.N.Sivasankara Pillai, IA & AS	10.8.2015 to 31.03.2021
	Dr. B. Ashok IAS	1.08.2021 to 2.09.2021
	Sri. Siji Jose	3.09.2021 to 31.01.2022
	Sri. V.R Hari IRS	1.02.2022 to 31.03.2022
Director (Transmission & System Operation)	Dr. Rajan P	1.04.2021 to 31.05.2021
	Sri. Siji Jose	11.06.2021 to 6.09.2021
	Sri. Rajan Joseph	6.09.2021 to 31.03.2022
Director (Planning, Safety SCM & REES)	Smt. Mini George	1.04.2021 to 2.09.2021
Director (Planning Safety & SCM)	Smt. Mini George	2.09.2021 to 31.03.2022
Director (Distribution, IT & HRM)	Sri. Kumaran. P	1.04.2021 to 31.08.2021
	Sri. Rajkumar S	2.09.2021 to 31.03.2022
Director(Generation Electrical)	Sri. Suku R	1.04.2021 to 2.09.2021
	Sri. Siji Jose	6.09.2021 to 31.03.2022
Director(REES, SOURA, Sports & Welfare)	Sri. Suku R	2.09.2021 to 31.03.2022
Director (Generation –Civil)	Sri. Kumaran. P	1.04.2021 to 9.06.2021
	Sri. Radhakrishnan G	10.06.2021 to 31.03.2022
Director (Ex Officio)	Dr. Saurabh Jain, IAS, Secretary to Government, Power Dept	1.04.2021 to 04.06.2021
	Dr. B. Ashok, IAS, Secretary to Government, Power Dept	04.06.2021 to 6.09.2021

Board of Directors	Name	Term
	Sri. Rajesh Kumar Sinha IAS, Principal Secretary (Power) GoK	6.09.2021 to 31.03.2022
	Sri. Rajesh Kumar Singh, IAS Additional Chief Secretary to Government, Finance Dept	1.04.2021 to 30.11.2021
	Sri. Mohammed Y Safirulla K, IAS, Secretary, Finance (Resources) GoK	30.11.2021 to 31.03.2022
Independent Director	Dr. V. Sivadasan	1.04.2021 to 17.04.2021
	Adv. V . Murugadas	15.06.2021 to 31.03.2022

1.2 Strategic Business Units

The company while continuing to function as integrated electricity utility in consistence with the State Government policy is carrying out the business through three separate Strategic Business Units (SBU) for each of the functions of Generation, Transmission and Distribution, headed by Full Time Directors.

1.2.1 Generation SBU

The Director (Generation Electrical) and the Director (Generation Civil) manages the Generation SBU. The Directors are supported in management by the Chief Engineers given in the table below.

Director (Generation-Electrical & SCM)	Chief Engineer (Generation)
Director (REES, SOURA, Sports & Welfare)	Chief Engineer (Renewable Energy & Energy Savings)
Director (Generation - Civil)	Chief Engineer (Civil Construction - North)
	Chief Engineer (Civil Construction - South)
	Chief Engineer (Civil - Investigation & Construction Central)
	Chief Engineer (Civil - Dam Safety & DRIP)
	Deputy Chief Engineer (Pallivasal Extension Scheme) with full power of Chief Engineer

The Generation SBU operates and maintains 40 hydroelectric generating stations, 2 thermal power plants, and the wind farm at Kanjikode. Renovation, Modernization and Up-rating of the old hydroelectric projects which have surpassed their useful life are also being carried out by this wing. The Director (Generation-Electrical) supported by the Chief Engineer (Gen & PED) manage these functions of Generation SBU.

Investigation, Planning and Design of all hydroelectric projects, land acquisition matters connected with various hydel projects, works connected with the environmental and forest clearance aspects of generation schemes, safety and maintenance of dams and connected structures, construction works of all hydroelectric projects are carried out by the Civil wing of Generation SBU. The related activities such as construction and maintenance of various office buildings, fabrication of line materials for distribution, yard structures for substations and accessories for hydraulic structures etc. are also carried out by the Civil Wing. The Director (Generation Civil) is assisted by the four Civil Chief Engineers and one Deputy Chief Engineer (with full power of Chief Engineer).

1.2.2 Transmission SBU

Director (Transmission & System Operation) heads the Transmission SBU. There are four Chief Engineers reporting to the Director, as given below:

- Chief Engineer (Transmission – North)
- Chief Engineer (Transmission – South)
- Chief Engineer (Transmission – System Operation)
- Chief Engineer (Transgrid)

The Northern Transmission Zone is headed by Chief Engineer (Transmission – North) with headquarter at Kozhikode. This Zone is administered through 5 Transmission Circles, 15 Divisions, 59 subdivisions. The Southern zone has headquarters in Thiruvananthapuram and has 6 Transmission Circles, one Division- Pathanamthitta with ARU, 14 Divisions, 81 Subdivisions. It is headed by Chief Engineer (Transmission – South). The System Operation is a separate function of State Transmission Utility and carried out by the Transmission SBU. It is headed by Chief Engineer (Transmission – System Operation) with headquarters at Kalamassery and has 3 System Operation Circles in Thiruvananthapuram, Kalamaserry and Kannur, 6 Divisions, 37 Subdivisions and 17 Sections.

The implementation of Transgrid 2.0, long term transmission plan is entrusted with the Chief Engineer-Transgrid with headquarters at Shoranur. Under the administrative control of the Chief Engineer, two deputy Chief Engineers in South and North region with headquarters at Kalamassery and Shoranur are executing the works under Transgrid.

Transmission SBU manages the construction, operation and maintenance of EHT substations and transmission lines including that to EHT consumers. It is responsible for the implementation of transmission loss reduction programs and coordinating the activities for system development. Transmission SBU exercise control over all load dispatch activities, with full responsibility for real time management and matters pertaining to protection system and communication system. Scheduling of generation, scheduling of annual maintenance, import of power from independent power producers and central generating stations and export of power are managed by this SBU. Other important activities include monitoring of daily system statistics, implementing policy matters related to merit-order dispatching, communication planning, networking of computers and co-ordination of activities under the system operation circles.

1.2.3 Distribution SBU

Director (Distribution & IT) heads the Distribution SBU. The Distribution License areas of KSEB are through four regional offices headed by four Chief Engineers namely,

- Chief Engineers, Distribution (South)
- Chief Engineer, Distribution (Central)
- Chief Engineer, Distribution (North)
- Chief Engineer, Distribution (North Malabar)

The South Region with headquarters at Thiruvananthapuram has 7 Electrical Circles, 22 Divisions, 64 Subdivisions and 217 Electrical Sections. Transformer Meter Repair (TMR) Divisions at Thirumala & Pallom are also attached to southern region. The Central Region with its headquarters at Ernakulam

has 7 Electrical Circles, 25 Divisions, 70 Subdivisions and 235 Electrical Sections. TMR Division at Angamaly comes under the jurisdiction of Distribution (Central). The North Region with its headquarters at Kozhikode has 7 Electrical Circles, 20 Divisions, 53 Subdivisions, 213 Electrical Sections. TMR Division at Shoranur comes under the Northern region. The North Malabar Region is headed by the Chief Engineer who is having headquarters at Kannur. This region has 4 Electrical Circles, 9 Divisions, 29 Electrical Sub divisions, 108 Electrical Sections. TMR Division, Kannur is attached to North Malabar region.

The Distribution SBU distributes and supply electricity in the entire State, except few small areas of other Licensees. The activities of the SBU include effecting service connection to all categories of consumers, construction, operation and maintenance of distribution network upto a voltage level of 11 KV (22 KV Distribution also in existence in some parts of Palakkad district). It is directly supplying electricity to more than 99% of the consumers in the state (134.23 lakh consumers as on March 2022). Implementation of Central sector Schemes such as RAPDRP (Part B), DDUGJY, IPDS, distribution projects funded externally, like MP LAD/MLA LAD/ Kerala Development Schemes, Urjja Kerala Mission Project, Dyuthi 1, are undertaken by Distribution SBU.

The Chief Engineer (IT, CR & CAPs) assist the Director (Distribution & IT) in activities related with IT based projects, customer relations and Centrally Aided projects.

1.3 The Corporate Office

The Corporate office carries out the corporate and common functions of the company such as corporate planning, financial matters and Audit, Legal affairs, Human resources management, Commercial matters, Tariff & Regulatory affairs etc.

The following Heads of Departments in Corporate Office report to the Chairman and Managing Director directly:

- Legal Adviser & Disciplinary Enquiry Officer
- Chief Vigilance Officer
- Secretary (Administration)
- Chief Public relations officer
- Chief Personnel Officer

Director (Finance) handles matters related to financial management, internal audit, tariff, Power Purchase and related commercial aspects. The offices with the following Heads of Departments function under the Director (Finance):

- Chief Engineer (Commercial and Planning)
- Financial Advisor
- Chief Internal Auditor
- Special Officer (Revenue)
- Company Secretary

The corporate supportive functions such as corporate planning, supply chain management, safety management are carried out by separate departments under the Director (Planning, SCM & Safety) supported by the following department heads:

- Chief Engineer (SCM)
- Deputy Chief Engineer (Corporate Planning)

- Chief Engineer (Renewable Energy &Energy Savings)
- Chief Safety Commissioner

Secretary (Administration) carries out general administration matters of the company and is the authorised representative of KSEBL in the matters of general administration and legal affairs. The Resident Engineer, New Delhi reports to the Secretary.

SOURA headed by the Deputy Chief Engineer (State Nodal Officer) under the Director (REES, SOURA, Sports & Welfare) is entrusted with the implementation of Roof Top solar plants

1.4 **Organisation chart**

The Organisation chart of Kerala State Electricity Board Ltd is given in Annexure- I.

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2 Performance of the Company

Consumer satisfaction has been prioritised over everything else, and the main objective is to increase the effectiveness and caliber of services provided by the electricity industry. During the past few years, KSEBL has undertaken a number of measures to enhance both the physical and financial performance. The ongoing efforts have begun to produce admirable outcomes. The company has succeeded in supplying power connections to every family, despite the Flood during 2018, 2019 and the Covid 19 pandemic.

2.1 Loss Reduction

The company has been working diligently to cut down on both technical and commercial losses in the system, and over the past several years, it has been successful in doing so. By enhancing the network, fortifying the network, coordinating theft control efforts, conducting energy audit, replacing defective and electromechanical meters, etc., losses were reduced. The T & D loss in the financial year 2016-17 was 13.93% which has been reduced to 10.19 % by the end of FY 2021-22. The Losses are the lowest among the utilities in the country. The reduction in losses has resulted in substantial financial savings as given in Table below.

Financial Impact of T&D Loss reduction							
Year	Energy consumption	Energy Input[1]	T&D loss (%)	Yearly Reduction (%)	Cumulative Reduction (%)	Energy Saved (MU)	Cost Savings (Rs Cr)
2016-17	20452.91	23763.58	13.93	Base			
2017-18	21159.19	24340.79	13.07	0.86	0.86	240.01	96.48
2018-19	21750.25	24849.15	12.47	0.6	1.46	417.53	182.04
2019-20	23058.91	26226.08	12.08	0.39	1.85	554.28	236.12
2020-21	22540.32	25132.93	10.32	1.76	3.61	1036.01	457.12
2021-22	23983.42	26703.13	10.19	0.13	3.74	1148.14	518.96

[1] including open access energy

The savings in energy due to loss reduction was used to meet the increase in yearly demand from consumers partially and consequently savings in additional power purchase cost. The cumulative savings owing to reduction in losses over the years in power purchase cost is to the tune of ₹ 518.96 Cr for FY 2021-22 as shown above.

2.2 Physical Performance

Only by continually growing and updating its physical assets will the electricity industry be able to meet the rising demand of its customers. The Company's business units for Generation, Transmission, and Distribution have recently engaged in a variety of capacity expansion operations, which are given in the Table below along with the increase in consumer strength.

Particulars	Capacity Additions							System as on 31.3.22
Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	
Generation (MW)								
Hydro Capacity	22.0	3.6	6	3	0	0	8	2066.36
Solar KSEBL	1.156	7.6732	6.0208	2.0	1.095	0.371	12.77	30.28
Solar capacity other than KSEBL (grid connected)	13.70	59.08	24.7	19.79	51.032	104.33	95.96	378.81
Transmission								
Substation (Nos)	14	10	16	9	19	17	8	430 (incl PGCIL)
400KV	0	0	0	0	1	0	0	6*+1
220KV	0	0	2	0	1	4	2	29
110KV	8	3	5	3	9	10	5	176+1*
66KV	3	0	3	1	2	1	0	56+1*
33KV	3	7	6	5	6	2	1	160
Lines (circuit km)	140.14	147.43	175.38	224.6	580.43	696.10	600.76	14244.17
400KV					92	85.03		177.03+1288.276*
220KV	0.68	0	54.1	0	73.18	238	224.81	3485.67 (incl PGCIL)
110KV	66.67	67.66	79.76	134.2	235.24	324.50	269.85	5385.43
66KV	6	0	0.44	29.5		8.4		1572.11
33KV	66.79	75.77	41.08	60.9	100.06	39.2	106.1	2335.657
Distribution								
LT Lines	4826	5357	3130	3401	3689	3650	3983	299538
HT Lines	2022	1844	1744	1773	1939	2195	2391	68173
Dist Transformers	2389	2270	2353	2410	2023	2372	2355	85594
No. of consumers	381247	462137	353642	368673	380584	372116	361712	13422549

(* owned by PGCIL)

2.3 Financial performance

To strengthen its financial position, the company has been implementing responsible financial management procedures. They include getting funds from the least expensive sources and availing loans at the barest minimum after completely utilising internal accruals. These are described below.

2.3.1 Restricted borrowings

The company executed capital projects for ₹3024.03 Cr during the year. However, the net additional borrowing (Long term and Short term) has been ₹48.07 Cr only. This was achieved by utilising internal accruals, capital grants and consumer contribution. Details of outstanding loans for FY 2021-22 are given below.

Outstanding Loan Liabilities (₹ Cr)						
Year	Loan Opening Balance	Loan received	Repaid	Loan Closing balance	Increase over previous year	Interest due for payment
2021-22	**7784.48**	**1510.03**	**1461.96**	**7832.55**	**48.07**	**NIL**

2.3.2 Reduction in interest payment

The Company has incurred ₹ 747.52 Cr towards interest on long and short term loans. Interest could be restricted substantially because of lower level of borrowing as reasoned above and the competitive interest rate at which the loan was availed. The interest as a percentage of average loan works out to 8.64 %.

The Board has substantially reduced the interest burden by taking fresh borrowing from least cost sources and reduction of cost of raising finance by way of dispensing with Government guarantee, upfront payments commitment charges etc.

2.3.3 Revenue Gap

KSERC had trued up the audited accounts of the company till 2020-21 (except for FY 2014-15 for which orders are reserved) allowing 14% rate of return on equity.

The approved revenue gap till FY 2020-21 amounted to ₹ 7130.73 Cr as given below

No	Item	Revenue Gap
1	Till 31-3-2011	736.71
2	FY 2011-12 (and Review petition)	1391.93
3	FY 2012-13	3132.97
4	FY 2013-14	195.50
5	FY 2014-15	NA
6	FY 2015-16	202.97
7	FY 2016-17(and Review petition)	1119.92
8	FY 2017-18 (and Review petition)	91.21
9	FY 2018-19	214.30
10	FY 2019-20	127.08
11	FY 2020-21	(-) 81.86
	TOTAL	**7130.73**

The average cost of supply per unit for the year 2021-22 was ₹ 5.83 and there was a surplus of 29 paise/ unit as given in Table below.

No	Particulars	FY16-17	FY17-18	FY18-19	FY19-20	FY20-21	FY21-22
1	Average cost of supply	5.98	6.55	6.45	6.63	6.97	5.83
2	Average revenue realized	5.82	5.80	6.07	6.50	6.16	6.12
3	Gap (=1-2)	0.16	0.75	0.38	0.13	0.81	0.29 surplus

2.4 Comparison of expenses and Revenue

Comparison of various components of expenditure over the last five years is given in **Annexure 4**.

2.5 Major initiatives

2.5.1 Oorjja Kerala Mission

The 'Oorjja Kerala Mission' launched during 2018, aimed at the integrated development of electricity sector in the state is progressing. The Status of the projects during 2021-22 is listed below:

2.5.1.1 Soura

Government of Kerala has launched the project “Soura” to add 1000MWp Solar Power Plants to the network of KSEB Ltd, under Urja Kerala Mission, a vision to develop the energy sector in the state to global standards and in line with the true spirit of National goal of achieving 100 GW of solar capacity by the year 2023. As part of the Soura project, 500 MWp of Solar Power Plants are to be established by utilizing the Roof Tops of domestic, public and private buildings including educational institutions, hospitals and commercial establishments.

a Soura Phase I- Non Subsidy Scheme

Out of this 500 MWp rooftop project, 200 MWp is the first phase project.

Three business models were put forth to consumers.

KSEBL investment Models

Model-1 (a fixed percentage of generation (10 %) will be given for consumer, free of cost for utilizing their roof)

Model-2: The energy generated will be sold to the consumer at fixed price for 25 years through PPA.

Consumer Investment model

Model-3: KSEBL will setup the solar plant for the consumer after collecting cost of the plant from the owner. Energy generated can be fully utilized by the consumer.

EPC Contracts: Based on tender for the project, EPC contract for 46.5MWp was awarded to the contractors namely M/s Tata power solar system limited, M/s Waaree Energies Limited and M/s INKEL Limited. Agreement was executed with consumers whose roofs suitable for the project were identified and such roofs were assigned to the developers for project installation.

Achievement - 1378 grid connected solar plants with capacity 8.57 MW was commissioned under Phase I Non subsidy scheme during the financial year.

b SOURA PHASE II- Subsidy Scheme

The Ministry of New and Renewable Energy had announced the subsidy programme of setting up of 4000 MW of Grid connected Solar Roof Top Plants in **residential sector** with 40% central financial assistance (CFA).

KSEBL received an allocation of 50 MW for 2019-20 and 200 MW for 2020-21 from MNRE. The time for completion of this subsidy project has been extended up to March 2023.

Business Models

Model I/ Kerala model: The financial investment by the consumer for the plant apart from subsidy portion is shared by KSEBL.

Model II/ Consumer Model**:** The total plant cost shall be met through Consumer Investment and CFA. The consumer owns the plant and whole energy generated from the plant is to the consumer's credit.

MNRE has awarded 200MW capacity of Rooftop Solar plants to the KSEBL under Phase II program. KSEBL has empanelled 37 developers for achieving the target. A fool proof tracking management portal E-KIRAN has been developed and submitted for the effective use of public for registration and monitoring of progress status. Meeting of Developers, Inverter manufactures, module manufactures, etc were organized across the state to facilitate the soura scheme among public. More over, frequent spot registration campaigns were held across the state at the electrical sections /subdivisions for easy access to the consumers.

Achievement - 1864 grid connected solar plants with capacity 7.308 MW was commissioned under Phase II Subsidy scheme during the financial year.

2.5.1.2 Filament free Kerala

The project envisages replacing the entire Filament lamps in the State by energy efficient and long-lasting LED lamps and safe disposal of ICL/CFL collected with reduction in peak demand, global warming and Mercury pollution. 14 lakh domestic consumers registered for 118 lakh LED bulbs as on 31.03.2021. One Crore LED bulbs were purchased and 84.18 lakh LED bulbs were distributed to the registered consumers. Additional quantity of 17.5 lakh LED bulb purchased and distributed to 3.77lakh consumers. Thus total LED distribution up to 31.3.2022 is 101.68 lakh to 14.2 lakh consumers.

2.5.1.3 Dyuthi 2021

The Dyuthi project commenced during FY 2018-19 focuses on providing 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 total plan outlay is ₹ 4036.30 crores for Replacement of faulty meters, Continued Electrification, Special Projects like SCADA in addition to the normal development works.

In spite of the devastating floods during 2018 & 2019 which affected the progress of Dyuthi works, financial progress of ₹ 1457.32 cr (44.3%) could be achieved. More details on Dyuthi works are included under the head Distribution SBU.

2.5.1.4 TransGrid 2.0 – 2nd Generation Transmission network

KSEBL had taken up the ambitious TransGrid 2.0 project aimed at enhancing the transmission capacity for meeting future demand, improving reliability and quality of power transmitted and to reduce losses. The works are planned to be implemented in two phases.

First phase of the project is planned for execution during 2017-2022 and second phase for 2019-2024. The works included in the 1st phase of the project are grouped into 13 packages and comprises construction of 12 substations and 2084 circuit kilometer of EHT lines. Out of these 12 substations, 4 are Air Insulated Substations (AIS) and the remaining are Gas Insulated substations (GIS). 14 substations (AIS - 2 Nos. & GIS - 12 Nos.) and 1930 Circuit km EHT lines are included in Phase II of the project. Total cost for the two phases of the project is estimated as ₹ 6,500 crores. The projects are financed mainly using loans from KIIFB and other financial institutions and grants under PSDF and Green Energy Corridor (MNRE) schemes.

Implementation of the projects in the 1st phase is progressing as scheduled. Out of 12 substations targeted in the 1st phase, 7 Substations and 1120 ckm of EHT lines are completed. The remaining 5 substations including associated EHT lines included in Phase I, will be completed by December 2022. Out of 14 substations in the 2nd phase, construction of 2 nos GIS substations and two line packages are in progress. MNRE has sanctioned grant amounting to Rs. 138.71 Crores for two projects under Green Energy Corridor scheme. Two line packages included in Phase II are tendered. Tendering/ DPRs for the remaining packages are under process.

2.5.1.5 ESafe

The eSafe project jointly mooted by Electrical Inspectorate and KSEB aims at zero electrical accidents in the State. KSEB has included improving safety of the distribution network as one of the primary goals under Dyuthi 2021 project. Works amounting to ₹ 2159.09 Cr were identified in the four-year project intended for improved safety. 24194 safety inspections were conducted by Safety Officers during 2021-22.

2.5.2 Other Solar Projects

Ground Mounted Solar Projects: works under 3MW Ground Mounted Solar Projects at Kanjikode under KSEB Ltd funding commissioned on 19.2.2022 and 1 MW plant at Agali commissioned on 22.1.2022. 1MW Solar plant at Ettumanoor , 4 MW plant at Brahmapuram and 1.5 MW plant at Nenmara are expected to be commissioned in March 2023.

Solar Parks: A 50 MW Solar plant at Ambalathara in Kasaragod was developed by Indian Renewable Energy Development Agency (IREDA) and the project was commissioned in 2017; additional 5 MW capacity is proposed in the 27 acres of balance land at Nellithadam in Ambalathara village. Another 50 MW solar plant was developed by THDC India Ltd at Paivalike, Kasaragod in 250 acres of land and the same was commissioned on 31.12.2020.

It is proposed to set up 100 MW Solar Park at Cheemeni under UMREPP scheme. The District Collector, Kasaragod, allotted 575 acres of land at Cheemeni, Kasaragod (under the possession of Plantation Corporation of Kerala - PCKL) for setting up of 100 MW Solar Park and Substation, out of which 475 acres of land was handed over to Renewable Power Corporation of Kerala Limited (RPCKL) in July 2020. However, these orders for transferring the land has been kept on hold by the Government of Kerala due to objection from PCKL, Agriculture dept. etc. The matter has been taken up with the Minister for Electricity and Power Secretary and meetings have also been convened in this regard. The proposal for 100 MW can be taken up only after land is made available by Government of Kerala.

Floating Solar Projects: Government has decided to set up a 50 MW floating Solar Project at the unusable wet land in West Kallada, Kollam District. The project will be executed through NHPC. A company named West Kallada Non-Conventional Energy Promoters Pvt. Ltd (WKNCEPPL) was registered on behalf of the land owners and the right to use of the land for setting up the Solar Plant has been handed over to the Company. A lease deed for utilisation of land is executed with

land owners and MoU signed with NHPC. The MNRE, GoI had accorded in principle approval on 08.12.2020 for developing it as Solar Park. Work of 92 MW solar plant of NTPC in the Kayamkulam Kayal is in progress and is expected to be commissioned during 2022-23.

KSEB Ltd has invited Request for Qualification (RFQ) to implement Floating Solar projects (total capacity – 300MW) in its 4 existing reservoirs of hydroelectric projects,4 reservoirs of Irrigation department and 2 reservoirs of Kerala Water Authority. The bidder should Design, Build, Own and Operate the projects for a period for 25 years. Tariff based bid is in progress.

2.5.3 NILAAVU Streetlight Program

The NILAAVU project of Local Self Government Department (LSGD) targets the replacement of all conventional street lights with LED Street Lights in a phased manner. The objective of the project is enhanced Public Lighting on all the roads across the State by means of eco-friendly and energy efficient LED Street Lights thereby achieving:

- An estimated peak load reduction of 42.25MW
- An estimated energy savings of 185MU per annum for public lighting
- An estimated savings in Electricity Bills of Local Bodies for an amount of Rs. 80 Cr per annum
- Environment Protection on account of
  Reducing CO_2 emission (150 to 180 kiloton per annum-estimated)
  Mercury ingression to earth (10.5 kg-estimated)

KSEBL is the SPV for implementing the project through Energy Efficiency Services Limited (EESL), utilising financial assistance from KIIFB. It is estimated that 8.72 Lakh Non-LED Street Lights are existing in the State for replacement under NILAAVU scheme. The project cost as per the DPR duly

approved by KIIFB is Rs.298.38 Cr.

The Phase I of the project has been completed by 30th June, 2021 by installing 2 Lakh LED Street Lights in 411 Grama Panchayats and 35 Municipalities. In Phase II, the Purchase Order for 1.72 Lakh LED Street Lights had been placed with EESL on 13.10.2021, based on the requirement raised from LSGD. The installation of the same is in progress. The balance procurement and installation, to achieve the target under this project, will be proceeded according to the requirement from LSGD.

2.5.4 Electric Vehicle Charging Stations

As per Government of Kerala (GoK) EV policy, KSEBL has been designated as the nodal agency for establishing the EV charging infrastructure in the State.

Fast charging stations

In the first phase, KSEBL had established 6 Pilot EV Charging Stations in the corporation areas across the State with a view to build public awareness on E-Mobility**.** The above-mentioned stations became operational on 07.11.2020. The work of 26 Fast Charging Stations under E-Mobility Promotion Fund of Kerala and 30 Stations under FAME II Scheme of Government of Kerala has started and the works are nearing completion.

Pole mounted charging stations

A pilot project of 10 pole mounted EV charging stations for 2 wheelers and 3 wheelers had been implemented successfully in Kozhikode city which was inaugurated by the Honorable Minister for Electricity on 9.10.2021 and opened to the public.

Subsequent to the successful implementation of the pilot project, it was decided to scale up and implement additional 1140 stations across the State with minimum 5 each in all the constituencies and minimum 15 each in corporation constituencies. Thus the charging points are distributed in the city as well as suburban regions across the State. Availability of sufficient charging points in all parts of the State can impact the choice of potential EV buyers which will in turn lead to in widespread adoption of E-Mobility in the State as envisaged in the State EV policy. Tenders for the work has been floated and work was awarded.

As per Government policy on EV promotion, KSEBL purchased 65Nos Electric Cars and added to KSEBL official fleet.

The following chapters provide activities and achievements of the three ***Strategic Business Units*** (SBU) of the company, viz, Generation, Transmission and Distribution.

GENERATION SBU

3 Generation SBU

The Hydro Electric potential is the only conventional energy resource of the state, since there is no known fossil fuel reserve in Kerala. Though Kerala is bestowed with 44 rivers, most of the hydro potential locations are deep in reserve forests and cannot be tapped economically because of legal and environmental concerns. Therefore the focus has shifted to developing Small and Medium Hydro Power Stations to meet at least a part of the state energy requirement. Development of Hydro Electric stations, right from initial investigation till commissioning is under taken by the Generation SBU of KSEBL in addition to operation and maintenance of old and new stations. The SBU maintains 61 dams (List attached as Annexure -3) 40 large and small Hydro stations, two thermal generating stations and one wind farm The present status of various projects thus undertaken by SBU-G is given below:

Hydro Electric Projects Status		
Description	Projects.	Capacity (MW)
Projects commissioned	1	2
Works in progress	8	185.5
Tenders invited	5	61.5
Work awarded during 2021-22	2	46
DPR and Administrative sanction accorded	3	21

3.1 Chief Engineer (Generation & PED), Moolamattom

The Chief Engineer (Generation & PED) has the primary responsibility of maintaining and operating 40 large and small Hydro stations, two thermal generating stations and one wind farm. Chief Engineer (Generation & PED) is a member of the committee for the approval of Detailed Project Reports of new hydel projects.

The primary responsibility of the office is to ensure maximum availability of all hydro and thermal generating stations and to generate power as required by the State Load Despatch Centre. The routine and break-down repairs and recommended maintenance has to be carried out in time to make the machines available. The Renovation, modernisation and Upgradation works on hydro stations are also carried out. Design and finalization of technical specifications, tendering, execution and monitoring activities of electro mechanical & hydro mechanical works of new hydroelectric power generation Projects, Residual Life Assessment (RLA) Study, Scope finalization of Renovation, Design and finalization of technical specifications, tendering execution and monitoring activities of electro mechanical & hydro mechanical works of RMU of existing hydro power projects are also carried out by this wing.

There are six Generation Circle Offices at Meencut, Moolamattom, Moozhiyar, Trissur, Kothamangalam and Kozhikode under the office for carrying out the above functions. Brahmapuram Diesel Power Plant (BDPP) and Kozhikode Diesel Power Plant (KDPP) are also attached to this office.

3.1.1 Generation of Electricity:

The total installed capacity of hydro stations owned by KSEBL as on 31.3.2022 is 2066.36 MW and the designed annual generation capacity is 7233.06 MU for hydro stations. A list of generating stations within State and its capacity is given in **Annexure-4.**

During 2021-22, a total of 9858.269 MU energy was produced from the generating stations. The summary is given in the table below.

No	Source	Energy Generated (MU)	Percentage of total generation (%)
1	Hydel Power stations	9836.91	99.78%
2	Thermal Power stations	0	0.00%
3	Wind generating station	1.159	0.01%
4.	Solar stations	20.2	0.20%
	Total	**9858.269**	**100%**

3.1.2 Works undertaken during 2021-22:

3.1.2.1 RMU Works

RMU works undertaken during 2021-22 are as follows:

No	Station	Unit	Status (as on March 2022)
1	Renovation of Sengulam Pump House	3X1400KW	Project dedicated to nation
2	Kuttiyadi HEP	3x25 to 3X27.5	Design/drawing approval is in progress
3	Sengulam SHEP (4X12.8 MW) – Replacement of penstock		Work in progress

3.1.2.2 Operation and Maintenance work

Operation and Maintenance work undertaken by the Generation wing are as follows:

No.	Station	Status as on 31.03.2022
1	Idukki	Commissioned 2 sets of 860 Ah Plante battery, Replaced 5 Nos. of oldAuxiliary transformers withdry type cast resintransformers, Refurbished 1No faulty 48 MVA, GT
2	Lower Periyar HEP	Purchased boom lift ,Procured and replaced one No. 66.667MVA, 220/11kV, GT
3	Idamalayar HEP	110kV Bay extension work at Idamalayar - on going
4	Kakkayam	Installation of new Digital Governor of U#4 ,Permanent protection and diversion work behind KAES and KES Ist Reach completed
5	Sabarigiri	Replaced 6 nos of GTs of U#1 and U#2 with new GTs, Renovation of Kochupamba pumping station completed.
6	Kakkad	Revival of U#1 completed
7	Kallada	Replacement of stator core and coil of unit #1 completed
8	Sengulam PH	Construction of Road to Sengulam Valve house completed
9	VSHEP	Refurbishment of VSHEP after flood
10	Panniar HEP	Design, Engineering, Manufacture, Supply, Erection, Testing and Commissioning of Automation system at Panniar
11	Sholayar	Commissioned 22 MVA GT
12	Adyanpara	Construction of RCC retaining wall along the river completed

3.1.2.3 Status of hydroelectric projects

No	Station	Status (as on March 2022)
1	Chathankottunada II (2x3 MW)	Project commissioned on 21.06.2021
2	Upper Kallar (2x1 MW)	Project commissioned on 30.09.2021
3	Poringalkuthu HEP(1x24MW)	Work in last stage. Physical Progress of E&M works : 98.5%;
4	Olikkal SHEP(2x2.5MW) & Poovaranthodu SHEP (2X1.5MW)	Combined Civil E&M tender was cancelled. Board accorded sanction to invite separate tender for Civil and E &M works for the implementation of the project
5	Thottiyar SHEP 1x30+1x10 MW	Work in progress
6	Pallivasal Extension scheme (2x30MW)	Work Order is issued to M/s TVPPL –KSK –BOOM-FITWELL-REHPL Consortium. Work in progress.
7	Chinnar (2x12 MW)	Combined Civil & E&M works tendered from the office eof the Chief Engineer (Civil Investigation &Construction Central).Tender evaluation is in progress.
8	Anakkayam SHEP (3x2.5 MW)	Combined Civil & E&M works tendered from office of the Chief Engineer (Civil Investigation & Construction Central).
9	Bhoothathankettu SHEP (3x8MW)	Work is in progress.
10	Chathankottunada Stage I (2X2.5MW)	DPR approved
11	Upper Sengulam (1X25 MW)	Revised AS obtained
12	MoorikkadavuSHEP (2x0.75 MW)	DPR approved
13	Peruvannamoozhy (2x3MW)	Work awarded on 25-01-2020.Design/Drawings approval is in progress.
14	Pazhassi sagar (3x2.5 MW)	Work awarded on 25-01-2020.Design and drawing approval is in progress.
15	Marippuzha SHEP	Combined Civil & E&M works tendered from office of the Chief Engineer (CC-North).Tender evaluation is in progress.

3.2 **Chief Engineer (Civil Investigation and Construction Central)**

The duties entrusted with this office are identification, preparation of various reports such as pre-feasibility report, feasibility report and detailed project reports and construction of civil works related to new Hydro-Electric Projects within the state.

3.2.1 Activities carried out during 2021-22

Investigation and DPR Preparation			
No	Project / Scheme	Activity	Remarks
1	Chathankottunada stage 1 (5MW)	Detailed Project Report	Administrative sanction obtained
2	Pasukkadavu SHEP (4MW)	Detailed Project Report	Administrative sanction obtained
3	Keerithodu	Detailed Project Report	Administrative sanction obtained
4	Idukki Extension scheme	Agreement executed with M/s WAPCOS on 3.9.2020	PFR submitted
5	Pallivasal Augmentation Phase I		Detailed Investigation Report under preparation
6	Letchmi HE Scheme	Detailed Investigation (DI)Survey in progress	
7	Marayoor HEP	DI Survey in progress	
8	Idamalayar HE Scheme	DI Survey in progress	
9	Pambla SHEP	Detailed Project Report	DPR Submitted for sanction
10	Upper Poozhithodu	DI Survey in Progress.	
11	Lower Poozhithodu	Detailed Project Report	DPR Submitted for sanction
12	Palchuram		DIR Prepared
13	Upper Chaliyar		Feasibility study conducted
14	Upper poringal		Preliminary study conducted
15	Kakkayam pumping scheme		DPR Prepared
16	Poringalkuthu Micro (Screw turbine) 36 KW	Detailed Project Report	DPR Prepared

3.2.2 Construction Works

Construction Works		
No	Project / Scheme	Construction Work / Project Stage
1	Poringalkuthu SHP(24MW)	Overall physical progress – 98.93 %
2	Chinnar SHP(24MW) Phase I	Overall physical progress – 93%
3	Marayoor Section Office	Work completed
4	Mini VB at Chengannur	Work in progress. Scheduled for completion July 2022
5	Chinnar Phase II	Finalisation of tender in progress
6	Mankulam SHP(40MW]	Board accorded sanction to award the work to M/S PES-KSR(JV) Hydrabad.

3.3 Chief Engineer (Civil-Dam Safety & DRIP)

The Safety of all the 61 dams owned by KSEBL are monitored and assured by the Dam Safety Department headed by Chief Engineer (Civil – Dam Safety & DRIP) under Generation SBU with headquarters at Pallom, Kottayam. The major functions of the office include (a) Monitoring of dams, instrumentation and preparation of reports etc, (b) Maintenance and upkeep of dams and connected structures, (c) Operation of intake, spillway gates and disperser valves as and when required, (d) Conducting Bathymetric Survey of reservoirs and assessing present storage capacity, Preparation of Standard Operating Procedures & DPR for Desiltation of Reservoirs of KSEBL, Matters related to Inter State Water issues, Management of Extreme Weather Events etc. (e) Execution of Dam Rehabilitation and Improvement Project (DRIP) approved by CWC aided by World Bank

Dam Rehabilitation and Improvement Project (DRIP) is a flagship project of Ministry of Water Resources, Government of India with technical assistance of Central Water Commission and financial assistance from World Bank to improve safety and operational performance of selected dams. KSEBL is an implementing Agency under Dam Rehabilitation and Improvement Project (DRIP). The project has been completed successfully and the Project closure was on 31st March 2021. KSEBL has implemented various activities under DRIP for an amount of Rs 125 Cr.

Govt. of India had launched the Second Dam Rehabilitation and Improvement Project (DRIP Phase II) and entered into agreement with World Bank and it is effective from 12th October 2021. Duration of the Project (Phase II and III) is 10 years. An amount of Rs 150 Cr. is allocated to KSEBL under DRIP Phase II & III. Pre activities for DRIP Phase II is almost complete. Bid for the works amounting to Rs 27.34 Cr. were invited. The major rehabilitation works in progress include:

1 Strengthening of Poringalkuthu Dam which was overtopped during 2018 flood
2 Upstream Treatment of Sholayar Dam to control the seepage
3 Construction of Quality Control Laboratory at Idamalayar
4 Protective works to the access road to Idamalayar dam
5 Bathymetric survey of Kakkayam, Pamba and Moozhiyar reservoirs etc.

3.4 Chief Engineer (Civil-Construction-North)

The office of Chief Engineer (Civil-Construction North) (CCN) carries out the structural design of various components of Hydro Electric Projects and major buildings, including design of civil parts of RMU works, land acquisitions for hydro-electric projects, design of civil structures of solar projects, transmission tower foundations for projects in Northern Region. The Mechanical Fabrication Facility in Kolathara, Kozhikode is managed by Chief Engineer (CCN). Fabrication and galvanizing of transmission and distribution line materials and A poles are carried out in this unit.

The major activities carried out during 2021-22 are summarised in the tables below:

Activities during 2021-22				
No	Project / Scheme	Capacity(MW)	Energy (Mu)	Status
I	**Hydro Projects**			
1	Chathankottunada SHEP Stage II	6.0	14.76	Project commissioned on 30.07.2021
2	Peruvannamuzhi SHEP	6.0	24.70	Physical progress of civil works – 81.35%E& M works -Model test under progress
3	Pazhassi SagarSHEP	7.5	25.16	Physical progress of Civil works – 32.50%. Now under litigation. Decision from Board on termination of contract awaited
4	Maripuzha SHEP	6.0	14.84	Tendered, land acquisition in progress
5	Olikkal SHEP	5.0	10.26	Land acquisition completed. PQ bids opened on 10.03.2022. Awaiting sanction from the Board for the execution of Civilworks
6	Poovaramthodu SHEP	3.0	5.88	
7	Chembukaddavu III SHEP	7.5	17.715	Land acquisition in progress
8	Valanthode SHEP	7.5	15.291	Land acquisition in progress
9	Barapole SHEP			Installing additional gates, 70% work in progress

Other activities during 2021-22

No	Project / Scheme	Status
1	Design & Consultancy	Design & Drawings of Buildings, various components of Hydro projects, Tower foundation, Cable bridge, retaining wall, rectification works of existing schemes Total drawings issued-29Nos
2	**MF II, Kolathara**	Fabrication of A Poles and Line materials as per Distribution Plan and Transmission planLine materials- 1085MT &A-poles-1062MT
3	**Construction of Office Buildings**	
A	Vydyuthi Bhavanam, Kasaragod	99.5% completed
B	TMR Building, Mangattupramba, Kannur	92% completed
C	Administrative Complex, Iritty	83% completed
D	IB at Burnassery-Kannur.	80% completed
E	Electrical section Vallithode, Kannur	12% completed
F	Mini Vydyuthi Bhavanam at Ponnani.	43.6% Completed
G	Electrical Section, Puduppady, Kozhikode	13.6% Completed
H	Electrical Section, Koombara, Kozhikode.	Work tendered on March 2022
I	Revival -Polecasting Yard at Mangattuparamba	Work order issued on 28.03. 22

3.5 Chief Engineer (Civil-Construction-South)

This office carries out design and construction of hydro-electric projects and buildings in southern region, including Thrissur District (except construction of Poringalkuthu SHEP, and Chinnar SHEP). The construction works of ongoing projects are carried out by two Civil Circles offices – Civil Circle, Pallom and Civil Circle, Kothamangalam. The Consultancy Wing under this office is carrying out consultancy works of other departments and has been entrusted as SPV for the implementation of prestigious Hospital Projects done through KIIFB. The Consultancy Wing is entrusted with ten hospital projects out of which Four hospital projects are in construction stage and four others are in tendering stage. Two projects are posed for financial sanction from KIIFB. The Consultancy Wing is also executing various public works under other departments.

KSEBL has also given the in principle approval for re-formulating Consultancy Wing as a subsidiary of KSEBL.

The three mechanical facilities under this office are situated at Pallom, Angamaly and Kolathara and

the major works undertaken are procurement of machinery for the fabrication of electrical line materials, 'A' pole structures etc., procurement of mobile crane and EOT crane, works relating to tendering of Hot dip galvanizing of electric line materials and 'A' pole structures, lattice structures etc.

A summary of works activities of this office during 2021-22 is given in the table below:

No	Project	Circle	Capacity (MW)	Energy (MU)	Work status
1	Upper Kallar SHEP	Kothamangalam	2	5.14	Completed
2	Thottiyar HEP	Kothamangalam	40	99	70.5%
3	Sengulam Augmentation	Kothamangalam		85	75.85%
4	Bhoothathankettu SHEP	Kothamangalam	24	83.5	99.95%
5	Upper Sengulam SHEP	Kothamangalam	24	53.22	Work Tendered
6	Peechad SHEP	Kothamangalam	3	7.74	Upcoming
7	Western Kallar SHEP	Kothamangalam	5	17.41	Upcoming
8	Deviyar SHEP	Kothamangalam	24	25.94	Upcoming
9	Marmala SHEP	Pallom	7	23.02	Upcoming
10	Ladrum SHEP	Pallom	3.5	12.13	Upcoming

The Civil Division in Vydyuthi Bhavanam, Pattom carries out all maintenance and operation of activities and capital works related to the head office estate and the Inspection Bungalow at Paruthipara.

3.6 Deputy Chief Engineer (Pallivasal Extn Scheme) with full power of CE

This office carries out the construction work of Pallivasal Extension Scheme (60MW). The civil works of the project has been tendered and arranged in three segments and the work is progressing. So far 88.65 % of the work has been completed.

Achievements in Generation SBU

Chathankottunada II SHEP commissioned on 21.06.2021

Upper Kallar SHEP commissioned on 30.09.2021

TRANSMISSION SBU

4 Transmission SBU

Transmission Strategic Business Unit of KSEBL carries out the construction, maintenance and operation of the intra-state transmission system in Kerala. The administrative control of the State Load Dispatch Centre (SLDC) currently vested with Chief Engineer (Transmission System Operation) is under Transmission SBU. The activities related to grid protection and related communication facilities, testing of meters and power equipments are carried out by three System Operation Circles in Thiruvanathapuram, Kalamassery and Kannur.

Transmission SBU is also responsible for the implementation of transmission loss reduction programmes and coordinating the activities for system development.

The Voltage wise capacity of the Transmission Network within the State as on 31.3.2022 is given below.

Transmission System as on 31.03.2021		
kV	Transmission Lines (in Ckt-km)	Substations (Nos)
400	177.03+1152.56*	5 +1 *
320	127.4*+54.6(UG)	1*
220	3366.21	29
110	5287.21	178
66	2004.79	60
33	2176.85	161
Total	14346.65	435
Total Transformation Capacity (in MVA)		**22634.06**

* PGCIL Owned

The construction, maintenance and operation of the transmission system is carried out by eleven (11) Circle offices and one Division with ARU across the state under two Chief Engineers for North and South regions. In addition to the above, transmission network strengthening works works undertaken under Transgrid 2.0 projects are being executed by the Deputy Chief Engineers, Transgrid (North) & Transgrid (South) under the jurisdiction of Chief Engineer, Transgrid. A number of major transmission network expansion works were also completed.

A summary of new substations and Transmission lines completed during 2021-22 is shown below.

kV	Substations (Nos)				Transmission Lines (Ckt-km)				Capacity addition/ enhancement (MVA)			
	North	South	TransGrid	Total	North	South	TransGrid	Total	North	South	Trans Grid	Total
400				0								
220			2	2		20.75	204.06	224.81			326	326
110	5	0		5	58.66	29.99	181.2	269.85	106	279.5		385.5
66												
33	0	1		1	10.6	95.5		106.1	6	23		29
Total				8				600.76				740.5

4.1 Chief Engineers (Transmission)

Transmission Circles are responsible for the construction of substations, transmission lines, transmission capacity addition and the maintenance of existing transmission lines & substations. The jurisdiction of Chief Engineer, Transmission South include six transmission Circles Thiruvananthapuram, Kottarakkara, Alappuzha, Poovanthuruthu, Thodupuzha, Kalamassery and one Division Pathanamthitta (with ARU) & the jurisdiction of Chief Engineer, Transmission North include five transmission Circles Thrissur, Palakkad, Malappuram, Kozhikkode and Kannur .

4.2 Chief Engineer (TransGrid 2.0)

KSEBL had taken up the ambitious ***TransGrid 2.0*** project for enhancing the transmission capacity for meeting future demand, improving reliability and quality of power transmitted and to reduce losses.

4.3 Achievement

4.3.1 Substation & Lines Commissioned region wise

Region	Voltage level	Substations commissioned		Lines Commissioned		
Transmission South	33kV	1	Marayoor	1	Pallivasal – Munnar SC line (7ckm)	
				2	Munnar-Marayoor DC line (88.5ckm)	
	110kV			3	Pothencode- Kazhakootam –UG Cable (9.241ckm)	
	220kV/110kV			4	Kattakkada- Balaramapuram MCMV line (20.75ckm)	
Transmission North	33 KV	2		5	Interlinking Vellangallur and Anjangadi (7.5 ckm)	
			Pattambi	6	33 kV UG cable from Substation Maruthoor to 110kV Substation Pattambi (3.1ckm)	
				7	Thirumittakode-Pattambi tap line (6.2 ckm)	
	110 KV	3	Nilambur	8	Elamkur-Nilambur (Upg) (22.3 ckm)	
		4	Edakkara	9	Nilambur-Edakkara (Upg) (27 ckm)	
		5	Mannuthy	10	LILO from Madakathata to Kodakara (0.06 ckm)	
		6	GIS Vennakkara			
Transgrid	220 kV/110kV	7	Kunnamangalam GIS	11	Malayamma-Kunnamamgalam 220/110kV MCMV line (15.2ckm Upg MCMV), 110 Kv – 15.2 Ckm	
		8	Pallivasal (Chithirapuram) AIS	12	Aluva-Pallivasal 220/110kV MCMV line (166 ckm MCMV), 110 KV -164.8 Ckm	
				13	Pallikkara – Aluva (22.86 ckm)	

Achievements in Transmission SBU

Substations Commissioned

Edakkara

Kunnamangalam

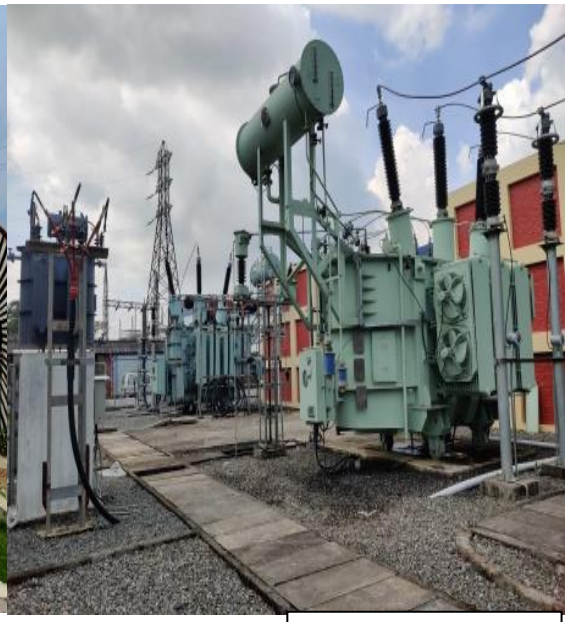
Mannuthy

Marayur

Nilambur

Pallivasal

Pattambi



Vennakkara

4.3.2 Substations and Lines under construction

400kV Substation: Kottayam (Transgrid)

220 KV

Substations (GIS-Transgrid)	Lines
1. Vizhinjam (Upgn.)	1. Kattakkada-Balaramapuram-Vizhinjam line
2. Ettumanoor	2. Kottayam-Ettumanoor-Thuravoor 220/110 kV MCMV (Transgrid)
3. Thalassery (Upgn.)	3. Mundayad-Thalassery 220/110 kV MCMV
4.Kunnamkulam (Upgn.)	4. Wadakkanchery-Kunnamkulam line
5. Pathanamthitta	5. Koodal-Pathanamthitta-Adoor-Edappon MCMV
6. Kakkad	6. Valupara-Kakkad line
	7. Kanjirode-Mylatty 220/110 kV MCMV
	8. Kodungallur-Irinjalakuda 220/110 kV MCMV(Transgrid)
	9. 220/110 kV MCMV lines to 220kV GIS Substations Pathanamthitta and Kakkad
	10.220/110 kV MCMV line to proposed Vengallur substation

110 KV

Substations	Lines
1. Palode (Upgn)	1. Mithrumala-Palode 110 kV DC line (upgn)
2. Karunagappally (Upgn)	2. Sasthamcotta-Karunagappally DC line (upgn.)
3. Alappuzha (Upgn)	3. Pooppally-Alappuzha 110 kV DC line (upgn)
4. Kuttanadu (Upgn)	4. Pooppally-Kuttanad 110 kV DC line (upgn)
5. Kuravilngadu (Upgn)	5. Koothattukulam-Kuravilngadu 110 kV DC line (upgn)
6. Murickassery	6. Murickassery-Konnathady 110 kV Line
7.Sulthan Bathery (Upgn)	7. Kainatty-Sulthan Bathery 110 kV DC line (upgn)
8. Adoor (Upgn)	8. Kaniyambetta-Mananthavady 110 kV DC line (upgn)
9. Velliamparamba	9. Idamalayar-Bhoothathankettu 110kV DC line (upgn)
10. Kannampully(Upgn)	10. Cherai-Njarakkal 110 kV DC line
11. Kuthumunda (Upgn)	11. Pothencode-Kazhakkuttom-Technopark 110 kV UG
12. Shornur 110 kV GIS	12. Vennakkara-Nemmara 110 kV line (upgn)
13. Thamarassery (Upgn)	13. Kunnamangalam-Thamarasery 110kV DC line (upgn)
14. Pariyaram (Upgn)	14. Nallam-Kuttikkattur 110 kV DC line (upgn)
	15. Kadachira-Chovva 110 kV DC line (upgn)

33 KV

Substations	Lines
1. Kidangara	1. LILO to Thumboor from 3IJPR feeder
2. Thumboor	2. Kodungallur-Methala line
	3. Ramanattukara-Feroke interlinking using UG cable

The total expenditure incurred towards Transgrid works is as below:

Expenditure of Transgrid 2.0 works as on 31.03.2022		
Sl No.	Project Execution by	Cumulative expenditure till 31.03.2022 in ₹ Crore
1	Own fund	14.93
2	PSDF grant	66.14
3	KIIFB loan	401.19
	TOTAL	**482.25**

4.4 Chief Engineer (Transmission - System Operation)

Power System Management and Grid Operation through State Load Despatch Centre at Kalamaserry including all allied functions are carried out by the Chief Engineer (Transmission System Operation). The Load despatch activities include generation scheduling, maintenance scheduling, scheduling of power from Independent Power Producers (IPP) and Central Generating Stations (CGS) on long term as well as on daily basis, economic load dispatching, merit order dispatching, unit commitment policy, real time load restrictions as and when necessary, fixing up of merit order for under frequency tripping and remote switching operation from SLDC. The market operation, a function of the Distribution Business Unit, is also carried out at present through Chief

Engineer (TSO). The operation of SLDC is managed by the Deputy Chief Engineer (Grid & Office) who also assists the CE (TSO) in office functions. The Deputy Chief Engineers of System Operation Circles at Kalamasserry, Kannur and Thiruvananthapuram are responsible for the protection, communication, SCADA and meter testing for energy audit.

4.4.1 System Operation for the year 2021-22

The financial year started with widespread summer rains and imposition of more and more Covid-19 restrictions and hence demand was lower than expected. But with intensified market operation of power purchase and sale at differential rates subject to the real time system conditions, SLDC was able to make a net sale of Rs 998.06 Cr. Consumption recorded during the year 2021-2022 was 1463.75 MU higher than the previous year. This is about 5.8% increase from 2020-21. However owing to the impact of COVID-19 pandemic, 2020-21 recorded a negative growth of -4.35%. Increase in consumption during the year is attributable to relaxation in Covid-19 restrictions during the later part of the year. Total Consumption for the year was 26608.75 MU against 25144.99 MU in 2020-'21. A comparison of inflow and consumption with that of previous year is shown in Table 1

Table I

	INFLOW (Total MU)		**CONSUMPTION (MU/day)**	
	2020-21	**2021-22**	**2020-21**	**2021-22**
APRIL	78.19	117.8	68.32	80.61
MAY	108.84	648.91	70.71	66.19
JUNE	311.86	1068.13	64.06	67.19
JULY	722.7	1821.53	62.43	67.04
AUG	2155.47	1177.43	62.6	68.2
SEP	1438.27	1030.08	63.63	72.06
OCT	856.83	1743.93	67.04	71.25
NOV	424.52	1450.92	70.62	70.69
DEC	263.16	596.36	70.09	73.59
JAN	284.78	176.07	70.16	74.78
FEB	115.27	94.91	74.86	79.28
MAR	95.54	93.21	82.45	84.38
TOTAL	**6855.43**	**10019.27**	**826.97**	**875.26**

It is seen that per day consumption is higher than that of previous year for all the months, except in May 2021. This is due to the record summer rains and higher inflow to the reservoirs besides resulting in reduction in demand. Also, with the resurgence of Covid since mid-April 2021 and the

consequent restriction imposed in the state, the consumption further came down drastically in May 2021 and resulted in a decrease of about 16% during the 1st Quarter of the year.

With gradual increase in the relaxation of Covid -19 restrictions, there was an increased growth of Consumption in the 3rd and 4th Quarter of the year. March recorded the all time high single day consumption (89.62MU on 15.3.22) and day demand (4380 MW on 17.3.22).

4.4.2 System Management

Demand	
Evening Peak	4380 MW on 17.3.22
Morning Peak	3499.7 MW on 16.3.22
Day Peak	3937.2 MW on 31.3.22
Consumption	
Internal generation	10516.50 MU
Total import	16092.39 MU

The year recorded following all time records in the power consumption and Maximum Peak Demand of the state.

	For the year 2021-22		Previous Record	
Daily Consumption	89.62 MU	15.03.2022	88.417MU	19.03.2021
Evening Peak	4380MW	17.03.2022	4316	13.04.2019

4.4.3 Hydel Scenario

Compared to previous year, the inflow to major reservoirs increased by 3163.8 MU. The water year began with carryover storage of 1483.4 MU against the planned level of 750 MU on 1.06.2021. This is attributable to the summer rains along with the drastic fall in consumption due to Covid -19 restrictions in May 2021. The summer rain was extra ordinary during the month of May 2021 and the total inflow received was almost 5 times the anticipated inflow (around 477MU excess). Buildup of storage in major reservoirs were used for market exploitation and meeting demand whenever there was a shortage in availability in the later months of the year.

The monsoon was comparatively weak in August resulting in a deficit of 555 MU from the anticipated inflow. However the monsoon revived strongly in October and November and compensated the deficit .The Anticipated vs. Actual Inflow/ Hydel generation details during the water year is summarized below:

Month	Inflow			% of anticipated	Hydro generation (MU)	
	Anticipated (MU)	Actual (MU)	Surplus (+) Shortage (-)		Anticipated	Actual
06/21	799.14	1068.13	268.99	1.34	696	745.9
07/21	1358.88	1821.53	462.65	1.34	761.36	977.1
08/21	1732.05	1177.43	-554.62	0.68	923.8	1014.27
09/21	984.5	1030.08	45.58	1.05	527.4	732.52
10/21	762.82	1743.93	981.11	2.29	660.3	1061.8
11/21	480.91	1450.92	970.01	3.02	764.1	1144.41
12/21	231.76	596.36	364.6	2.57	645.73	781.37
01/22	115.97	176.07	60.1	1.52	713	659.67
02/22	68.25	94.91	26.66	1.39	491.68	606.56
03/22	89.05	93.21	4.16	1.05	675.49	821.16
04/22	121	215.14	94.14	1.78	757.8	822.02
05/22	184	500.97	316.97	2.72	677.04	650.27
Total	**6928.33**	**9968.69**	**3040.36**	**20.74**	**8293.7**	**10017.05**

4.4.4 Market Operations

During the year 2021-22, the System Operation wing has managed the system in the most effective and economic manner.

The details of monthly Power Purchase and Sales through power exchanges during FY 2021-22 are given below.

Purchase and sales in Power Exchange during the financial year 21-22									
MONTH	PURCHASE			SALE			NET		
	MU	Amt in Rs.Cr	Rate in Rs/kWh	MU	Amt in Crore	Rate in Rs/kWh	MU	Amt in Rs. Cr	Rate in Rs/kWh
04/21	6.83	2.78	4.07	-24.68	10.23	4.15	17.85	7.45	4.17
05/21	0.54	0.08	1.48	-190.9	56.29	2.95	190.36	56.21	2.95
06/21	0.77	0.12	1.56	-174.01	65.06	3.74	173.24	64.94	3.75
07/21	0.41	0.08	1.95	-200.4	65.21	3.25	199.99	65.13	3.26
08/21	0.91	0.65	7.14	-307.53	178.36	5.8	306.62	177.7	5.8
09/21	1.23	0.23	1.87	-107.01	48.94	4.57	105.78	48.71	4.6
10/21	0.71	1.05	14.79	-225.99	171.23	7.58	225.28	170.2	7.55
11/21	0.05	0.01	2	-367.85	114.35	3.11	367.8	114.3	3.11
12/21	4.15	0.82	1.98	-151.41	61.53	4.06	147.26	60.71	4.12
01/22	12.76	2.52	1.97	-137.56	62.4	4.54	124.8	59.9	4.8
02/22	23.89	6.45	2.7	-81.54	50.58	6.2	57.65	44.13	7.65
03/22	11.98	4.15	3.47	-125.54	132.82	10.58	113.56	128.66	11.33
Total	**64.225**	**18.93**	**2.95**	**-2094.41**	**1016.99**	**4.86**	**2030.18**	**998.04**	**4.92**

The year 2021-22 recorded a consumption of 1463.76MU higher than the previous year 2020-21.

Market operation activities were deployed to exploit the market conditions favourably to keep the must run schedule and catering the low demand while monitoring the buildup of storage in the major reservoirs. The monsoon was comparatively weak in August and the inflow was only 1177.43 MU against the anticipated of 1732.05 MU resulting in a deficit of 554.62 MU from the anticipated. However the month of October and November witnessed a strong revival of monsoon changing the status from deficit to surplus. The total inflow was 10019.27 MU against anticipated inflow of 6903.7 MU.

The availability from Central Generating Stations, Long Term Generators, and Hydro for the Year was 29842.72 MU while the actuals was of the order 25134.1 MU, hence there was a surplus of 4708.62 MU.

The low demand on account of COVID-19, the heavy monsoon with increased inflow the surplus on account of must run generation and the high availability from the CGS and LTA were managed strategically under the umbrella of merit order dispatch by employing different tools of market operation.

i. Surplus availability from CGS + LTA + Hydro was managed through sale in Power through Exchange when the rates were high and also in merit order with the surrender of CGS and LTA.

ii. The market operation possible with flexing the hydro generation taking arbitrage in different time spells termed as Special Market Operation.

This mechanism utilizes

- Substituting high cost power in the merit order stack with low cost power in the market through surrender Vs purchase mechanism.
- Offering sale when the higher rates and compensating the same through purchase at lower rates with the intention of not disturbing the hydel plan for the month/year.
- When the demand is low and market rates are high, exploiting the market through sale by scheduling the availability from CGS and LTA as per merit order.

Special market operation is constrained due to technical reasons like limitation in surrender due to technical minimum of generators, low demand with must run condition of hydro units.

- Thus in the Financial year 2021-22 the sale was aggressive from May-21 onwards to manage the heavy inflow from summer rains and also to manage the reduction in demand due to resurgence of Covid-19 pandemic. The market clearing price surged during the months of August to October on account of poor coal quality and poor coal stock. Availability from hydel stations including Idukki was maintained during this period by deferring the annual maintenance of the units in the various stations on week days to Sundays and holidays, when the market rates were low. The average sale rate was of the order of Rs5.8/unit in Aug-21, Rs.4.6/unit in Sep-21 and Rs.7.55/unit in Oct-21.

- In the month of October, due to forced outage of generators under CGS and LTA high cost purchase was made to make up the deficit in LGB. Purchase up to Rs.20/unit for mandatory sign change was also done. Thus a total of 0.71MU @ Rs. 14.79/unit was procured for Oct-21.

  In the FY 21-22 Gross sale of 2090.41 MU @ of Rs.4.73/unit and Purchase of 64.23 MU @ Rs. 2.95/unit was done for managing the LGB. Net sale of 2030 MU @Rs.4.79 and sale of 58.59 MU fetching around Rs. 24.98 Crores through flexing the hydro generation taking arbitrage in different time spells was carried out.

- DSM activities for this year ended up with an export of 95.68MU fetching Rs. 86.44 Crores. Surrender of 2518.53 MU was carried to address the low demand monsoon season and for maintaining the generation schedule due to the heavy inflow to the reservoirs

- Total benefit out of security constraint economic dispatch can be summarized as follows:

Summary 2021-22	Qty in MU	Amt in Cr
Revenue by sale of Surplus energy-Gross sale	2094.41	992.02
Revenue by Special Market Operation	-	24.98
Revenue by Deviation Management	95.68	86.44
Savings in the expenditure towards power purchase by surrender of CGS/LTA	2518.53	714.4
Total benefits	**4708.62**	**1817.84**

4.4.5 System Operation Circles

System Operation Circles are responsible for the field activities in the protection, communication, SCADA and meter testing for energy audit. The relay subdivisions under the Circles carry out routine/pre-commissioning/ commissioning/testing and trouble shooting of all type of relays and panels of Substations and Generating Stations, while the PET subdivisions carry out testing of all the power equipment in Sub Stations for condition monitoring and life assessment. The Meter testing sub divisions carry out the testing of meters in Sub-Stations and Generating Stations and the communication wing maintain the communication network of KSEBL.

4.5 PSDF Projects:

The status of the projects under the Power System Development Fund Scheme (PSDF) is given in the table below:

Status of PSDF Schemes as on 31.03.2022						
No	Scheme	Estimate (Rs Cr)	Estimate Accepted in Cr/ MoP sanction date	Grant Approved (Rs Cr)	Grant Released (Rs Cr)	Progress
1	Renovation of Protection system of 220 kV substations	97.90	91.46 (31.12.2014)	82.31 (90%)	82.3 (100%)	Project closed.
2	Implementation of Automatic Demand Management Scheme	6.03	5.30 (02.01.2017)	4.77 (90%)	4.762 (99.84%)	Project completed
3	400/220 KV Multicircuit/ Multivoltage Transmission line from Madakkathara to Areekode. (Transgrid North-I)	371.03	371.03 (16.05.2017)	333.93 (90%)	333.93 (100%)	Project closed.
4	Up-rating Kakkayam-Nallalam 110 KV line (45 km) & Upgrading Nallalam- Koyilandy 110 KV Single Circuit to Double Circuit (32Km) (Transgrid North-II)	89.13	89.13 (16.05.2017)	66.85 (75%)	47.521 (71%)	Project completed
5	Renovation of Switchyard Equipments, AGC in Gen stations, AMR and associated works	33.68	22.42 (15.11.2017)	20.18 (90%)	13.909 (69%)	Physical progress- 90%; Financial= 87.8 %.
6	Reliable Communication and data acquisition system up to 110 KV Sub stations in Kerala	185.34	147.52 (15.11.2017)	73.76 (50%)	16.778 (23%)	OPGW stringing- 70% completed. Battery and battery

Status of PSDF Schemes as on 31.03.2022							
No	Scheme	Estimate (Rs Cr)	Estimate Accepted in Cr/ MoP sanction date	Grant Approved (Rs Cr)	Grant Released (Rs Cr)	Progress	
	(OPGW)					charger-installation in progress. Tender for communication equipments floated	
7.	Implementation of Scheduling, Accounting, Metering & Settlement of Transactions (SAMAST)	53.87	17.56 (10.05.2021)	15.8 (90%)	1.58 (10%)	Prequalification of tender documents for procurement of energy meters progressing	
	Total	**836.98**	**744.42**	**597.6**	**500.772 (83.79%)**		

4.6 Power System Engineering

This wing is primarily entrusted with conducting Load flow Studies using Simulation software for finding out the technical feasibility of proposals for Construction/Up- gradation/capacity enhancement of Substations, Lines and power evacuation proposals for new/existing projects as received from field. Intra state transmission planning and fine tuning in consultation with Transmission wing and Generation wing along with contributing to Inter State Transmission System Planning (ISTS) studies of CTU. Also, this wing is entrusted with the Power Evacuation studies for the LTA/ MTOA applications as well as for the upcoming renewable projects/ other major projects as and when required. Earth Mat designing for Substations, Conducting quarterly loss study of Transmission network at different voltage levels, Conducting reactive power compensation studies in the KSEBL Grid, Conducting short circuit studies for finding out fault level of substations and generating stations in the KSEBL etc are also entrusted with PSE wing.

Preparation/ updation and publishing of Single Line Diagram and Geo-referenced Grid Map of KSEBL transmission network, Assessment and publishing of spare Power availability in substations for providing feasibility for power requirement up to 1 MVA to applicants through HT Green Channel facility, Collection, Compilation and analysis of auxiliary energy consumption of all substations of KSEBL up to 33 kV for facilitating annual energy auditing and accounts statement preparation, Analyze the Monthly Operating Review (MOR) of Substations and Generating Stations for monitoring Transformer loading and Healthiness of equipment and taking follow up action,

Coding of substations and lines and maintaining a repository for the same etc are the other major functions of PSE.

Management of Web based business modules named PSEM which provides the centralized data warehouse for transmission asset management and operating statistics management in KSEBL transmission system is also a major work of PSE. Matters related to CEA, SRPC, TCC, CERC and other Central and Southern Regional Forums are also handled by PSE wing.

During FY 2021-22, PSE wing had conducted Load flow studies for 65 new proposals, 40 Capacity addition, 11 earth mat design works, for Substations/generating stations in addition to various reactive power studies, System Fault studies and Loss studies at various voltage levels.

DISTRIBUTION SBU

5 Distribution SBU

Major activities carried out in the Distribution sector are detailed as below:

5.1 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 by the year 2022, the Board had decided to implement a comprehensive network-based distribution plan 'Dyuthi 2021', as part of the Urja Kerala Mission. The focus of this project is 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 Board had issued approval for the following 4-year plan from 2018-19 to 2021-22 as shown below.

Financial Year	Capital Investment (Rs in Crore)			
	Normal Development	Replacement of faulty meters	Continued Electrification	Special Projects like SCADA
2018-19	723.64	60.00	50	50
2019-20	1221.06	54.49		
2020-21	1066.65	47.61		
2021-22	720.68	42.18		
Sub Total	3732.03	204.27	50.00	50.00
Total (2018-22)	Rs. 4036.30 Crore			

The actual expenditure of Dyuthi 1.0 project as on 31.03.2022 is 3225.47 Crore.

Works that were in different stages of progress as on 31.03.2022 in Dyuthi1 project has been extended for completion as spill over works. Some balance works are deleted from the project due to change in network condition after the preparation of DPR, advancements in technology, difficulty in getting sanction from other statutory authorities, change in terrain conditions and development of urban and rural roads. Many other planned works were either completed as part of various other funded works or included in Dyuthi 2.0 Project as revised proposal.

The Dyuthi 1 initiated many remarkable changes in the distribution development approaches through introduction of network based planning, adoption of new technologies and refreshingly utilitarian in-house products like Communicating Fault Passage Detector (CFPD). As mentioned earlier, Kerala had to face numerous challenges in the form of unprecedented natural calamities and unaccustomed pandemics during the above control period.

In spite of such formidable hardships, the Dyuthi project made decisive strides towards achieving the project goals. The most tangible among them being the drastic reduction in power system T&D losses from 13.07% in 2017 – 2018 to 10.26 % in 2020 – 2021, which translates to savings of more than 700 MU on that front. The frequency and severity of 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.

5.2 Service at doorsteps

Introduced as a pilot project under Electrical Circle, Palakkad from 01.10.2020 onwards “Services at doorsteps” the online platform wherein a consumer/applicant can request service by registering online or through customer care number was inaugurated by Hon’ble Chief Minister of Kerala on 06.02.2021. For a person requiring services like new electricity connection, change of ownership, change of connected load / contract load, change of tariff, line/meter changing, etc, it is sufficient to register the name and phone number by a phone call to the concerned section office/call center. The KSEBL staff will then contact the applicant to complete the process by assisting them in preparing the application to securing the service.

5.3 Electrification of Anganawadis

On request of the Director, Department of Women and Child Development as part of the Government's Hundred Days Program, 937 Anganwadis were electrified during the year. Of these, Rs.22.16 lakh has been spent from the own funds of Kerala State Electricity Board Limited for providing free electricity connections including one post, to 574 Anganwadis.

5.4 Tribal Colony Electrification

Based on the direction from Government of Kerala, KSEBL had identified Tribal colonies which are yet to be electrified and the funds required for electrifying colonies was intimated to Tribal Department on 23.11.2021 requesting the remittance of the estimated cost. The list of colonies, where grid extension is not possible, was handed over to the Director, Anert on 29.11.2021 requesting ANERT to explore the possibility of installing solar/DDGs.

5.5 **Tauktae Cyclone**

In spite of all preparedness activities carried out, heavy winds and downpour associated with the cyclonic storm "Tauktae" which lashed the entire State from early hours of 14th May 2021, severely affected the southern and central districts causing damages to electrical installations, disrupting power in most of the places especially the coastal areas of Thiruvananthapuram, Kollam Alappuzha and Ernakulam districts. Most of the damages were caused due to falling of tree branches/hoardings and similar installations, roofing sheets and other materials blown by the cyclonic winds, uprooting of trees, etc. on the power lines, leading to snapping of conductors and in many places resulted in shattering/ damages and uprooting of several electric poles at a stretch and otherwise. In the distribution network, damages to 68 transformers and 5473 poles were reported, along with distribution line snapping at 18,574 locations (length of conductor damaged - 3714.8 km) in association with the cyclonic storm, causing damages to the extent of Rs. 46.65 crore as per KSEBL estimation. Also 38,93,863 consumers were affected throughout the state due to supply interruptions. Apart from damages to the distribution infrastructure, the roofing sheets were blown off due to huge waves and winds causing severe damages to the office equipment at Arattupuzha Section (Harippad Electrical Circle), while one Section office at Kanamali (Ernakulam Electrical Circle) was inundated.

5.6 **Other Natural Calamities**

The State of Kerala witnessed heavy and incessant rains as part of the monsoon during June & July 2021, bringing in damages to the electrical installations. This was followed by heavy cloud bursts and rains as part of depression in Arabian Sea and Bay of Bengal during October & November 2021. A large number of structures including electrical installations were damaged due to uprooted trees and some installations were washed away due to landslide and gushing water. As part of the monsoon during June & July 2021, damages to 84 transformers and 9024 poles were reported, along with distribution line snapping at 34,381 locations (length of conductor damaged – 6876.2

km) in the distribution network, causing damages to the extent of Rs.83.94crore as per KSEBL estimation. In association with the calamity in October 2021 & November 2021, damages to 126 transformers and 3380 poles were reported, along with distribution line snapping at 12,919 locations (length of conductor damaged - 2583.8 km) in the distribution network, causing damages to the extent of Rs. 34.82crore as per KSEBL estimation.

5.7 **Dyuthi 2.0**

Despite all the achievements in Dyuthi 1, 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 main shortfalls observed are long periods of outages in certain areas during natural disasters, mainly due to snapping of conductors, damages of poles, 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 and change in prioritisation and selection of areas / networks due to change in local network requirements, mitigation activities.

Considering the prevailing priorities in project formulation enunciated above, a comprehensive and realistic plan for the control period 2022 - 2027 is evolved by accommodating the essential features and requirements of the Dyuthi 1 scheme and the RDSS scheme proposed by the Government of India.

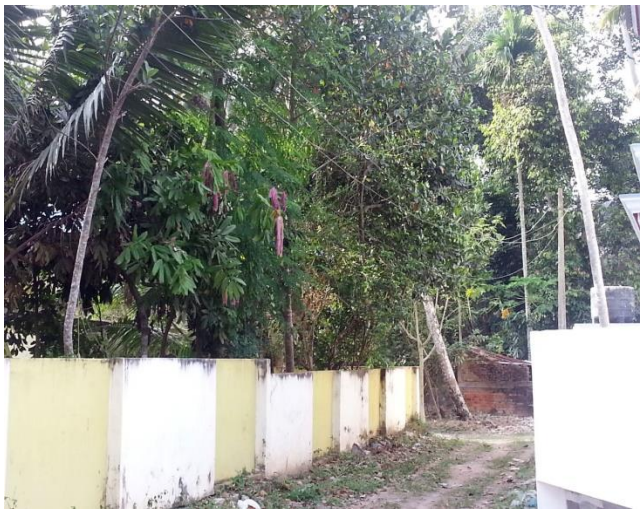
Goals of the project are as follows.

- Enhance the reliability & quality of power supplied – ensure uninterrupted supply
- Improve energy efficiency & reduce system losses
- Ensure standard, resilient and safe installations
- Ensure that the State remains totally electrified during the plan period
- Ensure hassle free integration of renewables (green energy)
- Ensure a revamped, smart, technologically equipped and adaptable network
- Facilitate the growth of electric mobility
- Ensure geo-mapping of all network assets

The abstract of year wise financial target of works under Dyuthi 2.0 of the Multi Year Plan 2022-23 to 2026-27 is as follows.

In Rs. Crore

Particulars	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**Total**
Dyuthi 2.0 works	574.199	527.111	599.066	1191.541	1124.179	4016.096
Provision forTotal Electrification	20	20	20	20	20	100
Provision for replacing faultymeters	30	30	30	30	30	150
Provision for installation ofspacers as part of safety	10	10	10	10	10	50
Total	**634.199**	**587.111**	**659.066**	**1251.541**	**1184.179**	**4316.096**

Installation ofspacers

A brief summary of zone wise activities and achievements of this SBU are given below:

Description	Achievement during 2021-22				
	South	Central	North	N. Malabar	Total
No. of service connections effected	84170	93864	121576	62102	361712
11 kV line constructed (km)	580	819	414	579	2391
LT line constructed (km)	966	978	1001	1039	3983
No. of distribution transformers installed (Nos.)	427	744	760	424	2355
Meter replacement (Nos)	153024	139341	129856	65661	487882
HT re-conductoring (C.Km)	189	273	412	154	1027
LT re-conductoring (C.Km)	7049	7759	5607	4596	25010
1Phase to 3Phase Conversion (km)	355	415	412	280	1462

5.8 **Centrally Aided Projects**

Projects announced by the Ministry of Power, Govt. of India (GoI) , are coordinated, monitored and carried out by a separate office, led by a Deputy Chief Engineer, CAPs under the Chief Engineer, (IT, CR & CAPs). Corporate project management activities such as obtaining sanction for DPR, follow up through the implementation stages, monitoring progress, co-ordination with the nodal agencies appointed by GoI, facilitating for the timely fund releasing requirements, and all coordinating efforts

till the closure of scheme are being carried out from the Centrally Aided Projects (CAPs) wing. Earlier central schemes viz. RAPDRP part-B, IPDS, DDUGJY and SAUBHAGYA were completed and KSEBL received eligible grants from GoI. The details of grants received for the completed central projects are as follows:

Sl. No.	Scheme	Financial Achievement	Amount received during 2021-22	Remarks
1	IPDS	Rs. 648.735 Cr	Rs.35.17 Cr	Closed & Eligible grant received.
2	DDUGJY	Rs. 507.08 Cr	Rs.53.5 Cr	Closed and eligible full grant received.
3	SAUBHAGYA	Rs. 95.75 Cr	Rs.11.75 Cr	Closed & eligible full grant received.
4	RAPDRP-Part A	Rs. 178.22 Cr	-	Closed and Full amount converted into grant.
5	RAPDRP-Part B	Rs. 1115.4 Cr	Rs.379.72 Cr	Closed and Eligible amount received towards loan to grant conversion.

5.8.1 REVAMPED DISTRIBUTION SECTOR SCHEME (RDSS)

The RDSS is a new scheme announced by the Central Government with a total outlay of Rs 3 lakh Crore for the development and modernization of the power sector. The duration of the Scheme is 5 years from (FY 2021-22 to FY 2025-26). The nodal agency for Kerala is M/s Power Finance Corporation Ltd, New Delhi.

The project aims to improve quality, reliability and affordability of power supply to consumers through a financially sustainable and operationally efficient Distribution sector. The project further aims to reduce AT&C losses to pan –India levels of 12-15% by 2024-25 and ACS-ARR gap to zero by 2024-25.

The major components of the scheme are:

Part A:

1 Prepaid Smart Metering

(i) Consumer metering - Smart metering with Pre-paid functionality

(ii) System metering (Feeder, DT & Border) – 100% communicable DT, Feeder, Border metering with AMI features to enable energy accounting.

2 Infrastructure works

(i) Loss reduction which includes Armoured / ABC cabling/ HVDS, in high loss areas and underground cabling in disaster prone areas, IT/OT enablement works, ERP, Billing software, Segregation of Agriculture feeders to enable solarization under PM-KUSUM implementation, replacement of conductors which are old and frayed, replacement of existing old feeders, segregation / bifurcation of feeders for loss reduction/ System strengthening, etc.

(ii) 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.

(iii) 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.

Indicative Reform Activities

- Mechanism to ensure prompt payment from Govt. Departments
- Payment of current electricity dues by all Government departments/local bodies
- Proper energy accounting of subsidized category and this subsidy released to the 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.
- Road map for funding accumulated and current financial losses clearance of part or whole of Regulatory assets through tariff or State funding

Present Status

- Sanction was accorded for the action plan and DPR proposals submitted by KSEBL under RDSS by GoK and placed before the monitoring committee of MoP for approval.
- Approval for the proposal was obtained in the 7th monitoring committee meeting held on 15.03.2022
- The sanctioned amount includes the Smart System metering & Infrastructure work proposals from Cochin Port Trust Authority (CoPA) amounting to Rs. 9.87Cr also. The approved DPR cost and 60% GoI Grant for the Loss Reduction Infrastructure works and Smart metering) under KSEBL is as follows:

Sl No.	Description	Amount (Rs.Cr.)	Remarks
1	Loss Reduction works	2235.78	
2	GoI Grant for Loss reduction works	1341.47	
3	PMA charges for Lossreduction works	33.39	1.5% of Project Cost
	PMA Grant	20.035	(60% of PMA charges)
5	SMART metering	8175.05	
6	GoI Grant for SMART metering	1226.26	
7	PMA charges	30.66	
8	PMA Grant	18.39	

- The modernization DPR will be considered for approval only after KSEBL meets certain pre-qualification criteria and achieving specific remarks in the Result Evaluation Matrix.
- KSEBL is in the process of implementing the scheme including appointment of PMA through tendering.

5.9 Consumer Grievance Redressal Forums (CGRF)

CGRF has been constituted by KSEBL as per regulation of the State Electricity Regulatory Commission. The forum has independent powers to issue orders in respect of grievances presented before the forum by consumers. The abstract details of complaints received at the three CGRFs during 2021-22 are given below.

Item description	South	Central	North	Total
Complaints pending as on 01.04.2021	31	17	40	88
Complaints received during 2021-22	81	88	131	300
Complaints settled during 2021-22	84	94	102	280
Complaints to be settled as on 31.03.2022	28	11	69	108

OTHER DEPARTMENTS

6 Finance and Accounts Department

The Finance and Accounts Department headed by the Financial Advisor & Chief Financial Officer, undertakes the company financial management, viz., long term and short term resource mobilization, working capital management, investment management, Financial planning, budgeting and budgetary control, cash flow management, corporate banking and treasury management. Centralised disbursements and Non operative collection bank accounts comes under the purview of this office. The FA & CFO being adviser to the company also gives advice on finance and contractual matters of the company. This office prepares the accounts of the Board as a whole in addition to the Budget of the company.

The following table shows Total sales and the revenue earned by the company from operations and other income during the period from 2014-15 to 2021-22:

Particulars	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Energy Sales within state (MU)	19325.07	20038.25	20880.71	21536.77	22660.93	22151.60	23499.59
Outside state (MU)	53.48	49.30	117.51	824.78	55.95	261.43	2094.41
Total sales (MU)	19378.55	20087.55	20998.22	22361.55	22716.87	22413.03	25594
Revenue from operations (₹ Cr)	10914.43	11218.83	12318.17	13521.22	14644.44	14420.63	16366.93
Other Income (₹ Cr.)	332.71	400.78	347.27	481.74	210.16	748.76	618.69
Total (₹ Cr)	11247.14	11619.61	12665.44	14002.94	14854.60	15169.39	16985.62

7 Information Technology and Customer Care Department

This wing is headed by Chief Engineer (IT, CR & CAPs) is mainly engaged in the automation of the core functional areas of KSEBL, viz. Billing, HR Management System, Accounting, Supply Chain Management etc. The department develops and implements Application software, and provides IT support services. Customer care Centre is also managed by this wing.

The Chief Engineer (IT, CR & CAPs) heads the IT wing and is assisted by the Deputy Chief Engineer-IT. Various offices of IT Wing are IT-Computerisation Unit, Thiruvananthapuram; IT- Projects Division at Thiruvananthapuram, IT- Cyber Security Division at Thiruvananthapuram and Regional IT-Units at Thiruvananthapuram, Kochi and Kozhikode.

7.1.1 SCADA/DMS Project

Ministry of Power, Govt. of India/PFC launched the Restructured Accelerated Power Development Reforms Programme (R-APDRP) in the XI Five year plan. The Distribution Automation system under the project- SCADA/DMS was implemented under part- A of RAPDRP projects. In KSEBL, the SCADA/DMS project for automation of distribution systems are implemented in Thiruvananthapuram, Ernakulam and Kozhikode towns. Main features of SCADA/DMS are Control Centers in Trivandrum, Ernakulam & Kozhikode SCADA towns for the real time monitoring and control of 11kV distribution network, Remote terminal units (RTU) in 50 substations, Local Data Monitoring system (LDMS) at substations, Feeder Remote Terminal Units (FRTU) in 2994 Ring Main Units (RMU) locations on 11kV feeders, integration with State Load Dispatch Centre (SLDC), IT Data Centre (ITDC), Customer Care centre (CCC) and Disaster Recovery (DR) centre, Advanced distribution management system (ADMS), Schematic and geographical display of 11kV network by integrating with GIS system, Fault Location Isolation and Supply Restoration (FLISR) for improved customer service, planned maintenance support, historical storage data for analysis, load flow analysis, etc. Works has been completed and the sanctioned amount for Rs 53.15 crore for part A of RAPDRP, SCADA/DMS project has been disbursed. The total loan amount along with accrued interest totalling to Rs 68 crore has been converted to grant by MoP/PFC.

7.1.2 Major software works undertaken during 2021-22

Sl.No.	Application / Projects	Work done
1	Centralised LT Billing Application software for metering, billing and collection - Orumanet	Integration works with Central Government portal E-Kiran, for the real time updation of solar applications completed

Sl.No.	Application / Projects	Work done
		Web platform to defray the Arrears for One Time Settlement Scheme 2022 (OTS) developed
		Service @ Doorstep facilty for Consumer Services enabled through Employee Mobile App
		TDS collection Modules under section 194J and 194Q of Income Tax added.
		Govt. Relief Package for BPL and NPG as per KSERC order dt:02/09/2021 implemented.
		AF Refund Module for the non feasible Soura Subsidy Phase II applicants enabled
		Module for the Monthly review of Arrears (Detailed 22 Column Reports) added.
		Integrated with ERP dashboard.'
2	Meter Data Management System	Development of Meter Data Management software for Smart City Mission Ltd. Project, Kochi.
3	HT/EHT application – Energise – for metering, billing, collection and accounting of HT/EHT consumers	Facilities for consumer to deduct TDS while paying bill amount as per 194Q of IT Act enacted in 2021.
		Module for calculating Allowable open access calculation by uploading monthly Load Survey Details of consumers provided by SLDC as per the orders of KSERC.
		Modules for billing consumers with faulty Net Meter connected with On Grid Solar plants developed.
		Integrated with ERP dashboard.
		Modules for uploading daily collection details undertaken
		Provisions for uploading GST invoices for IRN generation.
		Web service integration with SARAS and SOURA for proper accounting of Soura Registration Charges. Various new reports and other modifications implemented.
4	Online Electricity bill Payment Facilities	KSEB provides online payment facilities mainly through its payment website integrated with two payment gateways, direct integration with 4 banks and UPI.KSEB bills can also be paid through its own mobile app 'kseb', CSC, SSDG, NACH. Integrated with BBPS system for providing interoperable services to consumers across various platforms.

Sl.No.	Application / Projects	Work done
5	Online application submission for new connection/other services.	For LT new service connection applicants can submit online application through 'New LT Service Connection' link provided in www.kseb.in web site of KSEBL.
		Other consumer services provided online for registered consumers through online portal for KSEBL wss.kseb.in.
		For HT/EHT connections online applications through 'Green Channel' link in the www.kseb.in website.
		Additionally, consumers can also apply for industrial connections through KSIDC website.
6	Human Resource Management System - 'HRIS	Online uploading facility to disclose Property Statement and generation of reports were developed.
		Implementation of Pay revision for Employees on 2021.
		Implementation of Pension revision for Pensioners on 2021.
		Facilities for the refund of excess amount recovered named 'ARAS' modules developed.
		Revised PF credit card with separate account added for deposits above 5 lakhs and necessary provision for the recovery of IT on the interest of the deposits above 5 lakhs added.
		Modifications in Transfer guidelines of General Transfer of workmen and Officers were implemented.
		Updation of Masterdata changes in different modules.
		Online request for the Overseer promotion 2022 (10% quota) implemented.
		Online Submission of Employees willingness to work at Moozhiyar enabled.
		Provided Earned leave entries on quarterly basis.
		Welfare fund advance remittance adjustments in new rate provided
7	Enterprise resource project (ERP)	software development for Inventory Management, Human Resource Management and Accounts module of ERP envisaged as part of Integrated Power Development Scheme (IPDS – Phase II – IT).
		Module for making the existing system ready for data migration by providing various pre migration readiness checks.

Sl.No.	Application / Projects	Work done
8	Research and Development Project- National Mission on Power Electronics Technology (NaMPET) has included six R&D projects for KSEBL in their phase III program on Combined Smart meter and Smart Power Quality Centre for Electrical Distribution Network by CDAC.	6 projects as combined development with the Centre for Development of Advanced Computing (C-DAC) and KSEBL and developed technology to be handed over to KSEBL
		1. Implementation of digital substation architecture.
		2. Advanced metering infrastructure solutions including smart meter development using various communication technologies.
		3. Development and Implementation of Battery Energy Storage System. - 110kV Paruthippara Substation has been finalized for the development and implementation of BESS.
		4. Development of Solid-State Transformer and Solid-State Switch solutions.
		5. Power Quality Devices for Smart Distribution Grid.
		6. Intelligent Sensor network for Distribution systems Monitoring and Control.
9	Cyber Security Implementation in KSEBL	Cyber security technical committee constituted for the identification of Critical Information Infrastructure (CII) in Generation, Transmission and Distribution wings.
10	KFON Project- An ambitious communication infrastructure project for providing optical fiber network across the State, and to setup an access network to connect 30,000+ government and educational institutions, utilising the distribution and transmission infrastructure of KSEBL to draw OPGW and ADSS fibre network. As per the project KSEBL shall be the Infrastructure Service Provider and shall provide non-discriminatory access to service providers, to provide free internet to 20 lakh BPL households, connect all the Offices and Sections of KSEBL though KFON Intranet. The shareholding pattern of the SPV shall be 49%:49%:2% in favour of KSITIL, KSEB, State Government respectively.	The First Phase of the project launched on 15.02.2021 and 8 field offices of KSEBL are already connected successfully and are expected to be completed in 2022. Installation of OPGW backbone network is nearing completion.
		Work to connect Two RMUs each in Trivandrum, Ernakulam & Kozhikode to SCADA control room through KFON was also started.

Sl.No.	Application / Projects	Work done
11	Real Time Data Acquisition System (RT-DAS) for Non-SCADA Towns under IPDS - PFC has sanctioned the implementation of Real Time Data Acquisition System (RT-DAS) using FRTU at 124 substations to measure the reliability of power in terms of SAIFI and SAIDI to cover non-SCADA RAPDRP and IPDS towns.	Project cost is Rs. 5.25 Crore with a grant component of Rs. 3.15 Crore. Project completed by 31.01.2022 and eligible grant has been received from MoP
12	Phase-II Incremental IT under IPDS - The implementation of Phase-II Incremental IT in 21 towns as a continuation of implementation of RAPDRP IT projects has progressed.	Implemented for continued IT enablement of distribution sector in additional 21 towns. Project completed by 31.12.2021 and eligible grant has been received from MoP
13	Smart City projects at Kochi - Special purpose vehicles Cochin Smart Mission Limited (CSML) and Smart City Thiruvananthapuram Limited (SCTL) were formed to implement smart city projects under Smart Cities Mission (SCM). The Integrated Command Control and Communication Centres (IC4) were formed and IC4 gathers all the information of smart solutions of different departments of the city and act as a single source of information for the whole city.	Integration work for the following KSEBL systems is progressing.Advanced Metering Infrastructure (AMI) to enable two-way communication between smart energy meter and Head End System (HES) for remote reading, monitoring & control of energy meters. The raw data is to be integrated to KSEBL billing application. The MDM software was developed by IT wing and Integration of this software with LT billing software is progressing..Integration of SCADA with IC4 & CCC with IC4 are in progress.
	Smart City projects at Thriuvananthapuram	Data collection as part of Smart Cities Open Data Initiative is in progress
14	SCADA/DMS Project under RAPDRP- As part of RAPDRP part A, SCADA/DMS project for automation of distribution systems were implemented in Thiruvananthapuram, Ernakulam and Kozhikode towns for real time monitoring and control of 11kV distribution network, Remote terminal units (RTU) in 50 substations..	Three control centres have been made operational in the all 3 SCADA Towns with 50 RTU stations and 2994 FRTUs. Works has been completed and the sanctioned amount for Rs 53.15 crore for part A of RAPDRP, SCADA/DMS project has been disbursed. The total loan amount along with accrued interest totalling to Rs 68 crore has been converted to grant by MoP/PFC.
15	SCADA/DMS Project under RDSS – Sanction was accorded by MoP for the project in the 7th Monitoring Committee meeting held on 15.03.2022.	SCADA / DMS System in Kollam, Thrissur and Kannur towns and SCADA with FPI system in 53 Municipalities in Kerala.
16	Implementation of Advanced Metering Infrastructure under RDSS	Govt. of India notified that all Government offices and industrial and commercial consumers (other than agricultural consumers) shall be supplied electricity with Smart Meters working in prepayment mode by December 2023. All feeder meters shall be provided with smart meters by December 2022, all DT meters by December 2023 and the remaining consumers in the State by March 2025.

Sl.No.	Application / Projects	Work done
		MoP accorded sanction for the project under RDSS on 15.03.2022
		Letter of Acceptance was issued to M/s. RECPDCL as PIA for Phase 1 implementation of AMI in KSEBL on 31.03.2022.
17	Online Portal for LT Consumers - 'ORUMA Web'	Orumaweb software facilitates online payment of electricity bills of LT consumers through centralised collection of payments from Friends and Akshaya Centres.
18	'Kseb' mobile app	Consumer mobile application 'KSEB' was released to customers which enables them to make easy electricity bill payment through mobile devices just by employing their mobile numbers.
19	Implementation of E-file	Presently the e-file software DDFS is being utilised by 28 offices with 800 users in the VB headquarters at TVM and deployed at 258 offices in all with around 3200 users.
20	Students' internship online application portal	web enabled software application developed for industrial training/ project work/organizational study / research work/ industrial visit etc
21	Corporate Service Centre	Single window payment provision for corporate consumers in Vydyuthi Bhavanam, Trivandrum. Monthly about 4900 corporate consumers remit current charges using the Cash Deposit Machine (CDM) installed at CCC on 24X7 basis. An amount of Rs 90,55,21,529 /- collected in Corporate Service Centre through bulk payment, CDM and direct collection at CCC during 2021-22.
22	Centralized Customer Care Services (CCC)	Attended to 36,00,451 calls at the Call Centre. 3,99,579 complaints registered through IVRS, 469164 through WSS and 30,47,711 through CCC-ET. Service at Doorstep – 49370, New connection at Doorsteps – 27528.
23	Urja sowhrida, Billing Information system	Disseminates electricity bill information to the customers via SMS and e-mail as soon the bill is prepared. Reminder SMS shall also be sent in if bill is not paid before due date and disconnection date.
24	Urjadooth, Outage Management system	Automated SMS shall be sent to consumers about power outage information up to distribution transformer level
25	OMS- dashboard	Shows real-time view of live feeders, transformers, transformers feeders under outage, SAIFI, SAIDI and power availability of different level of offices.

Sl.No.	Application / Projects	Work done
26	SMART- Safety Application	Safety Monitoring and Reporting Software (SMART) for Accident Reporting and for generation of statutory reports for Electrical Inspectorate, etc
27	Assessment of Distribution Offices based on Key Performance Indices (KPIs)	Analysis reports about the activities of different distribution offices at different levels of offices available as line graph, bar-chart, speedometer-graph etc. Customer care centre data also integrated to the KPI system and analytical monthly-summary reports generated to view the trend in customer complaints.
28	LD Permit work Management System	For managing the permit to work processes of EHT lines for various substations and LD
29	National Information Infrastructure (NII)	Work was started in 2017 and already completed with 560 Government departments up to the panchayath level had been given internet connectivity. Annual maintenance contract of NII Project to M/s. Sreesastha Constructions which was extended to one more year till 20.05.2022, who have requested for further extension.

7.1.3 Maintenance and Support Activities undertaken during 2021-22

No	Application / Projects	Work done
1	Online Portal For LT Consumers - 'ORUMA Web'	online payment of electricity bills of LT consumers through centralised collection of payments from Friends and Akshaya Centres.
2	Implementation of E-file	e-file software DDFS is being utilised by 28 offices with 800 users in the VB headquarters at TVM and deployed at 258 offices in all with around 3200 users.
3	Students' internship online application portal	web enabled software application developed for industrial training/ project work/organizational study / research work/ industrial visit etc
4	Corporate Service Centre	Single window payment provision for corporate consumers in Vydyuthi Bhavanam, Trivandrum. Monthly about 4900 corporate consumers remit current charges using the Cash Deposit Machine (CDM) installed at CCC on 24X7 basis. An amount of Rs 90,55,21,529 /- collected in Corporate Service Centre through bulk payment, CDM and direct collection at CCC during 2021-22.

No	Application / Projects	Work done
5	Helpdesk Activities	Support and maintenance to the existing computerised Systems, viz. LT Billing, HT/EHT Billing, Human Resource Information System, KSEB's official website, e-tendering, Mail Messaging System, File and Mail Management System, Suit Management System, Attendance Management System etc.
6	Centralized Customer Care Services (CCC)	Attended to 36,00,451 calls at the Call Centre. 3,99,579 complaints registered through IVRS, 469164 through WSS and 30,47,711 through CCC-ET. Service at Doorstep – 49370, New connection at Doorsteps – 27528.
7	Urja sowhrida, Billing Information system	Disseminates electricity bill information to the customers via SMS and e-mail as soon the bill is prepared. Reminder SMS alsosent if bill is not paid before due date and disconnection date.
8	Urjadooth, Outage Management system	Automated SMS shall be sent to consumers about power outage information up to distribution transformer level
9	OMS- dashboard	Shows real-time view of live feeders, transformers, transformers feeders under outage, SAIFI, SAIDI and power availability of different level of offices.
10	SMART- Safety Application	Safety Monitoring and Reporting Software (SMART) for Accident Reporting and for generation of statutory reports for Electrical Inspectorate, etc
11	Assessment of Distribution Offices based on Key Performance Indices (KPIs)	Analysis reports about the activities of different distribution offices at different levels of offices available as line graph, barchart, speedometer-graph etc. Customer care centre data also integrated to the KPI system and analytical monthly-summary reports generated to view the trend in customer complaints.
12	LD Permit work Management System	For managing the permit to work processes of EHT lines for various substations and LD is software was developed. Modifications were done as per the requirements of these office users were released after testing.
13	E-Tendering	Developed and maintained by IT mission of Kerala and all KSEBL offices can upload tender in this online facility for the works with PAC above Rs.5 Lakhs.
14	Video Conferencing System	Video Conferencing System set up are functioning successfully in the following locations, viz. VB- Trivandrum, Transgrid KLMSY, VB- Kozhikode, 220 kV S/S, Kundara, 220 kV S/S, Edappon, 220kV S/S, Pallom, LD, Kalamassery, 400kV S/S Madakkathara, 220kV S/S Orkatteri, 220kV S/S Kanjikode, 220kV S/S Areacode, 220kV S/S, Kanhirode & 220kV S/S Mylatti.
15	Maintenance of KSEBL website	KSEBL official website maintained by IT wing.

No	Application / Projects	Work done
16	System Administration and Maintenance	Hardware related works like designing the system architecture and maintaining the Central Servers, database and the Wide Area Network, fixing of system parameters for configuration of the computer systems and peripherals, maintains Server Systems research and planning to adopt new technologies, assessing hardware requirements, furnishing technical specification, procurement assistance for Hardware items and networking equipment's for KSEBL offices, implementation of software, hardware and networking related works, Bio metric Attendance management system etc., maintenance and supervision of systems in the corporate office, field offices, Data Center/ DR Center, DC/ DR Technical & Physical infrastructure, online LT bill payment support, E-payment gateway etc., maintenance monitoring of storage, routers, switches, firewall etc. and MPLS – VPN connectivity of DC, DR and Field Offices.
17	National Information Infrastructure (NII)	Work was started in 2017 and already completed with 560 Government departments up to the panchayath level had been given internet connectivity. Annual maintenance contract of NII Project to M/s. Sreesastha Constructions which was extended to one more year till 20.05.2022, who have requested for further extension. The expenditure incurred on AMC and planned works, including cost of procuring materials for the same is being reimbursed on actual basis by KSITM.

7.1.4 Phase II IT Implementation under IPDS

DPR for Rs 22.86 Crore, covering 21 Towns was sanctioned on 20.02.2017. M/s. BCITS, Bangalore was appointed as the IT Implementation Agency. Go-Live declared in pilot town Kottarakara on 25 th June 2021. Implemented for continued IT enablement of distribution sector in additional 21 towns. Project completed by 31.12.2021 and eligible grant has been received from MoP.

7.1.5 Real Time Data Acquisition System for Non-SCADA Towns under IPDS

PFC had sanctioned the implementation of Real Time Data Acquisition System (RT-DAS) using FRTU at 124 substations to measure the reliability of power in terms of SAIFI and SAIDI to cover non-SCADA RAPDRP and IPDS towns. DPR for Rs 5.25 Crore, covering 125 substations of 63 Towns was sanctioned on 12.12.2018. M/s. SCOPE TNM Pvt. Ltd. was appointed as the RT-DAS implementation agency. The implementation activities in the two substations under the pilot town of Nedumangad have been completed on 22nd August 2021. Project cost is Rs. 5.25 Crore with a grant component of Rs. 3.15 Crore. Project completed by 31.01.2022 and eligible grant has been received from MoP.

7.1.6 ERP Implementation under IPDS

DPR for Rs. 42.64 crore was approved on 7.2.2018 by PFC. On 09.05.2019 Board decided to carry out customisation/development and implementation of ERP solution with the in-house development team under IT wing as part of partial turnkey basis execution sanctioned by PFC and supply, installation and commissioning of server, storage etc. through open tender process. The procurement, installation and commissioning of hardware has been completed. As part of in-house development of ERP application, development / customisation of almost all the ERP modules have been completed and are used in various wings. . Unit testing and integration related works are progressing. Parallel run in few departments within the Head office has been completed and its evaluation is progressing. Project completed by 31.12.2021 and eligible grant has been received from MoP.

8 Human Resources Management

The Chief Engineer (HRM) heads and manages the Human Resources activities for the company. The company has 31163 regular employees as on 31-03-2022, (Generation SBU: 1507, Transmission SBU: 2856, Distribution SBU: 25540 and Corporate Office: 1260). The department carries out HR functions such as (1) appointment of employees and apprentices (2) training, posting and transfer and promotion of employees (3) disbursement of salary, allowances and benefits and (4) disbursement of Terminal benefits and pension.

Activities during the year are summarized and given as below:

No	Activity	Quantum in Nos.
I	**Appointment**	
1	Recruitment through KPSC	470
2	Selected for Compassionate appointment	39
3	Sport Quota appointment	0
4	Paid apprentices appointed	0
5	Unpaid apprentices appointed	709
II	**Promotions**	
1	Promotions (up to the rank of AEE/AAO)	3939
III	**Vacancies**	
1	Vacancies reported to KPSC	261
IV	**Training**	
1	Officers deputed for foreign training	0
2	Officers deputed outside state for training	254
3	Officers deputed for training inside the State	303
4	Employees Trained in own institutes	10670

8.1 Training

HRD Cell co-ordinate training activities of Power Engineers Training and Research Centre (PETARC) at Moolamattom, Regional Power Training Institutes at Thiruvananthapuram, Kottayam, Thrissur and Kozhikode and Southern Regional Computer Training Center at Vydyuthi Bhavanam Thiruvananthapuram.

PETARC is a full-fledged training centre of KSE Board imparting technical as well as management training to the Officers of KSEB and has been recognized as Category -1 training centre by Central Electricity Authority. The Regional Power Training Institutes are working under the control of the Deputy Chief Engineer, PETARC. All the training centres are provided with adequate training facilities.

For matching the academic inspiration of the employee with the needs of the organization, KSEBL has tied up with some reputed institutions like, CPRI Bangalore, TNEB Madurai, NPTIs , PSTI

Bangalore, RECIPMT Hyderabad etc. During 2021-22, as restrictions were imposed on the conduct of classroom training programmes due to covid from May 2021 to July 2021, online trainings were resorted to. Covid restrictions imposed by health Department were strictly followed. Induction Cum Statutory trainings were conducted at PETARC following the 'Bio-Bubble Model'. Still 352 training programmes were arranged during this year. HRD Cell deputed 679 persons outside and inside the state for various training programmes during the year 2021-22. 14374 employees have been trained on various subjects through own training centres of KSEBL during the above period. In addition to the above, KSEBL has introduced numerous initiatives which helps to enhance creativity, functional aptitude, innovation, leadership quality, teamwork, etc., of the employees.

The training programmes are convened as per the training policy formulated by KSEBL by following the National Training Policy 2012 issued by Department of Personnel & Training (Training Division), Ministry of Personnel, Government of India and National Training Policy for the power sector issued by the Ministry of Power for the proper functioning of the training programmes.

- CEA approved syllabus was adopted for training of supervisors and technicians. Previously statutory training as per CEA stipulation was introduced for newly recruited graduate engineers. But now it has been extended to the graduate engineers who are already in service.
- *Sanction was accorded to execute a MoU between KSEBL and NTPC School of Business (NSB) for two years to conduct various training programmes to provide continuous learning and training to managerial level officers of KSEBL to enhance their competencies and skills with special focus on management topics. 90 Executive Engineers/Deputy Chief Engineers were deputed for attending trainings at NSB in 3 batches.*
- Many advanced trainings were imparted mostly by online to KSEBL officials in evolving technologies like Smart Grid, Renewable Energy Integration with Smart Grids, Electric Vehicles & Charging Infrastructure, Energy Storage, Hydrogen Energy, Cyber Security, Internet of Things, Seismic Safety, radical changes in disaster management strategies, safety aspects etc in collaboration with reputed organisations like Engineering Staff College of India, CBIP, NPTI, RECIPMT etc. The training helped the participants to gain in-depth knowledge in state-of-art power technologies and imparted continuing professional development in them. The trainings are given to employees of Hot Line Maintenance Wing, Kalamassery on Live Line Maintenance Techniques at NPTI, Bangalore.
- A total of 39 no.s of National Training Programmes funded by Ministry of Power, GoI through REC were conducted by 4 RPTIs during a short span of time from last week of December 2021 to the end of March 2022 for 975 C&D category employees on various variants as per the MoA between KSEBL and RECIPMT. Rs.50,40,000/- has been claimed to RECIPMT to be reimbursed for the FY 21-22 against the expenditure incurred on the above trainings.
- Also a one day 'Free in House One day Customer Support Programs for KSEBL' was organised with NTPC Ltd at Vydyuthi Bhavanam with an intention to share knowledge, best practices in power sector and to have better rapport building with the day to day dealing officials. Two free webinars were organised with support of RECIPMT, Hyderabad.

- The trainings for using various modules of ERP application of KSEBL 'Samagra' was rendered to officials concerned in time bound manner.
- Many Educational Institutions and students from Professional Colleges have identified KSEBL for undergoing their Project work/Research Work/Industrial Training/Industrial Visit etc in various Power Houses, Substations and Field Offices of KSEBL. Accordingly 1161 students from various educational institutions have undergone their Project work/Research Work/Industrial Training/Industrial Visit and an amount of Rs.20.34 lakhs had been generated from these activities during 2021-2022.
- An online portal which was set up for students to register for the industrial training fully automated the approval process and rendered reliable performance.
- An amount of Rs. 2.66 Crore has been spent towards the training and non-training expenditure during the year 2021-2022 conducted at PETARC, RPTIs and HRD Cell.

The abstract of training programmes conducted during the year 2021-22 :

Name of Training Center	No. of Program	No. of Participants	No. of Training days	Man days	Expenditure (₹)	Non training Expenditure (₹)	Total Expenditure (₹)
RPTI Trivandrum	63	3277	164	537428	1046200	422664	1468864
RPTI Kottayam	52	2402	132	317064	1498327	1455249	2953576
RPTI Thrissur	60	3723	136	506328	1296807	1539127	2835934
RPTI Kozhikode	84	3488	218	760384	1202145	792061	1994206
PETARC	20	837	146	122202	4705656	5966341	10671997
HRD	51	679	234	158886	6468606		6468606
SRCTC	22	647	27	17469	214375		214375
Total	352	15053	1057	2419761	16432116	10175442	26607558

TRAINING SESSIONS BY KSEBL

9 Board Secretariat

The Secretary (Administration) is the authorized representative of the Board for the general administration and legal matters and is delegated with powers to issue orders and sign Vakalaths on behalf of the Directors Board of KSEBL. The Secretary is assisted by Deputy Secretary (Administration), Chief Personal Officer, Public Relation Officer, Resident Engineer (New Delhi) & Assistant Engineer (Vehicle Monitoring cell). The main functions and responsibilities of this office is summarized below:

The Establishment Office (1) deals with personnel matters such as appointments, posting, transfers leave sanction , disciplinary action, pension matters of senior officers (2) correspond with Public Service Commission and Government relating appointments and recruitments (3) Clearing of audit paras regarding Board Orders, (4) Submission of answers to Legislative Assembly, Rajya Sabha, Lok Sabha, Questions and Compilations of reports to various selected Subject Committees (5) Account rendering of Corporate offices and (6) Benchmark grading system, Annual performance Appraisal Report (APAR) for promotion to and above AEE/AAO/AO .

The Resident Engineer, New Delhi is responsible for liaison with Central Government ministries and Agencies, coordination and conducting cases before Hon'ble Supreme Court and other legal fora, such as APTEL, CERC etc and act as a protocol officer and inspection officer for testing of materials. During 2021-22, the Resident Engineer witnessed about 26 Nos of material inspections at various locations in North India.

The Vehicle Monitoring Cell is responsible for purchase of new vehicles, custody, maintenance, operation of company vehicles and management of contract vehicles.

10 Safety Wing

Chief Safety Commissioner in the rank of Chief Engineer heads Safety Department. The main objective of the Wing is to maintain a persistent and systematic safety culture in the organization by reducing accidents to zero level. The Safety wing functioning in Corporate Office have jurisdiction over all wings of KSEBL.

Safety day was celebrated on 26.6.2021 for giving safety awareness among staff and public. During the year 23873 safety inspections were conducted observing COVID protocol. Stage II of 'Operation Shudhi' to reduce accidents by clearing creepers and vegetation from electric lines and installation is continuing. A manufacturing unit for Innovative Devices, Equipments and Accessories (MIDEA) project on pilot basis started functioning from January 2022 at the premises of 66 KV substation Cherthala.

The details of fatal and non-fatal accidents during 2021-22 are listed below:

Board's Installation (Nos.)		Consumer Premises (Nos.)	
Fatal	Non-Fatal	Fatal	Non-Fatal
161	219	128	25

11 Supply Chain management Department

The Supply Chain Management Department is headed by Chief Engineer (SCM) and reports to Director (Planning, Safety & SCM). The department is responsible for preparation of yearly Purchase Plan, procurement of Centralized distribution and transmission materials and raw materials required for the fabrication of line materials, allocation and monitoring and review of flow of materials.

KSEBL approved the Consolidated Purchase Plan for 2021-22 for an amount of Rs.1110.03 Crore which includes Rs.916.47 Cr for Distribution wing, Rs.185.16 Cr for Transmission wing and Rs.8.4 Cr for Generation wing. Technical specification of 150 Nos. centrally procured items in transmission and distribution sector were uploaded in KSEBL website. 121 Nos. of Purchase Orders were issued during 2021-22 for a total amount of Rs.671.82 Cr including Rs.120.76 Cr for PSC poles. During the year, 52 Nos. of e-auction were conducted for the disposal of 394 lots of selected scrap items through the web portal of M/s.MSTC Limited, and realised Rs. 120.13 Crore. Vendor registration phase II (RFVR-II), from reputed Original Equipment Manufacturers, for 57 nos. of centrally procured materials for getting registered with KSEBL for a period of three years and the process of registering the vendors is in progress.

12 Renewable Energy and Energy Savings Department

Renewable energy &Energy savings is headed by Chief Engineer (Renewable Energy and Energy savings) who reports to Director (REES, SOURA, Sports & Welfare), The activities of the department include works under RE projects and Innovation. The major achievements during the year are listed below:

Sl.No.	Achievements during 2021-22
I	Filament Free Kerala (FFK)
	Procured 17.5 lakh LED bulb purchased and distributed 27.03 lakh bulb (Including the stock from the previous year) to 3.77 lakh consumers 1 crore LED bulbs
II	Electric Vehicle Charging Stations
	Refer 2.5.4 . As per Govt policy on EV promotion, KSEBL purchased 65Nos Electric Cars and added to KSEBL official fleet
III	Renewable Energy Data Centre
	Work of installation, testing & commissioning (Phase 1) of data acquisition systems for performance monitoring of Solar PV systems at Renewable Energy Data Centre in the office of Chief Engineer (REES), Vydyuthi Bhavanam, Thiruvananthapuram with Data server commissioned on 03-8-2021.
IV	Solar projects
1	Supply, erection, testing and commissioning of grid Tied GM solar plant owned by KSEBL with total installed capacity of 8MWp (4MWp - Brahmapuram, 3MWp - Kanjikode, 1MWp - Agali) started; 4 MW (Agali & Kanjikode) commissioned in 2021-22 and 4MW Brahmapuram project work is in progress.
2	KSEBL invited tariff based bidding for 40MW to implement PM KUSUM Scheme under Component A and 5.5 MW work awarded to farmers and new tender invited for balance 34.5MW during 2021-22 FY. For feeder level solarisation under Component C - 11MW tendered under EPC model (Investment by KSEBL) and 6MW tendered for tariff based bidding by utilizing KWA land at Moogilmada, Palakkad
3	For West Kallada Floating Solar Project (50 MW) by M/s NHPC, in principle approval was received from MNRE for developing as Solar Park. Land Document verification in progress. Comfort letter being issued by KSEBL.
4	KSEB Ltd has invited Request for Qualification (RFQ) to implement Floating Solar projects works minimum 100MW from at least 3 reservoirs in 8 existing reservoirs of hydroelectric projects and 2 reservoirs of Kerala Water Authority. The bidder should Design, Build, Own and Operate the projects for a period for 25 years. Tariff based bid is in progress
5	Solar Plants installed by KSEBL during this FY on EPC basis for LSGD/Other institutions-Commissioned – 1.5MW, Work in progress during the FY – 0.9 MW
V	Wind Projects
1	Tariff Based competitive bid for 100 MW wind power development in Kerala under BOO model has been invited. Four bidders participated in the bid and Letter of Intent has been issued for installing 35.5MW wind power projects which is expected to be completed in 2023-24.
VI	Battery energy storage system (BESS)
10	BESS is proposed to be set up at 220kV Substation, Mylatti with 10 MW / 20 MWh output and for Two Cycles per day thereby handling 40 MWh output per day. E-tender for EoI was invited during the FY2021-22 and E-tender for financial bids was invited in 22-23 year

Sl.No.	Achievements during 2021-22
	which is under detailed evaluation. The project shall proceed after obtaining approval of KSERC.
	Other Achievements
	State Energy Conservation Award 2021 from Energy Management Centre Rooftop Enabler of the year 2022 award organized by EQ International Magazine RE Assets India Award 2022 for excellence in rooftop solar plant implementation

Completed Solar Projects as on 31.03.2022			
No.	Name of the projects	Installed capacity (MW)	Date of completion
I	**Owned by KSEBL**		
1	Kanjikode, Palakkad	3	19-02-2022
2	Agali Palakkad	1	22-01-2022
II	Government Buildings		
1	District Panchayath,TVM (6 locations)	0.315	10-3-2022
2	LSGD, District panchaytah, Kottayam	0.022	16-4-2021
3	Jilla panchayath, Kollam, 4locations	0.090	13-12-2021
4	Attingal Muncipality 2nd phase	0.021	15-01-2022
5	Jilla panchayath, Kannur, 2nd phase,29 locations	0.450	16-03-2022
6	Jilla panchayath,Palakkad Govt.goat farm, Agali	0.500	03-02-2022
7	Jilla panchayath,Kasaragode,7 locations	0.070	20-03-2022
8	LSGD Chengalayi	0.010	09-03-2022
III	On grid consumers as on 31.3.2022	207.5MW	

On-going Solar Projects as on 31.03.2022			
Sl No	Name of the project	Installed capacity (MW)	Target for completion
1	Nenmara	1.5	2022-23
2	Ettumanoor, Kottayam	1.00	2022-23
3	Brahmapuram Ernakulam	4	2022-23
4	West Kallada Floating Solar by NHPC	50	2022-23
5	PM KUSUM	40 in Component A 11 in Component C	2022-23

	Status of ongoing Solar Projects in Government Buildings as on 31.03.2022		
Sl. No	Name of the Project	Capacity (kWp)	Target for completion
1	Jilla panchayath,Kozhikode(21 locations)	330	2022-23
2	District panchayath,TVM (1 location)	70	2022-23
3	Attingal Muncipality 3rd phase	56	2022-23
4	Jilla panchayath,Malappuram,11locations	110	2022-23
5	Jilla panchayath,Kasaragode,5 locations, 1st phase	245	2022-23
6	Calicut University	57	2022-23

7	LSGD Malabar 1	60	2022-23
8	LSGD Malabar 2	305	2022-23
9	Kerala State Library Council, TVM	15	2022-23
10	Arogya Bhavan & KSDMA	50	2022-23
11	Collectorate building	380	2022-23
TOTAL		**1678**	

13 Corporate Planning

Planning Wing was headed by Deputy Chief Engineer (Commercial & Planning) till 04/2021 and Deputy Chief Engineer (Corporate Planning) there after, who reports to Director (Corporate Planning, Generation Ele, SCM & Safety) till 5/2021 and Director(Transmission, System Operation, Planning & Safety) there after, in matters related to planning functions. The assigned responsibilities of the wing can be broadly classified as (1) preparation of plans, (2) liaising with Government on policies, and corporate matter (3) monitoring of plan progress and reporting, (4) submission of various reports to Board of Directors, Government and external agencies and (5) publication of annual reports of KSEBL viz. Annual Administration Report(AAR) and Power System Statistics (PSS). However, as a matter of convention, functions which are not specifically assigned to any one of the three Strategic Business Units (viz. Generation, Transmission or Distribution) are also referred to this wing. The wing is providing reports to State and Union Government, and to various agencies like CEA, PFC, REC, Planning Board etc. During the FY 2021-22, Planning wing prepared and consolidated data for Economic Review 2022 (to State Planning Board) and All India Electricity Statistics – General Review 2023 (to CEA). Input notes for Budget Speech, Governor's address, Governors' Conference, MPs' Conference, Collectors' Conference, Demand for Grant etc were also provided. Quarterly updation of UDAY Portal was also done

The Planning wing prepared the Annual Plan of KSEBL for FY 2022-23 with a total outlay of ₹ 3551.54 Cr and the revised outlay for FY 2021-22 for ₹ 3492.57 Cr. Annual Administration Report 2019-20 was published in KSEBL website. Compilation of Annual Administration Report 2020-21 and that of Power System Statistics for FY 2018-19, 2019-20 and 2020-21 was completed.

Rollout of 5G: Government of India had announced rollout plan for 5G Small-Cells. KSEB, having wide distribution network covering every nook and corner of the State, viewed this as a business opportunity and proposed to Department of Communication, GoI, TRAI, various Telecom Service Providers and Network Service Providers to host an Industry Consultation to identify the requirements of various stakeholders in connection with rollout of 5G in the country. The meeting was convened by Secretary (Telecom) on14.12.2021. Planning wing coordinated to establish the Proof of Concept of utilising distribution poles to house 5G communication equipment.

Tauktae: Power distribution system in the State was disrupted in the Cyclone Tauktae, in May 2021. Power supply was completely disrupted. More than 40 lakh consumers were affected by the power outage. The Planning Wing of KSEB coordinated the activities of state-wide control room and mission centre set up to synchronize the restoration activities.

Comments on Draft National Electricity Policy 2021: In April 2021, the Ministry of Power, Government of India published draft of the National Electricity Policy 2021for which comments and

clause wise recommendations were furnished.

Power Quality Monitoring, Analysis and Benchmarking: KSEB had earlier not attempted a systematic study to monitor the quality of Power being delivered. KSERC, in 2019, published a draft regulation which mandates the utility to do the same. KSEB invited Expression of Interest for shortlisting firms intending to undertake 'Power Quality Monitoring, Analysis and Benchmarking' of its Distribution. Request for Proposal was sought from seven shortlisted firms in May 2021 and work order was issued on 30.09.2021.

NABARD-RIDF: KSEB has implemented six projects - 4 grid connected solar plants and 2 SHEPs, under NABARD-RIDF Scheme. Planning wing acts as Nodal Office for coordinating with Power & Finance departments in GoK and also with NABARD. Ten reimbursement claims aggregating to ₹1655.56 Lakh was forwarded to the Government during the review period.

13.1 **State Support Schemes**

Government of Kerala had been allocating funds for promoting innovations related to the sector energy savings. From the year 2013-14 onwards the amount has been set aside under Innovation fund and ESCOT. In the State Budget-2021-22, an amount of ₹ 23.20 cr was provided as State share for works under Innovation fund and ESCOT. The works included under Innovation fund in the State budget were Implementation of Enterprise resource Planning (ERP), Tidal and Wave Energy Projects, VGF- balance amount for spill over works and Other new renewable energy projects. Administrative sanction was obtained for ERP for ₹ 11.37 Cr and VGF for West Kallada for ₹ 11.83 Cr during the year. Even though, utilization certificate for ₹ 11.37 Cr against the amount utilized for ERP during 2021-22 was forwarded to GoK, no amount was released during the year.

14 Commercial & Tariff

Commercial and Tariff department is headed by the Chief Engineer (Commercial & Tariff). Commercial Department is primarily responsible for purchase of power and sale of excess power. Major functions of Commercial departments are given below:

- Inviting tenders related to purchase of long/short/medium term power including renewable power (Solar/wind), Sale, banking of power, evaluation of bids, obtaining approval of Board, issuing LoI, execution of agreement and participating in power procurement tenders.
- Monitoring of transmission corridors and matters related to open access
- Execution of Transmission Service Agreements
- Payment of Transmission and other Charges. Collection of energy charges, open access charges, transmission, wheeling charges etc. for sale of power to other utilities, traders.
- Settlement of accounts related to energy charges, open access charges, transmission, wheeling charges, trading margins etc. related to banking arrangements.
- Providing Techno - Commercial support to legal cell.
- Commercial matters related to SRPC/TCC meetings, Standing Committee meetings, LTOA connectivity meetings.

14.1 **Power Procurement and sale during 2021-22**

The following Long Term Power Procurement and Banking and swapping arrangement were made during the year:

14.1.1 Purchase of Power

14.1.1.1 Long Term Power Procurement

i KSEBL has entered into new Power Purchase Agreements/Power Sale agreements during this period for the purchase of renewable power as detailed in the table below:

Sl.No	Name of Station	Date of PPA/ Initialed PPA	Capacity MW	Tariff, Rs./kWh	Remarks
1.	M/s NTPC Floating Solar Kayamkulam	31.03.2022	92	2.94	PPA executed
2.	T P Sourya (TATA) Solar	8.12.2021	110	2.44	PPA executed

14.1.1.2 Medium Term Power Procurement

Period		Bid Qtm MW	Duration hrs	Offered Qtm MW	Price discovered Rs/kwh	Trader
From	To					
01-01-2022	30-06-2025 (From January to June)	270	RTC	270	3.26	M/s PTC India

14.1.1.3 Short Term Power Procurement

Purchase through DEEP: To meet the Summer 2021 demand KSEB Ltd had purchased RTC and peak power through DEEP portal from 01-04-2021 to 31-05-2021 as follows:

Banking of power during Summer 2022

Name of the Bidder	Supply Period	Quantum MW	Duraion (Hrs)	Return %	Return period	Return duration	Trading margin (ps/kwh)
APPCPL	Mar-22 (01.03. 22 to 31.03.22)	100	18.00 to 24.00	102.9%	15.06.22 to 30.06.22	23.00 to 01.00	2.75
						01.00 to 04.00	
					01.07.22	23.00 to 01.00	2.75

					to 15.07.22	1.00 to 4.00	

14.2 **Tariff and Regulatory Affairs Cell (TRAC)**

TRAC headed by Deputy Chief Engineer (TRAC), is responsible for preparing and submitting petitions for approval of income and expenses - called Annual Revenue Requirement (ARR), Expected Revenue from Charges (ERC) - and Tariff for various SBUs of the company before the State Regulator. The cell is also responsible for submitting capital expenditure plan, quarterly fuel surcharge petitions, performance and compliance reports to the Commission. Petitions before various other authorities such as Central Regulatory Commission, Hon'ble Appellate Tribunal, Hon'ble High Court and Hon'ble Supreme Court related to power purchase and tariff are dealt by TRAC. This cell also deals with amendments of the Electricity Act, Rules, Regulations and Policies of the Central and State Government and Power Supply Agreements related to licensees within the state. A brief summary of activities carried out by TRAC during FY 2021-22 is given below.

Petitions, counter affidavits, comments and reports filed before KSERC by TRAC during the year are briefly listed below:

No.	Subject	Period
I	**Petitions (before KSERC)**	
1	Implementation of OTS- 2022	2022
2	Fuel surcharge petitions	Four quarters of FY. 2021-22
3	Capital investment petition for 3 SBUs of KSEB Ltd. Dated 15.12.2021	FY 2022-23 to FY 2026-27
4	MYT Petition dated 31.01.2022 of SBU-G, SBU-T and SBU-D, Capital investment petition dated 15.12.2021	FY 2022-23 to FY 2026-27
5	Tariff petition dated 10.02.2022	FY 2022-23 to FY 2026-27
6	True up petition for 2019-20 and 2020-21	FY 2019-20 & FY 2020-21
7	For the approval of various relief measures announced by the State Government in connection with Covid-19 pandemic	2021-22
II	**Review petition (before KSERC)**	
8	Against the True-up Order for FY 2017-18	FY 2017-18
III	**Reply/ Clarification/ Counter affidavit/ Comments**	
9	Prepared and furnished data of KSEB Ltd. For Tenth Integrated Rating Excercise	FY 2021-22
10	Prepared the Technical Particulars	FY 2021-22

15 Internal Audit Department

Internal Audit Department performs post audit, pre audit and pre-check functions through various offices in corporate office, 3 Pre-check units and 23 Regional Audit Offices. There are three pre check units at Kothamangalam, Kozhikode and Thrissur under RCA Office in Headquarters which is headed by an officer on deputation from the office of Accountant General. The department is headed by Chief Internal Auditor and reports to Director (Finance). The functions of various offices under internal audit department are given below:

No	Office / Section	Function
1	RCA Office	Pre-check of capital and R&M bills
2	Work Audit Section	Audit of works, purchase and miscellaneous bills
3	EAS Section	Audit of establishment bills.
4	Pay fixation section	Audit of pay and allowances
5	Pension Audit Section	Audit of Pension fixation.
6	GPF Section	Maintenance of GPF.
7	ARI Section	Interface between KSEBL and Accountant General/Govt./PUC.
8	RAO Monitoring Section	Review and follow up of audit reports of 23 Regional Audit Offices.
9	Arrear Clearance Cell	Evaluation and consolidation of arrears of EHT/HT/LT consumers

A summary of activities of each office or section carried out during FY 2021-22 are given below:

Section	Value of Bills processed / quantum	Value of objections raised	Value of Recovery/Savings
RCA	₹ 1471.08 Crore	₹ 15.32 Crore	₹ 4.78 Crore
WAD	₹13.76 Crore		
Regional Audit Offices	643 Audit Reports	₹ 32.69 Crore	₹ 26.03 Crore
Pension Audit	2990 PPO/Service Books verified	₹ 35.02 Lakh	₹ 25.27 Lakh
Pay Fixation	10511 Service Books verified	₹ 61.24 Lakh	₹ 57.78 Lakh
Power Purchase Audit	₹ 185.58 Crore	₹ 54.83 Crore	
GPF	Closure 1498 Nos. (₹ 230.62 Cr) NRA audited - 8966 Nos (₹277.64 Cr)	NA	NA

Internal audit conducted by Regional Audit Offices, Pay Fixation and Pension Audit resulted in the realisation of ₹ 26.03 Crore, ₹ 57.78 lakh, ₹ 25.27 lakh respectively. Pre-check carried out by the Resident Concurrent Audit Wing saved ₹ 4.78 Crore.

16 Special Officer (Revenue)

The billing and collection monitoring of 6923 High tension and Extra High-Tension consumers, Licensees etc and allied works are carried out by the office of Special Officer (Revenue). SOR directly reports to Director (Finance). Activities of this office are (1) Monthly revenue billing and allied works of HT/EHT consumers, licensees, captive power plants and railway traction, (2) Monthly

billing of interstate wheeling charges and reactive energy charges, (3) Collection of Security deposit and Additional Security Deposit and its interest adjustments and accounting, (4) Issuance of disconnection/ reconnection notice to defaulters and (5) follow up of revenue recovery and court cases pending before various courts/other forums.

During the financial year 2021-22, an arrear amount of ₹ 2.45 Cr with Principal amount of ₹ 1.58 Cr and Interest amount of ₹ 87 Lakh had been collected through One Time Settlement Scheme 2022.

Details of HT, EHT Consumers and Licensee with consumption are provided as Annexure 8.

17 Public Relations Department

Public Relations Department manages corporate communication activities of KSEBL through effective use of print, electronic and new media. The Department, headed by Public Relations Officer (PRO), has three wings, namely 1) Mass communication and Advertisement 2) Social Media 3) Event Management, Hospitality and Front Office. In addition, PRO is the State Public Information Officer to the Chairman and Managing Director and other Directors of KSEBL. PRO also acts as the nodal officer of Malayalam Official Language in KSEBL.

Mass communication and Advertisement: All media campaigns, advertisements, statutory notifications, News items related to power sector in general and KSEBL in particular published in all major dailies and regular press releases are compiled and managed by this wing of PR Department. In 2021-22, the wing managed 5 different media campaigns through print, electronic and new media. As part of these campaigns, it aired 9 Video advertisements and 4 L Band advertisements on major Television News Channels, broadcasted 15 Radio advertisements on FM Channels and 1 advertisement on All India Radio, published 9 display advertisements in news papers and 10 display advertisements in other publications and 2 advertisements through new media. 28 episodes of weekly video News Magazine titled Spandanam covering all the activities of KSEBL were broadcasted through major news channels during 2021-22. The wing also published 487 tender notices in newspapers and 15 statutory notices in the Government Gazette. The total advertisement expenditure was Rs. 2.38 lakhs.

Social Media : This wing interacts with the public through different Social Media platforms viz. Facebook, Instagram, Twitter and Youtube. Facebook page of KSEBL with a follower base of 5.7 Lakhs is one of the most popular among the pages of public sector undertakings of Kerala. Videos and posters related to various subjects like Electrical Safety, Energy Conservation, Customer Care,1912 Call Center, Services at Doorsteps, Ease of Doing Business etc. are being posted in these official social media handles on a daily basis. The complaints and suggestions received through the inbox are being forwarded to the concerned departments.

Event Management, Hospitality and Front Office: PR Department organizes conferences, press meets and other events as and when necessary. Exhibitions are arranged during festivals and trade fairs to showcase the achievements of KSEBL and to create awareness among the public on the usage of electricity, electrical safety and e-initiatives. Earth Drive, an event to uphold the concept of green energy by flagging of 65 Electric Vehicles in connection with the 65th Anniversary of KSEBL,

on March 7th , 2022, attracted huge media attention. Two day Cartoon Camp from 23rd to 24th March organized by the Department in association with Kerala Cartoon Academy focusing on power sector was also a major highlight.

Other Activities: The department manages the front office of *Vydyuthi Bhavanam*, Thiruvananthapuram and organizes the farewell function of the employees retiring from the Headquarters.

18 Personnel Department

The Personnel Department is responsible for carrying out the personnel management functions of the company. It include Industrial Relations and Labour Welfare activities, that is, policies and norms related to employee transfer, collective bargaining for wage and Salary package, conciliations, arbitration, adjudication, payment of Compensations, welfare activities related to Women and Physically challenged employees, petty contractors, contract workers, fixation of Dearness Allowance, implementation of biometric attendance system and management Employee Welfare Fund. The department is headed by a Personnel Officer and assisted by a Regional Personnel Officer.

The activities conducted during the year are briefly given below:

- Framed norms for the General transfer of workmen and officers during the year
- Measures taken for the implementation of Employees State Insurance Scheme (ESI) in KSEBL to the eligible employees engaged by KSEBL, through contractors
- Routine review of SC/ST representation done which illustrates 12.72 % employees belong to SC community and 2.55 % belong to ST community among regular employees of the company.
- Proposal for revision of TA & DA rates of KSEBL employees placed before the FTD for sanction
- Accident Relief Assistant Scheme for one year, for the year 2021 was introduced through KSEB EWF
- The following accident compensation claims were settled during the year

No.	Description	Amount (₹)
1	Fatal and non fatal accidents to petty contractors & workmen	1,13,49,115
2	Fatal and non fatal accidents to employees	20,82,550
3	Medical claims reimbursement to the accident victims	1,22,77,672
4	Claims to electrical accidents to Public	2,23,92,000
5	Claims to electrocution to cattle	5,78,750

- Details of Employees Welfare Fund disbursed are shown below.

No.	Description	Employees	Amount (₹)
1	Retirement benefit	1435	7,28,01,800
2	Legal heirs of deceased employees	106	9,84,46,840
3	Voluntary retirement benefit	1	42,416
4	Resignation benefit	1	13,950
5	Educational awards to students (Class X)	802	16,08,804
6	Educational awards to students (Class XII)	492	14,72,490
7	Death Benefit from Accident Relief Assistance Scheme (ARAS)	8	80,00,000

19 Legal Department

Legal Department is headed by the Legal Advisor and Disciplinary Enquiry Officer (LA & DEO), a District Judge from the judicial Service on deputation, reports to Chairman and Managing Director. The main function of Legal Department is to conduct cases filed by and against KSEBL before various courts including Hon'ble Supreme Court, Judicial Fora and Tribunals.

KSEBL has engaged 79 Standing Counsels for conducting cases before Lower courts within the state, Two Senior Standing Counsels and Seven Standing Counsels for conducting cases in the Hon'ble High court of Kerala, and one Standing Counsel for conducting cases in the Hon'ble Supreme Court of India. Nodal Officers (litigation) appointed in Electrical Circles liaison with the standing counsel and field officers to monitor the conduct of Board's cases before various legal fora.

LA & DEO gives legal advice and clarification on the legal matters on files, important legal issues taken up by field officers and scrutinize reports of title deeds for the acquisition of properties. Agreements executed between KSEBL and the contractors, power purchase agreements and tender documents are vetted by LA & DEO. Nominee of LA&DEO attend the pre-qualification committee meetings. LA&DEO also conducts enquiries into the allegations against Board's officials, referred by the Chairman and Managing Director.

The Legal Liaison Office at Ernakulam and Resident Engineer at New Delhi monitors and conducts cases before Hon'ble High Court and Hon'ble Supreme Court & other quasi-judicial Appellate Fora at New Delhi respectively. Major Activities of the wing during 2021-22 are briefed in the below Table.

No of cases as on 31.3.2021	No. of cases filed during 2021-22	No. of cases disposed during 2021-22	No. of Adalaths conducted during 2021-22	No. of cases settled during 2021-22	Amount Rs.	
					Disbursed during 2021-22	Realized during 2021-22
9764	2142	1724	55	204	90,28,100	9,86,598

20 Land Management Unit (LMU)

The Land Management Unit (LMU) was constituted on 03.03.2014 for effective inventorisation of vast areas of land in possession of the company spread over the state and to provide guidance for the effective management of land under its control. The land developed on KSEBL are in any one of the manners viz. a) through land acquisition b) through land purchase c) through land assignment d) through land transfer e)through land relinquishment f)through lease (land developed by KSEBL on lease (Land developed by KSEBL on lease are mainly forest lands)

Steps were initiated to take stock of all the land parcels and inventorise in a systematic way. The Land Management Unit prepared a detailed format to capture about 25 parameters pertaining to each of the land parcels and the feedback was captured in special software prepared by the KSEB IT wing and the above database were made available online to restricted employees of KSEBL. An extent of 1683.0831 Ha has been mutated in favour of KSEBL in the financial year 2021-22.

Major achievements in FY 2021-22 include:

1. An Extent of 20.0627 Hectares (49.5549 Acres) of land in prime locations got mutated in favour of KSEBL.
2. Copies of Awards relating to various landed properties of KSEBL were traced out from different sources and uploaded in the database

21 Vigilance Department

Vigilance Department of KSEBL was established to investigate corruption and misconduct of employees, detection of Power theft and misuse by consumers and maintaining security of critical assets of KSEBL. The department is headed by Inspector General of Police on deputation. Now, Superintendent of Police is acting as the Chief Vigilance officer and reports directly to the Chairman & Managing Director. The department has two wings, viz. Vigilance and Anti-power-theft Squad.

21.1 Vigilance wing

Vigilance wing conducts enquires related to misconduct and corruption by employees of KSEBL such as Pilferage of energy, Unauthorised connections, Under Billing, Misuse, Misappropriation and theft of stores & funds and other properties etc and clearances for employee promotion pensionary benefits etc. Vigilance also process appeals preferred before Chairman & Managing Director, conducts surprise checks and conduct cases with CMD or CVO as respondent. CVO also advice on security measures of projects and other important installations.

A summary of activities of Vigilance office during 2021-22 is given below:

No	Item	Quantum
1	Petitions received	564
2	Enquiry ordered	564
3	Completed Enquiry	455
4	References handled	4146
5	Complaints received over phone	24
6	Complaints rectified	24
7	Details furnished on Pending cases /Disciplinary proceedings	1855

21.2 Anti Power Theft Squad (APTS)

APTS team consists of two Executive Engineers under the Deputy Chief Engineer, APTS, Thiruvananthapuram, co-ordinates the activities in Southern Region and Northern Region. The Head Quarters of these 2 regional units are located at Thiruvananthapuram and Kozhikode. 14 APTS units operate in various parts of State having Head Quarters at Thiruvananthapuram, Kollam, Thiruvalla, Alappuzha, Kottayam, Ernakulam, Vazhathope, Thrissur, Palakkad, Malappuram, Kozhikode, Kalpetta, Kannur and Kasaragod.

APTS now operate in a highly technical high platform with sophisticated testing equipments like electronic reference standard meters with theft analyzing capability and Meter reading instruments for downloading tamper data from memory of consumer meter. APTS Units Thiruvananthapuram, Thrissur and Palakkad are now engaged in solar testing and inspection work also.

A summary of activities of APTS team during 2021-22 is given below:

No	Item	Quantum
1	Total numbers of inspections	33558
2	Irregularities detected	2516
3	Theft cases	357
4	Short Assessment cases	309
5	Malpractice cases	1181
6	Inspection on HT premises	203
7	Irregularities detected	7
8	Total assessed amount	₹ 12.49 Cr
9	Amount Realised (incl. arrear)	₹ 10.14 Cr

22 Awards & Recognition

- Kerala SLDC bagged "LDC Excellence Award" of ICPS (International Conference on Power Systems) in 2021-22 for outstanding contributions in market operation, grid monitoring and better service to stake holders
- Kerala SLDC bagged the "E-Goverance Champions Award" instituted by the Indian express Group as part of "Technology Day Conference 2021"

23 Position of Kerala in various Ratings

23.1 Consumer Service Rating of Discoms (CSRD)

CSR activity for DISCOM was introduced in the year 2021 for the Financial Year 2020-21 by Ministry of Power, Government of India. M/s.REC Ltd is entrusted with CSR exercise with an aim to facilitate peer learning amongst DISCOMs and to enable benchmarking of services provided to consumers by DISCOMs across the nation. The DCSR has been developed across four key dimensions which are central to enhancing level of consumer services. This includes Operational reliability (45% weightage) and Consumer service (55% weightage) which includes connection and other services; metering, billing, collection linked services; fault rectification and grievance redressal.

Ministry of Power, Government of India released the 2nd edition of CSRD aimed at sensitising the DISCOMs on their performance across some of the most crucial service parameters from consumers perspective for the FY 2021-22. The positions secured by Kerala in various parameters is as below:

Operational Reliability (OR)	Connections and Other Services (CoS)	Metering, Billing and Collections (MBC)	Fault Rectification & Grievance Redressal (FRGR)	Aggregate Grades
A	A	C	A	B+

23.2 Integrated Rating & Ranking : Power Distribution Utilities

Ministry of Power, Government of India released the 11th Annual Integrated Rating and ranking Exercise covering 71 power distribution utilities for the rating period FY 2021-22. The report captures the outcomes and insights as per the framework approved by the Ministry of Power, with Power Finance Corporation Limited (PFC) as the nodal agency. KSEBL score improved significantly from 28.5 (10th rating) to 60.8 (11th rating) resulting in improvement of grade from "C" to "B". Major improvements were made in ACS-ARR gap, DSCR, Leverage, Loss takeover by State Government during FY 2021-22. The 11th integrated rating methodology evaluates discom performance against three main parameters viz. financial sustainability (75%), Performance Excellence (13%) and External Environment (12%). KSEBL scored 47.9 % for financial sustainability, 11.9 % for Performance Excellence and 8.5 % for External Environment.

Summary of Performance across Metrics

ACS-ARR gap(out of 35)	Distribution loss(out of 2)	Billing Effi-ciency (out of 5)	Collection Effi-ciency (out of 5)	Subsidy realised (out of 4)	Government Dues (out of 3)
35	**2**	**5**	**4.9**	**4**	**1.5**

Key Strengths

Financial Sustainability

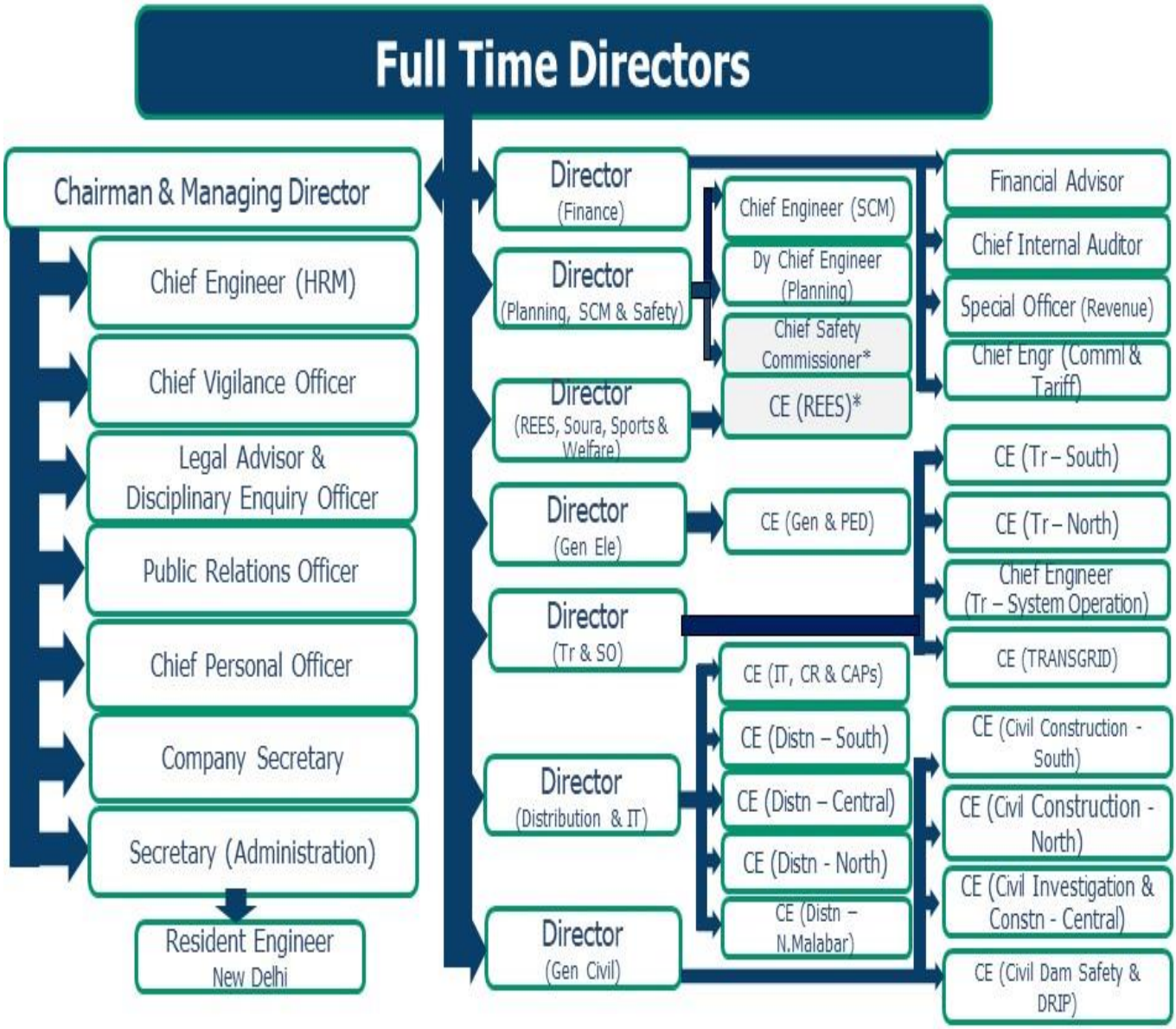
- Amongst the top 25% performers in ACS-ARR Gap (cash adjusted)
  - Positive PBT (4% of Revenue booked)
  - High Total Subsidy disbursement – 100% of Subsidy booked
- Positive cash adjustment due to Trade Receivables
- Days Receivable currently at 53 days as against National median of 71 days
- Healthy Cash adjusted Leverage, currently at 4.92

Performance Excellence

- Collection Efficiency currently at 100%
- Amongst the top 20% performers in Billing Efficiency currently at 92.3%
- Achieved SERC - approved Distribution loss target

ANNEXURES

ANNEXURE 1: Organisation Chart



ANNEXURE 2: Fact Sheet

1. Asset details

Generation Assets

- 17 Gated Dams out of 61 Dams
- 40 Hydro Electric Projects
- 1 Wind Station
- 2 Thermal Stations
- KSEBL Solar installed capacity - 30.28 MW
- Installed capacity from KSEBL stations – 2258.62 MW

Transmission Assets

- 400 kV Substation 1 No
- 220 kV Substation 29 Nos
- 110 kV Substation 176 Nos
- 66 kV Substation 56 Nos
- 33 kV Substation 160 Nos

Distribution Assets

- Distribution Transformers 85594 Nos
- HT lines 68173 km
- LT lines 299538 km
- Consumers 134.22 Lakhs

Charging Stations

- Fast Charging Stations 63 Nos
- Pole Mounted Chargers 1165 Nos.

Annexure 3: Highlights of Kerala Power system

Total Installed capacity	3145.98 MW
Storage as on 01.04.2021	2075.099 MU
Inflow during 2021-22 (Gross)	10655.02 MU
Storage as on 31.03.2022	2079.706 MU
Total generation (excluding Auxiliary)	9763.05 MU
Auxiliary consumption	95.22 MU (Generation) 20.77MU (Substations)
Purchase from IPPs inside the State	453.90 MU
Power injection by Captive Plants / Prosumers	299.84 MU
Purchase through Generators through long term contracts	7919.93 MU at Kerala Periphery
Purchase through short term contracts	687.21 MU at Kerala Periphery
Purchase through Power exchange	64.24 MU at Kerala Periphery
Power availed through Swap	52.76 MU at Kerala Periphery
Swap Return	106.28 MU at Kerala Periphery
Sale through Power exchange (at SR)	2094.41 MU at Kerala Periphery
CGS share	9505.47 MU at Kerala Periphery
Power availed through DSM(Net)	-95.68 MU
Total Power purchase	18887.67 MU at Kerala Periphery
Total Generation and power purchase	29295.77 MU
External PGCIL loss	645.05 MU
Energy sale inside the state by KSEB	23499.59 MU
Energy consumption within state	23983.42 MU (including open access)
Open access purchase at Kerala periphery	268.69 MU (253.37 MU at consumer end)
Energy injection at generator end for sale outside	49.2805 MU(44.0422MU at KSEB Periphery)
T & D loss in KSEBL system	2719.77 MU; 10.19(%) (including open access)
Maximum Demand recorded	4380.04 MW (on 17.03.2022)
Maximum Demand recorded during 2021-22	4380.04 MW (on 17.03.2022)
Unrestricted peak demand	4380.04 MW
Maximum daily consumption recorded	89.62 MU (on 15.3.2022) (All time high)
Length of EHT lines(As on 31.3.2022) (upto 66 KV)	10620 Ckm
Length of HT lines(11/22/33KV)(As on 31.3.22)	70660 Ckm
Length of LT lines(As on 31.3.2022)	2,99,538 Ckm
No. of EHT substations(As on 31.3.2022)	270 Nos.
No. of 33 kV substations(As on 31.3.2022)	160 Nos.
No. of Distribution transformers(As on 31.3.22)	85594 Nos.
Total consumers	134.23 Lakhs

ANNEXURE 4: Details of Dams of KSEBL

Sl.No	Name of the Dam	Name of reservoir/PONDAGE	District in which dam is situated	Full reservoir level (m)	Whether gated dam or nor (Yes/No)
1	Pamba	Pamba	Pathanamthitta	986.33	Yes
2	Anathode	Kakki		981.46	Yes
3	Kakki			981.46	No
4	Upper Moozhiyar	Upper Moozhiyar		983	No
5	Kullar	Kullar		1136.9	No
6	Meenar I	Meenar I		1075.94	No
7	Meenar II	Meenar II		1041.5	No
8	Gavi	Gavi		1136.9	No
9	Kochupamba	Kochupamba		935.73	No
10	Ranni Perunad	Ranni Perunad		18.10	No
11	Perunthenaruvi	Perumthenaruvi		51.00	No
12	Moozhiyar	Moozhiyar		192.63	Yes
13	Veluthode	Velithode		192.00	no
14	Lower Meenmutty	Lower Meenmutty	Thiruvananthapuram	62.75	No
15	Idukki	IDUKKI	Idukki	732.62	No
16	Cheruthoni			732.62	Yes
17	Kulamavu			732.62	No
18	Kulamavu saddle (Near Junction)			732.62	No
19	Kulamavu saddle(right bank)			732.62	No
20	Erattayar	Erattayar		754.38	Yes
21	Kallar	Kallar		824.48	Yes
22	Narakakkanam	Narakakkanam		768.00	No
23	Azhutha	Azhutha		956.00	No
24	Vadakkepuzha	Vadakkepuzha		723.25	No
25	Kuttiyar	Kuttiyar		795.50	No
26	Vazhikkadavu	Vazhikkadavu		936.70	No
27	Kundala	Kundala		1758.69	Yes
28	Mattupetty	Mattupetty		1599.59	Yes
29	RA Head works	RA Head works		1450.92	yes
30	Sengulam	Sengulam		847.65	No
31	Ponmudi	Ponmudi		707.75	Yes
32	Anayirankal	Anayirankal		1207.02	No
33	Parakkadavu	Parakkadavu		722.30	No

Sl.No	Name of the Dam	Name of reservoir/PONDAGE	District in which dam is situated	Full reservoir level (m)	Whether gated dam or nor (Yes/No)
34	Mullakkanam	Mullakkanam		717.5	No
35	Kallarkutty	Kallarkutty		456.59	Yes
36	Viripara weir	Viripara weir		1141.59	No
37	Lowerperiyar (Pambla dam)	Lower Periyar (Pambla dam)		253	Yes
38	Vellathooval	Vellathooval		472	no
39	Banasurasagar	Banasurasagar	Wayanad	775.6	No
40	Kuttiyadi spillway			775.6	Yes
41	Kuttiyadi saddle			775.6	No
42	Kozani saddle			775.6	No
43	Nayamoola saddle			775.6	No
44	Manjoora saddle			775.6	No
45	Kottagiri saddle			775.6	No
46	Near kottagiri saddle			775.6	No
47	Kuttiyadi (Kakkayam)	Kuttiyadi (Kakkayam)	Kozhikode	758.04	Yes
48	Urumi I	Urumi I			No
49	Urumi II	Urumi II		107.1	No
50	Chembukkadav	Chembukkadav		302.9	No
51	Poozhithode	Poozhithode		271.35	No
52	Panoth	Panoth		185.05	No
53	Valook	Valook		183.9	No
54	Adyanpara	Adyanpara	Malappuram	201.11	No
55	Idamalayar	Idamalayar	Ernakulam	169	Yes
56	Poringalkuthu	Poringalkuthu	Thrissur	423.98	Yes
57	Sholayar main	SHOLAYAR		811.69	No
58	Sholayar flanking			811.69	Yes
59	Sholayar saddle			811.69	No
60	Karingadu	Chathankottunada - II	Kozhikode		No
61	Koothampara				No

ANNEXURE 5: Installed capacity of Kerala as on 31.3.2022

Sl. No.	Name of Station	Installed Capacity (MW)	Annual Generation Capability (MU)
	PART A - HYDEL		
1	Pallivasal	37.50	284
2	Sengulam	50.80	182
3	Neriamangalam	52.65	237
4	Panniar	32.40	158
5	Poringalkuthu	36.00	191
6	Sholayar	54.00	233
7	Sabarigiri	340.00	1338
8	Kuttiyadi	75.00	268
9	Idukki	780.00	2398
10	Idamalayar	75.00	380
11	Kallada	15.00	65
12	Peppara	3.00	11.50
13	Lower Periyar	180.00	493
14	Mattupetty	2.00	6.40
15	Poringalkuthu Left Bank Extension	16.00	74
16	Kakkad	50.00	262
17	Kuttiyadi Extension	50.00	75
18	Malampuzha	2.50	5.60
19	Chembukadavu Stage I	2.70	6.59
20	Chembukadavu Stage II	3.75	9.03
21	Urumi Stage I	3.75	9.72
22	Urumi Stage II	2.40	6.28
23	Malankara	10.50	65
24	Lower Meenmutty	3.50	7.63
25	Neriamangalam Extension	25.00	58.27
26	Kuttiadi Tailrace	3.75	15
27	Kuttiadi Additional Extension	100.00	223
28	Poozhithode	4.80	10.97
29	Ranni Perinad	4.00	16.73
30	Peechi	1.25	3.21
31	Vilangad	7.50	22.63
32	Chimony	2.50	6.7

Sl. No.	Name of Station	Installed Capacity (MW)	Annual Generation Capability (MU)
33	Adyanpara	3.50	9.01
34	Poringalkuthu Micro	0.011	0.082
35	Barapole	15.00	36
36	Vellathooval	3.60	12.7
37	Perunthenaruvi	6.00	25.77
38	Kakkayam	3.00	7.34
39	Chathankottunada Stage II	6.00	14.76
40	Upper Kallar	2.00	5.14
	Total	**2066.36**	**7233.06**
	PART B - WIND		
1	Kanjikode	2.025	4.00
	Total	**2.025**	**4.00**
	PART C - THERMAL		
1	Brahmaputra Diesel Power Plant (BDPP)	63.96	363.60
2	Kozhikode Diesel Power Plant (KDPP)	96.00	672.00
	Total	**159.96**	**1035.60**
3	Kayamkulam (NTPC)	**359.58**	2158
	PART D -KSEB SOLAR		
1	Kanjikode S/s GM	1.00	1.58
2	Chaliyoor Colony, Agali RT	0.10	0.15
3	Poringalkuthu Powerhouse RT	0.05	0.06
4	Banasurasagar FL , Wayanad	0.01	0.01
5	Meencut RT	0.03	0.04
6	Moolamattom & Malankara RT	0.05	0.08
7	Kollengode Substation GM	1.00	1.66
8	Padinjarethara Dam Top RT	0.44	0.73
9	Edayar Substation premises GM	1.25	2.08
10	Barapole Canal bank	1.00	1.66
11	Barapole Canal top	3.00	4.99
12	KDPP,Kozhikode RT	0.04	0.06
13	Thalakulathoor GM	0.65	1.00
14	Roof Top of Vydyuthi Bhavanams (8 nos.)	0.34	0.42
15	Manjeswaram GM	0.50	0.70
16	Kuttipuram GM	0.50	0.83

Sl. No.	Name of Station	Installed Capacity (MW)	Annual Generation Capability (MU)
17	Roof Top KSEBL Distribution Wing Buildings (5nos.)	0.14	0.15
18	Moovattupuzha GM	1.25	1.75
19	Pothencode SS GM	2.00	2.80
20	Roof Top KSEBL Transmission Wing Buildings (3 nos.)	0.08	0.08
21	Roof Top KSEBL Transmission Wing Buildings (24 nos.)	0.73	0.77
22	Roof Top KSEBL Transmission Wing Buildings (11 nos.)	0.34	0.36
23	Roof Top KSEBL Transmission Wing Buildings (11 nos.)	0.21	0.22
24	Roof Top KSEBL Generation Wing PH/ Buildings (16nos.)	0.65	0.68
25	S/s Ponnani RT	0.50	0.83
26	S/s Kottiyam GM	0.60	1.00
27	Banasurasagar Floating solar	0.50	0.74
28	Peerumedu GM	0.50	0.83
29	Agali GM	1.00	1.58
30	Kanjikkode GM	3.00	4.73
31	GM Solar Parambikulam off grid,4.4.2017	0.05	0.07
32	GM Solar Nelliampathy off grid(4/4/2017)	0.02	0.03
33	SOURA under KSEBL fund	8.77	13.06
	Total	**30.28**	**45.75**
	PART D - PRIVATE HYDRO		
1	Maniyar(Captive)	12.00	36
2	Kuthungal(Captive)	21.00	79
3	Ullunkal	7.00	32.22
4	Iruttukkanam	4.50	15.86
5	Pampumkayam (Mankulam)	0.11	0.29
6	Karikkayam$^{\$}$	15.00	62.42
7	Meenvallom	3.00	8.37
8	West Kallar	0.05	0.13
9	Pathankayam	8.00	21.02
10	Deviyar	0.05	0.02
	Total	**70.71**	**255.33**

Sl. No.	Name of Station	Installed Capacity (MW)	Annual Generation Capability (MU)
	PART E - PRIVATE THERMAL*		
1	Phillips Carbon Black Ltd (Co-generation plant)	10.00	70.08
	Total	**10.00**	**70.08**
	PART F - PRIVATE WIND		
1	Ramakkalmedu (IPP)	14.25	32.46
2	Agali & Koundikkal (IPP)	18.60	37.48
3	Ahalia Alternate Energy Pvt Ltd, Kan-jikode (IPP)	8.40	16.19
4	INOX (IPP)	16.00	30.84
5	Kosamattom (IPP)	1.00	1.66
6	Malayala Manorama (CPP)	10.00	20.15
	Total	**68.25**	**138.77**
	PART G - PRIVATE SOLAR		
1	Cochin International Airport Ltd. (Prosumer)	38.44	58.93
2	Solar park, RPCKL Ambalathara(IPP)	50.00	78.84
3	ANERT ,Kuzhalmandam	2.00	3.33
4	Hindalco (Prosumer)	3.00	4.73
5	KMRL (Prosumer)	5.40	0.00
6	THDCIL-Paivalika Solar Park (IPP)	50.00	78.84
7	Grid Connected Solar Prosumers	222.43	331.25
8	Solar Prosumers under SOURA	7.54	11.23
	Total	**378.81**	**567.15**
	GRAND TOTAL	**3145.98**	**11507.73**
	Total KSEBL Stations	**2258.62**	**8318.41**
	Total Private Stations	**887.35**	
	Total- Hydel -KERALA	**2137.07**	**7488.39**
	Thermal-KERALA	**529.54**	**3263.68**
	Wind Total -KERALA	**70.28**	**142.77**
	Solar total-KERALA	**409.09**	**612.90**
	Total Installed capacity	**3145.98**	**11507.73**
*	Note: BSES & KPCL not considered as PPA expired		

Annexure 6: HT/EHT/Licensee Consumption as on 31.03.2022

Tariff Category	Consumers	Yearly Consumption (kWh)
EHT GENERAL (A)	1	3831800
EHT GENERAL (B)	4	54825483
EHT I (66 kV) INDUSTRIAL	13	364392315
EHT II (110 kV) INDUSTRIAL	20	759913795
EHT II (110 kV) RT	13	318288322
EHT III (220 kV) INDUSTRIAL	1	211769800
HT I (A) INDUSTRIAL	2654	2309478429
HT I (B) INDUSTRIAL	27	10090543
HT II (A) GENERAL	443	200803401
HT II (B) GENERAL	1112	619199207
HT III (A) AGRICULTURE	53	6525637
HT III (B) AGRICULTURE	10	2142382
HT IV (A) COMMERCIAL	1200	257952511
HT IV (B) COMMERCIAL	1193	312338430
HT V DOMESTIC	124	17994483
HT VII TEMPORARY	1	285200
KMRL(Kochi Metro Rail Ltd)	2	11486689
KMRL(Kochi Metro Rail Ltd)-HT	1	980
Licensee: CPT	2	36360600
Licensee: CSEZ	1	54038350
Licensee: KDHPCL	1	53079220
Licensee: KPUPL	4	69046340
Licensee: Karnataka Electricity Dept	2	891999
Licensee: MES	32	67038575
Licensee: RPL	1	33570460
Licensee: Technopark	3	51005025
Licensee: ThrissurCorporation	2	137587200
Licensee: Infopark, Cherthala	2	11042510
Licensee: SMART CITY	1	3931787
	6923	5978911473

ANNEXURE 7: Departmental Publications

1. System Operation
2. Power System Statistics
3. ARR & ERC
4. Annual Accounts
5. Budget Estimate
6. Annual Administration Report
7. Directors Report

ANNEXURE 8: The Team Preparing AAR

Draft Prepared by : Smt. Rekha R Chandran,
Assistant Executive Engineer, Corporate Planning

Vetted by : Smt. Suchitra M,
Executive Engineer, Corporate Planning

Smt. Geetha V S,
Deputy Chief Engineer, Corporate Planning

Reviewed by : Dr. Anand S. R.,
Director (T,SO, P&S)

KERALA STATE ELECTRICITY BOARD LTD.

Planning Wing, Phone: 0471 -2514570, Web: www.kseb.in, Email: dceplg@kseb.in