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மின்வலு, சக்திவலு மற்றும் தொழில்துறை அபிவிருத்தி அமைச்சு

MINISTRY OF POWER, ENERGY & BUSINESS DEVELOPMENT

2019 කාර්යසාධනය

2019 ஆம் ஆண்டின் செயலாற்றுகை

Performance 2019

CONTENT

Ministry of Power, Energy & Business Development

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1. Introduction

Although the Ministry had two other functions (Energy and Business Development) in this report only the 'Power sector' performance and related business development during 2019 will be presented. The Energy sector performance will be reported by the present Energy Ministry.

Electricity is one of the phenomenon sectors in the economic development of Sri Lanka as in other countries in the World. Accordingly, policies and plans have been prepared to provide affordable, high quality and reliable energy for all citizens by conserving the environment and, giving priority to the indigenous energy sources, and minimizing regional disparities in energy service delivery.

Functions assigned to the Ministry have paved the way to capture the full potential of all renewables in order for Sri Lanka to become a nation self-sufficient in energy.

Sri Lanka already achieved a 99.9% electrification which is commendable by south Asian Standards. Frequent improvements are being done to the Transmission and Distribution Network in order to ensure the quality and uninterrupted power supply to the citizens.

When the Power Sector is concerned, increasing renewable energy development (including wind and solar power generation), improving energy efficiency, expanding the transmission and distribution system and improving reliability and quality of power supply have been the main targets of the Ministry.

2. Vision & Mission

Vision

A sustainably Developed Sri Lanka

Mission

Providing leadership in the areas of Power, Energy and the Business Development through electricity generation, transmission and distribution supply, Regulation and promoting sustainable energy, Promoting and the utilization of peaceful nuclear applications, protections of person and environment from ironizing radiation, procurement of coal for power plants and electricity related project execution.

In the context of sustainable development, scaling up of renewable energy investments is one of the best options and the Ministry have been paying attention to the same.

3. Institutions under the purview of the Power Sector of the Ministry

Following institutions were administered under the purview of the Ministry of Power Energy and Business Development.

CEB: Established by Act No.17 of 1969. It is empowered to generate electrical energy, transmit it and distribute same to all categories of consumers and to collect revenue as per the tariff approved by the Public Utilities Commission of Sri Lanka (PUCSL)

Lanka Electricity Company (Private) Limited (LECO): A subsidiary of CEB with shareholding of 54.84%, and with minority shareholding of the Treasury 43.56%, Urban Development Authority 0.79% and Local Authority 0.81%

LTL: A subsidiary of CEB with shareholding of 63%, with minority shareholding of its employees (37%)

Sri Lanka Sustainable Energy Authority (SLSEA): Established by Act No.35 of 2007

Sri Lanka Atomic Energy Regulatory Council: Established under the Sri Lanka Atomic Energy Act, No. 40 of 2014

Sri Lanka Atomic Energy Board: Established under Sri Lanka Atomic Energy Act, No.40 of 2014

Lanka Coal Company (Pvt). Ltd. : A subsidiary of CEB with shareholding of 60%, with minority shareholding by the Treasury (20%), Sri Lanka Shipping Corporation (10%) and Sri Lanka Ports Authority (10%)

Sri Lanka Energies (Pvt) Ltd: A subsidiary of CEB with 100% shareholding.

4. Key Functions

Following subjects and functions related to the power sector assigned to the Ministry of as per the Extra Ordinary Gazette No: 2103/33 dated 28 December 2018.

- Formulation of policies, programmes and projects; Implementation, Monitoring and evaluation in relation to the subjects of Power, Energy and Business Development and those subject that come under the purview of Departments, Statutory Institutions and Public Corporations listed in the said gazette
- Formulation of an appropriate energy policy for the control, regulation and utilization of power resources
- Investigation, planning, monitoring and developing the activities relating to the generation of electricity and other energies by utilization of power sources such as solar, water, heat, coal wind & waste
- Controlling greenhouse gas emission
- Rural electrification
- Management of demand to ensure energy efficiency and development of renewable power
- Development of Renewable Energy
- Policy reforms and facilitation in productively harnessing the contribution of the business sector for economic development
- Taking measures for raising the "Ease of Doing Business Index" in Sri Lanka
- Ensuring Institutional coordination required in overcoming difficulties and obstacles encountered in the private business sector
- Introducing easy and efficient methodologies to initiate joint ventures between the public and private sectors (PPP)
- Matters relating to all other subjects assigned to Institutions come under the purview of the Ministry
- Supervision of the Institutions come under the purview of the Ministry.

5. Development Objectives

The Ministry ensures the improvement of generation capacity of the system including increasing the share of Renewable Energy sources, diversifying the Energy Mix, reducing total technical and commercial losses of the Transmission and Distribution networks and implementation of Demand Side Management measures fulfilling the following specific development objectives;

- Increase Power Generation Capacity of the country from existing 4,471 MW to 6,900 MW by 2025 with maximum feasible development of Renewable Energy.
- Improve Transmission Network (From 602 km to 1,300 km in the 220 kV network by 2025 and From 2,310 km to 3,000km in the 132 kV network by 2025).
- Improve Distribution Network to provide quality service and to maintain 100% household electrification level.
- Increase Renewable Energy capacity from existing 44% to achieve the status of carbon neutrality by 2050.
- Reduce Technical and Commercial losses of the System from 9% to 8% by 2025.
- Convert the power system of the country to a Smart Grid by encouraging manufacturing of electrical equipment locally.

6. Power Sector Status and Performance during 2019

National electrification ratio of the country has grown from 99.3% in 2016 to 99.9% in 2019 while the country has reached 100% of electricity accessibility. Sri Lanka is known as the only country in South Asia that has 100% electricity accessibility with 24 hours uninterrupted power supply.

6.1 Electricity Demand, Forecast for 2020 and Electricity Consumer Growth

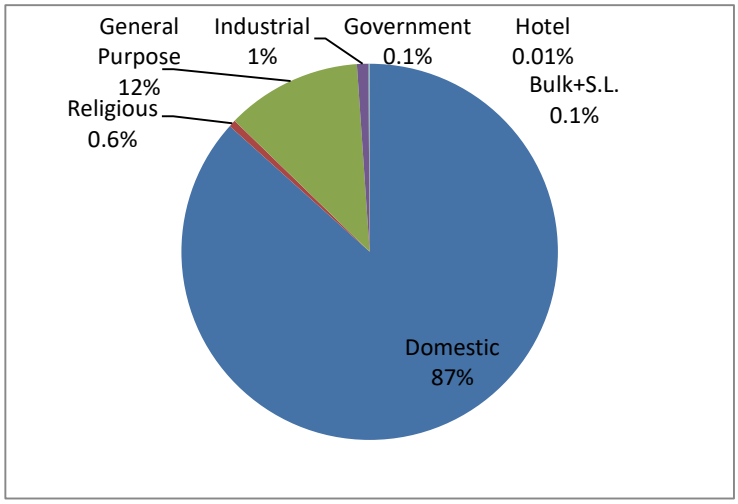
Demand for electricity is growing at a rate of about 5%-6% a year. Maximum reported Day Peak Demand during 2019 was 2,327.3 MW on 30th May 2019 and Maximum Night Peak was 2,668.7 MW on 28th May 2019. Average daily demand was 45.89 GWh and the maximum of 49.12 GWh was recorded on 29th May 2019.

For the year 2020 the electricity demand forecast based on approved Long Term Generation Expansion Plan 2018-2037 is Gega Watt hours 16,646GWh and the estimated generation in Gega Watt hours 18,456.

As per the projections, the Electricity Demand up to 2020 will be an average growth of 6.8% and 5.0% average growth rate for the 20-year planning horizon.

The total number of electricity consumers in the country in 2019 was 7,022,103. The number of consumers come under the different categories are given below

Category	Quantity
Domestic	6,084,851
Religious	42,796
General Purpose	818,854
Industrial	66,967
Government	4,552
Hotel	529
Bulk+S.L.	3,554
Total	**7,022,103**



6.2 National Energy Policy and Strategies of Sri Lanka

National Energy Policy and Strategies of Sri Lanka was first published in 2008 in Extra Ordinary Gazette No. 1553/10 of 10.06.2008. The Country was able to achieve several goals set in this policy document (2008) such as complete electrification and renewable energy development. This policy has to be reviewed and updated after three years. Accordingly, the National Energy Policy and Strategies were updated. This was a long outstanding task after public scrutiny and review by sector experts. New National Energy Policy and Strategies of Sri Lanka was then published in the Government Extra Ordinary Gazette No. 2135/61 on 09 August 2019 and was tabled in the parliament on 22 October 2019.

The main objective of National Energy Policy and Strategies is to ensure convenient and affordable energy services available for the equitable development of Sri Lanka using clean, safe, sustainable, reliable and economically feasible energy supply.

A National Steering Committee was appointed to monitor the implementation of this policy and to evaluate its impact. A Technical Working Group was appointed to assist the above committee in convening meetings and collation on Action plans, Progress information and other correspondence with relevant agencies.

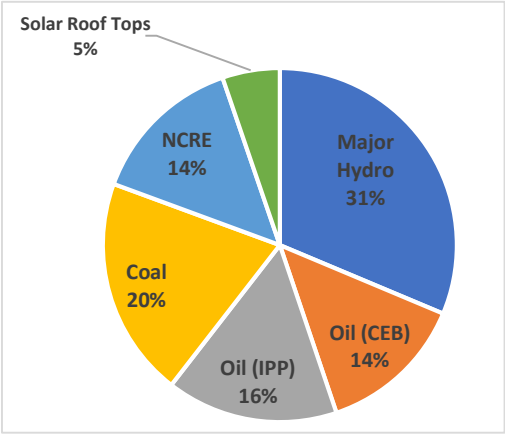
7. Progress of Power Sector during 2019

7.1 Electricity Generation, Access to Electricity and Reliability Improvement during 2019

Installed electricity generation capacity of the national grid was 4,471 MW in 2019, which is a 10% increase from last year due to solar rooftop electricity generation and contingency power generation.

Sri Lanka is a country blessed with renewable energy resources. Hydropower is the major renewable energy source of generation in Sri Lanka power system. Other renewable energy sources such as wind, solar, dendro and biomass are also connected to the system which is considered as Non-Conventional Renewable Energy (NCRE). Thermal Energy sources use for power generation in Sri Lanka are Coal and thermal oil (Diesel and Furnace oil) which are owned by CEB and Independent Power Producers (IPP).

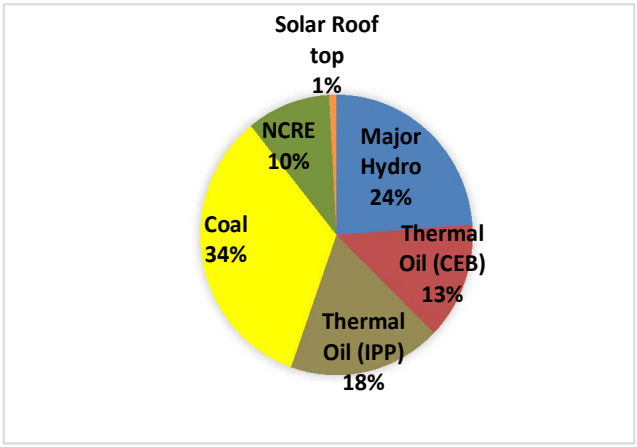
There are 235 MW of capacity of solar rooftop systems by 22,778 number of consumers are also connected to the generating system through community-based programme "*Soorya Bala Sangramaya*" commenced in 2016.



Total Installed Capacities (2019)

Source		Capacity (MW)	No. of Power Plants
Major Hydro		1399	17
Thermal			
	Oil (CEB)	604	9
	Oil (IPP)	701	6
	Coal	900	1
Renewable (NCRE)			
	Mini Hydro	406	190
	Wind	129	15
	Solar	54	11
	Dendro & Biomass	43	12
	Solar Roof Tops	235	
Total		**4,471**	**261**

15,925 GWh of electricity was generated during 2018. Forecasted electricity demand for 2019, according to the Long-term Generation Expansion Plan was 17,285 GWh. By the end of December 2019, 15,922 GWh of electricity was generated. Out of total generation, 24%, 34% and 31% of power have generated from hydro generation (without mini-hydro), coal and thermal oil respectively. The share of Non-Conventional Renewable Energy (NCRE) such as mini-hydro, solar, wind and biomass are 10%. The contribution of Solar Roof Top power generation for energy mix is 1%



Energy Mix 2019

7.1.1. Electricity Generation Expansions

As per the National Energy Policy and Strategies of Sri Lanka, our vision is to pave the way to realize complete Carbon neutrality by 2050. Share of electricity generation from Renewable Energy in 2019 was 35%. In a wet year like 2013, the share of electricity generation from Renewable Energy was 60%. Power generation facilities are planned and implemented in order to cater to increasing demand as per the Long-Term Generation Expansion Plan of CEB (2020-2039). The main concern has been given for the construction of optimal power generating plants with least cost and minimum negative impact to the environment and all plans were prepared to meet international obligations including the Nationally Determined Contributions (NDCs) under COP 21.

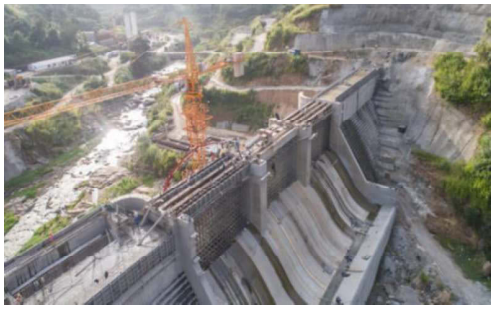
In addition to the major hydro reserves and thermal sources, the electricity is also generated from non- conventional renewable energy sources (NCRE) such as mini-hydro, wind, solar, biomass etc., is absorbed into the grid through Standardized Power Purchase Agreements. The details of these such NCRE projects are as follows.

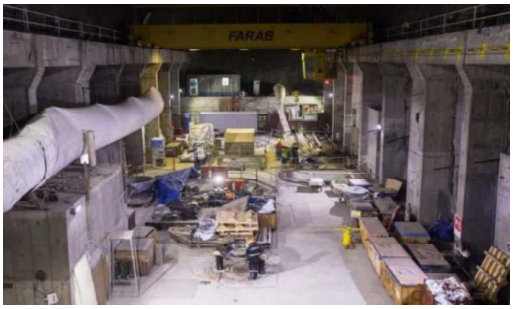
Project Type	No. of Projects	Capacity (MW)
Mini Hydro Power	190	**406**
Wind Power	15	**129**
Biomass-Dendro	12	**43**
Solar Power	11	**54**
Total	228	632

A) Hydro Power

The work related to the following Major Hydro Power Plants are in progress.

Uma Oya Hydro Power Project - Uma Oya Multi-Purpose Development Project is being implemented by the Ministry of Irrigation and Water Resources Management in collaboration with the Ministry of Power and Energy. The estimated capacity of the power plant is 120 MW (6x60MW) and the expected annual energy production is 290 GWh. This power plant will connect to the national grid through Badulla Grid Substation. The Project is expected to be completed in end of 2020. Total physical progress as at 2019 was 92%.





Broadlands Hydropower Project - The Broadlands Hydropower Project is a run-of-the-river type Project planned to build on the Kelani River, with the objective of harnessing the downstream hydro potential of the existing Polpitiya Power Station. The Project will have an installed capacity of 35 MW and is expected to generate 126 GWh of electrical energy annually. The Broadland Hydropower Project is the first large scale hydropower plant which has obtained CDM registration in Sri Lanka.

Total physical progress in 2019 was 66% and the financial progress was 55%. The Project was expected to complete in 2021.

Moragolla Hydro Power Project - The Asian Development Bank Committed to provide US$ 125 million to this Project under loan no. 3146 (SF)/ 3147 SRI – "Green Power Development and Energy Efficiency Improvement Investment Program (Tranche 1)" for the construction of Moragolla Hydropower Project. Total installed capacity of the project is 31MW and expected annual energy generation is 100 GWh. Physical progress was 22% in 2019 and the expected date of completion is March 2023.

Seethawaka Ganga Hydropower Project - The location of the project is Seethawaka Ganga tributary of the Kelani River in Seethawaka area in Kegalla District. Originally it was expected to implement 24 MW Hydro Power Plant. Feasibility of the project was completed and identified that the cost of the project will be 80 USD Million. CEB is of the view that the benefits of the project will be less by implementing the project with this estimated cost. Hence, CEB is considering the possibilities of implementing this project as Mini-Hydropower Plant.

B) Solar Power - Soorya Bala Sangarmaya

Soorya Bala Sangarmaya programme was launched in September 2016 in order to generate 1,000 MW by installing 1,000,000 solar rooftops by 2025.

The Criterion for the absorption of electricity to the National Grid under this programme is as follows.

Price of electricity for the first seven years is 22.00 Rs./kWh

Price of electricity from year 8 to 20 is 15.50 Rs./kWh

Under this programme, electricity consumers can select Net Metering, Net Accounting or Net Plus schemes. Among them, under the Net Accounting and Net Plus, the consumers will be paid for surplus electricity generated. There is no payment under net metering method, and the customer can utilize surplus in the coming period.

Under the second phase of Suurya Bala Sangramaya, it was planned to construct 150 MW by installing 1 MWx60 and 1MWX90 solar power projects. Under the tender of 1MWx60, bids were called for 60 power plants of 1MW capacity, and tenders were awarded to 36 projects. Tariffs proposed by the bidders under this tender with a declared ceiling price of Rs. 18.37 per kWh are as follows,

Under the third phase of Soorya Bala Sangramaya, 50 MW of Solar Power capacity was planned as 10MWX5 solar power projects. Construction of Valachchenai 10MW solar power project and Vavunathivu 10MW project to be commissioned.

Under the fourth phase of Soorya Bala Sangramay,a 400 MW Solar Power is planned to establish as follows.

100 MW of Floating Solar in Maduru Oya

100 MW X 2 Solar Power Park in Pooneryne

100 MW Solar Power Park in Monaragala

Preliminary work has been commenced for the implementation of the above Solar Parks.

Solar Village project has been introduced to create a path to earn additional income for low-income families.

“Rivi Aruna” programme was launched to provide solar rooftops to religious places. The total cost of this programme was Rs. 58. Million and a total capacity of 270kW has been installed to 126 temples, 4 mosques, 3 kovils and 2 churches.

New Rooftop Solar Power Generation Project under Asian Development Bank funds

A loan of USD 50 million was secured from the Asian Development Bank (ADB) in October 2018 for the implementation of Rooftop Solar with a limit of the maximum capacity of 50 kW of solar rooftop systems for any category of electricity customers. The project was commenced in 2019 and LKR Mn 1,337.43 was disbursed from the loan provided by the Asian Development Bank. Under this programme, 18 MW of capacity was installed and connected to the national grid in 2019.

C) Wind Power

100 MW Wind Power Project in Mannar Island - 100 MW Wind Farm Project in Mannar Island to be built and operated by the CEB. The project includes the construction of a 100 MW wind farm including power evacuation system and Control Centre with SCADA facilities. The project is expected to complete and commission in 2020. The expected average annual energy generation was 400 million units (GWh) over 20year operational life span of the wind farm. The current Progress of the project is 23%.

D) Thermal Power Development

Three Gas Turbine of 35MW each to Kelanitissa New Power Plant) - Development of a combined cycle power plant on the basis of Build, Own, Operate and Transfer (BOOT) which comprises the net output of 300±10%MWe (270-330MWe), multi-fuel (initially diesel fuel or heavy fuel oil and re-gasified liquefied natural gas when available at the site boundary), at the specified location at Kerawalapitiya along with support facilities. An operational period of twenty years following the commencement of commercial operation of the facility is planned as per the Project Agreements. The project cost is USD 70 million. The expected date of completion December 2020 and the tendering process has been initiated.

Four Reciprocating Engine Power Plants of 24MW each - It is expected to add this 100MW capacity to the Grid Substations of Habarana, Moneragala, Horana and Pallekelle by 2021. The tendering process is initiated.

E) Liquefied Natural Gas (LNG) Development

Ministry has taken several initiatives to introduce LNG as electricity generation source to the country.

400 MW Natural Gas Combined Cycle Power Plant and LNG Receiving Terminal in Hambantota - This project is proposed as a joint venture between Government of Sri Lanka, China Machinery Corporation (CMEC) and Ceylon Electricity Board (CEB). Natural Gas will be used as the power plant fuel. The Generated power will be transmitted to National Grid via Hambanthota 220 kV Grid substation which is under construction. A 220 kV double circuit transmission line of about 10 km length has to be constructed from the power plant site to the Hambantota Grid to transmit power. The main output of the project is to generate 2,102 GWh of energy annually for a period of 30 years.

500 MW Natural Gas Combined Cycle Power Plant, Kerawalapitiya – This is a joint venture project proposed between Ceylon Electricity Board (CEB) and National Thermal Power Corporation (NTPC) Ltd.

A Joint Working Group has been established. The capacity of the first phase shall be 300 MW ± 15%. Phase II with a suitable capacity may be undertaken subsequently by the JV company. Hence, the project will be developed as a re-gasified Liquefied Natural Gas/ Auto Diesel (Dual Fuel) fired 300 + 15% MW Combined Cycle Power Plant on BOOT basis. The land has been earmarked in the Kerawlapitiya area for the project.

500 MW Natural Gas Combined Cycle Power Plant, Kerawalapitiya - This is a joint venture project planned between the Government of Sri Lanka and Japanese companies (Mitsubishi Corporation and Sojitz Corporation of Japan). Land for the project has been earmarked for the project in Kerawalapitiya area.

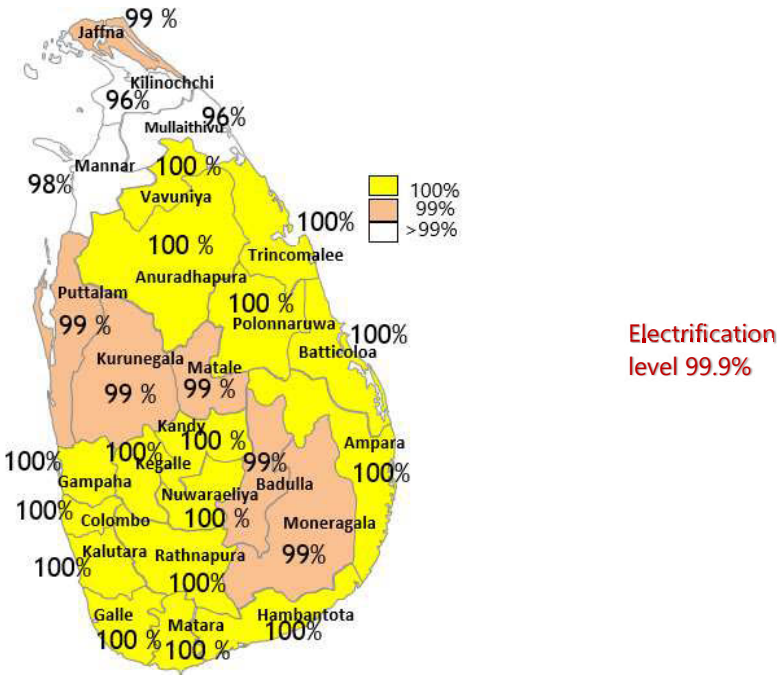
Liquefied Natural Gas(LNG) Terminal Infrastructure Facility - This project has been planned for the development of a Floating Regasification and Storage Unit (FSRU) and supplying of LNG for existing three power plants namely, 163 MW CEB owned power plant at Kelanitissa, 163 MW Sojitz Corporation owned power plant at Kelanitissa and 300 MW West Coast power plant and upcoming 300 MW LNG power plant, with an overall capacity of 926 MW. The expected annual LNG supply ranges from 0.6 Million Ton Per Annum (MMTPA) to 01 MMTPA.

It is expected to develop FSRU off sea outside the Colombo harbour, and gas pipelines will be built to the power plants. The total expected project cost of the terminal and pipelines is USD 400-450 million.

7.1.2. Enhance Electricity Accessibility

Present Electrification rate of the country is 99.9%. Accessibility to electricity is 100% of the country. Ministry facilitated to provide 105,111 new electricity connections during 2019.

Electricity distribution network consists of 30,963 Low Voltage Electricity Distribution substations, 33 kV and 11 kV Medium voltage (MV) lines currently 33,629 km in length and 142, 807 km Low voltage (400 V) distribution lines including underground cables.



7.1.3 Electricity Transmission and Distribution Projects Development

The National Transmission network comprising of 602 km of 220 kV lines and 2,311 km of 132 kV lines deliver power to 69 Grid Substations. The entire length of transmission lines and the Grid substations with all associated equipment form the transmission system. The Transmission system receives the power at generating stations, steps up to the transmission voltages of either 132 kV or 220 kV, and delivers power to the Grid Substations, where the power is stepped down either to 33 kV or 11kV.

The transmission network has been upgraded by implementation of a number of transmission development projects including renewable energy to ensure the reliability and quality of electricity supply and to enable the evacuation of power from new generation facilities. Transmission and Distribution losses were reported to be 8.3% of net generation during in 2019.

Transmission Development Projects carried out in 2019

	Project	Status
1	**Clean Energy & Network Efficiency Improvement Project**	
1.1	Construction of Mannar Transmission Infrastructure Augmentation of Vavuniya GS & Construction of Mannar GS. Construction of Transmission lines; new Anuradhapura to Vavuniya 55km & Vavuniya to Mannar 70km,	Total Estimated cost Rs. 4,149 Mn Funded by ADB Physical progress 98% (Line), 42%(Grid) Financial progress 81%
1.2	Construction of 132kV Transmission infrastructure Construction of Kegalle GS & augmentation of Thulhiriya GS. Installation of Breaker Switched capacitor banks for loss reduction at Biyagama Sapugaskanda, kolonnawa new, Kolonnawa old GSs Construction of Transmission Lines Thulhiriya - Kegalle 22.5km, Polpitiya - New Polpitiya 10km, Athurugiriya - Padukka 10km, Athurugiriya - Kolonnawa 15 km,	Total Estimated cost Rs Mn. 3,018 Funded by ADB Physical progress (Kegalle Grid Completed) 94% Financial progress 86%
1.3	Construction of 220 kV Transmission Infrastructure Construction of New Polpitiya & Padukka GSs. Augmentation of Pannipitiya GS. Construction of New Polpitiya - Pannipitiya 58.5km, Transmission Line through Padukka.	Total Estimated cost Rs. 2,100 Mn Funded by ADB Physical progress 93% Financial progress 82%
2	Renewable Energy Absorption Transmission Development Project (Construction of new Grid Substations at Maliboda, Wewalwatta, Nawalapitiya and Ragala)	Total Estimated cost Rs. 6,228 Mn Funded by AFD Physical progress 42% Financial progress 60%
	Project	**Status**
3	**Green Power Development and Energy Efficiency Improvement Investment (Tranche 1)**	
3.1	Construction of Kappalthurai GSS and Augmentation of Kerawalapitiya, Katunayake, Trincomalee GSS Augmentation of New Anuradhapura Gs and Construction of Kesbewa, Kalutara Old Anuradhapura GSS Construction of 132kV Transmission lines in Kappaithurai, Kalutara, Kesbewa and Old Anuradhapura.	Total Estimated cost Rs. 5,847 Mn Funded by ADB & AFD Physical progress 67% Financial progress 67%
	Project	**Status**
4	**Green Power Development and Energy Efficiency Improvement Investment (Tranche 2)**	
4.1	Construction of Hambantota Grid Substation New Polpitiya-Hambantota, 150km long transmission line	Total Estimated cost Rs. 7,660 Mn Funded by ADB 3% completed.
4.2	Mannar - Nadukuda Transmission Development Construction of Nadukuda 220/33 kV Grid Substation, Augmentation at Mannar 220/33kV Grid Substation, Mannar - Nadukuda 220kV, 30km transmission line. Padukka - Horana 132kV, 25km transmission line 2nd cct stringing of Habarana-Valachcheai 132 kV Tra.line	Total Estimated cost Rs. 4,078 Mn Funded by ADB 31% of construction progress
4.3	Construction of Colombo B GSS Single In & Out Connection from Colombo C - Kolonnawa 132kV 800mm^2 Cable	Project is in the bidding stage
	Augmentation at Colombo C and Kolonnawa Grid Substations Augmentation of Kotugoda , Kolonnawa, Horana, Dehiwala, Madampe Grid Substations and Padukka Switching Station. Construction of Biyagama GS and Augmentation	

5	**Electricity Supply Reliability Improvement Project**	
5.1	System Reliability Improvement Project Installation of 100 MVAR BSC at Pannipitiya Grid Substation Installation of +100/-50 MVAR SVC at Biyagama Grid Substation	Total Estimated cost Rs. 2,948 Mn Funded by ADB Project is in the bidding process
6	System Control Centre Modernization Project - Sri Jayawardenapura	Completed and commissioned (100%)
7	Colombo City Transmission Development & Loss Reduction Project Construction of new 220/132/11kV Colombo L Grid Substation, new 132/11kV Colombo M Grid Substation, new 132/11kV Colombo N Grid Substation and new 33kV GIS Substation at Kelanitissa. Extension of 220kV Kerawalapitiya Grid Substation and Extension/Augmentation of the Distribution SCADA System for the new & existing grid substation and necessary modifications at the existing GSS Augmentation of 132/11kV Colombo A & I Grid Substations, Extension of 220kV Kelanitissa Grid Substation and 132kV Kolonnawa Grid Substation and Modifications of 132kV Construction of 220kV & 132 kV Transmission Cables and 11kV Distribution Cables. Installation of 12kV Gas Insulated Switchgear in new 11kV Distribution Substation at proposed development sites. Supply of Specialized Vehicles for Distribution Works (05 Units of Insulated Bucket Truck, 04 Units of Pole Installation Trucks, 01 Unit of Digger and 05 Units of Cargo Cranes)	Total Estimated cost Rs. 22,458 Mn Funded by JICA Physical progress 93% Financial progress 100%
8	Construction of New Habarana Switching Station and New Habarana - Veyangoda Transmission Line Lot A: Construction of New Habarana 220/132/33 kV Switching Station Lot B: New Habarana Veyangoda 220 kV Transmission Line (JICA)	Total Estimated cost Rs. 10,558 Mn Funded by JICA Physical progress 41% Financial progress: 45%
9	National Transmission and Distribution Network Development and Efficiency Improvement Project Phase 1 Package 1: Construction of Transmission Lines (400kV, 220kV, 132kV) Package 2: Construction of Grid Substations (220kV/132kV, 132kV/33kV) Package 3: Construction of Transmission Lines (220kV, 132kV) Package 4: Construction of Distribution Cables (33kV, 11kV, 0.4kV)	Total Estimated cost Rs. 38,190 Mn Funded by JICA Tenders to be awarded
10	Kiribathkumbura Grid Substation Augmentation	Total Estimated cost Rs. 1,042 Mn CEB funds Physical progress 99% Financial progress 90%

Electricity Distribution projects were carried out in 2019.

	Project	Total Estimated Cost (Rs. Mn)	Funding Agency	Present Status
2	**Efficiency improvement of MV Distribution Network** I. Construction of 82 km of 33 kV Tower Lines and Five 33 kV Switching Gantries	1040	Asian Development Bank	Construction 93% completed. Financial Progress: 66%
4	**Capacity Improvement of LECO Distribution Network**	2,165	CEB	Construction 64% completed. Financial progress: 84%
5	**Construction of 33 kV distribution Tower Lines and Gantries** 1. Primary Substations: Construction of 1 new PSS and Augmentation of 2 existing PSS 2. 33kV Gantries: Construction of new 33kV Gantries 3. 33kV Lynx D/C, 4Cct Tower Lines: Construction of 05 new 33kV Tower lines	4,076	Asian Development Bank	Preliminary & profile surveying work of 33kV tower lines, land acquisition for 33kV gantries & primary substation are in progress
6	**Electricity Supply Reliability Improvement Project** (Package 1,2,3) Procurement of material for 106 RE Schemes	2,900	Asian Development Bank	95% completed
7	**Electricity Supply Reliability Improvement Project** (Package 4,5) 4.Construction of 270.5 km long 33kV tower lines and 13 no. of 33kV 2SSBB gantries 5. Supply and Delivery of Material for rural electrification network extended and distribution performance monitoring	10,008	Asian Development Bank	Project is in the bidding stage
8	**Electricity Supply Reliability Improvement Project** (Package 6) Construction of Hybrid renewable energy systems in 3 small islands (Nainativu, Analitivu, Delft)	619	Asian Development Bank	Project is in the bidding stage

7.2 Demand Side Management of Energy

National Programme on Energy Demand Management, Efficient Energy Use and Energy Conservation – The Presidential Task Force on Demand Side Management

Government has given high priority to the Energy Conservation and Efficient Energy Use through its manifesto and established a Presidential Task Force for Demand Side Management under the provisions of clause 36(2) of Sri Lanka Sustainable Energy Authority Act, No. 35 of 2007. Ten programmes have been proposed by the Presidential Task Force with a target to reduce Electricity Demand by 417 MW and total consumption of electricity by 1,684GWh within five years, which is equivalent to 20% of the present electricity demand and a 10% saving of electricity consumption.

	Project	Annual Saving by 2022 (GWh)
1	**Efficient Air Conditioning** The objective of this project is to replace the existing inefficient unitary Air conditioning machines from efficient A/C machines. A proposal for purchasing of Lab to measure the efficiency of A/Cs and specification in relation to that has been prepared	84
2	**Efficient Lighting** The objective of this project is to reduce the energy wastage due to incompetent designing and inefficient lighting in the Industrial and Commercial sectors. The proper study had been conducted to collect information regarding the energy-saving due to efficient lighting in those sectors.	250
3	**Efficient Refrigerators** Outdated inappropriate refrigerators in the domestic sector are being replaced with high efficient refrigerators, Operational Guideline has been prepared for this and it is expected to be operationalized in 2019. In addition, a pilot project will be conducted in collaboration with the e-friend loan scheme conducted under the Ministry of Industrial and Commerce.	161
4	**Efficient Chillers** The objective of this project is to gain energy saving by replacing the old inefficient chillers in Industrial and Commercial sectors by new efficient chillers. ADB loan is expecting for this project	41
5	**Efficient Motors** Supplying new efficient Motors and VSD instead of old Motors used in the Industrial sector. A study is being conducted for the benefits of this project	86
6	**Eliminating Incandescent Lamps (Domestic)** LED Lamp Programme called "Shakthi" was launched in March 2019 for the households which using 90 electricity units per month. 10 million LED lamps is expected to distribute such households wife and expected to save Rs. Mn. 12,710 at the end of each year. 6 KWh per month will be saved by one LED lamp. This worth Rs. 120 when considering the cost of electricity to generate, transmit and distribute. Cost for supply one LED to Household is Rs. 169 and the total cost will be recovered by one month and 12 days. **Progress at the end of 2019 is as follows** **No of LED lamps distributed - 383,469** **Energy Saving- 11.447 GWh / annum** **Cost saving - 207.072 LKR Mn/ annum**	432
7	**Efficient Fans** Old fans in the houses will be replaced with new efficient fans	298
8	**Green Building** The objective of this project is to popularize efficient building designing techniques in the Industrial and Commercial sectors.	43
9	**Smart homes** The objective of this project is to popularize the energy-efficient building techniques when designing new houses. Energy related guidelines have been prepared in relation to the construction of new houses.	139
10	**Reactive Power Management** Energy saving is expected by improving the transmission efficiency by reactive power management. One of the strategies is to give commercial value for the reactive power generated in the Industrial and Commercial sectors. A related cabinet memorandum has been prepared and submitted for approval.	150
	Annual saving of electricity at the end of 2022 **The net present value of saving by 2035 7,523 GWh**	**1,684**

7.3 Progress of the Projects under the annual budget 2019

	Project	Status
1	Solar Roof Top Power Generation pilot project Installation of Solar rooftop systems at Universities and Private Sector Institutions Budgetary allocation Rs. 38 Mn, funded by ADB	Physical progress 100% Financial progress 100%
2	Promoting Sustainable Biomass Energy Production and Modern Bio-Energy Technologies Budgetary allocation Rs. 20.9 Mn Funded by UNDP	Physical progress 98% Financial progress 100%
3	Appropriate Mitigation Actions in the Energy Generation and End-Use Sectors in Sri Lanka Project Budgetary allocation Rs. 80.2 Mn Funded by UNDP	Physical progress 80% Financial progress 100%
4	Supporting Electricity Supply Reliability Improvement Project conducted by SEA (Awareness programmes on efficient energy use for households in Nainathiv, Analativ & Delft) Budgetary allocation Rs. 42 Mn Funded by ADB	Project is in the Bidding Stage

7.4 Climate Change Activities

7.4.1 Nationally Determined Contributions (NDCs) in the Power Sector

Green House Gas (GHG) in the power sector in Sri Lanka has recently been on an increasing trend due to the use of petroleum-based fuels for electricity generation. In accordance with COP 21 Paris Agreement, Sri Lanka has committed to 4% unconditional and 16% conditional reduction of CO2 emissions in the Power Sector from Business as Usual (BAU).

GHG emission reduction in the power sector is to be achieved by enhancing renewable energy contribution to the power generation mix and to promote energy efficiency through implementing Demand Side Management (DSM) measures, improving transmission and distribution networks and introduction of natural gas (NG) based power generation to the country. Ministry with relevant Institutions is in the process of updating the power sector National Determined Contributions (NDCs) in order to forward the same to the UNFCCC through Climate Change Secretariat of Sri Lanka this year.

7.4.2 Carbon Partnership Facility Programme

Ministry facilitated and coordinated the activities related to the CPF programme which is CEB act as a seller of Carbon. Couple of discussions were held with the World Bank, CEB and their relevent agencies accordingly The World Bank has committed to provide Technical Assistance for this programme and requested the Ministry to develop a proper mechanism to obtain carbon credit. The Cabinet approval was obtained to implement this programme and as per the Cabinet decision, a request was made to the Ministry of Finance to develop a mechanism to obtain Carbon Credit as proposed by the World Bank.

8. Key Challenges faced by the Sri Lankan Power Sector and Proposed Strategies to overcome such Challenges

In accordance with the National Energy Policy to achive the complete carbon neutrality by 2050, the following key challenges have been identified.

1. Issues related to the investment for infrastructure development in the power sector (generation, transmission and distribution) – it is poposed to find private investments as Foreign Direct Investments.
2. Growing energy demand and providing energy services at optimal cost to the national economy – it was planned to use the maximum capacity addition to generation through renewable sources. We need to go for less-costly sources for electricity generation.
3. Technical issues and challenges in the National Grid to absorb maximum solar and wind energy resources
4. Lack of local research and development to promote local capacity development – promote research and development
5. Adverse effects of climate change, erratic weather patterns that affect hydropower generation, biomass production including agro residue generation – set standards and to have checks and balances to ensure mitigation of negative impacts to the environment

Ceylon Electricity Board

Introduction

The Ceylon Electricity Board (CEB) is a body corporate established by the Act No. 17 of 1969. It is empowered to generate electrical energy, transmit it and distribute same to all categories of consumers, to collect revenue as per the tariff approved by the Public Utility Commission of Sri Lanka (PUCSL) and to perform its functions as provided under its Act and in accordance with the licenses issued by the PUCSL so to ensure that the total revenue of the Board is sufficient for all its activities.

Vision

Enrich Life through Power

Mission

To develop and maintain an efficient, coordinated and economical system of electricity supply to the whole of Sri Lanka, while adhering to our core values; Quality, Service to the Nation, Efficiency and Effectiveness, Commitment, Safety, Professionalism and Sustainability.

Strategies/Strategic Themes

CEB recognizes eight goals for the Corporate Plan 2019-2023 by giving due consideration to the Sustainable Development Goals (SDG) issued by the United nations. These are a set of 'Strategic Themes' or 'Strategies' (also referred to as 'Long term objectives') formulated in order to realize the organization's long-term Vision and Mission. These are as given below:

- To make CEB Financially Stronger
- To enhance low cost electricity consumption
- To provide electricity to the entire Country at an affordable price
- To ensure high quality electricity supply and services to Customers
- To maintain a strong relationship with external stakeholders
- To enhance employee engagement
- To achieve operational excellence with state of art technology
- To optimize integration of green energy

The above eight long term objectives now form the eight strategies/Strategic Themes of the CEB.

Environmental Sustainability

We are committed to be an innovative enterprise in Sri Lanka, whilst safeguarding our environment for the future generations. Best environmental management practices will be adopted throughout the CEB to ensure its complete compliance with relevant environmental legislation and regulatory standards while building the trust and confidence of the community in CEB's operations. We will conduct our business through a participatory approach involving the community and other stakeholders in all stages of our development projects to ensure the optimum benefit to the community in the long run.

Overview of Electricity Supply

From a wet year to a dry year, CEB's annual expenditure on generation significantly varies with the amounts of electricity generated from thermal power plants of both CEB and Independent Power Producers (IPP). The securing of fuel supplies both Coal and liquid fuels, has a direct impact on the operation of thermal power stations and also very important in managing the finances of the CEB. However, the demand for electricity is growing at a rate of about 5 % per year which requires the addition of about 100 MW of capacity annually to the existing installed generation capacity. The CEB needs considerable investment for the development of its transmission and distribution network. This requires the expansion of CEB's present electrical network to cater to the increase in demand due to expansion of economic activities and also to cater the demand coming from new customers. Rural Electrification, being directed towards improvement of the quality of life of rural people and economic development of rural areas, the GOSL need to continue to compensate the CEB through investment or operational support, whenever such projects become commercially non-viable.

1. Electricity Demand

End of the year 2019, the demand for electricity was increased by 4%, while the maximum demand recorded during the year was 2,669 MW as against 2,616 MW last year. During this period 15,922 million Units (GWh) were generated and 14,611 million Units (GWh) sold.

By end of the year, the total generation stood at 15,922 GWh, of which 30% has come from Hydro generation (including mini hydro) with that of Coal power generation standing at 34%. Thermal Oil had contributed to 31% of total energy generation (total thermal power standing at 65%). Other renewable sources had a share of 5%. In comparison, by end of the year 2018, contribution from Hydro generation was 41%.

1.1. Electricity Demand Forecast for 2020

For year 2020 the electricity demand forecast based on approved CEB Long Term Generation Expansion Plan 2018-2037 is as follows:

Year	Demand		Generation		Peak
	(GWh)	Growth Rate (%)	(GWh)	Growth Rate (%)	(MW)
2020	16,646	6.8%	18,456	6.8%	3,077

It is projected an average growth rate of 6.8% for Electricity Demand up to 2020 and 5.0% average growth rate for the 20 year planning horizon.

2. Electricity Conservation

CEB engages with utility based Demand–side Management Programmes. A Load Research Program (LRP) is being conducted in Eastern Province and will be conducted in other Provinces by CEB staff, with the capacity acquired from LRP conducted in WPN with ADB technical assistance. The findings of Load Research Programmes are used to identify suitable DSM programmes to be initiated and to formulate end-user's tariffs effectively. CEB conducted energy audits and it will pursue energy audits and energy efficiency awareness programs among bulk customers. Further, CEB is conducting awareness programmes on Energy Efficiency for bulk customers to encourage rational use of energy.

3. Power Generation

The Generation Division of Ceylon Electricity Board is responsible for the operation and maintenance of Thermal and Hydro Power Plants owned by CEB. Generation Assets consist of 17 large Hydro Power Plants totalling to an installed capacity of 1,399 MW, one (01) 900MW Coal-fired Power Plant, Thermal Power Plants with an installed capacity of 654 MW consisting of seven large oil-fired power plants with 604 MW, and three Emergency Power Plants with 50MW oil-fired plants of 1 MW each. CEB also operates few power plants in the isolated networks in surrounding islands of Jaffna Peninsula. Thus the total installed Capacity of CEB-owned Power Plants as at 31st December 2019 were 2,953 MW.

Generation details of CEB and Independent Power Producers as at 31st December 2019 is given below.

For the 12 months ended; the total generation stood at 15,922 GWh, of which 24% has come from major hydro generation. While the share of Coal power generation standing at 34%. Thermal Oil had contributed to 31% of total energy generation (total thermal power standing at 65%). Other renewable sources had a share of 11%.

In comparison, contribution from major hydro during 2018 was 34%.

Description		Generation (GWh)
CEB	**Hydro**	3,784
	Thermal - Coal	5,361
	Thermal - Oil	2,141
IPP	**NCRE (Small Hydro)**	1,011
	Thermal	2,875
	Wind	348
	Solar (Grid Connected)	103
	Solar (Rooftop)	182
	Dendro & Bio Mass	117
TOTAL		**15,922**

4. Expansion of Generation Capacity

The implementation of the new Generation Projects is going ahead as envisaged in the CEB's approved Long Term Generation Expansion Plan (2018 – 2037).

The current status of Generation Expansion Projects is as follows.

4.1. Hydro Power Generation Expansion Projects

4.1.1. Uma Oya Hydro Power Project

The Uma Oya Multi-Purpose Development Project is being implemented by the Ministry of Irrigation and Water Resources Management in association with the Ministry of Power and Energy. The estimated capacity of the power plant is 120 MW (6x60MW) and the expected annual energy production is 290 GWh. This power plant will connect to the national grid through Badulla Grid Substation. The Project is expected to be completed in August 2020.total physical progress as at 31/05/2019 is 92%.

Power House of UOHPP

- Plant capacity : 120 MW
- Total Project Cost : USD 514 Million
- Expected Annual Energy Output : 290 GWh
- Expected date of completion : September 2020
- Current Progress : Total physical progress – 93.5%

4.1.2. Broadlands Hydropower Project

The Broadlands Hydropower Project is a run-of-the river type Project planned to build on the Kelani River, with the objective of harnessing the downstream hydro potential of the existing Polpitiya Power Station. The Project will have an installed capacity of 35 MW and is expected to generate 126 GWh of electrical energy annually. The Broadland Hydropower Project is the first large scale hydropower plant which was obtained CDM registration in Sri Lanka.

- Plant capacity : 35 MW
- Total Project Cost : Industrial & Commercial Bank of China (ICBC) - 85% - USD 69,723,605
  : Hatton National Bank of Sri Lanka (HNB) – 15% - USD 12,304,166
- Expected Annual Energy Output : 126 GWh
- Expected date of completion : January 2021
- Current Progress : Total physical progress -70%
  The construction work is in progress in parallel at Main Dam, Main Tunnel, Diversion Tunnel, Power House & Switchyard Site.

4.1.3. Moragolla Hydro Power Project

Asian Development Bank provided US$ 125 million to this Project under loan no. 3146 (SF)/ 3147 SRI – "Green Power Development and Energy Efficiency Improvement Investment Program (Tranche 1)" for the construction of Moragolla Hydropower Project.

- Plant capacity : 30.2 MW (2 x 15.1 MW)
- Total Project Cost : Foreign Funds USD 113.86 Million & Local Funds (CEB) LKR 3,958 Million
- Expected Annual Energy Output : 100 GWh
- Expected date of completion : August 2023
- Current Progress :

Lot A 2 – Main Civil Works	38%
Lot B - Mechanical and Electrical Facilities	Bid floated in January 2019. FBER was sent to ADB concurrence and awaiting for the reply.
Lot 3 - Project Management & Supervisory Support	Constancy works commenced on October 24, 2016. Consultancy Service will be expired on November 14, 2021 and need to be extended until August 2023.

4.1.4. Seethawaka Ganga Hydropower Project

Scope:

- Carrying out feasibility study for 20MW Hydropower Plant
- Conducting of Environmental Impact Assessment
- Detail designing and preparation of bidding documents
- Preparation & Implementation of resettlement action plan
- Construction of 20MW power plant including all civil structures
- Construction of 6km 33kV double circuit line up to Maliboda GS for grid Connection

- Plant capacity : 24 MW
- Total Project Cost : USD 79 Million
- Expected Annual Energy Output : 47.6 GWh
- Expected date of completion : 2024
- Current Progress : Feasibility study completed in December, 2018. Draft Resettlement Action Plan and Bidding documents are ready. Project Environmental approval expected by April 2020.

4.2. Thermal Power Expansion Projects

4.2.1. 3X35MW Gas Turbine Project (Kelanitissa New Gas Turbine Project) (Krishantha)

The objective of this Kelanitissa New Gas Turbine Project Unit is to replace the existing Frame V gas turbines in Kelanitissa Power Station with new gas turbine to restore electricity supply to the Colombo City during emergencies and to supply peaking power. However, the Project Management Unit has been restructured under the Transmission Division.

- Plant capacity : 130 MW (3 or 4 units)
- Total Project Cost : USD 70 Million
- Expected date of completion : 2021
- Current Progress : Funding arrangement to be finalized by the Ministry of Power.

Committed Thermal Power Projects by Private Sector

4.2.2. 4X24MW Reciprocating Engine Power Plants at the Grid Substations of Habarana, Monaragala, Horana and Pallekelle(vimalendra)

- Plant capacity : 100 MW
- Expected date of completion : 2022
- Current Progress : Technical Evaluation committee has been appointed and Request for Proposal (RFP) is under the preparation stage

4.2.3. 300MW Natural Gas fired Combined Cycle Power Plant – Kerawalapitiya(Chandana)

- Plant capacity : 300 MW
- Expected date of completion : 2023
- Current Progress : Cabinet approval received, approval of PUCSL has been requested for the draft PPA and awaited.

4.3. Renewable Energy Development Projects

4.3.1. MW Semi-Dispatchable Wind Power Project in Mannar Island

Project management Unit was set up for a proposed 100 MW semi-dispatchable wind farm project in Mannar Island to be built and operated by the CEB. The project includes construction of a 100 MW wind farm including power evacuation system and Control Centre with SCADA facilities. The operation of the plant is on semi-dispatchable basis. The project is expected to complete and commissioned in September 2020. It is expected average annual energy generation of 324 million units (GWh) over 20year operational life span of the wind farm.

- Plant capacity : 103.5 MW
- Total Project Cost : USD 200 Million
  ICG USD 13.6 Million
- Expected Annual Energy Output : 324 GWh
- Expected date of completion : November 2020
- Current Progress : Total physical progress – 42%

4.3.2. Renewable Resource Development by Power Producers

The electricity generated from new sources of renewable energy (Non Conventional Renewable Energy (NCRE)) such as small hydro, wind, solar, biomass etc., is absorbed in to the grid through Standardized Power Purchase Agreements. The details of these NCRE projects are given below:

Performance of the NCRE Sector as at 31st December 2019:

Commissioned NCRE Power Projects

Project Type	No. of Projects	Capacity (MW)
Mini Hydro Power	206	**410**
Wind Power	15	**128**
Biomass-Agri. & Industrial Waste Power	04	**13**
Biomass – Dendro Power	09	**27**
Solar Power	14	**57**
Total	**248**	**635**

Programs for NCRE Sector 2020

a) **SPPA Signed NCRE Projects which are expected to be commissioned in year 2020**

Project Type	No. of Projects	Capacity (MW)
Mini Hydro Power	48	81
Biomass-Agri. & Industrial Waste Power	01	2
Biomass – Dendro Power	10	56
Biomass Municipal Solid Waste Power	03	20
Solar Power	29	29
Solar Thermal Power	02	20
Wind Power	04	56
Total	97	264

4.4. Hydro Power Projects developed by Ministry of Irrigation and Water Resource Management

4.4.1. Thalpitigala Hydro Power Project

- Plant capacity : 15 MW
- Expected Avg. Annual Energy : 52.4 GWh
- Expected date of completion : 2024

4.4.2. Gin Ganga Hydro Power Project

- Plant capacity : 20 MW
- Expected Avg. Annual Energy : 66 GWh
- Expected date of completion : 2022
- Current Progress : The preliminary feasibility study is in progress.

4.5. Generation Rehabilitation Projects

The Generation Division of the CEB is implementing several rehabilitation projects through which several selected hydro and thermal power plants are to be refurbished. This will minimize their maintenance/repair costs and improve the efficiency and reliability of the machines. Obsolete equipment will be replaced with their modern counterparts using new technologies and this will enable to address issues arising from the non-availability of spares for old equipment and ensure their efficient performance in the years to come.

4.5.1. Performance of Rehabilitation works done and planned for 2020 are as given below.

Rehabilitation of Polpitiya (Samanala) Power Station

Rehabilitation of Polpitiya (Samanala) Power Station was commenced in 2017 and completed in 2018. Accordingly, major Electro – Mechanical equipment at the end of their service life were replaced with new equipment. The Main Inlet Valve (MIV), the generator and the turbine were also replaced. With the successful completion of the project, the capacity of the power station was increased by 15MW (2x7.5MW) and the weighted average efficiency was improved by 3%. Total cost of this project was around LKR 4,000 Million.

Works carried out in 2019

Project	Award Value	Funding	Physical Progress as at 2019	Status
Polpitiya Rehabilitation	EUR.20,668,016	CEB Bank Loan through PB	100%	Project Completed
Ukuwela Power Station GCB Replacement	LKR39 Million	CEB Funds	100%	Project Completed
Victoria Power Station U3 Stator Replacement	EUR.3,148,253	CEB Funds	100%	Project Completed
LVPS Coal Yard Extension Stage 1	LKR 129 Million	CEB Funds	100%	Project Completed
Kelanitissa Power Station V GT(Gas Turbine) Rehabilitation	LKR 960 Million	CEB Funds	After rehabilitation, three GTs(GT 1,2 and 4) were handed to KPS for commercial operation and 50% completed in GT 5	Remaining works under GT5 is in progress
LVPS Coal Yard Facilities Extension	LKR 1,882 Million +13,772,186.01 USD	CEB Funds	1.5%	Appointment of a PMU and establishment of site office completed

5. Transmission of Electricity

CEB Transmission Division plans, develops, operates and maintains the whole of the transmission assets of the CEB, while providing services to other Divisions of CEB in certain areas of activities.

The transmission division operates 220kV and 132kV grids, embracing all power stations and dispatches all electricity supplied to the grid through its System Control Centre. The System Control Centre plans and carries out the operation of generation and transmission system in order to achieve reliability, quality and operational economy. Archiving the generation and transmission data and the preparation of regular management information is also carried out by the Division

The operational objectives of the Division are to:

- Develop and maintain an efficient, coordinated, reliable and economical transmission system.
- Procure and sell electricity in bulk to distribution licensees so as to ensure a secure, reliable and economical supply of electricity to consumers.
- Ensure that there is sufficient capacity from generation plants to meet reasonable forecast demand for electricity.
- Maintain transmission voltage variations within ±10 % for 132 kV &220 kV and frequency within ±1 % of 50Hz of the system.

CEB Transmission system development projects at 220kV, 132 kV levels including all the Transmission Lines and Grid Substations in the country are carried out by specially formed Project Management Units which comprise of experienced groups of engineers. Brief description of the transmission development projects being carried out in 2019 and are expected to be continued in to the year 2020 is given below:

Progress of Transmission Network Development Activities

Item No	Project Description	Funding Agency	Cost	Commissioning year	Current Progress
01	**National Transmission & Distribution Network Development & Efficiency Improvement Project**	JICA	8,761 MLKR	January 2022	-
	Package 1: Construction of Transmission Lines				
	Package 2: construction of New 220/132 kV substation		7,418 MLKR	March 2021	16%
	Package 3: Construction of 220 kV Transmission Lines		10,258 MLKR	August 2021	12.2%
	Package 4: Construction of distribution S/Ss and 11kV cables		4,931 MLKR	To be commenced	-
02	**Green Power Development & Energy Efficiency Improvement Project – Tranch II**	ADB			
	Package 1 -Lot A : Hambanthota Grid Substation 220 kV Development		2,066.70 MLKR	December 2020	23.8%
	Package 1 – Lot B : Construction of New Polpitiya – Hambanthota 220 kV, Transmission Line (150 km)		7,642.20 MLKR	January 2021	32%
	Package 2- Lot A: Construction of Nadukuda 220/33kV Grid Substation and		3,086.80 MLKR	December 2020	55%

Item No	Project Description	Funding Agency	Cost	Commissioning year	Current Progress
	Augmentation at Mannar 220/33 kV Grid Substation	ADB			
	Package 2-Lot B1: Mannar-Nadukuda 220 kV Transmission Line - 30km		1,834.10 MLKR	August 2020	89.5%
	Package 2-Lot B2: Padukka-Horana 132 kV, 25km Transmission Line and 2nd circuit stringing of Habarana-Valachchenai 132 kV Transmission Line -98km		1,015.50 MLKR	April 2022 November 2021	1%
	Package3- Lot A1: Construction of Colombo B GSS, Single in & Out connection from Colombo C-Kolonnawa 132kV 800sqmm cable		1,577.6 MLKR	September 2021	2%
	Package3- Lot A2: Augmentation of Kotugoda, Kolonnawa, Stanley, Padukka, Horana, Dehiwala, Madampe GSS		1,663.0 MLKR	October 2020	33%
	Package3- Lot B : Construction of Biyagama 220/33kV GSS Augmentation of Biyagama GSS		1,883.0 MLKR	November 2020	31%
	Package 7- Lot A1 : Installation of 100MVAr BSC at Pannipitiya GSS		494.4 MLKR	January 2021	8%
	Package 7- Lot A2 : Installation of +100/-50 Mvar SVC at Biyagama GSS		2,244.6 MLKR	-	-
03	**Greater Colombo Transmission & Distribution Loss Reduction Project**	JICA	JPY 15,941 Million & 4,896MLKR		
	Lot 1: Construction of Colombo Port 220/132kV Grid Substation			October 2019	100%
	Lot2 – Augmentation/Modification of existing GSS			September 2019	100%
	Lot3 – Augmentation/Modification of existing GSS			August 2019	100%
	Laying of Total length of 30 km, 220kV/132kV underground cables between Colombo Port GSS & other Colombo GSS			September 2019	100%
04	**Renewable Energy Absorption Transmission Development Project**	AFD & ADB	EUR 30 Million & 1,329MLKR		
	Lot A: Construction of Maliboda, Ragala, Wewelwatta, Nawalapitiya 132/33 kVGrid Substations			September 2020	87%
	Lot B: Construction of associated Transmission Lines			June 2020	80%

Item No	Project Description	Funding Agency	Cost	Commissioning year	Current Progress
05	**Green Power Development & Energy Efficiency Improvement Investment Programme (Tranche1) Part 2**	ADB, AFD			
	Lot A: Construction of Kappalturei GS and Augmentation of Kerawalapitiya, Katunayake and Trincomalee GSS		2,500 MLKR	December 2020	90%
	Lot B1 : Construction of Kesbewa and Kaluthara GSS and Augmentation of New Anuradhapura, Old Anuradhapura, GSS		2,716 MLKR	December 2020	69.5%
	Lot B2 : Construction of associate transmission lines		682 MLKR	March 2020	96.8%
06	**Power System Reliability Strengthening Project (PSRSP)**	ADB	US $ 236 M		-
07	**CE & NEIP -P1 (Mannar Transmission Infrastructure Project)**	ADB			
	Lot A : Construction of Mannar 220/33 kV Grid Substation		USD 8.08 Million	February 2020	97%
	Lot B: Construction of New Anuradhapura to Vavuniya 55km, double circuit, two Zebra 132kV transmission line and Vavuniya to Mannar 70km,double circuit single Zebra 132kV transmission line (Designed for 220kV operation)		USD 23.69 Million	January 2019	98%
08	**Clean Energy & Network Efficiency Improvement Project (Package 03) 220 kV Transmission Infrastructure**				
	Lot A: Construction of new Polpitiya and Padukka 220/132 kV Grid Substations (GSS) and Augmentation of Pannipitiya GS	ADB	5,643 MLKR	June 2019	99.8%
	Lot B: Construction of New Polpitiya to Pannipitiya 69.2Km double circuit 2 x zebra, 220kV Transmission Line through Padukka	ADB	2,129 MLKR	December 2020	94.7%
09	**Habarana Veyangoda Transmission Line Project (HVTLP)**	JICA	9,573 Million JPY & 273 Million LKR		
	Lot A: New Habarana 220/132kV Grid Substations			September 2020	72%
	Lot B: 148 km ,220kV double circuit Transmission Line			March 2021	80%

Item No	Project Description	Funding Agency	Cost	Commissioning year	Current Progress
10	**Supporting Electricity Supply Reliability Improvement Project (SESRIP)**	ADB			
	Package 4: Construction of 33kV tower lines and 33kV 2SSBB gantries		USD 40.5 Million		
	Package 5: Supply & Delivery of Material for rural electrification network extended and distribution performance monitoring		USD 9.06 Million		
	Construction of Hybrid renewable energy systems		USD 12 Million		

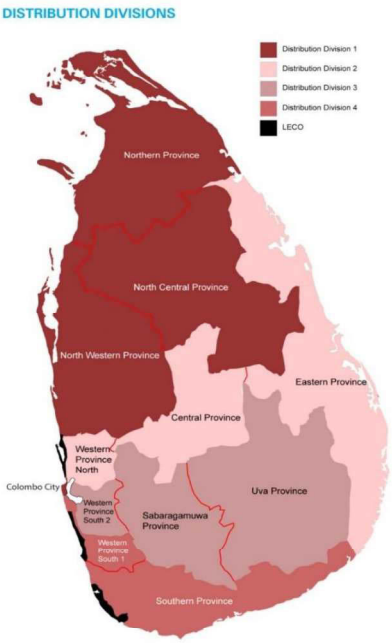
Progress of Transmission Construction Projects

Item No	Project Description	Funding Agency	Cost	Commissioning	Current Progress
01	Augmentation of New Anuradhapura Grid Substation – CEB (ICB) Budget		MLKR 216	June 2019	100%
02	Installation of 100 MVAr Reactor at New Anuradhapura GS and 50 MVAr Reactors at Mannar GS	ADB	MLKR 1,430	May 2021	8%
03	Construction of Wagawatta Grid Substation	BOI	MLKR 1,898	December 2021	23%
04	Construction of New 132/33Kv Transformer Bay at Pannala Grid Substation		MLKR 249	November 2019	100%
05	Construction of 02 Nos. of 220kV double bus bars Transmission Line Bay at New Polpitiya Grid Station		MLKR 291	March 2021	45%
06	Construction of Two (02) 33kV Feeder Bays at Ratmalana Grid Substation		CEB– MLKR 148	October 2020	58%
07	Reconstruction of Badulla – Madagama 132kV Transmission Line (29km)		MLKR 786	August 2020	82%
09	Kerawalapitiya – Kotugoda 220kV Transmission Line (at Kerawalapitiya Marshy land)		LKR 60 Million	December 2019	100%

6 Distribution of Electricity

The CEB is responsible for over 88% of electricity distribution in the country while the rest is taken care by Lanka Electricity Company Ltd. (LECO), a subsidiary of the CEB. The electrification level in the country is calculated as 99.6 % as at end of December 2019.

Distribution System of CEB consists of four Divisions. The main objectives of the formation of four divisions are to achieve benchmark competition to improve efficiency and quality of supply to the customers.



The Distribution Network System consists of 33kV and 11kV Medium Voltage (MV) lines and 400V Low Voltage (LV) lines absorbing power from 132kV and 220kV Transmission System via Grid Substations (GSS).

Each Division is headed by an Additional General Manager who is directly reporting to the General Manager. Four Divisions are formed with the following Provinces:

Division 1: Colombo City, North Western Province, North Central Province and Northern Province.

Division 2: Western Province North, Central Province and Eastern Province

Division 3: Western Province South II, Uva and Sabaragamuwa

Division 4: Western Province South I and Southern Province

Operational Structure

The Distribution Divisions are divided into provinces and each Province is headed by a Deputy General Manager. The Province is sub-divided into several Areas, which are managed by Area Electrical Engineers. The Area is further subdivided into several Consumer Service Centres (CSC) headed by an Electrical Superintendent.

In addition to the Provincial Deputy General Managers, there are three Deputy General Managers to look after Projects and Heavy Maintenance, Planning and Development and Commercial and Corporate functions of the Division. Division 1 has special Branch for Rural Electrification (RE) and Projects which is headed by a Deputy General Manager.

6.1. Distribution Infrastructure as at 31st December 2019

Description	Units	DD1	DD2	DD3	DD4	Total
33kV Distribution Lines (Overhead & Underground)	km	11,070	9,768	7,240	4,604	32,682
11kV Distribution Lines (Overhead & Underground)	km	1,374	580	45	313	2,312
No. of 33/11kV Primary Substations	Nos.	48	34	12	40	134
LV Distribution lines (Overhead & Underground)	km	47,425	42,348	32,189	28,207	150,169
No. of LV Distribution Substations	Nos.	11,734	10,240	6,339	5,163	33,476

6.2. Operational Statistics as at 31st December 2019

Description	Unit	Distribution Division 1	Distribution Division 2	Distribution Division 3	Distribution Division 4
Units sold within the Division	GWh	4,045	4,522	2,449	1,910
Revenue earned from electricity sold	Rs. Million	73,704	70,861	39,143	31,522
Average Selling Price	LKR/kWh	18.22	15.67	15.99	16.50
No of employees of the Division	Numbers	4,556	5,583	3,757	2,890
No of new connections provided	Numbers	43,023	51,692	29,126	22,519
No of Bulk Supply Consumers	Numbers	201	226	81	76
No of Retail Consumers	Numbers	42,822	51,466	29,045	22,443

According to above statistics, the CEB 's distribution system comprises of more than 33,000 Substations fed by a network of around 35,000 km of medium voltage lines.

At the end of 2019, there were 231 Customer Service Centres and 78 Point of Sale (POS) centres for collection of bill payments.

The transmission and distribution losses have been brought down to 8.23% by the end of the 2019.

6.3. Development of Electricity Distribution Network

Electricity distribution network improvements carried out during the year are listed below.

Division	HV (km)	LV (km)	Distribution Substation (No)
DD1	379	916	667
DD2	375	1044	579
DD3	78	115	292
DD4	209	218	122

7 Financial performance for year 2019

The year 2019 was challenging to CEB due prolonged dry spell experienced paving way to substantial reliance on thermal oil sources including emergency power that has led to record a loss. As no sufficient rainfalls were received where the share of major hydro was at 23% out of total gross generation. Consequently Direct Generation Cost has increased by 32% compared to year 2018 due to use of thermal sources for power generation and simultaneously escalation of commodity prices also affected on the said increase .Gross electricity generation increased by 4% against year 2018 with rising demand with the growth in economy. As a result of all the above factors the financial year 2019 ended up with a Net Loss of Rs.85Bn.

The financial position of CEB has been impaired remarkably to the extent of having a negative retained earning balance in the Statement of Financial Position. The costs were escalating with increasing price of fuel, coal and other material while there is no increase of electricity prices during last six years (since year 2013) to reflect the cost of generation.

CEB being a public enterprise involve in a major economic activity, it is compelled to provide electricity to end consumer at an affordable price. Thus, low end consumers in the domestic category as well as the consumers in industrial, hotel, religious and government category are heavily subsidized as CEB provides electricity at a price less than the average cost of production which bring the financial viability of the CEB to predicament.

7.1. Borrowings and Major Creditors

In year 2019 CEB has borrowed Rs.83Bn from banks to finance working capital requirements mainly to settle amount payable to Ceylon Petroleum Corporation, IPP's and procurement of coal. As at 31st December 2019 Bank loans for working capital stated at Rs.102Bn inclusive of Bank Overdraft. However, amount payable to CPC and IPPs as at 31st December 2019 recorded as Rs.84Bn and Rs.57Bn respectively inclusive of delay interest charges. Additionally, at the end of year 2019 total outstanding of project loans amounted to Rs.232Bn.

8 Human Resources

It is very much important to plan for personnel requirement and to fill the urgent vacancies in the CEB to carry out its business activities throughout the country. The approval was obtained from the Department of Management Services in year 2019 to increase the cadre for 26,774.

End of the year 2019, there were 20,512 permanent employees, 2,406 casual basis employees, 218 contract basis employees and 2,978 NVQ trainees making total employed by CEB to 26,114.

9 Enterprise Resource Planning Project

The Enterprise Resource Planning (ERP) Project of the CEB which commenced June 2017, progressed well during the years 2018/ 2019. ERP system will automate business processes in view of integrating information across the entire organization. Information that was previously fragmented in different systems can seamlessly flow throughout the organization so that it can be shared by different business processes in customer relationship management, financing, procurement, human resource management, asset management, maintenance management etc. Discrete business processes from Generation, Transmission, Distribution and Centralized Service would be integrated so that information will flow across the organization at all levels. The Design phase of the project was completed during the year 2018.

ADB Mission which was in Sri Lanka from 28th January 2019 to 01st February 2019 intimated the possibility of retroactive financing to implement the ERP Project on an estimated investment of US $ 10.0 million.

CEB managed to obtain USD 10 million concessionary loan financing from Asian Development Bank for the implementation of the Project. After carrying out the necessary changes to the Bidding Documents to suit for the ADB requirements, the ERP Project tender was advertised on 07th November 2019. It is envisaged to complete the Phase 01 of the Project in 02 years and the Phase 02 of the Project in another 01 year.

Lanka Electricity Company (Pvt.) Ltd.

INTRODUCTION

LECO was incorporated in 1983 under the Companies Act no. 17 of 1982 and the Companies Act No 07of 2007 with the primary objective to carry out the business of maintenance, improvement, supply, distribution and sale of electrical energy in LECO franchise area laid along the coastal belt of the Western Province and part of the Southern Province.

Our Vision

Enjoy being the light for lives of people through innovative eco-friendly business.

Our Mission

To provide the best energy solution to the society through continuous innovations.

Company Core Values

- Be eco-friendly
- To amaze our customers through innovative services, driven by continuous curiosity to improve distribution services within ecologically sustainable and environmentally geared, towards optimizing productivity and assuring profitability.

Company's Long Term Goals

- With new opportunities for growth LECO recognizes opportunities for optimizing efficiency and exploring avenues to increase productivity, sustainability and Profit.
- Transform LECO from a distributor of electricity to energy related diversified business.
- Develop innovative products by strengthening research and development in all activities of LECO.
- LECO aims to ensure and adequate source supply capacity.
- Take steps to promote renewable energy sources.
- To facilitate embedded generation from renewable energy sources.
- To implement programs through DSM (Deman side Management) in collaboration with Sustainable Energy Authority (SEA)
- Continuation of the pilot studies to convert our distribution system to a Smart system capable of integrating upward and downward.
- In line with the National Audit Act to implement procedures and prepare LECO manuals.
- According to the 19th amendment of the constitution of Sri Lanka and in terms of the Article 154(4) (a) LECO is a state owned enterprise (SOE) therefore it is necessary to follow public enterprise guidelines , so we have to prepare our manuals to comply to those manuals.

The Company's achievement exhibit our performance and the commitment made towards the high quality of service to the stakeholders.

	2015	2016	2017	2018	2019	2020 Forecast
Consumers	526,119	539,829	551,123	562,412	568,250	582,016
Sales GWh Mn	1,355	1,466	1518	1,570	1,646	1,662
Revenue Rs Mn	26,194	28,793	29,930	30,947	32,461	33,478
Distribution Losses (11 Kv) %	3.76	3.48	2.7	2.27	1.61	2.3
Consumers /Employee Ratio	359	347	351	358	370	370
Reliability of performance measurement Indices(SAIDI) (Hrs/Consumer /year)	20.7	43.1	41.9	39.1	34.7	35.0

Record of Distribution of Asset as at December 2019

Asset Category	Units	Beginning 2019	Target For 2019	Actual Performance December-19	Balance to be completed
11KV UG	km	65.963	7.1	2.428	4.672
11KVOH+ LV	km	840.547	47	3.819	43.181
Dist Sub 11 kv	Nos	2384	134	43	91
Bulk Sub 11kv	Nos	1762	122	100	22
Switching LBS and LBC	Nos	1071	99	42	57
LV Dist Sys	km	3408.350	67.20	24.258	42.942
Consumer Service Lines	Nos	565878	15250	11,047	4,203
11kv Auto Reclosures	Nos	19	150	5	145
11 Kv Sectionalisers	Nos	8	296	7	289

Projects and Progress

Operations

- Expansion and rehabilitation work in LECO is based on the geographical demand .It is a continuous process handled by each Branch.
- LECO provides a better and reliable supply to customers through an efficient distribution system.
- Minimize power outages and duration
- To ensure quality of power supply.
- To create a

Development

- The execution of proposed Clean Energy and Access Improvement Project for implementing 5 Primary substations in LECO franchise area is commissioned.
- The efficiency improvement of street lighting project has been completed.
- User friendly Billing system has been developed in house in 2015 and will be functioning in early 2016 so as to improve in the Information technology infrastructure to increase efficiency and improve customer satisfaction.
- We have upgraded the existing ERP system (PRONTO) with the new version and this will be operated from early 2016.
- A new project is being implemented to modernize the Distribution Control Center.
- It is planned to construct 08 primary substations in the LECO franchise areas to strengthen the source supply to LECO
- New scheme of recruitment and promotion is being developed and plan to implement in the year 2016
- Corporate plan has been prepared for a period 2016-2020 and plan to implement with effect from 2016

Sri Lanka Sustainable Energy Authority

Key objectives and activities of SLSEA

Energy sector plans place a strong emphasis on energy security from both national and individual perspectives. The goal of the government envisions a situation wherein reliable, affordable and clean energy will be made available to all the citizens at all times.

Sri Lanka Sustainable Energy Authority (SLSEA) is the government entity that implements the sustainable energy agenda of the country by developing all forms of renewable energy, improving energy efficiency across all sectors, formulating conducive policies, energy information management and ensuring necessary investments in the sustainable energy sector. The power sector of Sri Lanka is presently facing many challenges, especially in relation to supply of uninterrupted electricity for the entire country at affordable prices, and the severe adverse effects on the economy due to heavy dependence on imported fossil fuel for thermal power generation. In order to arrest this situation, the Government has set following targets;

- 20% grid electricity generation using New Renewable Energy sources by 2020 as an alternative to imported fossil fuel.
- 10% reduction in total energy use by 2020 through implementation of energy efficiency improvement and conservation (EEI&C) measures.

SLSEA has engaged several strategies to realise these targets while ensuring energy security of the country.

- Increasing the use of all forms of renewable energy
- Improvement of energy efficiency and conservation across all energy value chains
- Formulation of policies and strategies to encourage transition of the country's energy system from fossil fuel base to a sustainable energy base
- Creation of a conducive climate for sustainable energy investments in the country
- Introduction and promotion of new sustainable energy technologies
- Engaging the public to adopt sustainable lifestyles, habitats and neighbourhoods

The 10% share of electricity generation using New Renewable Energy (NRE), a primary objective of the government policy was realised in 2015. However, achievement of the 20% share of electricity generation using NRE by 2020 appears to be a tough task.

In the area of energy conservation, programmes have been implemented focusing regulatory interventions and strengthening the energy efficiency services sector through a ten fold accelerated programme formulated under a Presidential Task Force.

The programmes being implemented are under 4 thematic areas as per mentioned below.

- Energy Efficiency Improvement & Conservation – The objective is to directly involve in the realisation national energy efficiency targets
- Renewable Energy Development – The objective is to directly involve in the realization of national renewable energy targets
- Knowledge Management – The objective is to implement energy education programmes towards an energy conscious nation
- Strategy – The objective is to develop policy interventions, R&D interventions, technological dialogues, etc. to support long-term sustainable energy establishment in the country

1. Energy Efficiency Improvement & Conservation

In the area of energy conservation, programmes have been implemented focusing Commercial, Industrial and Domestic sectors under following three categories.

- Regulatory interventions
- Strengthening the energy efficiency services
- Training and awareness.

Programmes implemented in the year 2019 are shown in the following sections.

1.1 Establishment of Energy Management Systems

SLSEA facilitates the energy conservation in commercial, industrial and domestic sectors through long term programmes such as Energy Manager programme, Energy Auditor programme, Establishing Energy consumption benchmarks, etc.

- ✓ 7 Energy Managers accredited in 2019. Altogether 223 Energy Managers have been registered with SLSEA.
- ✓ Circular on Energy Conservation in government institutions has been revised and published.
- ✓ District-wise workshop series for energy management officers conducted annually was continued, conducting 3 workshops in Matale (130 participants), Badulla (200 participants) and Monaragala (100 participants).
- ✓ 2 Energy Auditors were accredited in 2019. Altogether 20 auditors already registered as accredited energy auditors.

1.2 Introducing Standards and Regulations

Different activities are being carried out by SLSEA to formulate proper regulatory interventions along with creating awareness to manage energy efficiency improvement in industrial, domestic and commercial sectors.

- ✓ Finalized and printed 250 copies of the 'Guideline for Sustainable Energy Residencies in Sri Lanka'
- ✓ Conduct stakeholder forum to aware building sector professionals on this guideline.
- ✓ Progress of Energy Labelling programme for appliances.

Description	Progress
Minimum Energy Performance Standard for LED Panels	Purchased relevant international standards Purchased LED modules from different manufacturers to test and set the benchmark Preparation of the standards is in progress.
Energy Labelling programme for Ceiling Fans	Test facility established at SLSI became fully functional Convened a stakeholder forum to make aware ceiling fan import companies on mandatory energy label Called for bids to create media content on ceiling fan energy label and the job was awarded
Energy Labelling programme for Computers	Established a computer test lab at University of Moratuwa Convened a stakeholder forum to make aware computer manufacturers and importers on voluntary energy label and launched the voluntary label
Energy Labelling programme for refrigerators	Draft standard was finalized and sent to SLSI for approval of sectoral committee Several models underwent testing on energy performance
Energy Labelling programme for LED lamps	Cabinet approval has been received for the regulation on mandatory MEPS label.

1.3 Advisory and Counselling Services

SLSEA assists industries, commercial and state sector institutes to solve their energy related issues by providing consulting services by answering queries, awareness programs upon request etc. A well maintained instrument bank is available for hiring for energy auditing activities. Energy Services companies have been registered to provide particular services in carrying out energy audits and implementation of energy efficiency improvement projects.

- ✓ Total number of instrument hiring days – 1710 Nos.
- ✓ Purchased 2 hand held power meters and 5 Lux meters for the instrument bank.
- ✓ Altogether 44 ESCos have been registered with SLSEA.
- ✓ Conducted 5 Energy Audits at Dockyard PLC, Divisional hospital, Galewela, DGH Matale, Dambulla.
- ✓ DSI Rajarata Tile Factory power measurement and analyzing.
- ✓ Conducted five ISO 50001 Energy Management System (EnMS) audits with SLSI at Gummi Lanka (Pvt) Ltd, Jetwing Lagoon Hotel, St Andrews Hotel in Nuwara eliya, Induruwa Beach resort, Bentota and Heritance Tea Factory, Nuwara Eliya.
- ✓ AC Selection and Determination of Cooling Load for National Victims Protection Authority
- ✓ Consultancy for 15 Energy Audits in Industrial Zones by Ministry of Industry and Commerce

1.4 Formulation & dissemination of Energy Data & statistics

- ✓ Compilation of Energy Balance 2017 and the Key Energy Statistics 2017 completed and data verification on Energy Balance 2018 is in progress.

1.5 Research and Development

Initiatives are taken for exploring the potential of adopting new and innovative technologies for the development of energy management practices in Sri Lanka.

- ✓ Designed a prototype of a standard tea withering trough including modified duct, radiators, process control and spreading mechanism with the assistance of Tea Research Institute (TRI), which would help in accurately evaluating the energy performance.

1.6 Pilot Projects

- ✓ Feasibility study was conducted for a tri-generation facility in Biyagama Export Processing Zone by the selected consultant, ISB Kurunegala.
- ✓ Final report of the study was presented to SLSEA, showcasing the virtues of a central thermal energy supply utility for industrial zones with added on-site power generation capability.

1.7 Operation Demand Side Management (ODSM) Program

Recent studies in the electricity sector indicate that focusing on few thrust areas can annually save 1895 GWh (worth 28 LKRB) electricity on an investment of 135 LKR billion. This concept, which provided the basis for the demand side management (DSM) case of the long term generation plan 2014-2039 of Ceylon Electricity Board, was found to be the least cost option for implementation. As per this option, for the implementation of nine thrust areas under commercial, residential and industrial sectors ODSM programme has been implemented under the presidential task force for energy demand side management and a national steering committee.

Thrust Area	Work Carried Out
Efficient Air Conditioning	Specification and funding proposal for a AC test facility were prepared and submitted to several donor agencies
Efficient Lighting	Lighting survey involving 100 commercial establishments was completed, revealing a 515 GWh energy saving potential in commercial lighting
Efficient Refrigerators	The procurement of refrigerant cylinders for the pilot study under a revised specification underway. Voluntary minimum energy performance standard for refrigerators was prepared and under scrutiny by the SLSI
Efficient Chillers	One pilot project for chiller replacement was started and it is in progress
Efficient Motors	Survey was conducted on motor usage, revealing a lower than anticipated saving potential
Eliminating Incandescent Lamps	350,000 LEDs were distributed among low electricity user families
Efficient Fans	The household appliance survey involving 6,357 homes was completed and data verification is in progress.

2. Renewable Energy Development

2.1 Resource Allocation and Development Activities

SLSEA undertakes the issuance of Energy Permits (EP) & Provisional Approvals (PA) for on-grid renewable energy projects, to accelerate the development of indigenous RE resources in to commercial scale projects. A summary of the project commissioned up to end 2019 is given below.

Renewable Energy Source	No. of projects	Installed capacities
Hydro	208	419.5 MW
Wind	15	128.5 MW
Biomass	12	43.5 MW
Solar	14	57.4 MW
Total	**249**	**648.9 MW**

SLSEA facilitates the developers to develop projects as follows.

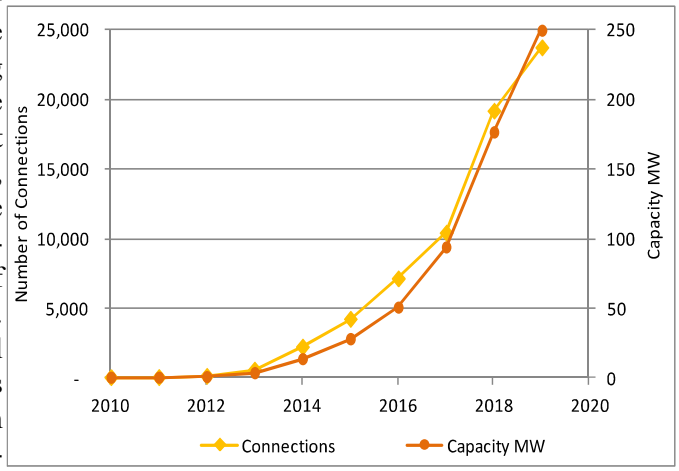
- Conducting Project approving committee and appeal committee
- Coordinating with other approving agencies
- Declare Energy Development Areas
- Project progress/post monitoring
- Maintaining and updating Geo-information system
- Facilitating to acquire the project related lands

2.2 Soorya Bala Sangramaya

The programme has realised 249.437 MW of capacity, delivering 2.3% of the total annual demand for electricity in Sri Lanka using more than 23,000 roofs.

During the last nine years in operation, the net-metering scheme has progressed rapidly.

Source: Sri Lanka Sustainable Energy Authority



The six service providers joined in the beginning quickly multiplied to the present 246 companies with the world wide crumbling of equipment prices. Realizing the value of rooftop solar as an alternative source of electricity generation with least environmental and social consequences, SLSEA is looking at furthering the scope of solar rooftop schemes. One key element in this effort is the introduction of hybrid inverter technology to Sri Lanka. A technical committee is now at the final stage of specifying solar storage systems suitable for operating in the Sri Lankan electricity grid. The usual issues associated with deep penetration of distribution networks by solar rooftop systems are substantially resolved by having an on-site energy storage system, usually a long life battery. To test the success and economics of such a scheme, a pilot project was deployed in Kurunegala under a UNDP project. The results indicate that the operation of solar / energy storage is technically feasible and also add a lot of value in terms of operating as a backup source of electricity in case of a grid electricity failure. However, without the economies of scale, introduction of battery storage systems to existing solar rooftop systems appears to be an expensive affair. Further, the battery life and the declining efficiency of the batteries will be known only after the operation of the pilot facilities for a longer period.

- ✓ 296 Service Providers were registered with SLSEA by end-2019. Created 7,600 direct and 4,500 indirect jobs through these companies.
- ✓ Standards on solar PV were published in collaboration with the SLSI.
- ✓ Conducted comprehensive technical workshops for Engineers & technicians in service provider companies.
- ✓ Installed 250 MW under this programme.
- ✓ ”Rivi Balaya Liya Saviyata” Programme was conducted to enhance skills of women related to solar energy sector.

  Initiated an NVQ Level 4 Training Programme for Solar PV Technicians in collaboration with NAITA
- ✓ Facilitated the ‘Gamperaliya’ Programme
- ✓ Provided technical support for roof top solar installations in Government Institutes
- ✓ Facilitated the Roof Top Solar Power generation Project through ADB Loan Scheme

  Conducted Public awareness programmes on Solar Rooftop Systems & Soorya Bala Sangramaya in Colombo, Monaragala, Badulla, Gampola, Jaffna, Mulatiu, Kalutara, Homagama, Negambo and Kurunagala

2.3 Hambantota National Energy Park

✓ Generated 1,077 MWh through the solar power project in Hambantota National Energy Park during 2019. Lot of university students, school children, and researchers visit annually and enhance their practical knowledge on solar energy.

2.4 Indurana Hydro Power Traning Centre

✓ Completed the construction of Sarathchandra Rajakaruna International Centre for Hydro Power Promotion at Indurana.

2.5 Electric Three Wheelers

The fossil-fuel era is nearing an end as shown by increasing world oil demand, widening the gap between new oil discoveries and consumption, and approaching of the world's peak oil production among other developments. Also, fossil fuel based automobile engines are a significant source of air pollution.

There are about 1 million 3-wheeled vehicles in Sri Lanka. These three-wheelers are usually operating with the 4 and 2-stroke internal combustion engines where the piston transmits power by rotating the crankshaft.

These three wheelers, normally driven by diesel, are more difficult to pass emission tests due to more greenhouse gas emissions (GHG emissions) and are more expensive to maintain, and the registration renewal may be restricted in near future. The E-trike, on the other hand, does not require engine service or emission testing and requires almost no maintenance costs, which can bring about a monetary gain of about $ 1,000 per year.

2.6 Awareness Programmes

- ✓ Conducted Awareness Programmes for Provincial Journalists in Nuwaraeliya, Kegalle, Ratnapura District
- ✓ Conducted an Awareness Programme for government officers in Nuwara Eliya District
- ✓ Conducted an awareness Programme for Siyane Teacher Training Education School (2,500 Participants)under the Scout Cambory Programme.
- ✓ Publish 4 'Sanraksha' Magazines

2.7 Donor Funded Projects

- ✓ Electricity Supply Reliability Improvement Project funded by Japan Fund for Poverty Reduction (JFPR) administered by Asian Development Bank (ADB) had been initiated by SLSEA in 2018 and is currently in progress with the selected Consultant.
- ✓ Conducted Training programmes for the people live in Nainathivu, Analathivu and Delfts islands on safety & Efficient use of energy and livelihood improvement.
- ✓ UNDP/GEF/FAO funded project titled 'Appropriate Mitigation Actions in the Energy Generation and End-Use Sectors in Sri Lanka' was successfully concluded in 2019. The project increased the readiness of Sri Lanka to comply with the requirements under CoP21 Paris agreement in emission reduction, monitoring, reporting and verification of emission reductions through an elaborate reporting system.

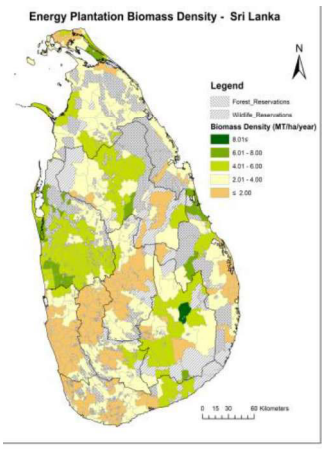
3. Strategy Division

3.1 Resource Exploration & Development Planning

Identification of different renewable energy resources, exploration of potential sites and planning the development process is one of the key areas in the renewable energy development programme. Biomass resource assessment, wind resource assessment, wave energy resource assessment, development of renewable energy resource maps & resource inventory and compilation of renewable energy development plan were carried out under this.

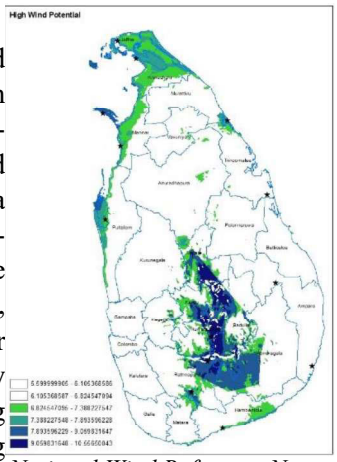
(a) Biomass Resource Assessment

Biomass energy resource assessment studies initiated in the previous years could be completed, where the necessary data and information for the compilation of energy resource maps were made available. Biomass energy resources are mainly of two types – dedicated energy plantations, which are referred to as 'dendro' resources and agro-residues.



(b) Wind Resource Assessment

Wind resource assessment implemented in the past years has resulted with the availability of wind energy resource data in the areas with high wind energy potential in the country. It has supported the development of large-scale wind power projects such as the Mannar wind power project which is under development at present. Also the data have been extensively used in the formulation of renewable energy resource map as well. Availability of real-time ground data is one of the most expected aspects in the case of wind power project development, and as there are high wind power plant capacity additions targeted for the future periods, continuous data for further periods will be highly useful. So, island-wide wind resource assessment was continued using the National Wind Reference Network comprising of wind measuring masts installed in different parts of the country.

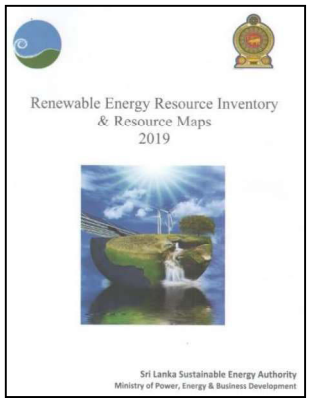


National Wind Reference Network and Wind Resource Map

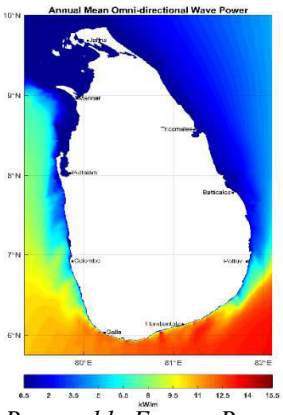
(c) Wave Energy Resource Assessment

Wave energy is one of the emerging renewable energy sources in the country. Apart from small scale research type interventions, no major efforts have been made to develop this resource. As the initial step of developing this resource, a wave energy resource assessment was carried out in collaboration with the Department of Mechanical Engineering, University of Peradeniya.

Making compliance with section 7 of the Sri Lanka Sustainable Energy Authority Act, Renewable Energy Resource Map & Renewable Energy Resource Inventory was compiled.



Wave Energy Resource Assessment in Sri Lanka

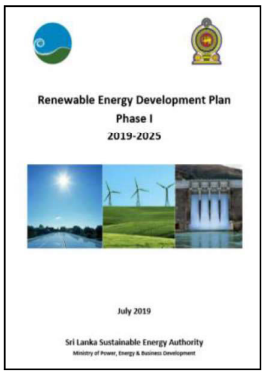


Renewable Energy Resource Inventory and Resource Maps

3.2 Renewable Energy Resource Development Plan

Section 8 of the Sri Lanka Sustainable Energy Authority Act makes provisions for preparing a comprehensive Renewable Energy Resource Development Plan, which is to be submitted to the Minister, whereby the Minister shall invite public comments for the same through publication of the plan in newspapers. This process was followed and the draft Plan was published for public comments. At the review stage, processes getting involved in land allocation had also to be taken into further review. Further, availability of the resource, availability of transmission system for evacuation and the possibility of obtaining lands had to be further considered. Accordingly, it is expected to look into the matter in a more practical level in consultation with the CEB and authorities relevant to obtaining lands, and publish the plan after the review.

Four renewable energy resources, namely, hydro, biomass, solar and wind were considered under this.



Renewable Energy Resource Development Plan

3.3 Preliminary Development Interventions in Energy Park Projects

Development of solar power and wind power projects in large scales such as 100 MW or above would attract international investors at competitive prices. Therefore, initiatives were made to implement projects of the particular scale, as Energy Parks. Pooneryn solar-wind hybrid energy park and Siyamabalanduwa solar energy park are the first two initiatives in line with this.

(a) Pooneryn Solar-Wind Hybrid Energy Park

Pooneryn area of Kilinochchi District has been identified as a prospective area for wind and solar power development, approval of the Cabinet has been granted to develop wind and solar power plants with the capacities of 240 MW and 800 MW in Pooneryn area. Initial project development activities were conducted by SLSEA in collaboration with the National Agency for Public-Private Partnership (NAPPP) of the Ministry of Finance and International Finance Corporation (IFC), which is the private arm of the World Bank.

Pooneryn Solar-Wind Hybrid Energy Park

A pre-feasibility study was conducted for the project, where it has been proposed to develop 130 MW of solar power and 240 MW as the first part of the project. It has been estimated that the direct investment for these projects as US$ 146 million and US$249 million. The solar power plant which is going to be installed first will be connected to the Kilinochchi grid substation through the proposed 132 kV transmission line. In the second stage it will be upgraded to 220 kV and connected to the Vavuniya grid substation. Bird study for the project was also completed in consultation with University of Colombo.

It will be possible to add 1,120 GWh of electricity to the national grid when the project is fully implemented. This is 7.5% of the total annual energy demand of the country. In addition to that 845,462 tons of CO_2 emission reduction can also be achieved annually.

(b) Siyamabalanduwa Solar Energy Park

Under the Energy Park development programme, the first 100 MW solar park is going to be implemented in the Monaragala district. An area of 500 acres has been identified for the project, located in 124/H Kotiyagala Grama Niladhari Division in the Siyambalanduwa Divisional Secretariat of the Monaragala district. Tracing of the land (boundary making by the department of survey, Monaragala District) for this project has been completed. Several approvals, such as those from the Land Use Committee and Department of Irrigation of Monaragala District have been obtained. Studies related to archaeological value and water availability were conducted during the year. The Environmental Impact Assessment was conducted obtaining technical assistance of a consultancy firm, having experience in the particular area of subject

Siyambalanduwa Solar Energy Park

3.4 Facilitation of Renewable Energy Research

Solar power and wind power are expected to make the maximum contribution to the renewable energy based power plant capacity additions in the future periods. Nevertheless, the intermittent nature of these resources creates difficulties in absorbing electricity generated using these resources in large scale. So, it is a major area for research in the current context. In connection to that, two research projects on integration of solar power to the grid were completed as means of identifying solutions for the issues created due to the intermittent nature of solar power, in collaboration with the Department of Electrical & Electronics Engineering, University of Peradeniya.

(a) Research project on energy efficient utilization of solar PV through a dc micro grid

Research project on energy efficient utilization of solar PV through a dc micro grid was carried out with the following objectives.

- To investigate design, control and operation of a dc micro-grid with a utility connection, PV panels and energy storage unit
- To investigate the effects of time varying loads and renewable output on energy storage
- To investigate the applications of super capacitors on dc micro-grids
- To investigate an Energy Management System (EMS) that maximizes the renewable energy usage and controls the storage capacity to reduce dependency of utility power.

According to this study, it is observed that interfacing PV to a dc network through a dc-dc converter brings more than 10% energy saving. In order to obtain maximum gain from solar PV connected to a dc network, the loads such as LED lights, computer equipment and air conditioners that have dc bus should be directly interfaced to the dc bus. Further, if LED lights, computer equipment and air conditioners in a bank are connected to a dc network powered by solar PV, the electricity bill can be matched with a solar panel having much lesser payback periods compared to the case of conventional operation using ac systems. Further, in order to get the optimal use of solar power in buildings as well as in identified geographical boundaries of the grid, using energy storage systems (ESS), it will be required to optimize systems using energy management systems. In this context, dc micro-grid will be an appropriate technology intervention. The project outcome will provide with the knowhow of different configurations for system optimization in such cases.

(b) Research project on security of supply with the large-scale deployment of PV

Research project on **s**ecurity of supply with the large-scale deployment of PV in Sri Lanka was carried out with the following objectives.

- Assessing and quantifying solar PV power output variations in power plants connected to Sri Lankan power system using suitable correlation techniques
- Assessing the reserve requirements of the Sri Lankan power system by considering uncertainties of generation and latent demand
- Modeling the Sri Lankan power system with varying amounts of renewable generation and carrying out dynamic studies

According to this study, it has been found that upward and downward regulating reserve for load variability ranges from 2.8-4.7% during the 2018-2028 period and scaling up the renewable energy share from 10% to 20% beyond 2020 increases the total regulating reserve requirement from 4.45 to 7.5% on average. Three methods have been presented to estimate reserve and operating cost for reserve while considering the uncertainties in solar forecasts. Accordingly, methodology for an accurate estimation of the net load requires forecasting solar PV generation with good accuracy. Further, the use of dynamic reserve margin ensures the minimum operating cost and requires maintaining minimum amount of reserve.

3.5 Vidulka National Energy Symposium and Innovation Forum

Vidulka National Energy Symposium was conducted with a view to obtain inputs from the researchers in the universities, research institutes, professional bodies, etc. to make fruitful use of their research outcomes in the sustainable energy development process. A wide spectrum of research papers including the diverse subject areas of energy such as energy policy & planning, electrical engineering, thermal energy systems, chemical engineering, energy management, biomass energy, solar energy, wave energy and geothermal energy were presented in the symposium. Innovations are also a key aspect in adapting renewable energy technologies, and this year's innovation forum was dedicated to solar energy. Valuable innovations in both solar electricity and solar thermal systems were also presented.

4. Knowledge Management

4.1 Energy Education Program

✓ In response to the request made by the Ministry of Education on the meeting held on 22.02.2019 to modified programme implemented in 2019. In par with that, it was decided to conduct training for science teachers in the 09 provinces to be in charge of the School Energy Clubs. We were able to train 1250 teachers under this programme in 2019. As a result of it we have able to re-register 700 nos of energy clubs in the nine provinces.

Sanasa Hall, Matara-25.10.2019/170 participants

4.2 Communication Program

✓ 'Rata Wenuwen Ekata Sitimu' organized by the President Secretariat & conducted school awareness programmes in Monaragala district on 02-05 July,2019 in par with it.

a. Mon/Thanamalwila National School on 02.07.2019
b. Mon/Malathawala National School on 03.07.2019
c. Mon/Mahanama Central college on 04.07.2019
d. Mon/Wellassa National School on 05.07.2019

- **Mon/Thanamalwila National School on 02.07.2019**


✓ Participated Shilpa Sena Exposition 2019, 18-21, July at BMICH, which was organized by the Ministry of Science, Technology & Research.

- **'Shilpa Sena'**


✓ Hosted Energy Symposium, which was held on 13th to 14th , December, 2019 at BMICH.

Sri Lanka Atomic Energy Board

Introduction to SLAEB

SLAEB has been assigned the responsibilities of promoting and facilitating the peaceful applications of Nuclear Science and Technology for socio-economic development efforts while SLAERC is assigned for regulatory functions.

The SLAEB has been fulfilling its functions in order to accomplish its objectives while gradually acquiring the distinctive technical competences required. The newly established SLAEB carries out qualitative, dedicated work in advancing cooperation in the technical areas, facilitating coordination of technical assistance in addition to performing other mandated tasks.

Vision: Sustainable Development of the Nation through Nuclear Science and Technology.

Mission: Promote and encourage peaceful applications of nuclear technology and utilize its benefits for socio-economic development of the country while ensuring safety, security and quality **and** Provide radiation protection services to facilitate protection of workers, public and environment from exposure to unwarranted ionizing radiation.

The objectives of the Sri Lanka Atomic Energy Board shall be to:

- Promote and encourage the peaceful application of nuclear technology and provide services using such technology;
- Conduct research on nuclear science and develop peaceful applications of nuclear technology for the purpose of achieving national objectives;
- Promote and support innovations to ensure safety and security systems and quality for the peaceful uses of nuclear technology;
- Provide radiation protection services to meet regulatory requirements relating to nuclear applications;
- Engage in activities involving ionizing radiation and complementary techniques, for commercial or other purposes;

Overview of the Current Operations Carried out by SLAEB

The SLAEB over the past four decades of its existence has gradually but steadily position in its multi-faceted national level roles by understanding its national responsibilities assigned by the Act therein both as the solitary national level implementing and promotion agency of the peaceful use of nuclear science and technology. The main job responsibilities carried out by the SLAEB are listed as follows;

1. Radiation Protection, Safety and Nuclear Security Program

- Nuclear Analytical Services and Radiation Measuring Capabilities
- Nuclear Technology in Water Management, Dam Safety and Climate Studies
- Nuclear Applications in Food and Agriculture
- Radiation Processing Technology in Material Development
- Nuclear Technology in Environmental Assessments
- International Cooperation in Development of Nuclear Technology
- Nuclear Knowledge Management and Nuclear Power Program
- Intangible Services of the SLAEB

2. Gamma Irradiation Services by Sri Lanka Gamma Centre at Biyagama

Providing irradiation services for sterilization of medical products - provides the required surgical gloves for all the Government hospitals in Sri Lanka which has led to save considerable amount of foreign exchange which would have been incurred for the importation of sterilized gloves. This has plan to expand in to other areas as well in the near future.

3. Non-Destructive Testing Services for Industry by NCNDT at Kelaniya

This Centre was established to provide training, certification and inspection services on Non Destructive Testing and related techniques within the country to the international level standards

Review of Financial Performance – 2019

During the year under review of 2019, SLAEB has recorded a surplus of Rs.27.9 Mn which is a significant improvement compared with the recorded deficit of Rs.0.4Mn in 2018.

Total Revenue has increased to Rs.346.6 Mn from Rs.288.5 Mn in 2018, Rs.58.1 Mn. or 20.1% increase. A main contributor for this increase was Generated Revenue from operations of which increased by Rs.46.6 Mn to Rs.143.1Mn from Rs.96.5Mn or 48% increase compared with the year 2018. Recurrent Grant has increased by Rs.11.6Mn or 13.8% and Donations has increased by Rs.15 Mn in year 2019.

Budgeted self-generated income of SLAEB for the year 2019 was Rs.118 Mn, but it was able to achieved total self-generated income for the year of Rs.155.7 Mn. This is an increase of 47%. Compare to the year 2018.

Total expenditure of the year 2019 has increased to Rs.318.6 Mn, an increase of Rs.29.4 Mn in total from Rs.289Mn in year 2018. The reasons for this increase are Wages Salaries and Employee Benefits which has increased by Rs.11Mn, Supplies and Consumables used which has increased by Rs.10.8Mn and Other Recurrent Expenditure which has increased by Rs.11Mn compared with the previous year 2018.

As at 31st December 2019, the total Assets of SLAEB has increased by Rs.42.1 Mn compared with the previous year and total Net Assets has increased by Rs.18.7 Mn.

Given below are the performances of each division of SLAEB during the year 2019.

Gamma Irradiation Service (Sri Lanka Gamma Centre - SLGC):

SLGC is providing irradiation services for sterilization of gloves manufactured by a Local manufacturer who supplies surgical gloves for all Government hospitals in the Country. This has resulted in saving of considerable amount of foreign exchange which was incurred for importation of sterilized gloves to the hospitals while uplifting local industries. In addition, SLGC involves in many research projects to develop and introduction of research work to local industries.

It also provides services such as sterilization of other medical products, microbial disinfestations and insect pest control of food products, radiation preservation of food, phyto-sanitary treatments, microbial disinfestations and insect control of medical herbs.

During the year 2019, 4,006.10 M^3 of surgical products such as gloves, disposable aprons, PET bottles were sterilized and earned total Revenue of Rs.54.8Mn. in average it has capacity for 330 m^3 amounts of surgical gloves for sterilization in every month and it has approved plan to more than double this capacity in 2020.

SLGC perform its activities according to the ISO 13485:2016 and ISO 9001:2015 Standards. Surveillance Audit on the ISO 13485:2016 was conducted by Ascent Lanka - TNV Certification (Pvt) Ltd on 10th June 2019 and successfully completed.

The agreement for providing surgical gloves has been extended with Lalan Rubbers (Pvt) Ltd with effect from 01st November to 31st March 2020 and it has planned to extend this for next ten years period.

Non-Destructive Testing Services:

National Centre for Non-Destructive Testing (NCNDT) was established by the SLAEB as a separate Centre at No. 977/18, Kandy Road, Kelaniya in 2014 with moderately equipped laboratories with a view to expand the Non-Destructive Testing services to the nation.

During the year under review total 137 NDT inspection services were provided with a view of sustained reduction of defects in products, civil constructions, etc and hence reduction in emergency shutdown in industrial components / assemblies / power plants etc.

Under its training of professional qualifications 232 NDT personnel were trained / qualified / certified with a view to make available a sufficient number of NDT knowledgeable/qualified and certified personnel in the industrial sites to carryout NDT related decision making and to have increased level of job opportunities both in local & foreign industries.

During the year 2019 total generated Revenue from the NCNDT is Rs.28.84Mn.

Life Science Division - Nuclear Analytical Services:

Life Sciences Division (LSD) is responsible for providing efficient and effective Nuclear Analytical Testing services for regulatory requirements, with special attention to testing of imported milk powder for radioactivity contamination for consumer safety. In addition, servicers provided on customer requests and academic research, in compliance with international standard while the division actively engages in the socio-economic development goals of the country.

During the year 2019, radioactivity measurements in food (milk powder etc.), agricultural products (tea, coconut, spices, herbs etc.), environmental samples (soil, sediment, water etc.) and building materials (tiles, sand) as well as various sample matrixes for multi elemental compositions were analysed in LSD laboratories. Approximately Rs.45.2Mn. income was generated by analysing and report issuing for a total number of 6032 samples.

Gamma Spectrometry Laboratory maintained Quality Management System (QMS) as per the ISO IEC 17025:2005 International Accreditation for testing laboratory since 2006. The QMS was upgraded including all the documents and processes as per new version of ISO IEC 17025:2017.

New analytical methodology was established to monitor the radiation levels in various sample matrixes including drinking water and waste water that is called as gross Alpha Beta measurements.

Installation and commissioning of Isotope Ratio Mass Spectrometry (IRMS) equipment was completed. The equipment was received through IAEA technical cooperation and Government cost sharing for stable isotope analysis. The total equipment cost was Rs.62Mn. Another new laboratory of Inductive Coupled Plasma Mass Spectrometry (ICPMS) was established for trace element analysis. The total equipment cost was Rs.23.9Mn. Methodology development for both analytical techniques are in progress for various sample matrixes. Both analytical methods are ready for sample analysis.

LSD has been involved in continuous monitoring and analysing the sea water samples for radioactivity under the activities of RAS7028 –'Marine Environment Monitoring with respect to the radioactivity contamination and climate change studies'.

A new research project has been commenced from January 2019 with the title of 'Applying Isotopic Fingerprinting to Authentication of Ceylon Tea' jointly with Tea Research Institute and Sri Lanka Tea Board under the activities of RAS5081.Under this project it is planned to develop a certification method for origin verification of 'Ceylon Tea'.

Development of Rapid Screening Methods to Assess the Authenticity, Safety and Quality of Imported and Locally Produced Milk Powder in Sri Lanka is another important project implemented under the LSD. In the dairy industry, agrochemicals and veterinary drugs are being used heavily and traces of agrochemicals or veterinary drug residues can be presence in the milk powder.

This study will be developed an analytical method to rapidly identify the unknown and known contaminants/adulterants. Under this project it is planned to establish a Near Infra-Red (NIR) method for screening of locally produced milk powder for known and unknown contaminants. Project work is in progress. The remaining budget of this project is approximately Rs2.0 Mn.

Another project is the "Assessing and improving Soil and Water Quality to Minimize Land Degradation and Enhance Crop Productivity Using Nuclear Techniques-RAS 5084". This project is being implemented in collaboration with Natural Resources Management Centre of the Department of Agriculture. Overall objective of this project is to assess soil erosion status of different land uses and assessment of pollution status in selected watershed in Nuwaraeliya District using stable isotope technique.

53 Soil samples were analysed for 137Cs and 210Pb at the LSD Gamma spectrometry laboratory for soil erosion assessment and 06 water samples were collected for pollution study covering vegetable and tea cultivation site in Nuwaraeliya during this period.

"Air quality monitoring programme" has been continued since 2006. Present study site is in Biyagama Export Processing site, Zone B. Continuously collected fine and coarse air particulate matter samples on to the filter papers weekly basis for analysis.

The IAEA has approved National Technical Cooperation project for the establishment of Cyclotron based radiopharmaceutical production facility in Sri Lanka.. Project work in national level is in progress jointly with the Ministry of Health and Apeksha Hospital project on establishing Cyclotron based radiopharmaceutical production facility in Sri Lanka for the benefit of health care services with regard to cancer diagnosis.

General Scientific Division (GSD):

Provision of quality service to protect general public, environment and radiation workers is the main objective of this division. This division provides radiation protection services to meet regulatory requirements and technical services to ensure the safety and security of the nuclear technology in the country.

Nuclear Instrumentation Section (NIS) of the GSD has designed and developed commercial level low-cost radiation measuring equipment for educational purposes for school and university students. Service agreement was signed to develop 21 set of Gamma Counting Systems, Radiation Survey Meters and Cloud Chamber kits were commercially developed for the education purpose of Northern Province Students. Also, this section provided necessary assisting services for repair and maintenance of nuclear instruments in order to derive benefits of nuclear technology to Sri Lankan community. The number of services carried out during the year 2019 was 28.

The island wide Services in Dissymmetry Calibrations & Personal Monitoring were provided with ISO 17025 accredited laboratories. During the year 2019, calibration services were provided 113 radiation monitoring equipment In addition, personal monitoring services were provided to protect than 1,724 workers free of charge or with a minimum charge. The environmental radioactivity monitoring services for Gamma and Radon have been conducted and the service of workplace monitoring is being continuing successfully

Ensuring the safety of citizens, the division also provides expert services for sustaining the nuclear security regime in the country. A significant contribution has been provided to strengthen up the nuclear security detection architecture identified under the Integrated Nuclear Security Plan (INSSP) of the country. Especially in ports of entry (Port of Colombo, Bandaranaike International Airport) and major public events through the distribution of instruments and providing training and consultation services to Sri Lanka Customs, Airport Aviation Security, Police and Tri-forces. The division also maintains the National Nuclear Disaster Early Warning System and the Central Disused Radiation Source Storage Facility.

The Division provides island-wide, non-profit oriented services, but the Division has generated Rs 13.8 Mn. income during the year.

Industrial Applications Division

Industrial Applications Division (IAD) was established to promote and apply isotope techniques in hydrology and radiation processing techniques in the fields of environment, industry, health and agriculture. IAD also provides related consultancies and analytical services for the stakeholder institutes/ organizations and other respective research institutions and organizations. Priority is given by the IAD for research and development activities which are conducted in collaboration with national and international institutes/organizations to fulfill the national needs.

There are two sub Sections in IAD;

- Isotope Hydrology Section and
- Radiation Processing Section.

In the year 2019, Isotope Hydrology Section mainly engaged in research studies on groundwater conditions in the Dry Zone areas where the water scarcity and some health issues such as Chronic Kidney Disease are common. The studies were focused on the groundwater in Malwathu Oya basin & Lower Mahaweli basin in North-Central province and MeeOya & Kala Oya basin in North-Western province. Groundwater recharge, origin, quality and possibility of contamination were studied. Important information on groundwater dynamics and quality were revealed in 2019. This information is beneficial to water sector institutes to manage the water resources in the selected river basins.

The research programs of Radiation Processing Section (RPS) have been disturbed by the relocation of SLAEB laboratories in 2018. However the research activities in the development of chemical formulation and conducting laboratory scale trials for developing an oil absorbent material using radiation grafting technology to use in oil spill incidents and relevant industrial application in the country were continued in preliminary level in 2019.

In addition to the above working areas, a new research area on investigation of optimum water requirement of agricultural crops was identified in 2019 and method development is being continued under new unit proposed as “Isotope Ecology Unit” under IAD. A research proposal was submitted to IAEA’s Regional Cooperative Agreement Programand the 2nd stage review of the proposal is being conducted by the IAEA at the moment.

School Education programs was also conducted successfully under IAD in 2019 by organizing workshops, seminars, exhibitions etc… for school children and general public throughout the country. Further, the program on distribution of Radiation Education Instrument Kits to schools in Northern Province was coordinated by the IAD. A web based educational module named “Smart Book” is also going to be launched by the end of 1st quarter of 2020 as a result of the close coordination with the Ministry of Education and the service provider who is currently working on Smart-Book.

International Cooperation Division:

International Cooperation Division of Sri Lanka Atomic Energy Board (SLAEB) functions as the National Liaison Office to the International Atomic Energy Agency (IAEA) which is widely known as the world’s “Atoms for Peace and Development”, an organization within the United Nations family.

International Cooperation Division coordinates activities with IAEA in order to obtain technical assistance under its Technical Cooperation (TC) Programme. The IAEA delivers its technical assistance to the Member States under various projects which are in following nature. This Division also coordinates activities with other international organizations such as Regional Cooperative Agreement regional Office (RCARO) in South Korea, Institutes functioning under Ministry of Education, Culture, Sports, Science and Technology (MEXT) in Japan, International Center for Theoretical Physics (ICTP) etc. to obtain technical assistance to develop nuclear technology in the Country. Coordination of bilateral discussions with IAEA Member States (MS) in order to see the possibility of obtaining technical support to Sri Lanka and coordination of Nuclear Knowledge Management (NKM) activities are other important functions rendered by this division.

34 Expert services-received for the country to enhance to capabilities of Sri Lankan Scientist 176 opportunities were received by scientists, engineers and researchers in related national institutes to participate in overseas training, workshop and meetings under regional and inter regional Technical Cooperation projects of IAEA.

04 number of national training courses were conducted in Sri Lanka under TC projects and RCA National Representatives meeting was hosted in Colombo Sri Lanka. These events benefited to Sri Lanka Scientist and technologist to enhance their knowledge.

04 TC projects, 963,809 Euro worth of technical assistance (Approximately 193 million) of technical assistance for 2020-21 cycle were approved to be received such assistance will be received in the forms of expert mission, Human resources Development (fellowship visit, Scientific Visits) equipment etc.

Sri Lanka Atomic Energy Regulatory Council

1. Introduction

1.1 Establishment of Sri Lanka Atomic Energy Regulatory Council

Sri Lanka Atomic Energy Regulatory Council **(Council)** was established on the 1st of January 2015 under the Sri Lanka Atomic Energy Act No. 40 of 2014 and functions under the Ministry of Power, Energy and Business Development. As per the provisions of the Act, the Sri Lanka Atomic Energy Regulatory Council has the responsibility for;

- Regulation of practices and sources involving ionizing radiation by implementing a licensing, an inspection and an import and export control programmes
- Ensuring the safety & security of radiation sources
- Taking legal actions for violations of provisions of the Act and
- Taking actions to fulfil the obligations of Sri Lanka on agreements signed by Sri Lanka on safety, security and safeguards related to nuclear applications

1.2 Objectives of the Council

The main objectives of the Council are;

(a) Protection of persons and the environment against risks associated with exposure to ionizing radiation and for the safety and security of the sources and facilities
(b) Ensuring the physical protection of radiation sources, nuclear materials and other radioactive material and ensuring the security of facilities that use such material
(c) Ensuring compliance with international standards and obligations in the field of nuclear energy, in accordance with international agreements that Sri Lanka has entered into

1.3 Key functions of the Council

(a) Licencing of the practices involving the use of ionizing radiation and renew, modify. suspend or revoke the same.
(b) Conducting inspections to ensure compliance with the requirements imposed under the Act and conditions specified in the licences issued.
(c) Taking appropriate measures to ensure due compliance with the provisions of the Act and proper enforcement of noncompliance.
(d) Maintenance of a national register containing information on all radiation sources used within Sri Lanka.
(e) Formulation of national policies and strategies on protection against ionizing radiation, on the safety and security of sources and nuclear and other radioactive material and on radioactive waste management.
(f) Formulation of regulation, rules, codes and standards relating to radiation protection and the application of ionizing radiation, which reflects best practices enunciated by the International Atomic Energy Agency and any other similar International Organizations.
(g) Taking necessary steps to fulfill the obligations of Sri Lanka under the international treaties, conventions, relevant protocols and agreements relating to safety & security of sources to which Sri Lanka is a party.
(h) Conducting public awareness programmes in relation to nuclear science and technology and training of radiation workers on radiation safety and security aspects.
(i) Supervision of radioactive waste management and transport of radioactive materials.
(j) Granting approvals for the plans of the buildings for the construction of radiation facilities.
(k) Approvals for import/export of radioactive materials.

1.4 Ongoing bi-lateral programme

With the technical assistance of the Global Material Security (GMS) programme of the United State Department of Energy (USDOE), the Council is engaged in installing physical security systems at facilities which use high radioactivity sources in order to ensure security of the high active sources.

2. Performance 1st January – 31st December 2019

Activity	Performance
1. Issuance of licence for the use/possession of ionizing radiation facilities	1.1 No. of licences issued - 514 1.2 No. of Modifications issued for existing licences - 34
2. Issuance of certificates for food testing	No. of certificates issued - 1065
3. Conducting regulatory & on request inspections of facilities involving ionizing radiation	3.1 No. of regulatory inspections conducted - 205 3.2 No. of on request inspections conducted - 13 3.3 Enforcement inspection - 20 3.4 Non-compliance inspection - 10
4. Issuing approvals for import/export of radioactive materials	No. of authorizations issued - 602
5. Approval of building plans of radiation facilities on radiation safety	No. of approvals given - 236
6. Preparation of radiation safety regulations	1st draft of radiation safety regulations has been prepared and reviewed with IAEA relevant safety publications. Final draft was sent to the IAEA for review.
7. Preparation of source security regulations	1st draft of source security regulations has been prepared and reviewed with IAEA relevant security publications. Final draft was sent to the Legal Draftsman Department for review.
8. Preparation of rules for establishment of concentration levels of radioactivity in food and other radioactive materials used by general public	Drafting of the rule is being done and 40% is completed
9. Rule on criteria for qualification of radiation workers	First draft of the rule on Criteria for Qualification of Radiation Workers were prepared and discussed and reviewed with relevant stakeholders. The draft prepared with comments was submitted to the Board of Management and the Board appointed a subcommittee of the Board to review the drafts and report to the Board of Management.
10. Preparation of a registry for radiation sources	Regulatory Authority Information System (RAIS) developed by the IAEA was obtained and installed with the help of an IAEA expert. The Council's Scientific Officers were trained on use of the database. The Data base is currently used for entering data of licences issued and inspections conducted. All radiation sources licensed by the Council are being uploaded to the database to maintain a National Source Registry

11. Preparation of National Radiological Theft Response Code (NRTRC)	Code has been drafted and reviewed by the Council. The draft was sent to stakeholders for review and their comments. Final report prepared with comments was approved by Board of Directors
12. Establishment of Nuclear/Radiological Emergency Response Plans and Teams	Completed final draft of the National Nuclear or Radiological Emergency Management Plan and was approved by the Board of Directors. Emergency Management plan was sent to the Disaster Management Center for approval.
13. Training of newly recruited 6 Scientific Officers on licensing, regulatory inspection and other regulatory activities	New Scientific Officers are being given on the job training under the supervision of 4 Deputy Directors
14. Transport of high Radioactive Sources.	Discussion were held with USDOE to repatriate US made spent radioactive sources stored at SSSF under USDOE Global Material Security (GSM) Programme which is currently participated by the Council. Approval for transport of 3 new sources imported from India for cancer units was given in second quarter and arrangement was made for security during transport.
15. Training of Police Army and Navy Officers in Radiation Protection and Nuclear Security	The Council assisted Special Task Force to conduct training courses at STF training school, Katukurunda for Police and STF Officers on radiation safety and security of sources from 6-8 March ,2019. Conducted training course for Navy Officers on 27th March2019
16. Publication of information of licensed facilities in the Council's WEB	Up to dated information of all licenced facilities are uploaded to the Council's WEB for public information to identify suitable places for obtaining services.
17. Additional Protocol (AP) to the Comprehensive Safeguards Agreement	Sri Lanka has entered in to the safeguard agreement as a country which is not involved in activities related to nuclear weapons. In order to strengthen the safeguard, the IAEA has introduced additional protocol (AP) and requested to member states to become a party to the AP for further strengthen the safeguards. In accordance with the above request the council prepared the additional protocol for Sri Lanka and submitted to Ministry of Foreign Affairs through Ministry of Power, Energy and Business Development. After discussion with relevant stakeholders the cabinet paper was submitted for approval. The approval of the cabinet was granted to the additional protocol to inform the IAEA that Sri Lanka will rectify the additional protocol after enabling legislation is promulgated in Sri Lanka. At present the Council is in the process of amending the relevant parts of the Act to adopt the Additional Protocol.

18. Recruitment of new staff for the Council	Arrangements are being made to recruit Technical Assistant in 2019 following requirements of the Scheme of Recruitment.
19. Conducting training courses	• Performed a review mission for radiation protection from 1-5 April by the IAEA expert mission. • Organized Assurance visit in collaboratives with USDOE experts from 18-21 February 2019 at relevant institutions to access implementation of nuclear security. Obtained approval from Board of Management to conduct a national training programme for workers who work in industry. Nominations have been already called by the Council. • Conducted a training programme for 50 officers of Ministerial Security Division (MSD) on 04th July 2019. • Conducted awareness programme at cardiology unit. Teaching Hospital, Kandy for cardiologists, Nurses and Radiographers working at this unit on 19th February 2019.
20. Training conducted on Nuclear or Radiological Emergency Response and Planning	Conducted a training on Radiological Emergency Management for STF officers at STF training college from 6-8 March 2019.

LTL Holdings (PVT) Ltd.

Introduction:

LTL Holdings (PVT) Ltd, formerly known as the "Lanka Transformers Limited" is a public private partnership between the Ceylon Electricity Board and the employees of LTL Holdings (PVT) Ltd.

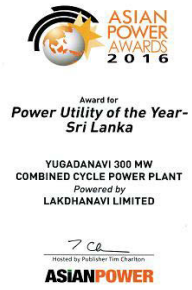
In its corporate journey over the past 37 years, LTL Holdings (PVT) Ltd had achieved healthy growth to become a leading Engineering Organization in the Power Sector having gained exemplary engineering excellence in Sri Lanka and Overseas. The Company, over the years, had diversified its business into various aspects, such as Power Generation, Electricity Infrastructure Development, Power Distribution Transformers and Hot Dip Galvanizing thus covering the entire value chain of the power sector in Sri Lanka.

Backed by the professionally qualified and well knitted team of young engineers coupled with vast experience gained through innovative modern technology over 3½ decades in the field of Power Sector engineering works with international exposure, the Company has now grown significantly and penetrated successfully into international markets, over the last 15 years, investing in Power Plants construction, operation and maintenance including providing Engineering Procurement and Construction (EPC) contracts in Sri Lanka and Overseas, such as Bangladesh, Tanzania, Uganda, Kenya, Ethiopia, India, Nepal and Australia. The transformer facility of the company, meets the entire requirement of power distribution transformers of the CEB and other local markets whilst exporting over 50% of its productions to many countries in the world.

LTL Holdings has a fully automated Galvanizing Plant provides Hot Dipped Galvanizing for transmission towers and other industries and capable of producing an output of 6.2 metric tonne per hour to the highest international standards.

The Company has been bestowed upon with various awards for engineering excellence over the years for its extra ordinary performance including the prestigious Gold Award for best independent producer (IPP) in the Asian Region, with others including:

- Winning Engineering Excellence Award in 2015 from the Institution of Engineers, Sri Lanka.
- Winning the Asian Power Awards 2016 for the excellent performance held in South Korea.



Dividend Income from Foreign Subsidiaries – 2019/20

The dividend income earned from foreign investments during the year under review, amounts to a sum of USD followed by successful operation of the subsidiaries of the company, which are tabulated below:

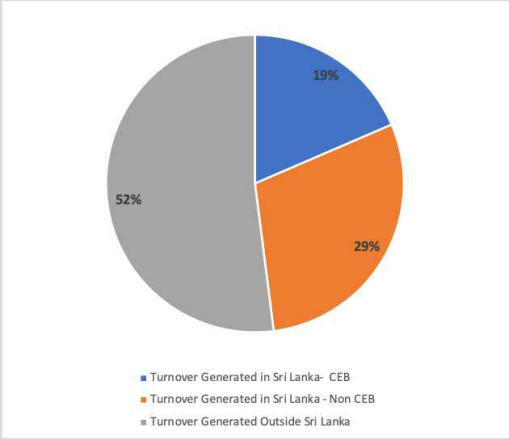
1.	Asiatic Electrical & Switchgear (PTE) Ltd, India	.. USD. 12,615.00.
2.	Lakdhanavi Bangla Power Ltd, Bangladesh	.. USD. 20,000.00.
3.	Raj Lanka Power Ltd, Bangladesh	.. USD. 448,894.47.
4.	Bright International Power PTE Ltd, Singapore	.. USD. 421,785.30.
	Total	**USD..903,294.77.**

Performance of LTL Holdings Group of Companies during the Financial Year including Financial Highlights for 2020

Tabulated below is a summary of the Financial Performance on major operations in comparison to the previous years are shown below:-

PERIOD	F/Year 2019/2020	F/Year 2018/2019	F/Year 2015/2016
TURN OVER	**(Rs.Million)**	**(Rs.Million)**	**(Rs. Million)**
Manufacturing Misc. Services	5,001.00	6,825.00	5,573.00
Power Generation	12,509.00	12,374.00	11,815.00
Construction Services	-	158.00	218.00
TOTAL	**17,510.00**	**19,357.00**	**17,606.00**
GROSS PROFIT			
Manufacturing Misc. Services	1,192.00	1,360.00	976.00
Power Generation	6,431.00	5,088.00	4,921.00
Construction Services	-	9.00	26.00
TOTAL	**7,623.00**	**6,457.00**	**5,923.00**

Though the overall consolidated Turn Over had declined in comparison to last year, the Gross Profit of the Company has recorded an excellent improvement showing an increase of 18.06%, equivalent to Rs.1,166 Million for the period under review, in comparison to the corresponding period last year.



The turnover recorded under “Manufacturing Misc. Services” shows a decrease of 26,72% over last year. The profit earned too records a decrease of 12.35% during the corresponding period last year. The turnover achieved under “Power Generation” gained slightly over last year by 1.09%, the gross profit recorded too during the corresponding period shows a considerable increase by 26.40%.

The income generated from outstanding operation and maintenance of the 300MW Combined Cycle Power Plant at Kerawalapitiya has compensated losses encountered owing to closure of 22.5MW Lakdhanavi & 100MW Heladhanavi Power Plants consequent upon expiration of the PPAs. As the CEB has turned down the request for extension of the PPA, the Company had reluctantly compelled to sell out these redundant power plants in order to avert the financial burden on the maintenance, rental fees, electricity bills, salaries/wages to staff and workers at site including security arrangements.

Performance for 2019

1. Operations and Maintenance of Power Plants

1.1 Yugadhanavi Power Plant at Kerawalapitiya

Installation	Yugadanavi Power Plant, Kerawalapitiya, Sri Lanka
Total Plant Capacity	300 MW
GT/ST Supplier	GE France/USA
Engine Model	GT – Frame 9E, ST SC5
Alternator Type	GE 9A5
Configuration	2:2:1
Machine Output	100 MW each
Number of Machines	2 GTs & 1 ST
PPA Period	25 Years start from May 2010

Annual Energy sale for the year 2020 upto 31st August, is 1,048 GWh and achieved availability is 87.88 %. The annual availability target for the year 2021 has been based at 70%.

Lakdhanavi Limited, the Operation and Maintenance contractor of Yugadanavi 300MW Power Plant, continue to retain the high degree of excellence in the maintenance and operation of the plant. Lakdhanavi successfully obtained the certification for ISO 9001, ISO 14001 and OHAS 18000 for the operations and maintenance activities carried out at Yugadhanavi Power Plant for the year 2018 followed by the audits conducted in January 2018. Lakdhanavi Ltd has also won the **Merit Award** from **International Safety Awards organized by British Safety Council**, for the operation of Yugadhanavi Power Plant. This achievement was followed by another land mark accomplishment, where Yugadhanavi Power Plant won the award of the best Sri Lankan power utility of the year, and Innovative Power Technology of the Year, Sri Lanka in Asian Power Awards held in 2017 at Thailand.

1.2 Raj Lanka Power Plant,Natore, Bangladesh (RLPP)

Installation	RajLanka Power Plant, Natore , Bangladesh
Total Plant Capacity	52.2 MW
Engine Supplier	Wartsila Finland
Engine Model	W20V32
Machine Output	8.9 MW
Number of Machines	6
PPA Period	15 Years starts from , January,2014

Annual Energy sale of RLPP for the year 2020 upto August is 35.39 GWh and achieved availability is 95.94%. The annual availability target for the year 2021 has been based at above 90%. This Thermal Power Plant is the first Sri Lanka owned plant outside Sri Lanka.

1.3 Lakdhanavi Bangla Power Plant, Comilla, Bangladesh (LBPP)

Installation	Lakdhanavi Bangla Power Plant, Comilla, Bangladesh
Total Plant Capacity	52.2 MW
Engine Supplier	Wartsila Finland
Engine Model	W20V32
Machine Output	8.9 MW
Number of Machines	6
PPA Period	15 Years starts from December,2014

Annual Energy sale of LBPP for the year 2020 upto 31st August is 44.83 GWh and achieved availability is 99.23%. The annual availability target for the year 2021 has been based at above 90%.

1.4 Feni Lanka Power Plant, Feni, Bangladesh

Installation	Feni Lanka Power Plant, Feni, Bangladesh
Total Plant Capacity	114 MW
Engine Supplier	Wartsila Finland
Engine Model	Six 18V50 and one W20V32
Machine Output	18.415*6 + 9.78*1 MW
Number of Machines	7
PPA Period	15 Years starts from November, 2019

Annual Energy sale for the year 2020 up to 31 August is 70.84 GWh and achieved availability 100.00 %. The annual availability target for the year 2021 has been based at above 90%.

1.5 Pawandhanavi Wind Power Plant, Norochcholai

Installation	Pawandhanavi Wind Power Plant, Ilanthadiya,Norochchole
Total Plant Capacity	9.8 MW
Turbine Supplier	Gamesa
Turbine Model	G58
Turbine Output	850kW
Number of Turbines	12
PPA Period	20 Years starts from September,2012

Annual Energy sale for the year 2020 upto 31st August is 6.60 GWh and achieved Plant Factor is 11.11%. The annual availability target for the year 2021 has been based at 75.%. This plant was subject to the periodical maintenance service, during the year under review.

2. BelihulOya Mini hydro Power Plant

Installation	BelilhulOya Mini Hydro Plant, BelihulOya
Total Plant Capacity	2.2 MW
Turbine Supplier	Wasserkraft Volk AG, Germany
Turbine Type	Horizontal Turbo Impulse
Turbine Output	1.1 MW
Number of Turbines	2
PPA Period	15 Years starts from May,2003

Annual Energy sale for the year 2020 upto August is 3.5 GWh and achieved Plant Factor is 27.46 %. The annual availability target for the year 2021 has been based at 50.00%. The damage caused to the penstock and Penstock Trail of the plant have been satisfactory repaired and the operations resumed at its full capacity.

2.1 Assupini Ella Mini hydro Power Plant

Installation	Assupiniella Mini Hydro Plant, Aranayake
Total Plant Capacity	4 MW
Turbine Supplier	VA Tech
Turbine Type	Horizontal Pelton
Turbine Output	2 MW
Number of Turbines	2
PPA Period	15 Years starts from November,2005

Annual Energy sale for the year 2020 upto August is 6.69 GWh and achieved Plant Factor is 29 % .The annual availability target for the year 2021 has been based at 50.70%. The penstock trail/pipeline etc., of the completely rehabilitated brought into successful operations, followed by severe flood damage owing to the landslide during the last year.

2.2 10MW Makarigad Hydro Power (PVT) Ltd, Nepal

Location	Water Source, Makari Gad, a tributary of the Chemeliya Riverin Khandeswari and Gujar Village of Darchula District in Far Eastern Nepal
Total Plant Capacity	10 MW
Energy – Saleable - Contracted	74.1 MU 69.8 MU
PPA	Signed
Turbine Supplier	Yet to be decided
Turbine Type	Horizontal 2 Jet Pelton
Hydrology	Rain & snow fed perennial stream

The required land for the construction of Power plant has been acquired from private owners and Government. A site office has been established. Transmission line route has been finalized after having obtained the approval of the Department of National Park and Wildlife Conservation to prepare the Feasibility Study Report followed by the EIA study. The access Road to the site of the power plant is in progress. The PPA and Bank Loan arrangements have been finalized.

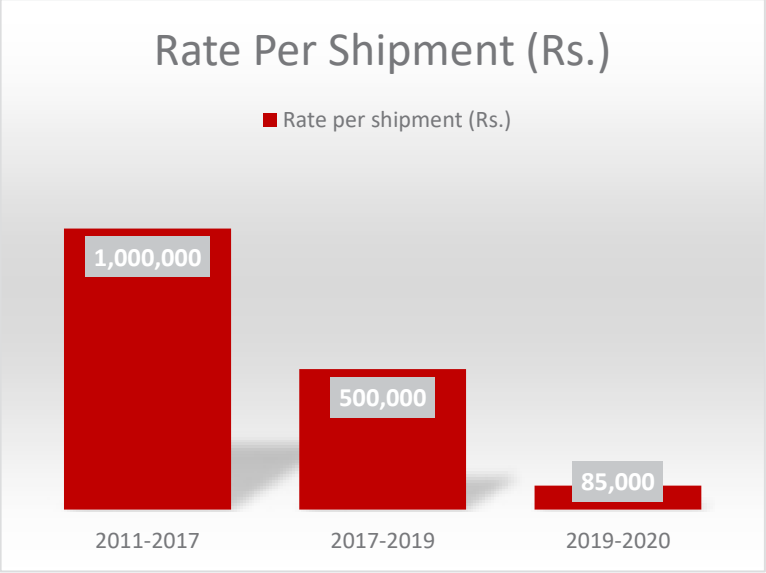
Lanka Coal Company (PVT) Ltd.

LANKA COAL COMPANY (PVT) LTD PERFORMANCE REPORT - 2019

At the outset, we must acknowledge that the following achievements were made possible due to synergies of a well-knit leadership headed by Ministry Secretary and Board of Directors. All stakeholders have been acting with collective responsibility and team spirit and that made it possible to reach the targets with ease.

1. Final Payments based on Discharge Port's Independence Surveyors Report Results
    - Term - Since September 2019

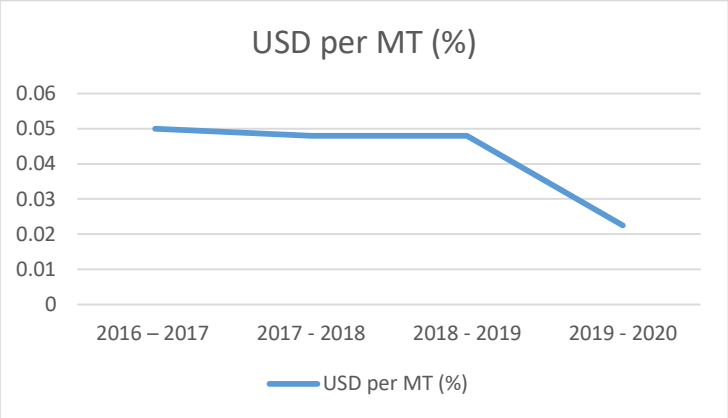
2. Cost of custom clearance was bought down over the years from Rs.1 million to Rs. 85,000. Ceylon Shipping Corporation was handling the customs clearing for one million rupees per shipment until 2016-2017 season. However, LCC had negotiated and bring down to Rs. 500,000 per shipment from 2017 to 2019. Moreover, LCC has handling the shipment clearing by hiring a CHA from season 2019-2020 onward only for Rs. 85,000.



Ceylon Shipping Corporation was paid one million rate for 154 shipments then LCC negotiated for five hundred thousand rate for 67 shipments. Finally, LCC appoint a Customs Housing Agent by paying only paid 85,000 rate for 40 shipments and onwards.

Description	Rate per Shipment (Rs)	No of Shipments	Total amount (Rs. million)
CSC 2011 -2017	1,000,000	154	154.0
CSC 2017 - 2019	500,000	67	33.5
CHA	85,000	40	3.4

3. Ceylon Shipping Corporation undertook both Fright and Insurance at the begging of coal procurement. The insurance rate was USD 0.05% per shipment. However, LCC started the insuring the shipments from season 2017-2018 and brought done from 0.05% to 0.048% the 0.0225% for the season 2019-2020.



4. Maintain 1.20 millions of MT buffer stock to avoid any obstruction that affects to generation. Coal Procurement can be taken only for 210 day from Mid-September to Mid- April of the following year and the period in between cannot unload due to on set of South West monsoon.

5. Introduce the documents of *Letter of Acceptance* (LOA) and *Letter of Confirmation* (LOC) as a condition of Letter of credit that leads to diminishing the payment risk. Preparation of LOA is based on the Lord port coal test certificates meanwhile the LOC is based on the discharge port Coal test reports.

6. Applying price adjustment for final invoice based on discharge port quality and quantity reports

7. This has helped to create more transparency in the coal operation. Price adjustment methods for some of the previous parameters were further introduced. Namely Ash fusion Temperature (Fluid and Deformation) and Hardgrove Grindality Index (HGI)

8. Lanka Coal Company has been able to issue bids for both the Term and Spot tenders after obtaining the legal approval of the Attorney General for long Term and Spot Bid Documents.

Sri Lanka Energies (PVT) Ltd.

Introduction

Sri Lanka Energies (Pvt) Ltd is a company incorporated in 1st quarter 2011 and operate as a 100% owned subsidiary of Ceylon Electricity Board.

SLE is with a vision of **Development of Renewable Energy,** among the other objectives of **Associated Transmission Asset Development**, **Manpower Resource Provision** and **Procurement**.

Performance 2019 and Programs for 2020

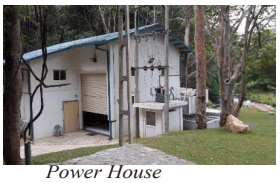
a. Kumbalgamuwa Mini Hydro Power Plant

Using the leakage water more than 20 years from Samanalawewa Reservoir Sri Lanka Energies (Pvt) Ltd has constructed **Kumbalgamuwa Mini Hydro Power Plant.**

The Commissioning of 1.2MW Francis Turbine in Kumbalgamuwa Mini Hydro Power Plant was completed on 2016 February 19 and connected to the national grid.

Kumbalgamuwa Mini Hydro Power Plant supplied 13.95 GW energy to the national grid during the last 30 months of operation.

During the construction



Power House

Plant Summery		
Installed Capacity	1.3	MW
Cumulative Energy Generated	21.071	GWH
Cum Income	390	mn LKR
Capital Investment by CEB	115	mn LKR
Period of operation	3.8	Yrs

Fore bay Area

Turbine and Generator

b. Managing the Manpower Required by CEB

The Company managed 2800 manpower force that required to cater the CEB man power requirement from April 2015 and currently 115 contract employees who are with SLE are providing the services to CEB and has the capacity of handling 10000 labnors.

c. Meter Enclosure Manufacturing Plant.

The construction of the Plastic Single Phase Meter enclosure Manufacturing factory was started on 05th of September 2016 in order to fulfill the requirement of Plastic Meter Enclosures of Ceylon Electricity Board and Lanka Electricity Company (Pvt) Ltd.

Completing the construction and machine installation, the factory was declare opened on 05th of September 2017. An annual requirement of 250,000 meter enclosures will be manufactured and supplied to the Ceylon Electricity Board and Lanka Electricity Company (Pvt) Ltd by this factory.

The factory is running its capacity to fulfill the entire Meter Enclosure requirement of CEB and LECO by now.

Opening Ceremony

Factory Front view

3 Injection Machine Unit

Assembly Line

a. Development of Daduruoya Mini Hydro Power Plant,

Under the directions given by the Secretary MOP , Sri Lanka Energies has started the construction of a 1.5 MW Mini Hydro Plant at Daduruoya Dam. This Dam was newly constructed by Dept of Irrigation and the entire Dam Project has been designed as a multipurpose project including power generation. The Provisional approval for this project has been issued to Dept of Irrigation by SEA and Dept of Irrigation has transferred the site and the relevant approvals were obtained after that.

Further the detail project feasibility study was done by Sri Lanka Energies and signing of a SPPA with Ceylon Electricity Board done. Construction of the project was started on September 2019 and expected to complete within this year.

Initiating construction works

3 penstocks to power house

Penstock Construction

Coffer Dam of Daduruoya

b. Upper Samanalawewa Mini Hydro Power Plant

According to the study done by SLE there is a water head from the point of leakage to the existing Kumbalgamuwa weir at 28m height. 600kw plant with 4.8GWh annual energy plant can be constructed from this water head.

This energy is wasted for more than 21 years without utilizing to any productive use.

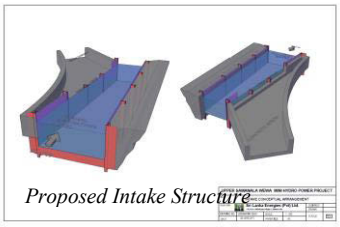
SLE did a detailed feasibility study in constructing a power plant as stated above without doing any disturbance to the existing leakage point or the surrounding area with Civil Engineering experts.

Draft TOR was issued by Central Environmental Authority and they asked for CEB views/observations over this proposal on 13th July 2016.

Up to now that letter (CEA letter) has not been replied and if replied the project can be constructed and connected to the grid within a year, from the date of replied.

Proposed Intake Position for Power Plant

Project Summery		
Plant Capacity	700	kW
Expected Energy per Year	4.8	GWH
Exp Annual Income	86	mn LKR
Annual Income in terms of Emergency Power (Rs 35 /KWh)	171.84	mn LKR
Estimated project Cost	227	mn LKR



Proposed Intake Structure

c. Broadland Mini Hydro Power Plant

Subjected to the Board decision taken by Board of Directors of CEB , SLE has planned to construct a mini hydro power plant with a capacity of 1.5 MW at Broadland to utilize the water released for water rafting.

Environmental approval FROM Environmental Authority and supplementary EIA for Mini Hydro is pending.

This Mini Hydro Project was taken back to CEB for construction later though it is a mini Hydro and not been completed yet.