

Economical Sustainability of Electrical Sector Reforms in Sri Lanka: A Review based on Historical Trajectories

G.M.B.S. Jayawardana
Department of Electrical Engineering
Faculty of Engineering, University of
Moratuwa
buddhiniejayawardana@gmail.com

Abstract—Since its inception, Ceylon Electricity Board (CEB) has undergone several structural reforms to ensure the delivery efficient, coordinated and economical system of electricity supply. It has launched various initiatives, also, to fulfill those objectives. However, the financial adversities that CEB currently experiences question the success in achieving the said objectives. This paper attempted to address this gap between the original objectives and the performance strategies to achieve those objectives. The financial indicators as depicted in CEB publications were studied in a cohesive manner, in order to ascertain the possible reasons for such gap. The importance of identifying the behavior of different customer categories, especially the domestic consumer category, was noted. The heavily subsidized pricing structure, primarily aiming for social justice and welfare, should not serve its purpose. More scrutiny on the composition and response to reforms by the domestic consumer category is recommended, with provision for further studies in this arena.

Keywords—Ceylon Electricity Board (CEB), consumer categories, tariff structure, pricing levels, subsidies

I. INTRODUCTION

Electrical undertakings in Sri Lanka have an illustrious history. Establishment of organizations such as Boustead Brothers Co. (1895), Colombo Electric Tramways and Lighting Co. Ltd. (1904), Kandy Electric Lighting Co. (1900), Department of Government Electrical Undertaking (1927, ceased operations in 1935 and re-established in 1937), Electricity Board (1935, ceased operations in 1937) were some of early milestones in that historical path.

Ceylon Electricity Board (CEB), established by Ceylon Electricity Board Act, No. 17 of 1969 (as amended), has been assigned with the responsibility to "develop and maintain an efficient, coordinated and economical system of electricity supply for the whole of Sri Lanka.", under section 11 of the said act [1]. Although the term 'economical' has not been defined conclusively, the clause 38 of the act may indicated a clue, when saying, "It shall be the duty of the Board to secure that the total revenues of the Board are sufficient to meet its total outgoings properly charge able to revenue account including depreciation and interest on capital, and to meet a reasonable proportion of the cost of the development of the services of the Board". Several structural reforms were implemented subsequently with the view of ensuring improved, regulated and economically viable electricity supply.

II. ELECTRICAL SECTOR REFORMS

A. Structural Reforms in the Electricity Sector

CEB, with the collaboration with Low and Bonar International (Holdings) Ltd, UK, established Lanka Transformers Limited (currently LTL Holdings) in 1980. This was as provisions made under Companies Act No. 51 of 1938, and the prime objective was to manufacture transformers needed by the CEB distribution network at a lower cost [2].

The status occupied by CEB as the sole electricity distributor was changed when the Lanka Electricity Company (Private) Ltd. (LECO) was established in 1983, as a private limited liability company under the Companies Act No. 17 of 1982. Distribution facilities in seven geographical branches, naming Kotte, Nugegoda, Moratuwa, Kalutara, Kelaniya, Negombo, and Galle were assigned to LECO.

With the enactment of the Sri Lanka Electricity Act, No. 20 of 2009 in April 2009, the electricity sector was brought under the regulatory purview of the Public Utilities Commission of Sri Lanka (PUCSL), established under the Public Utilities Commission of Sri Lanka Act, No. 35 of 2002. CEB was issued with a generation license, a transmission license and four distribution licenses, with the responsibility to "provide for and maintain a coordinated, efficient and economical system of electricity generation, transmission and distribution", under condition 30 [3]. Again, the exact meaning of "economical system" has not been given, but requirement of the economical operation of the licensees has been highlighted, such as "Economic purchasing of goods, assets and services" (condition 19) and "Economic purchasing of electricity and Ancillary Services" (condition 31).

Subsidiaries such as Trincomalee Power Co. Ltd. (Joint Venture with the National Thermal Power Corporation, India), Lanka Coal Co. Ltd, and Sri Lanka Energies (Pvt) Ltd. have been established under the purview of CEB, in years 2006, 2008, and 2011 respectively. These initiatives were also to ensure the proper economical operation of the CEB.

B. Objectives of the Structural Reforms

Once the above structural reforms are considered collectively, it is evident that the economical operation of the electricity sector was in focus since the inception of the CEB. This is well evident in the CEB mission statement, when it says "To develop and maintain an efficient, coordinated and economical system of electricity supply" [4]. One major

contributing factor for the economical operation of an institution is its financial situation. Sound economical outfits depend on the firm financial base, and the absence of such would prevent the institution to follow the optimum strategies for its economical sustainability. However, achieving such ends through CEB operations could not be ascertained. For many years, since its establishment in 1969, CEB was incurring losses. The main reason attributed such recurring losses was that the, CEB is considered as a service organization to the people by the political authorities, thus preventing to follow profit making or at least break-even pricing strategies [4]. Considering the importance of CEB's contribution in national development and the scale of losses it incurred during recent years, the reason for such its losses may call for in-depth analysis.

III. METHODOLOGY

Methodology of this study will be consisting of three major components, (i) studying the CEB's consumer base, (ii) studying the contribution of each consumer category for the financial status of the CEB, and (iii) analyzing the effects of the CEB reforms on the consumer base and thereby, on the financial status.

Until the first oil crisis in 1973, CEB followed a policy of reducing-block tariff (i.e. selling price per unit decreases with consumption) [5]. Thereafter, different tariff structures were introduced for the consumer categories. For household customers, an inverted block tariff (i.e. selling price per unit increases with consumption) was introduced, while a flat tariff was implemented for the commercial and industrial customers. Additionally, for the medium and large industrial customers, as well as for the commercial buildings, a monthly maximum demand charge was added.

Currently, the consumer base of the CEB is consisting of five main categories, naming domestic, religious and charitable institutions, other, street lighting, and agriculture. The category named other is consisting of four sub-categories naming industrial, general purpose, hotels, and government. Each category has been divided into sub-categories and the pricing levels have been stipulated accordingly. As the huge differences of electricity usage among the consumer categories, the total revenue generated from those categories varies considerably.

The volume of each category and the respective price levels vary over the time due to various reasons. CEB initiatives in institution level as well as the Government policy decisions at national level influence the behavior of the categories. Therefore the structural reforms and initiatives and the financial performance of the electricity sector institutions, primarily CEB, should be studied in a holistic manner.

IV. RESULTS AND ANALYSIS

A. Contribution by each consumer category for CEB losses

It has already been highlighted the importance of in-depth analysis of the contributing factors for CEB's recurrent losses. One possible measure is to segregate the losses in terms of consumer categories, and then examine the correspondence between such losses and the CEB reforms. Overall losses, for the time period from 2010 to 2020, are noted in tables 1.

Converting the data summarized in table 2 to the graphical form (figure 1) should illustrate the variation patterns of the financial performance, basically the revenues, costs and the profits (losses).

TABLE I. CEB FINANCIAL STATUS (2010 TO 2020)

| Year | Financial status (LKR million) | | | |
|------|--------------------------------|---------------|-----------------|----------------|
| | Sales Revenue | Cost of Sales | Other Rev./Exp. | Pre Tax Profit |
| 2010 | 121,226 | 116,168 | 2,981 | 8,039 |
| 2011 | 132,460 | 151,448 | (1,197) | (20,185) |
| 2012 | 163,513 | 222,419 | (2,541) | (61,447) |
| 2013 | 194,147 | 165,509 | (6,373) | 22,265 |
| 2014 | 202,645 | 213,646 | (4,001) | (15,002) |
| 2015 | 188,684 | 168,781 | (494) | 19,409 |
| 2016 | 206,811 | 222,097 | 2,095 | (13,191) |
| 2017 | 218,450 | 260,273 | (4,188) | (46,011) |
| 2018 | 229,571 | 251,964 | (7,952) | (30,345) |
| 2019 | 242,950 | 322,522 | (17,748) | (97,320) |
| 2020 | 238,910 | 270,134 | (16,699) | (47,923) |

Source: [4]; [6]

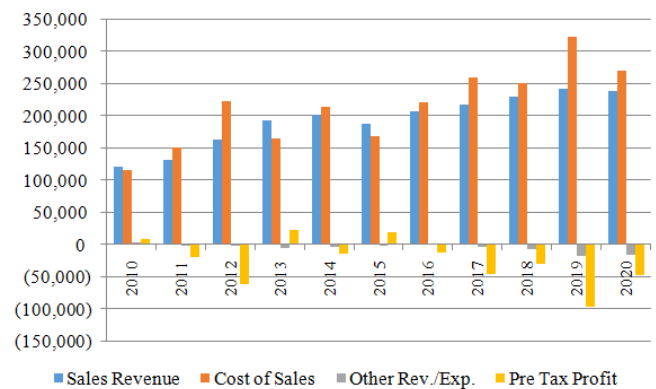


Figure 1: Variation patterns of the CEB financial status (2010-2020)

Each consumer category contributes to the overall losses in different scales. Unit cost of electricity (LKR/KWh) for the loss making consumer categories for the years 2016 and 2017 could be illustrated as in figure 2.

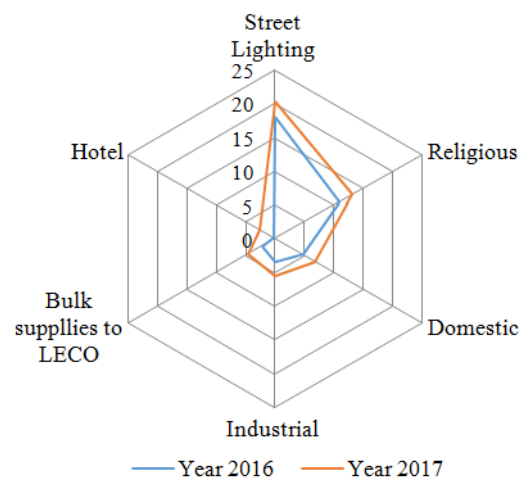


Figure 2: Per unit loss (LKR/kWh) under each consumer category

Considering the information as per tables 2 and 3, it is evident that the prime contributors to the CEB recurrent

losses are the domestic and the industrial categories. For the industrial category, electricity is a production factor hence their contribution to the losses need to be discussed in the context of overall contribution to the national economy. If such loss is due to the subsidized price levels, then such subsidies may be positively portrayed in the final products. However, for the domestic category, the losses need to be totally absorbed within the category as electricity usage is for the end user applications. As such, studying the CEB initiatives with regard to the domestic category may provide grounds to understand the reasons for CEB losses.

B. Subsidies for Electrical Pricing

The negative contributions as highlighted in above figure 2 were due to the subsidized pricing. Sri Lanka provides a variety of subsidies in various sectors such as energy, agriculture, petroleum, education, and health. These subsidies are basically due to the government policy of establishing social welfare and social justice, and in the form of Government grants, tax reductions, and exemptions from price control. One of the major subsidies government is manipulating is the electricity tariff. CEB offers electricity tariff at a price lower than the actual cost at the selling point as a Government policy, to consumers other than the General Purpose and the Government organizations.

C. Domestic Consumers as the Largest Consumer Category

Among the consumer categories, domestic consumers occupy the largest segment. Figure 3 indicates the composition of consumer base, depending on the percentages of the GWh units consumed by each category, in the year 2020.

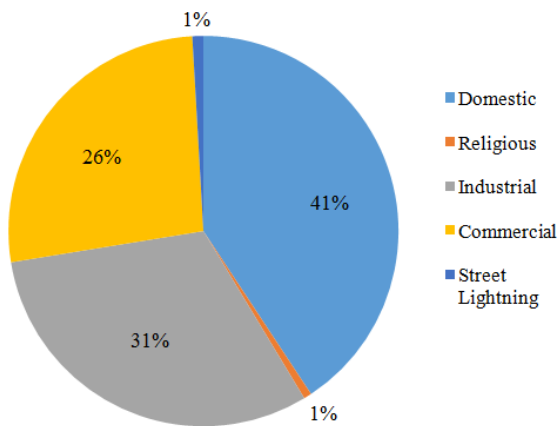


Figure 3: Yearly energy (GWh) consumption by consumer categories (2020)

The annual increments of consumption by each consumer category, for the time period 2010 to 2020, could be plotted as figure 4. It is evident that the overall increment for domestic, religious, industrial, commercial, and street lighting are 37.4%, 36.6%, 30.2%, 40.5%, and 1.5% respectively.

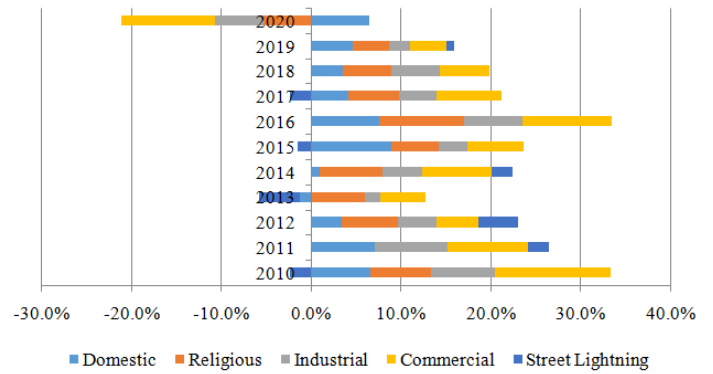


Figure 4: Annual increments of consumption (GWh) by each consumer category (2010-2020)

D. Spatial distribution of the domestic consumers

A major part of the electricity distribution in the island is handled by CEB amounting to 90% of the total sales volume while the rest is taken care of by the Lanka Electricity Company Ltd. (LECO), a subsidiary. The entire CEB distribution system is geographically separated into four Divisions namely; Distribution Division 1 (DD1), Distribution Division 2 (DD2), Distribution Division 3 (DD3) and Distribution Division 4 (DD4) (figure 5).

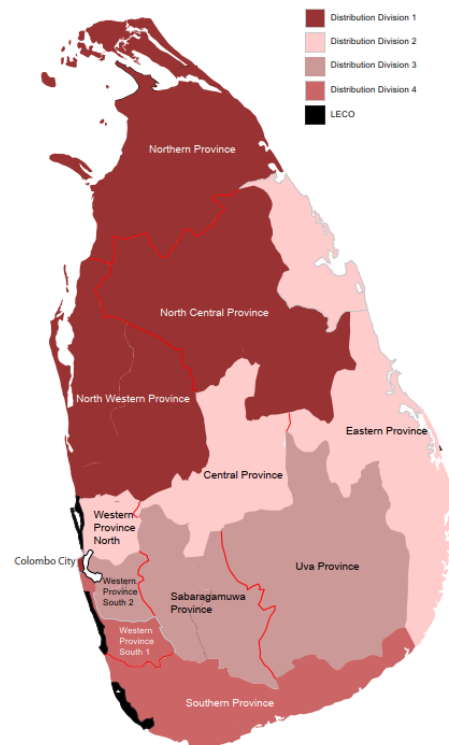


Figure 5: Distribution Divisions of CEB (Source: [7])

Considering the electricity usage in each division by the respective consumer categories (figure 6), it is obvious that domestic category surpasses the others by significant amounts.

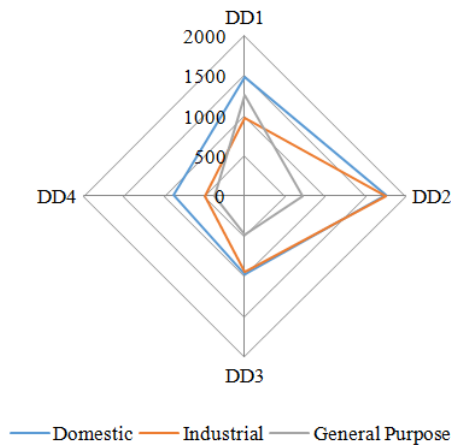


Figure 6: Electricity consumption (GWh) by consumer categories in distribution divisions.

E. Rebates granted to the Domestic Consumers

Further to the subsidized pricing policy, tariff rebates granted to the domestic category has also affected the financial position of the CEB. For example, LKR 5.907 billion rebate was given to domestic customers for the payment of electricity bills during the period from March to May 2020 due to the Covid 19 pandemic situation. This was based on the Cabinet decision Ref. No. 20/1063/226/062 dated 15th July 2020, and CEB received no compensations to cover this deficit [4].

V. CONCLUSION AND RECOMENDATION

Information revealed in the table 1 and figures 1 to 5 indicate CEB's financial situations from year 2010 to 2020. Although these are of basic nature, they provide some clues in understanding the operational features of the CEB in the context of achieving objectives stipulated during the various structural reforms.

First, recurrent losses have been encountered during the period under the discussion, even at the pre taxation stage (table 1 and figure 1). Second, domestic and industrial consumer categories are the prominent contributor to such losses. Price subsidies could be noted as the main reason for the losses. Subsidized prices for industrial category should have some rational as electricity is used as a production factor. But as far as domestic category is concerned, they are electricity end users and subsidized pricing could only be justifiable as a social welfare measure (figure 2). Third, domestic category recodes the highest increment in electricity consumption during the period under discussion (figure 4). Fourth, domestic category is the largest user in terms of GWh, nationally as well as in each Distribution Division (figures 3 and 5).

Above four factors emphasize that any economical operation of CEB need to focus on the price structure and behavior patterns of the domestic category. a previous studies have identified the impacts of electricity subsidies in Sri Lanka, with recommends that the electricity subsidies should be provided only for the needy parties, rather than in general terms [8]. Findings of this study can supplement those recommendations by suggesting more scrutiny on the behavioral patterns of domestic consumer category, its price sensitivities and electricity applications. The present incremental-block tariff system adapted for domestic

category would not pass the benefit of subsidized price structure to the social welfare.

Electricity used for a house-hold industry (such as several motor operated sewing machines or welding plant) should be registered under the general purpose category. Depending on the units (kWh) of monthly use, this category may impose higher tariff rates than the domestic category. However, users which are still in domestic category and use electricity for enhancing living comfort (such as several air conditioners) can still be under domestic category, with lower tariff rates. This may need bringing new parameters to the domestic tariffs, such as floor area, the type of appliances, and living standards of the consumers.

Another parameter which needs to be addressed in domestic tariffs is the distance of the consumer point from the existing network. More the distance, more the costs to be incurred for electricity supply. Marginal costing methods should be adopted to bring this differentiation to the price levels.

As a concluding remark, it could be noted that although the CEB reforms were aimed at ensuring the economical system of electricity supply, the operational indicators imply otherwise. The prime contributor for the recurrent financial deficits was the domestic category, but still the past initiatives were to expanding this category. To fulfill the sustainable economies, the behavioral patterns of the domestic consumers should be properly identified, analyzed and findings should be incorporated to the electricity industry policy decisions.

The aforementioned conclusions are subjected several assumptions and limitations. First, only the financial component of the economical system was focused. Other economical factors, such as social equity, were not considered under this study. Second, the external influences were not taken into consideration. Any further studies may address these limitations and widen the scope of these findings.

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