

Sri Lanka
State of the Economy Report 2011

Chapter 17
Accessibility and Affordability in the Power Sector

by
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17. Accessibility and Affordability in the Power Sector

17.1 Introduction

Numerous studies suggest the existence of a strong correlation between electricity consumption and economic growth.¹ Clearly, as the dependence of an economy on electricity rises, its impact on growth will become critical. In Sri Lanka, available evidence suggests that current as well as past changes in electricity supply have a significant impact on the country's growth outcomes.² Indeed, the lagged effects of increased electricity supply are found to have a greater impact on GDP. For instance, estimates suggest that for every increase in supply of electricity by 1 megawatt hour (MWh) in the current year leads to an income increase of Rs. 38,200 in the same year, Rs. 30,000 in the second year and Rs. 44,100 in the third year.

Given a clear nexus between electricity consumption and growth, access to a sufficient, affordable and reliable supply of electricity across all sectors of the economy has strong distributional implications. In Sri Lanka, despite considerable progress in ensuring access to electricity - currently estimated to reach 90 per cent level of electrification - significant disparities are to be found across sectors and provinces of the country. With a set government target of reaching 100 per cent electrification by 2012, an assessment of key policy issues in the power sector is timely. This discussion aims to provide an overview of the power sector in Sri Lanka - with a specific focus on household, commercial (hotel) and industrial sectors - and outline the new developments in the sector as it pertains to supporting the country's overall growth and development objectives.

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¹ See Ferguson, R., W. Wilkinson, R. Hill, 2000, "Electricity Use and Economic Development", *Energy Policy*, Vol. 28, No. 13; Gupta, G. and N.C. Sahu, 2009, "Causality between Electricity Consumption and Economic Growth: Empirical Evidence from India", Munich Personal RePEc Archive, available at <http://mpra.ub.uni-muenchen.de/22942>.

² Morimoto, R., C. Hope, 2001, "The Impact of Electricity Supply on Economic Growth in Sri Lanka", Research Papers in Management Studies, University of Cambridge.

17.2 Power Sector and its New Developments

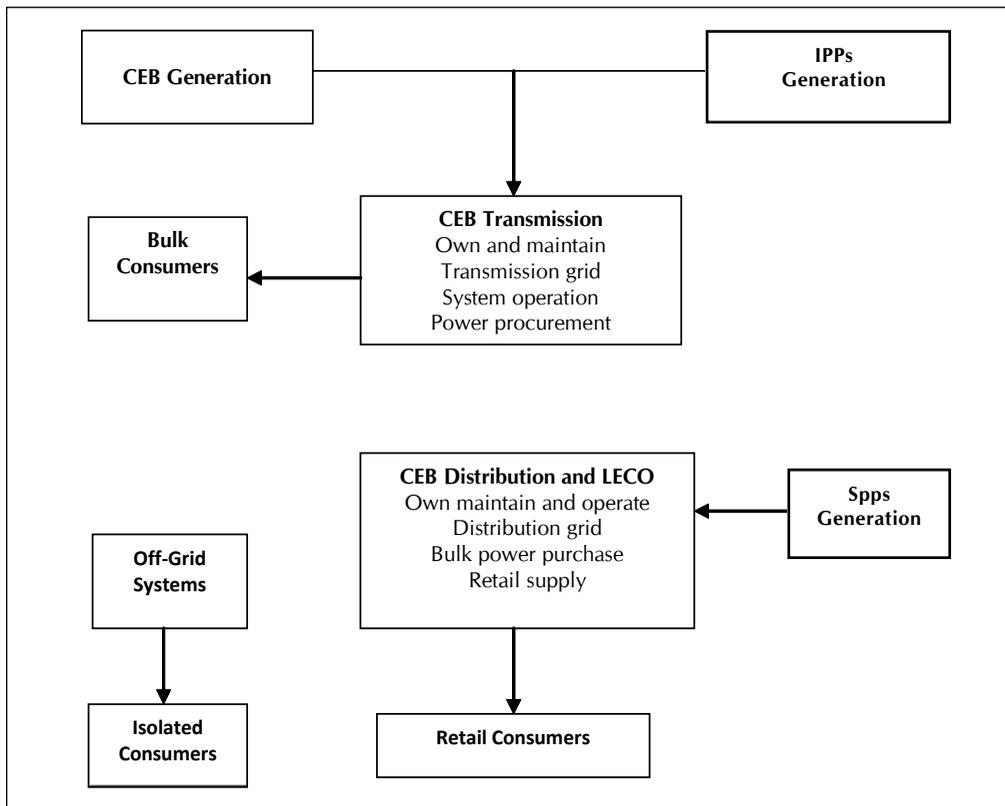
17.2.1 Overview of the Power Sector

The power sector in Sri Lanka is assigned three main functions, namely, the generation, transmission and distribution of electricity, which are licensed out to several parties. The majority of consumers are served by the national grid while isolated pockets of consumers are served by off-grid systems. In 2009, the Ceylon Electricity Board (CEB) contributed 55 per cent of gross generation to the national grid, while the rest was

generated by Independent Power Producers (IPPs).³ While the CEB is the sole transmission licensee in the national grid, distribution is jointly carried out by CEB and Lanka Electricity Company (LECO) licensees. Figure 17.1 illustrates the functional structure of the electricity sector in Sri Lanka.

At present, the electricity industry has long term debt exceeding Rs. 200 billion (largely the debts of CEB) which is expected to increase to Rs. 500 billion by 2015.⁴ The revenue is only adequate to meet around 90 per cent of industry expenditures.⁵ The CEB

Figure 17.1
Functional Structure of the Electricity Industry



Notes: IPPs = Independent Power Producers; SPPs = Small Power Producers.

Source: Public Utilities Commission of Sri Lanka (PUCSL).

³ PUCSL, 2009, *The Electricity Act of 2009 and the Development of the Sector*.

⁴ Siyambalapatiya, Tilak, 2011, "The New Electricity Pricing Policy in Sri Lanka", Prof. R. H. Paul Memorial Lecture, Institute of Engineers, Colombo, 10 February 2011.

⁵ *Ibid.*

has reported steady losses since 1999,⁶ and the utility has been making increasingly negative returns (Table 17.1). The reasons for the poor performance are two-fold, namely, the dependence on oil-powered thermal generation to meet the electricity demand and sustenance of end user tariffs below the cost.

The major share in the cost of sales to end users consists of generation cost which is around 80 per cent of the total. Of this, generation fuel alone was estimated to make up 62.4 per cent of the total in 2010. Given the energy mix of the country, the electricity sector is largely dependent on oil-fired thermal generation. As Table 17.2 indicates, 59.8 per cent of electricity generation in 2007 was oil-fired. This was estimated to increase to 63.3 per cent by 2010. Except for a slight drop in 2009, the global price of crude oil

increased steadily, driving up generation costs in the electricity sector. Therefore, the long term generation expansion plan of CEB is aiming at gradually decreasing the dependence on oil-fired thermal generation. By 2020, the industry will be dominated by coal-fired thermal generation, which is a cheaper alternative.

End user tariffs in Sri Lanka have consistently been set below the cost of sales, and have been insufficient to fulfill the revenue requirement of the CEB. For example, the average earnings of the CEB in 2005 were 7.71 rupees per kilowatt (Rs/kW), whereas the average revenue required to satisfy the cash flow requirements was 9.62 Rs/kW.⁷ Government efforts to mitigate the financial loss of the sector such as direct settlement of CEB dues to Ceylon Petroleum Corporation (CPC), moratorium on capital and interest

Table 17.1
Recent Financial Performance of CEB

	2006	2007	2008
Net profit before tax (Rs. mn.)	-11,125	-19,811	-33,870
Return on average net fixed assets (%)	-0.56	-2.29	-5.85

Source: Siyambalapitiya, Tilak, 2011, "The New Electricity Pricing Policy in Sri Lanka", *Sri Lanka Energy Managers Association*, Vol. 14, No. 1.

Table 17.2
Planned Generation Mix of the Sri Lanka Grid (Base Case)

Primary source	Share of Total Gross Energy in the Grid (%)			
	2007	2010	2015	2020
Hydro	40.2	36.7	28.2	19.5
Oil-fired thermal	59.8	63.3	5.7	9.6
Coal-fired thermal	0.0	0.0	66.1	70.9
Biomass, solar	Not included in the long term plan			
Wind	Not included in the long term plan			
Total	100.0	100.0	100.0	100.0

Source: PUCSL, The Electricity Act of 2009 and the Development of the Sector.

⁶ PUCSL, 2009, *The Electricity Act of 2009 and the Development of the Sector*.

⁷ *Ibid.*

due from CEB on long term debts and removal of value added tax (VAT) on fuel oil have failed to guarantee the financial success of the CEB.⁸ Therefore, a few key changes were made in the power sector with a view to making the entity profitable.

17.2.2 Recent Developments in the Power Sector

Sri Lanka Electricity Act No. 20 of 2009:

The Act aims to address the shortcomings of the power sector by introducing well targeted measures. The main features of the Act are to:

- Place the electricity sector under the regulatory purview of the Public Utilities Commission of Sri Lanka (PUCSL)
- Introduce a new mechanism for setting the tariff structure, and
- Assign the authority to form general policy guidelines to the Ministry of Power and Energy.

Although the PUCSL came into operation in 2003, it was not fully functional owing to the failure to pass the Electricity Reform Act of 2002.⁹ This was addressed by the new Electricity Act as the PUCSL was appointed to administer the provisions of the Act. One of the main functions of the PUCSL within this capacity, is advising the government on all matters concerning the generation, transmission, distribution and supply of electricity. The second key function, is regulating tariffs and other charges levied by licensees and other electrical undertakings in order to ensure that the most economical and efficient service possible is provided to consumers. The third, is consulting any

person or group of persons who may be affected, or are likely to be affected, by the decisions of the PUCSL. Thus, the Act ensures that the PUCSL safeguards the interests of all parties involved in the power sector.

The Act allows licensees to set electricity tariffs in a cost reflective methodology approved by the PUCSL. Within this capacity, the licensees may recover all reasonable costs in the carrying out of the activities authorized by the licensee in an efficient manner either through tariffs or by direct subsidies from the government. This aims to alleviate one of the main hindrances to the financial sustainability of the power sector - i.e., of electricity tariffs being set below cost. However, it is essential for the tariffs to fall within the policy guidelines set by the government and the PUCSL retains the right to revise the tariffs periodically.

The Ministry of Power and Energy is expected to form policy guidelines taking into consideration factors such as the requirements of electricity based on socio-economic characteristics, fuel diversity, and electricity pricing policy to ensure sustainable economic growth and any other measures being taken by the government with regard to the sector. Although this characteristic limits the authority of the PUCSL as an independent regulator, the implication of this provision is that the government is able to accurately reflect the views and needs of the stakeholders in making policy decisions. The policy guidelines, as outlined in the 'National Energy Policy and Strategies of Sri Lanka',¹⁰ aims to ensure that access and affordability

⁸ The Ministry of Power and Energy recently claimed that the CEB has made a profit of Rs. 5.06 billion. However, critics have pointed out that this has been achieved through a large government subsidy and underpriced fuel provided to CEB (see *The Island*, "Energy Policy Review: Need to Remain Focused in Fundamentals", May 31, 2011).

⁹ The Act was introduced in order to facilitate the restructuring process of the power sector. This included unbundling of CEB to form a single buyer and five companies for distribution, as well as appointing an independent regulator to regulate these independent businesses. However, owing to political pressure and opposition from the CEB staff, the sector failed to secure the Ministerial Order required to make the Act fully operational.

¹⁰ <http://power.lk/about-us/energy-policy>.

of electricity by consumers is addressed. Priority to improve access to rural areas, and a pricing policy that encompasses affordability by households and viability of commercial and industrial categories, are important elements in the policy documents.

The road map for tariff re-balancing: The road map as set out by the PUCSL aims to restore financial viability to the power sector by 2015,¹¹ with key characteristics of the exercise being:

- Debt moratorium to be granted on all long term debts till 31 December 2009.

Box 17.1 The Roadmap for Tariff Rebalancing						
Year	Households	Religious	Other retail (industry, general, hotel)	Industry (bulk)	Hotel (bulk)	General (bulk)
2011	No major changes	No changes	Reduce the gap between the three classes	TOU mandatory	All hotel customers unified into one category	No changes
2012	Reduce blocks from 6 to 4. For 0-30 kWh customers, Govt fully implements a direct subsidy, as provided in the National Energy Policy and the Govt's 10-year plan	No changes	Further reduce the price gap between the three classes of customer	All three classes of bulk customers to be unified and Time of Use (TOU) tariffs to be mandatory	Introduce a charge for reactive power	
2013	Reduce blocks from 4 to 3	No changes	No difference between the customer classes, except in terms of voltage at which service is provided. For the purpose of retaining a database, customer classification will be retained in the accounting system. TOU tariffs will be mandatory for all retail and bulk customers in industry, hotel and general purpose categories Any subsidies will be addressed outside the licensee tariffs.			
2014	Retain 3 blocks Optional TOU tariff for all 3-phase customers Tariffs yield adequate revenue to breakeven, meet all commitments including debt service, but excluding a return on assets to GOSL	No changes No changes	No further changes			
2015	Abolish block tariffs. Optional TOU tariffs to all customers Tariffs to all customers are targeted to be fully cost reflective. GOSL earns a return on assets on the sector	No changes	No further changes			
Source: PUCSL, 2010, <i>Consultation Paper on Setting Tariffs for the Period 2011 – 2015</i> .						

¹¹ PUCSL, 2010, *Consultation Paper on Setting Tariffs for the period 2011 – 2015*.

- Licensees held strictly responsible for matters under their control and to be transparently compensated for parameters beyond their control. For example, short term losses owing to weather conditions, etc., will be passed on to consumers, and any subsidies provided will be duly compensated by the government. Similarly, benefits arising from weather conditions, etc., will be passed through to consumers as reduced tariffs.
- Gradual reduction of the number of tariff blocks to three and apply Time of Use (TOU) tariffs to all consumers.

The first tariff revision as per the proposed rebalancing exercise was implemented for the period January-June 2011, which carried modifications such as reducing consumer categories from 27 to 20, unifying medium and large hotels into one category, mandating TOU tariffs for all medium and large industries as well as medium and large hotels, and distributing the cost of street lighting among all consumers. These alterations in the tariff structure have considerable impacts on affordability and competitiveness of industries, which will be discussed in the next section.

17.3 Electricity Sector and Inclusive Growth

17.3.1 Household Sector

When considering the accessibility of electricity, the overall level of electrification in Sri Lanka increased to 90 per cent by the end of 2010 compared to 86 per cent in 2009. It is targeted to reach 100 per cent by 2012.¹² As seen in Table 17.3, there is a remarkable improvement in the level of electrification, especially in the estate and rural sectors.

However, substantial disparities in the level of electrification at the district level can be seen. While developed areas such as Colombo and Gampaha have electrification levels close to 100 per cent, areas such as Monaragala, Kilinochchi and Mullaitivu have very low levels of electrification (Figure 17.2). As pointed out previously, lack of accessibility to economic infrastructure can constrain these areas from making use of gainful economic opportunities and contributing effectively to the growth process.

With a view to addressing inequitable access to electricity, the government has launched numerous rural electrification schemes (Table 17.4). Some of these are funded by the Treasury while others are implemented with funding received from lending agencies as well as bilateral government assistance.

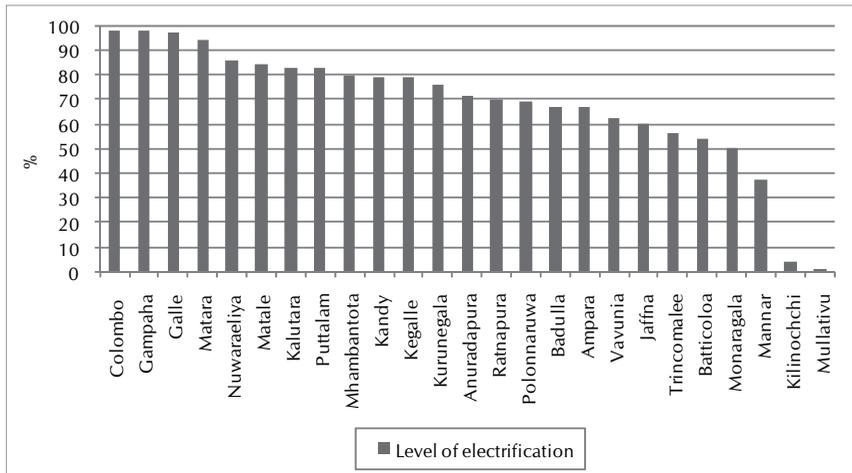
Table 17.3
Level of Electrification by Sector

	2006/07	2009/10
Urban	94.9	96.5
Rural	78.5	83.2
Estate	62.3	84.0

Source: DCS, HIES, 2006/07 and 2009/10.

¹² CBSL, *Annual Report 2010*.

Figure 17.2
Level of Electrification by District – 2009



Source: <http://power.lk/electricity-distribution>.

Table 17.4
Rural Electrification Schemes

Electrification Scheme	Description
Power Sector Development Project (RE6)	Targeted to benefit 141,000 consumers.
Conflict Affected Areas Rehabilitation Project (CAARP)	Benefiting 12,000 households in the N&E with extension to additional 9,000 households.
RE4	Benefiting 34,300 rural consumers.
RE8	Targeted to electrify remote areas as well as gap areas in between electrified areas, and aimed to benefit 180,000 households.
Wadakkin Wasantham	Aimed to supply electricity to the whole of Northern Province.
Lighting Sri Lanka - Hambantota District	Benefit 68,000 consumers in the underdeveloped regions of the Hambantota district.
Lighting Sri Lanka - Kalutara District	Target of 2,412 beneficiaries.
Lighting Sri Lanka - North Central Province	Initial beneficiary pool of 10,500 and extension with a view to achieving 100 per cent electrification in the North Western Province.
Lighting Sri Lanka - Eastern Province (Trincomalee and Batticaloa Districts)	Provide electricity to 30,000 new consumers in these districts.
Lighting Sri Lanka - Uva Province	Expected to provide electricity to 800 villages – 80,000 households and small, medium and large scale industries.
Sustainable Power Sector Support Project II	Provide electrification to 12,245 rural households in the Eastern Province.
Pubudamu Wellassa	Implemented in the areas of Kataragama, Sevanagala and Thanamalvila to benefit 637 households.
Rural Household Connection (Part 8)	Aims to connect 60,000 rural households to the national grid.
SIDA Extension	Aims to achieve 100 per cent electrification in the North Central Province.

Source: <http://power.lk/re-projects>.

Table 17.5
Affordability of Electricity

	Percentage of Households
Difficulty in paying the electricity bill	15.39
Fail to pay the electricity bill on a monthly basis	14.06
Taken steps to reduce the bill	43.06

Source: Social Policy Analysis and Research Centre, 2010, "A Study on Requirements of Prospective Electricity Consumers and Fuel Poverty (Electricity) and Affordability", PUCSL.

However, affordability of electricity remains an issue for the household sector (Table 17.5). Estimates suggest that nearly 15 per cent of households find it difficult to pay their bills on a monthly basis, while another 14 per cent do not make payments on a monthly basis. Around 43 per cent of households have found it necessary to adopt ways of reducing their electricity bills. Further, a high level of disparity is found to exist between consumer groups. The lowest 10 per cent of households consume only 2 per cent, while the top 10 per cent consumes 27 per cent of total electricity consumption. Low end users are argued to find it difficult to afford electricity due to pricing policy.

A possible alternative would be to identify low income groups and administer targeted subsidies. Although not implemented as yet, the energy policy document proposes to subsidize the electricity consumption of Samurdhi beneficiaries by financing 50 per cent of the cost of supply up to 30 kWhs. This is to be funded by the Treasury by providing coupons worth the value of the subsidy. However, poor targeting of Samurdhi recipients is an issue in Sri Lanka. More often than not, the appointment of Samurdhi officers and subsequently the selection of beneficiaries, are carried out under political patronage rather than income criteria.¹³ This leads to a misallocation of

resources. Perhaps, an alternative would be to credit the subsidy directly to consumer accounts held with the distributor, as practised in Hong Kong,¹⁴ for consumers identified by the distributor based on income criteria.

Another alternative adopted by consumers and much advocated by the government, is demand management strategies such as reducing the use of electricity at peak demand periods. However, despite the fact that electricity is meant to be used primarily for lighting, a number of appliances - such as televisions, irons, radios, etc., - constitute basic needs for decent living standards. These account for the major share of electricity demand by households, with a majority of households estimated to own a number of these high energy consumption equipment (Table 17.6). Although the degree of necessity for these is arguable, many view them as basic needs given the positive impact they have on living standards.

It is also noteworthy that a key feature of the road map is passing on any increased costs or benefits to consumers. Therefore, in principle, the profit of Rs. 5.06 billion made by the CEB in 2010 should ease costs for consumers in the next tariff period of July-December 2011.

¹³ <http://ipsilk.blogspot.com/2010/07/better-targeting-of-transfers-samurdhi.html#more>.

¹⁴ https://www.clponline.com.hk/Documents/Govt_Subsidy_update_clponline_pdf_file_English_v2.pdf.

Table 17.6
Ownership of Electric Equipment

Equipment	Percentage of Ownership
Television	89.4
Electric iron	75.1
Hand phone	62.7
Radio	50.1
Refrigerator	46.8
Cassette	44.2
Fan	41.8

Source: Social Policy Analysis and Research Centre, 2010, "A Study on Requirements of Prospective Electricity Consumers and Fuel Poverty (Electricity) and Affordability", PUCSL.

17.3.2 Commercial (Hotel) and Industrial Sectors

Over 40 per cent of urban manufacturing firms and 25 per cent of rural enterprises in Sri Lanka are estimated to find electricity to be a major bottleneck for industrial growth.¹⁵ In 2004, less than 70 per cent of rural enterprises received electricity from the national grid. Although this may have improved due to various electrification schemes, reliability of electricity supply continues to hamper the industrial sector. Nearly 75 per cent of urban manufacturing firms own generators to cope with power outages, which accounts to 12 per cent of their fixed assets on average.¹⁶

Maintaining competitiveness is crucial for the growth of commercial and industrial sectors, where electricity tariffs impinge on production costs. However, these sectors have been neglected within the tariff structure. At best, the low end commercial and industrial sub-sectors have received marginal subsidies. On the other hand, these two categories are surcharged in order to cross subsidize other categories (Table 17.7). Subsidies granted to 'Industrial 1', 'Indus-

trial 2' and 'Hotels 2' categories are comparable to that of the 'religious' category, which is smaller in terms of the amount of sales and has no commercial viability. On the other hand, the rest of the categories in commercial and industrial categories are heavily surcharged.

Implementation of TOU tariffs from January 2011 has further driven up the costs of commercial and industrial categories. Tariff increments in the commercial category affect key sectors such as tourism, where it is estimated that top city hotels will incur additional costs of Rs. 120 million due to electricity tariff increases in 2011.¹⁷ Similarly, electricity intensive industries such as textile, cement, ceramic, metal and aluminum, ship building and food and beverages are also affected by this measure. Industry sources expect a cost increase of 4 to 8 per cent on average, which adversely affects the competitiveness, especially of export-oriented manufacturers. In the ceramic manufacturing industry for example, the electricity component alone accounts for about 50 per cent of total costs. A statement by the Sri Lanka Ceramics Council (SLACC)

¹⁵ <http://www.enterprisesurveys.org/documents/enterprisesurveys/ICA/SriLankaICA.pdf>.

¹⁶ *Ibid.*

¹⁷ <http://www.porcelaintablewares.com/news/news32.html>.

Table 17.7
Total Subsidy or Surcharge on Consumers

Customer Category in the 2010 Tariff Schedule	Total Sales Forecast in 2011 (GWh)	Total Cost (Rs. mn.)	Total Revenue (Rs. mn.)	Total Subsidy or Surcharge on Customers (Rs. mn.)
Households				
0-30	233	5,518	1,113	-4,405
31-60	756	15,928	3,695	-12,233
61-90	1,018	20,093	5,974	-14,119
91-180	1,254	22,225	14,973	-7,252
181-600	492	8,346	9,957	1,611
> 600	100	1,479	3,561	2,082
Sub Total	3,853	73,590	39,273	-34,317
Other LV				
Religious	57	1,004	513	-491
General purpose 1	1,149	15,809	23,943	8,134
Industrial 1	238	3,171	2,611	-561
Hotel 1	1	19	20	1
Street lighting	148	2,292	3,668	1,376
Sub total	1,594	22,295	30,754	8,460
LV BULK				-
General purpose 2	875	9,751	18,555	8,803
Industrial 2	1,561	19,899	19,444	-455
Industrial 2 TOU	174	2,159	2,343	184
Hotels 2 TOU	2	26	30	4
Hotels 2 (GP)	73	824	1,169	345
Hotels 2 (IP)	54	656	625	-31
Sub total	2,739	33,315	42,165	8,850
Medium voltage				-
General purpose 3	223	2,263	4,378	2,115
Industrial 3	1,035	10,965	11,661	697
Industrial 3 TOU	143	1,376	1,721	345
Hotels 3	8	77	83	6
Hotel 3 TOU	71	629	725	95
Sub total	1,480	15,310	18,569	3,259
Total	9,666	144,510	130,761	-13,749

Source: PUCSL, 2010, *Consultation Paper on Setting Tariffs for the period 2011-2015*.

indicates that they expect the cost of electricity of their member companies to increase by 20 to 42 per cent.¹⁸

Consequently, global competitiveness of Sri Lanka's export manufacturing industries will

be affected. Competing economies such as India, Thailand, and Vietnam not only have lower electricity tariff rates than Sri Lanka, but also provide subsidies to their industrial sector. This may have significant repercussions on the external sector as export

¹⁸ *Ibid.*

margins become thinner, which will trickle down to other sectors of the economy by reducing employment. One such example, is the decision by Lanka Walltile PLC to shut down its Balangoda plant and retrench 800 odd employees owing to high energy costs.¹⁹ A suggested alternative by the Ministry of Power and Energy was shifting production from peak to off-peak hours. However, this is not practical in industries which have several shifts, work twenty four hours a day, seven days a week, and employ a large number of female staff. Another option is to install energy efficient plant and machinery which is a costly alternative involving considerable capital investment.

17.4 Conclusion and Way Forward

It is evident that electricity supply is a significant determinant of growth. To ensure that such growth outcomes are inclusive, factors such as accessibility, reliability of supply and affordability are important. Although accessibility to electricity has seen a remarkable improvement in the recent past, this was mainly achieved through rural electrification projects, most of which are not connected to the national grid as yet. Similarly, apart from urban centres, few areas enjoy electricity supply without power outages. Therefore, steps need to be taken to connect the rural electrification schemes to the national grid and minimize power outages in order to provide a constant supply of electricity.

Affordability of electricity remains a problem for households, commercial and industrial consumers. In the case of households, the best policy alternative would be to apply targeted subsidies to low income consumers such as Samurdhi beneficiaries. Ensuring affordability for commercial and industrial categories is equally important, as they are major contributors to national output. A possible measure which could be adopted is shifting the production process to off-peak hours in order to reduce the cost of electricity. However, this cannot be universally adopted given the practical constraints such as working several shifts a day or where significant numbers of female employees are present. Transforming the production process to energy saving plant and machinery is another option, albeit a costly one. Removal of import duties and taxes on energy saving equipment can help mitigate the high cost of installing such equipment.

It should be noted that these concerns are to be addressed amidst the attempts by the Ministry of Power and Energy to restore financial viability to the power sector, which may drive up electricity tariffs further. Therefore, the challenge remains for the government to strike a balance between affordability of electricity and the financial success of the power sector.

¹⁹ *Ibid.*