IMPACTS OF MANDATORY TIME OF USE TARIFF ON THE SYSTEM LOAD FACTOR

Ruwani Pradeepa Wijesinghe

(8427)

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Declaration of the Candidate & Supervisor

I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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R.P.Wijesinghe

Abstract

Time of use (TOU) tariff is common practice in developed economies around the world. These tariffs incentivise and encourage customers to lower peak loads in order to reduce their electricity bills. The objective for the power utility is to reduce peak loads and/or shift load from peak to off-peak periods.

Improvements in the load factor hold benefits to the utility in terms of constant system loading, improved sales and essentially a cost saving for the utility dependent on its tariff structure.

In Sri Lanka, TOU tariff has been mandate from 31 March 2011 for all consumers in customer categories of I-2, I-3, H-2 and H-3 as a means of demand side management measures and load factor improvement.

This report will discuss the effective application of TOU tariffs for industrial and commercial power users. Further it will discuss the consequences of recently introduced TOD (Time of day) tariff structure for industrial and hotel sector consumers.

As the first step of this study demand and supply side data were collected for the period from January 2009 to August 2011. Based on those data, the system average and peak power variations and trends were observed. It was shown that there is a higher rate of increase in average power than the rate of increase in peak power for the period beyond April 2011. This is a positive indication of proper adaptation of TOU tariff structure.

In the past, load factor was calculated without considering the effect of peak power generation by Small Power Producers (SPPs) on the peak demand. Thus it was required to redefine the method of calculating load factor considering the contribution from Small Power Producers (SPPs) for the peak demand. It has shown that the conventional load factor is about 2% higher than the actual.

Energy consumptions of bulk consumers who were already in two tire or three tire time of day (TOD) tariff structure were collected for the period from September 2010 to July 2011 and it was observed that there is a declining trend in percentage consumption during peak time.

For the programme to be effective proper publicity programmes and workshops should be arranged for the benefit of consumers coming under this category, educating them and even providing them with technical and financial assistance. Steps would have to be taken to label appliances depending on their energy efficiency and enforce the use of labelled energy efficient equipment by consumers.

By making the TOU tariff programme effective a very specific advantage that would be derived by the power sector utilities through load levelling and peak demand curtailment is the improvement of capacity factor of plant and equipment, continuing to maintain a lower growth rate and slower augmentation rate of plant.

The load factor improvement and peak load curtailment with the consumer energy efficiency programme would bring immense financial and economic benefits to the country. By reducing the import of hydrocarbon fuel, much foreign exchange can be saved and savings can be utilized for other important tasks.

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List of Abbreviations

CEB	-	Ceylon Electricity Board
CFL	-	Compact Fluorescent Lamp
GHG	-	Green House Gases
IPCC	-	International Panel on Climate Change
IPP	-	Independent Power Producers (IPPs)
kW	-	kilo watt
LECO	-	Lanka Electricity Company
LF	-	Load Factor
MW	-	Mega Watt
PUCSL	-	Public Utility Commission of Sri lanka
SPP	-	Small Power Producers
TOD	-	Time Of Day
TOU	-	Time Of Use