CREPE INDUSTRY AND NEW ELECTRICITY TARIFFS

By

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INTRODUCTION

Electricity is the most widely used sources of energy in the crepe industry in Sri Lanka. It is therefore, important to keep pace with the fluctuations in tariffs and to see possible alternative patterns of consumption for the minimum expenditure. Frequent changes in tariffs and increased cost of electricity have resulted in the escalation of the cost of production.

Ceylon Electricity Board has recently introduced it's new electricity tariffs in which the possibility of shifting the peak hours of consumption on an experimental basis has been looked into. This has been introduced as an alternative option to their normal new tariff; which considers only the total units consumed and the time of the consumption. Since the option offers a concession for the consumer it is worthwhile analysing cost benefit rations of the two systems.

This paper looks at the new tariffs and the options provided to the crepe manufacturer and evaluates the financial viability of accepting the time of day tariff against the normal new tariff.

ANALYSIS

In the crepe industry, electricity is mainly used for milling purposes.

Electricity to factories is mainly delivered and metered at 400/230 volts nominal, and this analysis concentrates only on this category of the industrial tariffs, although a few factories may not fall in to it.

(a) Differences between old tariffs and the new tariff (I.2)

Previously the factories were charged under the following heading.

i) KWH consumption – Rs. 0.65 per KWH
ii) Fuel adjustment – 150%
iii) Maximum demand – Rs. 100.00 per KVA

The total cost of the three sub-units contributed the final 6.4

In the new tariff (1.2) the fuel adjustment charge has been made 0% for the period of the first 12 months. This has been the result of the reduction of oil fired electricity generation and of the favourable weather conditions. However, the fuel adjustment charge may be re-increased whenever it is felt necessary.

The charge on KWH consumption has been raised up to Rs. 1.45 for the category under consideration. This is a 120% increase.

Maximum demand charge has been kept unchanged, whereas a fixed charge of Rs.200.00 per month has been imposed.

The above system which is more or less within the usual frame of electricity tariffs, does not consider the time of consumption. It merely measures the total monthly consumption and maximum demand and bills are assessed accordingly.

(b) Times of day tariff (I.2 [T.D.])

This has been introduced as an optional system of assessing the electricity bill, for industrial and hotel users. The new option is meant to split the peak demand by encouraging the consumer to 'switch off' during the peak hours.

Consumer can elect one of the two. If the consumer does not enquire for the time of day tariff; CEB will assess the bill under the above stated normal tariff (I.2)

Time of day tariff will be enforced to assess the bill of a particular customer only after a mutual agreement between the CEB and the customer. Special metering equipment must be installed for this purpose for which the consumer has to pay.

After the I.2 (T.D.) is agreed the consumer is entitled for a concessionary rate of Rs.1.35 per KWH for consumption between 9.00 p.m. and 6.00 p.m. (following day). Besides he will be charged at a penalty rate of Rs.1.90 per KWH for the consumption between 6.00 p.m. – 9.00 p.m. In other words, consumer should avoid consuming electricity between 6.00 p.m. and 9.00 p.m. as much as possible, if this system is to be accepted.

Furthermore, the maximum demand charge will also be halved (Rs.50.00 per KVA) if the I.2 (T.D.) is accepted.

	Description	I.2	I.2 (T.D)
(i)	Charge on KWH consumption	Rs.1.45/KWH	–
	a) 9.00 p.m. – 6.00 p.m. following day	–	Rs.1.35/KWH
	b) 6.00 p.m. – 9.00 p.m.	–	Rs. 1.90/KWH
(ii)	Maximum demand charge	Rs.100.00/KVA	50.00/KVA
(iii)	Fuel adjustment charge	0.0%	0.0%
(iv)	Fixed charge	Rs.200.00	Rs.200.00

Feasibility of the time of day tariff

A. General feasibility

Although the time of day tariff is agree upon, no crepe producer can be 100% sure of complete elimination of cunsumption between 6.00 p.m. to 9.00 p.m. There may be contingencies, some times it may be essential that the lights are on in the nights, so that there will be at least a nominal consumption within the restricted period.

However, the factory authorities can see that the consumption of electricity is kept to a minimum level by scheduling milling operations suitably. Since crepe manufacture is not a continuous production process throughout the day, this could be easily tried out, and the time of day tariff is a feasible option to be considered by crepe manufacturers. Operations in a contingency must be accounted for and will be looked into under financial consideration.

B. Financial feasibility

To evaluate the financial feasibility, the costs as well as the benefits must be considered in money terms. The implementation costs for new equipment installation will be the main cost, whereas the monthly savings will be the benefits, if any.

i) Cost of implementation

The implementation cost of the time of day tariff has to be borne by the owners of the factories. This would include the cost of metering equipment, installation charges and any other subsequent expenditure. The total cost would vary from factory depending on the supply characteristics and capacity of the factory.

Although the total cost of implementation would be within the range of Rs.8000/-, in analysing the financial viability the most conservative approach is adopted by considering it to be Rs.10,000/-. As the cost of implementation drops so should the financial feasibility be more attractive as reasoned out by the financial evaluation.

ii) Monthly savings

Since it is unfair to consider 100% avoidance of consuming electricity within the restricted period, this evaluation considers the savings at three levels. The savings that would be achieved by avoiding the consumption by 100%, 90% and 80% are analysed separately under level A; Level B and Level C, respectively.

Mathematical consumption of the monthly savings if the time of day tariff is adopted would be as follows: (See Appendix I)

	Savings/month (Rs.)
Level A	50 M + 0.1 Y
Level B	50 M + 0.45 Y
Level C	50 M – 0.01 Y

Where M = maximum demand for the month (KVA)
Y = total consumption of electricity for the month (KWH)

For comparison purposes and to stress the effects of the time of day tariff, this evaluation considers a factory which consumes 10,00 KWH per month and which is having an average maximum demand of 100 KVA within the month. Savings in rupees for the month therefore would be as follows:

		Savings/month (Rs.)
Level A:	(5000 + 1000)	6000
Level B:	(5000 + 450)	5450
Level C:	(5000 – 100)	4900

RESULTS

The financial evaluations show the feasibility of adopting the time of day tariff (I.2 (T.D) in crepe industry. (Appendix 2.A; 2.B and 2.C)

Even at 20% electricity consumption between 6 p.m. and 9 p.m. (Level C) it is very attractive with the pay back period less than 3 months. The crepe manufacturers can easily aim at level B or even level A consumption to reduce the cost further.

The adoption of this I.2 (T.D) is further beneficial for factories having maximum demand more than 100 KVA and the consumption more than 10,000 KWH/month, which is the case mostly in medium scale crepe factories.

If the implementation cost is less than the considered Rs.10,000 these would be further financial savings.

DISUCSSION AND CONCLUSION

It must be noted that the electricity tariffs are subjected to changes and this paper has been written based on the present tariffs and options. The authorities also must consider the fact that this option has been enforced on an experimental basis. However, the I.2 (T.D) tariff will be in existence at least for the year 1985, so that the crepe factories can extract the maximum benefit out of it.

Being faced with a situation where the crepe prices are low and not stable all the the possible ways to reduce the cost of production must be looked into, with a view to increase and maintain the profit margins. Since the energy costs are rising continuously and becoming a major portion of the cost of production it is advisable to cut down on the consumption of electricity. In such a situation, the benefits that could be extracted from adopting the time of day tariff would be much more significant. It also would be in keeping with the national strategy to saving electricity and energy in a broad sense.

APPENDIX 1

MATHEMATICAL FORMULATIONS FOR MONTHLY SAVINGS

Consumption patterns

Consumption	Level A	Level B	Level C
Between 6.00 p.m. – 9.00 p.m. each day	–	10%	20%
Between 9.00 p.m. – 6.00 p.m. following day	100%	90%	80%

(a) Level A

	I.2 Tariff Cost/month (Rs)	I.2 (T.D) Tariff Cost/month (Rs)	Difference/month (Rs)
Max demand charge	100 M	50 M	50 M
KWH consumption charge	1.45 Y	1.35 Y	0.10 Y
Fixed Charge	200	200	–
	200 + 100M + 1.45 Y	200 + 50M + 1.35 Y	50M + 0.10 Y

(b) Level B

	I.2 Tariff Cost/month (Rs)	I.2 (T.D) Tariff Cost/month (Rs)	Difference/month (Rs.)
Max. demand charge	100M	50 M	50 M
KWH consumption charge	1.45 Y	1.35 0.9 Y 1.90 x 0.1 Y	50 M
Fixed charge	200	200	–
	200 + 100 M + 1.45 Y	200 + 50 M + 1.405 Y	50 M + 0.045 Y

(c) Level C

	I.2 Tariff Cost/month (Rs)	I.2 (T.D) Tariff Cost/month (Rs)	Difference/month (Rs.)
Max. demand charge	100 M	50 M	50 M
KWH consumption charge	1.45 Y	1.35 x 0.8 Y 1.90 x 0.2 Y	– 0.01 Y
Fixed charge	200	200	–
	200 + 100 M + 1.45 Y	200 + 50 M + 1.46 Y	50 M – 0.01 Y

(d) Summary

	Savings/month (Rs.) (if I.2 (T.D) is accepted)
Level A	50 M + 0.1 Y
Level B	50 M + 0.45 Y
Level C	50 M – 0.01 Y

APENDIX 2

A. FINANCIAL EVALUATION AT LEVEL A SAVINGS

(1). Cash flow statement and net present value analysis for 6 months

	Month 0	1	2	3	4	5	6
Cost	(10,000)	–	–	–	–	–	-
Monthly changes	–	6000	6000	6000	6000	6000	6000
Net cash flow	(10,000)	6000	6000	6000	6000	6000	6000
DFC at 2% monthly	1	0.98	0.96	0.94	0.92	0.91	0.89
PV	(10,000)	5880	5760	5640	5520	5460	5340
NPV	+ 23,600						

(2). Simple pay back period : 1.66 months
(3). Discounted pay back period : 1.72 months
(4). Accounting rate of return : 360% for 6 months
(5). Benefit/cost ratio : $\frac{33600}{10,000}$ = 3.36 for 6 months

B. FINANCIAL EVALUATION AT LEVEL B SAVINGS

(1). Cash flow statement and net present value analysis for 6 months

	Month 0	1	2	3	4	5	6
Cost	(10,000)	–	–	–	–	–	–
Monthly savings	–	5450	5450	5450	5450	5450	5450
NCP	(10,000)	5450	5450	5450	5450	5450	5450
PFC at 2% monthly	1	0.98	0.96	0.94	0.92	0.91	0.89
PV	(10,000)	5341	5232	5123	5014	4960	4851
NPV	+ 20,521						

(2). Simple pay back period : 1.83 months
(3). Discounted pay back period : 1.89 months
(4). Accounting rate of return : 327% for 6 months
(5). Benefit/cost ratio : 30521 / 10,000 = 3.05 for 6 months

C. FINANCIAL EVALUATION AT LEVEL C SAVINGS

(1). Cash flow statement and net present value analysis for 6 months

	Month 0	1	2	3	4	5	6
Cost	(10,000)	–	–	–	–	–	–
Monthly savings	–	4900	4900	4900	4900	4900	4900
NFC	(10,000)	4900	4900	4900	4900	4900	4900
DFC at 2% monthly	1	0.98	0.96	0.94	0.92	0.91	0.89
PV	(10,000)	4802	4704	4606	4508	4459	4361
NPV	+ 17,440						

(2). Simple pay back period : 2.04 months
(3). Discounted pay back period : 2.11 months
(4). Accounting rate of return : 294% for 6 months
(5). Benefit/cost ratio : 27,440 / 10,000 = 2.74 for 6 months