KERALA STATE ELECTRICITY REGULATORY COMMISSION
THIRUVANANTHAPURAM

PRESENT

Shri. K.J.Mathew, Chairman
Shri. M.P.Aiyappan, Member

Petition No. RP - 19

8th December 2010

PETITION IN THE MATTER OF

Review of the KSERC Order dated 2-12-2010 on 'Rationalisation of ToD Tariff for HT-EHT consumers

ORDER

1.0 Background

The petition of the Kerala State Electricity Board (KSEB) is to review the TOD Tariff for HT and EHT consumers based on Orders of the Commission dated 2-12-2010 considering the financial loss to KSEB and lack of appreciable system benefit by way of reduction in peak demand consequent on the revision of TOD tariff. KSEB's Proposal dated 24-07-2009 was for a new ToD tariff as against the then prevailing ToD tariff structure. Commission modified this proposal as given below

Comparison of the ToD tariff proposed by KSEB and approved KSERC

Particulars	Rates Proposed by KSEB(% of Ruling Charges)			Rates approved by KSERC (% of ruling charges)		
	Normal Period (06.00 hrs to 18 .00 hrs)	Peak Period (18.00 hrs to 22 .00 hrs)	Off Peak (22.00 hrs to 18.00 hrs)	Normal Period (06.00 hrs to 06 .00 hrs)	Peak Period (18.00 hrs to 22 .00 hrs)	Off Peak (22.00 hrs to 06.00 hrs)
Demand Charges	100%	140%	85%	100%	140%	80%
Energy Charges	100%	130%	90%	100%	130%	85%

The above tariff was implemented by KSEB from January 2010 onwards. From the data provided by KSEB there is reduction in revenue in the three months when the new TOD tariff is applied. KSEB states that if the proposal of KSEB for TOD Tariff was approved by KSERC without any change the financial impact would have been neutral

2. The prayers of KSEB are:

(i) Restore the pre-revised ToD tariff which was continued till December-2009

OR

(ii) Approve the ToD tariff structure as proposed by KSEB vide its Petition No. TP No. 66 of 2009 on rationalization of KSEB tariff.

(iii) Issue appropriate orders by the Hon'ble Commission to recoup the losses already incurred by KSEB, from the same set of consumers.

3. Hearing of the petition.

3.1 Hearing of the petition was held on 4th October at Commissions Office and KSEB stated in the hearing that from the data available with KSEB for a period of three months after implementation, it is concluded that there was no appreciable change or shift in the consumption pattern of EHT and HT category of consumers. Hence KSEB did not get any benefit by way of reduction in the peak demand of the system. There was no appreciable shift of peak demand of system also as the study of daily load curves of the three months reveal as per KSEB data.

KSEB summarized the impact of revised TOD tariff as follows from the studies they have conducted.

(1) KSEB incurred a total revenue loss of Rs 14.11 Crore for the three months from January 2010 to March 2010 on account of revised TOD tariff.

(2) The monthly short fall was about 4% on total revenue.

(3) The consumption pattern of HT and EHT consumers did not show any change after implementation of revised TOD tariff.

(4) There was no shift in the system peak demand after the introduction of TOD tariff

3.2 Further KSEB pointed out that in the Schedule of Tariff approved Hon Commission had allowed an additional incentive in tariff during off peak period through granting 80%

of normal Demand Charge for entire off peak demand disregarding the ceiling limit of 130% of Contract Demand as per order dated 2-12-2009. As per Order dated 2-12-2009, if the Off Peak Billing Demand of a consumer exceeds 130% of CD the excess demand over 130% of CD is allowed to be charged at normal demand charge plus 50% of normal charge as excess demand charge. But as per the schedule of tariff approved, even when off peak tariff demand exceeds 130% of the CD, the entire billing demand is allowed to be charged at the reduced tariff of 80% of the normal demand charge. KSEB vide letter dated 02-03-2010 had brought this discrepancy before this honourable commission for making suitable amendments. But Hon Commission vide letter No KSERC/III/T&C of Supply/2010/339 dated 05-04-2010 communicated that, appropriate modifications in the billing procedures can be made after assessing revenue implications, impact of load shifting etc. as per study report of KSEB on the revised TOD tariff. Further Commission had made certain changes in the Billing Procedures for excess demand charges proposed by KSEB. A comparison of the billing procedures for excess demand charges proposed by KSEB and approved by KSERC is given below

KSEB PROPOSAL	KSERC APPROVAL
Demand Charge in each Time Zone (a) In Time Zone (T1)Dc1 = BMD1 x D x (12/24) (b) In Time Zone (T2), Dc2 = BMD2 x D x 1.4 X (4/24) (c) In time Zone (T3) Dc3 = BMD3 x D x0.80 x (8/24) (* Incentive is applicable for excess demand only Up to 30% of CD during time Zone –T3	Demand Charge in each Time Zone (a) In Time Zone (T1)Dc1 = BMD1 x D x (12/24) (b) In Time Zone (T2), Dc2 = BMD2 x D x 1.4 X (4/24) (c) In time Zone (T3) Dc3 = BMD3 x D x0.80 x (8/24)
Excess Demand Charge in each Time Zone (a) In time Zone (T1) , Ed1 = (RMD1-CD) x 0.5x D (b) In Time Zone (T2) , Ed2 (RMD2 – CD) x 0.5 xD (c) In Time Zone (T3), Ed3 =(RMD3- 1.3 x CD) x 1.5 x D (d) Total Excess Demand Charges (Ed1 + Ed2+ Ed3)	Excess Demand Charge in each Time Zone (a) In time Zone (T1) , Ed1 = (RMD1-CD) (b) In Time Zone (T2) , Ed2 (RMD2 – CD) (c) In Time Zone (T3), Ed3 =(RMD3- 1.3 x CD) Total Excess Demand Charges (ED) = Excess Demand Ed1, Ed2 or Ed3 which ever is higher x 05 x D

3.3 KSEB has proposed revision in TOD Tariff with the prime objective of reducing peak demand by shifting the same to off peak period. Accordingly KSEB has proposed to impose penalty for excess demand for each time zone separately as follows.

(a) Excess Demand charges may be charged for normal and peak time when billing demand exceeds contract demand,

(b) Excess Demand Charge for off peak period may be charged when the billing demand exceeds 1.30 x CD

However as per the billing procedure approved by the Commission excess demand charges can only be claimed for one of the three time Zones normal, peak or off-peak. Even though there was excess demand during peak hours / normal time and if there is more increase in excess demand during off peak hours the consumer will not be liable to pay any excess demand charges for excess consumption during normal/ peak period. This will overshadow the basic purpose of TOD Structure motivating the consumers to reduce demand during peak and normal time. This anomaly is also need to be corrected.

3.4 KSEB has analyzed the time zone wise energy consumption of HT and EHT consumers for the months of December 2009 to March 2010.with the same during the previous year 2007-08 and 2008-09. A comparison of zone wise consumption for EHT1, EHT2 and HT consumers for the months of December to March for years 2007-08, 2008-09 and 2009-10 were analysed. It is observed that during the period from Dec ember to March for years 2007-08 to 2009-10 the peak consumption of EHT1 categories varies between 14.6% to 15.88% of the total consumption, EHT2 category varies between 13.54% to 15.11% and that of HT consumers varies between 11.34% to 13.58% It is observed that even after introduction of revised TOD tariff, there was no appreciable change or shift in the consumption pattern of EHT and HT Consumers.

3.5 KSEB has studied system load after implementation of the revised TOD tariff. The variation in the average daily load curve of KSEB for the months January, 2010 to March, 2010 with that of corresponding months of previous years system. There was no appreciable shift of peak demand to off peak demand or variation in daily load curve after revising TOD tariff with effect from 01-01-2010. The month over month variation in load curve is only on account of increase in energy demand. Due to power restrictions in 2008-09 KSEB was able to contain system demand during normal and off peak time for the month of January and February 2009 as that of previous year.

Hence KSEB concluded that there was no appreciable change in the consumption pattern of HT and EHT Consumers after implementation of revised TOD tariff with effect from January 2010. KSEB also did not experience any reduction in peak demand by way of shifting a part of peak demand to off peak demand.

The impact of revised TOD tariff is summarized as follows

(1) KSEB has incurred a total loss of Rs 14.11 Crore for three months from January 2010 to March 2010 on account of revised TOD tariff as per KSERC Order dated 2-12-2009

(2) Monthly revenue shortfall was about 4% on total revenue.

(3) The HT and EHT Consumers of the State have not made any change in the consumption pattern after implementing the revised TOD tariff with effect from January 2010

(4) KSEB has not been benefitted with any appreciable reduction in peak demand by way of shifting part of peak demand to off peak demand.

3.6 Response by Stake holders.

Kerala HT and EHT Industrial Electricity Consumers, Association has pointed out that the load pattern of Kerala is highly skewed with peak load of 2900 MW and off peak load of 1500 MW due to high domestic consumption. Shifting of load from peak to off peak poses lot of problems and expenditure increasing the cost of production of the consumer. Therefore very attractive incentive scheme only can bring the desired level of shifting of load. The saving for KSEB for shifting per unit may be Rs 5/Unit as against this incentive offered is less than 10% of savings derived by KSEB. Many other states in India are offering better incentives. Effectiveness of TOD Scheme cannot be evaluated based on revenue reduction alone.

They have presented a case study

(1) Case I Uniform load in day, peak and off-peak
(2) Case II Day Normal , Peak 20% less than normal, Off Peak 10% more than normal
(3) Case II Day Normal, Peak 40% less than Normal, Off peak 20% more than normal

Case I Uniform Consumption throughout	Old Scheme	KSEB Scheme	Existing Scheme
Demand (Ps/Unit)	48.2	48	47.3
Energy (Ps/Unit)	299.5	294.8	290
Duty and Surcharge	12.5	12.5	12.5
Total (Ps/Unit)	360.2	355.3	349.8
Case II Normal Peak -20% Off Peak + 10%			
Demand (Ps/Unit)	46.6	51.9	46.3
Energy (Ps/Unit)	288.4	291	285.7
Duty and Surcharge	12.5	12.5	12.5
Total (Ps/Unit)	347.5	355.4	344.5

Case III Normal, Peak -40% Off Peak +20%			
Demand (Ps/Unit)	44.9	55.8	45.4
Energy (Ps/Unit)	277.3	287.1	281.3
Duty and surcharge	12.5	12.5	12.5
Total (Ps/Unit)	334.3	355.4	339.2

From the above it is evident that the existing scheme offers the maximum incentive for a consumer to shift load from peak to off peak. In the scheme proposed by KSEB the per unit rates for uniform load without any shifting, 20% reduction in peak, 40% reduction in peak are all the same and hence there is no incentive for consumer for shifting. But there is one anomaly in the existing scheme, in case III where a consumer shifts 40% of load from peak to off peak the old scheme provides more incentive.

Further as per KSERC Order for excess demand billing highest of excess demand over contract demand in normal and peak or 1.3 contract demand of off peak is charged 50% extra. But KSEB continues to bill as per their original proposal imposing excesss demand charges in effect three times. As per KSERC order billing of the entire recorded consumption during off peak has to be charged extra at 50% of ruling demand charges.

M/s Binani Zinc pointed out that effectiveness of TOD tariff should not be evaluated based on loss/gain of revenue. TOD scheme ordered by the Commission is better than the Older Scheme and also the scheme proposed by KSEB. For Demand as well as energy the incentive is half of penalty. From the comparative statement provided it is seen that there is a reduction in percentage increase of peak demand from January to July 2010 compared to 2008 and 2009 both in capacity and energy which indicates a marginal shift from peak to off peak for both capacity and energy.

Travancore Cochin Chemicals stated that attractive TOD helps to flatten the load curve and reduce peak demand. Peak hour power is costlier than Off Peak hour power and availability of power during peak hour is also scarce. It is essential that differential price between peak and off peak should be increased to encourage shifting of load from peak to off peak hours.

Hindustan Newsprint Ltd pointed out after analyzing through a case study that the existing scheme offers the best overall incentive for a consumer to shift the load from peak to off peak.

Carborundum Universal has pointed out that the basic motive behind TOD Tariff is to manage demand by the licensee and to persuade the consumer to shift the peak load to off peak time. But the KSEB proposed scheme does not provide incentive for

shifting of load as the unit rate may not vary irrespective of the change of consumption pattern. They suggested a scheme with 60% peak penalty and 40% off peak incentive.

4.0 Analysis by the Commission.

4.1 Analysis of the existing TOD system reveals that the invoices based on the Commissions' approved TOD system existing at present are lower when off peak load of consumers are lower and higher when off peak loads are higher compared with the invoices based on the earlier KSEB TOD system. The existing TOD system approved by the Commission was the proposal of KSEB with only change of increase in incentive by 5% for Demand Charges and Energy Charges during off peak hours.

4.2 A comparison of impact in cost based in the Commission approved TOD System , KSEB proposed TOD System and the TOD System which existed in the KSEB earlier when the load is shifted from peak period to off peak period in the case of 110 kV consumer with Contract Demand of 25 MVA and LF 50% is given below.

From Table-I it can be concluded that when there is shifting of load from peak to off peak, the revenue loss of KSEB due to the introduction of the Commission's approved TOD System will be getting reduced and beyond a shifting of 5 MW of load from Peak to Off Peak there is increase in revenue for KSEB than from the earlier TOD system. Also there is gradual reduction in the cost/unit and consequently in the invoice amount of the consumer as the consumer shifts the load from peak to off peak in the existing TOD system. Such reduction is not noticeable in the case of TOD System proposed by KSEB. Hence as pointed out by the stakeholders there is not enough incentive in the KSEB proposed system for shifting load from peak to off peak hours.

Table-I

Sl No	Normal (MW)	Peak (MW)	OffPeak (MW)	Present TOD System (Ps/Unit)	KSEB Proposed TOD System (Ps/Unit)	Past KSEB TOD System (Ps/Unit)
1)	25	25	25	358	364	368
2)	25	24	26	357	363	360
3)	25	23	27	355	361	360
4)	25	22	28	354	360	356
5)	25	21	29	352	359	353
6)	25	20	30	351	357	349
7)	25	19	31	349	356	345
8)	25	18	32	348	355	342
9)	25	17	33	347	356	338
10)	25	16	34	347	359	334
11)	25	15	35	346	361	331

There is a positive impact on the system load profile with increasing tariff differential between peak and off - peak tariff.The rational deduction from this statement

is that higher the difference between peak and off peak tariffs over a period of time , higher should be the incentive for consumers to shift the load from peak to off peak period. When the Commission increased the incentive for non peak hours by 5% both for Capacity Charges and Energy charges from the original proposal of KSEB the objective was to provide more incentive for the consumers to encourage shifting of load from peak to off peak hours. But as pointed out by KSEB based on the data analysis the shifting of load has not been effected as expected and hence KSEB incurred a total revenue loss of Rs 14.11 Crore for the three months from January 2010 to March 2010 on account of revised TOD tariff. Monthly revenue shortfall was about 4% on total revenue. The HT and EHT Consumers of the State have not made any change in the consumption pattern after implementing the revised TOD tariff with effect from January 2010

The Commission has already increased incentive for off peak consumption in the proposal of KSEB. Hence further increase in the difference between peak and off peak tariff can only be achieved by increasing the penalty for consumption during peak hours. Hence the penalty for peak consumption may be increased by 10%. Table II gives the impact of increasing penalty by 10% for peak hours for both Demand and Energy charges.

Table-II

Sl No	Normal (MW)	Peak (MW)	OffPeak (MW)	Present TOD System (Ps/Unit)	KSEB Proposed TOD System (Ps/Unit)	Past KSEB TOD System (Ps/Unit)
1)	25	25	25	364	369	368
2)	25	24	26	362	368	364
3)	25	23	27	360	366	360
4)	25	22	28	358	365	356
5)	25	21	29	357	363	353
6)	25	20	30	355	362	349
7)	25	19	31	353	360	345
8)	25	18	32	351	359	342
9)	25	17	33	350	359	338
10)	25	16	34	350	362	334
11)	25	15	35	350	364	331

After shifting a load of 3 MW from peak to off peak the invoice amount based on the present TOD System is found to be always higher than the invoice based on the Old TOD System of KSEB., resulting in additional revenue to KSEB.Hence increase of penalty for consumption during peak hours by 10% for Demand and Energy will reduce revenue loss for KSEB even when the load shifting is not effected. It will give further incentive for shifting load from peak to off peak hours.

KSEB has not analysed the details of the benefits and costs for a sufficient time period to reach a conclusion that the existing system is not providing the desired results expected ie shifting of load by individual consumers from peak to off peak resulting in reduction in peak demand of the system. The details of benefits such as additional revenue on account of TOD surcharge during peak hours, reduction in cost of power purchase due to reduction in peak consumption, revenue increase due to increase in sales during normal hours (shifting of load from peak hours to normal hours), reduction in the capital expenditure for net work augmentation have to be analysed for sufficient time span ie a period of one year. So also the cost involved like the revenue loss due to reduction of sales during peak hours after introduction of the new TOD system has to be analysed for a period of one year. Only after a detailed study a decision can be taken regarding the changes to be made in the existing TOD system like giving more incentive for shifting by increasing the penalty for peak hour consumption mentioned above.

The setting of TOD tariff is an iterative process requiring periodic monitoring to ensure the effectiveness of its implementation. Monitoring of consumption of energy shall be done for individual consumers for each time zone and also category wise on a mothly basis by KSEB for one year. Analysis of load curves of individual consumers and also the system for the day of maximum demand in the month is required for examining the extent of shift in individual consumer and the consequent impact on the system load curve. KSEB is to provide a comprehensive report covering these parameters for a period of 12 months from the date of implementation. A decision whether any changes are to be made in the existing TOD system can be arrived at, based only on the study report of implementation for a period of one year.

As per Order dated 2-12-2009 excess demand charges shall be applicable to the recorded maximum demand in excess of contract demand during normal period and peak period , which shall be charged 50% extra (ie excess demand charges during normal/peak period x ruling demand charges x 0.5) Excess demand charges during off peak period shall be applicable only if recorded maximum demand during off peak period is in excess of 130% of Contract Demand. In the Billing Procedure as per Annexure F of Schedule of Tariff and Terms and Conditions for excess demand in Time Zone T3 Demand Charge Ed3 = [RMD3 –(1.30 X CD)]and Total Excess Demand Charge is calculated taking the highest of excess demand of the three periods. Hence the procedure approved is consistent with the tariff order dated 2-12-2009 and shall be followed by KSEB.

5. Orders of the Commission.

(1) Since the time period for the analysis of the impact of TOD tariff by KSEB was only 4 months, the conclusions of KSEB cannot be accepted as such. Hence KSEB is directed to submit the commission a detailed report on the impact of TOD system after implementation of the system for a period of 12 months and the details of benefits and costs to reach a conclusion that the existing system is not providing the desired results expected ie shifting of load by individual consumers from peak to off

peak resulting in reduction in peak demand of the system. The details of the benefits such as additional revenue on account of TOD surcharge during peak hours, reduction in cost of power purchase due to reduction in peak consumption, revenue increase due to increase in sales during normal hours(shifting of load from peak hours to normal hours), reduction in the capital expenditure for net work augmentation etc have to be analysed for a period of one year. So also the cost involved like the revenue loss due to reduction of sales during peak hours after introduction of the new TOD system has to be analysed for a period of at least one year. The report shall be submitted within one month after the completion of one year of the operation of TOD tariff approved by the Commission in KSEB. In order to facilitate shifting of load from peak to off peak period and to neutralize revenue loss which need not be passed on to ordinary consumers, the Commission feels that the penalty for peak period use can be raised by 10%. From 1-01-11 the existing TOD System shall be modified by increasing the penalty by 10% for both energy and capacity charges.

Revised TOD rates effective from 1-01-11.

Particulers	Rates existing as approved by KSERC(% of Ruling Charges)			Rates revised by KSERC (% of ruling charges)		
	Normal Period (06.00 hrs to 18 .00 hrs)	**Peak Period (18.00 hrs to 22 .00 hrs)**	**Off Peak (22.00 hrs to 06.00 hrs)**	**Normal Period (06.00 hrs to 18 .00 hrs)**	**Peak Period (18.00 hrs to 22 .00 hrs)**	**Off Peak (22.00 hrs to 06.00 hrs)**
Demand Charges	**100%**	**140%**	**80%**	**100%**	**150%**	**80%**
Energy Charges	**100%**	**130%**	**85%**	**100%**	**140%**	**85%**

(2) The question of recoupment of losses incurred by KSEB on account of the new TOD system shall be considered at the time of truing up of ARR and ERC of KSEB

(3) As per Order dated 02-12-2009 excess demand charges shall be applicable to the recorded maximum demand in excess of contract demand during normal period and peak period, which shall be charged 50% extra. Excess Demand charge during off peak period shall be applicable only if recorded maximum demand during off peak period is in excess of 130% of Contract Demand. In the Billing Procedure as per Annexure F of Schedule of Tariff and Terms and Conditions for excess demand in Time Zone T3 Demand Charges Ed3 = [RMD3 – (1.30 X CD)] and Total Excess Demand Charge is calculated taking the highest excess demand of the three

periods. Hence the procedure approved is consistent with the tariff order dated 2-12-2009 and shall be followed by KSEB.

The petition is disposed off accordingly

Sd/-
Shri. M.P.Aiyappan
Member

Sd/-
Shri. K.J.Mathew
Chairman

Authenticated copy for issue

Secretary