

**KERALA STATE ELECTRICITY REGULATORY COMMISSION
THIRUVANANTHAPURAM**

In the Matter of : Incentive for high load factor, prompt payment, high power factor and improvement in TOD billing system

1. Proposal submitted by M/s Kerala State Electricity Board Ltd. pursuant to the directions contained in the order dated 31.05.2013 in appeal no. 179/2012.
2. OP. No. 29/2013 filed by M/s Binani Zinc Ltd., Binanipuram 683 502.

**Present : Shri T.M. Manoharan, Chairman
Shri P. Parameswaran, Member
Shri Mathew George, Member**

Common order dated 06.02.2014

1. The Kerala High Tension (HT) and Extra High Tension (EHT) Industrial Electricity Consumers' Association had filed an appeal petition before the Hon'ble Appellate Tribunal for Electricity (APTEL) from the tariff order dated 25-07-2012 issued by the Commission. Hon'ble APTEL admitted the petition as Appeal No. 179 of 2012. Along with other issues related to tariff fixation, the petitioner had pleaded before the Hon'ble APTEL that, the State Commission had dis-allowed incentives such as load factor incentive and prompt payment incentive without any valid reasons.
2. Hon'ble APTEL vide its judgment dated 31-05-2013 decided on the appeal petition No. 179 of 2012 and the paragraph 62 and 63 of the judgment deals with the issues raised by the HT&EHT consumers on providing incentive for prompt payment and load factor. The relevant paragraphs of the judgment of the Hon'ble APTEL are reproduced under.

"62. The State Commission in the impugned order has held that it would separately consider the introduction of such incentive for high load factor and prompt payment after the Board has carried out a study on implication of these incentives in the performance and revenues of the Board and impact on consumer's bill. In view of the above, we do not find any infirmity in the order of the State Commission. The State Commission is justified in examining the implications of these incentives before allowing them. We also find that the State Commission has not included any interest on working capital to cover the Operation and Maintenance expenses and receivables from the consumers in the ARR and Tariff of the Board. Inclusion of such expenses in the ARR could have given a reason to the Appellant to claim rebate for prompt payment. This is not the case here.

63. However, since the State Commission has decided that the question of introduction of incentive for load factor and prompt payment would be decided after examining the implications of these proposals and the Board has been directed to submit a detailed study on these issues, we feel that a time bound direction is necessary. Accordingly, we direct the Electricity Board to submit the relevant information on these issues as sought by the State Commission within 3 months from the date of this judgment and thereafter the State Commission shall decide the issue after hearing all concerned within 120 days for adoption by the State Commission in the subsequent tariff order.”

3. Accordingly Kerala State Electricity Board Ltd., submitted a proposal in compliance of the directions of Hon’ble APTEL. M/s. Binani Zinc Ltd., submitted a petition for granting load factor incentive, power factor incentive and for changing the methodology for calculating demand charges under time of the day (ToD) tariff. Commission admitted both the petitions and decided to hear them jointly.

Prayer

4. The proposals of KSEB Ltd were
 - (1) *An incentive for prompt payment at 0.20% of the bill amount (excluding Electricity Duty and Cess if any) shall be given in case the payment is made at least seven days in advance of the due date of payment where the current month electricity charges is equal to or greater than Rs. One Lakh. The consumers in arrears shall not be entitled for prompt payment incentive.*
 - (2) *For advance payment, an interest of 0.70% per month for the entire advance payment (excluding security deposit) which remains with the Board for the calendar month shall be credited to the consumer account after adjusting any amount payable to the Board.*
 - (3) *Considering the incentivized ToD tariff prevailing in the State, there is no need to further introduce the incentive based load factor improvement in the Kerala Power System.*
5. The prayers of M/s Binani Zinc Ltd in their petition no.29/2013 are
 - (1) *To review methodology of calculating chargeable MD in order to ensure that consumers who shift the load are benefited*
 - (2) *To introduce load factor incentives*
 - (3) *Revise PF incentive to rationalize the scheme*
 - (4) *To issue necessary orders to KSEB to pass on the benefit of lower tariff for interstate sales , to EHT consumers*
 - (5) *To consider the improved Hydel situation and pass on the effect of lower cost to EHT consumers.*
6. The view points , submissions, and arguments by the Petitioners as well as other stake holders on various issues are discussed below:

Incentive for prompt payment of electricity charges

7. KSEB in the proposal for introducing incentive for prompt payment of electricity charges, load factor and bulk consumption dated 24-09-2013 and in the public hearing held on 18-12-13 submitted the following points.

“4. The HT&EHT Industrial Electricity Consumers’ Association vide their objections dated 5th June-2012 on petition filed by KSEB for revising the tariff applicable for the year 2012-13 has suggested that, an incentive @0.25% be given for payment within 10 days of the bill being received by the consumer.

5. KSEB has duly considered the proposal of the HT&EHT consumers association. Presently, Board as the distribution licensee has been raising the invoice for monthly electricity consumption during the subsequent month, i.e., invoice for the consumption during the month of January is being raised during the month of February. Further, as per the regulation 22 of the Kerala Electricity Supply Code, 2005, the consumers has to remit the electricity dues within (7) days of the bill date. However, considering the time taken for delivering the invoices to the consumers, KSEB has been now allowing 10 days from the bill date for making payments. It is the responsibility of every consumer to pay the electricity dues within the due date prescribed in the invoices.

6. Further, as observed by the Hon’ble APTEL, Hon’ble Commission has not been allowing interest on working capital for accounting the O&M expenses and ‘receivables from the consumers’ through the ARR. Hence, there is no need for extending incentive for making the payment for the electricity within the due date.

7. However, KSEB propose to give incentive to those consumers, who remit electricity charges immediately on receipt of the invoices without waiting till the due date of payment. Further, KSEB has been now encouraging online payment and also ECS. Hence KSEB proposes that, if the payment is made at least seven days in advance of the due date of payment, an incentive for prompt payment at 0.20% of the bill amount (excluding electricity duty and Cess) shall be given to the consumers. However, KSEB proposes the prompt payment incentive only to those consumers, whose electricity bill amount is equal to or greater than Rupees One Lakh. The consumers in arrears shall be not eligible for prompt payment incentive.

8. The average monthly revenue from the HT&EHT consumers including railways is about Rs 232.00 crore per month. If the entire HT&EHT consumers avail the prompt payment incentive, the amount payable towards incentive shall be about Rs 5.60 crore per annum.

9. Rebate for advance payment: At present Board has been offering 4% for one year advance payment and 2% rebate for 6 months advance payment. In order to attract the consumers for advance payment towards electricity charges and also considering the present rate of interest offered by the financial institutions, Board may propose to offer an interest @0.7% per month for the entire advance payment (excluding security deposit) made

before the commencement of the consumption period for which bill is prepared, which remain with the Board for the entire calendar month. The rebate shall be credited to the account of the consumer after adjusting any amount payable to the Board.”

8. Kerala HT and EHT Industrial Electricity Consumers Association vide letter dated 09-12-2013 and in the public hearing on 18-12-13 submitted the following on the Incentive for prompt payment:

“We, in our objections dated 5th June-2012 on petition filed by KSEB for revising the tariff applicable for the year 2012-13 had suggested that, an incentive @0.25% be given for payment within 10 days of the bill being received by the consumer.

Quoting the above, KSEB has proposed that, if the payment is made at least seven days in advance of the due date of payment, an incentive for prompt payment @0.20% of the bill amount (excluding electricity duty and Cess) shall be given to the consumers.

However, in our Objections to ARR & ERC Petition of KSEB for 2013-14 we had submitted as:

“4.21 The Commission should also introduce incentives / rebates for prompt payments, of 2% on energy bill on similar lines of other Commissions viz. Maharashtra, etc, which is equivalent to the incentive that the Board gets for prompt payment of its power bills”

Even though we had requested that a prompt payment incentive of 0.25% be introduced in our earlier objections, we now stand by the latest request of 2.0% made in our Objections dated 20-02-2013 on ARR & ERC Petition of KSEB for 2013-14. The justifications for the above request of 2.0% incentive are given below. All the Licensees are getting ‘Prompt Payment Incentive’ of 2.0% for payment done within 7 to 10 days of bill date from CGS and Power Traders. This is uniformly accepted across India. Therefore, it is only fair that the same kind of treatment is given to the consumers of KSEB also.

Many Licensees across India are offering Prompt Payment Incentive to their consumers up to 2.0% of the bill amount. A list of a few States giving such incentives is given below:

State	% Incentive	Remark
Jharkhand	2	Within 2 days of bill date
	1.67	Within 3 to 5 days
	1.2	Within 6 to 12 days
	0.67	Within 13 to 20 days
	0.13	Within 21 to 28 days
Bihar	10 ps/unit	Within 15 days
Maharashtra	1.0%	Within 7 days
Delhi	1.0%	Within 7 days
Odisha	1.0%	Within 3 days
Chhatthisgarh	0.5%	Within 7 days

In our original request dated 5th June 2012, we had requested for an incentive of 0.25% for payment within 10 days of receipt of the bill by the consumer. But, KSEB has now proposed an incentive for payment before 7 days of the due date. 'Prompt payment' means a payment made within the due date and an "incentive for prompt payment" is for the payment within due date and not before due date. In the light of the above, we propose a prompt payment incentive of 2.0% of billed amount for payment made within 7 days of the bill date. There is considerable delay in receiving bills sent by KSEB to consumers. To avoid this, the Hon'ble Commission may direct KSEB to publish the monthly electricity bill in the case of HT & EHT consumers on the bill date itself in the website of KSEB and also send the same by e-mail to respective consumer on the bill date itself. Further, KSEB has also proposed that consumers in 'arrears' shall not be eligible for prompt payment incentive. To this we would like to comment that the term 'arrears' has created lot of confusion in the past. We, feel that KSEB has misrepresented the term and used it unfairly to the detriment of the consumers. In order to avoid such confusions in future we request that a clarification on the term 'arrears' be also given. Payment of any amount stayed by a court of law or referred to high power committee constituted by Government of Kerala shall not be considered as arrears."

9. Other stake holders and HT/EHT consumers who participated in the hearing also supported the pleadings by the Association.

Analysis

10. Kerala HT and EHT Industrial Electricity Consumers Association, in their submission dated 5th June-2012 on the petition filed by KSEB for revising the tariff applicable for the year 2012-13 had suggested that an incentive @0.25% be given for payment within 10 days of the bill being received by the consumer. However, in their objections to ARR & ERC Petition of KSEB for 2013-14 they had pleaded to introduce incentives / rebates for prompt payments, of 2% on energy bill on similar lines of other Commissions viz. Maharashtra, etc, which is equivalent to the incentive that the Board gets for prompt payment of its power bills. Eventhough the present proceedings is the result of an order of Hon APTEL on Appeal No. 179 of 2012 challenging the tariff revision for 2012-13 , the commission has no hesitation in examining the pleadings during the public hearings on ARR&ERC petition of KSEB for 2013-14 also, since the subject matter is same.
11. But the Association has failed to establish convincingly their claim for prompt payment incentive at the rate of 2.0% of billed amount for payment made within 7 days of the bill date and their revised concept of 'prompt payment'. They argue that 'prompt payment' means a payment made within the due date and an "incentive for prompt payment" is for the payment within due date and 'not before due date' and pleaded for incentive even if payment is made on due date. Commission cannot accept this argument. Every consumer is expected to make payment of electricity charges on or before due date and Commission

cannot restrict or limit such favours to a few consumers.

12. The argument that the licensees are getting rebate from generators for prompt payment and the same has to be passed on to HT and EHT consumers is also not acceptable. The contractual relations, payment security systems and the service delivery mechanisms are not similar in the above two cases.
13. The Commission is of the considered view that the incentives should be only for early payment and it should be linked to the cost of funds applicable for both payer and receiver. The incentive has to progressively increase in proportion to the number of days of early payment. That is, the earlier the payment is made, the higher the incentive has to be. Thus incentive will be zero for payment on due date, at the rate of x % for payment one day in advance, 2x% for payment two days in advance and so on.
14. The working capital interest rates for SBI at present is reported to be around 14 % that is 0.04% per day. This could be taken as bench mark for deciding the rate of incentive. It is seen that Consumer payment can be directly credited to the collection account of the Licensee with the direct debit facility , net banking system etc. This means the cost of collecting the payment is practically negligible . The Commission is of the firm view that this should also be factored into the incentive mechanism. Considering all these factors the incentive offered by the Licensees shall be fixed as given below:

If the payment is made before 5 clear days from the due date the HT and EHT consumers in the state will be eligible for an incentive of 0.3% of the invoice amount (excluding Duty and other levies payable to Government)

15. The following general instructions are issued on the procedures to be followed in the matter.
 - (1) The early payment incentive cited above shall be implemented in the case of HT and EHT consumers, as a first step, with effect from 01-04-2014 . The same shall be rolled out to other major consumers later with the approval of the Commission, after the necessary infra structure is ready and experience is evaluated.
 - (2) All the licensees including KSEB are hereby directed to make available the invoice details of all HT and EHT consumers through their website and also to send a copy of the invoice to the consumers by email on the date of issue of the invoice.
 - (3) Early payment incentive will be allowed to all HT and EHT consumers who are not in arrears, the arrears being defined as any payments due to the licensee , unless it is stayed by a court of law.
 - (4) The incentive will be computed by the licensee based upon the date on which the invoice amount in full is credited to the bank account of the licensee and the incentive amount shall be credited to the account of the consumer immediately. This amount shall be adjusted in the first subsequent invoice raised against the consumer. Any delay in adjusting the incentive amount shall attract penal interest at twice the bank rate.

- (5) Incentive shall not be payable on Electricity duty and other levies payable to Government.

Decision

16. **Considering all the submissions and arguments presented by all the stake holders, the Commission decides that if the payment is made before 5 clear days from the due date the HT and EHT consumers will be eligible for an incentive at the rate of 0.3% on the invoice amount (excluding Duty and other levies payable to Government).**

Incentive for high Load Factor

17. KSEB in its proposal dated 24-09-2013 for introducing incentive for early payment of electricity charges, load factor and for bulk consumption and in the public hearing held on 18-12-13 submitted the following points.

“10. The HT&EHT consumers have been consistently demanding load factor incentives and also incentives for bulk energy consumption. The load factor and bulk consumption aims at increasing the energy consumption by the consumers. However, considering the scarcity of fuel and also for optimum utilization of the resources, the need of the hour is to conserve the electricity to the possible extent and to avoid the wasteful usage of electrical energy.

11. It is further submitted that, the gap between the peak and ‘off-peak demand’ is the major concern of the Kerala power system. However, the reduction in peak usage or shifting of peak consumption cannot be achieved through introducing load factor incentive.

12. Hon’ble Commission vide the order dated 14th January, 2005, ‘in the matter of incentives to HT/EHT consumers on power factor improvement and ToD pricing’ had appraised the issue in detail and concluded that, providing load factor incentives may not result in reduction of the grid peak power demand and concluded that the incentive based on load factor improvement might not bring in the required results. The relevant paragraph from the order issued by the Hon’ble Commission is extracted below.

‘The present system peak demand in the State has increased to almost twice the off-peak demand. This necessitates more investment in the power system to meet the peak demand and generation and power purchase of expensive thermal energy. And the system remains unutilized during the off-peak periods. Therefore all possible measures are required to be resorted to reduce the peak load consumption and increase the consumption during the off-peak period. Increase in off-peak consumption minimizes the idling cost of generating plant and power system network. Increased consumption during off-peak period substantially saves the costly peak-power and excessive technical losses in the system.

Increase in the Load Factor of individual HT&EHT consumers may not necessarily result in reduction of the grid peak power demand. Therefore, the Commission is of the view that incentive based on load factor improvement might not bring the required results. The incentive scheme should be designed in such a way as to encourage the consumers to shift

their consumption from peak period to off-peak. For this purpose, the existing provisions in the differential pricing method for providing incentives for Time of Day (TOD) consumption in the prevailing tariff structure shall be reviewed on the basis of suggestions filed by the HT&EHT Industrial Consumers' Association.

In the above context, the Commission is of the view that incentives shall be provided to HT/EHT consumers, with due consideration to the resulting benefits to KSEB by way of improvement in technical performance of the power system and reduction of line losses and reduction in expensive peak-time power.

13. Hon'ble Commission had completely revised the ToD tariff structure applicable to the HT&EHT consumers during the year 2009-10. At present, the energy charges under TOD for the peak period is 50% higher than the normal ruling tariff and the same during 'off-peak' period is less by 25% of the normal ruling rate. Further, Hon'ble Commission has been allowing to use up to '30% of the contract demand' as 'excess demand' during off-peak hours at the incentivized rate (i.e., 25% less of the normal rate), without any penalty for the excess demand over the contract demand. The present ToD tariff may incentivize the industrial consumers to shift the consumption from 'peak hours' to 'off-peak hours' and this may lead to reduce the peak consumption.

14. However, the peak demand of the Kerala power system is more than 80% of the 'off-peak demand'. Hence there is not much improvement in the KSEB system, as compared to the year 2005, wherein Hon'ble Commission has concluded that, incentives based on load factor improvement might not bring the required results. Hence, KSEB is of the opinion that, incentives based on load factor may not be considered at this juncture.

15. It is also noticed that, very few regulators across the country only has introduced the load factor incentive system in the country, considering the predominant base load thermal stations in their power system. However, KSEB system is still a hydro predominant system having installed capacity of about 2000 MW. The average capacity utilization factor (load factor) of the KSEB hydro system is about 35 to 40% only. However, the optimum capacity utilization factor of a thermal system with coal and lignite is about 80 to 85%. Hence, there is no need for maximizing the generation by providing load factor incentives to the consumers.

16. It is further submitted that, all the power utilities across the country has been taking all efforts to conserve energy and also to reduce the wasteful usage of electricity. Further, all the DISCOMS have been taking efforts for 'Demand Side Management' and for the efficient use of electricity through consumer awareness. KSEB has also been taking all efforts for DSM, Energy conservation, consumer awareness etc.

17. Considering the above, KSEB recommends before the Hon'ble Commission to kindly continue the decision taken vide the order dated 14th January, 2005, 'in the matter of incentives to HT/EHT consumers on power factor improvement and ToD pricing' that, the incentive based load factor improvement might not bring the required results in Kerala Power System."

18. KSEB vide submission KSEB/TRAC/ Incentives/ Binani Zinc/ 31-12-2013 further informed as follows:

"In the hearing held on 18-12-2013 in the matter of load factor incentive, power factor incentive and ToD demand charges M/s Binani Zinc Ltd and HT&EHT Industrial consumer's association has claimed that, increase in load factor may lead to reduction in T&D loss and ultimately beneficial to KSEB. Hon'ble Commission during the hearing has directed to provide KSEB's comments on the claim of M/s Binani Zinc Ltd and M/s HT&EHT consumers association. I am directed to provide the following comments on the subject matter under reference.

1. The load factor of a consumer during a month is the ratio of 'Monthly consumption in units' and 'Number of hours in a billing month x Demand x Power Factor'.

Load factor (%) = (Monthly consumption x 100)/ ('Number of hours in a billing month x Demand x Power Factor')

Where in

(i) 'Monthly consumption' shall be units (kWh) consumes in the month excluding those received from sources other than licensee.

(ii) Demand shall be the maximum recorded or contract demand whichever is higher.

(iii) Power Factor (PF) shall be 0.90

2. Due to the prevailing 'ToD' tariff in the State of Kerala, almost all the HT&EHT industrial consumers has been operating at its maximum 'contracted demand' or 'even at the excess capacity up to 130% of the CD during night off-peak hours'. Hence, for this study purpose, the demand of the consumer is presumed as 'CD', though in reality the 'maximum demand' may exceed CD during night off-peak hours.

3. Thus, as per the formulae given under paragraph-1 above, as the load factor increases, the monthly consumption shall also increases provided the 'number of hours of operation and maximum demand' remains unchanged.

4. Let the contract demand (CD) of a consumer, availing power at 110kV supply level is 24000 kVA, then monthly energy consumption at different load factor between 60% to 98% is as detailed below.

Table-1

Monthly consumption at different 'LF'

Particulars	Contract Demand	Load factor	Monthly consumption
	(kVA)	(%)	(MU)
Case-1	24000	60%	9.33
Case-2	24000	70%	10.89
Case-3	24000	80%	12.44
Case-4	24000	90%	14.00
Case-5	24000	95%	14.77
Case-6	24000	98%	15.24

5. The total transmission loss in a month for the energy consumption with different load factors as detailed above was computed with following assumptions.

(i) The EHT industrial consumers may avail the benefit of ToD tariff by maximizing the generation during night off-peak hours by continuously availing power at 'CD'.

(ii) The consumption pattern during the three time zones under ToD tariff (i.e., day time between 6:00am to 6:00pm, peak time between 6:00pm to 10:00pm and night off-peak between 10:00pm to 6:00 am) may be different.

(iii) It is assumed that, during the night off-peak hours the consumers may be availing electricity at 'CD' irrespective of the load factor.

(iv) It is further assumed that, as the load factor increases, the demand and energy consumption during 'day time and peak time' may steadily increase up to the level of 'CD'.

(v) As the load factor increases to 100%, the consumers shall continuously avail power during peak hour as well.

6. The zone wise likely 'maximum demand and monthly consumption' of the consumer at different load factor is as detailed below.

Table-2

Zone wise demand and monthly consumption at different load factor

Time zone	Case-1- Load factor 60%		Case-2- Load factor 70%		Case-3- Load factor 80%		Case-4- Load factor 90%		Case-5- Load factor 95%		Case-6- Load factor 98%	
	Power demand	Monthly consumption	Power demand	Monthly consumption	Power demand	Monthly consumption	Power demand	Monthly consumption	Power demand	Monthly consumption	Power demand	Monthly consumption
	(kVA)	(MU)	(kVA)	(MU)	(kVA)	(MU)	(kVA)	(MU)	(kVA)	(MU)	(kVA)	(MU)
Day time (6:00 am to 6:00pm)	9907	3.21	14246	4.62	18547	6.01	22896	7.42	24000	7.78	24000	7.78
Peak time (6:00pm to 10:00pm)	8640	0.93	10080	1.09	11520	1.24	12960	1.40	16826	1.82	21126	2.28
Night off-peak (10:00pm to 6:00am)	24000	5.18	24000	5.18	24000	5.18	24000	5.18	24000	5.18	24000	5.18
Total/ Average	14394	9.33	16803	10.89	19194	12.44	21608	14.00	22804	14.78	23521	15.24

7. As detailed above, as the 'load factor' of the consumer increases, the monthly total consumption as well as, the 'demand and consumption' during day time and peak time get increases. At the load factor of 60%, the demand during day time and peak time was 9907 KVA and 8640 KVA respectively compared to the contract demand of 24000kVA, whereas at the 'load factor' of 98%, the zone wise demand was 24000kVA and 21126 KVA during day time and peak time compared to the contract demand of 24000 KVA.

8. The transmission losses of the consumer are estimated for each of the six cases as detailed in the Table-1 and 2 above, with the following assumptions.

(i) As adopted by M/s Binani Zinc Ltd, the combined resistance of the transmission line from the substation to the consumer premises, at the transmission loss of 3% will be 53ohms.

(ii) The power factor of the consumer is assumed at 0.90.

9. The detailed computation of transmission losses with different load factor is detailed below.

Table-3

Case-1. Load factor @60%

Particulars	Day time (6:00am to 6:00pm)	Peak time (6:00pm to 10:00pm)	Night off-peak (10:00pm to 6:00am)	Total/ average
Number of hours	12	4	8	
Energy consumption (MU)	3.21	0.93	5.18	9.33
Max demand (kVA)	9907	8640	24000	
Average current (Amps)	46.80	40.81	113.37	
Transmission loss (MU)	0.04	0.01	0.16	0.22
Transmission loss (%)	1.30	1.14	3.15	2.31

Table-4

Case-2. Load factor @70%

Particulars	Day time (6:00am to 6:00pm)	Peak time (6:00pm to 10:00pm)	Night off-peak (10:00pm to 6:00am)	Total/ average
Number of hours	12	4	8	
Energy consumption (MU)	4.62	1.09	5.18	10.89
Max demand (kVA)	14246	10080	24000	
Average current (Amps)	67.30	47.62	113.37	
Transmission loss (MU)	0.09	0.01	0.16	0.26
Transmission loss (%)	1.87	1.32	3.15	2.43

Table-5

Case-3. Load factor @80%

Particulars	Day time (6:00am to 6:00pm)	Peak time (6:00pm to 10:00pm)	Night off-peak (10:00pm to 6:00am)	Total/ average
Number of hours	12	4	8	
Energy consumption (MU)	6.01	1.24	5.18	12.44
Max demand (kVA)	18547.20	11520.00	24000.19	
Average current (Amps)	87.61	54.42	113.37	
Transmission loss (MU)	0.15	0.02	0.16	0.33
Transmission loss (%)	2.44	1.51	3.15	2.64

Table-6

Case-4. Load factor @90%

Particulars	Day time (6:00am to 6:00pm)	Peak time (6:00pm to 10:00pm)	Night off-peak (10:00pm to 6:00am)	Total/ average
Number of hours	12	4	8	
Energy consumption (MU)	7.42	1.40	5.18	14.00
Max demand (kVA)	22896	12960	24000	
Average current (Amps)	108.16	61.22	113.37	
Transmission loss (MU)	0.22	0.02	0.16	0.41
Transmission loss (%)	3.01	1.70	3.15	2.93

Table-7

Case-4. Load factor @95%

Particulars	Day time (6:00am to 6:00pm)	Peak time (6:00pm to 10:00pm)	Night off- peak (10:00pm to 6:00am)	Total/ average
Number of hours	12	4	8	
Energy consumption (MU)	7.78	1.82	5.18	14.78
Max demand (kVA)	24000	16826	24000	
Average current (Amps)	113.37	79.48	113.37	
Transmission loss (MU)	0.25	0.04	0.16	0.45
Transmission loss (%)	3.15	2.21	3.15	3.04

Table-8

Case-5. Load factor @98%

Particulars	Day time (6:00am to 6:00pm)	Peak time (6:00pm to 10:00pm)	Night off- peak (10:00pm to 6:00am)	Total/ average
Number of hours	12	4	8	
Energy consumption (MU)	7.78	2.28	5.18	15.24
Max demand (kVA)	24000	21126	24000	
Average current (Amps)	113.37	99.79	113.37	
Transmission loss (MU)	0.25	0.06	0.16	0.47
Transmission loss (%)	3.15	2.78	3.15	3.10

1. The summary of the transmission losses computed with different load factor of the consumer is contract demand of 24000kVA is given below.

Table-9

Summary of the transmission losses at different load factor

Particulars	Contract Demand	Load factor	Monthly consumption	Transmission loss	
	(kVA)	(%)	(MU)	(MU)	(%) of total
Case-1	24000	60%	9.33	0.22	2.31
Case-2	24000	70%	10.89	0.26	2.43
Case-3	24000	80%	12.44	0.33	2.64
Case-4	24000	90%	14.00	0.41	2.93
Case-5	24000	95%	14.77	0.45	3.04
Case-6	24000	98%	15.24	0.47	3.10

11. As detailed above, it is observed that, as and when load factor of a consumer increases, the monthly energy consumption as well as the transmission losses associated with providing supply to that consumer may also steadily increases.

12. It is further seen from the Table-3 to Table-8 above that, as the load factor increases, the demand and energy consumption during 'day time' and 'peak time' has been steadily increasing and also the transmission losses associated energy consumption during 'day time' and 'peak time' also steadily increases.

From the above, it is submitted that, as the load factor of a consumer increases without any change in the 'Contract Demand', the transmission losses associated with providing supply to that consumer has been steadily increasing. Hence there is no merit in the argument of M/s Binani Zinc Ltd and M/s HT&EHT Electricity Industrial consumers that, as the load factor of a consumer increases, there shall be reduction in transmission losses and hence the argument may be summarily rejected"

19. Binani Zinc in the petition dated 15-11-2013 and in the public hearing held on 18-12-13 stated as follows:

" Load Factor incentive

13. Several State Electricity Regulatory Commissions have introduced Load Factor incentives in order to reduce transmission losses and for better utilization of infrastructure. In its judgment dated 31-5-2013 in Appeal no: 179/ 2012, Hon'ble APTEL has directed KSERC to introduce Load Factor incentive. Load Factor incentive scheme is a win-win proposition. For the licensee, the transmission losses get reduced and consumers with high Load Factor get incentive. Considering the above facts we propose Load Factor incentive scheme as below:

Load Factor (%)	Incentive
75 to 85	Rebate of 0.25% for every percentage point increase in load factor
Above 85	Rebate of 0.5% for every percentage point increase in load factor

Maximum ceiling for the incentive will be 7.5%

While introducing Load Factor incentive scheme it is important to define Load Factor and Maximum Demand properly.

Load Factor is defined as the ratio of units consumed in a month to the product of number of hours of the month and Maximum Demand of the month in KW.

Thus in a 30day month,

$$\text{Load Factor} = \frac{\text{Energy consumed in KWh/ (30X 24X)}}{\text{Max Demand KVA X PF}}$$

where PF is the Power Factor of the month.

Maximum Demand:

In the context of 3 MDs in a month due to ToD tariff, a suitable definition of Maximum Demand is necessary.

$$\text{Maximum Demand} = (\text{MD1 X 12} + \text{MD2 X 4} + \text{MD3 X 8}) / 24$$

where MD1 = MD recorded during day

MD2 = MD recorded during peak

MD3 = MD recorded during off-peak”

20. Binani Zinc vide letter date 27-01-2014 has provided the following comments to the letter of KSEB dated 31-12-2013

“1. Copy of the letter referred above has been forwarded by KSEB to us only on 22nd January 2014 and we are sending our comments in five days after receipt of the letter.

2. KSEB has carried out the study based on energy consumption on six cases at Load Factors varying from 60% to 98% and Contract Demand of 24000 KVA. The monthly energy consumption varies from 9.33 MU to 15.24 MU (Please refer table 1)

3. Electricity consumption of industries is based on the Production plan which is fixed by annual/ monthly targets. There would be normally a variation in electricity consumption up to +/- 10% due to variation in production, breakdowns etc. Abnormal variation would be there only when there are major breakdowns, power restrictions, load shedding etc.

4. In Table 1, from case 1 to 6, the energy consumption varies by more than 63%. This is not a logical situation as far as HT &EHT consumers are concerned.

5. The basic assumption for a comparative study on the impact of Load Factor on transmission losses should have been the same energy consumption.

6. For the reason cited above, the case study of KSEB is fundamentally wrong.

7. In Table 2, the energy consumed in day, peak and off peak in cases 1 to 6 has been calculated using the formula given below:

$\text{Energy consumed} = \text{Power Demand (KVA)} \times \text{Power Factor} \times \text{No. of hours in the time slot} \times \text{No. of days in the month.}$

Eg.: Case 1: Day time monthly consumption = $9907 \times 0.9 \times 12 \times 30$
= 3,209,868 units
= 3.21 MU

8. It is submitted that the formula used by KSEB for calculating energy is wrong. The correct formula is given below:

$\text{Energy consumed} = \text{Power demand (KVA)} \times \text{Power factor} \times \text{Load factor} \times \text{no. of hours/day} \times \text{no. of days in the month}$

The Load Factor is missing in the formula. It would mean that the energy consumptions calculated for day, peak and off peak for cases 1 to 6 in Table-2 are based on unity Load Factor which is fundamentally wrong. Interestingly, the correct formula is given in para 1 of the KSEB letter itself.

9. The transmission losses calculated in Tables 3 to 8 and the summary of transmission losses in Table 9 are all based on Table 1 and Table 2 and hence are all wrong.

10. From Case 1 to 6, the energy consumption increases from 9.33 MU to 15.64 MU. In a given transmission system when the energy consumption increases, the losses also would increase. The increase in the losses would be higher because the losses increase proportional to the square of the current. The increase in transmission losses from Case 1 to 6, as per the KSEB case study, is due to the above fact.

11. Our comments given above on the KSEB letter are summarized below:

i) The Case studies 1 to 6 are based on energy consumption varying by more than 63%. This is not logical. Any study on impact of Load Factor on transmission losses should have been carried out based on same energy consumption.

ii) The energy consumptions calculated for different time slots in Cases 1 to 6 have been calculated using wrong formula.

iii) The transmission losses would naturally increase as the energy consumption increases.

12. Findings of KSEB that 'as the load factor of a consumer increases without any change in the Contract Demand, the transmission losses associated with providing supply to that consumer has been steadily increasing' are based on fundamentally wrong assumptions and calculations based on wrong formula. Hence the submissions of KSEB may please be summarily dismissed.

13. In this connection, we would like to reiterate that Maximum Demand shall be the basis for assessing the Load Factor and not Contract

Demand. It may please be noted that in the UP Load Factor incentive scheme, Load Factor is based on Max Demand and not Contract Demand.

14. We would also like to submit that for calculating the Load Factor, the total energy consumed by the consumer including power purchased if any from other sources should be reckoned. But the incentive, if any, may be made applicable to the energy drawn from licensee only.”

21. Kerala HT and EHT Industrial consumers Association vide submission dated 09-12-13 and the public hearing on 18-12-13 stated as follows.

“ Load Factor Incentive

2.10 On Load Factor Incentive KSEB’s opinion in the petition is given below. The HT&EHT consumers have been consistently demanding load factor incentives and also incentives for bulk energy consumption. The load factor and bulk consumption aims at increasing the energy consumption by the consumers. However, considering the scarcity of fuel and also for optimum utilization of the resources, the need of the hour is to conserve the electricity to the possible extent and to avoid the wasteful usage of electrical energy.

2.11 We would like to submit that ‘Bulk Consumption Incentive’ is not under consideration as APTEL has not directed KSERC to consider it. The purpose of Load Factor Incentive is not to incentivize bulk energy consumption as stated by KSEB. On the contrary it is for reducing the transmission losses, transformer losses and for better capacity utilization of infrastructure of KSEB. Load Factor Incentive will not result in wasteful use of electricity. On the contrary it will result only in reducing losses. To substantiate this argument, we quote from the Tariff Order of West Bengal ERC for 2012-13.

8.2.1.1 In order to reduce the overall system T&D loss and to flatten the load curve by improving the existing system load factor of WBSEDCL the voltage-wise graded load factor rebate applicable for EHV and HV industrial consumers and L&MV industrial consumer under rate (B-ID) will be as per the following table.

2.12 We would like to deliberate on the advantages of high load factor as below.

2.13 Transmission Losses: High load factor of consumers reduces the transmission losses and consequently power purchase cost. Reduction in power purchase during ‘peak’ reduces purchase of expensive power. High LF reduces the transformer losses of licensee also.

2.14 Capacity Utilization: Improved LF reduces the load on transmission lines and transformers. This permits additional loading of transmission lines and transformers. This results in better utilization of the available infrastructure of licensees and delays the requirement of additional transmission lines & transformer capacity.

2.15 LF incentive is a win-win proposition. Consumer gets paid for the extra effort for improving LF. The licensee gets benefited by way of reduction in transmission losses and better infrastructure utilization.

2.16 Now going into the mechanism of introducing load factor incentive we would like to submit as below.

2.17 Definition of Load Factor: Several States have adopted definitions based on Contract Demand. E.g. West Bengal and Maharashtra. We would like to point out that this is not the right method for defining Load Factor. Consider the following example:

A consumer with a CD of 10000 KVA draws 8000KVA during day, 6000KVA during peak and 9000 KVA during off-peak. He operates at 0.9PF at 85% LF during day, peak and off peak.

$$\begin{aligned} \text{Total energy consumption} &= 8000 \times 12 \times 30 \times 85\% \times 90\% \\ &+ 6000 \times 4 \times 30 \times 85\% \times 90\% \\ &+ 9000 \times 8 \times 30 \times 85\% \times 90\% \\ &= 44,06,400 \text{ units} \end{aligned}$$

$$\begin{aligned} \text{LF as per CD based formula} &= (44,06,400 \times 100) / (10000 \times 0.9 \times 30 \times 24) \\ &= 68\% \end{aligned}$$

From the above example it can be seen that in the case of consumer having 85% LF the computed LF based on contract demand is only 68% which is not correct.

2.18 This discrepancy has to be overcome. The consumers who reduce their load during peak time and increase their load during off peak should not lose the LF incentive if they are operating during day, peak and off peak separately at high LF.

2.19 Another drawback of the CD based formula is that the consumer will have to operate at load close to CD for availing LF incentive. This is not practical. Hence we propose the following formula for Load Factor calculation.

Load Factor is defined as the ratio of units consumed in a month to the product of number of hours of the month and Maximum Demand of the month in KW.

Thus in a 30day month,

$$\text{Load Factor} = \frac{\text{Energy consumed in KWh}}{(30 \times 24 \times \text{Max Demand KVA} \times \text{PF})}$$

Maximum Demand:

In the context of 3 MDs in a month due to ToD tariff, a suitable definition of Maximum Demand is necessary.

$$\text{Maximum Demand} = (MD1 \times 12 + MD2 \times 4 + MD3 \times 8) / 24$$

where

MD1 = MD recorded during day

MD2 = MD recorded during peak

MD3 = MD recorded during off-peak

2.20 Alternatively, the definition prevailing in West Bengal which is given below may be adopted.

For the purpose of billing, the load factor of a consumer for a billing month shall be determined in accordance with the following formula:

$$\text{Load Factor (\%)} =$$

$(\text{Energy Consumed in Kwh for the billing period} \times 100) / (H - \sum Hi) \times MD + \sum(Hi \times RD_i)$

Where

H = Total Hours in the billing period

MD = Maximum Demand for Load Factor Calculation

= Recorded maximum demand in the billing period or 85% of the contract demand whichever is higher

Hi = The duration involved for the incidence of interruption / total shed / partial restriction on load in supplying power to the consumer by the licensee as specified under regulation 3.9.3 of these regulations.

RD_i = Restricted load imposed on the consumer corresponding to its incidence or actual drawal during the period of such restriction whichever is higher.

2.21 Several states in India have introduced Load Factor incentives. Examples: West Bengal, Madhya Pradesh, Maharashtra, Odisha etc.

2.22 Examples of LF incentives in other States:

(1) West Bengal

Load Factor Rebate (Ps / kWh)

Range of Load Factor (LF)		Supply Voltage		
		Below 33kV	33kV	Above 33kV
Above 55%	Up to 60%	1	2	3
Above 60%	Up to 65%	7	8	9
Above 65%	Up to 70%	14	29	39
Above 70%	Up to 75%	20	35	45
Above 75%	Up to 80%	25	40	50
Above 80%	Up to 85%	30	45	55
Above 85%	Up to 90%	35	50	60
Above 90%	Up to 92%	40	55	65
Above 92%	Up to 95%	45	50	70
Above 95%		50	65	75

Industrial consumer whose contract demand is 1.5 MVA or above will get additional rebate as per following table subject to the condition that payment is made within the due date.

Additional Load Factor Rebate (paise/kWh)

Load Factor	2012-13
Above 65% but up to 80%	22
Above 80%	42

(ii) Odisha (2013-14)

Load Factor (%)	HT	EHT
Up to 50%	565 ps / kWh	560 ps / kWh
>50% = <60%	490 ps / kWh (25%)	485 ps / kWh (13%)
>60%	435 ps / kWh (27%)	430 ps / kWh (11%)

(iii) Maharashtra (2013-14)

Load Factor (%)	Incentive
75 to 85	Rebate of 0.75% for every percentage point increase in load factor
Above 85	Rebate of 1% for every percentage point increase in load factor
Total rebate will be subject to a ceiling of 15% of energy charges	

2.23 In the case of consumers availing open access, for computing load factor, total energy drawn by the consumer (energy from KSEB + energy from open access) has to be considered. However, incentive may be for energy from KSEB.

2.24 In view of the foregoing deliberations, we request the Hon'ble Commission to introduce load factor incentive in Kerala as per the formula proposed by us and in line with schemes prevailing in other states mentioned above.

22. M/s Binani Zinc Ltd has claimed that increase in load factor may lead to reduction in T&D loss and beneficial to KSEB. The Kerala HT and EHT Industrial Electricity Consumers' Association also pointed out that high load factor consumers reduces transmission losses and consequently power purchase cost. Reduction of power purchase during 'peak hours' reduces purchase of expensive power. LF also reduces transformer losses of licensees. M/s Travancore Cochin Chemicals pointed out that the Electricity Act, 2003 provides for differentiation between consumers on the basis of load factor and hence such consumers shall be incentivized.
23. Southern Railways has submitted as follows;
- (a) *In two part tariff regime and TOD pricing incentive for higher load factor is already built in as the consumption increases average cost of energy is reduced.*
- (b) *When the Demand and consumption is more supply is given at higher voltages. Energy charges for supply at higher voltages are lesser than at lower voltages.*

24. Sri. Shaji Sebastian pointed out that for LT consumers TOD Tariff may be refixed and also steps shall be taken to extend energy conservation incentives. M/s Hindustan News Print pointed out that LF is for reducing transmission losses and for capacity utilization of infrastructure of KSEB. M/s Carborandum Universal has pointed out that through LF incentive consumer gets paid for the extra effort for improving LF and Licensee gets benefited by way of reduction in transmission losses and better infrastructure utilization.
25. But KSEB through detailed computation of transmission loss with different load factors has concluded that when load factor of a consumer increases the monthly energy consumption as well as transmission losses associated with providing supply to that consumer may also steadily increase. As load factor increases, the demand and energy consumption during 'day time' and 'peak time' has been steadily increasing and also transmission losses and associated energy consumption during 'day time' and 'peak time' also steadily increases. It is also pointed out by KSEB from the computations for different load factors that when the load factor of a consumer increases without any change in the Contract Demand transmission losses associated with providing supply to that consumer has been steadily increasing. (Para 10 of letter KSEB/TRAC/Incentives/Binani Zinc dated 31-12-2013)

Analysis

26. Load factor (LF) is expressed as the ratio of the average demand to the maximum demand. The load factor is also the ratio between the actual energy consumption during a period and the energy that would have been consumed had the demand remained constant at the maximum demand for the same period .Load factor in a period is calculated by the following equation:

$$LF = \frac{\text{Energy consumed during a time period in hours}}{\text{Maximum Demand during the time period in kW} \times \text{number of hours of that time period}}$$

Load factor (LF) is defined as the ratio of average power to maximum power or the ratio of real energy consumption to the expected energy consumption by maximum power in a fixed period.

The minimum and maximum of load factor is between 0 & 1;

27. According to the definition of load factor when the average power become equal to maximum power (demand) then the load factor becomes equal to 1 and it means that the load profile is a straight line parallel to the time axis. When the load factor become less than 1 and near to 0 then the load profile shape become far from a straight line and near to a curve with high peaks and deep valleys together. Having a load profile with a straight line form and a load factor equal to 1 is an ideal situation for utilities where all customers consume the electrical energy with a constant power less than the existing capacity of power generation and distribution. But it is an ideal situation not existing in reality.

28. The consumers consume the electricity with different and variable loads but they can be encouraged by incentives to flatten the load curves and thereby the utilities can move nearer to the ideal situation. Gap between peak and off peak demand is a major concern of Kerala Power System. However the reduction of peak demand and shifting of load from peak to off peak period cannot be achieved through the introduction of load factor incentive. Increase in load factor of individual HT and EHT consumers need not necessarily result in reduction of grid peak power demand. The incentive system relevant in Kerala situations should be designed in such a way as to encourage consumers to shift their consumption from peak period to off peak period. The TOD tariff regime is a step in this direction.
29. Consumers who keep the load constant throughout the day will have higher load factor. Incentives for maintaining high load factor signals the consumer to keep his load constant throughout the day and they may raise the same demand during peak hours also. In order to reduce peak demand, industrial consumers are to be encouraged to increase their demand during off peak hours and reduce their load during peak hours. The ToD Tariff has inbuilt characteristics such that the consumers are incentivized to shift their consumption to off peak hours and thus reduce the burden on the system during peak hours.
30. The ToD metering system with differential pricing and any incentive for load factor are inversely linked. The pricing signal for increasing off peak consumption and reducing peak consumption is already built in the differential pricing system of TOD tariff. Hence incentivizing increase in load factor will be counter productive to reducing peak hour consumption and increasing the off peak consumption.
31. Conflicting views have been presented before the Commission on the impact of high load factor on the system losses. The KSEBLtd., argues that with a given demand, in a given time frame, the transmission losses will increase as and when load factor increases for obvious reasons of increased consumption. But M/s Binani Zinc argues that the consumption should be taken as a constant factor in a given time frame. This view has the support of the fact that, generally consumption of energy will be determined by the production or out put of a plant. For a given consumption the demand will obviously come down in proportion to the increase in load factor. This is evident from the calculations presented by the Consumer during hearing. With the consumption fixed as 12 MU per month the MD would come down from 30870 KVA to 23140 KVA, as per their calculation, as and when the load factor increases from 60% to 80%. Reduction in demand results in reduction in current flow and reduction of losses for obvious reasons. But the computation of losses presented by the Consumer is marked by unreasonable assumptions far from actual working conditions in the present situations.
32. The arguments of the Petitioner in O.P No. 29/2013, M/s Binani Zinc shows that a plant working with high load factor can contract for lesser contract demand. The reduction in contract demand results in considerable reduction in demand

charges. When the contract demand reduces by around 7700 KVA, as per their calculations, the annual savings by the consumer would be around Rs.269 lakhs where as the annual savings in transmission losses, even by the calculations of the Petitioner, is around 11 lakh units only. It is obvious that the benefits accrued by the consumer by way of reduction in demand charges is much higher when compared to the gains of the Licensee by way of reduction of losses.

33. It is well known that a tariff structure with two part namely demand charges and energy charges, has an inherent incentive for higher load factor. The demand charge is fixed for a particular contract demand since the rate is fixed per kVA per month. The consumer can vary energy consumption depending on his requirement. Since the demand charge gets distributed over the number of units of energy, the average combined cost (demand charge plus energy charge) will progressively reduce when consumption increases. Therefore the higher the load factor, the lesser would be the average combined cost of energy. Thus there is an inherent provision in the two part tariff structure to incentivise the consumers with higher load factor.
34. Marginal cost of power in Kerala goes up as and when consumption goes up. As per the latest approved ARR & ERC for KSEB for 2013-14 , the merit order of power and their per unit cost is given below:

SOURCE	Quantum MU	Variable Cost Per unit Rs.
Hydro	6527	0
CGS	9156	1.86
Liquid Fuel : BDPP	85	9.94
Liquid Fuel : KDPP	111	10.64
Liquid Fuel :RGCCP	831	11.36

35. If the load factor of consumer is improving, by consuming more electricity than the existing consumption, such increased consumption would result in drawing more power from the costly sources, **if energy is not available for purchase at cheaper rates. In the situation prevailing in Kerala, the chances for getting cheaper power for purchase is not bright, especially in view of the non-availability of corridor for transmission of electricity from other states.** Thus incentivising load factor improvement may not be desirable under the existing situations.
36. It can also be seen that the average cost of power purchase in FY 13-14, as per approved ARR &ERC when hydro sources are excluded, will be around Rs. 4.45 per unit. The energy charges of EHT 110KV consumers is Rs. 4.30 per unit. **Therefore it is found that giving further benefits by way of load factor incentive will not be in public interest, though it may be beneficial to few consumers with very high load factor.**
37. Improving Load factor has generally been explained as 'filling the trough' in the

load curve. That is , incentives are offered for consuming more energy , during the minimum load hours in the night off peak through appropriate price signals. This result in increased demand during off peak hours. The minimum load in the Kerala power system is normally around 1850 MW at present . This load is normally met by around 1100 MW CGS power, and around 100 MW hydro power .The remaining load is met through trades and liquid fuel power stations. UI drawal may also be possible sometimes. If this 'trough' is sought to be filled further, KSEB may have to use more hydro or costly Liquid source power to meet the demand during this 'trough' hours. Both the above propositions are not advisable on cost considerations. The existing ToD tariff itself provide sufficient incentive to shift consumption to such off peak 'troughs'.

38. Base load requirement in a power system can be seen as the minimum level of demand on an electrical supply system over 24 hours. Base load power sources are those plants which can generate dependable and cost effective power to consistently meet this demand. Base load power plants are to produce continuous, reliable and efficient power at low cost. They often take a long time to start up and are relatively inefficient at levels less than full capacity. Base load plants run at all times through the year except in the case of repairs or scheduled maintenance. Their reliability to provide the base demand keep their operation costs low and offers stable and attractive pricing through long term agreements. **Filling of the demand trough during off peak hours would be beneficial in general only when capacity of such huge base load stations remain unscheduled.**
39. The fact is that Kerala has no cost-effective base load stations. The CGS power of 1100 MW is functioning as our base load source. Hence until a major cost effective base load station with LNG or Coal as fuel, is added to Kerala Power System, it would not be in public interest to incentivize 'filling the trough'.
40. M/s Binani Zinc or other stake holders have not put forward any substantial and convincing argument in support of the plea for bulk consumption incentive. Petitioners plea for bulk consumption incentive can also be examined based upon reasons explained above. **In view of the fact that marginal cost of power goes up to unsustainable levels as and when the consumption goes up further in Kerala power system at present, more incentives than the existing ones in two part tariff structure and ToD tariff structure cannot now be granted.**

Decision

41. **Under the above circumstances and considering all the submissions and arguments presented by the stake holders, the Commission decides that the plea to provide incentive for high load factor cannot be granted in the present power situation in the state.**

Power Factor Incentive

42. Binani Zinc in the petition dated 15-11-2013 and in the public hearing held on 18-12-13 stated as follows on Power Factor incentive.

“ 14. A PF incentive scheme is already in place now. As per the scheme, the maximum incentive. i.e. the incentive for a consumer with unity PF is 2.5%. The following factors may be considered by the commission.

- i) A substantial investment is required for installing Capacitor Banks.*
- ii) There is a recurring cost incurred in maintaining Capacitor Banks.*
- iii) The system transmission losses get reduced and there is advantage for the licensee.*
- iv) In some other States, maximum PF incentive is as high as 8%.*

Considering the above facts we request the Hon'ble Commission to improve the PF incentive scheme as given below:

Proposed: 0.6% rebate in energy charges for every 1% increase above 0.90 Power Factor (6%Max)”

43. KSEB Vide letter dated 12-12-2013 stated that:

“III. Power factor incentive

1. Hon'ble Commission vide the order dated 25-07-2012 on petition No. OP 23 of 2012 has enhanced the incentive rate of PF improvement to 0.25% of the energy charges from 0.15% of the energy charges for each 0.01 unit increase in power factor from 0.90.

2. There is no meaning in comparing the PF incentives prevailing in other state, since the transmission losses, reactive loading by different categories of consumers are different.

3. KSEB submit that, any further incentive on PF shall be made only after a detailed study on the financial impact of PF improvement through incentive system with the reduction in transmission losses. The petitioner has also not provided sufficient reasons for enhancing the PF incentives further. Hence the proposals of the petitioner may be rejected.

IV. Other issues raised by the petitioner.

The petitioner has prayed before the Hon'ble Commission to issue necessary orders to KSEB to pass on the benefit of lower tariff for interstate sales to EHT consumers and also to consider the improved hydel situation and pass on the effect of lower costs to EHT consumers.

The petitioner has not provided sufficient details with legal provisions to make such claims. KSEB may submit that, this is not the appropriate time to appraise such matters. As per the regulations and prudent utility practices, KSEB shall submit the actual details of power purchase along with supporting facts including the unbridged revenue gap accumulated over the years through the truing up petitions before Hon'ble Commission.

Considering the facts and submissions as detailed in the preceding paragraphs above, KSEB submits before the Hon'ble Commission to reject the proposals filed by M/s Binani Zinc Limited in total.”

44. The Kerala HT &EHT Industrial Electricity Consumers' Association in the response dated 10-12-13 informed that:

“ 2.32 Higher Load power factor results in the reduction of reactive power generation at the source and reactive power flow in the network. This, in turn reduces the ampere loading of power network components such as transformers, switchgears and transmission lines which effectively release system capacity, enabling better utilization of power generators and transmission network in a given power system. Over and above it reduces transmission losses.

2.33 At present there is a Power Factor Incentive scheme which provides a rebate of 0.25% on energy charges for increase of every 1% above 90% PF. So the maximum incentive, for a consumer operating at unity PF is 2.5%. This is very low compared to PF incentives offered in many other states.

2.34 Power Factor Incentive schemes prevailing some of the other states are given below.

(1) Madhya Pradesh

Power Factor Incentive:

If the average monthly power factor of the consumer is equal to or more than 85%, incentive shall be payable as follows:

Power Factor	Percentage incentive payable on billed energy charges
Above 85% up to 86%	0.5
Above 86% up to 87%	1.0
Above 87% up to 88%	1.5
Above 88% up to 89%	2.0
Above 89% up to 90%	2.5
Above 90% up to 91%	3.0
Above 91% up to 92%	3.5
Above 92% up to 93%	4.0
Above 93% up to 94%	4.5
Above 94% up to 95%	5.0
Above 95% up to 96%	6.0
Above 96% up to 97%	7.0
Above 97% up to 98%	8.0
Above 98% up to 99%	9.0
Above 99%	10.0

(2) Maharashtra

Sr. No	Range of PF	PF Level	Incentive
1	0.951 to 0.954	0.95	0%
2	0.955 to 0.964	0.96	1%
3	0.965 to 0.974	0.97	2%
4	0.975 to 0.984	0.98	3%

5	0.985 to 0.994	0.99	5%
6	0.995 to 1.00	1.0	7%

(3) Bihar

Power Factor Rebate

In case the average power factor (monthly) of the consumer is more than 90% (0.90) a power factor rebate at the following rates shall be allowed.

For each increase of 0.01 in power factor above 0.90 upto 0.95	0.5 (half) percent on demand and energy charge (Actual Recorded)
For each increase of 0.01 in power factor above 0.95	1.0 (one) percent on demand and energy charges. (Actual Recorded)

(4) Gujarat

13.6.2 Power Factor Rebate:

If the power factor of the consumer's installation in any month is above 95%, the consumer will be entitled to a rebate at the rate of 0.5% (half percent) in excess of 95% power factor on the total amount of electricity bill for that month under the head "Energy Charges" for every 1% rise or part thereof in the average power factor during the month above 95%.

We request the Hon'ble Commission to modify the Power Factor Incentive scheme in Kerala as "Rebate of 0.75% on energy charges for increase of every 1% above 90% PF."

45. M/s Binani Zinc Ltd. in the petition dated 15-11-2013 and in the public hearing held on 18-12-13 stated as follows on Power Factor incentive

"14. A PF incentive scheme is already in place now. As per the scheme, the maximum incentive. i.e. the incentive for a consumer with unity PF is 2.5%. The following factors may be considered by the commission.

- i) A substantial investment is required for installing Capacitor Banks.*
- ii) There is a recurring cost incurred in maintaining Capacitor Banks.*
- iii) The system transmission losses get reduced and there is advantage for the licensee.*
- iv) In some other States, maximum PF incentive is as high as 8%.*

Considering the above facts we request the Hon'ble Commission to improve the PF incentive scheme as given below:

Proposed: 0.6% rebate in energy charges for every 1% increase above 0.90 Power Factor (6%Max)"

46. M/s Binani Zinc Ltd. has pointed out that as per the present scheme the maximum incentive for a consumer for achieving unity power factor is 2.5% whereas in some states it is as high as 8%. Substantial investment is required for the consumer for installation of capacitor banks. There is recurring cost incurred in maintaining capacitor banks. The reduction of transmission loss is the advantage to the consumer. They propose that a rebate of 0.6% rebate in energy charges for every 1% increase above 0.9 power factor shall be allowed as incentive which comes to 6% maximum incentive.
47. The Kerala High Tension and Extra High Tension Industrial Electricity Consumers' Association has proposed that the present system shall be modified with a rebate of 0.75% on energy charges for increase of every 1% above 90% PF
48. The Travancore- Cochin Chemicals Ltd proposed that a rebate of 1% shall be allowed for each increase of 0.01 in PF above 0.90 and 1.5% for each increase of 0.01 in the power factor above 0.95 on demand and energy charges.

49. Shaji Sebastian, Industrial Electricity Consumers Consortium pointed out that instead of incentivizing and penalizing consumers for power factor, kVAh based tariff shall be introduced.
50. Carborundam Universal Limited proposed that kVAh billing shall be adopted which is an effective mechanism to promote effective power factor and harmonics control.

ANALYSIS

51. The basic purpose of specifying the benchmark power factor and incentive for higher power factor is to reduce the reactive power drag on the system which results in lower voltage and higher T&D losses and, therefore, the consumers are encouraged to maintain a higher power factor. Technically also it is beneficial for reducing T&D losses if the reactive compensation is provided at the consumer's end. This is the reason for introducing KVA based billing and incentive/disincentive for power factor .
52. It is obligatory on the consumer to maintain the benchmark power factor i.e. power factor of 0.9. Till 30-06-2012 the incentive was 0.15% of energy charges for each 0.01 increase in power factor from 0.9 and disincentive below 0.9 for every 0.01 unit fall in PF a disincentive of 1% energy charge is applied in energy charges. As per the tariff order dated 30-04-2013 for each 0.01 unit increase from 0.9 in power factor 0.25% of energy charges is given as incentive. If the power factor is below 0.9 for every 0.01 unit fall in PF a disincentive of 1% energy charge is applied. But if a higher power factor than the benchmark is maintained it helps the system and is being incentivized.
53. Though, it is the responsibility of every entity to maintain the specified power factor in the electrical system, the role of the consumer is most important because only if the consumer maintains a power factor of near unity in his load end, the entire network (from generator to the load) is relieved of carrying the reactive power. Maintaining high power factor at load end (consumer end) helps to maintain the stability of the grid and good voltage profile in the electrical network. This ultimately helps the consumer to avail quality power.
54. The Petitioner M/s Binani Zinc , HT &EHT Industrial Electricity Consumers Association and other EHT consumers have sought for an increase in the existing Power Factor incentive scheme. They point out that substantial investment is required for installing capacitor banks and recurring cost is incurred for maintaining high PF. But they did not put up a cost benefit analysis to show that the existing incentive schemes are insufficient to make the investments viable. Commission also notes that almost all the existing major HT and EHT consumers maintain a high power factor through out the year , which prima facie show that the existing incentive-disincentive mechanism provide appropriate price signals to for maintaining high PF.
55. The above stake holders have also pointed out that better PF incentive regimes are available in a number of states. But KSEBL has pointed out that the

incentive scheme has been withdrawn in Tamilnadu in November 2010 since the TNERC considered that maintaining a high power factor a consumer could save his electricity charges considerably by way of reduced demand charges and could recover his capacitor installation cost within a few months. TNERC also pointed out that any further incentive would be a bonus for the consumer.

56. It is true that consumer maximum demand reduces by improving the power factor. The consumer has to pay higher demand charges if he maintains a low power factor. The important factor to be considered is that by maintaining a high power factor, a consumer could save his electricity charges considerably by way of reduced demand charges. By way of lower demand charges, a consumer can recover his capacitor installation cost within a few months. After this short pay back period, the consumer is continuously benefited by the lower demand charges.
57. Another factor to be considered is that in the changing scenario in the consumption pattern in the state, consumers other than EHT , HT , LT Industrial sections also contribute to the deterioration of quality of power considerably due to extensive use of electronic gadgets etc. This results in extensive drawal of reactive power in the down stream levels and consequent fall in the system power factor. Hence the Licensees are to take steps like installation of capacitor banks, harmonic filters etc at various load points . Such investments for the benefit of the power system as a whole in the state are to be encouraged . Instead of offering further incentives to EHT,HT and LT power consumers , investments in this direction will be more beneficial.

Decision

58. **Under the above circumstances and considering all the submissions and arguments presented by the stake holders, the Commission decides that the plea to increase the existing power factor incentive cannot be granted at present in the prevalent power situation in the State.**

Method of computation of MD charges under ToD tariff

59. M/s Binani Zinc Ltd. vide petition dated 15-11-2013 submitted the following facts and averments in support of their claim for changing the present method of computation of MD charges under the ToD tariff ordered as per tariff order dated 30.04.2013.

5. Vide paras 8.120 and 8.121, the Hon'ble Commission has accepted the logic that TOD charges for Energy usage, need to be structured effectively to incentivize shifting of loads to night off-peak hours and that it would be beneficial to the power system. The paragraphs are reproduced below:

"8.119 It has been observed that the ToD tariff structure for demand charges has yielded little benefit for both licensees and the consumers. More over the general practice followed in most of the states is to provide ToD tariff for

energy charges only. Hence the Commission decides to discontinue the ToD structure for demand charges for HT and EHT consumers.

8.120 The ToD structure for EHT/HT and LT industrial consumers shall be modified in order to achieve the twin objectives of providing dis-incentive for industries operating during evening peak hours as well as incentivizing the shifting of loads to night off peak hours , which will be beneficial for the power system as a whole.”

In this connection we would like to submit that Demand (Max Demand) of a consumer is proportional to the energy consumed and Load Factor of the consumer. It is one thing not to have ToD structure for Demand charges. But it is a totally different matter altogether to stop ToD structure for Demand changes which is prevailing for more than a decade.

6. Ever since TOD tariff was introduced in 1998, M/s Binani Zinc Ltd., has been reducing its load during peak and increasing it during off peak. The energy and demand of M/s Binani Zinc Ltd., during day, peak and off peak during the past 12 months and the percentage shift from the average is given in the table below

ENERGY							
Month	Day		Peak		Off peak		Total (kWh)
	Day (kWh)	% shift from avg	Peak (kWh)	% shift from avg	Off peak (kWh)	% shift from avg	
Aug-12	7028700	2	1259200	-45	5457500	19	13745400
Sep-12	6753700	1	1197300	-46	5324400	20	13275400
Oct-12	6352100	4	1007100	-50	4769200	18	12128400
Nov-12	6157900	5	1048100	-46	4489600	15	11695600
Dec-12	5470700	-3	1228000	-35	4606300	22	11305000
Jan-13	5081100	-4	1204700	-32	4302000	22	10587800
Feb-13	4514800	-7	1102800	-32	4112300	27	9729900
Mar-13	4611400	-3	1028700	-35	3824600	21	9464700
Apr-13	5357700	3	1082000	-38	3987300	15	10427000
May-13	5485100	0	1378500	-25	4101000	12	10964600
Jun-13	4557700	-1	910490	-41	3782890	23	9251080
Jul-13	4764412	-6	1041228	-39	4369420	29	10175060

DEMAND							
Month	Day		Peak		Off peak		Avg MD
	Day (kVA)	% shift from avg	Peak (kVA)	% shift from avg	Off peak (kVA)	% shift from avg	
Aug-12	20540	2	12020	-40	23450	17	20090
Sep-12	21070	4	11170	-45	23410	16	20200
Oct-12	23290	10	11290	-467	23170	9	21250
Nov-12	21450	5	11190	-45	23320	15	20363
Dec-12	21240	5	10920	-46	23120	15	20147
Jan-13	16100	-3	11260	-32	19900	20	16560
Feb-13	15620	-4	10970	-32	19740	22	16218
Mar-13	17940	2	11130	-37	20310	15	17595
Apr-13	19700	3	11290	-41	22000	15	19065
May-13	22480	5	15110	-30	23080	8	21452
Jun-13	18270	4	11300	-35	19420	11	17492
Jul-13	18250	5	11430	-34	18960	9	17350

7. The impact of the tariff order 2013-14 on M/s Binani Zinc Ltd., is explained below. This has been done by a comparison of electricity charges of the M/s Binani Zinc Ltd., for the past 6 months in the following methods.

i) Pre revised tariff & TOD structure

ii) Revised tariff & TOD structure

i) Pre revised tariff & TOD structure

MD charges						
Month	Day (kVA)	Peak (kVA)	Off peak (kVA)	Demand Charges (Rs)	Total energy (kWh)	Avg MD charges (ps/ kWh)
Feb-13	15620	10970	19740	4586785	9729900	47
Mar-13	17940	11130	20310	4978865	9464700	53
Apr-13	19700	11290	22000	5376358	10427000	52
May-13	22480	15110	23080	6139928	10964600	56
Jun-13	18270	11300	19420	4970213	9251080	54
Jul-13	18250	11430	18960	4941165	10175060	49
				30993315	60012340	52

Energy charges						
<i>Month</i>	<i>Day (kWh)</i>	<i>Peak (kWh)</i>	<i>Off peak (kWh)</i>	<i>Total (kWh)</i>	<i>Charges (Rs)</i>	<i>Avg Charges (ps/ kWh)</i>
<i>Feb-13</i>	<i>4514800</i>	<i>1102800</i>	<i>4112300</i>	<i>9729900</i>	<i>38216700</i>	<i>393</i>
<i>Mar-13</i>	<i>4611400</i>	<i>1028700</i>	<i>3824600</i>	<i>9464700</i>	<i>37209960</i>	<i>393</i>
<i>Apr-13</i>	<i>5357700</i>	<i>1082000</i>	<i>3987300</i>	<i>10427000</i>	<i>41046820</i>	<i>394</i>
<i>May-13</i>	<i>5485100</i>	<i>1378500</i>	<i>4101000</i>	<i>10964600</i>	<i>43603400</i>	<i>398</i>
<i>Jun-13</i>	<i>4557700</i>	<i>910490</i>	<i>3782890</i>	<i>9251080</i>	<i>36191370</i>	<i>391</i>
<i>Jul-13</i>	<i>4764412</i>	<i>1041228</i>	<i>4369420</i>	<i>10175060</i>	<i>39744553</i>	<i>391</i>
				<i>60012340</i>	<i>236012803</i>	<i>393</i>

ii) Revised tariff & TOD structure

MD charges						
<i>Month</i>	<i>Day (kVA)</i>	<i>Peak (kVA)</i>	<i>Off peak (kVA)</i>	<i>Charges (Rs)</i>	<i>Total energy (kWh)</i>	<i>Avg charges (ps/ kWh)</i>
<i>Feb-13</i>	<i>15620</i>	<i>10970</i>	<i>19740</i>	<i>5724600</i>	<i>5724600</i>	<i>59</i>
<i>Mar-13</i>	<i>17940</i>	<i>11130</i>	<i>20310</i>	<i>5889900</i>	<i>5889900</i>	<i>62</i>
<i>Apr-13</i>	<i>19700</i>	<i>11290</i>	<i>22000</i>	<i>6380000</i>	<i>6380000</i>	<i>61</i>
<i>May-13</i>	<i>22480</i>	<i>15110</i>	<i>23080</i>	<i>6693200</i>	<i>6693200</i>	<i>61</i>
<i>Jun-13</i>	<i>18270</i>	<i>11300</i>	<i>19420</i>	<i>5631800</i>	<i>5631800</i>	<i>61</i>
<i>Jul-13</i>	<i>18250</i>	<i>11430</i>	<i>18960</i>	<i>5498400</i>	<i>5498400</i>	<i>54</i>
				<i>35817900</i>	<i>35817900</i>	<i>60</i>

Energy charges						
Month	Day (kWh)	Peak (kWh)	Off peak (kWh)	Total (kWh)	Charges (Rs)	Charges (ps/ kWh)
Feb-13	4514800	1102800	4112300	9729900	39788868	409
Mar-13	4611400	1028700	3824600	9464700	38798470	410
Apr-13	5357700	1082000	3987300	10427000	42876053	411
May-13	5485100	1378500	4101000	10964600	45702980	417
Jun-13	4557700	910490	3782890	9251080	37670591	407
Jul-13	4764412	1041228	4369420	10175060	41294272	406
				60012340	246131232	410

Summary of the Comparison

Month	At pre-revised tariff			At revised tariff		
	Demand charges	Energy charges	Total charges	Demand charges	Energy charges	Total charges
	(ps/ kWh)	(ps/ kWh)	(ps/ kWh)	(ps/ kWh)	(ps/ kWh)	(ps/ kWh)
Feb-13	47	393	440	59	409	468
Mar-13	53	393	446	62	410	472
Apr-13	52	394	445	61	411	472
May-13	56	398	454	61	417	478
Jun-13	54	391	445	61	407	468
Jul-13	49	391	439	54	406	460
Average	52	393	445	60	410	470

From the summary of tables given above, it can be seen that though there were no increase in Demand charges as per the Tariff order, for a consumer like us who shift a significant part of the load from peak to off peak, there was an increase of 8 ps/ kWh in Demand charges by way of restructuring of TOD.

8. In the above paragraphs, the impact of revision of TOD tariff has been demonstrated. Also analysis has also been done with the help of a

comparative study of a typical consumer with a normal demand of 10000 KVA operating his plant in 3 different methods as given below. For both pre-revised & revised TOD tariffs, revised demand & energy rates have been considered.

i) Uniform load during Day, Peak and Off peak

ii) Day - Normal

Peak - 20% less than normal

Off peak -10% more than normal

iii) Day - Normal

Peak - 40% less than normal

Off Peak - 20% more than normal

The details of the study have been given in the Annexure. The summary of the study is given be

	Day, Peak & Off Peak: Uniform load	Day: normal Peak:20% less Off Peak: 10% more	Day: normal Peak:40% less Off Peak: 20%more
<i>Demand Charges</i>	(ps/ kWh)	(ps/ kWh)	(ps/ kWh)
<i>Pre revised</i>	57	56	54
<i>Revised</i>	56	62	67
<i>Increase</i>	-1	6	13
<i>Energy Charges</i>			
<i>Pre revised (430 ps)</i>	437	429	421
<i>Revised (430 ps)</i>	430	419	409
<i>Increase</i>	-7	-10	-13
<i>Total Charges</i>			
<i>Pre revised</i>	494	485	476
<i>Revised</i>	486	481	476
<i>Increase</i>	-8	-4	0

From the above, it can be seen that the consumers who shift their load from peak to off peak have to pay higher demand charges, compared to other consumers, due to the present revision of ToD tariff. Same is the case of consumers who reduce their load during peak.

9. The basic purpose of any TOD Tariff is to incentivize shifting of load from peak to off-peak. As per the current TOD tariff, the highest among the MDs during day, peak & off-peak is the chargeable MD. It means, when a continuous process industry shifts a part of its load from peak to off-peak, the

MD during off-peak which is higher due to shifting of load is charged for the whole month. This is a discrepancy and hence has to be addressed.

10. *Continuous process Industries have to incur significant additional cost for shifting the loads to off peak hours. This factor seems to have been missed by the Hon'ble Commission.*

11. *ToD structure for demand charges has been prevalent in Kerala for more than a decade. Withdrawal of ToD structure for demand charges is disadvantageous for consumers who reduce their load during peak and shift it to off peak. This defeats the very purpose of the ToD tariff.*

12. *We propose the following change in billing methodology to overcome the above discrepancy.*

Demand charges:

(i) Day = Day demand X demand charges X 12/24

(ii) Peak = Peak demand X demand charges X 4/24

(iii) Off peak = Off peak demand X demand charges X 8/24

No change is proposed in the methodology for the billing of excess demand.

It may kindly be noted that even without any change in rate of demand charges, in the three time slots, EHT consumers like Binani Zinc (who shift loads from Peak) will be free from the unintended penalty of 8 ps/ kWh. This will also remove the disincentive to shift load from peak to off peak and thereby reduce load during peak. Needless to say, consumers who do not shift loads are not affected adversely by the proposed change in methodology.”

“Annexure

Revision of ToD tariff – case study

For the study of comparison of ToD tariffs, the revised rates of demand & energy have been considered. Power Factor of 0.90 and Load Factor of 80% have been assumed. Demand charges: Rs 290/ KVA, Energy charges: Rs. 4.30/ kWh

Case 1: Uniform load in day, peak and off peak					
		<i>Day</i>	<i>Peak</i>	<i>Off Peak</i>	<i>Total</i>
<i>Max Demand</i>	<i>KVA</i>	10000	10000	10000	
<i>Energy</i>	<i>kWh</i>	2592000	864000	1728000	5184000
Demand charges					
		Tariff till April 2013		Tariff from May 2013	
	<i>Demand</i>	<i>Rate (%)</i>	<i>Charges</i>	<i>Rate</i>	<i>Charges</i>
<i>Day</i>	10000	100	1450000	<i>Highest of the three Demands</i>	2900000
<i>Peak</i>	10000	150	725000		
<i>Off Peak</i>	10000	80	773333		
<i>Total</i>		<i>(Rs)</i>	2948333		2900000
<i>Average demand charges</i>		<i>(ps/kWh)</i>	56.9		55.9
Energy charges					
		Tariff till April 2013		Tariff from May 2013	
	<i>Energy</i>	<i>Rate (%)</i>	<i>Charges</i>	<i>Rate</i>	<i>Charges</i>
<i>Day</i>	2592000	100	11145600	100	11145600
<i>Peak</i>	864000	140	5201280	150	5572800
<i>Off Peak</i>	1728000	85	6315840	75	5572800
<i>Total</i>		<i>(Rs)</i>	22662720		22291200
<i>Average energy charges</i>		<i>ps/kWh</i>	437.2		430.0
<i>Average electricity charges (demand + energy)</i>		<i>ps/kWh</i>	494.0		485.9

Case 2: Day: Normal, Peak: 20% less than normal & Off Peak: 10% more than normal

		Day	Peak	Off Peak	Total
Max Demand	KVA	10000	8000	11000	
Energy	KWh	2592000	691200	1900800	5184000
Demand charges					
		Tariff till April 2013		Tariff from May 2013	
	Demand	Rate (%)	Charges	Rate	Charges
Day	10000	100	1450000	Highest of the three Demands	3190000
Peak	8000	150	580000		
Off Peak	11000	80	850667		
Total		(Rs)	2880667		3190000
Average demand charges		(ps/kWh)	55.6		61.5
Energy charges					
		Tariff till April 2013		Tariff from May 2013	
	Energy	Rate (%)	Charges	Rate	Charges
Day	2592000	100	11145600	100	11145600
Peak	691200	140	4161024	150	4458240
Off Peak	1900800	85	6947424	75	6130080
Total	(Rs)		22254048		21733920
Average energy charge		(ps/kWh)	429.3		419.3
Average electricity charges (Demand + Energy)		(ps/kWh)	484.9		480.8

Case 3: Day: Normal, Peak: 40% less than normal & Off Peak:20% more than normal						
			Day	Peak	Off Peak	Total
Max Demand	KVA		10000	6000	12000	
Energy	kWh		2592000	518400	2073600	5184000
Demand charges						
		Tariff till April 2013		Tariff from May 2013		
	Demand	Rate (%)	Charges	Rate	Charges	
Day	10000	100	1450000	Highest of the three Demands	3480000	
Peak	6000	150	435000			
Off Peak	12000	80	928000			
Total		(Rs)	2813000		3480000	
Average demand charges		(ps/kWh)	54.3		67.1	
Energy charges						
		Tariff till April 2013		Tariff from May 2013		
	Energy	Rate (%)	Charges	Rate	Charges	
Day	2592000	100	11145600	100	11145600	
Peak	518400	140	3120768	150	3343680	
Off Peak	2073600	85	7579008	75	6687360	
Total		(Rs)	21845376		2117360	
Average energy charges		ps/kWh	421.4		408.5	
Average electricity charges (demand + energy)		ps/kWh	475.7		475.6	

60. Kerala HT and EHT Industrial consumers Association in their response dated 10-12-13 stated as follows

2.25 *The very purpose of ToD tariff structure is to discourage peak loading and to encourage shifting of load from peak to off peak. In the Tariff Order for 2013-14, ToD structure for Demand charges was discontinued. ToD structure for Demand charges was prevailing in Kerala from 1998 onwards.*

2.26 *Several industries used to shift their load from peak to off peak. The discontinuation of ToD structure for demand charges has affected those industries very badly.*

2.27 *Prior to the current tariff order, normal, peak or off peak demand charges were calculated separately applying factors 12/24, 4/24 and 8/24 and 100%, 140% and 85% (number of hours and incentives). Now highest of the three Max demands is charged for the whole month.*

2.28 *On one side, consumers are asked to shift load from peak to off peak. Afterwards, the demand charges corresponding to the increased load is charged for the whole month. This is extremely unfair and it has to be corrected.*

2.29 *The tariff for demand charges which has been made uniform during normal, peak & off peak may continue to be uniform as decided by the Hon'ble Commission. We propose charging Demand charges for Normal, Peak and off peak applying factors 12/24, 4/24 and 8/24 as was done earlier. The method of billing as per our proposal is given below:*

Demand charges:

(i) Normal = Normal demand X demand charges X 12/24

(ii) Peak = Peak demand X demand charges X 4/24

(iii) Off peak = Off peak demand X demand charges X 8/24

2.30 *No change is proposed in the methodology for the billing of excess demand.*

2.31 *The above proposal does not affect any consumer generally; but allows more incentive to consumers who shift their load from peak to off peak. But, it will affect a consumer owning a captive small hydel power plant and has a special billing agreement with KSEB. In their case, the existing billing system may be continued ”*

61. KSEB submitted vide letter dated 12-12-2013 the following comments and objections on the proposal of the petitioner to introduce (i) Load Factor incentive, (ii) Power factor incentive and ToD demand charges.

1. The petitioner submitted before the Hon'ble Commission that, the prevailing ToD tariff structure approved by the Hon'ble Commission w.e.f May-2013 had resulted in unintended penalty to the petitioner compared to the tariff payable under pre-revised ToD tariff structure prevailing till April-2013. KSEB completely disagree with the submission of the petitioner. The argument is raised without appraising the facts fully.

(i) Hon'ble Commission vide the order dated 30th April-2013 had revised the ToD tariff w.e.f May 2013. The pre-revised ToD tariff in the State till April-2013 and Revised ToD tariff w.e.f May-2013 is detailed below.

Table-1. Comparison of pre-revised & Revised tariff w.e.f May-2013

Particulqrs	Pre-revised ToD tariff			Revised ToD tariff (w.e.f May-2013)		
	Normal period	Peak period	Off-peak period	Normal period	Peak period	Off-peak period
Demand charges	100%	150%	80%	100%		
Energy charges	100%	140%	85%	100%	150%	75%

(ii) As detailed above, Hon'ble Commission had completely dispensed with the ToD tariff for 'demand charges' w.e.f May-2013 onwards, however enhanced the penalty as well as incentive for the ToD tariff for energy charges. Obviously, the increase in demand charges if any on account of dispensing with the ToD tariff of demand charges may be compensated with the increase in incentive on energy charges at the revised ToD tariff.

(iii) It seems that, there is some mistake in the tariff computation given by the petitioner at the pre-revised and revised tariff for the period from February-2013 to July-2013. KSEB had verified and computed the demand charges and energy charges during the same period, i.e., from February-2013 to July-2013 as detailed below.

(a) Though there is slight differences in the zone wise consumption figures adopted by the petitioner compared to the actuals, KSEB has adopted the same zone wise 'Billing Demand' and 'Energy consumption figures adopted by the petitioner to have a proper comparison.

(b) The normal demand charges for the consumer is Rs 290/kVA/month.

(c) Energy charges: Hon'ble Commission vide the order dated 30-04-2013 has revised the energy charge of the petitioner from Rs 4.00 per unit to Rs 4.30 per unit w.e.f May-2013. Hence the ToD tariff at pre-revised tariff and revised tariff for the period from Feb-2013 to April-2013 was computed with Energy charge @ Rs 4.00 per unit and from May-2013 to July-2013, the ToD tariff was computed at the energy charge @Rs 4.30 per unit. The details are given below.

Table-2. Comparison of Demand charges at pre-revised and revised TOD tariff

Month	Billing Demand			Total Energy consumption	Demand charges at pre-revised ToD tariff		Demand charges at revised TOD tariff		Increase in demand charges due to revision of TOD	
	Day	Peak	Off-peak		(Rs)	(Rs/unit)	(Rs)	(Rs/unit)	(Rs)	(Rs/unit)
	(kVA)	(kVA)	(kVA)	(kWh)	(Rs)	(Rs/unit)	(Rs)	(Rs/unit)	(Rs)	(Rs/unit)
Feb-13	15620	10970	19740	9729900	4586785	0.47	5724600	0.59	1137815	0.12
Mar-13	17940	11130	20310	9464700	4978865	*0.53	5889900	0.62	911035	0.10
Apr-13	19700	11290	22000	10427000	5376358	0.52	6380000	0.61	1003642	0.10
May-13	22480	15110	23080	10964600	6139928	0.56	6693200	0.61	553272	0.05
Jun-13	18270	11300	19420	9251080	4970213	0.54	5631800	0.61	661587	0.07
Jul-13	18250	11430	18960	10175060	4941165	0.49	5498400	0.54	557235	0.05

Note: Normal demand charge- Rs 290/kVA/month

Table-3. Comparison of energy charges at the pre-revised and revised ToD tariff

Month	Zone wise Energy consumption				Energy charges at pre-revised ToD tariff		Energy charges at revised ToD tariff		Increase in energy charges	
	Day	Peak	Off-peak	Total	(Rs)	(Rs/unit)	(Rs)	(Rs/unit)	(Rs)	(Rs/unit)
	(kWh)	(kWh)	(kWh)	(kWh)	(Rs)	(Rs/unit)	(Rs)	(Rs/unit)	(Rs)	(Rs/unit)
Feb-13	4514800	1102800	4112300	9729900	38216700	3.93	37012900	3.80	-1203800	-0.12
Mar-13	4611400	1028700	3824600	9464700	37209960	3.93	36091600	3.81	-1118360	-0.12
Apr-13	5357700	1082000	3987300	10427000	41046820	3.94	39884700	3.83	-1162120	-0.11
May-13	5485100	1378500	4101000	10964600	46873655	4.27	45702980	4.17	-1170675	-0.11
Jun-13	4557700	910490	3782890	9251080	38905723	4.21	37670591	4.07	-1235132	-0.13
Jul-13	4764412	1041228	4369420	10175060	42725394	4.20	41294272	4.06	-1431123	-0.14

(d) The summary of the net increase in tariff (both demand and energy charges together) to the petitioner on account of the revised ToD tariff is given below.

Table-4. Net increase in tariff to the petitioner on account of the revised ToD tariff.

Month	Demand charge			Energy charge			Net increase due to revision of TOD	Remarks
	At pre-revised TOD rate	At revised TOD rate	Increase on account of revision of TOD	At pre-revised TOD rate	At revised TOD rate	Increase on account of revision of TOD		
	(Rs/ kWh)	(Rs/ kWh)	(Rs/ kWh)	(Rs/ kWh)	(Rs/ kWh)	(Rs/ kWh)		
Feb-13	0.47	0.59	0.12	3.93	3.80	-0.12	0.00	Normal demand charge- Rs 290/kVA/month, Energy charge- Rs 4.00/kWh
Mar-13	0.53	0.62	0.10	3.93	3.81	-0.12	-0.02	
Apr-13	0.52	0.61	0.10	3.94	3.83	-0.11	-0.01	
May-13	0.56	0.61	0.05	4.27	4.17	-0.11	-0.06	
Jun-13	0.54	0.61	0.07	4.21	4.07	-0.13	-0.06	
Jul-13	0.49	0.54	0.05	4.20	4.06	-0.14	-0.09	

(e) As detailed above, there is an overall reduction of 6 to 9 paise per unit on the tariff payable by the petitioner by the revised ToD tariff approved by the Hon'ble Commission vide its order dated 30-04-2013, hence there is no merit in the argument of the petitioner.

(f) It seems that, the petitioner had not appraised the substantial reduction in energy charges after the revised ToD tariff compared to the pre-revised ToD.

2. There is no meaning in comparing the impact of ToD with the hypothetical case study as provided by the petitioner, since all the consumers may be aware of the revised ToD tariff and may try to optimize their user pattern to get the maximum benefit as done by the petitioner.

3. The petitioner has further requested to re-introduce the ToD tariff for demand charges as it was prevailing in the State till last April-2013, however there was no proposal to restore the ToD tariff for energy charges. KSEB do not recommend for introducing the ToD tariff for demand charges considering the following.

(i) Generally two part tariff is being followed in the country consisting of (a) fixed charges/ demand charges based on the contract demand/ connected load of the consumer and (b) energy charges based on the quantum of electricity used by the consumers.

(ii) The general concept of the 'demand charges/ fixed charges' is for recovering a part of the revenue expenditure associated with the

infrastructure created by the distribution utility for providing supply to the consumers. The annual recurring cost associated with the infrastructure of the distribution utility involves interest on capital assets, depreciation, repair and maintenance expenses, part of the employee cost etc.

(iii) Irrespective of the electricity usage by the consumers, the distribution utility has to incur the annual recurring cost associated with the infrastructure of the DISCOMS. Hence there is no meaning in linking the demand charges with the electricity consumption as well as its time of usage by the consumers.

(iv) ToD tariff was introduced in almost all the State Electricity Regulatory Commissions across the country. The TOD tariff prevailing in other state is given below.

Table-5
TOD tariff prevailing in other States

State	Particulars	Demand Charges	on Energy Charges /unit		
			Day	Peak	Off peak
Kerala		Nil	Nil	50% extra	25% reduction
Andhra Pradesh	11 KV& 33 KV	Nil	Nil	Rs1/Unit extra	Nil
Tamilnadu		Nil	Nil	20% extra	5% reduction
West Bengal	132 KV (optional)	Nil	Nil	Rs 2.26/U extra	Rs 2.20/U incentive
	220 KV				
	Summer	Nil	Nil	Rs 2.14/U extra	Rs 1.82/U incentive
	Monsoon			Rs 2.13 /U extra	Rs 1.81/U incentive
	Winter			Rs 2.12/U extra	Rs 1.80/U incentive
	400 KV				
	Summer	Nil	Nil	Rs 2.14/U extra	Rs 1.82/U incentive
	Monsoon			Rs 2.13 /U extra	Rs 1.81/U incentive
Winter	Rs 2.12/U extra			Rs 1.80/U incentive	
Maharashtra		Nil		Rs 1/U extra	Rs 0.75/U incentive
Uttarkhand	Upton 33 % LF	Nil	Nil	Rs 2.35/U extra	Rs 0.30/U incentive
	Above 33% and up to 50% LF	Nil	Nil	Rs 2.10/U extra	Rs 0.33 /U incentive
	Above 50% LF	Nil	Nil	Rs 1.80/U extra	Rs 0.36/U incentive
Madhya Pradesh	132&220/400 KV	Nil	Nil	15% extra	7.5%reduction
Bihar	132 KV above 7.5 MVA	Nil	Nil	Rs 1.08/U extra	Rs 1.08/U incentive
	C.D above 300 KVA(33/11 KV)	Nil	Nil	Rs 0.62/U extra	Rs 0.62/U incentive

(v)As detailed above, as per the information available to KSEB, none of the regulators across the country has not introduced ToD tariff for demand

charges, considering the fact that it is not logical to link the demand charge with ToD tariff.

(vi) However, almost all the utilities across the country including KSEB has been procuring substantial portion of the electricity from short-term market. Presently, the electricity prices at the short-term market including 'energy exchanges', 'UI' and 'day ahead market' fluctuate with the demand and supply position of electricity. Considering the increase in demand during peak hours, electricity prices at the short-term market is being substantially higher during peak hours compared to 'normal day time' and 'night off-peak hours'. Further, entering into 'long term PPA and establishing new generating stations' exclusively for meeting the demand may results in under utilization of resources and also not economical. Considering the above, KSEB also recommends for ToD tariff for energy charges, which provide dis-incentive for peak usage and incentive for off-peak usage.

(vii) Considering the above, KSEB also agree with steps taken by the Hon'ble Commission for dispensing with the ToD tariff for demand charges and rationalizing the ToD tariff for energy charges vide its order dated 30-04-2013.

Hence, KSEB may submit that, by the implementation of the new ToD tariff approved by the Hon'ble Commission vide the order dated 30-04-2013 has not resulted in any dis-incentive to the petitioner, but there was a net reduction in tariff to the extent of 6 to 9 paise per unit since the month of May-2013, i.e., after the implementation of the revised ToD tariff. It is further submitted that, the demand charges, which is intended for partly recovering the annual recurring cost associated with the infrastructure created by KSEB for providing supply, which need not be linked to the Time of the Day (ToD) tariff. The State Electricity Regulatory Commissions (SERCs) across the country has also not linked the demand charges with the ToD tariff. Considering the above, KSEB may request before the Hon'ble Commission to reject the proposal of the petitioner.”

Analysis

62. In the order dated 30.4.2013 on OP 2/2013 on ARR &ERC of KSEB the commission observed as follows :

8.119 It has been observed that the ToD tariff structure for demand charges has yielded little benefit for both licensees and the consumers. More over the general practice followed in most of the states is to provide ToD tariff for energy charges only. Hence the Commission decides to discontinue the ToD structure for demand charges for HT and EHT consumers.

8.120 The ToD structure for EHT/HT and LT industrial consumers shall be modified in order to achieve the twin objectives of providing

dis-incentive for industries operating during evening peak hours as well as incentivizing the shifting of loads to night off peak hours , which will be beneficial for the power system as a whole.

63. Subsequently in the Annexure A of the schedule of tariff for the period from 1-5-2013 to 31-3-2014 approved and published by the Commission, it was specified that differential pricing of demand charges is withdrawn from 1-5-2013. It was also specified that Demand charges during a particular month shall be assessed based on the recorded maximum demand during that month or 75% of the contract demand whichever is higher. The Annexure E of the schedule specifies that the recorded maximum demand shall be the highest of the recorded maximum demand of the 3 time zones.
64. In short, the demand charges payable by a consumer will be for the highest maximum demand imposed by the consumer during any time zone.
65. M/s Binani Zinc Limited in their Petition has sought for review of the methodology of calculating chargeable MD in order to ensure that consumers who shift the load are benefited. They have pointed out that the basic purpose of any TOD Tariff has to be to incentivize shifting of load from peak to off-peak. As per the current TOD tariff, the highest among the MDs during day, peak & off-peak is the chargeable MD. It means, when a continuous process industry shifts a part of its load from peak to off-peak, the MD during off-peak which is higher due to shifting of load is charged for the whole month. The Petitioner says that this is a discrepancy and hence has to be addressed. They have also pointed out that there was an increase of 8 ps per Kwh on the demand charges due to the restructuring of the TOD tariff. It has also been pointed out that withdrawal of TOD structure had been disadvantageous to the consumers who reduces their load during peak and shift to off peak and this defeats the very purpose of TOD tariff.
66. Kerala State Electricity Board Ltd. pointed out that even though the Commission had dispensed with the ToD tariff for demand charges w.e.f May-2013 onwards, the penalty as well as incentive for the ToD tariff for energy charges were enhanced. Obviously, the increase in demand charges if any on account of dispensing with the ToD tariff of demand charges will be compensated with the increase in incentive on energy charges at the revised ToD tariff. It is also pointed out that the petitioner M/s Binani Zinc Ltd. had not appraised the substantial reduction in energy charges after the revised ToD tariff compared to the pre-revised ToD.
67. As pointed out by M/s Binani Zinc Ltd. the demand of a consumer is proportional to the energy consumed. Hence it is obvious that allowing concessions on both demand and energy charges under ToD structure amounts to allowing the benefit twice.
68. The restructuring of TOD tariff in the tariff order dated 30.04.2013 has allowed increased concessions on energy consumption during off peak hours, by reducing the energy charges from 85% to 75%. This will translate into 43 ps

reduction in the revised energy charges and 40ps reduction in the pre-revised energy charges for a 110 KV consumer. More over the details furnished by the consumer shows that the demand charges of the Petitioner is only 14% of the bill amount or total electricity charges . Thus the impact of the increase in demand charges by around 8 ps per unit due to the discontinuing of TOD structure on demand charges pointed out by the Petitioner is negligible when compared to the savings in Energy charges consequent to the increased incentive.

69. The Petitioner during hearing also admitted that TOD tariff on demand charges is not prevailing in any states in India except Bihar.

Going by the basics , demand charge is supposed to cover the cost associated with having enough capacity to meet each consumer's need when that need is highest. Utilities must have sufficient system capacity to meet customers maximum kW demand. Hence the demand charges has to be levied on the maximum demand imposed by the consumer at any time slot.

70. Under the above circum stances the Commission decides that the methodology of calculating chargeable MD as specified in the Schedule of tariff for the period from 1-5-2013 to 31-3-2014 approved and published by the Commission need not be reviewed.

Other Pleadings

71. The Petitioner M/s Binani Zinc Ltd. had pleaded to issue necessary orders to KSEB to pass on the benefit of lower tariff for interstate sales to EHT consumers and to consider the improved Hydel situation and pass on the effect of lower cost to EHT consumers.
72. Kerala State Electricity Board Ltd. pointed out that the petitioner has not provided sufficient details with legal provisions to make such claims. Kerala State Electricity Board Ltd. also submitted that this is not the appropriate time to appraise such matters. As per the regulations and prudent utility practices, KSEB shall submit the actual details of power purchase along with supporting facts including the unbridged revenue gap accumulated over the years through the truing up petitions before Hon'ble Commission.
73. Commission also finds that pleadings on lowering the tariff and passing on the benefits of lower costs due to better inflow etc are to be made during the proceedings on ARR & ERC , tariff petitions , true up petitions etc and decides to disallow the same in this petition.

Orders of the Commission

74. After carefully considering all the pleadings , submissions and arguments of the Petitioners , stake holders and Kerala State Electricity Board Ltd. the Commission orders as follows:

1. The HT and EHT consumers in the state will be eligible for an incentive of 0.3% [zero point three percent] of the invoice amount (excluding Duty and other levies payable to Government), if payment of electricity charges is made **in full** before 5 clear days from the due date.
 2. The plea to provide incentive for high load factor cannot be granted in the present power situation in the state and therefore the request to provide incentive for high load factor is declined.
 3. The plea to increase the existing power factor incentive cannot be granted at present in the prevalent power situation in the State and therefore the request to increase the power factor incentive is declined.
 4. The methodology of calculating MD charges as specified in the Schedule of tariff order dated 30.04.2013 for the period from 01.05.2013 as approved and published by the Commission need not be reviewed.
75. The Proposals of Kerala State Electricity Board Ltd. dated 24.09.2013 in accordance with the order dated 31.05.2013 of Hon'ble APTEL in Appeal No 179/2012 and the Petition no: OP 29/2013 filed by M/s Binani Zinc Ltd., are decided and disposed of accordingly.

Sd
Member (Finance)

Sd
Member (Engineering)

Sd
Chairman

Approved for issue

Secretary.