BEFORE THE KERALA STATE ELECTRICITY REGULATORY COMMISSION

Original Petition No:

In the matter of: **(i) Load Factor incentive**

 (ii)   Power Factor incentive

 (iii) TOD Demand charges

Petitioner: Binani Zinc Limited

Binanipuram

Ernakulam District

Pin – 683 502

Email: zinc@binanizinc.co.in

Respondent: Secretary

Kerala State Electricity Board

Vydyuthibavanam

Pattom

Thiruvananthapuram 695004

Original Petition

1. The Petitioner is a Public Limited Company incorporated under the Companies Act, 1956 having its registered office at 601, Axis Mall, 6th Floor, Block – C, Action Area – I, New Town, Rajarhat, Kolkata – 700 156 and owns, manages and operates a Zinc Smelter at Binanipuram, Cochin. The Petitioner is an Extra High Tension Consumer of Electricity. The Petitioner operates with the contract demand of 24 MVA. The average monthly consumption of the Petitioner is one crore forty lakhs units per month.

2. The Petitioner is constrained to approach this Hon'ble Commission regarding introduction of Load Factor incentive, revision of Power Factor incentive and anomaly in the prevailing TOD tariff.

3. In the context of the unprecedented 26% excess South West monsoon and a prediction of 15% excess North East monsoon by Indian Meteorological department, the gap between ARR and ERC for the year 2013-14, would undergo a sea change. The following factors are significant:

i) The Hydro generation would increase to an all time high of more than 8500MU during 2013-14.

ii) The generation of liquid fuel power plants has been minimal during June to October 2013. This is likely to continue for a few more months.

iii) KSEB sold 455 MU of power to Indian Energy Exchange and Trades at rates varying from Rs. 2 to Rs. 4.35/kWh and earned around Rs. 150 Cr so far.

iv) The fall in demand of power has obviated the need to purchase high cost power from outside the state.

v) Commissioning of Koodankulam Atomic Power Plant would improve the situation further.

We would like to submit, as per a reasonable estimate, the entire gap of Rs. 1050 Cr projected for the year 2013-14 would get wiped off and there would be a decent surplus instead.

4. In the favorable situation explained above the difficulties faced by EHT consumers due to the TOD tariff structure and Judgment in Appeal in 179/2012, we request the Hon'ble Commission to

i) Introduce a Load Factor incentive scheme.

ii) Improve the existing Power Factor incentive scheme.

iii) Modify the TOD tariff suitably to mitigate the losses incurred by   EHT consumers.

Grounds

TOD Tariff

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, BZL has been reducing its load during peak and increasing it during off peak. The energy and demand of BZL 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							
	Day		Peak		Off peak		
Month	Day (kWh)	% shift from avg	Peak (kWh)	% shift from avg	Off peak (kWh)	% shift from avg	Total (kWh)
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

Month	Day (kVA)	% shift from avg	Peak (kVA)	% shift from avg	Off peak (kVA)	% shift from avg	Avg MD
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							
	Day		Peak		Off peak		
Month	Day (kVA)	% shift from avg	Peak (kVA)	% shift from avg	Off peak (kVA)	% shift from avg	Avg MD
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 BZL is explained below. This has been done by a comparison of electricity charges of the BZL for the past 6 months in the following methods.

i)   Pre revised tariff & TOD structure

ii)   Revised tariff & TOD structure

i)   <u>Pre revised tariff & TOD structure</u>

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						
Month	Day (kWh)	Peak (kWh))	Off peak (kWh)	Total (kWh)	Charges (Rs)	Avg Charges (ps/ kWh)
Feb-13	4514800	1102800	4112300	9729900	38216700	393
Mar-13	4611400	1028700	3824600	9464700	37209960	393

Month						
Apr-13	5357700	1082000	3987300	10427000	41046820	394
May-13	5485100	1378500	4101000	10964600	43603400	398
Jun-13	4557700	910490	3782890	9251080	36191370	391
Jul-13	4764412	1041228	4369420	10175060	39744553	391
				60012340	236012803	393

ii) <u>Revised tariff & TOD structure</u>

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

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. <u>For both pre-revised & revised TOD tariffs, revised demand & energy rates have been considered.</u>

      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 below.

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

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,

Load Factor =   Energy consumed in KWh/ (30X 24X

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.

Maximum Demand = (MD1 X 12 + MD2 X 4 + MD3 X 8)/ 24

where   MD1 = MD recorded during day

MD2 = MD recorded during peak

MD3 = MD recorded during off-peak

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)

Our appeal:-

15. Commission may issue necessary orders:

i) To review the methodology of calculating chargeable MD in order to ensure that consumers who shift load are benefitted.

ii) To introduce Load Factor incentive.

iii) Revise the PF incentive to rationalize the scheme.

iv) To issue necessary orders to KSEB to pass on the benefit of lower tariff for inter-state sales, to EHT consumers.

v) To consider the improved Hydel situation and pass on the effect of lower cost to EHT consumers.

Dated this the 15th day of November 2013.

Roshan K Menon

Vice President

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					
		Day	Peak	Off Peak	Total
Max Demand	KVA	10000	10000	10000	
Energy	kWh	2592000	864000	1728000	5184000
Demand charges					
		Tariff till April 2013		**Tariff from May 2013**	
	Demand	Rate (%)	Charges	Rate	Charges
Day	10000	100	1450000		
Peak	10000	150	725000	Highest of the three Demands	2900000
Off Peak	10000	80	773333		
Total		(Rs)	2948333		2900000
Average demand charges		(ps/kWh)	**56.9**		**55.9**

		Tariff till April 2013		Tariff from May 2013	
		Energy charges			
	Energy	Rate (%)	Charges	Rate	Charges
Day	2592000	100	11145600	100	11145600
Peak	864000	140	5201280	150	5572800
Off Peak	1728000	85	6315840	75	5572800
Total	(Rs)		22662720		22291200
Average energy charges	ps/kWh		**437.2**		**430.0**
Average electricity charges (demand + energy)	ps/kWh		**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			
Peak	8000	150	580000		3190000	
Off Peak	11000	80	850667	Highest of the three Demands		

		Tariff till April 2013		Tariff from May 2013	
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**