

## SCHEDULE OF COMPENSATION AND MANNER OF PAYMENT

Type of Complaint	Resolution Time	Compensation Amount (if not resolved)	Mode of Compensation
Normal Fuse-off	6 Hours in Urban Areas 24 Hours in Rural Areas	Rs.100/-	Automatically to be paid by Distco
Line Breakdown (Ordinary)	12 Hours in Urban Areas 24 Hours in Rural Areas	Rs.100/-	To be claimed by the Complainant
Line Breakdown (Major)	24 Hours in Urban Areas 48Hours in Rural Areas	Rs.100/-	To be claimed by the Complainant
Distribution Transformer (DTR) Failure	24 Hours in Urban Areas 48Hours in Rural Areas	Rs.200/-	To be claimed by the Complainant
Period of Scheduled Outages	Exceeding beyond 12 hrs. a day	Rs.200/-	To be claimed by the Complainant
Improve voltage variation	15 days if no expansion/ enhancement required	Rs.200/-	Automatically to be paid by Distco
Improve voltage variation	120 days for 11 kV 180 days for 33 kV	Rs.500/-	Automatically to be paid by Distco
Inspect and check correctness of the meter	7 working days	Rs.100/-	To be claimed by the Complainant
Replace slow/ creeping/ stuck-up meters	30 days	Rs.100/-	Automatically to be paid by Distco
Replace burnt meters if cause not attributable to consumer	30 days	Rs.200/-	Automatically to be paid by Distco
Release of supply if no expansion/enhancement of network required.	30 days	Rs.100/- for each day of default	Automatically to be paid by Distco
Release of L.T. supply including Agriculture if expansion/ enhancement of network required	30 days	Rs.100/- for each day of default	To be claimed by the Complainant
Release of H.T. (11 kV) supply if expansion/enhancement of network required	60 days	Rs.500/- for each day of default	To be claimed by the Complainant
Release of H.T. (33 kV) supply if expansion/enhancement of network required	90 days	Rs.500/- for each day of default	Automatically to be paid by Distco
Release of E.H.T. supply if erection of sub-station is required.	As decided by the Commission	Rs.1000/- for each day of default	Automatically to be paid by Distco
Title transfer of ownership	15 days	Rs.100/- for each day of default	Automatically to be paid by Distco
Change of category	15 days	Rs.100/- for each day of default	Automatically to be paid by Distco
Conversion from LT 1 Ph. to LT 3 Ph.	30 days	Rs.100/- for each day of default	Automatically to be paid by Distco
Conversion from LT to HT and vice-versa	60 days for 11 KV 90 days for 33 KV	Rs.200/- for each day of default	Automatically to be paid by Distco
Resolution of billing complaints	1 month	Rs.50/- for each day of default	Automatically to be paid by Distco
Reconnection of supply following disconnection due to non-payment of bill	4 working hrs.	Rs.100/-	Automatically to be paid by Distco

**Conditions Applicable to payment of compensation:**

1. The Licensee shall register every complaint of a consumer regarding failure of power supply, quality of power supply, meters and payment of bills etc. and intimate the complaint number to the consumer.
2. The Licensee shall maintain all records regarding the Guaranteed Standards of Performance, in a consumer-wise manner, in order to give a fair treatment to all consumers and avoid any dispute regarding violation of standard.
3. The compensation payable may be done by the licensee by way of adjustment against existing, current, and/or future bills for supply of electricity.
4. The compensation claims shall be dealt with in the following manner:

**Automatic :**

This mode of payment requires the Licensee to calculate and pay or adjust the compensation amount to the affected consumer automatically, following non-compliance of the specific standard. The consumer can also approach the Licensee to claim compensation, if the standard is violated and the Licensee fails to dispense the compensation in a reasonable amount of time.

5. The Licensee is required to make internal investigation regarding fixing of liability for recovering the compensation amount from the erring employees concerned.
6. The employees should be informed on the details of Regulations and suitably trained so that they make endeavour in the form of proper operation and maintenance in their system to meet the standards.

**To be Claimed:**

This mode of payment requires the consumer to bring to the notice of the Licensee that the standard has been violated and accordingly claim the compensation amount from the Licensee.

# **HYDRO POWER GENERATION IN ORISSA – LARGE POTENTIAL**

**Jayadev Mishra**

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## **INTRODUCTION**

There is great concern world over on CO<sub>2</sub> emissions from fossil fuel use causing global warming. Great importance is given now to reduce global CO<sub>2</sub> emission. The KYOTO protocol was signed in 1977 to which India is a signatory. A clean development mechanism (CDM) was created & certified emission reduction (CER) through monetary incentives has been established for reduction of CO<sub>2</sub> emission. Non fossil fuel power generation & renewable energy generation particularly hydro power generation is chosen as the first preferred alternative. Hydro generation is also necessary for efficient grid management particularly for peak support.

## **HYDRO / THERMAL MIX**

The power system in India presently is predominantly coal based, hydro generation standing next for energy & capacity availability. The present power supply position region wise in India with plans upto 2012 is furnished in statement – I (attached). It is seen that while capacity wise the thermal & hydro component is 66% & 26% of the total respectively, energy wise hydro component is only 15%. A large capacity addition along with possible energy generation (including secondary hydro generation) is necessary. The Govt. of India have identified 50000 Mw of hydro generation by 2012 as indicated in statement – I.

While every one would agree that hydro power generation should be the first choice the power need is so great & potential hydro power sites are so far fletched, for quick results, coal based or gas based power generation is getting maximum attention both from state & private sector.

## **HYDRO POWER NEEDS IN THE GRID**

Nuclear or coal based power stations can operate at or above 90% P.L.F. The system load factor in India is about 70%. Therefore, hydro capacity to the extent of at least 25% of total is necessary to provide peaking support in the grid. For CO<sub>2</sub> emission control large quantum of hydro energy generation is however necessary. Therefore, wherever possible hydro stations for peaking or energy generation are to be established. Even though cost of hydro generation may be high for the first 10 to 12 years it will turn out to be the cheapest source once the loan component of capital investment is repaid. I therefore support, irrespective of cost of generation, hydro power should be promoted by the state govt. & regulatory authorities as first priority procurement.

It would be seen from the statement- I that presently on All India basis the energy shortage is 9.6% & peak shortage 13.8% (2006-07). It is however 3.1% & 4.1% respectively in eastern region because of the large hydro component in Orissa. Since the all India Grid is already established, the national needs will affect each state. Open access in the grid is allowed in the Electricity Act 2003. All states must therefore put their best effort to plan for the national need & not for their own state. For few years now nuclear & thermal generation have to be promoted for quick results, to meet the large quantum of energy

needs. **But wherever possible & feasible, hydro generation should get the first attention by the state irrespective of cost.** If there are no feasible hydro generation sites immediately available, pump storage schemes can be planned for grid management. It is of course off-peak energy storage arrangement of thermal power for supply to the grid during peak hours. It does not reduce the CO2 emission but helps peaking supports.

A pump storage scheme in Purulia in West Bengal is already commissioned. In 1957 I found a number of pump storage schemes operating in Austria for storing off-peak thermal energy & glacier melt water.

### NEW HYDRO PROJECTS IN ORISSA

Many hydro power generation projects have been taken up which are now operating & providing low cost power. The first power station commissioned on 19<sup>th</sup> Aug. 1955 in Orissa at Machkund where I started my career, operates today & provides power at about 18 Paisa per Kwhr. Orissa has about 11 large river basins. A comprehensive plan is required to be under taken for each river basin to harness all possible hydro power. Some hydro power project can be developed on trans basin diversion of water. Some pump storage scheme can be taken up at existing reservoirs like Upper Indravati, Upper Kolab, Machkund & Balimela. Basin wise availability of water in Orissa is furnished in Statement –II (attached). Development already made is indicated under the remark column of this statement.

### NEW PROJECTS (FIRST PRIORITY)

Hirakud & Chiplima power projects are in operation with a capacity of 347.5 Mw on Mahanadi. Five new power projects have been already planned by OHPC to be developed. Detailed Project Report (DPR) have been prepared by the State Govt. & OHPC through WAPCOS. I had the opportunity to work for these DPRs as consultant/ advisor to WAPCOS. Out of these five projects the Hirakud-B & Chiplima-B can add 408 Mw more to Hirakud system & Sindol I, II & III can provide 1266 mKwhr of energy mostly as run-of-the-river projects. The features of the projects are following

Sl. No	Name of the Project	Installed Capacity (Mw)	Annual Energy Capability (mKwhr)	Estimated Cost Rs Cr.	Remarks
1	Hirakud-B	4 x 52 = 208	295	593.30	Back of Hirakud
2	Chiplima-B	4 x 50 = 200	370	481.00	right dyke With a forebay at Chiplima P.H.
3	Sindol-I(Deogaon)	5 x 20 = 100	365	490.40	River Barrage
4	Sindol-II(Kapasira)	5 x 20 = 100	379	540.80	River Barrage
5	Sindol-III (Godhaneswar)	6 x 20 = 120	522	644.00	River Barrage
Total		728	1931	2749.50 (5000.00)	1994 price 2007 price

Hirakud –B & Chiplima –B can operate along with Hirakud –A & Chiplima – A as peaking stations with 755 Mw capacity & 1839 mKwhr energy at 27% PLF. The system can work as good peaking station. Sindol - I, II & III can provide 320 Mw capacity & 1266 mKwhr energy at 45% PLF to work as energy generation project.

During 1997-98 many International firms expressed interest to develop these five projects through private investment. They gave presentation of their proposals to the State Govt. & OHPC. At that time it could not be considered as GRIDCO did not have requirements to purchase this additional power. The all India Grid was also not developed for sale to other states. Now since the all India Grid is developed, open access & power trading is allowed for the generators, these will attract interest for private investment.

Availability Based Tariff (ABT) which is frequency related can provide a sale rate of at least 7.50 per Kwhr during peak load hours.

In 1957 during my training in Austria I found many barrage projects were in operation / construction over the river “Danube” at Passau, Ybbs-Persenberg with navigational facilities Sindol projects will be similar.

Down stream of Sindol –III one or two more such projects can also be developed right upto Munduli to utilize the head RL 90 m to 26 m. These projects will get dependable water supply from Hirakud to the extent of 7000 Cusece for delta irrigation. Similar Cascade projects can also be planned below Samal barrage RL 70 m upto Jenapur over Brahamani river which could be supported through Mahanadi Brahamani link projects mentioned below.

#### **MAHANADI BRAHAMANI LINK PROJECTS**

The river system of Mahanadi & Brahamani with locations of power stations now working & the five projects suggested above are shown in the sketch-I enclosed. I suggest the following river link –projects for equitable water distribution between Mahanadi & Brahamani rivers for power generation & industrial use without affecting irrigation potentials.

Ref: Sketch -I

On Mahanadi River			On Brahamani River		
Projects	FRL/MDDL	Tail	Projects	FRL/MDDL	Tail
1. Hirakud	192/179.8 m				
2. Chiplima	155 m	132			
3. Sindol –I	131.5 m	121	Rangali	123.5/ 109.7 m	79.5
4. Sindol –II	119.5 m	100			
5. Sindol –III	100 m	90	Samal	79.5 / 76.2 m	70 Barrage
6. Five to Six	90 m	30new projects	Three to four new projects to utilize head 76 m to 30 m.		
7. Mudali Weir	26 m				

**SUBMERSION AT THESE BARRAGE PROJECTS WILL BE CONTAINED WITHIN THE RIVER CHANNEL**

#### **LINK PROJECTS**

Link I – Sindol I (131.5) to Rengali Dam (123.5) 2000 Cusece can be diverted which will generate additional power at Rengali.

Link II – Sindol III (100) to Samal Barrage (79.5) 2000 Cusece to be diverted for power generation at Samal at 20 m head.

Link III – Finally from the last barrage at Brahmani at about 30 m FRL about 2000 to 3000 Cusece can be brought back to Mahanadi to be dropped up stream of Munduli barrage reservoir at RL 26 m.

The first two projects will divert 4000 Cusecs of Mahanadi Water to Brahmani with power generation at Rengali & Samal without affecting generation at Sindol –I, II & III and about 3000 Cusecs of water will come back to Munduli for Delta irrigation. These barrages & links can provide equitable water distribution for irrigation, power developments & also for industrial use.

A large number of thermal power stations are planned between Talcher & Athgarh. A large industrial complex is developed at Kalinga Nagar. These I, II & III links will meet the water requirement for the thermal power stations & Kalinga Nagar complex without affecting irrigation. Large reservoirs located at Hirakud & Rengali will ensure dependable water supply at all these projects.

Later on, cascade development on tributary to Mahanadi on Ib, Harihar Jore, Jonk, Jeera, Ong, Tel, & similarly on Brahmani on Samakoi, Rameal, Gohira, Tikra, Singadajore, Nigra & Barjoe etc; apart from developing power in their own cascade system, will supplement water to Mahanadi & Brahmani barrage projects.

## **PUMP STORAGE PROJECTS**

Many new thermal power stations to the extent of about 20000 Mw are planned in the state through private / state investment. Many steel plants will also add large thermal power generation projects as Captive Power Plants. Over the next 50 years many nuclear power stations will also be added in the country. Therefore, there are necessities for pump storage schemes to use off peak cheap thermal / nuclear energy for pumping water to an upstream reservoir to be used for hydro generation during peak hours. The low cost energy at less than Rs. one during off-peak hours can be purchased & converted for sale as peak energy at Rs. 7.50 per Kwhr. Thus it will be viable for the project. In 1957 in Austria I had the opportunity to visit many such pump storage plants operating then to store off-peak thermal energy & surplus glacier water discharge for use in those projects. A sketch is enclosed sketch-II which indicates the extent of large interlinks & pump storages all totaling to 132 MW only at one site i.e Reiseck & Kreuzeck. This would prove that any interlink & pump storage projects which are feasible should be developed.

In Orissa three new pump storage schemes each of 1000 Mw capacity can be executed.

1. Baitarani (1000 Mw) - A new diversion weir is to be constructed at Balijori RL 900 ft over river Baitarani. A power channel is to be taken on the left bank hill range, to end at a fore bay near Thakurmunda. A Tail race reservoir at Baigundi (201 RL) will have to be formed. A 1000 Mw pump storage plant can be developed which can operate as hydro station during rainy season when sufficient water is available in Baitarani. In other season it will work as pump storage plants. Many

up-stream projects such as that at Kanpur are existing. Some more can be developed also. These will provide adequate water supply to the large steel plant coming up at Kendujhor and provide hydro power generation of 1000 Mw capacity during emergency situations.

2. Upper Indravati (1000 Mw) – A pump storage project can be developed here with Indravati reservoir as head race reservoir. (FRL 642 m) & the Tail race reservoir existing at Mangapur weir (RL 282). A new tunnel from Indravati dam to Mangapur with a underground power station can be developed with at 360 m head. This plant can operate as a hydro plant whenever there is sufficient water during rainy season & at other times it will work as a pump storage plant.
3. Upper Kolab (1000 Mw) – The Upper Kolab dam reservoir at (RL 858 m) & Satiguda Tail race reservoir (RL 617 m) with a new tunnel & a under ground power house can be developed similar to that at Upper Indravati.
4. Other possible pump storage sites – Such projects can be developed at Machkund & Balimela if an interstate agreement with Andhra Pradesh can be worked.

It is also possible to divert some water from Kolab reservoir (RL 858 m) to Machkund reservoir (RL 846 m) near Nandapur with a channel or tunnel. This water can provide additional generation both at Machkund & Balimela. When water is surplus at Machkund reservoir it can be pumped back to Kolab reservoir. However, an interstate agreement is required for this.

The lower Machkund project to utilize Machkund Tail race water at (RL 515.6 m) to Balimela reservoir (RL 462 m) with a barrage near Machkund power house can provide 100 Mw of power.

Jalapur dam toe & Balimela dam toe power houses can also be developed.

These projects were entrusted to some private developers. Exact status of these projects are not available. However, these could immediately be developed for additional hydro power.

## **CONCLUSION**

All the link projects, pump storage projects and suggested cascade barrage projects are only preliminary conceptual proposals. It is only after some investigation with topo map studies pre feasibility reports can be prepared. It is suggested that some consultancy organizations should be employed by the state govt. or OHPC, one for each river basin, to quickly prepare the pre feasibility reports within one year. Thereafter priority can be attached to different projects. The expenditure incurred can be met by the OHPC under a separate directorate. Feasible projects should be developed through private sector investment. State Govt. & OHPC should however obtain all necessary approvals particularly for environment, forest clearance, rehabilitation, interstate agreements where necessary & CEA approval etc before tendering for the projects so that the private investor is sure of quick implementation.

Encl :- 2 statements & 3 sketches.

The writer was ex-advisor (power) Govt. of Orissa

**STATEMENT – I**

**POWER UTILIZATION (SOURCE POWER LINE MAY 2007)**

	Energy (mKwhr)		Peak (Mw)		Capacity of Plant
	2005-06	2006-07	2005-06	2006-07	As on 31.03.2007 all India (in Mw)
1. NR					
Demand	188794	202125	28154	31516	i) Thermal
Availability	168611	179987	25200	26644	Coal – 69918 (54.2%)
Shortfall (%)	10.7	11.0	10.5	15.5	Gas – 13582 (10.6%)
2. WR					Oil – 1202 (0.9%)
Demand	215983	232391	31772	36453	Total – 84234 (65.6%)
Availability	186904	196117	25257	27463	ii) Nuclear – 3900 (3.1%)
Shortfall (%)	13.5	15.6	20.5	24.7	iii) Hydro – 34110(26.6%)
3. SR					iv) Renewables – 6191 (4.8%)
Demand	157179	180091	24889	26176	Total – 128435 (100%)
Availability	155790	175197	23372	24350	
Shortfall (%)	0.9	2.7	6.14	7.0	
4. ER					
Demand	62347	68198	10161	10491	Power generation in may 2007 (mKwhr)
Availability	60706	66183	9677	10058	Thermal & Nuclear – 50936 (84.3%)
Shortfall (%)	2.6	3.1	4.8	4.1	Hydro – 9511 (15.7%)
5. NER					Total - 60447 (100%)
Demand	7534	7782	1385	1477	
Availability	6888	7012	1192	1166	Growth rate Thermal & Nuclear
Shortfall (%)	8.6	9.9	13.9	21.1	over 2006 – 9.09%
India Total					Growth rate of Hydro – 8.15%
Demand	631757	690587	93255	100715	
Availability	578819	624496	81792	86818	
Shortfall (%)	8.4	9.6	12.3	13.8	

Power Generation	–	Plan Targets
(Ref ECONOMIC TIMES, 30 <sup>th</sup> March 2007)		
10 <sup>th</sup> Plan target (end FY-2007)	-	41110 Mw
Likely achievement	-	23230 Mw
Shortfall	-	17880 Mw
11 <sup>th</sup> Plan target (FY-2012)	-	68869 Mw
With best efforts additional	-	11545 Mw
Total	-	80414 Mw

50000 Mw Hydro Power development plans of CEA for 12<sup>th</sup> Plan (Ref CEA Website)

Total 162 schemes - 47930 Mw

Out of these Arunachal

Pradesh 42 schemes - 27293 Mw

Orissa 4 schemes - 1189 Mw

Rest other states

1<sup>st</sup> year tariff below Rs. 2.50 KWHR 78 schemes for 34020 Mw

Most of which are in Arunachal Pradesh

#### STATEMENT – II

#### RIVER BASINS IN ORISSA (FROM NORTH TO SOUTH) (REF – IRRIGATION IN ORISSA A.K. DALUA & AVAYA NAYAK PAGE 26)

Name of River	Catchment Area (sq.km) inside Orissa	Yield in (mCum)75% dependability
1. Subarnarekha	19300	1350
2. Budhabalanga	4837	840
3. Baitarani	10400	3000
4. Brahmani	39033	11300
5. Mahanadi	141589	45750
6. Rushikulya	8900	2110
7. Bahuda	1250	230
8. Vansadhara	11500	1630
9. Nagabali	9400	680
10. Indravati	41700	11300
11. Kolab	20400	
12. Machkund & Sileru	N.A	N.A

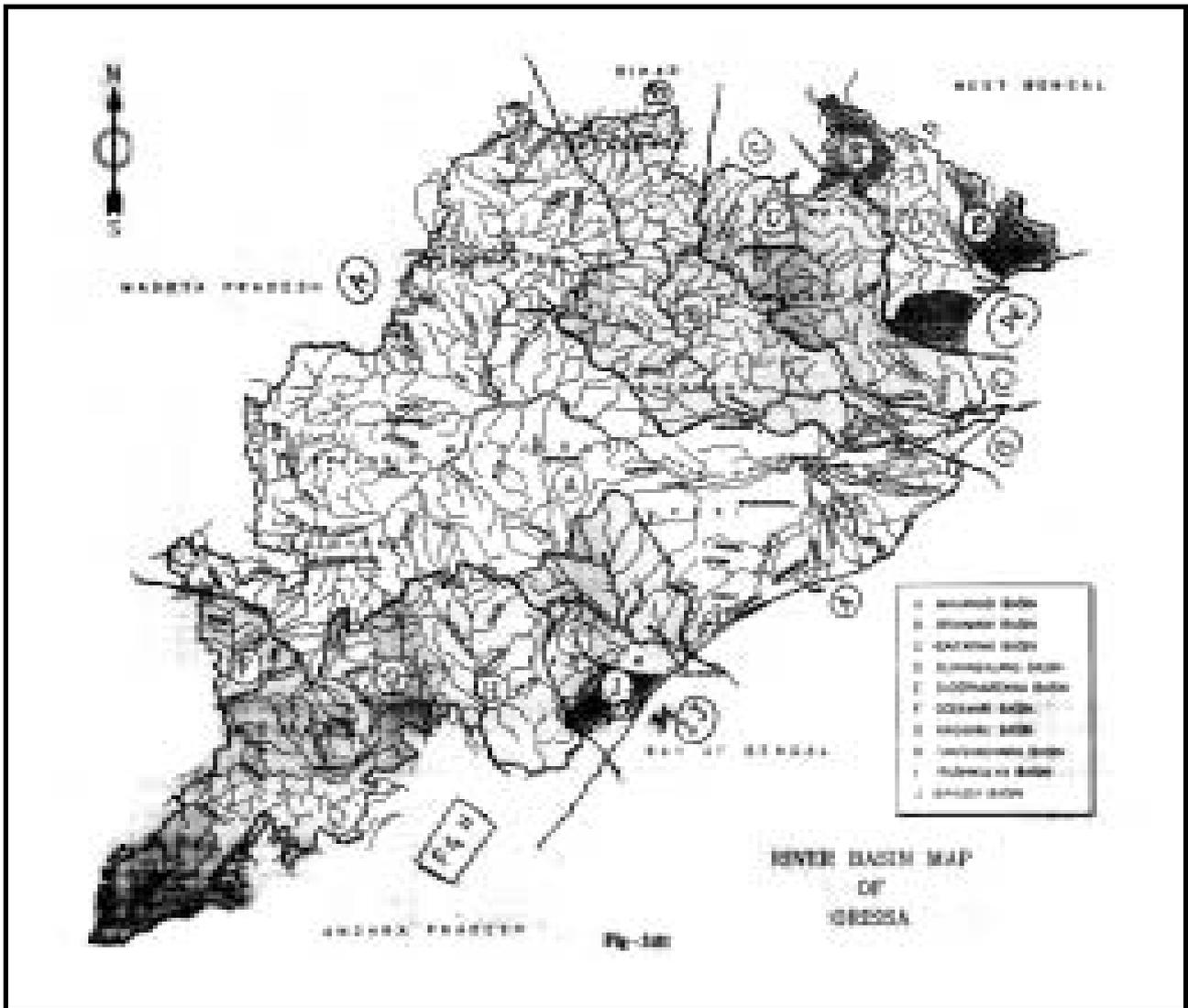
(Sketch no. 3)





## Supply of Water and Energy

Stage	Utilization of	Catchment area in sq km	annual flow in hecto. cum.	gross head in m	Energy in GWh			Capacity MW	Storage	Details
					Winter	summer	year			
1. Reibeck Stage	Riekenbach stream muhldorfer stream By Lowering level Gr. Muhldorfer lake	15.95 11.75	19.6 23.6 1.8	678.50	6.7 13.3	19.8 20.2	26.5 33.5	6.5   17.5 24	daily 40,000 cum	partly normal production during the day
1a. Reibeck Stage Extension	Kaponig stream Zwenberger stream GoB stream Ricken-a. GoB Stream	13.5 13.18 16.45 -	9.9 12.7 19.7 -	678.50 interm station 255	- 3.0 6.0 4.0	14.3 13.1 19.5 12.5	14.3 16.1 25.5 16.5	8	Weekly 100,000 cu.m.	mostly normal production during the day
2. Reibeck Storage with pumping station	GroBer Muhldorfer lake	1.05	3.8 + 4.1 water by pumping	1713	30.0		30.0	2x20 40	winter 7.9 hect. cu.m	peak power during the day
2a. Reibeck Storage Extension	Hochalpen lake Rad lake Kl. Muhldorfer lake	6.72	8.18 + 2.2 water by pumping	1771.30	42.0		42.0	20	+ 10.1 hect. cu.m	peak power during the day
3. Kreuzeck stage	Teuchl Stream Niklai Stream	42.25 23.75	49.9 25.6	587.50	16.6 8.7	44.4 22.3	61.0 31.0	2x20 40	weekly 185,000 cu.m	mostly normal production during the day
3a. Kreuzeck stage Extension	Gnopnitz stream Grab Stream	31.28 22.33	27.5 21.5	587.50	10.3 8.0	24.2 18.5	34.5 26.5			mostly normal production during the day
Gross total excludes pumping water, includes the energy used for pumping amounting to about 27 GWh					146.3	201.7	348.0	132	325,000 cu.m. plus 18 hect. cu.m.	normal production and peak power during the day



## **POWER SECTOR REFORM IN ORISSA : IS IT THE END OF THE ROAD ?**

**Dhirendra Kumar Roy**  
Formerly Chairman,  
Orissa Electricity Regulatory Commission.

**We are all faced with great opportunities brilliantly  
disguised as impossible situation**

- **Charles R. Swindol**

Orissa is the acknowledged pioneer in reform of the power sector. It has many firsts to its credit. It was the first state to enact an electricity reform Act, first to bring about functional unbundling, the first to set up an electricity regulatory commission, the first to privatize distribution, the first to divest shares of a government generation company, the first to set up a state transmission utility, the first to lay down procedure and to operationalise the quasi-judicial regulatory body, the first to set tariff through open hearing and the first to set standards of service.

Most of the above activities have been replicated and promoted by the Government of India and a number of State Governments with minor modification or improvement.. Those states who have not done so are also moving in the same path. None have found fault with the essentials of the so called Orissa model of electricity reform. But it is a widely prevalent perception that Orissa model has failed. Many of the states and power sector professionals have loudly and demonstratively criticized the Orissa model. But the paradox is that they have not found fault with the essentials and have promoted the same model with incremental approach or recalibrated mechanism or readjusted sequence of reform.

A fundamental error in evaluation of the reform arises from the inability to distinguish between restructuring and reform. No one has found serious fault with the restructuring model and the basic concepts adopted in Orissa. Like proof of pudding is in the eating, very fact that all the states – sooner or later have adopted or intend to adopt the Orissa restructuring model is evidence of the appropriateness of the model.

The failure as well as the achievements of Orissa reform have been discussed time and again by various studies, presentations and Reports. The latest “Study on Impact of Restructuring of SEB”, made by the Indian Institute of Public Administration gives a comprehensive picture. The findings and recommendations need not be recounted. But it will be the end of the road for reform if the Government of Orissa and the Orissa Electricity Regulatory Commission still dither to acknowledge the inadequacies and failures which are glaring. Solution stems from the problem; and hence, if the problem is not recognized and corrective steps are not taken, there can be no solution.

It may be appropriate to highlight some of the glaring inadequacies in the conceptual realm as well as in implementation. First, Government “must intellectually internalize the fundamental commercial precept of the reform.” In Orissa context the government totally ignored the basic commercial principles that private investors expect a commercially viable environment. They cannot be expected to sacrifice shareholders’ money for political imperatives and administrative inefficiency. They would continue to be players only if Government facilitated a commercial environment in which the cost of supply can be

collected from the consumers. Whether the investors should have done their due diligence or not is a matter of argument only. Even if they had failed to do so, the reality of the situation on ground must be taken into account and decisions should be taken in the larger public interest involving supply of an essential commodity / service. The private sector cannot be expected to invest money to maintain, upgrade and expand a system if they are not sure of realizing the cost of investment, if not profit.

The second fatal error on the part of Government is to equate reform with withdrawal of subsidy. It can be an endless debate in whether and to what extent subsidy is desirable. But that subsidy is per se bad and that it has no place in a reform environment is a dangerous misconception. Withdrawal of subsidy and subvention at one go without evaluating the economic, political and commercial consequence was a faulty step, to say the least. Subsidy amount (In crores of rupee) booked during the years 2000-01 to 2004-05 in the four states who were the first to adopt reform program is as under:

<b>States</b>	<b>2000-01</b>	<b>2001-02</b>	<b>2002-03</b>	<b>2003-04</b>	<b>2004-05</b>
Andhra Pradesh	2936	2437	1509	1515	1303
Haryana	820	763	829	1026	1102
Orissa	0	0	0	0	14
Karnataka	1821	221	1335	1529	1102

The argument that Orissa does not have agricultural consumers and that subsidy is given only for free power to agriculturists is a facetious argument. The real fact is that if any section of people is used to free supply, whether legitimately or not, it will continue to resist payment. In Orissa the rural population, urban poor and thieving consumers of industrial and L.T. segment having been used to free supply which was adjusted by SEB against the subsidy amount, would not be expected to pay up the moment reform was introduced. The withdrawal of subsidy at one go touted by the Government as a great achievement was a wrong step which must be admitted at least now.

The withdrawal of subsidy aggravated the financial misery of utilities when the Government adjusted Rs.343 core Government loan and the dues to Gridco against subsidy payable to Gridco. The financial model having been weak due to upvaluation of assets by over Rs.2000 crores, Gridco faced an enormous burden with empty coffers.

It is high time that the Government of Orissa makes a mid-course correction of its policy and extends political and financial support to the sector as repeatedly advised in all studies made so far.

The task of the OERC is more crucial, even if it may not be as wide ranging as that of the Government of Orissa. We must realize that the inaccurate methodology for calculating the loss figure did not bring out the enormity of the task involved. The collection efficiency level, lack of political support and resistance of vested interests including employees of utility should not have been ignored. This has not only left an unbridgeable gap in revenues of utilities. It has jeopardized the resilience and credibility of the regulatory system which has refused to act on realistic numbers and has relied on idealistic benchmark. Secondly, normative basis for allowing expenditure for the purpose of Revenue requirement is inappropriate in the

ground reality in Orissa with technical incompetence, managerial inadequacy and other deficiencies. Deliberately ignoring the wide gap in Revenue and not increasing tariff for years together can be dubbed either as populist measure or a well considered measure to play safe. Regulators have to take their guidance from economic principles and not decide on the basis of administrative expediency as expected from the government functionary controlled by political leadership.

The Regulator is not expected to have the judicial detachment for the orders, decisions and instructions they issue. As the Regulator is in the vanguard of reform, it has to be responsive to the economic and social developments around it. It needs to be realized that regulatory regime designed for the end-state of a market oriented sector is incompatible with the need to discipline a government utility or a successor private concern retaining the same old management and staff. This regulator has also to realize that private distribution companies are not guided by public interest unless they are assured of commercial viability.

To conclude, the task before the Government of Orissa and the OERC are formidable but not impossible. The challenge must be converted to opportunity so as to disprove the detractors of Orissa reform and to regain the position of pioneer for successful reform of Power Sector.

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## **POWER SECTOR REFORMS IN ORISSA – A KEY TO INDUSTRIALISATION**

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In recent times power sector reforms have been the hot topic of discussion, particularly after the 19<sup>th</sup> January 2001 tariff order of OERC. Irate consumers have started doubting the rationale of going for the reforms and restructuring and have even demanded a roll back of the reforms. Those of us with long association with the power industry are asked whether it was necessary to go for sweeping structural changes in the SEBs. Was it not possible to achieve the same result by internal reorganization or by introducing a tougher method of accountability? Before answering these questions, it is perhaps worthwhile to have a close look at the power sector from its inception till date.

India had its first power plant (reportedly the first in Asia too), a hydroelectric station of 130 KW capacity at Sidropong near Darjeeling town in the year 1897 (10.11.1897). In 1899 (17.04.1899) CESC, gave Calcutta its first electricity power supply at a place then known as Emumburg Lane near Prinsep street. By 1900, the total installed capacity in the country was 1.1 MW, (1 MW thermal and 0.1 MW Hydro). In these initial 50 years or so till independence, the generation and distribution of electricity was through private sector efforts only. In Orissa we had Cuttack Electricity Supply Company, Puri Electricity Supply Company, Balasore Electricity Supply Company and Berhampur Electricity Supply Company. Hydroelectric stations were developed along the Western Ghats by Tatas, Commencing power supply to Bombay.

Along with hydro plants, coal based thermal power stations were also set up by private companies only. These companies were licensees as per the Indian Electricity Act, 1910 and were usually managed by large and well-known companies like Martin burn, B. N. Alias, Kilburn and many others.

Generation and distribution of electricity grew from 1.1 MW to 1363 MW by the year 1947. However, in Independent India, it was felt that the widespread availability of electricity was vital for the country's development. This was the consideration which resulted in the enactment of the Electricity (Supply) Act, 1948 which aimed at the rationalization of generation and distribution of electricity in India and created Electricity Boards to achieve the objective. The 1956 Industrial Policy Resolution also emphasized the need for development of the sector through state initiative and virtually barred the private utilities in adding generation capacities. SEBs were empowered to set up power generating stations except Nuclear power station, which remained with Central Govt. and the Central Electricity Authority (CEA) was formed to oversee the integrated development of the Sector.

In the initial decades after independence, State Govts. Received Central Plan Assistance to set up generating stations and construct the transmission and distribution systems. However, power demand increased at an exponential rate. To meet this increasing demand, Central Sector Organisations like NTPC and NHPC were formed. PGCIL was hived off from NTPC to be exclusively in charge of transmission and to develop the inter connected grid system across the country. Rural Electrification Corporation (REC) was set up to assist State Electricity Boards to take up Rural Electrification works and Power Finance Corporation was set up to fund state projects. Five Regional Electricity Boards (REBs) were created to monitor and regulate generation by different agencies and to keep a proper control of export and import of power between States.

These steps yielded remarkable results. The achievement in the first 50 years post independence was stupendous. The installed capacity, which was only 1363 MW in 1947, increased to 85919 MW by 31<sup>st</sup> March 1997. Today it is as on 31.03.07 1,32,329 MW. The total energy generation shot up from a meagre 5000 MU to 6,24,495 MU per annum. During the same period the number of consumers increased 59 times and per capita increase of consumption of power approximately twenty three times.

But, inspite of these remarkable achievements, the country was reeling under the following problems of the power sector.

1. Power is a critical development indicator. For an overall GDP growth of 6%, the growth of power generation should be at the rate 9%. CEA has estimated that by 2012 the installed capacity in the country should be 2,40,000 MW to cater to the demand, which meant an additional capacity of 1,00,000 MW calling for an investment of about Rs. 5,00,000 Crores. A similar amount will be needed for building transmission and distribution capacity to evacuate the power. In other words an investment to the tune of Rs. 10 lakh crore in the power sector is needed against a likely outlay of Rs. 2.5 lakh crores (based on the annual rate of capacity addition during 1997-2000 which was around 4,000 MW). The resources for repairs and maintenance works (R & M) are also woefully short. There is no way the needed resources can be raised without attracting investment into the power sector from private investors and by generating internal resources.
2. Under the Electricity (Supply) Act. 1948, the SEBs were required to have a return of at least 3% on their capital after meeting all expenses. This was to be achieved by adjustment of tariffs with shortfalls being met by State subsidies. This formula started failing after the mid 80's. The annual commercial losses of the SEBs in the country increased from Rs. 1,565 crores in 1985-86 to around Rs. 20,000 crores in 99-2000. The effective subsidy (difference between cost of supply and revenue realization) to agricultural and domestic sectors worked out to Rs. 27,227 crores by 98-99. However, cross subsidization (mainly from commercial and industrial sector to domestic and agricultural sectors) also increased to Rs. 10,120 crores representing about 37% of the subsidy provided to these sectors.
3. The efficiency level (PLF) of the power stations in the country at 64.4% (99-2000) is yet to reach the optimal level of 80% particularly in the Eastern Region. This is a huge loss to the country and has led to a shortage of peak demand of 12.04% and energy deficit of 6.2%.
4. The total system losses which include transmission & distribution losses and commercial losses in different States is close to 45% whereas the acceptable level of losses in Indian context should be within 20%.
5. India's per capita consumption is 363 Kwh, less than one fifth of the World average of 2053 Kwh. The per capita consumption of China, another major developing country with comparable population size is 714 Kwh, nearly twice that of India.

Thus, the power sector has made itself non-sustainable in the present form. In spite of the remarkable achievements, what really went wrong with the SEBs leading to such a situation? The Major factors contribution to non-sustainability of the power sector as it stands today were the following.

- a. Lack of commercial orientation and conflicting objectives – is it social service or a commercially viable activity? Governmental interference in day-to-day running of the Utility despite “autonomy” promised to it (MOU’s with Government are as good as useless).
- b. Adverse capital structure.
- c. High transmission and distribution losses.
- d. Unmanageable size and monolithic structure
- e. Unrealistic pricing policy resulting in a skewed tariff structure.

Initially many of the State Governments tried to recover a part of the costs by charging a little more to commercial and industrial consumers. Over the years this kind of cross subsidy reached a level where it was almost impossible for power intensive industries to survive after paying such high electricity charges. As an aftermath of this unrealistic pricing policy, the industrial consumption either remained stagnant or it came down since many industries went in for captive generation. The result was that the mechanism of cross subsidy became counter productive.

- f. Poor billing and collection.
- g. Bad quality of service due to want of repair and maintenance activities and lack of spares.
- h. Manpower related problems like over staffing, low skill levels and lack of training. Low motivation levels coupled with low accountability.
- i. Misuse of the statutory power of the State Governments to issue directives to SEBs.

To debate the crisis in the electricity sector, the Chief Ministers of the country had several rounds of discussions. After protracted deliberations in December 1991, a new National Economic Policy was adopted in which power sector featured prominently. The new policy while going for liberalization and welcoming private participation in infrastructural development like power, roads etc. set the following objectives for the power sector.

- i. To reduce reliance on government and raise resources from private sources for generation, transmission and distribution.
- ii. To make available power at a reasonable cost.
- iii. To ensure stable and good quality power supply.
- iv. To supply power on demand.

It was against this backdrop of acute resource crunch that the Central Government adopted the new economic policy and decided to open up the power sector to private investors, both local and foreign.

This marked a reversal of the policy followed in the past and it welcomed an increasing role for the private sector in meeting the growing demand for funds and greater sector efficiency. The unsatisfactory financial health of the SEBs and lack of structural safeguards, however, has resulted in poor response from private investors. The reforms of the type pioneered in Orissa were meant to address those weaknesses in the legal and commercial framework governing electricity.

## **POWER SECTOR REFORMS – ORISSA SCENARIO :**

The OSEB was formed on 31.03.1961. It took over the generation and transmission from the State Government. Several private Supply Companies engaged in distribution of power were taken over by the OSEB through a Government Notification. By 1970-00 the total consumption of power was 1900 MU and the consumer strength was about 1.70 lakhs. By 1999-2000 the consumption was 6000 MU with the consumer strength 16 lakhs.

Till 1990-91, OSEB managed to carry on its business with the help of the subsidy mechanism mentioned earlier. After 1990-91, the financial burden on OSEB increased tremendously as it started taking large loans from Financial institutions like REC, PFC and LIC to meet the cost of massive rural electrification, energisation of lift irrigation points and construction of new lines and sub-stations. The State Government was not in a position to meet its subsidy, which had accumulated to over Rs. 369 Crores by March, 1996. As a result maintenance works at different levels of generation, transmission and distribution suffered. No money was available to meet the consumer requirement for extension of lines and Substations to cater to increasing load. On the top of it, the demand for power supply outstripped the generation, which forced the State Government and OSEB to impose load restrictions by way of power cuts. By 1993-94, the gap between peak demand and supply reached an alarming proportion of 40% to 47%. There was tremendous pressure to commission the Ib Valley thermal units-1 & 2 (each of 210 MW) quickly, so that some relief could be available to the consumers of Orissa. Fortunately Unit – 1 (210 MW) of Ib Valley could be synchronized to Grid on 20.12.94 and the 2<sup>nd</sup> unit in 1996. By that time, the commissioning of Central Sector Power Stations under NTPC like Kaniha (2 x 500 MW), Kahalgaon Extension (2 x 210 MW), Farakaa Expansion (2 x 500 MW) got also delayed due to various reasons, for which Orissa could not avail its share from these Stations.

The political leadership then in Orissa could visualize the gravity of the situation and problems for the future. It had the conviction and political will to rescue the Power Sector of the State from the morass into which it was slowly and steadily sinking. In April 1992, Govt. of Orissa and OSEB agreed upon a Power Sector reform programme. Chief Minister of Orissa conveyed to the World Bank the State Government's commitment to reform the Power Sector in the State.

The programme envisaged substantial privatization and separation of the power Utilities from Govt. control. Between January'94 to January'95 a number of positive steps were taken like formation of a Steering Committee under the Chairmanship of the Chief Secretary and a Task Force under the Chairmanship of the Principal Secretary (Energy) to steer and guide the Power Sector reforms. Under the oversight of these Committees, the process of divisionalisation of OSEB into Generation, Transmission & Distribution Undertakings, was set in motion. In June 1995, the different Working Group's set up to study different aspects of the reforms finalized their recommendations and in November'95 the State Legislature passed the Orissa Electricity Reforms (OER) Act., 1995. On 3<sup>rd</sup> January 1996 the OER Act was assented to by the President of India. The OER Act envisaged the following measures :

- (i) **Restructuring** – unbundling generation, transmission & distribution. The rationale was that the requirements of Generation, Transmission and Distribution are quite different in terms of staff skills. In an integrated utility, there is constant movement in between. Generation, Transmission and Distribution in the name of “broadening experience”. But it defeats specialization which is the need.

- (ii) **Regulation** – a transparent and independent regulatory body to set tariffs and oversee the entire sector.
- (iii) **Competition** – competitive bidding for new generation, and later for transmission and distribution.
- (iv) **Privatization** – Private sector participation in Generation, Transmission & Distribution (It was aimed at distancing Governments from the Utilities and to attract private investment into the sector).
- (v) **Tariff** – Tariff reforms at bulk power transmission and retail level in such a manner that in a few years, tariffs will recover costs.

In July, 1996 Orissa Electricity Regulatory Commission was constituted. On 19.11.97 GRIDCO divided its distribution functions into four geographical zones viz. Western zone, North-Eastern Zone, Southern Zone and Central Zone. GRIDCO incorporated these four wholly owned subsidiaries viz. WESCO, NESCO, SOUTHCO and CESCO under the Companies Act, 1956. The assets and liabilities were assigned to these Companies with an equity base for each Company. A decision was taken at the Govt. level for privatization of the distribution system in the State through a joint sector/joint venture route, in which the proposed equity sharing will be as under :

Private Strategic Investors (PSI)	:	51%
GRIDCO	:	39%
Employees Trust	:	10%

Through a process of International Competitive Bidding, the Private Investors were selected and 51% equity was off-loaded to them on an over all additional value of 38.6%. There was no asset sale. The private companies because of their majority shareholding were responsible for day-to-day management of the Distribution Companies. They were issued retail supply licenses by the Regulatory Commission who had also the authority to regulate their functioning as per the provisions of OER Act, 1995. Three distribution Companies viz. WESCO, NESCO and SOUTHCO were taken over by M/s BSES of Mumbai from 01.04.99 and the CESCO was taken over by the AES of USA with effect from 01.09.99. The State Govt., which was paying a subsidy to the tune of Rs. 300 Crores per year by 31.03.96 during the OSEB time, did not pay any subsidy from 01.04.96 onwards after the split up of OSEB and creation of GRIDCO and OHPC.

The Central Govt. brought out Electricity Regulatory Act, 1998 which sought to distance the Govt. from functioning of SEBs and create independent Regulatory bodies at the Central and State level. The main objects of this Act were : Rationalization of electricity tariff, Transparency in policy formulations, promotion of efficient and environmentally benign policies and greater involvement of private sector.

However, the need was felt for a more forward looking Act removing various entry barriers in Generation, Transmission & Distribution and setting up of CPPs. On June 10, 2003, the New Central Electricity Act was enacted and came into force from that date. The Act repealed all the three Central Acts viz. Indian Electricity Act 1910, Supply Act 1948 and CERC Act 1998.

The Act seeks to establish a more competitive market in the power sector by removing restrictive barriers

- ❖ Steps taken to delicense the industry
- ❖ Takes into consideration social interest
- ❖ Provisions are made for protection of consumer interests by creating GRF and Ombudsman
- ❖ Encourage policies consistent with environmental friendly objective

### **THE SALIENT FEATURE OF THE ELECTRICITY ACT, 2003 ARE AS FOLLOWS**

The objectives of the Act are “to consolidate the laws relating to generation, transmission, distribution, trading and use of electricity and generally for taking measures conducive to development of electricity industry, promoting competition therein, protecting interest of consumers and supply of electricity to all areas, rationalization of electricity tariff, ensuring transparent policies regarding subsidies, promotion of efficient and environmentally benign policies, constitution of Central Electricity Authority, Regulatory Commissions and establishment of Appellate Tribunal and for matters connected therewith or incidental thereto.”

The Act strikes a balance taking into account the complex ground realities of the power sector in India with its intractable problems. The salient features of the Act are :

- (i) The Central Government to prepare a National Electricity Policy in consultation with State Governments. (Section - 3)
- (ii) Thrust to complete the rural electrification and provide for management of rural distribution by Panchayats, Cooperative societies, non-Government organization, franchisees etc. (Sections 4, 5 & 6)
- (iii) Provision for license free generation and distribution in the rural areas. (Section - 14)
- (iv) Generation being delicensed and captive generation being freely permitted. Hydro projects would, however, need clearance from the Central Electricity Authority. (Sections 7, 8 & 9)
- (v) Transmission Utility at the Central as well as State level, to be a Government company – with responsibility for planned and coordinated development of transmission network. (Sections 38 & 39)
- (vi) Provision for private licensees in transmission and entry in distribution through an independent network. (Section 14)
- (vii) Open access in transmission from the outset. (Sections 38-40)
- (viii) Open access in distribution to be introduced in phases with surcharge for current level of cross subsidy to be gradually phased out along with cross subsidies and obligation to supply. SERCs to frame regulations within one year regarding phasing of open access. (Section 42)
- (ix) Distribution licensees would be free to undertake generation and generation companies would be free to take up distribution business. (Sections 7 & 12)
- (x) The State Electricity Regulatory Commission is a mandatory requirement. (Section 82)

- (xi) Provisions for payment of subsidy through budget. (Section 65)
- (xii) Trading, as a distinct activity is being recognized with the safeguard of the Regulatory Commissions being authorized to fix ceilings on trading margins, if necessary. (Sections 12, 79 & 86)
- (xiii) Provision for reorganization or continuance of SEBs. (Sections 131 & 172)
- (xiv) Meeting of all electricity supplied made mandatory. (Section 55)
- (xv) An Appellate Tribunal to hear appeals against the decision of the CERC and SERCs. (Section 111)
- (xvi) Provisions relating to theft of electricity made more stringent (Section 135-150)
- (xvii) Provisions safeguarding consumer interests. (Sections 57-59 & 166) Ombudsman scheme (Section 42) for consumer's grievance redressal.

#### **VARIOUS CONCESSIONS/OPPORTUNITIES PROVIDED FOR INDUSTRIES UNDER THE SECTORAL REFORM SCENARIO**

- (i) During the reform process it has been acknowledged that the tariff structure is skewed. That means, that industries availing power supply at various voltages pay more than the cost of supply. Therefore one of the mandates before the state electricity regulating commissions is to bring down the element of cross subsidy now prevailing between different categories of consumers. In fact most of the state Electricity Regulating Commissions have been working in the direction to minimize/eliminate the extent of cross subsidy existing between different categories of consumers.
- (ii) The Electricity Act 2003 in Section – 9 authorizes a person including the industries who can set up captive power plants for their own use. They can also wheel this power to the destination of use through open access of the transmission lines. The norm for setting up a captive generating plant has also been relaxed. In a captive generating plant an industries or a group of industries can hold 26% of the equity share and must consume 50% of the power generating.
- (iii) An industry for that matter any consumer can choose its supplier of electricity. Even being located in one distribution company they can avail power from another distribution company by paying wheeling charges and cross subsidy sub-charge as per section – 42 (2) of the Electricity Act.
- (iv) National electricity policy envisages that transmission lines should be built and network expansion should be planned and implemented keeping in view the anticipated transmission needs. Prior agreement with the beneficiaries would not be a precondition for network expansion. CTU/STU should undertake network expansion after identifying the requirement in consultation with state holders and taking up the execution after due regulatory approvals.
- (v) Industries having co-generation plans get incentive by two ways. The distribution companies are required to purchase the power, so generated from the west heat with regulatory approvals. Secondly the industry can avail incentive through carbon trading under CDM provisions.

**IT WILL BE WORTHWHILE TO MENTION HERE THAT SUBSTANTIAL BENEFITS ACCRUED TO THE STATE GOVERNMENT AFTER RESTRUCTURING AND PRIVATIZATION OF DISTRIBUTION FUNCTIONS. THESE ARE AS FOLLOWS**

- (i) Previously state government was paying subsidy to the erstwhile OSEB. This amount was around 350 crores per annum and went on increasing year after year. It is estimated that the state government has saved around 4400 crores by 31.03.05 by way of not paying subsidy to the power sector.
- (ii) The state government received an amount of 603 crores by disinvesting 49% of the equity worth of Rs. 280 crores in OPGC. Each year the state government is getting around 75-80 crores towards dividend from this company right from the year 1999-2000
- (iii) State government received 159 crores by disinvesting 51% shares in the four distribution companies.
- (iv) Due to better billing and collection by the distribution companies, the electricity duty payable to the state government increased from 120 crores in 1995-96 to 350 crores by 2005-06.

These could be achieved only through the power sector reforms in the state.



**FORMERLY**

- ❖ Member, Orissa Electricity Regulatory Commission
- ❖ Chairman cum Managing Director, GRID Corporation of Orissa Ltd.
- ❖ Chairman, Eastern Regional Electricity Board (Now ERPC)
- ❖ Managing Director, Orissa Power Generation Corporation

# **ROLE OF POWER SECTOR REFORM IN FISCAL RESTRUCTURING IN ORISSA**

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## **BACKGROUND**

1. Orissa has been a pioneer state in India in embarking on a comprehensive reform of the electricity industry in the country. The aim of the reform has been to address the fundamental issues underlying the poor performance of the erstwhile Orissa State Electricity Board (OSEB) and restructure the power sector so as to improve its efficiency on technical and financial parameters.
  - ❖ On technical side the core objectives centre on improvement in quality of power supply position which could be achieved by monitoring certain key parameters like providing electricity connections in time, reducing interruption in supply of electricity particularly, in rural areas, improving voltage and frequency of supply and further extending rural electrification network etc.
  - ❖ Rationalization of consumers tariff structure based on cost of supply of electricity and achieving financial viability of the newly constituents have been the main objectives on the financial side.
  - ❖ While redesigning tariff, extreme care has been taken to safeguard consumers' interest while providing a good reasonable return to attract private capital into the sector.
  - ❖ The ultimate objective of the power sector reform has been to make power supply available to all those who need it at reasonable and affordable prices so that state's developmental needs can be met on sustainable basis. Thus, the reform objectives can be summarized as following :-
    - (i) Increase operational efficiency by functional unbundling the sector into generation, transmission and distribution,
    - (ii) Bring accountability to improve performance,
    - (iii) Attract private sector capital to meet the financial gaps in the sector,
    - (iv) Rationalize tariff structure
    - (v) Establish an independent and transparent regulatory regime.

## **LEGISLATIVE BACK-UP**

2. Accordingly to achieve the above mentioned objectives a new legislation, namely, the Orissa Electricity Reform (OER) Act, 1995 (Orissa Act 2 of 1996) was enacted for the purpose of restructuring of the electricity industry. This Act came into force w.e.f. 1.4.1996. The OER Act, 1995, contains several fundamental building blocks, namely, restructuring and corporatisation of the vertically integrated Orissa State Electricity Board (OSEB), unbundling of functions of generation,

distribution and transmission to be managed by separate entities. Subsequently, Govt. of India have enacted the Electricity Act, 2003 modelled on the provisions of the OER Act, 1995 and this Act has come into force w.e.f. 10.6.2003.

3. In pursuance to the provisions of the OER Act, 1995, following steps were taken:-
- (a) OSEB was restructured and corporatised into Grid Corporation of Orissa and Orissa Hydro Power Corporation w.e.f. 1.4.1996.
  - (b) Orissa Electricity Regulatory Commission (OERC) was established in April 1996 and became functional from 1.8.1996.
  - (c) Orissa Power Generation Corporation Limited (OPGC) was privatized with disinvestment of 49% stake and management control was transferred to a private sector company, viz. M/S AES, in January 1999.

## **2<sup>ND</sup> PHASE OF REFORM**

4. The 2<sup>nd</sup> phase of reform envisaged private sector participation in the distribution segment. Pursuant to Orissa Electricity Reform (Transfer of Assets, Liabilities, Proceedings and Personnel of GRIDCO to Distribution Companies) Rules, 1998, the Govt. of Orissa transferred the distribution assets and properties along with personnel of GRIDCO to four distribution companies w.e.f. 26.11.1998. These distribution companies namely, CESCO, NESCO, WESCO and SOUTHCO continued to function as affiliates of GRIDCO up to 31.3.1999 and thereafter functioned under distribution and retail supply license granted by OERC. The management of NESCO, CESCO and SOUTHCO was handed over to the erstwhile BSES (now Reliance Energy) w.e.f. 1.4.1999 pursuant to the agreement signed on 31.3.1999, GRIDCO disinvested 51% of its share held in CESCO in favour of the consortium led by the AES Corporation, USA, after obtaining approval of the State Govt. The management of CESCO was handed over to AES from 1.9.1999 and after AES left, the CESCO has been renamed as CESU being managed by a Management Board constituted by OERC as per Section 22 of the Electricity Act, 2003.

- ❖ The proceeds of disinvestment of 51% share in four distribution companies which fetched Rs.159.00 crore were utilized to meet the liabilities of GRIDCO towards outstanding power purchase bills and other liabilities to NTPC and others.
- ❖ Separation of unbundling have been completed after a new public limited company under the name and style Orissa Power Transmission Corporation Limited (OPTCL) was incorporated w.e.f. 29.9.2004 to carry out all the business of transmission , STU and SLDC functions of GRIDCO. The new company OPTCL obtained certificate on 31.3.2004 to commence business which entitles the company to carry on business. On 1.4.2005, OPTCL became functional. GRIDCO continue to carry out its bulk supply and trading functions.

## **EFFECT OF POWER SECTOR REFORMS ON THE STATE FINANCES**

5. Under the provision of the erstwhile Electricity (Supply) Act, 1948, the State had to ensure 3% Rate of Return (ROR) on net fixed assets. The erstwhile OSEB was not able to achieve the same and accordingly state govt. was required to provide subsidy from its budget to ensure 3% return as

envisaged. The average annual subsidy was of the arrear of Rs.200 crore. The subsidy burden on the State Govt. increased from Rs.14. crore in 1989-90 to Rs.257.62 crore in 1995-96 (the last year of OSEB). If the power sector reform would not have been implemented, the state govt. budget would have been burdened with an ever increasing subsidy of more than Rs.250 crore per annum.

- ❖ Although OSEB was incurring heavy losses, huge investments were necessary for creation of additional generating capacity to bridge the demand-supply gap. The State Government was not in a position to provide the requisite resources to meet the current as well as future demands of the power sector in the State.
- ❖ In January, 1999, 49% share capital of OPGC with 420 MW thermal generation capacity having face value of Rs.240.21 crore was sold to AES along with management control at a cost of Rs.603.20 crore.
- ❖ Talcher Thermal Power Plant (TTPs) with an installed capacity of 460 MW was sold to NTPC in 1995 which fetched a sum of Rs.356 crore out of which outstanding dues of NTPC for Rs.249.00 crore was adjusted, arrear liabilities of employees for Rs.7 crore was paid and Rs.100.00 was paid to State Govt.
- ❖ The entire generation has been dedicated to the state after sale of 49% of share in OPGC and sale of TTPS to NTPC. More power is available at a reasonable price to electricity consumers in the state.
- ❖ The Plant Load Factor (PLF) of TTPS before taken over by NTPC was less than 35% but the PLF has increased to about 87%. Similarly, OPGC is operating with a PLF of more than 85% (in FY 2006-07 PLF was 90.18%).
- ❖ Besides, utilizing its disinvestment proceeds of OPGC, sale proceeds of TTPS, disinvestment proceeds of four distribution companies, State Govt. have in the meantime got a dividend of Rs. 561.27 crore from OPGC from 1995-96 to 2005-06 (No yet declared for 2006-07). In addition to the payment of dividend, OPGC have paid Rs.16.09 crore to the State govt. towards guarantee Commission during the period 1995-96 to 2006-07, interest amounting to Rs.55.03 crore on loan during the period 1995-96 and 1998-99. Further, OPGC have also paid Electricity Duty amounting to Rs.41.21 crore during the period 1995-96 to 2006-07. Thus, total payment by OPGC to State Govt. from 1995-96 to 2006-07 comes to Rs.673.61 crore including the dividend of Rs.561.27 crore.
- ❖ Similarly, OHPC have also paid Rs.81.32 crore to the State govt. towards interest (Rs.41.41 crore), repayment of principal (Rs.19.00 crore APDP loan) and guarantee commission (Rs.20.91 crore including Rs.7.05 crore in 07-08).
- ❖ GRIDCO has paid Rs.464.97 crore to State Govt. from 1998-99 to 2006-07 towards principal (Rs.329.33 crore), interest, (Rs.108.87 crore) and guarantee commission fees (Rs.26.77). GRIDCO has also reduced its losses and have earned cash profit of Rs.517.00 crore in FY 2003-04, and Rs.454 crore in FY 2004-05, and Rs.26.00 crore in FY 2005-06 and Rs.200 crore (provisional) in 2006-07.

- ❖ The payments made to State Govt., by OPGC, OHPC and GRIDCO from 1996-97 to 2006-07 comes to Rs.1171.64 crore excluding Rs.2160.35 crore paid towards Electricity Duty and Rs.7.05 crore Guarantee Commission paid by OHPC in 2007-08, the details of which are given below:-

Items	[Payments made from 1995-96 to 2006-07 by] (Rs. In Cr.)			
	OPGC	OHPC*	GRIDCO	Total
Dividend	561.27	-	-	561.27
Interest	55.03	41.41	108.87	205.31
Guarantee Commission	16.09	13.87	26.77	56.73
Repayment of Principal	-	19.00	329.33	348.33
Total	632.39**	74.28	464.97	1171.64
Electricity Duty	—	—	—	2160.35

\* OHPC has paid Rs.7.05 crore Guarantee fees in 2007-08

\*\* Excludes Electricity Duty paid Rs.41.21 crore upto 2006-07

- ❖ In addition to direct payment to the state exchequer as indicated above, Govt. of Orissa has benefited by Rs.2000 crore by up valuation of GRIDCO (Rs.1194.00) and OHPC (Rs.812.00 crore) assets and viewed from that angle the financial savings of the state govt. would worked out to Rs.6179.27 excluding the payment of electricity duty, guaranteed Commission, interest payment and payment of principal. These are indicated below:-

- (i) Sale proceed of TTPs to NTPC - Rs.356 Crore  
(out of which 100 crore was paid to the State Govt. and Rs.256 crores was retained by OSEB to pay the dues of NTPC towards the cost of power purchase bills and to meet the liabilities of the employees).
- (ii) 49% equity disinvestment in OPGC to AES - Rs.603 crore (deposited to State govt. account)
- (iii) 51% equity divestment in four - Rs. 159 crore (retained by GRIDCO to meet its distribution companies to the private sector various obligations)
- (iv) Savings in subsidy support - Rs.2500 cr (@ Rs.250 cr. p.a from the State budget from 1996-97 to 2006-07.
- (v) Dividend paid by OPGC to - Rs.561.27 crore  
State Govt. from 1996-97 to 2005-06 (dividend for 2006-07 not yet declared)
- Total - Rs.4179.27
- Up valuation of assets of GRIDCO and OHPC - Rs.2000.00
- Total - Rs.6179.27 crore**

- ❖ Electricity Duty paid was Rs.121.35 crore in 1995-96 and this has increased to Rs.282.58 crore in 2006-07. Total contribution of Electricity Duty from 1995-96 to 2006-07 is Rs.2160.35 crore to the State exchequer.
- ❖ Though the distribution sector is incurring loss there is profit in generation and transmission. Hence, the sector as a whole has made substantial contribution to the State Finances.

## GOVT. SUPPORT

6. Govt. have also supported GRIDCO and OHPC on various ways. These are summarized below:-

- ❖ Equity support of Rs.793.00 crore has been provided by the State govt. out of which Rs.493 crore relates to GRIDCO and Rs.300 crore relates to OHPC.
- ❖ State govt. have provided maximum guarantee for Rs. 4281.60 crore to power utilities up to 2006-07 out of which guaranteed amount outstanding as on 31.3.2007 is Rs.1605.77 crore. (GRIDCO – Rs.1351.14 Crore, OHPC Rs.254.63 Crore). Rs.1605.77 crore Guarantee as on 31.3.2007 relating to GRIDCO also includes Rs.105.00 crore NTPC Power Bond (out of Rs.343.00 crore as on 1.10.2001).
- ❖ State govt. have provided loan of Rs.704 crore out of which Rs.180 crore relates to GRIDCO and Rs.524 relates to OHPC.
- ❖ State govt. have issued bonds to the extent of Rs.1102.87 crore to NTPC towards power purchase cost of GRIDCO on back to back arrangements and GRIDCO has so far not defaulted in paying the interest along with principal to the state govt. in respect of this bond being serviced by State Govt.
- ❖ Because of the default of the then erstwhile OSEB and subsequently GRIDCO in paying the dues of NTPC, PFC etc. Central govt. had deducted State Plan Assistance from the entitlements of the state govt. and so far a sum of Rs.214.18 is outstanding with GRIDCO for payment to the state govt. on this account.
- ❖ The four distribution companies are yet to pay to State Govt. the World Bank loan, interest on World Bank loan and interest on APDRP loan.

7. Govt. of Orissa had constituted a Committee of Independent Experts under the Chairmanship of Shri Sovan Kanungo, IAS(Retd.) to review the Orissa Power Sector Reform in Orissa. The said Committee submitted its report to the state govt. on 2.11.2001 and on receipt of the Kanungo's report, Govt. of Orissa in its notification No.1068/E/29.1.2003 have decided as under:-

- (i) The effect of up-valuation of assets of OHPC and GRIDCO indicated in Notification No.5210 dated 01.4.1996 and No.5207 dated 1.4.1996 would be kept in abeyance from the FY 2001-02 prospectively till FY 2005-06 or the sector turns around whichever is earlier to avoid re-determination of tariff for past years and also re-determination of assets of various DISTCOs. For this purpose depreciation would be calculated at pre 1992 norms notified by Govt. of India.
- (ii) Moratorium on debt servicing by GRIDCO and OHPC to the State Govt. would be allowed

from the FY 2001-02 till 2005-06 except the amount in respect of loan from the World Bank to the extent the State Government required to pay to the Government of India.

(iii) GRIDCO and OHPC shall not be entitled to any Return of Equity (ROE) till the sector become viable on cash basis or 2005-06 whichever is earlier.

8. Though the State Govt. had allowed to keep the up valuation of assets under hold and allowed moratorium on debt servicing till 2005-06, Orissa Electricity Regulatory Commission have assumed the extension of these financial benefits by the State govt. beyond 2005-06 and accordingly determined the tariff. By keeping up valuation of assets in abeyance and allowing moratorium on debt servicing by OHPC and GRIDCO beyond 2005-06, the Commission has deferred an amount Rs.462.48 crore for 2006-07 and its effect on tariff rise has been estimated 48 paise per unit. Similarly, for 2007-08 the financial effect has been determined at Rs.457.49 core for 2007-08 and its tariff impact is 38 paise per unit. The effect of keeping up valuation under hold and extending the deferment of the debt servicing liabilities beyond 2005-06, **Commission has reduced the tariff hike by 48 paise for 2006-07 and 38 paise on the average for FY 2007-08.** The year wise revaluation impact and deferment of debt servicing liabilities by GRIDCO and OHPC has been tentatively estimated which is indicated below:-

Year	Additional Financial Impact on tariff (Rs. In Crore)
2006-07	462.48
2007-08	457.49
2008-09	452.50
2009-10	447.52
2010-11	442.53
2011-12	437.54
2012-13	432.55

#### IMPACT OF POWER SECTOR REFORM ON FISCAL PARAMETERS

9. In the pre-reform period the State Govt. was providing budgetary support to the power sector in the shape of subsidy, loan capital and also equity investment. From 1996-97 budgetary support for power sector has been totally withdrawn. Over and above, lessening of the burden on state budget by way of withdrawal of budgetary support, the state has got revenue from the power sector in shape of dividend, interest payment and electricity duty. The Electricity Duty paid in 1995-96 was Rs.121.35 crore and this has increased to Rs.353.13 croe in FY 2005-06 but slightly reduced to Rs.282.58 crore in FY 2006-07. The payment of dividend, electricity duty along with revenue from other sources has actually helped in reducing the revenue deficit and fiscal deficit. There was a

revenue deficit of Rs.807.10 crore in 1995-96 which had increased to Rs.2833.74 in FY 2001-02. Now the revenue deficit have been wiped out and the state govt. has got a revenue surplus of Rs.481.20 crore in FY 2005-06 and this has increased to Rs.2260.60 crore in FY 2006-07. Fiscal deficit has also been reduced from Rs.2836.44 core in FY 1999-00 to Rs.276.47 crore in FY 2005-06. There has been a fiscal surplus of Rs.823.17 crore in FY 2006-07. This has also helped in reduction of net borrowing on year to year basis. While net loan incurred during the year 1999-00 was about Rs.3350 crore, this has reduced to Rs.2406 in FY 2005-06 and Rs.793.06 crore in FY 2006-07. On the other hand the reduction of revenue deficit and fiscal deficit has helped in increase of the capital expenditure. The expenditure on capital outlay has increased from about Rs.447.00 crore in 1995-96 to about Rs.1038.00 crore in FY 2005-06 and Rs.1451.00 crore in FY 2006-07. As per the budget estimate of FY 2007-08 the capital outlay has been projected at Rs.1914.00 crore. Various expenditures natinationalisation measures, revenue generation measures, debt restructuring coupled with power sector reform have helped in fiscal turn around of the state. It needs special emphasis that it is the power sector which is the pace setter of a comprehensive fiscal reform in the state. **Therefore, it can be safely said that if power sector would not have been taken up in 1996 perhaps it would have been difficult to see the turn around of the state finances.**

10. Though power sector reform is the pace setters of inclusive reform in state, it still remains the area of concern for all the stake holders. High T&D losses, AT&C Losses and high incidence of power theft are the areas of serious concern for the power sector as a whole. The overall distribution losses still continue to be as high as 38.6% in FY 2006-07 compared to all states average of 31%. Similarly, AT&C losses continue to be as high as 42.7% in FY 2006-07 against all states average of 35.4% and around 30% in West Bengal and Andhra Pradesh. It has been estimated that 1% improvement in T&D loss would yield additional resource of 43 crore. Unless there is sustainable improvement of reduction in the AT&C losses it would be extremely difficult for the power sector to turn around. Unless power sector becomes vibrant and viable the state economy would not grow at the desired rate. It is pertinent to mention here that contribution of electricity to Gross State Domestic Products (GSD) constitutes around 3.5%. Already 13 independent power producers have signed MOUs with Govt. of Orissa to develop thermal power plant in Orissa. The estimated project cost is Rs.68299 crore with a projected capacity of 16190 MW. As per the agreement 25% of the share of the estimated capacity which works out 4047.50 MW is to be sold to Orissa. Similarly 12 upcoming industries have proposed to establish captive power plants with a total capacity of 3650 MW. Already 20 industries have got captive power plants with an installed capacity of 2260.188 MW. **The state finances would benefit from the projected generation from different sources only if there is substantial improvement in the reduction of AT&C loss and substantial reduction in the incidence of theft of electricity.**

## **PRIVATE INVESTMENT IN POWER SECTOR AND ITS EFFECT ON THE STATE ECONOMY.**

11. The power sector reform has attracted private investment in the sector but state does not get the full benefit from such investment. In this connection, important factor that needs consideration is the necessity for amendment of the current constitutional arrangement. The setting up of large power plants has huge costs associated with land, water and environmental degradation, as well as rehabilitation and degradation of infrastructure like road and rail. The power industry has very low employment potential. While the State where power is generated does not get any revenue, the state where it is consumed gets an advantage of about Rs.500 crores per annum, which includes a direct revenue stream of at least Rs.150 cores per annum for every 1,000 megawatt of power plants set up outside its own borders.
12. The current constitutional arrangements prohibit the states from levying any duty or tax on generation of electricity which is recognised as 'goods' in the eye of Law. In the absence of any specific provision for levy of duty or any other form of tax by the state governments in the Electricity Act, 2003, this cannot be imposed by any state government through a state legislation. This has created a difficult situation for the states, where capacity addition in generation of electricity is primarily taking place for the purpose of sale outside its boundaries, as these states are not in a position to levy any tax or duty on such inter-state sale. The current arrangement thus does not in any way benefit the States where generation takes place. Power-flows to other States who gain not only from the supply of power and consequential increased economic activities but also from electricity duty levied. Increasingly generation will take place at pit-heads and in States where the coal or hydro resources are available. Such generation has enormous costs to the host States by way of environmental degradation. The impact is rather severe despite mitigation and other management measures undertaken by the Mining and Generating companies. Methods must be devised, both fiscal and otherwise in compensating such states who are generally poor and underdeveloped, so that their people and region can also share the fruits of development resulting from the generation and supply of power far beyond their borders.
13. Non-discriminatory open access in transmission is a mandate of the Electricity Act, 2003. This is certainly desirable and necessary for the efficient choice of locating generating capacity and reducing the cost of supply. However, such location and extraction of coal or submergence of land and forests have huge costs and associated environmental impacts. Such an impact on the lives and livelihoods of the people of such region need necessarily to be borne in mind and appropriately protected and mitigated. Secondly, given the severe deficit of power in other parts of India, open access should not result in all power flowing to the areas of deficit and at prices which they are willing to pay. The needs and demands of the local areas at regulated tariffs also need to be kept in view. Development and growth needs to be equitable and inclusive. While we are conscious of the needs of the nation as a whole and are willing to participate and contribute in all its development,

our backwardness and underdevelopments should not be lost sight of. The developed and developing states must march together as equal partners in the road to prosperity and growth.

14. To conclude, the power sector reform has helped the State finances turn around but full benefit would accrue only after necessary amendment is made regarding the point of levy of Electricity Duty and the distribution segment of the power industry really become efficient and solvent. Govt. have to play an effective facilitating role for turning around the power sector. Transitional financial support is needed for investment in speedy operation and maintenance work. Besides this, theft control requires pro-active involvement of State Govt. which needs to recognize the menace as the single most reason for the sickness of the industries which in turn leads to fragile economic structure. Wherever theft control was given the highest priority by top leadership of states, there has been significant turnout of the utilities. Govt. should establish separate Energy Police Stations and Special Courts for speedy disposal of electricity theft cases in all the 30 districts. Govt. of Orissa should play a very pro-active role to ensure effective functioning of Energy Police Station and Special Courts. Under the circumstances, the Regulatory Commission need to strike the right balance between the requirement of commercial viability of distribution licensees, consumers' interest and the overall developmental need of the state which has to play a dominant role in ensuring good governance, particularly in the matter of control of theft of Electricity.



❖ *Views and opinions wherever expressed are those of the author but not of OERC.*

**Ref: Various documents of Govt. of Orissa and Utilities, Study on Impact of Restructuring of SEBs by IIPA etc.**

# **OPGC – RISING TO NEW HEIGHTS**

**Paramita Tripathy, IRS**  
Director (Finance), OPGC

## **INTRODUCTION**

The Government of Orissa incorporated the Orissa Power Generation Corporation Limited (OPGC) on November 14, 1984 as a fully owned corporation. Accordingly, OPGC set up two units of 210 MW each under Phase I of Ib Thermal Power Station (ITPS) in the Ib valley area. Unit 1 was commissioned on December 21, 1994 and Unit 2 on June 20, 1996. The total project cost for Phase I was Rs. 11,350 million.

## **POWER SECTOR REFORMS**

Orissa's power sector reforms is first in India and taking the lead in this restructuring process, the government of Orissa divested 49 per cent of its equity in the project in 1999 through an international competitive bidding process. The stake was picked up by AES Corporation, USA for Rs. 6.03 billion. The management affairs of OPGC vests in the Board of Directors comprising six Directors with equal number of nominees from both the shareholders. Principal Secretary (Energy), Government of Orissa, is the ex-officio Chairman of OPGC. The business affairs of the company are managed by the Managing Director, Director (Finance) and Director (Operations)

## **EXISTING PLANT**

Ib Thermal Power Station (ITPS) is located on the bank of Hirakud reservoir at Banharpali in Jharsuguda district of Orissa. The project has been built over an area of around 1,866 acres leased from the Government of Orissa on a 99-year lease with annual rent and cess.

Phase I of the project consists of two units of 210 MW each. The steam generators (CE Design) and turbine generators (Kraftwerk Union Design) for both the units were supplied by BHEL. Coal is supplied by Mahanadi Coalfields Limited (MCL) from the Lakhanpur open cast mines of Ib Valley under a long term coal linkage of 2.4 MTPA available for the project. Coal is transported to the plant by a MGR system. Water is drawn from the Hirakud reservoir through a 5.45 km intake canal. The raw water requirement is 1250 m<sup>3</sup>/hr after implementation of ash water recovery system for the existing units. Power generated by ITPS is evacuated through two 220 KV double circuit line up to Budipadar (at Brajrajnagar).

OPGC has a Power Purchase Agreement with GRIDCO for the sale of entire power generated by the existing units. Payments from GRIDCO are regulated through monthly revolving LC for Rs 340 million, which is again backed by an escrow account opened with the LC banker. The project has been making profits from its inception and has been paying dividends.

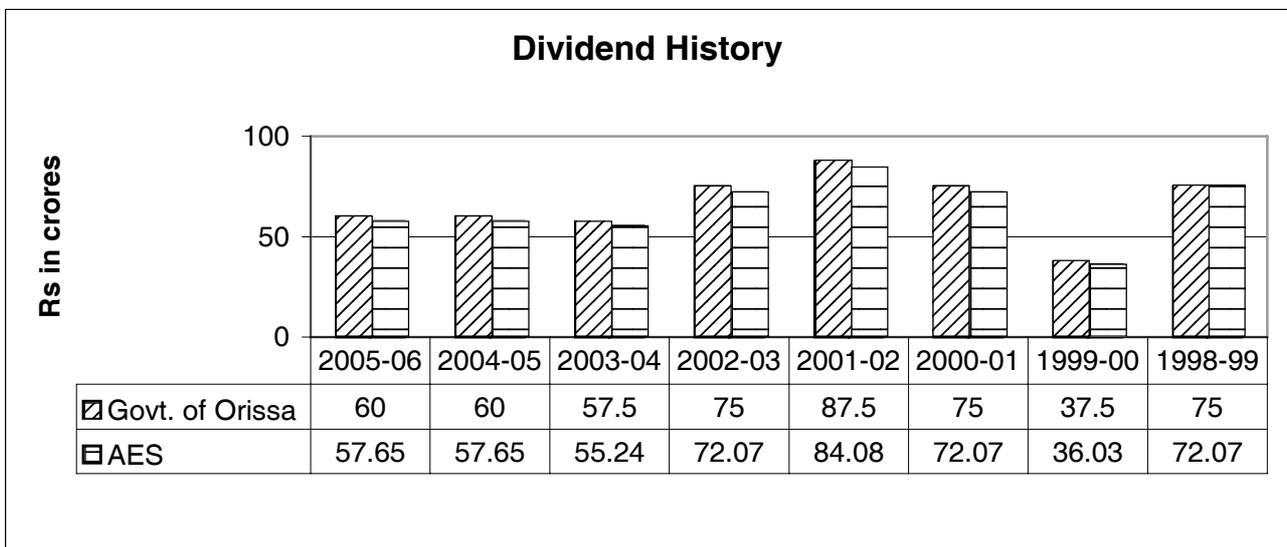
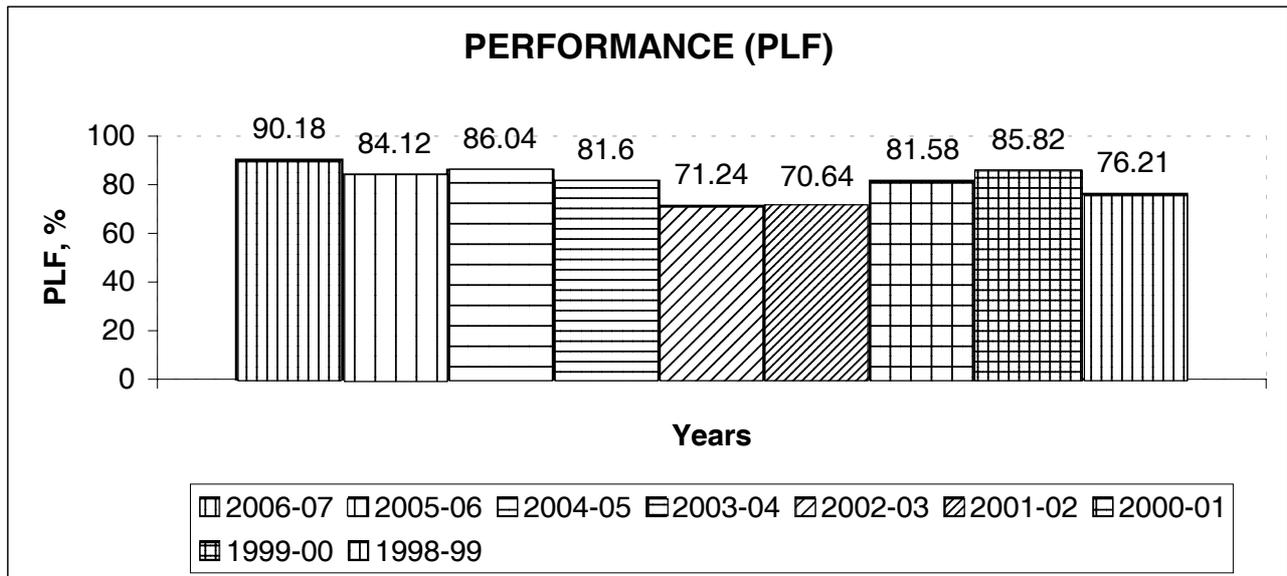
## **ENVIRONMENT AND RENEWABLE ENERGY**

OPGC has also undertaken the construction of seven mini hydel stations having a total capacity of 5,075 kW as a technological demonstration. Mini hydel projects with a capacity of 1,150 KW were commissioned in January and February 1994. A one-ton biogas plant using kitchen wastes and crop residues has been

installed in ITPS as a demonstration project to promote renewable energy. Commissioning of 100 % ash water recycling system and installation of a mini ash brick plant in ITPS exhibits OPGC's concern and commitment for environment.

**PERFORMANCE**

It is commendable to note that ITPS has consistently improved its PLF from 76.21% in 1998-99 to 90% in 2006-07. Both the units have been operating at high availability factor.



**AWARDS AND RECOGNITIONS**

OPGC has received many awards and distinctions for plant performance, effective pollution control measures and better safety performance. For outstanding achievement in environment management ITPS has been selected for Greentech Environmental Excellence Gold Award in Thermal Power Sector for the year 2003-04, 2004-05 and 2005-06. ITPS has been certified with ISO 14001, OSHAS 18001 and also received inter alia State Best Safety Award in 2006 from Directorate of Factories and Boilers, Govt. of Orissa.

## **FUTURE GROWTH**

Considering the multidimensional opportunities in energy sector OPGC has already initiated capacity addition to the existing project. As an expansion project it has the advantages of having existing facilities and infrastructure available in the project site. This along with the fact that the company has successful operational experience makes the expansion plan a highly attractive proposition. OPGC has highly talented, skilled and motivated workforce to meet present requirements and take up future challenges of expansion.

Substantial progress has been made in conceptualization and formulation of key project features like appointment of consultants etc for capacity addition of around 1000 MW to 1200 MW.

## **COAL MINE**

A significant milestone in the successful roadmap of OPGC is allotment of a 532 million MT captive coal block in favour of OPGC in the Manoharpur area in Sundergarh district. This captive mine shall ensure coal security for the expansion units and enable to generate power at a highly competitive rate.

## **SAFETY**

Safety of the people and the plant has been the top priority and OPGC has emerged as a leader in the field of industrial safety. Constant efforts are being made to achieve improvement in safety by means of training, counseling, auditing, reporting incidents & near misses and investing the same. ITPS is one of the Power plants where the use of Personal Protective Equipments is mandatory for the visitors too. ITPS has been operating with exemplary Safety Record by achieving over 1200 Lost Time Accident Free days since 03.02.2004 (as on June'07). OPGC has been awarded Greentech Safety Gold Award in Power Sector for the year 2004-05.

## **SOCIAL RESPONSIBILITY**

OPGC is committed to provide clean, affordable and reliable power to the state of Orissa and has the highest commitments towards Safety, Health and Environment. OPGC provides excellent healthcare facility to its people as well as people of its surrounding localities through well-equipped hospital and specialized doctors. Apart from natural greenery inside plant, 1,90,690 numbers of plants of different species have been added through new plantation. OPGC is as much concerned for the development of the surroundings of the power plant as for generation of electricity. As a part of its social responsibility OPGC has always taken a lead in peripheral development and implemented several projects in plant periphery for providing the neighbouring villages with drinking water, education, roads, electricity infrastructure, small irrigation, healthcare etc.

OPGC with its motivated work force and top management commitment for continual improvement strives to be one of the world-class power utilities in India with a clear focus on Safety, Health, Environment and peripheral development.



# **NOTES ON THE NEW INDUSTRIAL POLICY RESOLUTION-2007**

**Hemant Sharma, IAS**  
Director of Industries, Orissa

## **HOW IT IS IMPORTANT OVER THE PREVIOUS INDUSTRIAL POLICY AND COMPARE WITH INDUSTRIAL POLICIES OF OTHER STATES.**

1. The Industrial Policy Resolution (IPR) of Orissa 2001 has put in place a robust policy frame work for industrial promotion and investment facilitation in the State including creation of an enabling environment. The Industrial Policy Resolution 2007 aims at reinforcing and further expanding this process.
2. IPR-2007 has been formulated after going through an elaborate iterative process wherein all stake holders including Industry Associations, Sector Specific Associations, Chambers of Commerce & Industry Exports and Departments concerned have been consulted and their suggestions have been duly considered. While providing financial incentives the Industrial Policy of other neighbouring States have been compared and the best facilities provided.
3. Any policy is as good as its implementation mechanism. Accordingly, institutional arrangements for industrial promotion and investment facilitation at various events have been further strengthened, which include District Industries Centre(DIC) as the District Level Nodal Agency(DLNA), Industrial Promotion and Investment Corporation of Orissa Limited (IPICOL) as the State Level Nodal Agency(SLNA) and Team Orissa as the Common Focal Point for extending single window services to investors. At the helm the High Level Clearance Authority (SLSWCA) chaired by the Chief Secretary shall provide the overall direction and guidance.
4. **SINGLE WINDOW MECHANISM**
  - 4.1 Single Window Mechanism that has been established in pursuance with the Orissa Industries (Facilitation) Act have been made fully operational and extended throughout the State.
  - 4.2 The District Industries Centre (DICs) shall be suitably restructured to enable them to effectively discharge the functions of DLNA. They shall also maintain a comprehensive database on micro and small enterprises.
5. "Team Orissa" shall mean the broad institutional frame work of the Government that is engaged in industrial facilitation and investment promotion in all key areas of economic growth. The Chief Minister is the Captain of Team Orissa and the principal goal of the Team is to provide necessary synergies and convergence of all Government efforts to ensure Orissa's position at the vanguard of economic and social prosperity
6. **THRUST SECTOR**
  - 6.1 To facilitate the direct investment into sectors that offer huge employment opportunities, maximize value addition and have a multiplier effect in terms of ancillary and down stream linkages.

6.2 To provide tailor made incentive packages and provide additional incentive for the pioneer industries in these sectors.

**7. FILM INDUSTRY**

7.1 Film industry in Orissa provides direct and indirect employment to about 1.00 lakh people. In Orissa, the employment opportunities in film industry can be doubled by improving market outreach of Oriya Films through appropriate incentives for film production, film studios and multiplexes.

7.2 All Oriya feature films produced in Orissa shall be exempted from Entertainment Tax.

7.3 Multiplexes shall be eligible to get allotment of Government/IDCO; land at concessional industrial rate.

**8. SHIPLA ADALAT**

With a view to provide a timely and effective dispute/grievance resolution mechanism for industries, the State Government shall constitute a Shipla Adalat which shall meet every month and near the grievances/complaints of investors and make its recommendation to the appropriate authority/authorities for consideration and redressal of the grievances.

**II. IPR-2007 AND POWER SECTOR**

9. Orissa has also emerged as a national hub for thermal power with a proposed capacity installation of over 20,000 MW in the medium term involving investment of over Rs.80,000 crore. The State is therefore poised to leverage the availability of low cost and reliable power to attract further investments.

10. New Industrial Unit other than Thrust Sector Industries shall be exempted from the payment of electricity duty up to a contract demand of 110 KVA for a period of 5 years from the date of availing power supply for commercial production. New Industrial Unit in the thrust sector shall be entitled to 100% exemption of electricity duty up to a contract demand of Five Megawatt for a period of 5 years from the date of availing power supply for commercial production.



## **ORISSA – THE EMERGING JEWEL**

**Ashok Kumar Meena, IAS  
Subhra Ranjan Mishra**

The State of Orissa aims to usher in balanced socio-economic growth in the State through industrialisation, sustainable harnessing of natural resources and maximizing the employment potential of the local workforce. Industrialisation is viewed as a platform to commence the process of inclusive and sustainable growth. The goals are to eradicate poverty, generate employment and promote entrepreneurship to ensure enhanced quality of life for the populace. As part of this vision, in the year 2001, the Government announced the Industrial Policy Resolution (IPR) that marked new paradigms for industrial growth, such as provision of enabling environment; private investment led growth; and focus on sectors to benefit poor (examples - tourism, forestry, fisheries, horticulture, etc) and modern manufacturing & services sector. The State has a vision of creating a business climate conducive to accelerating investment in industry and infrastructure projects; raising income, employment & economic growth; and reducing regional disparities in economic development.

The broad institutional framework of the Government that is engaged in industrial facilitation and investment promotion in all key areas of economic growth, operates under the banner of “Team Orissa”. The Chief Minister is the captain of Team Orissa and the principal goal of the Team is to provide necessary synergies and convergence of all Government efforts to ensure Orissa’s position at the vanguard of economic and social prosperity. The Orissa Industries (Facilitation) Act 2004 has been enacted to provide single-window clearances so as to reduce transaction costs and times for investors. The High Level Authority chaired by the Chief Minister and State Level Authority chaired by Chief Secretary have been constituted to evaluate investment proposals and accord clearances. Industrial Promotion and Investment Corporation of Orissa Limited (IPICOL) and Orissa Industrial Infrastructure Development Corporation (IDCO) have been entrusted with multi-faceted roles of investor support. At the District level, the General Managers of District Industries Centres (DIC) have similar roles. Grievance redressal for industries is being managed at the highest levels in Team Orissa.



*Team Orissa consisting of Government and Corporate officials at Hannover Industrial Fair in April 2006*

The State initiated active investment promotion initiatives in reaching out to the private sector with concrete investment potential in sectors such as mineral value addition, power generation, cement, agro-processing, IT/ITES, etc. The strategy to realise the mining sector's development goals is multi-pronged and focuses on value addition; strong Government support for setting plants; monitoring of MoU milestones and stress on environment management. Through conscious policy levers, it has been possible to rightly leverage the natural resources and mineral wealth, thereby focusing upon stepwise value-addition and moving up the modern industrial manufacturing value chain. In addition, a critical component of the Government's strategy has been investment portfolio diversification. There are continual attempts to boost growth and capital formation in core areas of economic growth, like agro & food processing, tourism, fisheries & animal resources, information technology, biotechnology, pharmaceuticals, etc. The forward looking changes brought about to the policy environment pertaining to these sectors and the diverse triggers by the State Government to jumpstart sectoral growth have become case studies for other States. Today, Orissa is poised to be the mining, metals and manufacturing hub of the country with substantive addition of energy generation capacity. The State is in the steps of adding in excess of 70 million tonnes per annum (mtpa) capacity in steel making, 4 mtpa in alumina refining, 15 mtpa capacity in petrochemical refining, 13000 MWs in power generation and 7 mtpa in cement manufacture, with a direct employment forecast of 1,60,000 manpower and spawning the growth of indirect employment of multiple magnitudes. POSCO, Tata Steel, Arcelor Mittal, Jindal Stainless, Bhusan Steel, ESSAR, Indian Oil, Vedanta, Hindalco, Grasim, CESC, GMR Energy are among the blue-chip companies with investments lined up in Orissa. Of the MoUs signed, 25 iron & steel projects have gone into commercial production with more than Rs. 25,000 crores investment and direct & indirect employment opportunity to around 35,000 persons. Capacity addition has been to the tune of 3.57 mtpa in sponge iron, 0.45 mtpa in pig iron, 1.84 mtpa in steel. The projects have contributed Rs. 272.90 crore to the State and Rs. 613.30 crore to the Central exchequer as tax revenue till March 2007.

The position of Orissa in the emerging steel scenario of India and southeast Asia becomes one of critical importance. The Morgan Stanley Global Economic Forum 2005 report forecasts that Orissa shall emerge as a centre for metals business in India and attract investments up to US\$ 30–40 billion over the next 5 years. But, the State has already received investment proposals that would create steel making capacities in excess of 70 mtpa entailing an investment of US\$ 45 billion. Why so? The mere availability of mineral resources is not reason enough. The State offers immense prospects in terms of natural, institutional, developmental, economic and infrastructural advantages that give any investor a distinctive edge over other locations. Orissa offers relevant mineral resources in close proximity, skilled manpower, quality rail and road connectivity from the hinterland to the ports, efficient port handling facilities, competitive power tariff and plentiful water resources. To top it, the Government backs up with investor friendly policies and continued facilitation. Steel and aluminium makers located in Orissa shall be the lowest cost producers of primary metal. This shall enable them to survive and make normal profits, even during times of sectoral recession which ensures sustainability even for their vendors and customers. At other times, the cost economies shall enable these manufacturers to pass through the savings to their vendors, suppliers and business service providers.

The output multiplier for iron ore is 1.40 while that for steel is 2.36. In other words, every Rs. 1 lakh worth of output in the iron ore sector would result in Rs. 1.4 lakh of output (including the Rs. 1 lakh output of iron ore) in the economy. Similarly for each Rs. 1 lakh output in the iron and steel sector, the economy would

derive an output of Rs. 2.36 lakh. The employment multiplier for iron ore is 0.35 and for steel it is 0.69. In other words, for every Rs. 1 lakh of output, 0.35 man-year of employment is created in the case of iron ore while it is 0.69 man-year for every Rs 1 lakh output of crude steel. Therefore, in terms of both output and employment, steel has a larger impact.

In view of the high output-multiplier effects (2.36), any partial waiver of tax on steel output produced within the State boundaries gets compensated by additional tax inflows to the extent of 136 per cent from input supplying industries assuming that steel and input supplying intermediates' industries have similar tax rates. Thus, it would be beneficial for the State economy to even offer incentives to lure investments to set up steel plants over the alternative of collecting the depletion premium of US\$ 27 per tonne of ore exported from the State for processing elsewhere. Hence, the clear vision of Government of Orissa to encourage steel making in the State.

Orissa has also provided a chance to the secondary producers of steel to go in for both backward and forward linkage, thereby fostering greater market making mechanisms. Many of these projects propose to make special grades of steel that would have numerous types of applications. So, on these platforms, the State is in the process of building a strong base of ancillarisation and downstream industries that shall spread the economic fallouts of economic growth among a larger geographical and populace distribution. The ancillary, downstream and construction phase of steel and aluminium are envisaged to be the largest contributors to employment generation and revenue resources in the State. There is an opportunity to covert substantial parts of steel sectors' expenditure into ancillary spend that would include core specialised services, support specialised services, operations & maintenance, spares & manufacturing, supply chain & logistics, township management and general services.

With the fruition of the steel and power projects, there shall be generation of blast furnace slag and flyash. Consequently, Team Orissa encouraged and invited entrepreneurs & promoters to partner in establishing eco-friendly cement manufacturing facilities utilising flyash and blast furnace slag. Today, 3 projects have been approved to manufacture 7 million tonnes of cement.



*MoU signing between Government of Orissa and Arcelor Mittal in December 2006*

The State has embraced sustainability and inclusiveness as the key principles in developing and promoting a dynamic and competitive industrial sector. Development interventions are configured with active participation of all stakeholders and the focus is on a continuous improvement in delivery of services like infrastructure, rehabilitation and resettlement. At all junctures, due emphasis is given on adopting modern environment management practices in industrial processes. Environment is a nonreplenishable resource and to be handled in the most responsible manner. All industrial projects are urged to take utmost care in ensuring energy conservation and environment protection. Since, an industry is a public commodity existing in a particular socio-cultural milieu with a dynamic give & take balance, each industry house in Orissa is bound to concentrate upon timely & effective rehabilitation & resettlement services. Beyond the mandated rehabilitation packages, industries are being encouraged to actively participate in peripheral development activities thereby improving the very environment in which they exist & operate in because contributing to peripheral infrastructures and community capacity buildup is viewed as the long-term way to increasing returns to scale in business.

Agriculture growth leveraged upon greater private investment in the entire value chain of agro and food processing has been initiated through Amendment of the Orissa Agricultural Produce Markets Act, 1956. The State has embarked on contract farming for crucial crops like cotton and oilseeds from 2006-07 rabi season with the objective of increasing crop area and productivity and a MoU has been signed with NAFED to start contract farming of groundnut and til. The Centre and State have come together to promote Koraput ginger and Phulbani turmeric and two distinct agro-processing zones are being established to fill sectoral infrastructure gaps. Similarly, in the case of fisheries and aquaculture, a vision and action plan has been drawn up for boosting exports from the State. The ambitious action plan envisages a three-fold increase of exports within the next 5 years. The recent MoU with Ruchi Industries to boost oil palm & soybean cultivation in the State along with the establishment of a manufacturing facility for value added soy products is expected to directly benefit thousands of farmers. All these steps shall also actualize the true employment potential exceeding 2,00,000 workforce.

The objective is to make the agriculture sector more productive and the surplus unproductive labour being fruitfully engaged in industries oriented vocations which shall enable optimization of Orissa's valuable human resources. Hence, the Government is committed to promoting those specific sectors and projects that have the largest employment generating potential – both direct & indirect. All steel and aluminium majors are being encouraged to promote downstream and ancillary industrial parks. The petrochemical refinery is being interwoven into a petroleum, chemicals and petrochemicals investment region to spawn the growth of downstream chemical converters and plastics. The steel companies are being asked to produce specialized products that would be utilized in auto components, shipbuilding, finished goods, consumer products, etc. All of this planning and efforts are directed only towards improving the employment base and increasing revenue generation.

With the objective of developing its human resources pool, the State has endeavored to triple engineering / MCA technical education capacity since 2001. Orissa is home to the big 4 Indian IT majors – Satyam, Infosys, Wipro and TCS. Other leading Indian IT players like Mindtree, ICICI Bank, Ramitech, IBM, etc are part of Bhubaneswar's IT horizon. A mega InfoPark is under development for which the reputed DLF has been finalized as the concessionaire. This shall pave the way for availability of ready-to-occupy office space for the IT sector SMEs which are showing keen interest of operating from Bhubaneswar. The city is expected to be house to more than 100,000 software professionals by the year 2015. Genpact is in the

process of establishing its operations in Bhubaneswar which will boost the IT enabled services sector. The Government envisions making the State Capital as the new knowledge and IT hub. A big stride has been taken with the launch of IIIT at Bhubaneswar. For the mining sector HRD, a world-class school for mining and metallurgy technologies & applications is being established at Keonjhar. The Directorate of Technical Education and Training (DTET) has launched ambitious reform programmes for the ITIs, poly-technics and other centres of vocational education. The J.N. Tata Technical Education Centre at Gopalpur, being managed and operated by the Nettur Technical Training Foundation (NTTF) is evolving as one of the finest centres in India for providing practical & employment-related disciplines catering to the steel, mining and metal sectors. Many of the upcoming industrial projects are taking keen interest in supporting the local ITIs to improve their infrastructure, training facilities, laboratories, syllabi in order to build the capacities and skills of the local workforce making them highly employable. Attention to augmentation of technical and vocational education capacities has made sure that Orissa marches forward to becoming an egalitarian and enlightened State.



*A Steel Plant in the construction stage during 2007*

A cluster approach to development of micro, medium and small enterprises is gradually being adopted in sectors like handloom & textiles, handicrafts & cottage industries, ancillary and downstream / upstream industries. To further the agenda of enlargement of micro, small & medium Enterprises domain, the Government is working on a proposed policy framework that would dedicatedly target interventions towards supporting small industries. With the inherent skills in handloom and handicrafts available in the State, at this juncture, the sectors need further development and augmentation in the links of the overall value-chain. Better market linkages, access to finance, new designs incorporation and patenting of product lines are the critical challenges. Establishment of a branch of National Institute of Design, Ahmedabad in Orissa will boost the sectoral initiatives. The textiles and crafts are huge employment sectors in the State and are on top of the Government's growth planning agenda. To this end, an integrated textiles park is being set up at Choudwar by Welspun Group, the leading sectoral player in the country. Similarly, an auto components cluster by RSB Transmissions is in the process of implementation at Choudwar by an Oriya entrepreneur.



*Chief Ministers of Orissa, Chhattisgarh and Jharkhand signing a joint memorandum at a conclave in Bhubaneswar on the 27th December 2006 in connection with mineral and power related issues*

The Action Agenda today for Team Orissa includes providing special thrust on SMEs; developing agriculture & agro-processing; and strengthening infrastructure. The growing importance of infrastructure to sustain and power the emergent trend of growth is fully appreciated. With limited public resources available for the purpose, the State now wishes to leverage upon private capital to develop world-class infrastructure in areas like road corridors, ports, power transmission, rail linkages, industrial water supply, industrial clusters, etc. The commencement of turnkey port development in Gopalpur, Dhamra and Kirtania are steps in the right direction. The successful conclusion of the shareholders' agreement for developing an 82 kilometre rail link between Paradeep and Haridaspur, connecting the iron ore hinterland with the port is considered as a major landmark because 9 parties including steel projects, mining companies, port trust and Government agencies have joined hands for the infrastructure creation. Similarly, the 98 kilometre Angul – Duburi – Sukinda rail link project between the coal bearing areas and the iron ore belt is in the stage of finalization involving participation of 9 private steel companies. The policy framers are keen to see greater participation of entrepreneurs and businesses in the State's infrastructure sector including the social infrastructure like education and healthcare. There is a big opportunity to invest in areas of technology like applications for usage of flyash & blast furnace slag and environment-friendly manufacturing practices.

The next 5 years are critical for the State when most of the planning for industrial growth shall fructify and Orissa shall make the transition to a vibrant and throbbing industrially developed State. The new Industrial Policy 2007 enunciates most forward looking and unique approaches towards balanced industrial growth. It's major focus is on quality institutional support, infrastructure development, liberal incentives package, human resources augmentation and timely & responsive grievance redressal. It is a time for each entrepreneur to make the maximum out of the emerging opportunities in the land of Orissa and the Government strives to provide the best business operating environment. ■

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## **CAPTIVE POWER AN ELIXIR FOR FUTURE**

**Sanjeev Das**

Secretary

Confederation of Captive Power Plants Orissa

The generating structure in this country has had a paradigm shift from the pre reforms era to the post reforms era. Prior to 1991, generation was mostly in the Central sector, State Sector and by some pockets of private sector. Growth of generation was dismal as the capital outlay was prohibitive and the trade off between welfare measures likely to be undertaken vis-à-vis the infrastructure development was in favour of a socialistic outlook. Post reform i.e after 1991, IPPs, Joint arrangements and Hybrid structures came into focus.

After the Electricity Act of 2003, sector has seen focus on Captive power Plants, Co-operatives and Merchant power Plants and of course Ultra mega power plants.

From a dismal figure of 1363 MW generation in 1947, the country has traveled a long way to have an installed capacity of 1,32,110 MW as on 31-3-07 with 65% generation capacity contributed by the thermal sector which includes, coal, gas, and oil. From Aug 26<sup>th</sup> 2006, we have synchronous grid system from Gujrat to Arunachal Pradesh.

However, all that is not enough. We are still running with a deficit of 8.5% as regards Energy shortage is concerned amounting to almost 52 Billion Units and peak demand shortage of 12.5%. The target being addition of over 100,000 MW by 2012, encouraging public investments and nurturing private sector whose contribution in the entire sector is hardly 11.5% in comparison to the state sector of over 56.5% and Central sector of over 32%. While generation is the focus, rural electrification of around 56% rural household is the mantra.

In order to retain a sustainable national GDP growth of 8%, power consumption should grow at least 2% points higher that is at 10%. Therefore from the existing levels of 606 units per capita consumption in 2005 the consumption is required to grow to 1030 by year 2012.

The Eastern Region of which Orissa is a part is characterized by growing load, high coal reserves and pit head based load plants, with average peak demand of 10300 MW corresponding to 208 MU per day. The effective generation by utilities is over 16000MW and the share of Captive Power Plants is 3436MW. It would be worth noting that Orissa has the highest share of CPP's in the entire Eastern Region with 2241MW installed capacity, which corresponds to almost 65% of the entire Eastern region. Others states like Jharkhand is a close second with 825MW-installed capacity, which is only 24% of the entire Eastern Region. It is today without dispute that the Eastern region is called the Power hub of the Country, combined with synchronous operation with NER in Oct91 and synchronization with Western Grid in Mar '03. However, all these are of course not without its share of challenges, like congestion management, reliability of integrated network, special protection schemes, handling disturbances, Management of coal supplies etc.

Power generation in Orissa started in the early 20<sup>th</sup> century which reached 157 MW by the year 1961. No wonder orissa suffered huge deficit from 1979 to 1994, clubbed with abysmally low PLF in one of its

major thermal power plant which saw windfall generation post 1995. Issuing of section 22B orders by the State regulated power. Availability based tariff led to most thermal power plants operating at over 80% PLF. The deficit state transformed into a relatively surplus state with power being traded outside the region. Pioneering steps were taken to privatize the power sector. Orissa had the unique distinction of trading 9352 million units in FY 03-04, 04-05 and 05-06 combined. Orissa is likely to experience a huge surge of demand in the coming few years, leading to a shortfall in supplies versus the demand of power. Amidst this uncertainty, growth of Captive Power plants have been seen as a evangelic to the entire power sector. The Captive Generating Plant not only meets the huge demand growth of the mother Industry but also supplements the surplus power to the state and the country at its most crucial phase.

Captive Generating Plants in the state at present have an installed capacity to the tune of 2241 MW and constitute a whopping 60% of the total installed capacity of 3720 MW in the State of Orissa including the state's share of Central sector power. This share of 60% is likely to go up substantially in view of the fact that several upcoming industries have planned CPPs to meet their requirement. It is estimated that about 3470 MW of CGP power is being planned to be set up by industries by 2012. It is projected by CEA that by the year 2012, the peak demand and energy requirement of the state will be 4459MW and 27149MU respectively. It is worth mentioning that after commissioning of 4x150MW of Indravati Hydro Electric Project during 1999-2001 there has not been a single MW of generation addition till now in the state of Orissa.

Growth of Captive Power was initiated by the Industrial policy, which offered sweeteners in the form of Electricity Duty exemption thereby substantially reducing the cost of generation. IPR 96 provided Exemption on Electricity Duty. IPR 2001 permitted Third party sale in addition to the ED exemption.

Captive Power is the best option available as it takes less time to set up, little or nil capital outlay by the state. Captive generation being aliened to the Industry to which it is captive is normally set up in a distributed manner. The transmission network is also not burdened due to the distributed generation.

Electricity Act 2003 has given the real impetus to establishment of Captive Generating station with the twin objective of capital outlay participation by private enterprise and the advantage of distributed generation in order to take the maximum leverage during Black start operation while managing a huge grid to the tune of 80,000 MW barring SER.

The Electricity Bill 2001 made progressive endeavours to strike a balance given the current realities of power sector in India. Generation is delicensed and Captive Generation is being being freely permitted. There has been provision for private transmission licensees. Open access in transmission is permitted at the outset with provision for surcharge for taking care of current level of cross subsidy.

The bill also encourages direct commercial relationship between a consumer and a generating company or a trader and the price of power would not be regulated barring the transmission and wheeling charges with surcharge, which shall remain, within the domain of regulatory authority.

#### **EA- 2003/ RULES- PROVISIONS FOR CAPTIVE GENERATING PLANTS**

Provisions outlined in **Section-9** of the Act are:

- (i) A person may construct, maintain or operate a captive generating plant and dedicated transmission lines.

- (ii) The supply of electricity from the captive generating plant through the grid shall be regulated in the same manner as the generating station of a generating company.
- (iii) Every person, who has constructed a captive generating plant and maintains and operates such plant, shall have the right to open access for the purpose of carrying electricity from his captive generating plant to the destination of his use.

Provisions outlined in **Section-10** of the Act applicable when the Captive generating plant supplies electricity through the grid are:

“ A generating company may supply electricity to any licensee in accordance with this Act and the rules and regulations made there under and may subject to the regulations made under sub-section (2) of section-42, supply electricity to any consumer.”

Provisions outlined in **Section 30** applies to transmission within the state and emphasises that the state commission shall facilitate and promote transmission, wheeling and interconnectivity within its territorial jurisdiction for the transmission and supply of electricity by economical and efficient utilisation of Electricity.

**Section 39** is relevant as it refers to the transmission utility and its functions, which is “ to provide non-discriminatory open access to its transmission system for use by any licensee or generating company on payment of the transmission charges or any consumer as and when such open access is provided by the state commission under sub section 2 of section 42 on payment of transmission charges and a surcharge thereon as may be specified by the state commission.

A further step in defining captive Generating plant and with the objective to harness captive generation to bridge the yawning gap between demand and supply was the Electricity rules of 2005.

As notified by Government of India (GoI) under rule GSR -379 (E) dated 8-6-2005, the criteria of Captive / Group Captive Generating Plant is as under:

- (1) No power plant shall qualify as a ‘Captive Generating Plant’ under section 9 read with clause (8) of section 2 of the Act unless-
  - (a) In case of a power plant -
    - (i) Not less than twenty six percent of the ownership is held by the captive user(s), and
    - (ii) Not less than fifty one percent of the aggregate electricity generated in such plant, determined on an annual basis, is consumed for the captive use:

Provided that in case of power plant set up by registered cooperative society, the conditions mentioned under paragraphs at (i) and (ii) above shall be satisfied collectively by the members of the cooperative society:

Provided further that in case of association of persons, the captive user(s) shall hold not less than twenty six percent of the ownership of the plant in aggregate and such captive user(s) shall consume not less than fifty one percent of the electricity generated, determined on an annual basis, in proportion to their shares in ownership of the power plant within a variation not exceeding ten percent:

- (b) In case of a generating station owned by a company formed as special purpose vehicle, for such generating station, a unit or units of such generating station identified for captive use and not the entire generating station satisfy (ies) the conditions contained in paragraphs (i) and (ii) of sub-clause (a).

## **NATIONAL ELECTRICITY POLICY**

The policy was issued on 12<sup>th</sup> February 2005 and it aimed at facilitating setting up of Captive Generating Plant by small and medium industries combinedly who may not be individually able to set up a CGP.

It mandated that surplus capacity should be harnessed either continuously or during certain time periods.

Appropriate commercial mechanism should be in place between licensees and captive generators for harnessing spare capacity from captive generating plants.

Captive generating plants should be permitted to sell electricity to licensees and consumers when they are allowed open access by SERC ( State Electricity Regulatory commission) under section 42 of the Act.

### **❖ NATIONAL TARIFF POLICY:**

The National tariff policy was notified on 6th Jan 2006. It recognised that although state has right to impose duties and taxes, cess on sale or consumption, these imposition do have the potential of distorting competition and curtailing generation. It was clarified in the tariff policy that the sole purpose behind allowing captive generation free of all controls was to enable industries access to reliable cost effective power. There should be differential tariff for peak and off peak hours. Frequency based pricing should be thought as an alternative. Wheeling charges for captive power plants should be determined on the same principles as laid down for inter state transmission charges.

## **RECOMMENDATIONS OF FORUM OF REGULATORS (FOR)**

FOR has constituted a Group for Preparation of a Paper on “Appropriate commercial arrangements required to be instituted between licensees and the captive generators for harnessing of surplus Capacity/ Energy from Captive Power Plants”. The group has made the following recommendations in the FOR meeting held on 18.1.2006:

SERCs should carry out an exercise to figure out the total installed captive generation in the state

SERCs should identify availability of firm and infirm captive generation separately.

Stand alone captive plants, which were not connected to the grid earlier, should be encouraged to have connectivity with the grid.

SERCs may also encourage distribution licensees to procure firm power from CPPs through Competitive bidding on a composite tariff basis.

The price of infirm supply should be linked to UI rates at the time of injection.

CPP/ Consumers should be allowed to reduce their CD at any time and to any extent without any penalty

In view of little jurisdiction for levy of parallel operation charges/grid support charges, these charges to be kept at the lowest level.

Wheeling charges and other terms and conditions should be determined in advance by the state regulatory commission ensuring that charges are fair and reasonable.

### **CEA'S RECOMMENDATIONS ON TAPPING SURPLUS POWER FROM CGP**

CEA recommended that the following issues relating to CGP's should be resolved on top priority:

The important issues which are required to be resolved on top priority basis, are as under:

The States/State Regulatory Commissions which have not issued the regulations for open access may have to expedite the same.

In the interest of providing competitive and smooth access and to facilitate export and import of power within the state or between consumers of two or more states, the open access regulations and methodology of determination of charges should be aligned across states. The state regulators may be urged to develop progressive and encouraging policies for CPP (like one issued by MERC)

- vi) Electricity duty: No electricity duty should be imposed on utilization of generated captive power by participating industry. Reasonable duty may be imposed for export of power.
- vii) Transmission charges and losses should not exceed 7% of the generation cost.
- viii) Banking of energy may be allowed by the distribution licensee and shall be regulated by the energy banking agreement and may be signed between HT industries/ CPP holder and the distribution licensee.

Fixation of reasonable tariff by State Regulatory Commission for the surplus Power available from the CPPs. Fixed cost plus variable cost along with some margins for fuel escalation should be the bench mark.

### **ISSUES IDENTIFIED IN THE CHIEF MINISTERS CONFERENCE HELD ON 28<sup>TH</sup> MAY 2007**

The conference recognized captive generation capacity is being sub-optimally utilized.

It was resolved that no captive capacity should be left idle. States should facilitate captive generating plants to provide spare generating capacity to the grid and strive to do away with restrictive levies, duties and regulations.

States should commit themselves to operationalising open access in transmission and distribution sectors and resolve to issue policy directives to regulators as appropriate in order to augment power flow into the grid.

Open access and competition in supply of electricity would help lower tariffs and attract investments.

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# REGULATORY INTERVENTION FOR RENEWABLE ENERGY

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## INTRODUCTION :

1. All sources of energy that we use every day are divided into two groups — Renewable energy and Non-Renewable energy.
  - a. Renewable energy sources include solar energy, which comes from the sun and can be turned into electricity and heat. wind, geothermal energy from inside the earth, biomass from plants, and hydropower and ocean energy from water etc..
  - b. The Non-renewable energy sources include the fossil fuels – oil, natural gas and coal These are called fossil fuels because they were formed over millions and millions of years by the action of heat from the Earth's core and pressure from rock and soil on the remains (or "fossils") of dead plants and animals. Another non-renewable energy source is the element nuclear ( uranium ), whose atoms we split (through a process called nuclear fission) to create heat and ultimately electricity.
2. The Renewable sources of energy have gained preference over the Non- Renewable source of energy because it is pollution free and more over it is obtained from Renewable sources.
3. Ministry of New and Renewable Energy (MNRE) attempted to give a thrust to this area through Policy Guidelines in 1993. The important recommendation was regarding the pricing, concessions regarding banking and wheeling charge for power from renewables. However, these efforts did not yield the desired results. The Electricity Act, 2003 has given the entire aspect a new and bold outlook through improved legal and regulatory framework. The major concerns of the Regulatory Commission in promoting RE are as follows:
  - i) The reasonable share of renewable energy in the portfolio of energy procurement.
  - ii) The cost of RE.
  - iii) Addressing issues related to grid interconnection issues.
4. Regulatory Provisions in EA, 2003: Mandates SERCs to take action to promote renewable energy (RE) Sections 61(h) and 86(1)(e) – these provisions are mandatory.
5. Tariff for RE Technologies:
  - i) Section 61 prescribes the philosophy to be followed by SERCs while determining tariffs.

- ii) Sub-section (h) prescribes promotion of co-generation and generation of electricity from renewable sources.
6. SERCs are found to take this into account in drafting their Terms and Conditions of Tariff Regulation. Nearly all SERCs including OERC have issued tariff orders incorporating conditions to promote and give preferential treatment to RE – covering various technologies, such as wind, small hydro, bio-mass, municipal waste, etc.
  7. Obligation to purchase RE : While Section 61(h) is important from the perspective of improving viability of projects, Section 86(1)(e) helps develop the market for RE by requiring regulator to prescribe the percentage of RE to be purchased by DISCOMs.
  8. Action taken by OERC for encouraging development of Renewable Energy:
    - a. Renewable sources of energy including non-conventional sources are eco-friendly and need to be encouraged especially when we are facing pollution problems owing to operation of large thermal plants and rapid depletion of the fossil fuels.
    - b. OERC, a Quasi Judicial Body is playing proactive role in encouraging Renewable Energy in the State.
  9. Section 86(1)(E) enjoins upon the Commission to *“promote co-generation and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person, and also specify for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee.”*
  10. Concerns: Since RE potential is often not uniformly distributed over the state, and in the event of there being more than one distribution licensee, percentage share of RE may not be the same across all the distribution licensees.
  11. In case of Orissa, under the “Single Buyer Model” of power procurement of DISTCOs in Orissa, the Commission in their Order dated 23.04.2005, relating to Case No.151 of 2004 –
    - a. Have specified the quantum of energy to be sourced from the renewable energy projects as 200 MU for 2006-07.
    - b. Further, the Commission, in their Order have directed that the unit cost of renewable energy should not exceed the highest generation cost of the thermal stations in the eastern region.
  12. The cost of energy during the first and subsequent years, till the debt is repaid, will be higher on account of the high capital cost.

13. Possible options:
  - i) Price based on pooled variable cost
  - ii) Cost plus approach
  - iii) Marginal cost of power purchase
14. The Commission further in its order dated 20.08.2005 in case No.14 of 2005 directed –
  - a. That procurement of power from non- conventional and renewable energy such as, small hydro, wind, biomass, co-generation of electricity from waste heat products etc. would be allowed by the supply licensees for use of consumers within the State upto 3% of the total purchase during the FY 07-08 to go up at the rate of 0.5% per annum for each subsequent year to reach a level of 5% by the year 2011-12.
  - b. The project cost fixed by the State Technical Committee after due diligence will be taken as the ceiling cost for determination of tariff.
  - c. The tariff for procurement of the power from this sources will be determined by the Commission under Section 62(1)(a) so long as this power is being supplied to the state consumers through distribution companies.
  - d. To encourage competition for reduction in cost of power purchase of by DISTCOs shall be through competitive bidding process within the same sources of generation where the price determined by the Commission under Section 62(1) shall be treated as the ceiling price.
  - e. The generating companies of non-conventional and renewable sources may be permitted by DISTCOs/OPTCL to deliver the power at 11 KV or 33 KV as the case may be. Depending upon the techno-commercial viability of the project, the interconnection point for delivery of power may be at 132 KV.
15. The Commission has already fixed a minimum percentage of purchase of energy from non-conventional sources including from co-generation for the FY 2007-08. It has allowed upto 400 MU. The pricing of power from these generating stations will follow the cost plus approach based on the project cost to be approved by the State Technical Committee.
16. Therefore, technology wise tariffs for Renewable Energy is yet to be determined in Orissa.
17. At present there are seven PPAs on small hydel projects with total installed capacity of 77 MW having total project cost of Rs. 346 cr. executed between GRIDCO and developers which are under process at OERC. The Commission is considering the remunerative price in respect of the PPAs.
18. It is hoped that more number of generators should come forward and avail of such opportunity for establishment of power stations. ■

# EVOLUTION OF INDIAN ELECTRICITY MARKET - TRADING AND POWER EXCHANGE

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## 1.0. INTRODUCTION

### 1.1. DEFINITION AND CHARACTERISTICS OF ELECTRICAL POWER

As per Webster Universal Dictionary, Electricity is defined as a form of energy the ultimate nature of which is unknown. Electrical Power is endowed with a few strange/ peculiar characteristics. It cannot be seen/visualized. It cannot be stored/warehoused. It can not be measured by conventional Measuring units in Kg, Ltr,Mtr etc. but its parameters like Voltage, Current, Active and Reactive power etc. can be measured in appropriate measuring Unit in an operating band of  $-10^6$  to  $+10^{12}$ . It is indistinguishable as to which type of power is being used at any point of time whether Hydro, Thermal, Nuclear and Renewable energy as it cannot be segregated. It flows as per Laws of Physics and follows path of least resistance. Its availability and demand vary every second. The buyer has no control over what the trader supplies and the trader has no control over what the buyer draws from the inevitable Power Pool. ***Electrical Power is thus a Unique Product.***

### 1.2. COMMODITISATION OF ELECTRICAL POWER

A product when traded becomes Commodity. Power is the third important Commodity after air and water. Power being a commodity should obey the Laws of the Market. The Oxford dictionary defines market as a place or institution in which buyers and sellers of a good or asset meet. The perfect Market Conditions stipulate that

- (a) There shall be a number of buyers and sellers,
- (b) Both buyers and sellers can enter and exit the market at any time,
- (c) It shall try to meet the Market demand
- (d) Supply and demand of a product determines its price
- (e) No body, whether buyer or seller, can influence the price individually.
- (f) Follow the Market Supply Chain viz Manufacturers-Wholesalers-Distributors-Retailers  
**(Conventional Market Supply Chain).**

As both buy and sale transactions in Electrical power take place on real time basis, the Supply chain follows a slightly different Model as stated below:

Manufacturers        -    Wholesalers        -    Distributors  
(Generators)            (Bulk Suppliers)            (Retail Suppliers)

**(POWER SUPPLY CHAIN)**

### **1.3. DEFINITION AND CLASSIFICATION OF POWER TRADING**

1.3.1. Prior to Electricity Act, 2003, Core functions/activities of Indian Power Sector were Generation, Transmission & Distribution only. After the enactment of Electricity Act, 2003 from 10<sup>th</sup> June, 2003, Power trading has been recognized as a distinct licensed activity as per Sec-12 and Sec-14 of the Act and has been added as another core function in Indian Power Sector.

1.3.2. As per Webster Universal Dictionary, trading in general has been defined as a Business/Commercial Transaction especially those of buying and selling commodities. But as per Sec-2(71) of Electricity Act, 2003, Power trading means purchase of electricity for resale thereof.

1.3.3. Power Trading is an “ on-line trading” which means that all buy and sale transactions are conducted on real time basis and can be monitored with the aid of Computer networks which can be in the form of Govt./privatized leased lines; internet or wireless.

1.3.4. Various “ on-line trading” models have been put into practice which are categorized based on the method of transaction as mentioned hereunder:

- (a) One - to - One
- (b) One - to - Many
- (c) Many - to - Many
- (d) Many - to - One

“Many-to-One” online trading Model is the most adopted in practice.

1.3.5. Trading can be further classified as mentioned hereunder:

- (a) Time – of – the Day (TOD) trading
- (b) Time – of – the Day (TOD) trading at different time of the day with Differential Pricing Concept (DPC)
  - ❖ Peak (Evening & Morning), Off-Peak (Night & Day), Round-The-Clock) (RTC)
- (c) “ Auto Power trading “ through Unscheduled Interchange (UI)
- (d) Trading of / for un-requisitioned power
- (e) Trading of/for infirm Power

### **2.0. MARKET DEVELOPMENT OF POWER AND PRICING PHILOSOPHY**

2.1. As a sequel to introduce competition, determination/discovery of Pricing Philosophy and a framework for development of the market in Indian Power Sector, the Act envisages the following three steps/ways through Sections 61 to 66 viz:-

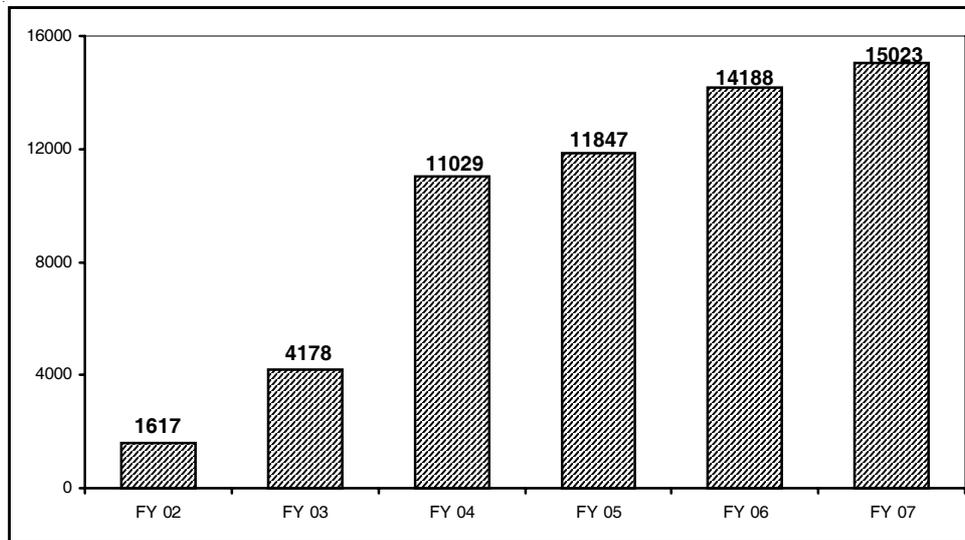
- ❖ Determination of Tariff on cost-plus normative basis by the appropriate Regulatory Commission. (Section 61 & 62)
- ❖ Determination of Tariff through Competitive Bidding (Section-63) and
- ❖ Price determination/discovery in the Electricity Market (Section-66)

- 2.1.1. As per Sec-61 & Sec-62, the Central Electricity Regulatory Commission (CERC) has already determined a Multi-Year-Tariff (MYT) for the period from 01.04.2004 to 31.03.2009 in respect of Generation tariff of all Central Generating Stations (CGS) of NTPC, NHPC & DVC and Transmission Tariff of POWERGRID- the Central Transmission Utility (CTU). All the State Electricity Regulatory Commissions have already determined the terms and conditions of Tariff for Generation, Transmission and Retail Supply for respective State Generating Stations (SGS), State Transmission Utility- (STU) and DISCOMS on cost Plus normative basis for each year excepting a few states which are switching over to MYT mode from 01.04.2007 onwards for a three-year-control period to begin with.
- 2.1.2. Section 63 of the Act seeks to move away from regulated cost-plus tariff to tariff determination through competitive bidding route. The Central Government has already issued detailed guidelines for tariff based bidding process for procurement of electricity by Distribution Licensees for medium-term (one to seven years) and for long-term period (for more than seven years) vide Notification dated. 19.01.2005 and that for providing Transmission Service vide Notification dated 13.04.2006.
- 2.1.3. Section 66 of the Act provides the final step for development of Market for price determination/ discovery. The provision says “The Appropriate Commission shall endeavor to promote the development of a market (including trading) in power in such manner as may be specified and shall be guided by the National Electricity Policy referred to in Section 3 in this regard”.
- 2.1.4. Para 5.7.1(d) of National Electricity Policy mandates that enabling regulations for inter and intra State trading and also regulations on power exchange shall be notified by the appropriate Commissions within six months.

### **3.0. TRADING AND EMERGING ELECTRICITY MARKET**

- 3.1 Pursuant to Electricity Act, 2003, CERC has taken immediate steps for formulating the relevant/ required regulations for implementation of inter-state-open access and inter-state-trading in 2004, which laid the foundation for Power Trading in the country in an organised manner. It is now possible to trade electricity between any two points in India through inter-state open access on advance reservation basis (upto a maximum period of 3 months), on current reservation basis, on day-ahead basis and even on real time basis through UI. Due to formation of Central Grid w.e.f. 26.08.2006; power is mostly being traded between Power Surplus Utilities in Eastern Region (ER) and North-Eastern Region (NER) on one-hand and deficit Power Utilities in Northern Region (NR) and Western region (WR) on the other in a synchronous mode.
- 3.2. Be it a deficit scenario or otherwise, power trading is essential to meet the short-term demand at an optimum cost. Adequate inter-state transmission System with capacity of inter state power transfer of about 14,100 MW has been already created since May, 2007 which is likely to be increased to 37,100 MW by the end of March 2012 (end of 11<sup>th</sup> plan). The annual volume of power traded in India at present is about 2.5% and the growth of trading volume in the last six years i.e. from FY 2002 to FY 2007 is shown in Table – 1 below:-

**TABLE –1  
GROWTH OF POWER TRADING VOLUME IN INDIA (in MU)**



**3.3. SOME OF THE KEY FEATURES OF THE EXISTING POWER TRADING IN INDIA ARE ENUMERATED BELOW**

- (a) Sellers dictate prices by inviting bids from traders. Traders bidding the highest obtain the limited supplies and sell it to deficit power utilities after topping it with trading margin.
- (b) Trading is taking place through non-standard loose bilateral contracts. Generally, there is little or no penalty if the supplier fails to supply or the buyer backs out.
- (c) Payment for scheduled traded energy is settled directly by the seller with the Trader on one-hand and Trader with the buyer in the other through L.C. & Escrow Mechanism.
- (d) Energy Accounting at Regional and State level through monthly Regional and State-Energy Accounts (REAs & SEAs) are papered by RLDCs and SLDCs based on Scheduled Energy and deviations from schedules are handled through UI mechanism.
- (e) Percentage increase in volume of traded energy lags behind the percentage rise in price in the last couple of years.
- (f) Sellers located in different regions/states cannot compete on equal footing due to pancaking of transmission charges and transmission losses.

**3.4. THE ABOVE OBSERVATIONS RELATING TO PRESENT DAY POWER TRADING PAVE THE WAY FOR ESTABLISHMENT OF A COMMON PLATFORM FOR TRADING OF POWER SO THAT**

- ❖ Trading is done in an efficient, transparent and equitable manner.
- ❖ Existing conventional and non-conventional resources are utilized optimally resulting in availability of adequate power so that short-term demand can be met at a reasonable cost.
- ❖ Commoditisation of electricity as a tradable product can be achieved.

- ❖ Energy Contracts and Transmission clearance are obtained through a Single Window Mechanism.
- ❖ Financial risk, hassles and costs are better addressed so that more Peaking Power Plants (PPPs), Merchant Power Plants (MPPs) and Captive Generating Plants (CGPs) are encouraged to trade.
- ❖ Transparent price discovery mechanism is established to provide long-term and short-term price signals.

**3.5 THE EMERGING POWER MARKET SCENARIO VIS-À-VIS THE PRESENT ELECTRICITY MARKET IS PRESENTED IN TABLE- 2 BELOW:**

**TABLE –2**

<b>Present Electricity Market</b>	<b>Emerging Electricity Market</b>	<b>Remarks</b>
Long-term PPA	Long-term PPA	97% of power supplies are tied with long-term PPAs and those won't be disturbed
Short-term PPA	Short-term PPA	Non-standard contracts, volume varies between 2.12% to 2.45%
Bilateral Markets	Bilateral Markets· ❖ <i>Common Electricity Market Place (PX)</i>	Standard contracts, Nation-wide acceptance, better price signals, fool-proof payment security mechanism.
UI/Real-Time	UI/Real-Time	Very short-term requirement, volume low about 0.5%

**4.0. DEVELOPMENT OF A COMMON PLATFORM (POWER EXCHANGE) AND RELATED ISSUES**

4.1. Power Exchange (PX) is a proven mechanism for efficient and transparent trading as it is possible to allow all the stakeholders/players i.e. suppliers and buyers of power to participate in the bidding process on one platform in an equitable manner. Moreover, a well designed and well functioning of a Power Exchange would provide fool proof payment security to all the players/stakeholders and that in turn has the potential to energize the power Sector.

4.2. The setting up of a Power Exchange (PX) for India is therefore associated with a number of country specific issues which are being debated and consensus opinions/decisions are being arrived. Some of the key issues are:

- (a) One National Power Exchange (NPX) v/s multiple Power Exchanges (PX) at National / Regional /State level
- (b) Mandatory participation v/s Voluntary participation.
- (c) Double side bidding for both suppliers and buyers v/s supply side bidding.

- (d) Uniform Pricing v/s Discriminatory Pricing
- (e) Day-ahead PX v/s same day PX.
- (f) Unscheduled Interchange (UI) v/s Power Exchange
- (g) Congestion management and assignment of transmission capacity etc.

## **5.0. INTERNATIONAL EXPERIENCE ON ELECTRICITY MARKET**

5.1 The first serious attempt to form a liberalized Electricity Market was launched in Chile in 1982. Markets were launched in England and Wales in 1990, Nordic Market was started in Norway in 1991 which later became famous Nord Pool in 1996 as a common Electricity Exchange for Norway and Sweden. Electricity Market started operating in Australia & New Zealand in 1994 and 1996 respectively. Several Electricity Markets were started in late 1990s, such as Pennsylvania-New Jersey-Maryland (PJM) Power Pool in 1997, New England, New York and California Markets Spain and Netherlands opened their electricity market in 1998. Texas and Alberta (Canada) opened electricity market in 2001. ESKOM has been operating as an “internal” power pool of South Africa whereas South African Power Pool (SAPP) has been operating since 1995 with an objective to promote Energy Corporation and to develop a common Electricity Market amongst 8 nations of the region, including South Africa, Botswana, Mozambique, Zambia, Zimbabwe, Angola, Democratic Republic of Congo and Namibia. The Inter-Government MoU, Inter-Utility MoU and operating Grid Code are in place and the Grid operation in SAPP resembles that of inter-regional Grid Operation in India based on Indian Electricity Grid Code (IEGC).

## **6.0. CERC GUIDELINES FOR SETTING UP AND OPERATION OF POWER EXCHANGE**

- 6.1. In pursuance of its statutory responsibilities of developing market in electricity, CERC initiated a suo motu Petition No. 155/2006 and vide order dated 06.02.2007 issued guidelines for setting and operation of Power Exchanges after a Public hearing on 19.12.2006 where more than 150 stakeholders including CEA, Commodity Exchanges, Generators, Distribution Companies, State Electricity Boards, Licensed Power Traders and IIT, Mumbai participated and deliberated the issues involved threadbare.
- 6.2. In keeping with CERC order dated 18.01.2007 on statement of reasons for development of a Common Platform for electricity trading market (with voluntary participation, no mandate for one PX, no restriction regarding ownership and minimal regulation), CERC seeks to encourage Power Exchange to emerge as a market-based institution for providing price-discovery and price-risk management to the generators, DISCOMs, traders, Open Access customers and other stakeholders.
- 6.3. In the Guidelines for setting up of Power Exchange, CERC has prescribed that the promoters shall be required to develop their own model Power Exchange and seek permission from the Commission before start of operation. The Commission has issued the following broad guidelines for development of Power Exchange viz.:
- ❖ De-mutualized form of organisation
  - ❖ Reliable, effective and impartial management

- ❖ Ring-fencing between ownership, management and participation
  - ❖ Investment support from the investors including institutional investors
  - ❖ Transparency in operation and decision-making
  - ❖ Computerised trading and clearing system
  - ❖ Efficient financial settlement and guarantee system
  - ❖ Effective trade information and dissemination system
- 6.4. CERC has further proposed that the promoters will have the freedom to develop, manage and operate the Power Exchange according to approved rules, bye-laws and procedures. The Commission will be concerned with the following aspects while granting permission to the Power Exchange:
- ❖ Scrutiny of the Rules and bye-laws of the Power Exchange
  - ❖ Assignment of transmission capacity to the Power Exchange
  - ❖ Apportionment of transmission charges and losses
  - ❖ Procedure for handling transmission congestion.
  - ❖ Monitoring of the functioning of the Power Exchange to the extent of preventing speculation, collusion and unfair gaming.
  - ❖ Adjudication of disputes between the Power Exchange and the Members
- 6.5. CERC has specified that any company registered under the Companies Act or a consortium of companies would be eligible for applying for setting up of the Power Exchange. The applicant would be required to have adequate knowledge and understanding of the Indian Electricity Grid Code, Open Access Issues, Availability Based Tariff, UI Mechanism, Scheduling Despatch and Energy Accounting Procedure.
- 6.6. CERC has prescribed that any applicant interested to set up a Power Exchange should submit the following details:
- ❖ Memorandum and Articles of Association of the company making the application.
  - ❖ In case of a consortium, it should submit formal agreement among its Members, which should dwell upon the issues critical to the setting up of the Power Exchange.
  - ❖ Details of the existing business of the applicant company.
  - ❖ Net worth as defined under the Companies Act, 1956 of the applicant as on 1st April of the financial year in which the application is made in case of the companies formed prior thereto or on the date of making application in other cases.
  - ❖ Copies of the Annual Reports and/or audited accounts of the applicant for the last three years, to the extent these are applicable.
  - ❖ A project Report containing the following details:
    - I. Constitution of the proposed Power Exchange

- II. Funding sources of the proposed Power Exchange
- III. Management and Administrative structure of the proposed Power Exchange
- IV. Infrastructural facilities available/proposed to be acquired by the Power Exchange
- V. Clearing and Settlement mechanism
- VI. R&D facilities and training programmes likely to be made available by the proposed Power Exchange

❖ Rules and Bye-laws of the proposed Power Exchange

- 6.7. CERC has further prescribed that before the permission is granted, the applicant shall be required to get the Company registered as a Limited Company under the Companies Act, 1956 exclusively for the purpose of Power Exchange.

**7.0. INDIAN ENERGY EXCHANGE LIMITED (IEEL)**

- 7.1. A consortium of Multi Commodity Exchange (MCX) and Financial Technologies (India) Ltd (FTIL) as promoters has floated a Limited Company named as Indian Energy Exchange Ltd. for the purpose of Power Exchange MCX set-up in November 2003 is now India's No. 1 Commodity Exchange with around 73% market share as per Forward Markets Commission, Govt. of India Press Release March 2007. MCX is also the first Commodity Exchange in the world to receive dual ISO certifications i.e. ISO/IEC 27001: 2005 for information security and ISO 9001 for operational efficiency. FTIL a listed company on BSE and NSE with USD 2.5 billion-group market value is the 8<sup>th</sup> amongst list of NASSCOM top 10 Indian public software companies. FTIL has developed the entire technology backbone of MCX, including trading, clearing & settlement and risk management. PTC India Ltd. – the pioneer of Power trading of India with major market share, the nodal agency for cross border trade in electricity also in principle has agreed to join IEEL as the third promoter to facilitate the development of power market.
- 7.2. MCX and FTIL filed petition No 38/2007 in CERC in March 2007 for grant of permission for setting up of IEEL based on the guidelines issued in CERC order dtd. 06.02.2007. CERC heard the matter on 10.07.2007. During hearing the representative of PGCIL stated that there were issues regarding transmission charges, transmission losses, congestion management, reservation of transmission capacity, role of SLDCs and fees to be paid by the Power Exchange to RLDCs etc. which need to be resolved before final permission is granted in favour of the proposed power exchange IEEL. PGCIL also referred to the possibility that an entity may default in UI charges but may continue to trade using the Power Exchange platform. The representative of MCX proposed that a tolerance limit for UI default might be devised in consultation with RLDCs and Members / participants shall not be allowed trading using the Power Exchange platform if these limits are breached.
- 7.3. CERC during hearing on 10.07.2007 enquired about the system software security, adjudication of disputes between the Power Exchange and the Members and the likely time required for

establishment of power exchange. The representative of MCX stated that system software was in compliance with the highest level of security and the certificate thereon would be produced before the Commission. On adjudication of dispute, MCX assured the Commission that the bye-laws of Power Exchange would have a proper mechanism to resolve the same. However, if the dispute could not be resolved within the policy framework and if there was a policy issue during the operational phase, the power exchange would interface with the Commission for appropriate resolution of the issue/issues. MCX further submitted that the proposed power exchange IEEL would become operational within a period of four to six months after the receipt of the permission / in-principle approval from CERC.

7.4. CERC vide an interim order dated 17.07.2007 accorded provisional permission to MCX and FTIL to set up the proposed Power Exchange IEEL and directed the promoters to submit the following information through affidavit.

- (a) Copy of formal agreement between MCX and FTIL;
- (b) Certificate of incorporation of the company;
- (c) Annual accounts for last three years for MCX & FTIL;
- (d) Records of discussions held in the conferences organized by the applicant and its response on the issues raised by the stakeholders;
- (e) Certificate regarding audit of system software security;
- (f) Factual information in regard to recent press reports connecting MCX with income-tax related matters;
- (g) Detailed write-up to establish the following, namely:-
  - ❖ De-mutualized form of organization,
  - ❖ Reliable, effective and impartial management,
  - ❖ Ring-fencing between ownership, management and participation,
  - ❖ Transparency in operation, Price discovery and decision making,

7.5. CERC through the same interim order dated 17.07.2007 stated that a view on further proceeding would be taken after receipt and consideration of the information called for.

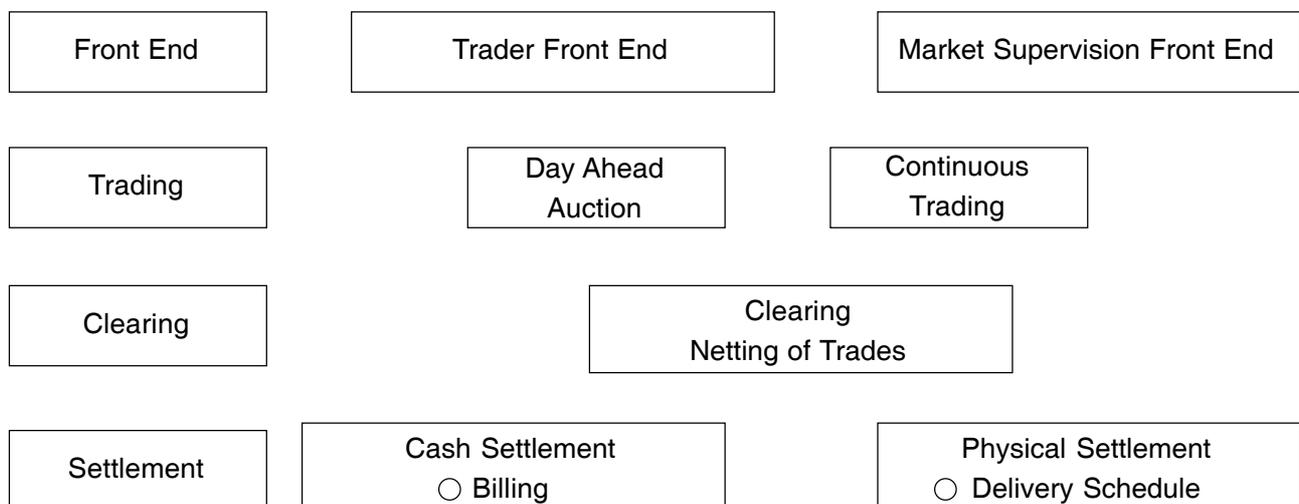
## **8.0. FUNCTIONAL OVERVIEW AND DAY-AHEAD SCHEDULE SUGGESTED FOR OPERATION OF PX BY INDIAN ENERGY EXCHANGE LIMITED (IEEL)**

8.1. IEEL during a presentation in August 2007 has outlined the following day-ahead schedule for operation of the proposed PX in close coordination with NLDC/RLDCs as shown in Table –3 below.

**TABLE –3**

Time (in hours)	Activity
10.00	PX opens for day-ahead bidding
12.00	NLDC informs PX on the availability of Inter-Regional Transmission Capacities (Transmission capacities assigned to PX plus spare capacity in regional tie-up if any), PX closes for bid submission
13.00	PX closes the auction
15.00	PX selects suppliers, buyers, set prices and volume/quantity to be traded based on availability of inter-regional transmission capacity and communicates to NLDC for concurrence.
16.00	NLDC gives concurrence to PX (reduction if any assigning due reason of transmission constraints)
16.30	PX conveys revised quantity (in case any reduction due to transmission constraints) to NLDC
17.00	RLDCs issues day ahead
17.30	<ul style="list-style-type: none"> <li>❖ Generation Schedules for CGS</li> <li>❖ Drawl Schedules from CGS by beneficiaries.</li> <li>❖ Bi-lateral Schedules</li> <li>❖ PX trades</li> </ul> PX issues BUY & SELL Schedules to successful bidders.
23.00	RLDCs issue Final Schedules, PX issues Final Schedules
8.2.	IEEL has suggested the following functional overview for the proposed Power Exchange as shown in Table – 4 below.

**TABLE – 4**  
**POWER EXCHANGE (PX) – FUNCTIONAL OVERVIEW**



## 9.0. COMPARISON WITH OTHER EXISTING EXCHANGES

9.1. A comparison of power exchanges with the existing Stock Exchanges and Commodity Exchanges is shown in Table – 5 below:

**TABLE – 5**

### **POWER EXCHANGES VS. OTHER EXCHANGES**

Item	Stock Exchange	Commodity Exchange	Power Exchange
Traded Commodity	Shares	Commodity	Power
Delivery	Easiest	Easy	Difficult to package & control delivery
No. of Participants	Largest	Large	Small
Market-type	Continuous	Continuous	Auction & Continuous
Quality	Yes	Yes	Nascent, unpredictable now
Retail participation	Available	Available	Not Available

## 10.0. CONCLUSION

- 10.1. Electricity Act, 2003 envisages three steps through Section 61 to 66 to determine tariff on cost-plus normative basis by the appropriate Regulatory Commission (Sec. 61 and 62), to move away from regulated cost-plus tariff to determine tariff through competitive bidding (Sec 63) and finally development of Power Market for price determination / discovery (Sec 66).
- 10.2. Indian power sector has passed through the cost-plus normative tariff regime under CERC /SERC and has already moved to tariff-based competitive bidding regime in generation as well as in transmission in November and December, 2006 setting the National Benchmark of Pithead thermal generation price at 119 p/KWH for Sasan Ultra Mega Power Project (SUMPP) and the transmission tariff at 40% less of PGCIL cost-plus tariff for Western Regional System Strengthening Scheme (WRSSS).
- 10.3. In another significant development to combat the growing power shortage of the Country and to stick to its deadline of assuring “Power on Demand” by 2012, Government of India Ministry of Power has decided to speed up “MERCHANT POWER PLANTS” with 500 MW to 1000 MW capacities. The Ministry of Coal has identified 15 coal blocks with reserve of 3.6 billion tonne to be given to merchant power plants for captive use. These merchant power plants have been identified for development by private developers outside the tariff-based competitive bidding process as they cater to different niches in the market, some provide steady supplies to grid while others fire up to meet peak loads.
- 10.4. In keeping with its approach to encourage voluntary participation in the PX and allowing more than one PX, CERC in their guidelines dtd. 06.02.2007 has not proposed to mandate any restriction on

the number of Power Exchanges rather encouraged the trading arm of power giant NTPC – NTPC Vidyut Vyapar Nigam Ltd (NVVNL) to establish the second power exchange in the country in association with National Commodity and Derivatives Exchange (NCDEX) NHPC and Reliance Energy Ltd. utilizing the technical expertise of NORDPOOL – the ruling Global leader in electricity market. It is expected that the consortium led by NVVNL will set up the second National Power Exchange in FY 09.

- 10.5. To meet the growing demand, there is a difference of opinion amongst the Experts, about supply options through long-term contract/ short-term contract/ UI mechanism and through market structured Power Exchanges. One school of thought advocates that a competitive market is the most efficient way to realize optimal fuel and technology choices for extraction, conversion, transmission, distribution, supply and end use of energy. This approach believes that a power market being managed on competitive principles is bound to minimize market distortions and maximize efficiency gains. However, there is another school of thought which questions the very wisdom of assuming automatic efficiency gains in utter disregard to the prevailing market conditions and absence of a matured / perfect market with sufficient number of players in the supply chain and highly skewed demand-supply mismatch. Nobel laureate **Sri Amartya Sen** forcefully argues, **“Market Mania involves an under-examined faith in the efficiency and other virtues of the market, regardless of the context”**.
- 10.6. In keeping with the argument of Sri Sen, CERC in February, 2007 issued guidelines for grant of permission for setting up and operation of Power Exchanges which is another milestone in the history of Indian Power Sector which would help in streamlining power trading, standardize electricity as a commodity, provide Payment Security Mechanism to buyers and sellers, help in harnessing captive generation and co-generation and usher investment in Merchant and Peaking Power Plants so that “AAM AADMI” the end consumers of both Urban India and Rural Bharat can reap the real benefit of Power Sector reforms of low cost affordable power at market driven price.
- 10.7. CERC interim order dated 17.07.2007 paves the way for establishment and Operation of India’s first National Power Exchange - Indian Energy Exchange Ltd (IEEL) in FY 08 promoted by MCX – India’s leader in Commodity Exchange, PTC India Ltd. – India’s leader in domestic and cross border power trading and FTIL - one of India’s top software companies providing system security which will not only fulfill the mandate provided in Sec. 66 of Electricity Act, 2003 to develop the Electricity Market but also will be another option in the hands of all stakeholders / players in electricity market to examine the efficiency and other virtues of market mania as a part of ongoing reforms in Indian power sector as operation of IEEL in FY 08 and the National Power Exchange to be set up by the consortium of NVVNL, NCDEX NHPC and REL in Fy 09 will certainly provide short to medium term price signals and will be the leading organized platforms for transparent commercial transactions within India and with India’s future electricity trading partners like Bhutan, Nepal, Bangladesh, Sri Lanka and Pakistan as propounded under 4-Border Theory and 2-Border Theory under South Asia Regional Initiative for Energy (SARI- Energy) in USAID dream project.

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## **EFFICIENT ELECTRICITY PRICING**

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***The essence of the Electricity Act, 2003 lies in efficient pricing of power and market development. If the appropriate commissions, as surrogates to market, find it difficult to determine prices based on marginal costs, efficient prices can be set by Ramsey's elasticity formula.***

Electricity tariff or pricing in the pre-reform period has been similar to administered pricing of a public good / commodity. This pricing policy definitely depresses economic efficiency. The reforms process in the power sector has brought in a set of Regulatory Commissions across the country to act as surrogates to market forces in order to determine electricity prices keeping in view the efficiency and equity considerations associated with an optimal tariff/price system.

Efficient electricity pricing and development of market form the very basis of the Electricity Act, 2003. Section 61(a) of the Act stipulates that the appropriate regulatory commission shall be guided by the objective that the tariff progressively reflects the cost of supply of electricity and also reduces cross-subsidies within the period to be specified by the Appropriate Commission. The spirit of the new Act is that prices should gradually be cost based and the existing inverted tariff structure should go which means the cross-subsidies have to be gradually reduced in a time bound manner. Now the practical problem the states face is how to determine electricity prices efficiently and make them cost based particularly in a situation where marginal cost pricing is difficult to adopt.

Whether it is determination of tariff or computation of cross-subsidy or for that matter fixation of cross-subsidy surcharge, Cost of Service has to be computed first. The Task Force on Power Sector Investments and Reforms popularly known as the N K Singh Task Force which was constituted by the Ministry of Power to evolve and recommend the National Tariff Policy, in its Report had considered three alternative methods for computation of Cost of Service, namely, '*Average Cost Method*', '*Embedded Cost Method*' and '*Long Run Incremental Costs (LRIC)*'. The first two methods are very similar in nature. In fact the '*Embedded Cost Method*' of cost computation is also an '*Average Cost Method*'. But the '*Embedded Cost Method*' calculates cost based on historical accounting costs which have truly been incurred. The '*Average Cost Method*' needs not necessarily be based on true accounting and historical costs. It may also be based on cost estimates i.e. the average cost is arrived at by dividing total estimated costs (not true or accounting costs as is used by the embedded cost method) by estimated quantity of energy to be sold in a particular year. The regulatory commissions in various states have so far used both the Average Cost Method and the Embedded Cost Method either in isolation or simultaneously.

Efficient pricing in true sense is a theoretical concept in a regime where competition is nonexistent. In a perfectly competitive market situation where large number of buyers and sellers of power exist, efficient prices are automatically established through market competition. But in a country like India, the market

for power is imperfect and is characterized by large number of buyers and one or few sellers. In such a situation, the appropriate commissions as regulators have to play the role of determining prices optimally i.e. by considering a number of factors related to economic efficiency and may be equity.

Economic theory has established that prices are efficient if they are set equivalent to marginal (incremental) cost. Marginal or Incremental cost is defined as the increase in the cost resulting from one unit increase in the output (of energy). If the energy generated falls short of the equality between marginal cost and price, this would mean some units of energy are not being produced which would have been consumed by the society and enhanced social gains more than it costs society to generate them. Maximum welfare/benefit is achieved if generation of energy output is expanded to the level of equality point between marginal costs and price. Such prices are considered efficient/optimal.

As the situation stands today the regulatory commissions are not yet ready to adopt the method of LRIC for electricity pricing. Some pioneers like Orissa adopted the method of marginal costs in determining transmission tariff in 1998-99 based on the prevailing Tariff Guideline of Ministry of Power, Government of India. The results were that the marginal transmission costs were far ahead of the average ones. This appeared all right then considering the huge number of ongoing transmission projects with long gestation periods in the state. After a year it was observed that many tariff related assumptions for transmission pricing had gone haywire including realized expenses in case of many projects falling short of estimated/projected costs whose present values were taken for tariff computation. That apart the nature and number of assumptions usually made in marginal cost pricing and poor data availability standing as a hindrance for practical implementation of this method in many states are reasons why the regulators can not easily adopt the marginal cost method for electricity pricing immediately. Another important consideration is the poor capacity utilization in the power sector which boils down to higher marginal costs than average ones in developing countries like India as compared to overutilisation of resources employed in Western Countries. All these mean that a second best alternative is to be found out for electricity pricing which shall make use of the existing methods of cost calculation while ensuring optimal allocation of the scarce resources and minimizing thereby the deadweight loss in the sector.

This paper discusses the related issues and endeavors to put forth certain definite ways of determination of retail tariff based on the currently widely used methodology of cost computation and its allocation among various consumer segments in a least distortionary manner. The idea is that if electricity prices deviate from marginal costs of producing them, such deviations should be so determined as to cause the least distortion in resources allocation. Had it been possible to set retail prices at cost of serving electricity instantly, there would not emerge any need to design principles for an optimal tariff system. The problem is that the subsidized categories shall receive a tariff shock if their tariffs are made equal to Cost of Service.

As a first step, the regulatory commissions may work out the *Cost of Service* for each category of consumers based on that category's contribution to total consumption during the designated system peak. The total costs shall be functionally assigned as production costs, transmission costs and distribution

costs. Then these shall be classified further to demand, energy and also customer related costs before allocating them to various categories of consumers. An ideal method of cost allocation shall be the Average and Excess Method which allocates production plant costs to various categories using factors that combine the categories' average demands and non-coincident peak demands (Electric Utility Cost Allocation Manual, National Association of Regulatory Utility Commissioners, January, 1992, USA). The allocation factor here shall consist of two parts: (1) the first component of each category's allocation factor is its proportion of total average demand (or energy consumption) times the system load factor; (2) the second component of each category's allocation factor is called the 'excess demand' factor which represents the proportion of the difference between the sum of category's non-coincident peaks and the system average demand. The total allocator is obtained by multiplying this component by the remaining proportion of production plant i.e. by one minus the system load factor, and then adding to the first component. The Average and Excess Method uses the non-coincident peaks to allocate the excess demands.

Having determined the *Cost of Service* of each category, the regulatory commissions, therefore, may have to proceed for determination of tariff for each category. Three major principles may be used to recommend tariff increases in any category viz. a) Tariff should be progressively cost based and reduce the existing inverted structure of pricing, b) Tariff increases should not hamper economic efficiency and c) Equity considerations may also be built in based on the ability to pay approach. These principles are inherent in the spirit of the Electricity Act, 2003 and also are recommended by the N K Singh Task Force. The moot question, however, is how to achieve a sound trade-off between efficiency and equity considerations while determining retail tariff and setting a well defined target for reducing the cross-subsidy element.

First the efficiency considerations. Any increase in the existing electricity tariff imposes a cost on its consumer and also changes the relative prices of electricity vis-à-vis other sources of fuel and light like gas and kerosene. This increase, therefore, could lead to substitution of other category of fuels with electricity. For instance, a household substitutes a traditional *chula* with an electric heater. An industry installs a Captive Power Plant and withdraws from the Grid and so on. Therefore, before it is proposed to increase the tariff for any consumer segment, it is essential that the sensitivity of that category's electricity demand with respect to its tariff (i.e. price elasticity of demand) should be computed based on historical data. The optimal tariff policy following Ramsey Rule (Ramsey, F P. "A Contribution to the Theory of Taxation", Economic Journal, Vol. 37, 1927) shall suggest that that category of consumer should face the highest increase in tariff or pay most part of its Cost of Service, which has the least price elasticity.

In the context of Orissa, an attempt has been made to estimate the price elasticity coefficients for various categories of consumers for the post-reform period 1996-97 to 2002-03. These elasticity co-efficients are presented below in tabular form along with the category-wise cross-subsidy figures for 2000-01 (the latest available).

Category of Consumers	Price Elasticity	Cross-Subsidy (Paise/Unit)
Domestic	0.96	182.64
General Purpose <110 KVA (Commercial)	1.19	-25.85
Irrigation Pumping and Agriculture (Irrigation)	-0.70	272.84
Public Lighting (Streetlight)	0.56	48.24
LT Industrial (S) Supply (Small Industry)	-0.69	16.65
LT Industrial (M) Supply (Medium Industry)	-1.39	-14.94
Specified Public Purpose (Public Institution)	0.81	-32.55
General Purpose $\geq$ 110 KVA	0.67	-177.68
Public Water Works and Sewerage Pumping (Public Water Works)	0.95	-66.43
Large Industries	-1.04	-172.29
Railway Traction	1.20	-245.81
Heavy Industries	-7.87	-222.34
Power Intensive Industries	1.43	-158.39
Mini Steel Plant	-0.80	-188.35

The elasticity coefficients are estimated using yearly data by making category-wise consumption of power in million units a function of that category's tariff/price expressed in terms of paise/unit, in a log-linear framework. Not all the elasticity coefficients satisfy the *a priori* expectations of economic theory in respect of their signs as consumption of electricity is dependent on many other factors like contract demand, number of consumers etc. which sometimes play bigger role in determining the power demand. It is discernible from the above table that most High Tension (HT) and Extra High Tension (EHT) consumers like medium industry, large industries, heavy industries, power intensive industries and railway traction have displayed elastic consumption (elasticity  $> 1$  ignoring signs). However, in Low Tension (LT) category, the estimated coefficient for domestic households exhibits inelastic (elasticity  $< 1$  ignoring signs) character of consumption while that of commercial category it is elastic in nature. Going by Ramsey's Elasticity Rule, further tariff hikes can be considered by the Orissa Electricity Regulatory Commission (OERC) in categories like Domestic, Irrigation, Street Lighting, Mini Steel Plant, Public Water Works, Public Institution, General Purpose ( $\geq 110$  KVA) and Small Industry.

While recommending tariff increases in the above categories, OERC may also look at the estimated/projected price increase in the fuel group in the WPI to determine partially the magnitude of tariff rise. As a thumb rule, all categories may be allowed to face an increase in tariff equivalent to the projected price increases in the fuel group in the WPI at the first instance provided costs increases are there to that extent. This will ensure no or little change in the relative price of electricity vis-à-vis other categories of fuel and light. To get rid of the existing inverted tariff structure and reduce cross-subsidy gradually, the Commission may look at the extent of cost not recovered in LT, HT and EHT categories. Analysis of cost data reveals that a large proportion of the costs incurred in the LT category remains uncovered. The proportion of uncovered cost plus the possible yearly rise in the uncovered cost due to inflation and other exogenous factors such as change in consumer mix, hydrology failure, upward trend in market rates of interest exerting serious financial burden on the distribution companies etc. should be planned to be recovered over a period of 5 to 7 years during which the State Commission may plan to reduce cross-

subsidies gradually. The sum total of the above two cost rises should be equally divided and spread over the same 5 to 7 years horizon and the average percentage rise may be added to already considered fuel price rise to arrive at the retail tariff hike of that category having inelastic demand. Necessary adjustments in the final tariff may be done by considering the efficiency gain on account of loss reduction by the utility. *As a matter of principle, therefore, subject to cost rise, the inelastic categories shall face a tariff hike equal to fuel price rise as measured by the WPI plus a percentage on account of the cost recovery of uncovered costs proposed and spread over the definite future years as mentioned above minus the efficiency gain due to loss reduction in terms of paise per unit. At the same time elastic categories shall face tariff rises equivalent to fuel price hike minus the efficiency gain on account of loss reduction.*

Another consideration is the cross-subsidy surcharge which shall be levied on open access consumers. As of now the cross-subsidising categories like commercial, medium industry, public institution, general purpose, public water works, large industries, railway traction, heavy industries, power intensive industries and mini steel plant in the State of Orissa are filling the revenue gap which remains due to under pricing of most LT categories. Sections 38, 39, 40 and 42 of the Electricity Act, 2003 have highlighted the need for progressive reduction of cross-subsidies. This objective may be achieved in two ways: (1) by increasing the tariff for subsidised categories in the manner as suggested above, (2) by imposing cross-subsidy surcharge on consumers availing open access in transmission and distribution network as stipulated in the Act.

There are also consumer categories which have inelastic consumption but are already subsidising others, let's say mini steel plant in Orissa. How shall the State Commission consider tariff increases when the category's consumption is inelastic in nature and it is cross-subsidising? Here comes a plethora of factors which the State Commission may look into while determining tariff. First of all in case of mini steel plant, as it should happen in other categories of consumers also, consumption of power and the tariff which it faces have negative correlation. It means with an increase in tariff of this category, there can be a possible fall in demand for power. Therefore, the ability to pay the enhanced tariff may be examined at the Commission's end while scrutinising the tariff applications of a licensee. While the ability to pay for electricity tariff in case of domestic consumers can be guessed by looking at the yearly growth in per capita income, rise in per capita fuel expenditure and Engel's ratio of the State etc., in case of other categories like say industrial consumers, the financial and operational status of these industries along with the growth rates of indices of industrial production may be looked into. Similarly in case of commercial consumers, the State Commission may assess the growth status of the business segments by looking at indicators like the business confidence indices before opting for a power tariff increase. Even after looking for these parameters it may so happen that relatively larger segments in categories like Domestic, Irrigation, Small Industry etc. are not in a position to face any tariff hike. In that case the State Government has to rush in with adequate subvention in order to sustain the possible tariff hike and save the situation.



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# **ROLE OF THERMAL POWER PLANTS & SMALL HYDRO ELECTRIC PROJECTS IN MEETING ORISSA'S DEMAND FOR POWER**

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## **1.0. INTRODUCTION**

- 1.1. Economic growth of any country or State depends on the growth and availability of power. Orissa is having 23% of India's Power Grade Coal with deposit of approximate 46,000 Million tonnes in its two coalfields located at Talcher and IB Valley area, which can sustain thermal generation of 1,00,000 MW for a period of 100 years. Similarly 10% of surface water of the country flows down through the State rivers in Mahanadi, Brahmani, Baitarani, Budhbalanga and Subarnarekha etc. to Bay of Bengal year after year which is also an important requirement for power generation.
- 1.2. Generation of electricity in Orissa started in the early years of the 20<sup>th</sup> Century mostly by small private Generators/Small Princely States, which reached an installed capacity of 157 MW by 1961 at the time of formation of Orissa State Electricity Board. Creation of State Electricity Board led to setting up of pit-head Thermal Generating Stations at Talcher and Ib Thermal (Banaharpalli), major hydro-stations at Hirakud, Rengali, Balimela, Upper Kolab, Indravati etc., establishment of grid net-work at 400 KV, 220 KV and 132 KV for evacuation and transmission of power to the various load centers. This helped growth of Eastern Regional grid for exchange of power between Central Generating Stations located in the Eastern Region of the country and strengthening connectivity to Southern and Western regions due to strategic geographical location of Orissa.

## **2.0. PRESENT POWER SCENARIO**

- 2.1. Orissa at present is endowed with an installed generating capacity of 3822 MW as shown in Table-1 below:

**TABLE –1**

**INSTALLED GENERATING CAPACITY OF ORISSA**

<b>(a)</b>	<b>State Generation</b>	<b>MW</b>	<b>%</b>
(i)	Thermal	880.00	23.00
(ii)	Hydro	1934.87	50.60
(iii)	CGPs (Surplus power to Grid)	102.00	2.70
	<b>Total State</b>	<b>2916.87</b>	<b>76.30</b>
<b>(b)</b>	<b>Share from Central Sector Generating Stations</b>		
	Thermal	822.00	21.50
	Hydro	83.00	2.20
	<b>Total Central</b>	<b>905.00</b>	<b>23.70</b>
	<b>Total Installed capacity of Orissa</b>	<b>3822 MW</b>	<b>100%</b>

2.2. Orissa has witnessed an average peak shortage of 51 MW in Evening peak hours (EPK) and energy shortage of 79 MU during FY 2007-08 (for the period from April to June 2007) as per the report compiled by CEA which is shown in Table – 2 below:

**TABLE –2**  
**POWER SITUATION OF ORISSA AS PER CEA REPORT**

Description	Period	Requirement	Availability	Deficit (-) / %
Energy	April to June 07	4471 MU	4392 MU	(-)79 MU / (-)1.8%
Average Peak Demand Met	April to June 07	2652 MW	2601 MW	(-) 51 MW / (-) 1.9%

**3.0. UPCOMING DEMAND FOR POWER BY END OF XI PLAN - 2012**

3.1. Govt. of India had circulated National Rural Electrification Polices (NREP) during December 2005 in which it is envisaged that 100% villages and 100% households would be effected with power by 2009 and 2012 respectively. As per the new definition of electrification of a village, it is estimated that about 20,000 villages are to be electrified and 80% of rural households are to be supplied with power in Orissa. The DISCOMs of Orissa made a detailed exercise and have projected the following additional demand to fulfill the aforesaid objectives under RGGVY which is shown in Table –3 below:

**TABLE – 3**  
**ADDITIONAL DEMAND ON ACCOUNT OF NREP**

Agency	Additional Demand Projected (MW)
CESU	549
WESCO	495
SOUTHCO	225
NESCO	360
<b>Total</b>	<b>1629</b>

The additional demand on account of NREP is 1629 MW. Considering the present T&D loss of 4% and at 80% availability, the installed generating capacity required to cater to this additional demand of NREP will be of the order of 3394 MW which is to be added to the Orissa Power System by 2012.

3.2. As Orissa is endowed with huge mineral resources, 47 Companies have signed MoU with Govt. of Orissa to set up Steel Projects and three companies have signed MoU to set up Allumina Projects in the State. The year wise power requirement for the aforesaid industries who have signed MoU with Govt. of Orissa is indicated under Table – 4 below:-

**TABLE – 4**  
**PHASED DEMAND OF POWER OF NEW INDUSTRIES (ALL IN MW)**

Status of the Power Supply	06-07	07-08	08-09	09-10	2010-11	Total
Already committed Power by GRIDCO / OPTCL	243	301	336	336	-	1216
Already applied to GRIDCO / OPTCL and under active examination	286	413	510	630	703	2542
Already signed MoU with GOO but not applied to GRIDCO / OPTCL	-	-	-	-	633	633

**Total : 4391 MW**

The additional demand on account of the aforesaid up coming industries is about 4391 MW. Considering the Transmission Loss of 4% in EHT system and 80% availability, the installed capacity required to cater to the aforesaid additional demand of the industries will be about 5717 MW, which is to be added to Orissa Power system by 2010-11.

- 3.3. The additional installed capacity on account of NREP and that of industries to be added to the Orissa Power system is estimated at about 9000 MW by 2012 to fully cater to the demand of the upcoming industries in the State as well as to effect power supply to 100% households as projected by DISCOMs in the State under Rajiv Gandhi Grameen Vidhyutikaran Yojana (RGGVY).
- 3.4. The 17<sup>th</sup> Electric Power Survey (EPS) finalized by CEA in March 2007 projected a Peak demand of 4459 MW at the end of XI Plan (2012) and to cater to this Peak demand, installed capacity of 6778 MW is required for Orissa Power System.
- 3.5. Realizing this, OERC has recently advised the State Govt. as per the statute regarding demand for power in the State and need for timely action to avoid deficit situation. The contents of the letter and certain relevant points are summarized below:
  - (a) Current availability from all sources in a year of normal rainfall is around 18212 MU with peaking capacity of 3000 MW, which is just sufficient to meet the present demand.
  - (b) Orissa has reached a break neck situation with regard to demand & supply of power due to no addition of generation capacity after commissioning of UIHEP in FY 2001.
  - (c) Unless the Govt. takes appropriate initiatives in a timely manner for generating stations to be established by the IPPs and such other future units (which take time to be erected and commissioned), the State may not be able to meet the demand for power. A bad monsoon will be ruinous for the State's economy, which called for sufficient spinning reserve to maintain continuity of supply of electricity.
  - (d) Appropriate steps should be taken for completion of brown-field projects like expansion of Ib Thermal Power Station and early implementation of projects by IPPs in the State so that the State can continue to maintain a comfortable power position and meet the upcoming industrial loads and vast expansion of Rural Electrical Network.

#### **4.0. ESTABLISHMENT OF THERMAL POWER PLANTS (TPPS) BY INDEPENDENT POWER PRODUCERS (IPPS)**

- 4.1. Thirteen nos. of Independent Power Producers (IPPs) have signed Memoranda of Understanding with Government of Orissa on 09.06.2006 and 26.09.2006 and have executed Power Purchase Agreements (PPAs) with GRIDCO on 28.09.2006. GRIDCO has filed application for each IPP separately on 28.09.2006 before OERC under Section 86 of Electricity Act, 2003 seeking the approval of the PPAs executed with the 13 IPPs for their upcoming thermal projects in Orissa.
- 4.2. The details of Independent Power Producers (IPPs) signed MoUs with Govt. of Orissa and PPAs with GRIDCO to develop 13 nos. Thermal Power Plants in Orissa are shown in Table –5:

**TABLE – 5**

**DETAILS OF THERMAL POWER PLANTS (TPPS) DEVELOPED BY IPPS**

<b>Sl. No.</b>	<b>Name of IPP</b>	<b>Capacity (MW)</b>	<b>Date of MoU/ Date of PPAs</b>	<b>Estimated Project outlay (Rs. Cr.)</b>	<b>Capacity Allocation of 25% to Orissa (MW)</b>
1.	M/s Navbharat Power Ltd, Hyderabad	Phase I 2 x 520 Phase II 2 x 600 Total=2240.00	09.06.2006 / 28.09.2006	9675.00	560.00
2.	M/s GMR Energy Ltd. Bangalore	1000.00	09.06.2006/ 28.09.2006	4200.00	250.00
3.	M/ Mahanadi Aban Power Company Ltd, Chhenai	1030.00	09.06.2006/ 28.09.2006	4257.00	257.00
4.	M/s Tata Power Company Ltd., Mumbai	1000.00	26.09.2006 / 28.09.2006	4384.00	250.00
5.	M/s Jindal Photo Ltd., New Delhi	1000.00	26.09.2006/ 28.09.2006	4525.00	250.00
6.	M/s Essar Power Ltd. Mumbai	Phase-I 1200.00 Ultimate- 2000.00	26.09.2006 / 28.09.2006	4500.00	250.00
7.	M/s CESC Ltd., Kolkata	1000.00	26.09.2006/ 28.09.2006	4042.21	250.00
8.	M/s Visa Power Ltd., Kolkata	1000.00	26.09.2006/ 28.09.2006	3698.00	250.00
9.	M/ Bhusan Energy (p) Ltd., New Delhi	Phase I 1000 Phase II 1000 Total= 2000.00	26.09.2006/ 28.09.2006	8483.00	500.00
10.	M/s LANCO Group Ltd, Hyderabad	1320.00	26.09.2006/ 28.09.2006	4500.00	330.00
11.	M/s Sterlite Energy (P) Ltd, Mumbai	2400.00	26.09.2006/ 28.09.2006	7481.00	600.00
12.	M/s Monnet Ispat Energy Ltd, New Delhi	1005.00	26.09.2006/ 28.09.2006	2852.00	150.00
13.	Ms/ KVK Nilachal Power (P) Ltd, Hyderabad	Phase-I 600.00 Phase-II 600.00 Total – 1200.00	26.09.2006/ 28.09.2006	2580.00	150.00
	<b>Total</b>	<b>16,190.00 MW</b>		<b>Rs. 68,299 Cr</b>	<b>4047.50 MW</b>

- 4.3. Government. of Orissa, Department of Energy vide Resolution No. 7947 dtd. 17.08.2006 has declared GRIDCO as the “**State Designated Entity**” for execution of PPA with Private Power Developers interested to develop thermal power projects coming up in the State.
- 4.4. Govt. of Orissa, Department of Energy vide letter No. 8404 dtd 02.09.2006 requested GRIDCO to undertake the following actions relating to Thermal Power Plants (TPPs) developed by IPPs.
- (a) The long term PPAs are to be signed with the above IPPs in line with the MoUs and the same are to be filed before OERC for their approval by 30.09.2006 positively pursuant to the National Tariff Policy of GoI dated 06.01.2006 and MOP letter No. 45/2/2006 – R&R dated 28.03.2006.
  - (b) An enabling clause is to be retained in the PPA that in case, for some reasons, GRIDCO is barred from buying and selling of the power in Bulk then GRIDCO shall assign the PPAs to such other agency of the state as may be decided by the State Government.
  - (c) Further, power generated beyond 80% of the Plant Load Factor (PLF) from the Thermal Power Plant is to be made available to the state at variable cost plus incentive as provided in the MoU may also be incorporated in the PPA.
  - (d) The capacity allocated to GRIDCO shall be up to 25 (Twenty Five) percent of the installed capacity of the thermal power station as requisitioned by GRIDCO once in each 5 (Five) year block period. GRIDCO shall requisition the capacity up to 25 (Twenty Five) percent six months prior to the commencement of each 5-year block period. For the first 5 (five) year block period, the requisition shall be given by GRIDCO six months prior to COD.
- 4.5. Para 5.1 of Tariff Policy notified on 06.01.2006 by Government of India reads as under:
- “..... All future requirement of power should be procured competitively by distribution licensees except in cases of expansion of existing projects or where there is a State controlled/owned company as an identified developer and where regulators will need to resort to tariff determination based on norms provided that expansion of generating capacity by private developers for this purpose would be restricted to one time addition of not more than 50% of the existing capacity .....”
- 4.6. The Ministry of Power, Govt. of India on a clarification to CERC has stipulated the following conditions for the power generation projects to cover under the aforesaid provision of the Tariff Policy:
- (i) Where the Power Purchase Agreement (PPA) has been signed and approved by the Appropriate Commission prior to 06.01.2006 or PPA has been signed and is pending before the Appropriate Commission on 06.1.2006 such procurement would be treated as falling outside the scope of clause 5.1 of Tariff Policy as contractual obligation for procurement of power has been firmly established in such cases.
  - (ii) Similarly, where the appraisal of any power project has started before 06.01.2006 by the relevant financial institutions for lending funds to the project on the basis of appropriate evidence of process of procurement of power by any utility, such procurement would be treated as falling outside the scope of clause 5.1 of the Tariff Policy provided that in all such cases final PPA is filed before the Appropriate Commission by 30<sup>th</sup> September, 2006.

- 4.7. OERC had a series of hearings regarding admitting the PPAs of the aforesaid IPPs and impressed upon them to furnish the requisite evidential documents for financial appraisal by any Financial Institution and off-take of power by any power utility/utilities from the proposed projects prior to 06.01.2006 to consider the proposed projects to be undertaken under MoU route. Only a few IPPs have furnished the requisite documents through affidavit for exemption under clause 5.1 of Tariff Policy.
- 4.8. The IPPs during hearings in OERC submitted that the proposed projects would be undertaken after receipt of statutory clearances from the competent authorities, allocation of coal blocks / long-term coal linkage, allocation of water linkage, allocation of land etc. after which the financial closure will be made.
- 4.9. Based on the present status of the projects, it is estimated that about 1874 MW i.e. only 50% of capacity considered out of 25% share ear-marked for Orissa from the IPPs which have executed MoUs with the Government would be available from the proposed thermal projects during XI Plan.

#### **5.0. NON-CONVENTIONAL SOURCES OF ENERGY GENERATION INCLUDING GENERATION FROM SMALL HYDRO ELECTRIC PROJECTS (SHEP)**

- 5.1. Para 5.12 of National Electricity Policy (NEP) issued by Ministry of Power dtd. 12.02.2005 stipulates that Non-conventional sources of energy being the most environment friendly, urgent action should be taken to promote generation of electricity based on such sources of energy.
- 5.2. Para 6.4 of National Tariff Policy (NTP) issued by Ministry of Power dtd. 06.01.2006 states that pursuant to provisions of Section 86(1) (e) of the Act, the Appropriate Commission shall fix a minimum percentage for purchase of energy from such sources taking into account availability of such sources in the region and its impact on retail tariffs. Such percentage for purchase of energy should be made applicable for the tariffs to be determined by the SERCs latest by April 1, 2006.
- 5.3. Para 5.3(i) of National Tariff Policy stipulates that Tariff fixation for all electricity projects (generation, transmission and distribution) that result in lower Green House Gas (GHG) emissions than the relevant base line should take into account the benefits obtained from the Clean Development Mechanism (CDM) into consideration, in a manner so as to provide adequate incentive to the project developers.
- 5.4. Based on the aforesaid principle laid down in NEP and NTP, OERC vide Order dtd. 20.08.2005 had approved procurement upto 200 MU by GRIDCO from renewable sources during FY 06-07. OERC has further directed that procurement of power from non-conventional and renewable energy viz small hydro, wind, biomass, cogeneration of electricity from waste heat products etc. would be allowed by supply licensees for use of consumers within the State upto 3% of the total purchase during FY 2007-08 to go up @ 0.5% per annum for each subsequent year to reach a level of 5% by the year 2011-12.
- 5.5. OERC vide Order dtd. 20.08.2005 categorically mentions that small, mini, micro plants may not be in a position to arrange for connectivity with the OPTCL as the cost of such arrangements may be quite exorbitant rendering the project unviable. Therefore, the generating companies of non-conventional and renewable sources would be permitted by DISTCOs / OPTCL to deliver the

power at 11 KV or 33 KV as the case may be. Depending upon the techno-commercial viability of the project, the interconnection point for delivery of power may be at 132 KV.

5.6. The Ministry of New and Renewable Energy (MNRE), Govt. of India has taken a number of steps due to which grid connected renewable energy capacity is 10,175.03 MW as on 30.06.2007. MNRE is taking an ambitious step to add another 14,000 MW grid connected renewable energy capacity by 2012.

5.7. Govt. of Orissa have also taken a number of steps to harness power from renewable sources during XI Plan. Govt of Orissa Deptt. of Energy have encouraged a number of Small Hydro Electric Projects under renewable energy sources to come up during XI Plan. The details of such Small Hydro Electric Projects developed by IPPs by Orissa are shown in Table-6 below:

**TABLE – 6**  
**LISTS OF SMALL HYDEL ELECTRIC PROJECTS DEVELOPED BY IPPS**

<b>Name of the Developer</b>	<b>Name of the Small Hydro Electric Project (SHEP)</b>	<b>Location of SHEP</b>	<b>Installed Capacity in MW with no. of units</b>	<b>Design Energy (in MU)</b>	<b>Project Cost (in Rs. Cr.)</b>	<b>Date of MoU with Govt.</b>
M/s Sharvani Energy (P) Ltd	Dumajorhi SHEP	On Kolab river at Village Dumajorhi	2x7.5	52.10	72.00	14.09.2006
M/s Orissa Power Consortium Ltd.	Jalaput Dam Toe SHEP	Jalaput Dam, Jalaput	3x6	82.50	83.50	07.11.1994
M/s Salandi Hydro Power Projects Pvt. Ltd.	Salandi Dam SHEP	Hadgarh (V) Dist- Keonjhar	2x4.5	28.40	39.52	07.10.2005
M/s Kakatiya Chemicals Pvt. Limited	Bargarh Head Regulator SHEP	Near Bargarh Head Regulator 18 km from Attabira	2x4.5	27.22	36.00	27.10.2005 (Revised MoU)
M/s Jeypore Hydro Power Projects Pvt. Ltd.	Jeypore SHEP	Sattiguda near Reservoir Jeypore town	2x3.0	19.97	27.63	05.07.2004
M/s Sideshwari Power Generation Pvt. Ltd.	Kharagpur SHEP	On Kolab river at Kharagpur	2x5.0	29.08	42.00	06.06.2002
M/s. Arun Power Projects Ltd.	Hatipathar SHEP	on Nagavali river in Rayagada Dist.	2 x 3.75 + 1 x 2.50	38.02	45.75	08.03.2004

5.8. Besides the above five nos. of Small Hydro Projects, M/s Venus Energy Pvt. Ltd, (VEPL) Hyderabad have executed a PPA with GRIDCO to develop a Small Hydro Project (2 x 10 MW) at Lower Machkund site in the State of Orissa at an estimated cost of Rs. 95.86 crore with a design energy of 92 MU. During last hearing in OERC on 20.08.2007, GRIDCO submitted that Govt. had cancelled the MoU and as well as the site at Lower Machkund in favour of VEPL. VEPL submitted that they had represented before the Govt. to restore the MoU as well the site in their favour and the same is under active consideration of the Govt. The Commission vide Order dtd. 20.08.2007 directed VEPL to again file the application for approval of Tariff after the matter is resolved at Govt. level.

## **6.0. CONCLUSION**

- 6.1. In exercise of power vested with OERC under Section 86(2) of Electricity Act, 2003, Commission had advised the Govt. of Orissa, Deptt. of Energy in 2005, in 2006 and again in 2007 to enhance the generation capacity of the State so as to maintain a comfortable power supply position after meeting the upcoming industrial demand as well as demand due to massive rural electrification under RGGVY.
- 6.2. Govt. of Orissa, Deptt. of Energy only signed the MoUs with 13 nos. of IPPs in year 2006 to set up Thermal Power Projects of about 16,000 MW at an estimated cost of Rs. 68,000 crores from which Orissa would get about 4,000 MW towards 25% share. Not a single IPP has achieved the financial closure for their projects and hence Orissa may be able to add 1874 MW from these proposed Thermal Power Projects based on their present project status..
- 6.3. Govt. of Orissa, Deptt. Of Energy expects to add 97 MW by 2012 from Small Hydro Electric Projects but from the present status of these SHEPs, the State may add only about 77 MW from the proposed Small Hydro Electric Projects.
- 6.4. Experts in power sector visualize that due to complete inaction of the State Govt. since a decade (1997-2007) to add any generation capacity, Orissa although endowed with 23% of the Country's power grade and 10% of annual surface water flow, will be with begging bowl for power in 2008 resorting to statutory power-cut on industries and area load shading and will be ultimately plunging to power-famine from the year 2009 onwards.
- 6.5. Govt. of Orissa should constitute a task force in the pattern of war council functioning during war time to monitor the power project so that all the IPPs who have signed MoU with Govt. should start their Thermal Power Projects as well as Small Hydro Electric Projects by December 2007 completing their financial closure so that at least 4,000 MW thermal power and 97 MW small hydro renewable power can flow to Orissa grid by 2012 to avoid the impending disaster in the State economy on account of acute shortage of power.



## **ACHIEVEMENT OF CONSUMER SATISFACTION AS A FALL OUT OF THE CONSUMER SERVICE DOCUMENTS UNDER THE ELECTRICITY ACT, 2003**

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Electricity sector deals with generation, transmission and distribution of electricity. The end user of the product this is the consumer. The consumer may belong to LT or HT or EHT. Number of LT consumers are generally very high compared to other consumers. Electricity sector thus has to deal with enormous consumer related affairs like new connection, maintaining quality supply, restoration of supply, billing, collection, disconnection, reconnection, change of load and category etc.

The preamble of the Electricity Act, 2003 says that it shall consolidate the laws relating to various activities/objectives. One among them is the protection of interest of the consumers. Sec.14 of the Act empowers the Commission to grant licence to any person to distribute electricity as a distribution licensee in any area as may be specified in the licence. Sec.16 of the Act empowers the Commission to specify general or specific conditions which shall apply to the licensee as deemed conditions. Accordingly, the Commission has granted distribution licenses to 4 nos. of DISTCOs i.e. CESU, NESCO, WESCO & SOUTHCO vide order dt.27.10.06 in Case No.21/2006, which contains various licence conditions.

Sec.42 to 50 of the Act says about the provisions relating to duty of the distribution licensees to supply power to their consumer and accordingly the Commission has framed OERC Distribution (Conditions of Supply) Code, 2004. These regulations provide time-bound activities that the licensees are required to follow, so that consumers avail the services in time and are not harassed. Sec.57 & 58 of the Act also provides that the distribution licensees should adhere to the standards of performance specified by the Commission failing which the affected consumers shall be given compensation. Accordingly OERC (Licensee's Standards of Performance) Regulations, 2004 has been framed. It also contains the time bound activities that the licensees should follow so that various consumer services are fulfilled in time. Failure on the part of the licensees shall result in payment of compensation. The OERC Distribution (Conditions of Supply) Code, 2004 and OERC (Licensee's Standards of Performance) Regulations, 2004 are compatible with each other.

The licensees had earlier got the consumer service documents like Code of Practice on Payment of Bills, Complaint Handling Procedure and Consumer Rights Statement under OER Act, 1995 after approval of the Commission. As per the Licence Condition issued to the Distribution Licensees vide order dt.27.10.2006 in case No.21/2006, the Licensees are required to prepare the consumer service documents for approval of the Commission. They are as below:

### **❖ CODE OF PRACTICE ON PAYMENT OF BILLS**

As per Licence Condition No.19.1(a), the Licensee shall, within a reasonable time, as directed by the Commission, prepare and submit to the Commission, for its approval, a Code of Practice concerning the payment of electricity bills by consumers including appropriate guidelines for the

assistance of such consumers who may have difficulty in paying such dues, and procedures for disconnection in the event of non-payment by the consumers.

While granting approval of such document, the Commission may make such modifications to the Code, as it may consider necessary.

❖ **COMPLAINT HANDLING PROCEDURE**

As per Licence Condition No.19.2(b), the Licensee shall, within a reasonable time, as directed by the Commission, notify a procedure with approval of the Commission for handling complaints from consumers of the licensee in addition to the Forum for Redressal of Grievances.

While granting approval of such document, the Commission may on consultation with the State Advisory Committee (SAC) or a person or body of persons, who the Commission considers as representing the interest of the consumers likely to be affected make such modifications of the Procedure, as it deems necessary.

❖ **CONSUMER RIGHTS STATEMENT**

As per Licence Condition No.19.3(a), the Licensee shall, within a reasonable time, as directed by the Commission, prepare and submit to the Commission for approval, a Consumer Rights Statement explaining to the consumers their rights.

While making modification of the Statement, as it considers necessary in public interest, the Commission may, upon holding such consultation with the SAC and such other persons or bodies of persons who the Commission considers as representing the interest of the consumers likely to be affected by it.

These consumer service documents are supposed to contain various service areas in which the licensees are required to provide service to their consumer within a stipulated time. For example, the licensees are required to restore power supply to the consumers whose power supply has been affected due to fuse-off, line breakdown, transformer failure. The licensees are required to set right the voltage inconvenience of their consumers within certain period. Similarly, there are many areas where licensees are to meet the consumer satisfaction. The licensee's consumer service documents says that its employees are to be approached by the consumer if the service is not provided in time. If the consumer fails to get due satisfaction of service from the licensees, he/she is entitled to get compensation from the licensees. He/she also may go to GRF/Ombudsman to get his/her grievance redressed. Above all, the Commission is there to penalize the licensees if they do not meet the consumer satisfaction by disregarding various statutory norms under the Act/Regulation/Code/Standards. Of late, the Commission has begun the exercise of consumer satisfaction survey for which the Public Affairs Officer of the Commission is working as the nodal officer.



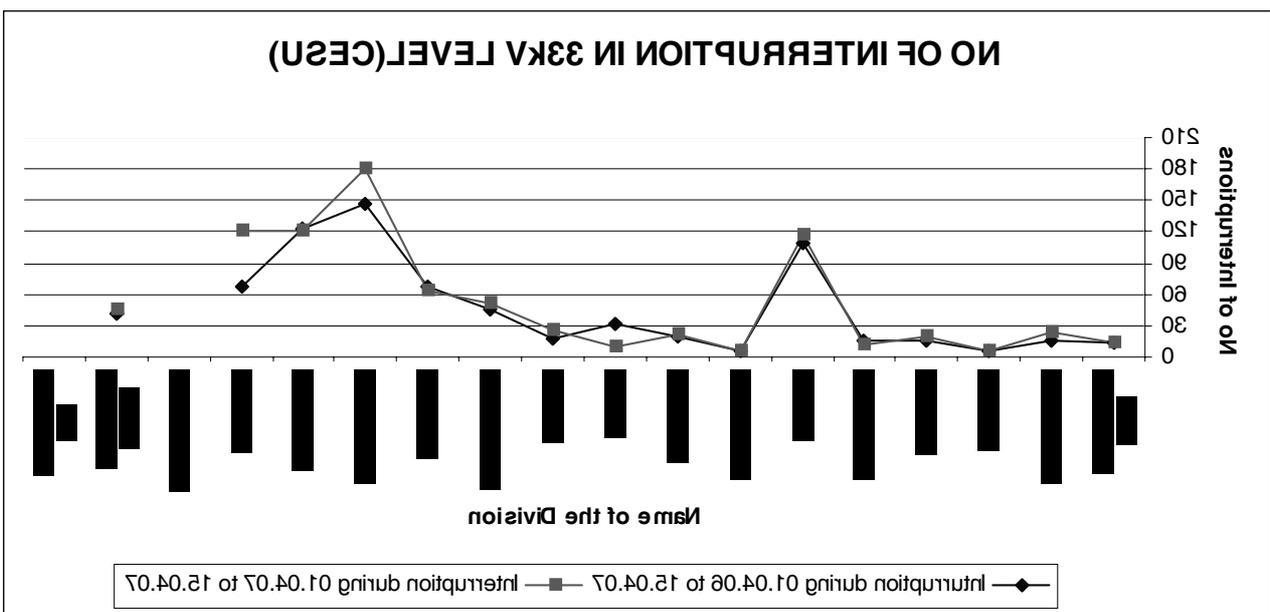
# LICENSEE'S STANDARD OF PERFORMANCE AND COMMISSION'S INVESTIGATION

S.P. Mishra

Dy. Director (Engg.), OERC

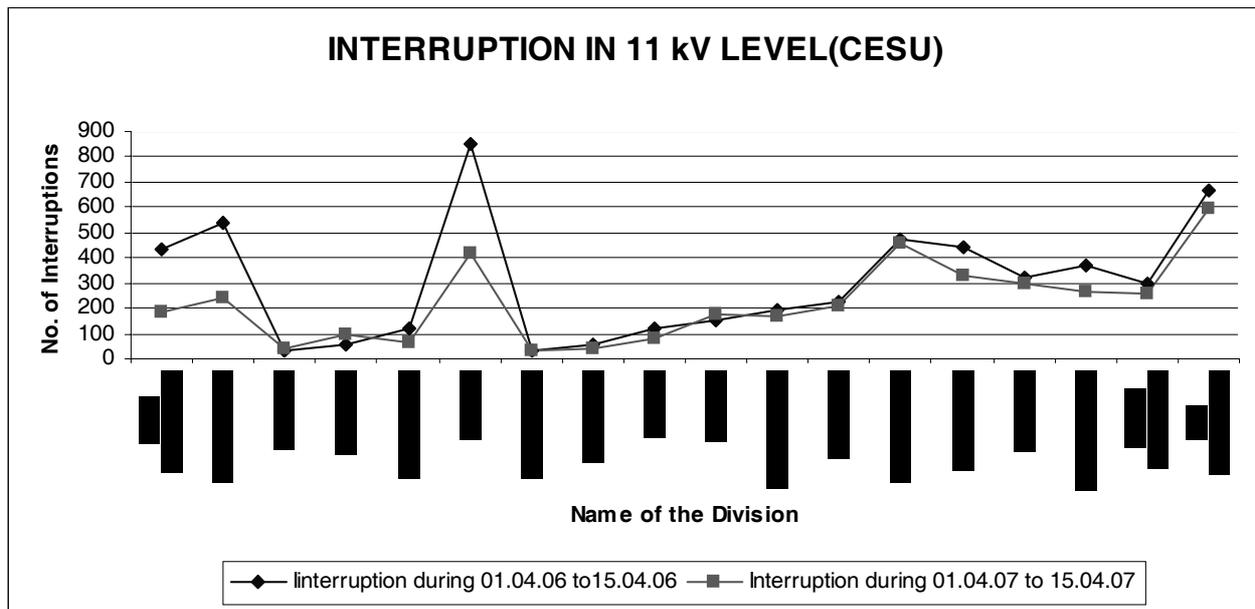
The Commission has framed OERC (Licensees Standard of Performance) Regulation, 2004 in accordance with section 57 of the Electricity Act 2003. As per the said Regulation, the Licensees are required to attain the Consumer complaints with reference to various service areas. These areas are restoration of supply, improvement of voltage, complaints on meters/billing, reconnection after disconnection, change of category, title transfer of ownership and providing new power supply. These services are to be provided within a specified time period by the Licensees failing which the affected consumers are liable to get compensation. The Licensees are submitting periodic reports on achievements of their above standards.

Of late, The Commission while reviewing the Disaster Preparedness and Disaster Management Plan of CESU on 21.05.2007 has found that the instances of disruption of supply of electricity in different Divisions/Circles in the jurisdiction of CESU have continued to remain high affecting a very large number of consumers. The Commission further observed that service provided by the Licensee has deteriorated mainly because of absence of specific action plan. Also in that meeting it was revealed that unlike revenue review, the issue of quality of power supply has never been discussed and no directions have been issued from the corporate office of CESU, except some informal discussions. A comparative statement graph on the number of interruption and duration of interruption in 11 kV & 33 kV feeders during the first 15 days of the last financial year (01.04.2006 to 15.04.2006) and the current financial year (01.04.2007 to 15.04.2007) are enumerated below:



**Comparative statement of interruption of 33 kV & 11kV Feeder between 01.04.2006 to 15.04.2006 and 01.04.2007 to 15.04.2007 in CESU.**

Name of the Circle	Name of the Division	01.04.2006 to 15.04.2006		01.04.2007 to 15.04.2007		01.04.2006 to 15.04.2006		01.04.2007 to 15.04.2007	
		No. of Interruptions	No. of Interruptions	No. of Interruptions	No. of Interruptions	Duration of interruption in Minutes.			
		33kV	11kV	33kV	11kV	33kV	11kV	33kV	11kV
Electrical Circle No-I, Bhubaneswar.	B.E.D. Bhubaneswar.	13	431	13	188	45	1377	69	2072
	NED, Nimapara	15	539	24	245	554	1949	2023	1496
	BCDD Nol	5	29	5	37	127	466	108	984
	BCDD Noll	15	57	19	98	221	1130	206	2060
	NED Nayagarh	16	120	11	62	464	3422	33	1196
Electrical Circle No-II, Bhubaneswar.	PED, Puri	109	851	116	420	5610	11358	4852	15452
	BED Balugaon	5	31	6	31	84	857	47	790
	KED, Khurda	20	58	21	43	1307	1200	2170	2399
	CDD Nol	31	122	9	84	468	1903	72	986
Electrical Circle, Cuttack.	CDD Noll	18	154	25	173	116	4090	371	5646
	CED, Choudwar	45	196	51	171	1771	6465	3956	7235
	SED, Salipur	67	222	63	208	1281	4220	2233	6341
Electrical Circle, Dhenkanal	DED Dhenkanal	146	473	180	459	4640	16820	7853	27634
	TED, Chainpal	122	444	120	327	7005	33214	9275	16340
	AED, Angul	67	325	120	294	2761	12485	3521	12522
Electrical Circle, Paradeep	KED, Kendrapara		371		264		423		407
	KED No II, Marshaghai	42	295	45	255	623	4309	519	3207
	JED, Jagatsinghpur		668		591		20873		20023



As this is a matter of serious concern regarding the poor quality of supply of electricity to the consumers in different Divisions/Circles under CESU, teams was constituted by OERC for conducting enquiry into the power supply problem in Bhubaneswar city and recommend the measures for improvement of the system.

The enquiry team has submitted a detail report with the following observations /recommendations, broadly classified under Short-term and long term measures required to be implanted in CESU.

### SHORT TERM MEASURES

- ❖ A quick check of the Lightning Arrestor installations at 33/11KV transformers,33KV line terminals, 11KV outgoing feeders at 33/11KV sub-stations, 11KV incoming feeders at 11/0.4KV distribution sub-stations should be carried out with replacement of all damaged / missing Lightning Arrestors.
- ❖ Earthing connections of Lightning Arrestors should be checked and defects are to be rectified.
- ❖ Measurement earth resistance at every location may be made regularly and record of this should be maintained for analysis, if required.
- ❖ Immediate checking of all connectors and joint.
- ❖ All worn out and arcing AB Switches must be immediately replaced
- ❖ All Bus conductors at 33/11KV sub-station where ACSR conductors are used must be upgraded to ACSR PANTHER (211mm<sup>2</sup>).
- ❖ Oil leakages from 33/11KV transformers must be attended forthwith.
- ❖ Operation of all Breakers and their mechanism should be checked at least once in a month by relay operation manually.

- ❖ Oil from 33/11KV transformers must be tested at least for BDV, Moisture content and Tan Delta locally either at OPTCL Laboratory, Bhubaneswar or at the Government Testing Laboratory under Chief Electrical Inspector, at Bhubaneswar till CESU set up their own Testing Laboratory at Bhubaneswar.
- ❖ Immediate action should be taken for improvement of the Battery installations at all 33/11KV sub-stations. Also regular checking of Battery electrolyte Sp-Gr from specific cells at Sub-stations should be made.
- ❖ All fused indication lamps at C/R panel and 11KV panels must be replaced. And sufficient stock of lamps must be maintained.
- ❖ An immediate review of IDMT relay gradation between 33/11KV sub-station and Grid sub-station with Back-up check up to 132KV side of the transformer should be carried out on the basis of 3ph and 1ph-G fault MVA's available from recent systems studies by OPTCL. Each successive relay, for the same fault current must have at least an operation time interval of (0.3to 0.4sec). It was suggested that a Relay Coordination Committee may be constituted for the purpose, constituting of members from CESU and OPTCL.
- ❖ The sub-stations and Control rooms must be maintained in a proper manner with Proper fencing and compound walls.
- ❖ Detailed inspection of all 33KV lines & 11KV lines run on single poles and double poles must be carried out under supervision of at least one Asst. Manager and immediate action may be taken for replacement of damaged insulators, pruning of tree branches, Bamboo trees, coconut trees etc. in a time bound programme. All jumper connections must be inspected and every connector must have two PG clamps.
- ❖ KVA-KM loading of all 11KV feeders must be assessed taking peak loads into consideration and determine the voltage regulations.
- ❖ Standards as prescribed by OERC, 'Distribution System Planning and Security Standards' should be adhered to.
- ❖ Load balancing at the distribution transformer end must be carried out and corrections has to be made to avoid over loading.
- ❖ All LT cables at Distribution sub-stations must be properly clamped, crimped to sockets and then connected.
- ❖ Tensioning of wires in case of excessive sagging, positioning of phase spacers in LT lines, Straightening and re-clamping of cross arms, Regular removal of birds nest from top of the pole, Strict enforcement of Rules for laying of cables by TV Cable operators on Distribution poles must be ensured.
- ❖ Gradual removal of overhead service connection and change over to pillar box outlet scheme, should be done.
- ❖ To discipline consumers from consuming power in excess of declared connected loads, installation of Minimum Circuit Breakers(MCB) for each consumer may be incorporated in the proposed pillar box out let, at consumers cost.

## LONG TERM MEASURES

- ❖ Procurement action for relays and other equipment for LILO arrangements at the connected 33/11KV sub-station for ring operation of the DC 33KV lines should be initiated. A target date of April 2009 for completion of the extension work was suggested for better will be the performance of the system.
- ❖ 33KV take off arrangements from newly constructed 132/33KV sub-stations at Bargarh and Phulnakhara should be planned from now onwards, otherwise there may be right of way problems later.
- ❖ The proposal for running the LT system , underground may be considered and financial implication has to be worked out . Engineers may be deputed to visit places where such underground systems are in operation, to see their working and performance.
- ❖ Complete renovations and modernization of sub-stations at Badagada and Mancheswar Industrial Estate area is required. This may be planned after shutting down the sub-stations once the new 132/33 KV sub-station at Badagada and Phulnakara became functional.
- ❖ Training center may be created to impart training to officers and men handling sub-station equipment.
- ❖ Energy Audit must be made functional for the entire supply area of the Licensee for monitoring losses. Feeders contributing considerably to losses can be detected and appropriate remedial measures must be taken up. Proper studies may be carried out for proper planning the distribution network to meet the growing demand in future..
- ❖ In every 33/11KV sub-station provisions may be made for separate rooms for storing materials. The prevailing practice of dumping waste and construction materials in control room and battery room must be discontinued.
- ❖ Register of inspection shall be maintained at each 33/11KV sub-station to record data and notes of inspection of senior level officers.
- ❖ A new HT maintenance Division was proposed for efficient operation and maintenance of the 33/11KV sub-stations.
- ❖ Reorganization of Technical Wing in Head Office may be done at the earliest. To run a Supply Company efficiently, a dedicated technical wing should be created to carry out a lot of planning and monitoring.
- ❖ The functions of maintenance and commerce should be separated for better & timely service to the consumers.

Further, the Commission has recently appointed two enquiry committees to do similar exercises for PED, Puri & Burla Circle.

The present unsatisfactory condition of the power supply has arisen because of poor maintenance and lack of monitoring of performance of various elements of system.

The situation will definitely improve considerably if some simple measures as suggested by the enquiry committee are taken up at the earliest and must be completed within a specified time limit supported by a good monitoring team. With proper management leadership and motivational efforts, the entire associated persons will rise to the occasion and contribute to build a strong, efficient distribution network.



# **ORISSA HYDRO POWER CORPORATION LTD (OHPC) -A BIRD'S EYE VIEW**

**S.S. Bhoi**  
**A.K. Jagdev**  
PPA Cell, OHPC

## **INTRODUCTION**

In view of the gradually ailing & repeatedly tripping of Indian power sector, debate on its reform was started. The major points of consideration were unbundling of the State Electricity Boards into utilities of generators, transmitters and distributors. The prime aim was qualitative power supply and quantitative realization of revenue. Orissa being the pioneer State, initiated unbundling of Orissa State Electricity Board (OSEB) in the year 1996 by enacting Orissa Electricity Reform, Act, 1995. In this process, Orissa Hydro Power Corporation Ltd. (OHPC), a state owned generating company, was incorporated on 1<sup>st</sup> April 1996 under companies Act, 1956 to carry out the business of generation of electricity and the assets, liabilities and personnel of OSEB were transferred to this company.

The hydro power stations transferred to OHPC are (1) Hirakud Power System (HPS) (both Burla & Chiplima Power Stations), (2) Balimela H.E. Project (BHEP), (3) Rengali H.E. Project (RHEP), (4) Upper Kolab H.E. Project (UKHEP), (5) Upper Indravati H.E. Project (UIHEP) & (6) Potteru Small H.E. Project (PSHEP), out of which UIHEP & PSHEP were under construction stage. The 1<sup>st</sup> unit of UIHEP was commercially operated on 19.09.99 and the last unit of UIHEP was commercially operated on 19.04.2001. But, the generating units of PSHEP are yet to be commercially operated. Further, in 1997, the Machhkund Hydro Electric (Jt.) Scheme was transferred to OHPC by Govt. notification with 30 % share of Orissa. However, Orissa is entitled to purchase power from Machhkund upto 50 % of its generation.

## **INSTALLED CAPACITY & DESIGN ENERGY**

At the time of formation in 1996, the total installed capacity of OHPC was 1272 MW including 34.5 MW Orissa share from Machhkund. In the mean time, 600 MW capacity was added at UIHEP. Similarly at Burla Power house total 40 MW was added by up-gradation of units 1 & 2 from 37.5 MW to 49.5 MW each and units 3 & 4 from 24 MW to 32 MW each. Further, an additional capacity of 150 MW is to be added shortly in the FY 2007-08 in respect of 7<sup>th</sup> & 8<sup>th</sup> extension units at Balimela. The capacity of Potteru Small H.E. project which is yet to be commercially operated, is consists of two power houses of 3 MW each.

Similarly, the total design energy of OHPC power stations excluding Machhkund (Jt) Project & Potteru Small H.E. Project is 5676 MU. The design energy of Machhkund Project is 525 MU with Orissa share upto 50 % & that of Potteru Small H.E. Project is 44 MU. However, the re-assessment of design energy OHPC power stations are under process.

The design energy as per the project report and present installed capacity of individual generating stations including 7<sup>th</sup> & 8<sup>th</sup> extension units of BHEP is illustrated below.

Name of the Power Station	Installed Capacity(MW)	Design Energy(MU)
Hirakud (Burla & Chiplima)	347.5(2 x 49.5 + 2 x 32+3 X 37.5 +3 x 24)	1174
Balimela	510 (6 x 60 + 2 x 75)	1183
Rengali	250 (5 x 50)	525
Upper Kolab	320 (4 x 80)	832
Upper Indravati	600 (4 x 150)	1962
Machhkund (Orissa Share)	34.50	262.5
<b>Total</b>	<b>2062</b>	<b>5938.5</b>

### POWER GENERATION

Except Upper Indravati, all other power stations of OHPC are very old. HPS, Burla have completed their 50 years of operation and Balimela has completed its 35 years of operation. Rengali & Upper Kolab Power Stations are about 20-25 years old. In spite of frequent maintenance of the old generating units, OHPC could be able to maintain the availability & generation of its power stations at optimum level. However due to weeds & other problems at Chiplima the availability of HPS is not encouraging. The year-wise generation of individual power station in MU is illustrated below.

YEAR	HPS	BHEP	RHEP	UKHEP	UIHEP	MACHHKUND (O.D)	TOTAL
1996-97	975.397	1185.059	783.263	726.667	—	362.389	4032.775
1997-98	936.930	918.549	987.782	469.290	—	296.661	3609.212
1998-99	1218.457	806.575	933.525	434.321	—	245.001	3637.879
1999-00	1115.180	1214.746	898.940	808.198	490.383	310.102	4837.549
2000-01	585.766	1006.585	718.476	520.024	1768.765	318.445	4918.061
2001-02	961.728	1070.553	793.085	657.378	2965.406	325.120	6773.270
2002-03	647.435	546.211	644.432	497.392	807.078	266.078	3408.626
2003-04	955.536	1144.896	1052.100	656.507	2140.681	198.900	6148.620
2004-05	839.700	1527.502	750.068	896.016	2851.296	366.592	7231.174
2005-06	908.91	1053.012	677.454	623.693	1762.989	323.985	5350.043
2006-07	862.344	1621.385	669.911	1026.468	3019.387	341.718	7541.213

### COMMERCIAL MECHANISM

Historically the entire power generated by OHPC Power Stations is procured by GRIDCO as a deemed license for bulk supply business within the state, who in turn supply the same to the Distribution Licensees

of the state. Hence, under the existing single buyer set up, the real benefit of the low cost power produced by OHPC passes on to the consumers of our state, GRIDCO being only a medium to receive the power from OHPC power stations for the Distribution Licensees.

However, on account of the inter-state agreement between Orissa & Madhya Pradesh and subsequent order for Hon'ble High Court of Madhya Pradesh at Jabalpur, 5 MW generation from HPS Burla was supplied to MPEB, Madhya Pradesh from 03.02.05 to 04.09.06 and thereafter, it is being supplied to CSEB, Chhatisgarh. Further, in December' 2006, based on the decision of Govt. of Orissa & approval of Hon'ble OERC, 32.454 MU power has been sold to M/S AEL. However, the revenue earned from this outside sale of power is to be adjusted against the outstanding dues of GRIDCO.

In the present regulatory set up, the tariff of OHPC power is being fixed by the Hon'ble OERC every year through public hearing on the ARR & tariff application of OHPC at the beginning of each financial year.

Upto the FY 2004-05, single part tariff was being followed for OHPC Power Stations, where the revenue is earned through energy charges only. In this case the Annual Revenue Requirement can only be recovered if design energy is achieved. From the FY 2005-06 as per the directive of Hon'ble OERC, two part tariff was implemented at UIHEP, where AFC is recovered through capacity charges & Primary energy charge. From the FY 2007-08, two part tariff has been extended to all the power stations i.e. UKHEP, RHEP BHEP, HPS. Salient features of two part tariff is that, secondary energy is priced almost at same rate as that of primary energy rate and incentive / dis-incentive is applied on generator (OHPC) for higher / lower Capacity Index than the normative value of 85%.

Further, in view of the recommendations of the committee of independent experts and the correctives suggested by OERC & the notification of the State Govt., the moratorium on debt servicing by OHPC to the State Govt. and the effect of up-valuation of assets of OHPC was kept in abeyance from the FY 2001-02 in order to reduce the generation tariff so that the retail supply tariff would not increase.

The Average Tariff of OHPC Power Stations in Paise / KWh from the FY 1996-97 is illustrated below

YEAR	HPS	BHEP	RHEP	UKHEP	UIHEP
1996-97	38.00	38.00	38.00	38.00	
1997-98	49.00	49.00	49.00	49.00	
1998-99	48.11	48.11	48.11	48.11	
1999-00	49.64	49.64	49.64	49.64	59.07* 44.70*
2000-01	50.02	50.02	50.02	50.02	57.83** 63.05**
2001-02	24.99	24.99	24.99	24.99	65.40
2002-03	24.73	24.73	24.73	24.73	63.82
2003-04	27.35	27.35	27.35	27.35	64.96
2004-05	28.67	28.67	28.67	28.67	62.86
2005-06	52.96	19.50	31.42	13.72	64.53
2006-07	57.10	21.82	35.56	16.35	65.50

N.B. : \* One unit operation & two units operation.

\*\* Two units operation & three units operation

## **DEVELOPMENT OF HYDRO POWER**

As a state owned generating company, OHPC explores the possibilities for development of hydro power in the state of Orissa. OHPC is planning for development of Sindol Hydro Electric Complex on Mahanadi River. This project complex comprises of three barrage based cascading power houses viz. Sindol - I (3 x 30 MW) at Deogaon, Sindol – II (3 x 30 MW) at Kapasira and Sindol – III (4 x 30 MW) at Godhaneswar. Further, OHPC also planning for RLA study of the generating unit at BHEP for renovation & modernization as it has already completed its 35 years of operation.

Apart from the development of hydro power, OHPC also diversifying its scope to develop thermal power projects in the state to harness the huge quantity of available coal blocks. For this purpose OHPC has formed a joint venture company in collaboration with OMC, to set up a thermal power project of 2000 MW. Further under the SPV scheme of GOI, OHPC is likely to be allotted three coal blocks by GOI through three numbers of Shell Companies under OHPC for the purpose of developing thermal power of 8500 MW.

## **CONSTRAINTS**

All the power stations under OHPC are multi purpose projects, where priority is given to the water demand for irrigation in khariff & Rabi Seasons. Hence beyond the monsoon period, use of water for power generation is almost controlled by the irrigation department so that the declaration of capacity for power generation is affected in non-monsoon season. Further power generation is scheduled by SLDC as per the grid demand, even when stations are capable for more generation, which affects the earning of revenue through energy charges. The peculiarity is that OHPC power stations have no control over use of water in one hand and also no control over evacuation of generation of its own in other hand, which effects on both capacity charges & energy charges respectively. Further, revenue is not fully recovered from GRIDCO, which partly affects the procurement of adequate maintenance spare for timely repair & maintenance of generating units. Apart from the above, non-availability of sufficient technical non-executives & executives at ground level is also a major constraint for Operation & Maintenance of the power stations.

## **CONCLUSION**

Orissa is rich in natural water resources by the blessings of the God. The development of hydro power in this economically poor state is absolutely necessary, as it is eco-friendly and the cost is comparatively lower. Hence the Govt. of Orissa as well as the eminent technologists should explore the possibilities for growth of hydro power in our state, with minimum possible rehabilitation & re-settlement. Further, renovation & modernization of the existing projects is also need of the day. In spite of some difficulties in its path, OHPC is marching ahead with renovation & modernization and operation & maintenance of the existing hydro power stations of its control under the guidance & co-operation of the State Govt., State Commission & other utilities of the state.



## **PERFORMANCE OF DISTCOS**

**Anil Kumar Panda,**  
Dy. Director (Tariff- Engg.)

GRID Corporation of Orissa (GRIDCO), initially after reforms in 1996 till 1999, performed both transmission and distribution business. After that it divested 51% of its shares in four distribution companies, to be run by private companies. Distribution Companies as given below were formed on geographical basis.

- ❖ Central Electricity Supply Company (CESCO)
- ❖ Northern Electricity Supply Company (NESCO)
- ❖ Western Electricity Supply Company (WESCO)
- ❖ Southern Electricity Supply Company (SOUTHCO)

### **The main objectives of privatisation of distribution functions were**

- (i) **Operational Improvements:**
  - ❖ Improve quality of service to consumers.
  - ❖ Improve operational efficiencies and reduce losses.
  - ❖ Mobilize professional skills
- (ii) **Financial benefits:**
  - ❖ Attract private investment into the distribution business.
  - ❖ Reduce the need for govt. funding of the electricity sector.
  - ❖ Contribute to increased economic growth in Orissa.
- (iii) **Employee considerations:**
  - ❖ Create opportunities for secure and increasingly rewarding employment for qualified personnel.
  - ❖ Provide a stable environment for employees.
- (iv) **Sale of all 4 Zones to promote competition.**

### **It was recognised that operational improvement will be achieved through following activities**

- ❖ Execution of World Bank funded distribution package
- ❖ Execution of HVDS (High voltage Distribution system )
- ❖ Replacing LTOH (Low tension over head) bare conductor line by AB conductor
- ❖ Fixing meter in feeders, LT side of Dist. Transformer and consumers premises and take up energy audit through energy balance, thereby identify loss prone areas and take corrective measures

All the above works have been partially executed but some other works could not complete due to non-extension of time by World Bank and other constraints. Further some of the problem faced by licensed are

- ❖ No fund has been mobilised by investor to take up the energy audit related works
- ❖ APDRP fund are not available due to various constraints

- ❖ Mobilisation of franchisee
- ❖ Lack of rules and regulation for engaging franchisee do not exist. Govt. of India to provide such guidelines for engagement of franchisee.
- ❖ Consumers are the largest stakeholders of the electricity industry. Educating them is very essential, particularly with regard to tampering or unauthorised use of electricity.

The Distribution Licensees in Orissa namely, CESCO, NESCO, SOUTHCO and WESCO are carrying out the business of distribution and retail supply of electricity in their licensed areas as detailed below:

**TABLE-1**

Sl. No.	Name of DISTCO	License No.	Licensed Areas (Districts)
1.	CESCO	1/1999	Puri, Khurda, Nayagarh, Cuttack, Denkanal, Jagatsinghpur, Angul, Kendrapara.
2.	NESCO	3/1999	Mayurbhanj, Keonjhar, Bhadrak, Balasore and Jajpur.
3.	SOUTHCO	2/1999	Ganjam, Gajapati, Kandhamal, Boudh, Rayagada, Koraput, Nawarangpur and Malkangiri.
4.	WESCO	4/1999	Sambalpur, Sundargarh, Bolangir, Bargarh, Deogarh, Nuapara, Kalahandi, Sonapur and Jharsuguda.

A statement of Energy Sale, Purchase and Overall Distribution loss from FYs 2001-02 to 2006-07 for the four DISTCOs is given in tabular form below:

**TABLE-2**

	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
<b>CESCO</b> Energy Sale (MU)	2143.0	2310.6	2398.0	2252.3	2391.6	2611.4
Energy Purchased (MU)	4186.5	4055.5	3899.5	3849.3	4184.5	4623.6
Overall Distribution Loss %	48.8	43.0	39.8	41.5	42.8	43.5
<b>NESCO</b> Energy Sale (MU)	1128.3	1404.9	1490.6	1809.2	2144.2	2669.7
Energy Purchased (MU)	2302.6	2396.8	2645.8	2985.7	3407.6	3991.8
Overall Distribution Loss %	51.0	41.4	43.7	39.4	37.1	33.1
<b>WESCO</b> Energy Sale (MU)	1595.8	2069.3	2307.7	2577.2	2605.3	2972.4
Energy Purchased(MU)	2979.3	3353.7	3784.2	4051.0	4188.3	4670.6
Overall Distribution Loss %	46.4	38.3	39.0	36.4	37.8	36.4
<b>SOUTHCO</b> Energy Sale (MU)	906.08	946.94	924.82	960.00	1003.2	1034.3
Energy Purchased (MU)	1521.9	1555.9	1607.4	1613.4	1702.2	1832.2
Overall Distribution Loss %	40.5	39.1	42.5	40.5	41.1	43.6

## **CENTRAL ELECTRICITY SUPPLY COMPANY OF ORISSA LIMITED (CESCO)**

CESCO was incorporated on 19.11.1997 and started functioning separately with effect from 26.11.1998, as per notification of the Government of Orissa in the official Gazette on 25.11.1998. Since CESCO was not having the distribution license, it started functioning under GRIDCO. CESCO obtained the separate license from OERC for distributions of power in the Central zone of Orissa on 31.03.1999 and from 01.04.1999 onwards it is functioning as a separate licensee for distribution of power in the Central zone of Orissa. From the inception, the company was a wholly owned subsidiary of GRIDCO. As a major of reform of power sector in Orissa, 51 percent of the shares of CESCO was disinvested by GRIDCO to private sector investors namely M/s AES Orissa Distribution Private Limited which is a joint venture of M/s AES Corporation, USA and Jyoti Structures Limited, Mumbai on 1.9.1999. From 01.09.1999 the management of CESCO was vested with M/s AES Orissa Distribution Private Limited as per the share holders agreement executed by CESCO, GRIDCO and the private sector investors. Subsequently Orissa Electricity Regulatory Commission, the Regulatory body for electricity for the State of Orissa, on hearing an application of GRIDCO, vested the management of CESCO with a Chief Executive Officer w.e.f. 27.08.2001. This was to avoid continued dislocation of the CESCO's day to day management and providing uninterrupted power supply to the consumers of CESCO. Due to super cyclone in 1999-2000, a number of assets of CESCO was damaged, CESCO has spent about Rs.70 cr. For restoration of damage due to super cyclone out of which about Rs.30 cr was provided by the World Bank.

### **THE PROBLEM WITH CESCO HAS BEEN SUMMERISED AS BELOW**

- ❖ The Distribution loss level as high as 43.5 % (FY 2006- 07). Though it is an improvement from the initial years when CESCO started with 51 % loss. (FY 1999 – 2000)
- ❖ The billing collection remains at a level where there is enough scope for improvement. It has shown some improvement though from 65% to present 93.6%.
- ❖ The accounts of the company have still been not audited by the statutory auditor since 1999. Therefore there is always a likelihood of the variance in the actual and audited figures.
- ❖ The incidence of pilferage by way of illegal abstraction has been the major bottle neck in the path of reform process. The bulk of consumers in the CESCO area are of domestic, commercial and agriculture category which is incidentally the most subsidied categories and they have grown manifolds over the years.

CESCO has about 9.48 lakh consumers and company has claimed to have metered all the consumers. However the number of working meters is about 8.55 lakhs only and a number of consumers are being billed arbitrarily. Therefore actual distribution loss could not be assessed. Further there are number of Ghost Customers present in the system which increased loss percentage.

#### **A. PAYMENT OF BULK SUPPLY BILL TO GRIDCO:**

CESCO- During commencement of the licence condition during 2000-01 the company was able to pay only about 74% of the bill raised. It has now improved to 95.5% in 2006-07. The company has not yet been able to pay the 100% BST bill after eight years of performance..

## B. BILLING AND COLLECTION EFFICIENCY

The billing and collection efficiency has in fact increased but not up to the desired level. The trend of increase in efficiency can be judged by the fact that in the FY 2001-02 the efficiency level was 78.2% and during the FY 2006-07 it has increased to 93.6%

## C. AT & C LOSS :

The Aggregated Technical and Commercial (AT&C) Loss can be stated as the difference between the unit input and input realized. The unit realized is the product of unit billed and the collection efficiency. In otherwise Units realized indicate the quantum of energy for which money was actually realized. Collection efficiency is defined as the ratio of actual amount collected and the amount billed. Billing efficiency is the ratio of units billed to units purchased.

$$\text{AT \& C Loss} = \{ 1 - (\text{Billing efficiency} \times \text{Collection Efficiency}) \} \times 100$$

The AT&C loss % in 2000-01 was 56.2% and it has reduced to 47.1% in 2006-07.

However, this high T&D and AT&C loss is attributable to the illegal abstraction of energy by means of tampering and bypassing meters and direct tapping or hooking from the LT overhead networks. Legislation in this regard has not been very effective mainly due to lack of proper efforts of the company and support of the Govt. machinery in weeding out this menace.

## NESCO, WESCO & SOUTHCO

Reliance Energy (formerly known as BSES) acquired 51% stake in three Distribution Companies (i.e. NESCO, WESCO & SOUTHCO) with effect from 01.04.1999. Distribution & retail supply license availed by NESCO, WESCO & SOUTHCO. The number of consumers served by these companies over the years is shown in the table below: -

**TABLE-3**  
**NUMBER OF CONSUMERS – NESCO, WESCO, SOUTHCO**

Company/ Year	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
NESCO	292,344	311,804	374,066	404,352	435,410	466,533	494,204	515,595
WESCO	322,807	343,952	379,268	407,976	434,546	438,972	452,523	465,947
SOUTHCO	358,201	381,970	411,596	426,920	435,557	461,958	474,075	497,049
TOTAL	973,352	1,037,726	1,164,930	1,239,248	1,305,513	1,367,463	1420,802	1478,589

The problem of the three companies has been summarised as below:-

- ❖ The Distribution loss level averagely has come down below 40% and now stands at 368 % (FY 2006-07). Though it is an improvement from the initial years when they started with average loss of 43 % loss. (FY 1999 – 2000)
- ❖ The bill collection is still to attain the level of 100% and there is enough scope for improvement.

- ❖ The incidence of pilferage by way of illegal abstraction has been the major bottle neck in the path of reform process.

## PERFORMANCE

### A. Payment of Bulk Supply bill to GRIDCO:

NESCO- During commencement of the licence condition during 2000-01 the company was able to pay only about 74% of the bill raised. It has now improved to 100% in 2006-07. The company has also been able to pay the interest on NTPC Bond to the tune of Rs.17 crore.

WESCO – The WESCO has registered more impressive growth with 73% during 2000-01 to 106% during 2006-07. The excess payment was towards Bulk Supply tariff outstanding.

SOUTHCO – The SOUTHCO also showed remarkable improvement with 76% in 2000-01 to 100% in 2006-07.

### B. Distribution loss:

The total Distribution loss though has reduced in all the companies (WESCO, NESCO and SOUTHCO) over the years but they have not achieved the target fixed by the Commission in the Long-term tariff strategy (LTTS). It stands at 33.1%,36.4% & 43.6% in case of NESCO,WESCO & SOUTHCO respectively.. According to the Commission's target this should have been about 31.5% for NESCO ,33.7% for WESCO and 33% in the case of SOUTHCO during the year 2006-07.

The loss at the LT (Low transmission) side, which we understand as domestic and other low voltage categories, is more matter of concern. It stands at about 60% for NESCO, 64% for WESCO and 52% for SOUTHCO, during the year 2006-07. All Orissa average is about 57%. The percentage of LT distribution losses over the years is given in table below

**TABLE-4**

**DISTRIBUTION LOSS AT LT OF DISTCOS (In percentage)**

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
CESCO	52.44	54.86	50.16	46.36	47.35	49.75	53.2
NESCO	64.22	64.55	58.28	61.56	60.60	60.17	59.4
WESCO	59.56	63.29	58.60	63.34	65.04	64.68	64.0
SOUTHCO	49.20	46.65	45.99	50.19	47.55	49.26	52.0
ALL ORISSA	56.05	57.75	53.30	54.74	54.84	55.81	

### C. Billing and Collection Efficiency:

The collection efficiency of the companies has shown signs of improvement over the years. It has registered a growth in this aspect but much to be done to achieve the hundred percent efficiency levels. It stands averagely at about 93% for all the companies. The total collection against billing in demonstrated in the comparative table below:

**TABLE-5****BILLING AND COLLECTION EFFICIENCY OF DISTCOs (In percentage)**

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
CESCO	74.93	71.04	78.91	81.13	83.66	88.6	93.6
NESCO	82.12	74.34	81.46	88.11	90.90	89.1	91.6
WESCO	79.32	79.95	85.40	88.26	91.96	94.1	94.8
SOUTHCO	83.32	79.29	82.55	84.15	91.14	91.2	92.7
Total	78.47	75.24	81.69	84.87	89.0	90.9	93.3

**D. AT & C Loss :**

This loss stood averagely at about 56% during 2000-01 for these companies which have now gone down to about 42.65%. However, there is much to be done in this front to make up for the losses.

A table below shows the comparison of AT &C losses.

**TABLE-6****AT & C losses of DISTCOs (In percentage)**

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
CESCO	58.70	63.6	55.04	51.10	51.05	49.36	47.11
NESCO	54.37	63.57	52.25	50.36	44.92	43.96	38.77
WESCO	54.94	57.18	47.31	46.18	41.52	41.46	39.68
SOUTHCO	52.10	52.80	49.76	51.56	45.78	46.27	47.70
Total	56.06	60.48	51.60	49.71	45.90	45.11	42.65

**E. Outstanding arrears:**

The outstanding arrears have been mounting for all the companies over the years. The commission has directed the companies to segregate arrears collectible from non-collective dues. The outstanding arrears position for four companies is shown in the following table:

**TABLE-7****ACCUMULATED ARREAR AS ON 31.03.07 (Rs. in Cr.)**

(\* SOURCE : Performance Review)

	CESU	NESCO	WESCO	SOUTHCO	TOTAL
EHT	2.84	50.21	(3.24)	10.65	60.46
HT	72.37	53.19	35.43	50.32	211.31
LT	1,088.18	456.45	594.13	279.51	2,418.27
<b>TOTAL</b>	<b>1,163.39</b>	<b>559.85</b>	<b>626.32</b>	<b>340.48</b>	<b>2,690.04</b>

The details of the distribution companies profile as on 31<sup>st</sup> March, 2007 are given in the table below.

**TABLE-8**

**PROFILE OF DISTRIBUTION COMPANIES AS ON 31<sup>ST</sup> MARCH,2007**

	<b>CESCO</b>	<b>NESCO</b>	<b>WESCO</b>	<b>SOUTHCO</b>	<b>TOTAL</b>
No. of Circles	5	4	3	8	20
No. of Divisions	19	14	15	26	74
No. of Subdivisions	62	41	55	54	212
No. of Sections	249	141	202	133	725
<b>No. of consumers</b>					
EHT	14	14	18	11	57
HT	719	280	503	122	1,624
LT	947,236	515,595	465,426	496,916	2,425,173
Total	947,969	515,889	465,947	497,049	2,426,854
<b>FEEDER METERING</b>					
No. of 33 KV feeders	125	57	87	159	428
No. of 33 KV feeder metering	122	55	87	159	423
No. of 11 KV feeders	584	420	417	425	1,846
No. of 11 KV feeder metering	584	382	417	425	1,808
No. of 33 / 11 kv transformers	347	244	242	211	1,044
No. of 33/11 kv transformer metering position	81	-	-	30	111
No. of distribution transformers	17,405	15,303	13,815	10,163	56,686
No. of DT metering position	5,118	-	12,558	8,993	26,669
Length of 33 KV Line (km.)	2,741.80	2,050.00	3,340.53	2,706.97	10,839.30
Length of 11 KV Line (km.)	15,779.57	13,762.00	18,912.98	13,360.05	61,814.60
Length of LT KV Line (km.)	18,904.78	16,436.00	16,202.41	9,913.11	61,456.30
<b>METERING POSITION</b>					
Total number of meters	947,969	455,600	459,587	489,965	2,353,121
No. of working meters	855,739	352,485	449,100	460,911	2,118,235
Percentage of working meters ( % )	90%	77%	98%	94%	90%
No. of defective meters	92,230	103,115	10,487	29,054	234,886
Replacement of defective meters	6,140	7,015	11,475	12,572	37,202
No. of transformers burnt	2,528	1,821	2,530	801	7,680
Length of conductor stolen (km.)	77.89	74.47	118.84	24.73	295.93

### High Distribution loss-

The staff Appraisal Report (SAR) prepared by the World Bank served as the blue print of reforms in Orissa. It estimated the system losses for the base year 1995-96 at 43 %. These system losses were further estimated to come down to about 20.6 % in the seventh year of reform 2002-03. However fixing of 43% loss for the base year 1995-96 was grossly under estimated and the World Bank in it's subsequent report (aid memoir) revised it to about 47%.

It seen that the overall losses have come down to about 43% in 2003-04 which is far from satisfactory. The performance of Utilities in this regard has left much to be desired and until this problem is addressed fully no gain can be achieved in the reform times. Transmission & Distribution loss during pre reform & Post reform are given in table below.

**TABLE-9**

**T&D LOSS DURING PRE-REFORM & POST-REFORM PERIOD (In Percentage)**

	<b>Transmission Loss</b>	<b>Distribution Loss</b>	<b>T &amp; D Loss</b>
1995-96			46.94
1996-97			49.47
1997-98			49.24
1998-99			51.02
1999-00	4.9%	43.9%	46.7%
2000-01	5.2%	44.0%	46.9%
2001-02	5.2%	47.5%	50.2%
2002-03	5.1%	40.8%	43.8%
2003-04	4.2%	40.8%	43.2%
2004-05	3.9%	39.2%	41.6%
2005-06	4.6%	39.6%	42.4%
2006-07	5.3%	38.6%	41.8%

### AT & C LOSS AND POOR BILLING COLLECTION OF THE DISTRIBUTION COMPANIES

An important parameter used for gauging the performance of losses is the AT & C loss because it encompasses both technical and Commercial losses taken together.

The losses in the distribution system has traditionally been calculated as the difference between the energy input and the energy sold (in units) as a percentage of the total energy input ( in units). However this method of measuring distribution losses had flaw since hundred percent metering of the LT feeders, distribution transformers and at the consumers end was yet to be achieved. Therefore this measure never really depicted the real picture of actual losses, compounded with the rampant pilferage.

The target of AT & C loss reduction as fixed by the Kanungo Committee and Long term Tariff Strategy (LTTS) as notified by the commission have been far from it. The AT & C losses have however shown a declining trend over the years, reduced to below 42.65 % in 2006-07 from as high as 62 % in the year 1998-99. This reduction has been attributable to the increased collection efficiency

### **BILLING AND COLLECTION EFFICIENCY**

The AT & C losses as discussed above have an important component as the billing and collection efficiency. Loss reduction can be achieved by enhancing this efficiency. It has however been seen that collection efficiency in turn depends lot on the factor such as Consumer mix in the distribution area. On analysis of the consumer mix in the Orissa's four distribution zones reveals that it has a large LT (Low Tension) categories mainly comprising of domestic, commercial, irrigation and small industrial segments. The collection efficiency in these categories continues to be miserably low.

The tardy progress in the billing efficiency has largely been attributable to the lack of proper efforts by the companies themselves, support from the State Government in the shape of police, law and administration.

### **LESS THAN EXPECTED GROWTH OF HT AND EHT LOADS**

Unfortunately the growth in EHT and HT loads did not materialise due to recession in the State's economy and scrapping of the proposed power intensive projects such as steel plants in Gopalpur and Duburi. Moreover due to tariff structure high voltage load consumers preferred to have their own captive power plants (CPP).

### **STEPS TAKEN BY OERC TO SET THE SECTOR IN ORDER**

- No rise in consumer tariff since 01.04.2001 even in absence of revenue subsidy by the Govt. of Orissa since 01.04.1996
- Reduction in cross subsidy
  - ❖ Rationalisation of Tariff (generally voltage based)
  - ❖ Abolition of minimum charge
  - ❖ Incentive for industrial consumer for higher consumption at 11 kV and above
  - ❖ Introduction of Time of Day (ToD) tariff
  - ❖ Adoption of Long Term Tariff Strategy
- Introduction of guaranteed overall and individual standard of performance
- Implementation of Orissa Grid Code
- Conducting Energy audit.
- Setting up of 12 Grievance Redressal Forum and 4 Ombudsmen for four DISTCOs since 2004
- Consumer Education through interaction with consumer groups and training of officers and staff of licensees, Publication of Regulations in Oriya
- Spot billing, consumer indexing and revenue audit
- Regular monitoring of licensee's performance .

❖ ❖ ❖

## ENERGY CONSERVATION PLAN AND PERSPECTIVE

**Priyabrata Patnaik**

Dy. Director (Tariff/Eco.), OERC

The magnitude of energy consumption has always been taken as an indicator of development status of any economy. However, what actually a country requires is not energy per se but the services that energy provides. More energy will positively not accelerate the economic growth as long as economy has high energy intensity. India's energy intensity per unit of GDP is higher by 3.7 times of Japan, 1.4 times of Asia and 1.5 times of USA indicating to very high energy wastage. In the globalized economy, countries with high energy intensity may become uncompetitive due to high energy input cost. Therefore, energy cost reduction must become one of the important bench marks for economic success. Efficiency in consumption of energy and its conservation would be one of the most important means of energy cost reduction and also for meeting future energy demand.

There is a huge scope of energy saving in our country. Various studies undertaken suggest substantial energy saving potential in industrial, commercial and domestic sectors. Efficient use of energy provides the least cost and environmentally friendly option for capacity creation in the shortest time frame. Energy efficiency also assumes further importance as **“one unit of energy saved at consumer ends avoids three units of fresh capacity addition”**.

### ACTUAL POWER SUPPLY POSITION (ALL INDIA BASIS)

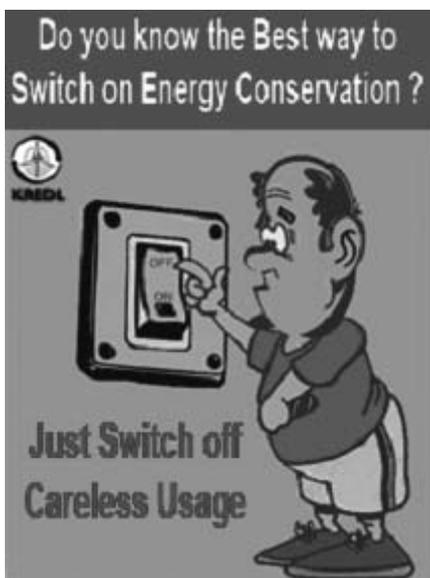
Year	Peak				Energy			
	Requirement (MW)	Availability (MW)	Surplus (+)/ Shortage (-) (MW)	Shortage/ Surplus (%)	Requirement (MU)	Availability (MU)	Surplus (+)/ Shortage (-) (MU)	Shortage/ Surplus (%)
2006-07	100715	86818	-13897	-13.8	690587	624495	-66092	-9.6

With the background of high energy saving potential and its benefits, bridging the gap between demand and supply, reducing environmental emission through energy saving and to effectively overcome the barrier, the Government of India has enacted the Energy Conservation Act, 2001 (EC Act, 2001). The Act came into effect from 1<sup>st</sup> March, 2002. The Act provides mainly for efficient use of energy and its conservation and for matters connected therewith or incidental thereto. Meaning of energy is very wide under this act. It includes any form of energy derived from fossil fuels, nuclear substances or material, hydro electricity and also includes electrical energy or electricity generated from renewable sources of energy or bio-mass connected to the grid.

### SOME IMPORTANT PROVISIONS UNDER THE ACT

- ❖ **Bureau of Energy Efficiency(BEE)** has been established at National level w.e.f. 1<sup>st</sup> March, 2002. The Bureau would be responsible for implementation of policy, programmes and coordination of energy conservation activities in the country.
- ❖ **Energy audit** has been defined in the Act as the verification, monitoring and analysis of use of energy including submission of technical report containing recommendation for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption.

- ❖ Qualification of accredited **Energy auditor and Energy manager** has been prescribed. Bureau of Energy Efficiency will certify the persons to be declared as either Energy auditor or Energy manager.
- ❖ As per the Act, it is mandatory for all the designated energy consumers to get energy audit conducted by an accredited energy auditor and to designate or appoint one energy manager.
- ❖ The **designated energy consumers** are covered under the schedule to Energy Conservation Act. At present, there are 15 types of designated consumers. Out of them, thermal power stations, hydel power stations, electricity transmission companies, distribution companies and commercial building are prominent.
- ❖ The Act defines **commercial building** as any structure or erection or part of a erection after the rules relating to energy conservation building codes have been notified under this Act which is having a connected load of 500 KW or contract demand of 600KVA and above and is intended to be used for commercial purpose. The energy conservation building code means the norms and standards of energy consumption expressed in terms of per sq.mtr. of the area wherein energy is used and includes the location of the buildings.
- ❖ Different states have declared their designated agencies to coordinate, regulate and enforce provisions of energy conservation act in their State. Govt. of Orissa has declared **EIC-Principal Chief Electrical Inspectorate** as the designated agency for our State.
- ❖ If any person, fails to comply with the certain provisions as mentioned in the Act, he/she shall be liable to a monetary penalty as laid down in the Act. **State Electricity Regulatory Commission** shall Act as adjudicating body for holding an enquiry for this penal provision in their respective jurisdiction.
- ❖ The Central Govt. shall establish an **Appellate Tribunal** to be known as Appellate Tribunal for Energy Conservation to hear appeals against the orders of the adjudicating officer or the Central Govt. or the State Govt. or any other authority under this Act.



As the scope of energy conservation and efficiency are very vast in our society it should begin with our home first. Lot of energy can be saved if electric lights, fans, airconditioners are switched off when there is no necessity of them or the occupants of the rooms go out. Maximum use of day lights should be made and the works which can be avoided in the evening hours may be made when day light is available. The residential and commercial sector of our State consumes more than 35% of the total electrical supply usage of the State and major portion of this is utilized in the buildings.

The present day buildings that are designed and used, symbolize un-restrained consumption of energy, be it a five star hotel, commercial establishment, Govt. buildings or a residence complex. Thus, there is need to design and develop the new buildings on sound concepts of sustainable efficient use of energy and also apply suitable retrofit option to existing buildings that could substantially improve the energy efficiency. Some of them are

- a) **Energy saving through building design and Orientation of the Building** – The placement of the building in north south direction reduces the heat energy input in the building, increases overall ventilation and also make available light energy from the north.

- b) **Use of Walls and Windows Thermal insulation of roof** – Use of building walls with transparent glass provides entry of sunlight for use.
- c) **Skylighting** in which light is allowed centrally in the building through roof.
- d) **Fiber tube lighting** – Lighting pipes which make use of fiber tube lighting are new way of achieving the same purpose with greater flexibility. Light pipes will not only bring light include otherwise inaccessible or dimly lit places, but also improve the internal environment without generate excessive heat. The most effective light pipes being straight and short.
- e) **Type of wall** – Use of cavity wall construction with insulation infill for outer walls with reduced ingress of heat/cold and will maximize thermal comfort of a building.
- f) **Underground Earth Tunnel** – The thermal storage capacity of earth is very high. The daily and annual temperature fluctuations decrease with increasing depth of the earth. At a depth of about 4 m below the ground, the temperature remains constant round the year and is equal to the average annual temperature of a place. The average annual temperature of most part of India is around 26 Deg.C. Thus, we can use the principle of underground earth tunnel in which air forced through underground pipes or tunnel which are at a depth of 4 m and then the air circulated in the room. This system can be used to pre-cool the fresh air input to the air handling units in buildings with central air conditioning systems. This system is widely used in Australia and other developed countries where the temperature fluctuations are high. In India this concept is used by TERI in Green Buildings.
- g) **Fluorescent Tube Lights** – A 40-watt fluorescent tube emits 2,150 lumens as compared to 455 lumens by a standard incandescent 40-watt bulb. In addition, fluorescent tubes typically last longer and create much less heat than incandescent lamps. The newer generation in fluorescent tubes are T-8 and T-5 tube lights, especially with triband phosphor and they are highly energy efficient. Some of the five star/four star rated, BEE labeled tubular fluorescent lamps available in the market as on August 13, 2007 are mentioned below.

Brand Name	Rating	Star
Surya	36W, 6500 K Super Bright	4*
Osram	36W, 4000 K HL	5*
	36W, 2700 K HL	5*
Philips	36W, True light 6500 K	5*
Wipro	36W, 6500 K Ultra lite	5*
	36W, 4000 K Ultra lite	5*
Crompton	36W, HL 6500K Power lux	5*
	36W, HL 2700K Power lux	5*
Myna	36W, 6500 K, High lumen	4*

(The list is not exhaustive)

- h) Compact Fluorescent Lamps** – Compact fluorescent lamp (CFL) is energy efficient as most of the electric energy used is converted into light rather than heat. CFL are simply small fluorescent tubes with attached electronic ballast. When compared to standard incandescent bulbs, they consume 80% less electricity and last ten times longer.
- i) Light Emitting Diodes (LEDs)** – LEDs are new entrant to the field of lighting and are causing lighting revolution in areas where lighting intensity required is not very high. These LEDs have about 11 years of life, a real advance in lighting technology. This small light has no element to break, no glass to shatter and is not affected by heat or cold and can be lit up using ordinary batteries or very low voltages. These are at present used in a big way in automobile industry and for traffic lights. Research is going on to improve upon the quality of LED for its use in lighting applications.
- j) Energy efficient controls** – The various type of energy efficient control available are :
- Dimmer switch
  - Timer
  - Motion detectors or occupancy sensors
  - Photo-sensors or photocells
  - Combination of above

The successful working of these controls depend on the environmental conditions and hence are being used only on selective basis.

- k) Energy Efficient Air Conditioning System** – Use of natural air cooling systems integrated with conventional HVAC systems incorporating use of energy efficient chillers and other energy efficient equipments such as air handling units, pumps, cooling towers, etc with use of various variable speed drives for chillers, pumps and AHUs make it possible to reduce energy consumption by about 40% over conventionally designed HVAC Systems. Some of the energy efficient BEE labeled airconditioners available in the market as on July 26, 2007 are mentioned below:

Brand Name	Model	Ton	Power Consumption (Watts)	Star rating
Carrier (Split)	Estrella 012	1.0	1128	5*
	Daiseikai 012	1.0	1183	5*
Voltas (Window)	4501004	1.0	1140	5*
LG (Split)	LSA3ZG5NTY1	1.0	1120	5*
Samsung (Split)	AS12LA	1.0	1150	5*
	AS18LA	1.5	1650	5*
Blue Star (Split)	KHWE121YPS	1.0	1090	5*

(The above list is not exhaustive but only suggestive)

*(NB: Energy – efficiency labels are informative labels fixed to manufactured products which describe the product's energy performance (usually in the form of energy use, efficiency, or energy cost) and rate the product on a comparative scale, thereby providing consumers with necessary information to enable*

making informed purchase. Energy-efficiency standards are procedures and regulation that prescribe limits on the energy performance (usually maximum energy use or minimum efficiency) of manufactured products. BEE has rated different manufactured product in terms of energy efficiency starting from five star to one star. Higher the star numbers more is the energy efficiency of the product.)

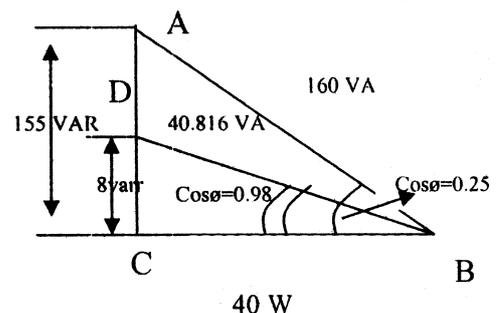
- l) The Government of India has already issued **energy conservation codes for commercial building** on 27<sup>th</sup> May, 2007. Initially, implementation of the codes will be voluntary but will be made mandatory soon under the Energy Conservation Act 2001 for the buildings having connected load of 500 KW or more. The implementation of the codes will reduce energy consumption from 25% to 40% and will yield annual saving of about 1.7 billion units in All India basis. The State Government will have the flexibility to amend these codes to suit local or regional needs and notify them accordingly.
- m) Government of Orissa on 18<sup>th</sup> May, 2007 has issued certain instruction regarding energy conservation. Some of them are:
  - i) The use of incandescent lamp in all new building under Govt. sector including board/autonomous bodies is banned.
  - ii) It will be mandatory that in the existing building the defective incandescent lamp when replaced would be replaced by only CFL, and airconditioners with energy efficient airconditioners.
  - iii) In outdoor lighting the defective sodium vapour, mercury vapour lamps when replaced shall be replaced with energy efficient metal halide fittings and lamp.
  - iv) Use BIS mark pump sets, power capacitors, foot/reflex valves in agricultural sector is compulsory.
  - v) All the new buildings to be constructed in Govt. sector will incorporate energy efficient building design concept.
  - vi) It will be mandatory to use BIS marked solar water heating system in certain areas such as industries where hot water is required for processing and all residential building built on a plot of size 500 sq. yards and above falling within the municipal limits.

### ENERGY SAVING BY REACTIVE COMPENSATION

Let us consider total electrical system. To control the losses and increase efficiency in the system reactive compensation is very much required. Reactive compensation requires installation of capacitors in different places particularly near the load end. India in general and Orissa in particular the installation of capacitor for reactive power management is very limited.

- A) If we consider a State like Orissa there are about 2294169 of LT consumers as on 31.03.2007. Let us assume that everyone has a fluorescent tube light. So, we have about 23 lakhs tube lights with power factor 0.25 (average).

Each tube light is single phase 40W, 230V, 50Hz.  
 The VA consumed =  $40/0.25 = 160VA$ .  
 Let us improve the power factor of the circuit to 0.98.  
 The tube always consumes 40W.  
 The current drawn at PF 0.25 =  $160/230 = .0696$  Amp.  
 And current drawn at PF 0.98 =  $40.816/230 = 0.177$ .



So, the excess current drawn when the PF 0.25, i.e. the tube light is not compensated is 0.519. Thus, when all the tube lights glow in the evening hours upto 11 O'clock in the night the total excess current drawn will be  $0.519 \times 2294169 = 1190673$  Amp from generating stations. Thus, total extra VA drawn =  $1190673 \times 230 = 274$  MVA.

This 274 MVA in term of MW is about 268 MW.

- B) Total agricultural consumers as on 03/2007 are around 33837. Let us now consider about the lift irrigation pump set having small motors say 1.5 HP or 2 HP and a power factor of 0.75. Let us take each farmer has a 2 HP motor each of 0.75 PF (single phase). These motors are not compensated at all. Motor rating for agriculture purpose assuming each consumer has 1 no. each of 2 HP, 230V, 1 Ph, 50 Hz, PF 0.75.

$$2 \text{ HP} = 2 \text{ KVA} = 1.5 \text{ KW}$$

Let us improve this PF 0.98. When the PF is improved to 0.98, the VA is reduced to 1.53 KVA. So, the excess drawl of current without compensation is 2.043 Amp. So, 33837 consumer it is  $2.043 \times 33837 = 69129$  Amp at 230V which is equal to approximately 15.8 MVA.

Hence, extra MVA drawl due to above uncompensated equipments is approximately  $274 + 15.8 = 289.8$  MVA which is equal to 283 MW. This extra drawl can be avoided through installation of capacitors.

Capacitors can also be utilized in lines and grid s/s to reduce VA drawl and improve power factor and voltage.

Industries generally use power factor controllers. Various types of automatic power factor controls are available with relay/micro processor logic. Two of the most common controls are: voltage control and KVAR control.

Voltage alone can be used as a source of intelligence when the switched capacitors are applied at point where circuit voltage decreases as circuit load increases. Voltage is the most common type of intelligence use in substation application. For this application drop in voltage should be around 4-5% with increasing load.

KVAR sensitive controls can be used at locations where the voltage level is closely regulated and not available as control variable. The capacitor can be switched to respond to a decreasing power factor as a result of change in system loading. This type of capacitor control can be used to avoid penalty on low power factor by adding capacitor in steps.

## **ENERGY EFFICIENT MOTOR**

Induction motor is the work horse of the industry. Motors those operating below their rated capacity are the main reason for low power factor in the electric system. Hence, selection of motor capacity is of prime importance. For variable speed application the speed control through variation of frequency is the most efficient. Motor connected through VFD provide variable speed mechanical output with high efficiency. These devices are capable of upto 9:1 speed reduction ratio (11% of full speed) and a 3:1 speed increase (300% full speed). There is extensive use of equipment like pump sets with even 28% efficiency. Energy efficient pump sets having efficiencies up to 60% are available in the market, which are to be adopted.

Also, motors with amorphous core, which have the least loss, are required to be developed. A three phase irrigation pump set is to be enabled to run only if a capacitor installed. These capacitors shall be in built and not tamperable.

### **SOFT STARTER**

Soft starter provides a reliable and economical solution to high torque development during starting of induction motor by delivering a controlled release of power to the motor, thereby providing smooth, step less, acceleration and deceleration. Motor life will be extended as damage to winding and bearing is reduced. It also improves power factor and lower maximum demand

### **ENERGY EFFICIENT TRANSFORMERS**

The energy efficient transformers use amorphous material – a metallic glass alloy for the core. The expected reduction in energy loss over conventional (Si Fe Core) transformer is roughly around 70% which is quite significant.

### **ELECTRONIC BALLAST**

It is now well established that fluorescent lamp efficiency in the KHZ range is higher than those attainable at low frequencies (50-60 Hz) of magnetic ballast. Electronic ballast has low internal core loss and has increased light output.

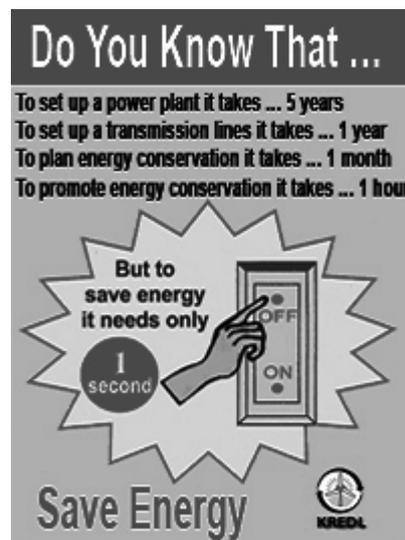
### **ENERGY SAVING IN IT&IT ENABLED SERVICES**

IT and IT enabled services have now a days seen rapid growth in India. There is also vast scope for energy conservation in this area. As per Forbes magazine IT servers consume 1.5% of total US electricity consumption, more than the electricity used by American televisions. This is a sector where yesterday's servers are tomorrow's door steps. Moore's law states that computing power doubles in every two years also applies roughly to server efficiency. That means new energy saving servers quickly pay for themselves. The biggest hope for that technological transformation may be a process called **virtualization**. Most traditional servers do nothing for about 90 per cent of their lives and continue to burn about half their peak energy consumption even while idle. Virtualization turns each of those underperforming machines into pieces of software and packs them

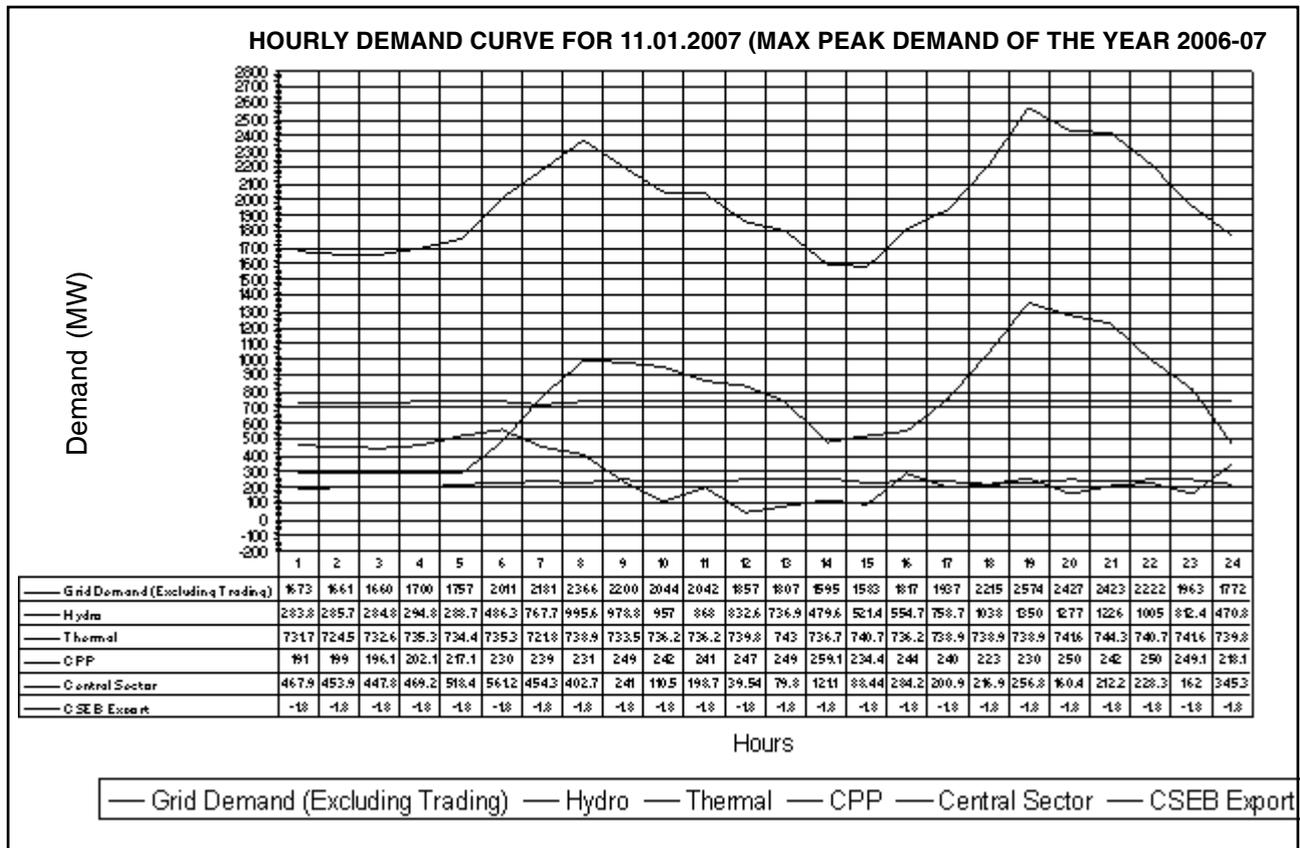
together on a single physical server that runs continuously. It is seen that 100 physical servers turn into seven. So also it avoids airconditioning to cool those servers, the back up generators for them, the lighting needed in the bigger data centre. In India more investigation required to be made.

### **Demand side Management**

**Demand side management (DSM) is a new source of power with minimum investment and hence is commonly practiced in all modern economies and is becoming an essential fore-runner to generation investment.**



DSM techniques include increasing peak or reducing peak of the demand. If peak increases generation capacity is to be increased and with reducing peak there is saving of energy and fixed cost of generation.



### 1) Peak Clipping

This is a reduction in load during the peak periods. It reduces capacity requirement and dependability on expensive fuel like natural gas etc.

### 2) Valley fillings

It builds up load during the off-peak period or lean period when the incremental cost is less than the average cost of electricity. The common methodology adopted by the utility is lowering the off-peak tariff offered by the utility.

### 3) Load Shifting

It is common use of shifting of loads from peak to off peak period without changing over the consumption.

### 4) Strategic Conservation

This is a reduction in load during the peak periods. It reduces capacity requirement and dependability on expensive fuel like natural gas etc.

## 5) **Strategic Load Curve**

This is achieved by producing general increase in sale beyond that is possible by valley filling technique.

## 6) **Flexible Load Shape**

This is related to reliability and planning constraint by offering the customers option of quality of supply in exchanging various incentives like discount of interruptible tariff.

### **Incentives provided by the OERC in its tariff order**

- ❖ Industrial loads overdrawing upto 20% during off peak hours will not be charged with over drawal penalty.
- ❖ TOD Tariff has been introduced. 10 paise concession on tariff rate for drawals during off peak hours i.e. from 10 P.M. to 6 A.M. applicable to all category of loads.

Consumer awareness is the corner stone of energy efficiency drive. Government of India celebrates **December 14<sup>th</sup> every year as energy conservation day**. Energy conservation not only reduces cost of the energy but also makes the world clean and green. It makes all the development sustainable and secures an energetic future for the mankind.



## **E - COMMISSION & TECHNOLOGY STRATEGY**

**Jyotish Chandra Mohanty**

Jt. Director (IT), OERC

Though a decade has passed after the power sector reform started in Orissa, the level of consumer satisfaction is yet to reach the desired mark. This is mainly due to inadequate service provided by the distcos in the areas of billing and collection, providing new connection, handling of complaints, quality of supply, quality of service etc. As demonstrated by some other states like Andhra Pradesh or Delhi, intravention of technology especially, Information Technology (IT) can improve upon these services to a great extent.

In this perspective, the Commission strongly feels that the Distcos need to adopt technology at various levels and functions to become efficient, responsive, competitive and consumer-friendly Information Technology (IT) will be the major driver / enabler in this regard. Initially, it might be perceived as projects involving high investments and risk; but, with a strategic plan in place, these investments will yield rich dividends for all the stakeholders in a realistic time frame of 2-3 years. Therefore, the Distcos should, prepare a 'Technology Strategy' which should be in line with their overall Business Strategy. While preparing the strategy, they should take into consideration the collective knowledge at many levels in the organisation and include various functional areas like billing, stores, complaint handling, quality of supply etc. Broadly, it shall entail the following:

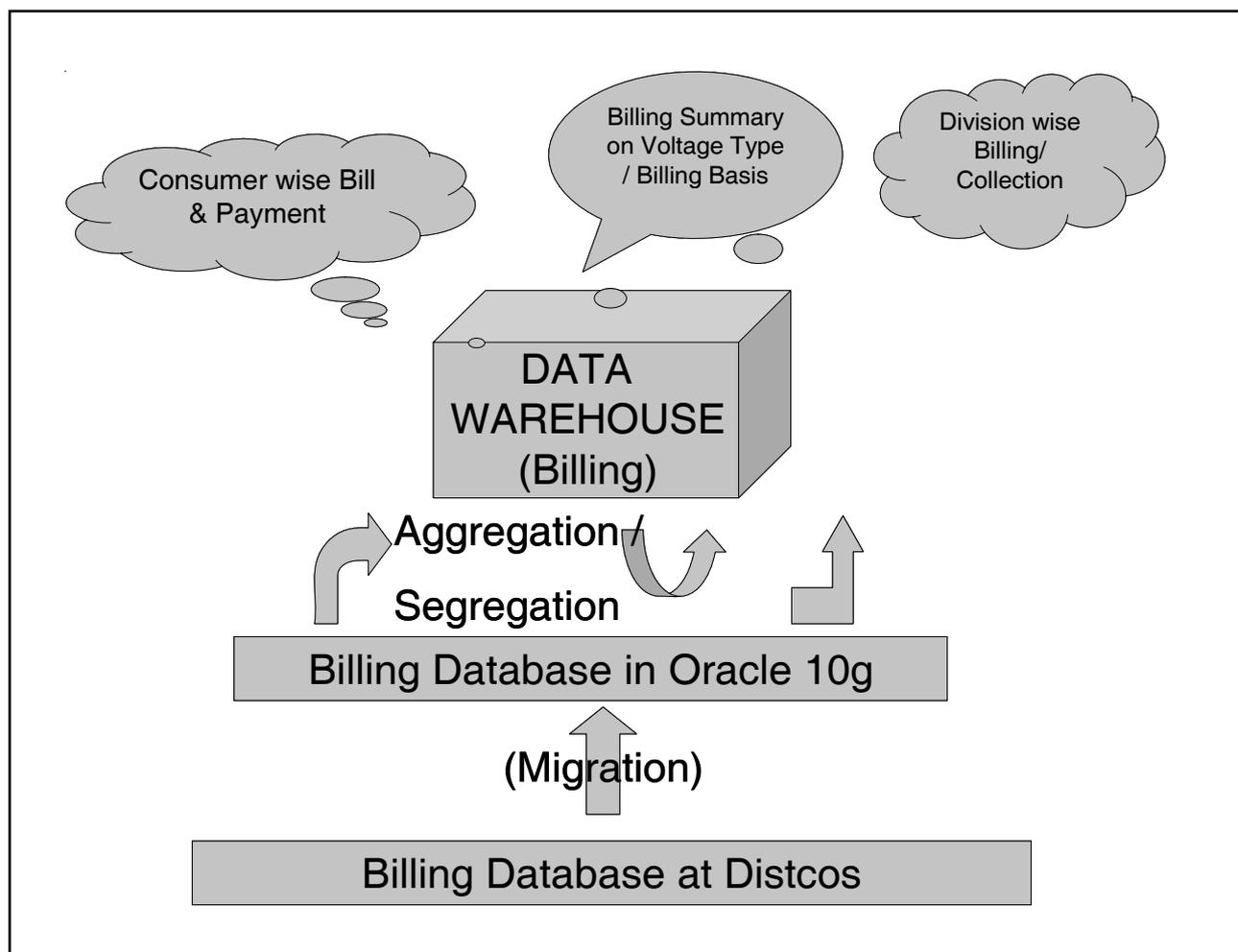
- ❖ High level organizational benefits
- ❖ Relationship to overall business strategy
- ❖ Resource summary
  - ⇒ Staffing
  - ⇒ Budgets
  - ⇒ Summary of key projects

It is again reiterated that prudent investments towards the implementation of the 'Technology Strategy' will be allowed by the Commission in the revenue requirement and shall be passed onto tariff.

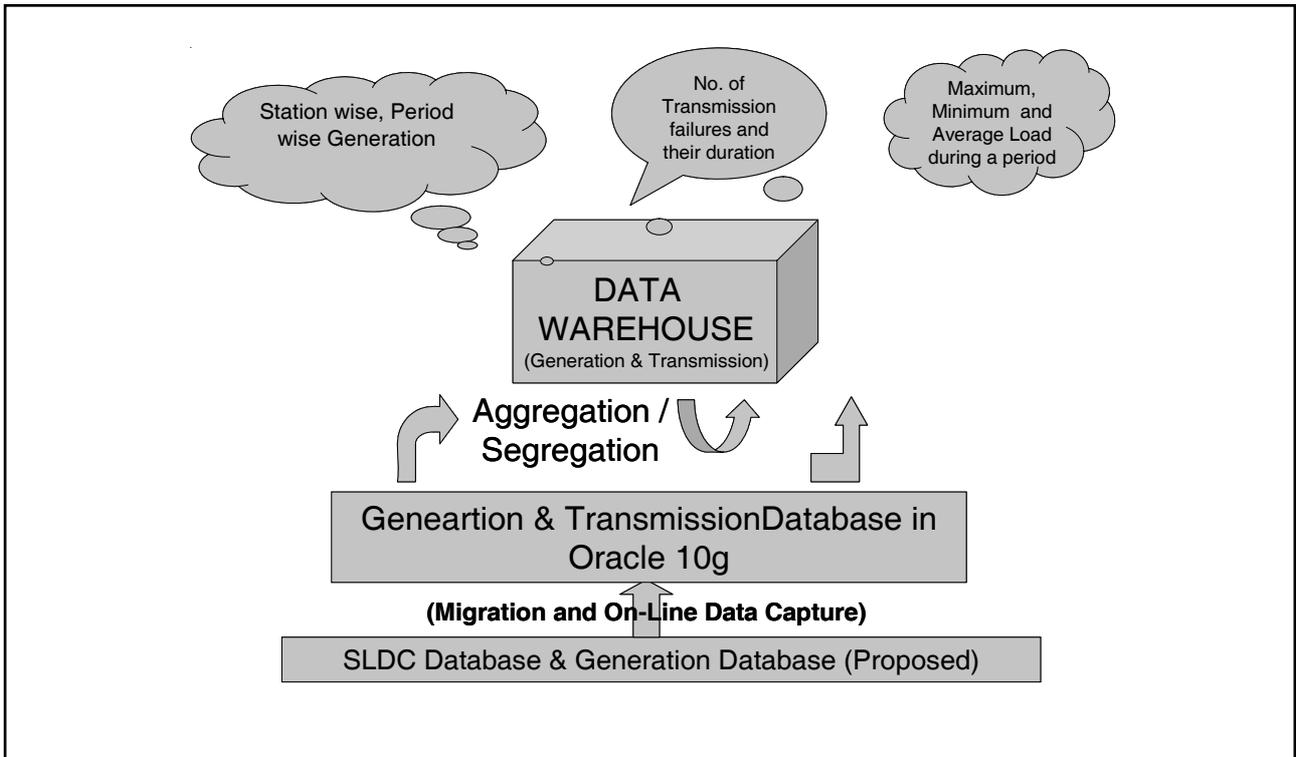
In this context, it will be pertinent to spell out the IT strategy of OERC. The Commission has all along endeavored to make relevant data / information easily available to various stakeholders of power sector in Orissa. It has already become an e-commission by launching its portal, an overhauled version of its website [www.oriarc.org](http://www.oriarc.org) in January 2007. The new portal allows an electricity consumer of the State to see billing as well as payment details on the site and also, to file petitions online. Development of RIMS (Regulatory Information Management System), CTS (Case Tracking System) and Cesu Billing Information System (CBIS) on a Oracle 10g database provide the foundation for the portal. CTS enables one to track cases on the basis of case number or other parameters such as date and year of case, its category and party.

Presently, the Commission is in the process of developing a Data Warehouse (DW) for the Power Sector of Orissa. The Data Warehouse shall be a repository of historical as well as current data on generation, transmission, distribution, trading, SLDC, cases, complaints etc. and shall allow users to query, analyze and find patterns and trends on-line. This requires building up systems and procedures to get the desired data and load them to the data warehouse. It is also required to plan and enter sizeable data of the past. Moreover, these data exist in various formats and places making the analytical processing of information very slow, cumbersome and subject to interpretation. A data warehouse will be an invaluable asset for the power sector as a whole. This will immensely help in the functioning of the Commission and the State Govt. by providing analytical information and trends for planning. It will also readily provide information (general and analytical) to the consumers. The schematic diagrams for developing DW Cubes related to Billing, Generation & Transmission and Complaints & Cases are given below.

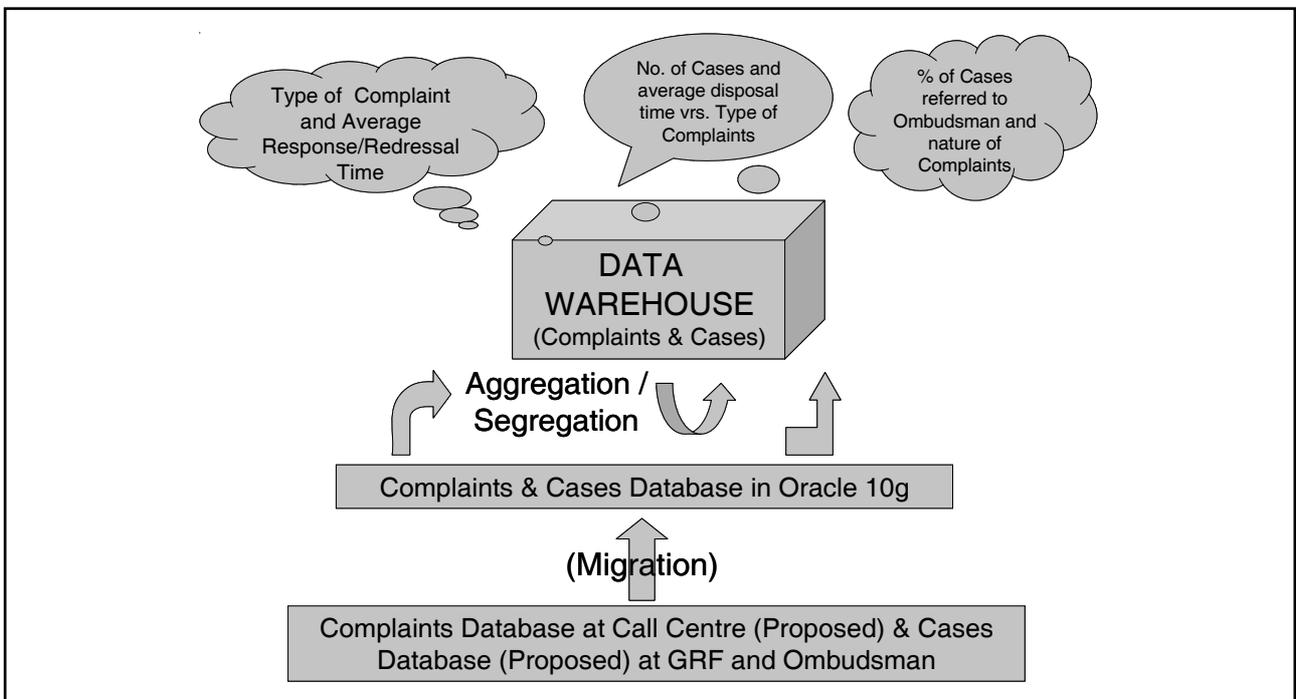
**Fig. 1 - DW Cube on Billing**



**Fig. 2 - DW Cube on Generation & Transmission**



**Fig. 3 - DW Cube on Complaints & Cases**



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## **THE ELECTRICITY ACT-2003 (SECTION-126 & 127) APPREHENSIONS AND EXPECTATIONS**

**J.P. Sharma**

Engineer-in-Chief Elec-cum-  
Principal Chief Electrical Inspector: Orissa

As we know Orissa is the first state to undertake reforms by enacting the Orissa Electricity Reform Act, 1995 (The Orissa Act No.2 of 1996). The Orissa State Electricity Board (OSEB) was split up into GRIDCO and OHPC. While GRIDCO took over the Transmission and Distribution business. OHPC took over the Hydro Power Generation business. Then the Orissa Electricity Regulatory Commission (OERC) was established, which became fully operational w.e.f.01.08.1996. Subsequently in the year, 1997 GRIDCO incorporated four wholly owned subsidiary companies for effecting transfer of distribution functions to those companies, namely (i) CESCO, Bhubaneswar for Central Zone (ii) SOUTHCO, Berhampur for Southern zone (iii) NESCO, Balasore for North Eastern zone and (iv) WESCO, Burla for Western Zone. In the year, 1999 these four distribution companies were issued with Distribution and Retail supply Licenses by the OERC) Thereafter, AES Corporation acquired 51% share in CESCO and took over the management from GRIDCO. Similarly BSES Limited acquired 51% share in WESCO, NESCO & SOUTHCO and took over the management from GRIDCO. After AES Corporation backed out from CESCO in the year, 2001, the OERC has appointed a Chief Executive Officer to manage CESCO and now Reliance Energy limited is managing WESCO, NESCO & SOUTHCO after taking over BSES Limited. Following Orissa, other States like Haryana, Utter Pradesh, Andhra Pradesh, Karnataka, Rajasthan have passed their Reform Acts and unbundled their State Electricity Board in to separate companies. Other States are progressing fast to enact their respective Reform Acts and to establish Regulatory Commissions after the Electricity Act, 2003 came into force, which has paved the way for open access private companies participation in the Generation, Transmission and Distribution and Retail Supply business.

No doubt in the Electricity Act,2003 much care has been taken to make provisions for preventing theft of energy with a revenue focus to minimize the loss sustained by the Distribution Companies/Licensees under this head. Obviously while entrusting power to the authorities under different provisions of the Act the Legislature expected fair play and equity from such officers the Licensees and other authorities. Four years is shortly going to be completed since the new Act came into force in June, 2003. May it be too early to assess the performances of different authorities under the Act, but an analysis of the last four year's experience may help improving the performances.

So far as distribution and retail supply of electricity is concerned, the OERC has framed Orissa Electricity Regulatory Commission Distribution (Conditions of Supply) Code, 2004 which covers almost every aspect of it like new connection, agreement for supply, security deposit, installation and testing of meters, reduction and enhancement of contract demand system of supply, classification of consumer charges for supply and billing, disconnection and restoration of power supply etc. The said Code, 2004 does not include any provision concerning theft of unauthorised use of electricity and punishment/penalty as the Electricity

Act, 2003 sufficiently takes care of it. Sections-135 to 139 under PART-XIV of the Electricity Act, 2003 deal with punishment/penalty for offences like theft of electricity, theft of electric lines and materials interference with meters, etc. However, the offences punishable under Section-135 to 139 are to be tried by the Special Courts which are yet to be constituted under Section-153 of the Act. In absence of such Special Courts, the Distribution Companies have resorted to action under Section-126 in PART-XII of the Act, which deals with 'unauthorised use of electricity' and assessment of electricity charges payable by person indulging in such unauthorised use of electricity. Even if the consumers of our State are not aware of the provisions of the new legislations in the form of Electricity act, 2003 and the OERC Distribution (Conditions of Supply Code,2004, but it is for sure that most of them have heard about Section-126 (An aggrieved consumer or any person concerned in these fields would usually say that " a case has been booked under Section-126" ( Whatever it may be, but it has definitely made an impact on those consumers who have been indulging in unauthorised use/theft of electricity in the sense that these consumers now do not want to risk tampering of by passing of the meter. In this regard the efforts of the officers of the Distribution Companies need to be appreciated. But simultaneously there is strong probability of illegalities being committed by the Distribution Companies while taking action under Section-126 of the Act.(since the Distribution Companies are now under private management and giving more emphasis on revenue collection, possibility of bias and unfair practice on the part of the Distribution Companies can not be ruled out). So, it is of great importance here to discuss the provision of Section-126 and 127 of the Electricity Act, 2003).

The provision of Section-126 reads as follows:

**"126. ASSESSMENT –**

1. If on an inspection of any place or premises or after inspection of the equipments, gadgets, machines, devices found connected or used, or after inspection of records maintained by any person, the assessing Officer comes to the conclusion that such person is indulging in unauthorised use of electricity, he shall provisionally assess to the best of his judgment the electricity charges payable by such person or by any other person benefited by such use.
2. The order of provisional assessment shall be served upon the person in occupation or possession or in charge of the place or premises in such manner as may be prescribed.
3. The person, on whom a notice has been served under sub-section(2) shall be entitled to file objections, if any, against the provisional assessment before the assessing officer, who may, after affording as reasonable opportunity of hearing to such person ,pass a final order of assessment of the electricity charges payable by such person.
4. Any person served with the order of provisional assessment may, accept such assessment and deposit the assessed amount with the licensee within seven days of service of such provisional assessment order upon him: Provided that in case the person deposits the assessed amount, he shall not be subjected to any further liability or any action by any authority whatsoever.
5. If the assessing officer reaches to the conclusion that unauthorised use of electricity has taken place, it shall be presumed that such unauthorised use of electricity was continuing for a period of

One year immediately preceding the date of inspection for all categories of services, unless the onus is rebutted by the person, occupier or possessor of such premises or place.

6. The assessment under this section shall be made at a rate equal to two times the tariff applicable for the relevant category of services specified in sub-section(5).

Explanation- For the purposes of this section:-

- a. “ assessing Officer” means an officer of a State Government or Board or licensee, as the case may be ,designated as such by the State Government;
- b. “ unauthorised use of electricity” means the usage of electricity-
  - (i) by any artificial means; or
  - (ii) by a means not authorised by the concerned person or authority or licensee; or
  - (iii) through a tampered meter; or
  - (iv) for the purpose other than for which the usage of electricity was authorised”.

***(It may be noted here that the Govt. of Orissa in Energy Department has notified different rank of engineers/officers of the Distribution Companies as ‘ Assessing Officer’ for different categories of consumers in their respective power distribution areas in the State of Orissa)***

Sub-section (1) empowers the Assessing Officer to provisionally assess the electricity charges payable by the person indulging in unauthorised use of electricity. But to exercise such power, the Assessing Officer has to satisfy the requirements of Sub-section(1) i.e. firstly, the Assessing Officer himself has to inspect Secondly, he has to come to the conclusion that the person is indulging in unauthorised use of electricity i.e. use of electricity in the manner indicated under Explanation-(b) above.

*(As per Rule-5 of the Orissa Electricity (Manner of Service of Provisional Assessment Order) Rules, 2004 the provisional order has to be passed in the form contained in the schedule appended to the rules)*

After a provisional assessment order is served upon the person under Sub-section (2), the said person is entitled to file objection against the provisional assessment before the Assessing Officer. The Assessing Officer may pass a final order of assessment only after affording a reasonable opportunity of hearing to the person concerned as per Sub-Section (3).

However, there are instances where the Assessing Officer has not himself inspected the consumer’s installations, but has passed the provisional assessment order. Sometimes even the provisional assessment order is not being passed in the format prescribed under the relevant rules or straight way a penal demand is being served on the consumer without any provisional assessment and without affording an opportunity of hearing to the affected person. These practices are illegal and should be avoided by the Distribution Companies.

Sub-section(4) gives an opportunity to the concerned person to accept the provisional assessment and deposit the amount within seven days and in such event, he shall not be subjected to any further liability

or any other action by any other authority. But cases are remote where a person served with provisional assessment order is accepting the assessment and depositing the amount. The reasons are many. In some cases the consumer is not satisfied with the mode and manner of inspection and not convinced about the allegation of unauthorised use of electricity. Sometimes even if the consumer is convinced regarding the detection of unauthorised use of electricity and do not hope any possibility of challenging the provisional assessment successfully, still then he files objection because it is not within his capacity to pay the assessed amount as the assessment is on a higher side.

If the Distribution Companies and their Assessing Officers take a little care and apply their mind to this aspect while making provisional assessment, same would result in speedy recovery of the dues as well as prevent wastage of valuable time in passing final order of assessment after hearing the consumer. The Assessing Officers while making provisional assessment on bet judgement basis should not exploit the situation and take this as an opportunity for increasing the revenue collection, otherwise the 'bet judgment assessment' would result in a bias judgement assessment.

The Assessing Officers to make their job easier, should not observe in the inspection report that the meter is recording 50% or 70% less due to tampering, without any testing and in absence of any proof that such less recording in the meter is being caused due to interference with the meter. Further, if the consumer is not satisfied with the opinion of the inspection officer regarding accuracy of the meter, the consumer has the option of testing the meter by the Electrical Inspection or in the Standard Testing Laboratory of the Govt. of Orissa. The Licensee will not be prejudiced in any manner if the provisional assessment is made after ascertaining the correctness of the meter or percentage of error in the meter in the manner stated above so as to make it's action more transparent.

The O.E.R.C. Distribution (Conditions of Supply) Code, 2004 provides for installation of Check meter to test the accuracy of the original/billing meter. To avoid any dispute, it is required that a duly tested check meter should be installed in presence of the consumer and the readings from both meters should be taken in his presence. If the check meter is found to have recorded more consumption than the original meter, the check meter reading is to be treated as conclusive and the bill for the said period is to be raised as per the check meter reading. However, the responsibility of the Licensee is to test the accuracy of the billing meter. After testing if the meter is found to have become defective due to deliberate damage or interference by the consumer the Licensee may take action under Section-126 of the Act. But the Licensee should not treat the excess consumption recorded in the check meter as authorised consumption without testing of the meter to ascertain the cause of such difference in readings.

Sometime the meters are declared as tampered or defective only for the reason that the seals are found broken/tampered. Breaking or tampering of seals though punishable under law, it does not itself amount to tampering of meter so as to attract Section-126. To bring it within the purview of this Section, it needs to be further established that the meter has been interfered with after breaking the seals and due to such interference only the meter is not registering the actual consumption. There may be a case where the meter may continue to register the actual consumption even after interference (tamperproof meters with advanced technology like SEMS and SECURE meters now being installed mainly for commercial/industrial consumers continues to register actual consumption depending upon the nature of interference) of the

meter may not register actual consumption due to some other mechanical defect and not for the reason; of interference. So, it is always advisable that if the licensee suspects tampering of the meter, then the meter should be sealed in presence of the consumer with his acknowledgement and the meter should be tested by the Electrical Inspector or in the Standard Testing Laboratory. After such testing and report thereof, the Assessing Officer may proceed to assess the electricity charges under Sub-Section (I). Similarly, meters with advanced technology mostly used for industrial consumers are capable of storing tamper data and other particulars. If dump is taken from these meters and down loaded in computer, it would reflect the actual consumption, drawal of load amount of voltage and current flown in different phases including the date, time and nature of any abnormal occurrence in the meter etc. To prevent theft of energy through a tampered meter, the licensee may take dumps from such meters frequently and if the dump analysis reflects any abnormality in the meter or if the licensee suspects the meter has been tampered with, the licensee should immediately check for the reason of such tampering. He may also seal the meter and test it in the manner explained earlier to confirm the findings from the dump analysis. The licensee should not resort to action under Section-126 on the basis of such dump analysis only. It is because advanced technology may be adopted to check or prevent tampering of meters by collecting information/data from the meters through dump analysis, but to bring an allegation of tampering of meter against a consumer, it has to be strictly proved beyond any reasonable doubt that the consumer has interfered with the meter. Obviously the allegation is to be proved by physical inspection of the installations in the premises of the consumer and testing of the meter in the manner stated above.

The above discussions are made for the reason that the action under Section-126 of the Act is penal in nature as sub-section(5) empowers the Assessing Officer to presume that the unauthorised use of electricity was continuing for 3 months or 6 months immediately preceding the date of inspection( 3 months for domestic and 6 months for other categories of services) and sub-section-(6) provides for assessment of charges at a rate equal to one and half times the tariff applicable for relevant category of services. So under Section-126 no presumption is permissible regarding any 'unauthorised use of electricity' by a consumer though presumption can be made as regards the period of such unauthorised use only after the Assessing Officer reaches to the conclusion that there has been unauthorised use of electricity. Obviously the conclusion made by the Assessing Officer under Sub-Section (5) must be founded upon legally admissible evidence. Utmost care has to be taken by the Assessing officer while concluding that there is unauthorised use of electricity, because a slightest mistake on the part of the Assessing Officer may lead to closure of an industry/commercial establishment depriving hundreds of people from earning their livelihood. In our State when majority of the population, may be Govt. and private sector employees or small shop owners, find it difficult to maintain the family, an assessment for even Rs.10,000/- under Section-126 against an innocent consumer may lead to severe consequences.

So far as the provision of Sub-section-(5) is concerned, a debatable question arises as to while making a provisional assessment under sub-section(1), whether the Assessing Officer can presume the period of unauthorised use of electricity to be 3 or 6 months as the case may be under sub-section(5). In my opinion the initial assessment under sub-section (1) should be a reasonable one intended only to compensate the actual loss sustained by the licensee on account of theft of electricity. Here there is every chance that the consumer may accept the assessment and deposit the amount to avail the benefit

given under Sub-section (4). But while making the provisional assessment if the presumption under sub-section(5) regarding period of unauthorised is taken into consideration, the assessment may end up at such a figure, which may prevent the consumer to avail the benefit under sub-section(4) and this provision will become redundant. Further, Sub-section (5) requires that for presuming the period of unauthorised use, the Assessing Officer has to reach to conclusion that unauthorised use has taken place. Whether a statutory authority can reach to a conclusion having effect of penal consequences without hearing the affected party or before exhausting the procedure objection and hearing under Sub-Section(3), is left to be decided by the court of law.

Since all the four Distribution Companies in our State have mostly designated their Executive Engineers and S.D.O.s as the Assessing Officers for different category of services, there may be an apprehension in the mind of the consumer that the Engineer-Assessing Officer being a n employee under a private management will be motivated to serve the commercial interest of his organisation to satisfy the management and as such the assessment will never be free from bias. Though the assesses consumer is entitled to file objection and hearing on the provisional assessment, still the apprehension remains whether the Engineer-Assessing Officer will appreciate the point of law raised in the objection or whether the Assessing Officer being answerable to the management will fairly accept the illegalities if any committed by him in the inspection. These apprehensions can be removed from the mind of the consumer by gaining trust of the consumer. The Engineer while acting s an Assessing Officer under Section-126 should not be influenced by bias considerations and should conduct himself in such a manner that the consumer does not get a feeling of being harassed. While hearing the consumer on the provisional assessment, due weightage should be given to the explanations and grounds stated in the objection filed by the consumer. While passing the final order of assessment, the Assessing Officer should fairly deal with all those issues/grounds raised in the objection and pass a Companies have adopted standard pattern for passing the final assessment order in a manner far or less similar to the following:

“ After careful consideration of your reply dated..... to the show cause notice under reference and after hearing you; on examination of the documents available in the record and the show cause reply filed by you, I being the Assessing Officer hereby decide that your final assessment amount comes to Rs.....Therefore, you are hereby directed to make payment of the above final assessment amount within 15 days from the date of receipt of the notice, failing which appropriate steps shall be taken for disconnection of power as per law”.

The Assessing Officer only fills in the blanks above without assigning any reason for reaching to such a conclusion. Such opportunity of hearing is nothing but an eye wash. This practice is not going to help either the licensee or the consumer. If the consumer has a good case, due to such type of orders the consumer will be compelled to prefer appeal under Section-127 after depositing one third of the assessed amount. On the other hand, even if the consumer has not merit in the objection, but such orders can not be sustained on the face of it by the Appellate Authority. So the licensee wills never the benefited in the long run if such practices are not avoided.

Since, the Distribution Company/Licensee is an organisation enjoying a monopoly status and on the other side there is an individual consumer, the Assessing Officer must bear in mind that an exaggerated

claim/assessment may prevent the consumer even from filing appeal against the final order of assessment if payment of 1/3<sup>rd</sup> of the assessed amount and fees is beyond reach of the consumer. In other words this would be deliberately preventing the consumer from filing the appeal under Section-127 and thereby the consumer will be deprived of electricity for ever, which is certainly not the intension of the legislation. Since the Appellate Authority has not power to waive or reduce the amount of deposit required for filing appeal under Section-127 ( i.e. 1/3<sup>rd</sup> of the assessed amount), an innocent consumer will feel helpless as he has no other remedy also. Perhaps only option will be left for the consumer to knock the doors of the High Court seeking relief under Article-226 and 227 of the Constitution of India. I hope the think-thanks of the nation will consider the aspect to bring in an amendment to Section-127 giving power to the Appellate Authority to waive or reduce the amount required to be deposited for filing appeal in appropriate cases like the Appellate Authority/Tribunal under other statutes have this power. This will help to have a check on the possible exploitation of the consumers in the even of the baseless and exaggerated assessment by an Assessing Officer of the Licensee. Because the condition imposed under Section-127 for filing appeal has vested unbridled power with the Assessing Officer under Section-126 who if wants, can easily take away the right of appeal of the consumer by arbitrarily enhancing the assessment of electricity charges to an astronomical figure.

The intention behind above discussion is that now the engineer of the Distribution Company in our State has been entrusted with an added responsibility to act as an Assessing Officer under Section-126 of the Electricity Act, 2003. While a lot of expectations are there from the Officers of the Licensee, simultaneously increasing apprehensions are also there in the mind of the consumer. So the responsibility has to be discharged by the Assessing Officer with utmost sincerity and care without being motivated by any factor than law and equity. This will go a long way to fulfil the object of the legislation to prevent theft of electricity, to minimize the loss of the Distribution Company and to ensure better service to the consumers at large.



## **POWER SECTOR REFORMS UNDER ELECTRICITY ACT, 2003 AND HANDLING OF CONSUMER GRIEVANCES**

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The rationale for reform in the power sector has been to make it self sufficient, competitive and efficient with benefits to the consumer being the main criterion, thereby releasing government revenue for much needed investment in the social sector. The reality however is somewhat different. Historical and political factors indicate that there are many considerations at work that do not correspond to the stated objectives. These are:

- The urge for reform has become necessary in India, rather than motivated by protection of consumer interests, in order to attract private investors since nobody was coming forward to invest in power projects. Therefore, incentives such as an assured rate of return to the investor, which are anti consumer, ran into serious trouble as in the case of Enron, a private power generation project in collaboration with an American Company, M/s Enron power plant in Maharashtra.
- The power sector has traditionally been a government monopoly. The mindset has been feudal and welfare- oriented rather than professional and commercial. State governments themselves anticipate resistance to reform from those who stood to benefit from the old system be they politicians, bureaucrats, employees or consumers who colluded in corrupt practices.
- Regulatory commissions, both Central and State, are key to the efficiencies of the reform programme. There are a great many expectations from Electricity Regulatory Commissions (ERCs), which are to deal with issues regarding investments, standards of supply, etc. and pricing in the power sector in an apolitical, rational and transparent manner, taking into account the interest of producers, distributors and consumers. It is essential that ERCs are neutral, autonomous agencies with the power infrastructure experts and suitably experienced manpower to play this role.

The electric supply industry in India prior to the year 2003 was governed by the enactments namely Indian Electricity Act 1910, the Electricity (Supply) Act 1948 and the Electricity Regulatory Commission Act 1948. The Indian Electricity Act, 1910 created the basic framework for electricity supply industry in India. The Act envisaged growth of the electricity industry through private licensees. The Electricity (Supply) Act 1948 mandated the creation of the State Electricity Board which was responsible for arranging the supply of electricity in the State.

Over a period of time the performance of SEBs has deteriorated substantially on account of various factors. In order to address this issue and to provide for distancing of government from determination of tariff. The Electricity Commission Act was enacted in 1998. It created the Central Electricity Regulatory Commission and has an enabling provision through which the state Government have created State Electricity Regulatory Commissions.

With the policy of encouraging private sector participation in generation, transmission and distribution and the objective of distancing the regulatory responsibilities from the Government to the Regulatory Commission, the need was for harmonizing and rationalizing the provisions in the Indian Electricity Act, 1910, the Electricity (Supply) Act, 1948 and the Electricity Regulatory Commission Act 1998. Therefore a new self contained, comprehensive legislation was approved in 2003, by the parliament as Electricity

Act 2003 and is in operation since then. The Act has progressive features and endeavors to strike the right balance given the current realities of the power sector in the manner they consider appropriate.

The Central Electricity Regulatory Commission ( CERC ) has the mandate to regulate generation and transmission up to the boarder of a state, central government owned generating stations, licenses for private investment in transmission. The State ERCs have the mandate to regulate the power sector within the respective states. The thinking underlying the reform process appears to be that

- Establishment of a credible and transparent regulatory frame work is key for the success of privatization of distribution.
- Changes in management culture and attitudes are also essential.
- Improvement in the quality of power supplied is needed for the acceptance of tariff adjustments.

### **CONSTITUTION OF 'CONSUMER GRIEVANCE REDRESSAL FORUMS'**

With the enactment of Electricity Act 2003, the Electricity Regulatory Commissions of the States, where the Distribution of Electricity is either by Private or Government controlled Service Provider, have been mandated to constitute Consumer Grievances Redressal Forums and Electricity Ombudsman to function under their control, for impartial and speedy redressal of consumer grievances, which otherwise were not to the satisfaction of the consumers, when communicated by the Service Provider.

### **JURISDICTION OF THE FORUM**

- 1) The Forum shall have the jurisdiction to entertain the complaints filed by the complainants with respect to the electricity services provided by the Distribution Licensee and to take up a matter suo-moto if the same fulfils the requirements specified in Regulation.
- 2) The Forum shall entertain only those complaints where the complainant has approached the appropriate authority of the licensee as prescribed in the complaint handling procedure of the licensee approved by the Commission from time to time and either is not satisfied with the response of the licensee or there is no response within the time prescribed therein or within reasonable time:  
Provided that the no complaint shall be entertained unless it is filed before the Forum within three months from the date the consumer exhausted the remedy under the complaint handling procedure or when no action is taken by the authority prescribed in that procedure within the period prescribed therein, from the expiry of such period as aforesaid, which ever is earlier:  
Provided further that the Forum may, for reasons to be recorded in writing, entertain a complaint which does not meet the aforesaid requirements;
- 3) The Forum shall not entertain a complaint if it pertains to the same subject matter for which any proceedings before any court, authority or any other Forum is pending or a decree, award or a final order has already been passed by any competent court, authority or forum or is frivolous or vexatious in nature;

### **GRIEVANCE FILING**

- 1) The Forum shall take up any kind of grievance concerning with electricity supply to the consumers except the grievances as specified in the Regulation.
- 2) Every grievance to the Forum must be submitted in writing to the Forum stating;
  - a) the name of the individual or the organisation, postal address, K No, and telephone number, fax number and the E-mail address (if any) of the complainant;

- b) the name of the office of the origin of complaint, name of the electricity district etc;
  - c) a full description of the matter, which is the source of the grievance, including copies of any relevant and supporting documents, if any;
  - d) the relief prayed for
  - e) a statement that the matter is not pending before any other court, authority or forum.
- 3) A copy of response if any from the licensee shall be enclosed.
  - 4) The Forum may accept complaints through e-mails or website subject to fulfillment of such requirements as the Forum may consider appropriate.

#### **GRIEVANCE HANDLING PROCEDURE FOR THE FORUM**

- 1) On receipt of the consumer grievance, the Secretary shall make an endorsement on the grievance subscribing his dated initial.
- 2) Within 7 days of receipt of a consumer grievance, the Secretary shall send an acknowledgement to the applicant. Consumer grievances received shall be registered and serially numbered for each year, and shall referred be referred e.g. C.G. No.1/2002, 2/2003 and soon. A copy of the grievance shall be forwarded simultaneously to the concerned officer of the licensee for redressal or to file objection if any in writing in case the licensee is not agreeable to the request of the complainant.
- 3) The employee nominated / authorized in this regard by the licensee or the employee named in the complaint shall furnish the parawise comments on the grievance within 15 days from the date of receipt of the letter from the Forum, failing which the Forum shall proceed on the basis of the materials available on record.
- 4) The Forum may call for, any record of the licensee or from the complainant relevant for examination and disposal of the grievance and the parties shall be under obligation to provide such information, document or record as the Forum may call for. Where a party fails to furnish such information, document or record and the Forum is satisfied that the party in possession of the record is withholding it deliberately, it may draw an adverse reference.
- 5) On receipt of the comments from the licensee or otherwise and after conducting or having such inquiry or local inspection conducted as the forum may consider necessary, and after affording reasonable opportunity of hearing to the parties, the Forum shall pass appropriate orders for disposal of the grievance, as far as possible, within 60 days of filing the complaint.
- 6) The proceedings and decisions of the Forum shall be recorded and shall be supported by reasons. The decision/s of the Forum shall be based on the opinion of the majority members of the Forum present and voting. The order of the Forum shall be communicated to the Complainant and licensee in writing within 7 days. The licensee shall comply with the order of the Forum within 21 days from the date of receipt of the order.
- 7) The Forum may, subject to the Regulations made by the Commission in this regard, award such compensation to the complainants as it considers just and appropriate in the circumstances of the case.
- 8) The Forum may issue such interim orders pending final disposal of the complaint as it may consider necessary.

- 9) Where the complainant or the licensee fails to appear before the Forum on the date fixed for hearing on more than two occasions, the Forum may decide the complaint ex-parte.
- 10) The Forum may settle any complaint in terms of an agreement reached between the parties at any stage of the proceedings before it and there shall be no right of representation before the Ombudsman.
- 11) The Forum shall not be bound to follow the procedure prescribed in the Civil Procedure Code 1908(Act 5 of 1908). Subject to these Regulations the Forum may evolve procedure conforming to the principles of fair play and justice for efficient discharge of its functions.
- 12) Any complainant aggrieved by orders of the Forum may prefer a representation before the Ombudsman appointed / designated by the Commission.

#### **REASONED ORDER**

Every Order made by the Forum shall be a Reasoned Order and signed by the members conducting the proceedings. Where the members differ on any point or points, the opinion of the majority shall be the Order of the Forum. The opinion of the minority shall however, be recorded and form part of the Order.

#### **ORDERS OF THE FORUM TO BE BINDING**

Subject to the right of the representation before the Ombudsman specified in these Regulations, the Orders of the Forum shall be binding on the consumers and the licensee.

#### **INSPECTION OF RECORDS AND SUPPLY OF CERTIFIED COPIES**

- 1) The consumer and the licensee may obtain certified copies of the Orders, decisions, directions and reasons in support thereof given by the Forum in respect of the complaint.
- 2) Any person may obtain copy of the Orders of the Forum subject to payment of such fee and after complying with such other terms, which the Forum may direct.

#### **MONITORING OF CONSUMER GRIEVANCES BY THE FORUM**

- 1) The Forum will keep a record of consumer grievances reported to it and the results thereof.
- 2) The Forum shall submit a report on the number of complaints received, redressed and pending, every month to the Commission for the period of 1<sup>st</sup> of the month to end of the calendar month and a copy shall also be forwarded to the distribution licensee.

#### **APPOINTMENT OF OMBUDSMAN**

The Commission shall designate or appoint a person to be known as Ombudsman to carry out the functions entrusted to him by the Act and these Regulations. The Commission may appoint more than one Ombudsman if so deemed necessary.

#### **FINALITY OF AWARD**

The award or the orders of the Ombudsman shall be final and binding on the parties.

Powers to call information

For the purpose of carrying out his duties, Ombudsman shall have the same powers to call for records or information as are available to the Forum under Regulation 9(4)

Power to remove difficulties

If any difficulty arises in giving effect to any of the provisions of these regulations, the commission may, by general or special order, do anything, not inconsistent with the provisions of the Electricity Act 2003, which it considers necessary or expedient for the purpose of removing the difficulties. ■

# RURAL ELECTRIFICATION PROGRAMME IN ORISSA

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## 1.0 INTRODUCTION AND OBJECTIVE

- 1.1. Ministry of Power, Govt. of India vide its resolution No.44/26/05-RE (Vol-VII) dated 23.08.2006 has modified the National Rural Electrification Policy. The National Rural Electricity Policy has provided the following objectives:-
  - Provision for access to electricity for all rural households during the next five years.
  - Quality and reliable power supply at reasonable rates.
  - Minimum lifeline consumption of 01 unit per household per day as a merit good by year-2012.
- 1.2 In compliance with Para- 3.4 of the Government of India “Rural Electricity Policy” and under the provisions contained in Section-4 and 5 of the Electricity Act, 2003, the Government of Orissa intends to notify the Rural Electrification Plan for the State to achieve the National goal for providing access to electricity for all rural households during the next five years. This is also as per the aims and objectives under Para - 2 of National Electricity Policy to be achieved by 2012.
- 1.3 The Govt. of India has introduced a new scheme “Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY)” – scheme for Rural Electricity Infrastructure and households electrification and the guidelines were issued by Ministry of Power, Govt. of India vide letter No.44/19/2004-D(RE) dt.18.03.2005. The scheme would be implemented through Rural Electrification Corporation (REC), which has been designated as the Nodal Agency. The responsibility of implementation of the district wise projects under the scheme have been entrusted to Central Public Sector Undertakings (CPSUs) namely NTPC, PGCIL and NHPC for execution of the projects on a turn-key basis.
- 1.4 Deployment of franchises for the management of rural distribution in projects financed under the scheme and ensures determination of bulk supply tariff for franchisees in a manner which ensures their revenue return substantially with improved services to consumers.
- 1.5 Considering the prevailing conditions laid down by Rural Electrification Corporation that the habitation with population of less than 100 would not be considered in present proposal of the RGGVY scheme, Govt. of Orissa has launched various schemes under which the habitations (mostly less than 100 populations) not covered under RGGVY scheme shall be electrified during the XI Plan by the State Government.
- 1.6 Govt. of Orissa has launched a scheme known as “Biju Gram Jyoti Yojana (BGJY)” with an aim of electrification of 10000 villages (habitations) over a period of five years effective from the year 2007-08 to 2011-2012 and envisages a total outlay of Rs1000 Crore For BGJY. During FY 2007-08, an amount of Rs. 50 crore has been provided in the budget under BGJY.

- 1.7 The other two state schemes will cover those villages under the “**Gopabandhu Gramina Yojana (GGY)**” and “**Biju KBK Plan**” funded by **Backward Regions Grant Fund (BRGF)**. The GGY shall be implemented in the following 11 districts: i) Angul ii) Balasore iii) Bargarh iv) Bhadrak v) Cuttack vi) Jajpur vii) Jagatsinghpur viii) Kendrapada ix) Khurda x) Nayagarh and xi) Puri. The GGY aims at providing infrastructure consisting primarily of Bijli, Sadak, and Pani to every revenue village in the identified eleven districts. For this purpose, each village may be given funds as follows: i) the villages having a population of below 500 persons may be given funds to the extent of Rs. 2 Lakh each, ii) the villages having population above 500 but less than or up to 1000 persons may be given Rs.3.00 lakh each, and iii) the villages having population more than 1000 persons may be given Rs.5 lakh each. The census figure of 1991 shall be adopted for determining the population of village for the purpose of implementation of GGY. The objective of the Govt. of Orissa is to cover all revenue villages in a phased manner by the end of the 11<sup>th</sup> Five Year Plan.
- 1.8 Similarly, **Biju KBK Plan** will cover backward districts like undivided Koraput (i.e. Koraput, Nawarangpur , Rayagada and Malkanagiri), undivided Bolangir (i.e. Sonapur and Bolangir) and undivided Kalahandi (i.e. Kalahandi and Nuapada). The other remaining eleven backward districts ( as scheduled in the BRGF programme) will be covered under rural electrification programme by BRGF. The BRGF programme envisages the rural electrification where intensive electrification of a village may be beyond what is proposed to be done from investment at the national level at present. Panchayatraj Institution (PRIs) could be motivated to take up intensive electrification by bringing a certain component of financial support to add to investment made through the Rajiv Gandhi Grameen Viduyutikaran Yojana (RGGVY) and for electrification of agricultural pump etc.
- 1.9 The Govt of Orissa shall be the owner of the assets created in the implementation of the projects as proposed by the State Govt. and sanctioned by REC. The Govt. of Orissa shall authorize Distribution Companies (DISTCOs) to operate and maintain these assets for effective power supply in the project areas and derive consequential benefits out of the assets created under the project by way of revenue to be received against O & M of the system and the cost of power supplied.
- 1.10 In consideration of foregoing para, Govt. of Orissa notifies the Rural Electrification Plan under RGGVY, BGJY, GGY and Biju KBK Plan for the State which shall be a five year plan beginning from April,2007 and will be known as “Rural Electrification Plan 2007-2012 ” for the State of Orissa and shall fulfill objective with regard to providing reliable and quality power supply to the consumers within the State, besides providing access to electricity to all house-holds in next five years, with achievement of merit good of 01 KWH (Unit) per household per day by 2012.

## **2.0 APPROACH TO RURAL ELECTRIFICATION**

- 2.1 For villages intensive distribution network having distribution voltage of 11000 Volts and 440 Volts shall be developed and necessary infrastructure of distribution network such as Sub-station, distribution transformer, LT line, complaint centers etc. shall be developed. The development of infrastructure is to be ensured in the schemes under implementation by CPSUs and setting up of complaint centers and related mechanism to ensure services to consumers by the franchisee(s).

## **2.2 Each electrified village included in the programme shall include:**

- Basic infrastructure such as Distribution transformer and Distribution Lines in the inhabited locality as well as a minimum of one Dalit Basti/Hamlet where it exists; and
- Electricity provided to public places like Schools, panchayat Office, Health Centers, Dispensaries, Community Centers etc; and
- Number of households electrified to be at least 10% of the total number of households in the village.

## **2.3 Further programme shall also encourage domestic lighting scheme for such areas which are not covered under RGGVY and may provide for following:**

- To have stand alone local distribution net work based on solar lighting system or any other renewable source like wind, biomass etc.
- To have stand alone local distribution based on generator running on Bio-diesel or diesel in rural areas which are being notified as Rural areas as per Section 4, 5 & 6 of Electricity Act,2003.

## **3.0. SCHEME FOR RURAL ELECTRICITY INFRASTRUCTURE AND HOUSEHOLD ELECTRIFICATION-RGGVY**

### **3.1. The Govt. of India, Ministry of power has reviewed the existing schemes of Rural Electrification recently and has launched a comprehensive programme of RGGVY in which all the 30 districts of the State are included. Under the scheme the project will be financed with 90% capital subsidy for provision of:**

#### **(a) Rural Electricity Distribution Backbone (REDB)**

- Provision of 33/11KV ( or 66/11KV) sub-stations of adequate capacity and lines in blocks where these do not exist.

#### **(b) Creation of Village Electrification Infrastructure (VEI)**

- Electrification of un-electrified villages.
- Electrification of un-electrified habitations
- Provision of distribution transformers of appropriate capacity in electrified villages/ habitation(s)

## **4.0 DECLARATION OF VILLAGE/HAMLET(Habitation) AS ELECTRIFIED:**

### **4.1 As per the new definition of an electrified village specified vide Ministry of Power letter No.42/1/2001 D(RE) dt.5.2.2004, a village would be declared as electrified based on the certificate issued by Gram Panchayat Certifying that:**

- ***Basic infrastructure such as Distribution Transformer and Distribution Lines are provided in the inhabited locality as well as a minimum of one Dalit Basti/Hamlet where it exists; and***

- ✱ ***Electricity is provided to public places like Schools, Panchyat Office, Health Centers, Dispensaries, Community Centers etc; and***
- ✱ ***The number of household electrified is at least 10% of the total number of households in the village.***

Govt. shall notify a village as electrified only after fulfilling the above mandatory requirements.

4.2 Gram Panchayat /association of consumers subject to fulfillment of the technical and financial requirement shall be involved in the development of various activities in the business of electricity including responsibility of operation and maintenance of distribution network in Rural areas.

#### **5.0 TAKING OVER OF R.E PROJECT BY DISTCOs or PANCHAYAT/ LOCAL COMMUNITY**

5.1. The concerned CPSU will intimate and handover the project to DISTCOs upon successful commissioning and test charging of the same (In part or full, as the case may be) and DISTCOs will take over the project(s) and commence operation and maintenance of the project(s) at their own expenses and shall also ensure compliance of provisions as indicated in the quadripartite agreement. DISTCOs will issue necessary taking over certificate subject to rectification of defects/ deficiencies, if any.

5.2. The operation and maintenance of the same shall be the responsibility of DISTCOs, as and when the project is commissioned and taken over by DISTCOs.

#### **6.0 DECENTRALISED DISTRIBUTED GENERATION**

6.1 Govt. of Orissa is committed to encourage the development of local stand alone system in the area based on generation of electricity from the generators running on bio-diesel or diesel, bio-mass etc. State Govt. would facilitate such projects by giving quick clearances through administrative measures such as single window clearance with easy access for giving necessary approval in a time bound manner to fully utilize the potential of local resources of the State. This will cover those areas which are otherwise not being electrified with the grid power.

6.2 Govt. of India has already approved vide no. 15/6/2006-07-RVE of Ministry of New and Renewable Energy, the programme for electrification of Remote Un electrified census villages and Remote Un-electrified Hamlets of electrified Census villages through Non- Conventional Energy Sources. This will be implemented by Orissa Renewable Energy Development Agency (OREDA), a Govt. of Orissa agency.

#### **7.0 STATUS OF RURAL ELECTRIFICATION IN THE STATE OF ORISSA**

The status of Rural Electrification as well as status Electrification of Habitation as on 31.03.2007, Electrification of Un-electrified portion in electrified villages and Electrification of Un-electrified portion in electrified Habitations (to cover all Households) as well as status of BPL Households Electrification in the State are shown in the following Tables 1-5.

**TABLE-1**  
**STATUS OF VILLAGE(CC VILLAGE) ELECTRIFICATION AS ON 31.03.2007**

		<b>CESU</b>	<b>NESCO</b>	<b>WESCO</b>	<b>SOUTHCO</b>	<b>Total</b>
1	Total Inhabited Villages as per 2001 Census	<b>11814</b>	<b>11184</b>	<b>10585</b>	<b>14363</b>	<b>47529</b>
2	Total Electrified Villages	9571	9146	7575	8151	<b>34443</b>
i)	By Conventional means	9571	9146	7575	8151	34443
ii)	By Non-conventional means	0	0	0	0	<b>0</b>
iii)	Total Electrified Villages (as per old definition)	9571	9146	7575	8151	<b>34443</b>
3	Percentage Electrification	81.01%	81.78%	71.56%	56.75%	<b>71.84%</b>
4	Balance un-electrified villages (Sl.no.1-Sl. No2iii)	<b>2243</b>	<b>2038</b>	<b>3010</b>	<b>6212</b>	<b>13086</b>
5	Declared un-electrified due to new definition = 7027	1799	1314	1121	2793	<b>7027</b>
<b>6</b>	<b>Total Balance Un electrified Villages</b>	<b>4042</b>	<b>3352</b>	<b>4131</b>	<b>9005</b>	<b>20113</b>
i)	To be Electrified through non-Conventional	101		154	0	255
ii)	Total Un-Electrified villages through Conventional means	<b>3941</b>	<b>3352</b>	<b>3977</b>	<b>9005</b>	19858

**TABLE 2**  
**STATUS OF ELECTRIFICATION OF HABITATIONS (HAMLETS & DALIT BASTEES) AS ON 31.03.07**

		<b>CESU</b>	<b>NESCO</b>	<b>WESCO</b>	<b>SOUTHCO</b>	<b>Total</b>
1	No of Habitations	42899	22315	13917	25126	104257
2	Total Electrified till 31.03.07					
i	By Conventional means	14463	9426	1702	6066	31657
ii	By Nonconventional means	0	0	0	0	0
3	<b>Total Electrified Habitations</b>	14463	9426	1702	6066	31657
4	<b>Percentage Electrification</b>	33.71%	42.24%	12.23%	24.14%	30.36%
5	<b>Total Un Electrified Habitations</b>	28436	12889	12215	19060	72600
a	Un Electrified Habitations to be electrified through conventional means	<b>28354</b>	<b>12508</b>	<b>12135</b>	<b>18246</b>	<b>71243</b>
b	To be Electrified through non-Conventional means	82	381	80	814	1357

**TABLE-3**  
**ELECTRIFICATION OF UN-ELECTRIFIED PORTION IN ELECTRIFIED VILLAGES**  
**(TO COVER ALL HOUSE HOLDS)**

<b>A)</b>	<b>Villages</b>	<b>No. of villages</b>
	Total Electrified villages (Conventional)	34443
(i)	House Hold Electrification 100%	3419
(ii)	House Hold Electrified more than 75% and funds required @ 1.00 lakh/ Villages	963
(iii)	House Hold Electrified between 50% to 75% and required funds@2.00 lakhs / Village	1609
(iv)	House Hold Electrified less than 50 % covered and required funds @2.50 lakhs / Village	28452
(v)	Total villages & Funds Required	<b>31024</b>

**TABLE-4**  
**ELECTRIFICATION OF UN-ELECTRIFIED PORTION IN ELECTRIFIED HABITATIONS**  
**(TO COVER ALL HOUSE HOLDS)**

<b>A)</b>	<b>Habitations</b>	<b>No. of Habitation</b>
	Total Electrified Habitation (Conventional)	31657
(i)	House Hold Electrification 100%	0
(ii)	House Hold Electrified more than 75% and funds required @ 1.00 lakh/ Habitations	16892
(iii)	House Hold Electrified between 50% to 75% and required funds@2.00 lakhs / Habitations	4934
(iv)	House Hold Electrified less than 50 % covered and required funds @2.50 lakhs / Habitations	9831
(v)	Total Habitations	<b>31657</b>

**TABLE-5**  
**STATUS OF BPL HOUSE HOLDS ELECTRIFICATION IN THE STATE**

	Total Rural House Holds in the state as per 2001 census.	6847879
	House Holds Electrified as on 31.03.07	1423736
	Percentage House Holds Electrification	20.79%
	Balance House Holds to be Electrified	<b>5424143</b>
(i)	Out of Total SC / ST HHs 742956 Nos. 80% is BPL	594364
(ii)	Out of Total General HHs 4681187 Nos. 62.7% is BPL	2935857
(iii)	Total BPL HHs to be Electrified.	<b>3530221</b>
(iv)	Funds required @ Rs1500/- per House Hold (Rs.in Cr.)	<b>529.53</b>

**TABLE-6  
RGGVY COVERAGE OF VILLAGE ELECTRIFICATION**

Sl. No.	Dist.	VIII. Covered for Household electrification			Habitations Covered for Household electrification			Rural HH to be Provided access to electricity		Implementing Agency	
		No. of Un-electrified vill. to be electrified	No. of De-electrified vill. to be electrified	No. of electrified vill. to be electrified (for its un-electrified portion)	Total no vill. Covered	No. of Un-electrified Habitation to be electrified	No. of electrified Habitations to be electrified (for its un-electrified portion)	Total no Habitation covered	No. of connections proposed to be released to BPL rural HH		No. of connections proposed to be released to rural households (including BPL HH)
1	Nayagarh	335	268	873	1476	88	0	88	133271	69775	NTPC
2	Puri	21	31	1451	1503	2292	1451	3743	165615	35949	NHPC
3	Jajpur (CESU)	0	5	198	203	87	198	285	28892	16293	PGCIL
4	Dhenkanal	87	163	817	1067	440	345	785	169502	57568	NTPC
5	Angul	280	314	1034	1628	930	1032	1962	159226	94614	NTPC
6	Jagatsinghpur	81	35	1113	1229	188	2727	2915	103525	97029	PGCIL
7	Cuttack	15	146	1693	1854	161	1849	2010	223647	107327	PGCIL
8	Kendrapara	135	95	1177	1407	310	5329	5639	110902	48639	PGCIL
9	Khurda	94	36	1218	1348	146	1533	1679	134892	52326	PGCIL
10	Balasore	96	78	2445	2619	2629	2733	5362	197749	168238	PGCIL
11	Bhadrak	133	156	953	1242	2398	1077	3475	84558	69208	PGCIL
12	Mayurbhanj	1074	650	2029	3753	2030	2095	4125	336236	231889	PGCIL
13	Jajpur (NESCO)	25	102	1248	1375	1116	1865	2981	151363	143761	PGCIL
14	Keonjhar	591	328	1157	2076	2428	1656	4084	235751	184865	NTPC
15	Bargarh	23	94	1062	1179	173	1423	1596	209452	136314	NTPC
16	Deogarh	327	27	344	698	245	153	398	53728	46115	NTPC
17	Nuapada	168	48	391	607	358	492	850	98000	76398	NTPC
18	Sundargarh	563	234	884	1681	1427	885	2312	180112	109709	PGCIL
19	Sambalpur	382	76	766	1224	1689	915	2604	121084	71133	NTPC
20	Jharsuguda	16	27	305	348	200	669	869	61694	32681	NTPC
21	Sonepur	398	75	486	959	875	486	1361	98128	63078	PGCIL
22	Kalahandi	1053	47	917	2017	190	283	473	261346	216253	NTPC
23	Bolangir	369	95	1300	1764	878	0	878	210558	153039	NTPC
24	Boudh	665	68	376	1109	1632	471	2103	132087	66599	NHPC
25	Nawarangpur	422	128	350	900	1200	440	1640	174556	111897	PGCIL
26	Koraput	1256	17	579	1852	1424	295	1719	222022	208158	NTPC
27	Malkangir	789	47	165	1001	1089	212	1301	81230	54731	PGCIL
28	Ganjam	644	40	1984	2668	1745	2541	4286	222311	112263	NHPC
29	Gajapati	590	131	746	1467	1372	926	2298	83817	58428	NHPC
30	Kandhamal	1416	188	756	2360	2212	774	2986	122942	29924	NHPC
31	Rayagada	1582	481	402	2465	2516	407	2923	162034	127550	NHPC
	<b>TOTAL</b>	<b>13630</b>	<b>4230</b>	<b>29219</b>	<b>47079</b>	<b>34468</b>	<b>35262</b>	<b>69730</b>	<b>4730230</b>	<b>3051751</b>	

## **8.0 CONCLUSION**

- 8.1.1 The coverage under RGGVY scheme is given in the Table - 6 below. The figures are provisional. RGGVY would cover 13630 nos. of Un-electrified Villages, 4230 nos. of De-electrified villages & 29219 nos. of electrified villages (for un-electrified portion).
- 8.1.2 Similarly, 34468 nos. of un-electrified habitations & 35262 nos. of electrified habitations (for its un electrified portion) will be covered under RGGVY scheme.
- 8.1.3 4730230 nos. of connections will be provided to rural House Holds. Out of these 3051751nos. will be BPL rural House Holds.
- 8.1.4 In the 1st stage, BPL HH in electrified villages will be taken up.
- 8.2 Biju Gram Jyoti Yojana envisages to cover 10,000 villages (habitations) in a span of 5 years with an outlay of Rs. 1000 crore. The habitations with population less than 100 will be covered mostly in this Yojana.
- 8.3 Gopabandhu Gramin Yojana will mostly cover those revenue villages in specified 11 districts where electrification of some portion/ part is required.
- 8.4 Biju KBK Plan and BRGF (Central Funding Plan) would take up villages only in 19 specified backward districts in Orissa.
- 8.5 All households in Orissa will enjoy electricity by 2012 under Rural Electrification Programmes like RGGVY, BGJY, GGY and KBK Plan initiated by GoI and Govt. of Orissa.



## **ACCELERATED POWER DEVELOPMENT AND REFORM PROGRAMME (APDRP)**

**Debraj Biswal**

Chief Executive Officer, CESU

Due to the inability of State power utilities to systematically fund essential activities relating to the upgradation of the sub-transmission and distribution system and renovation and modernization of old plants, developmental activities in the power sector had not taken place in an organised and comprehensive manner, resulting in shortages, poor quality of supply and frequent interruptions. The commercial losses of the State Electricity Boards had been escalating. In order to address these issues, the Government of India (GoI), in February 2001, launched the Accelerated Power Development Programme (APDP). The scheme would finance specific projects relating to:

- Renovation and Modernisation (R&M) / life extension/ uprating of old power plants (thermal and hydel); and
- Upgrading and strengthening of sub-transmission and distribution network (below 33KV or 66 KV), including energy accounting and metering in the distribution circles in a phased manner.

APDP was to continue till the end of the 11th Five Year Plan i.e. 2012. An amount of Rs.1000 crore was budgeted as APDP funds among the States in 2000-01 for various schemes under the above categories.

For quick turnaround of the power sector, Government of India decided to restructure the concept of APDP from merely an investment window to also a mechanism for supporting power sector reforms in the States linked to the fulfillment of performance criteria by way of benchmarks. To “incentivise” the reform process, it was proposed to reward the actual improvement in the performance of the utilities by way of reduction in commercial losses and increased revenue realization. Therefore, APDP was renamed as “Accelerated Power Development and Reforms Programme” (APDRP) in the Union Budget 2002-03.

### **THE FOLLOWING MAJOR BENEFITS OF THE PROGRAMME WERE ENVISAGED**

- Reduction of Aggregate Technical and Commercial Losses (AT&C Losses)<sup>1</sup> from around 60 per cent to around 15 per cent in five years, to begin with in the urban areas and high density/ consumption areas, which implied a targeted reduction of 9 per cent per annum in AT&C Losses.
- Significant improvement in revenue realization by reduction of commercial and technical losses.
- Improved quality of supply and reliable interruption-free power.
- Decrease in the burden of heavy subsidies to SEBs/ Utilities.

Aggregate Technical and Commercial Loss (AT&C Loss) is considered the clearest measure of the overall efficiency of power distribution as it measures technical and commercial losses. By contrast, Transmission and Distribution Loss (T&D Loss) does not capture losses on account of non-realization of payments.

## **SALIENT FEATURES**

### **Organizational Setup**

- At the Central level, the Distribution Division in the Ministry of Power (MoP), under the overall charge of the Joint Secretary, is responsible for release of funds, approval of projects, signing of Memoranda of Agreement (MoA), monitoring, processing of incentive claims etc.
- In addition, a Steering Committee, chaired by Secretary (Power) and comprising members from the Central Electricity Authority (CEA), Ministry of Finance (MoF), Planning Commission, National Thermal Power Corporation (NTPC), Power Grid Corporation of India Limited (Power Grid), Power Finance Corporation (PFC) and Rural Electrification Corporation (REC), has been constituted to consider the proposals under APDRP and to review the implementation of the programme.
- NTPC and Power Grid have been designated as the Lead Advisor cum Consultants (Lead AcCs).
- At the State level, the projects sanctioned under APDRP are implemented by the State Electricity Boards (SEBs)/ State Utilities/ State Electricity Departments (SEDs).

### **APDRP HAS TWO COMPONENTS**

- An investment component for strengthening and upgradation of the sub-transmission and distribution system; and
- An incentive component to motivate utilities to reduce cash losses.

### **INVESTMENT COMPONENT**

APDRP has an outlay of Rs.40,000 crore as Additional Central Plan Assistance to the State Governments during the 10th Five Year Plan (2002-07). Of this amount, the investment component was for Rs.20,000 crore, with the remaining Rs.20,000 crore for the incentive component.

The funding mechanism under the investment component was as follows:

- For Special Category States, APDRP would finance 100 per cent of the project cost in the ratio of 90 per cent is grant and 10 per cent as soft loan.
- For other States, APDRP would finance 50 per cent of the project cost (ratio of grant and loan would be 1:1 i.e. 25 per cent grant and 25 per cent loan) and the SEBs/Utilities would have to arrange the remaining 50 per cent of the funds from PFC/ REC or other financial institutions as counter part funds.

With effect from November 2005, the loan component of 10 per cent for Special Category States and 25 per cent for other States was dispensed with.

### **APDRP INTERVENTIONS**

The technical, commercial and administrative interventions under APDRP were prioritized into Category A and Category B items, as follows:

**Table 1: Category A and B Items under APDRP**

Category- A Items	Category – B Items
<p>Targeted to reduce commercial losses and increase reliability by:</p> <ul style="list-style-type: none"> <li>● Feeder Metering</li> <li>● Distribution Transformer (DT) Metering</li> <li>● Sub-Station R&amp;M (Renovation and Modernization)</li> <li>● Capacitor Placement</li> <li>● Distribution Transformer R&amp;M</li> <li>● Service Connection Improvement</li> <li>● IT enabling, including Sub-Station Automation</li> </ul>	<p>Targeted to reduce technical losses and capacity augmentation by:</p> <ul style="list-style-type: none"> <li>● New Sub-Stations</li> <li>● New Lines</li> <li>● Bifurcation of Feeders</li> <li>● Reconductoring</li> </ul>

**PROCEDURE FOR SANCTION, IMPLEMENTATION AND MONITORING**

In brief, the procedure for sanction and implementation of projects under APDRP is as follows:

- SEBs/ Utilities prepare Detailed Project Reports (DPRs), containing the activities to be implemented by the utilities, which are submitted to the AcCs (Advisor-cum-Consultants).
- The DPRs are scrutinized and vetted by the AcCs, and submitted to the MoP for the consideration of the APDRP Steering Committee.
- After the proposal is approved by the Steering Committee, the MoP approaches the MoF for release of funds.
- MoF releases funds to the States. SEBs / Utilities obtain counterpart funds from Financial Institutions and open escrow account.
- SEBs / Utilities take up the tendering process and award contracts.
- Monitoring of the programme is done by MoP, Lead AcCs/ local AcCs, State level/ District level Distribution Reforms Committees.

**INCENTIVE COMPONENT**

Under the incentive component, the State Governments would be given incentives upto 50 per cent of the actual total loss reduction by SEBs/ Utilities. The grant under this component was to be utilized exclusively for the improvement of the power Sector. The salient features of the incentive scheme are as follows:

- The year 2000-01 would be taken as the base year for calculation of loss reduction in subsequent years.

- ✿ Losses would be calculated net of subsidy.
- ✿ Revenue would be considered on net realization basis (i.e. increase in receivables would be factored into the calculation).
- ✿ Incentive in subsequent years would be given on the incremental loss reduction (disallowing regression, if any).
- ✿ All qualifications on the audited accounts in the audit report having a bearing on reduction of expenses or inflation of income would be factored in. Similarly, any change in accounting policy having the effect of decreasing expenses or increasing the period of amortization/ depreciation would also be factored in.

## **CONDITIONS FOR AVAILING BENEFITS UNDER APDRP**

### **Memoranda of Understanding (MOUs)**

- ✿ As part of the six-level strategy, at the State level, the MoP insisted on signing of MOUs covering the following major reforms:
  - ✿ Setting up of State Electricity Regulatory Commissions (SERCs);
  - ✿ Restructuring of SEBs, viz. unbundling into separate entities for generation, transmission and distribution and corporatisation of unbundled entities;
  - ✿ Removing cross subsidies and tariff anomalies, and providing budgetary support to SEBs towards subsidies;
  - ✿ Introduce private participation in generation, transmission and distribution;
  - ✿ Filing of first tariff petition by SEB/ Utility with SERC, and implementation of tariff orders of the SERC; and
  - ✿ Securitisation of dues of Central Public Sector Undertakings (PSUs) to the SEBs/ Utilities.

### **Memoranda of Agreements (MOA)**

In order to enable the SEBs/ Utilities to manage distribution on a profit centre approach and to improve their performance on the basis of certain benchmarks, the signing of a Memorandum of Agreement (MOA) by them with the MoP for power reforms was made a pre-requisite for release of funds under APDRP. The key reforms envisaged through the MOA were as follows:

- ✿ 100 per cent metering for each 11 KV feeder and also for consumers;
- ✿ Energy accounting and audit;
- ✿ Distribution Circles to be operated as independent profit centres with adequate delegation of powers, with the Superintending Engineer as the Circle Chief Executive Officer (CEO);

- 11 KV feeders to be operated as business units, with the Junior Engineer as the feeder manager; and
- Turnkey contracting system to be adopted by the SEBs/ Utilities.
- MOUs and MOAs with the State Governments and SEBs/ Utilities;
- Guidelines for Reduction of T&D Losses issued by the CEA (February 2001);
- Guidelines for Development of Sub-Transmission and Distribution Systems by Committee of Experts and CEA (November 2001); and
- DPRs for APDRP Projects.

## **ACHIEVEMENT OF APDRP OBJECTIVES**

### **Projected Reduction in AT&C Losses not achieved**

Hitherto, T&D Loss (Transmission & Distribution Loss) was being used to measure the efficiency of power distribution. However, this measure has the following anomalies:-

- T&D loss does not capture losses on account of non-realization of payments.
- In absence of feeder metering in the past, a substantial portion of T&D loss, including theft of electricity, was attributed to agricultural consumption. Utilities were overestimating agricultural consumption, and showing a lower value for T&D Loss.

By contrast, AT&C Loss is considered a clearer measure of the overall efficiency of power distribution, since it measures technical and commercial losses.

AT&C Loss is calculated as

$$\frac{(\text{Energy Input} - \text{Energy Realized}) \times 100}{\text{Energy Input}}$$

where

Energy Realized = Energy Billed x Collection Efficiency, and

$$\text{Collection Efficiency} = \frac{\text{Amount Realized} \times 100}{\text{Amount Billed}}$$

While launching APDRP in March 2003, it was envisaged that AT&C Losses would be brought down from the existing level of about 60 per cent to around 15 per cent in five years, to begin with in the urban areas and high density/ consumption areas. This implied that reduction of AT&C Loss @ 9 per cent per annum was targeted.

Analysis revealed that AT&C Loss was still very high, and ranged between 15.86 per cent in Goa and 72.74 per cent in Mizoram. Except in the States of Goa, Andhra Pradesh and Tamil Nadu, the AT&C Losses continued to be very high in other States. The reduction in AT&C Loss in most States was marginal.

Thus, the primary objective of APDRP of reducing AT&C Loss by 9 per cent per annum had not been achieved.

## SYSTEM AND CONSUMER METERING

### Status of Feeder, Distribution Transformer (DT) and Consumer Metering.

At the time of formulation of APDRP, implementation of 100 per cent system metering and consumer metering was envisaged with a view to ensure proper energy accounting and auditing. In particular, metering of feeders and DTs were prioritised as Category – A

items, as these were points of bulk deliveries.

Status of feeder, consumer and DT metering as of March 2006.

Percentage of Metering	Feeder Metering		Consumer Metering		Distribution Transformer Metering	
	Number of States		Number of States		Number of States	
	2001-02	2005-06	2001-02	2005-06	2004-05	2005-06
100-80	18	25	14	20	4	3
80-60	-	1	7	5	-	-
60-40	3	1	7	4	2	2
40-20	6	1	-	-	4	5
Below 20	1	-	-	-	6	9
No data available	1	1	1	-	13	10

It can be seen from the above table that while there was considerable improvement in terms of reported feeder and consumer metering, as regards DT metering, only 3 States had shown 80 to 100 per cent metering and there was no information in respect of 10 States, with consequent lack of control on AT&C losses and inadequate energy accounting and auditing. (Metering status – All states upto 2006- source PFC – Annexure – I & II)

## RELIABILITY AND QUALITY OF POWER SUPPLY

One of the expected benefits of APDRP was improved quality and reliability of power supply, which would encourage usage of energy efficient equipment/ appliances, which would further lead to improvement in availability of energy. The key performance parameters for quality and reliability were:

- ✱ Frequency of feeder tripping (number of trippings per feeder per month), and average duration of feeder outages<sup>6</sup> (average outage duration per feeder per month);
- ✱ Failure rate of DTs;
- ✱ Average Power Factor; and
- ✱ Consumer Complaints and Disposal Time

Audit scrutiny, however, revealed significant deficiencies in this area, which are described in the succeeding paragraphs.

## **Feeder Tripping and Outages**

While the MoP had prescribed that feeder outage should be less than one per feeder per month, audit examination at the State level revealed that the actual outage was much higher than the prescribed level.

## **High DT Failure Rate**

The Distribution Transformer is a key component of the distribution network, and its failure not only results in financial loss to the utility but also adversely affects consumer satisfaction due to interruption in supply. The high failure rate of DTs is caused by a combination of factors viz. over loading of DTs, improper earthing and protection, improper fuses, inadequate preventive maintenance etc. For proper reliability, DT failure rate of less than 1.5 per cent per annum was indicated by MoP. Audit examination, however, revealed that most States had DT failure rates which were much higher than this benchmark.

## **ENERGY ACCOUNTING AND AUDIT**

### **Introduction**

One of the most important measures to ensure reduction of commercial losses, with relatively lower capital investment, is comprehensive energy accounting and audit, which would enable quantification of losses in different segments of the system and their segregation into commercial and technical losses.

Energy audit involves analysis of energy accounting data in a meaningful manner to evolve measures to introduce checks and balances in the system to reduce leakages and losses and also to improve technical performance. In order to achieve effective energy accounting and audit, it is imperative that meters are installed at all levels i.e. feeder, distribution transformers and consumers, meter readings are taken regularly and reconciled, and proper consumer indexing is done through GIS mapping and linked to the billing system so that loss pockets are identified and corrective measures taken.

Energy accounting is not a one time exercise but is to be done on a continuous basis.

Logically, with 100 per cent system metering at the feeder and DT levels, energy accounting at the feeder and DT levels should be feasible, provided meter readings are being taken at the prescribed intervals. Audit, however, observed that effective energy accounting and auditing was not being carried out in the States.

The main reasons for lack of an effective energy accounting and auditing were as follows:

- Lack of system metering - for proper energy accounting and auditing, installation of tamper proof meters at all levels of transformation (including DT metering) was required. However, audit observed that the utilities failed to bring in a high level of DT metering. Only 10 per cent of the States had achieved DT metering between 80 and 100 per cent as of 2005-06. Even where feeder and DT meters had been installed, the lack of energy accounting at the feeder / DT levels is indicative of lack of regular readings of such meters. Test check of records and physical verification of one power sub station of test checked Supply Division in Jharkhand, revealed that though some 11 KV

feeders and the connected distribution transformers were metered, neither were regular recording of feeder meters taken, nor were the feeder meter readings reconciled with meter readings of distribution transformers and meter readings of consumer meters. Thus, the whole purpose of metering at 11 KV feeder level was defeated in the absence of linkages between feeder, DT and consumer metering.

- ✱ Lack of accountability at the circle and feeder level .
- ✱ Computerization – low progress in respect of IT enabling activities such as consumer indexing, digital mapping, Automated Meter Reading instruments, Data Loggers etc. contributed to non-implementation of effective and meaningful energy audit and accounting.

Further, CRISIL and ICRA, which had been mandated by PFC at the instance of MoP to carry out a performance rating of the state power sector across all States, in their report in June 2006 pointed out ineffectiveness of energy audit in all States (except Goa, Himachal Pradesh, Meghalaya, Madhya Pradesh and Mizoram where no comments were made in respect of energy audit).

### **THE IMPLEMENTATION OF THE APDRP IN THE STATE OF ORISSA**

During the 10<sup>th</sup> plan period a sum of Rs.600 Crore approximately were sanctioned in respect of the 4 Distribution Companies for Implementation of APDRP. But the Discoms under the control of private Management could not mobilize adequate counterpart funding for successful implementation of the project, while their counterparts in other states are able to mobilize funds with the help of State Government guarantee.

### **APDRP UNDER THE 11<sup>TH</sup> PLAN PERIOD**

Though the Aggregate Technical & Commercial (AT & C) losses at the all India level have shown a marginal decline during the 10<sup>th</sup> Plan period , these losses continue to be very high in many states. Going by international experience, and achievements in some States in India ; these losses should be around 15% . Drastic reduction of Losses is the single most essential measure for turning around the power sector in the country.

The Ministry of Power therefore constituted a Task Force headed by Sh. P. Abraham, former Secretary, Power, Government of India, to assess and analyze the current efforts, suggestions made by various agencies and to suggest restructuring of the programme to better achieve the objectives of APDRP. The Task Force also recommended continuation of the programme during the 11<sup>th</sup> Plan with certain modifications.

The focus of the programme shall be on establishment of base line data and adoption of Information Technology in the areas of energy accounting & auditing, and improvement in consumer services through establishment of IT enabled Consumer Service Centers. Once these systems are established, schemes for strengthening & up-gradation of the sub-transmission and distribution network will be taken up for implementation.

As in the 10<sup>th</sup> Plan, the programme covered urban areas only, covering all district headquarters & towns with population of more than 50,000 (important towns of special category states having lesser population will also be covered). The funding will be project specific.

The establishment of baseline data and IT applications for energy accounting/auditing and establishment of IT enabled consumer service centers will be a prerequisite. Funding for strengthening of sub-transmission and distribution network will be in form of loan through financial institutions. Up to 50% (up to 90% for special category states.) of the loan would be converted into grant on reducing AT & C losses to at least 15% through specified reform and performance milestones. It is proposed to provide for incentive to employees in project towns where the agreed targets are achieved.

Based on the feedback from the various states at the level of Chief Secretary and Chief Minister Conference. It has been decided to continue with APDRP Programme during the 11<sup>th</sup> Plan period as a Centrally Sponsored Scheme with revised terms & conditions.

## **CONCLUSION**

The experience of APDRP shows that wherever policy maker and top management were aligned to sound commercial practices, they could reduce AT & C losses and move towards commercial viability with the help of technical interventions. Mere infusion of investment through APDRP and formal adherence to reform conditionality are not sufficient for credible loss reduction. In present unsustainable levels of theft make further investments in the generation and distribution unviable and unattractive. Power theft needs to be treated as a national problem and curbed with determination. It must be recognized that this is basically a governance issue rather than technical & commercial one.

This requires pro-active involvement of State Government which need to recognize the menace as the single most important reason for the sickness of utilities, which in turn leads to a fragile economic infrastructure. Wherever theft control was given the highest priority by the States, there has been significant turn around of utility. The states like West Bengal & Andhra Pradesh can be cited as the best example in this regard.



## **COMMERCIALIZATION, COMPETITION AND CHANGE IN MINDSET - ESSENCES FOR DISTRIBUTION SUCCESS**

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*All the views made in this article are personal & professional views and not to be treated as a view of any organisation or group. The following article mainly encompasses the journey of the privatized Distribution Sector in the State and the changes in the mindset of the Stakeholders.*

**No consumer tariff increase in last seven year, No Subsidy for the last ten years and No power cut in last five years are sufficient reasons to speak about the success of Distribution Sector in any State.** Exactly, that is the benefit; the Orissa Power Sector has got after implementing reform. Yes, the performance improvement had to match with the optimum expectations of the stakeholders, but the achievements are creditworthy.

DISCOMS namely WESCO, NESCO and SOUTHCO have increased revenue collection from Rs.834crores in 2001-02 to close to Rs.1,830crore in 2006-07, an increase of Rs.1,000crore. The other DISCOM namely CESCO has also improved it's AT&C performances even after frequent changes in management. The reduction in AT&C loss can be seen from the table given below;

### **AT&C LOSSES IN %**

	FY02	FY03	FY04	FY05	FY06	Reduction in % from FY 02 to FY 06	FY07
WESCO	57	47	46	41	40	17	39.7
NESCO	64	51	49	41	38	26	38.8
SOUTHCO	54	50	50	46	45	11	47.7
CESCO	63	55	51	51	50	13	47.1

There is an increase in cash collection by Rs.1,000 Crore in FY 2006-07 over the base year of 2001-02 by WESCO, NESCO and SOUTHCO despite there being no RST increase for last seven years and without any transitional finance or subsidy.

For the last five years, the full current BST is being paid by WESCO, NESCO and SOUTHCO. The other DISCOM CESU has also started paying the full BST since last one and half year. All the Discoms have been paying the power bills through Letter of Credit within 48 hours to GRIDCO.

Sri D.P.Bagchi, Member, MoP Committee of Experts to Study "Impact of Restructuring of SEBs" & Ex. Cheif Secretary applauded the success of Distribution sector saying that

*“The distribution companies (DISCOMs) have stabilised and the following features are worth mentioning.*

*XXXXXXXXXXXXXXXXXXXXXXXXXXXX*”

*“Reduction in AT&C Losses*

*The DISCOMs have substantially reduced AT&C losses through various measures.”*

#### **SOME MILESTONES ACHIEVED BY THE DISCOMS ARE AS UNDER;**

- ✱ Large scale implementation of the Spot Billing, decreased consumers billing grievances
- ✱ Meter Reading through hand held Meter Reading Instrument.
- ✱ Enhanced vigilance activities
- ✱ Strengthened manpower by inducting personnel in technical, finance, commercial and HR disciplines – more than 2000 persons including 1800 GET / DET /ITI for reduction of AT&C losses and maintenance of the network system,
- ✱ Better consumer services through creation of Grievance Redressal Forum / Consumer Care Centers.
- ✱ Automatic Meter Reading and Energy Audit
- ✱ Streamlined billing function
- ✱ Installed more than 6.5 lakhs consumer meters
- ✱ Installation of Cubicles, XLPE cables, Check Meters to arrest theft in HT category and appointment of Security Guard for vigilance
- ✱ Appointed Franchisee - Collection & Input based.
- ✱ Formation of Squads for collection of outstanding dues from consumers and for de-hooking

#### **PROBLEMS AND ISSUES OF THE DISCOMS**

- ✱ *DISCOMs Power Bonds:* These are securitised power purchase liabilities converted to Bond issued by DISCOMs to enable GRIDCO to service the dues to NTPC. This is an ironical part to the Orissa Consumers that the State have not accepted to avail the benefit of the One Time Settlement Scheme of Govt of India as per the recommendations of Montek Singh Ahluwalia Committee. The forgone benefit to the Orissa people is more than Rs.210crore. This was not implemented inspite of repeated advice of the State Regulator. In order to overcome the threats of the power regulation from NTPC, the Bond has been settled by GRIDCO and needs urgent attention for amicable reimbursement of the settlement amount to GRIDCO by the DISCOMs, so that the benefit of the settlement should passed on to the consumers
- ✱ *Employee and Unions:* The Unions of the employees shall also required to accept the fact of competitive environment and requires a complete change in the mindset. The sector is now operating in a regulated environment and anticipating huge competition through open access. There is a

requirement of complete change in attitude towards consumers and innovative ideas for better service to the Consumers shall be the key for existence in the ensuing competitive environment.

- ✱ *Regulatory Assets* : Huge Regulatory Assets are laying in the sector which shall have impact on the Tariff in future years, if not managed properly. Denial of Regulatory Assets is not the solution but recognizing it and passing it in a reasoned manner shall take out the sector from the present financial vulnerable situation.
- ✱ APDRP Cash Incentive component should be passed on to DISCOMs and the Central Financing Institutions should recognize the fact of privatization in the Distribution business and come forward with necessary changes in the policies and guidelines to finance the privatized DISCOMs, otherwise it shall remain as a big blow to the Distribution sector and power sector as a whole.
- ✱ Securitization of outstanding dues of GRIDCO (BST and outstanding loan), which is already reconciled with GRIDCO with reasonable and practicable moratorium and repayment period. More moratorium period shall enable DISCOMs to retain some funds for the O&M expenses which are much neglected due to Escrow operation.
- ✱ Continuation of 30 per cent grant under World Bank Loan in line with the Government of Orissa notification and the interest to be charged on the loan portion at the rate at which the State Government received from Government of India and rephrasing of the loan repayments is also needed.
- ✱ *Establishment of special courts and Energy Police stations* for speedy disposal of the electricity theft cases. As law and order are the duties of the State, Government of Orissa should bear the cost of establishment and operation of such courts and police stations. In true sense the Energy police stations should work towards the detection and trial of the Power theft cases.

#### **BENEFIT TO GOVERNMENT OF ORISSA BY REFORM AND RESTRUCTURING OF THE SECTOR**

Restructuring of the OSEB to GRIDCO and OHPC was done through the 1<sup>st</sup> Transfer Scheme which resulted in net inflow of Rs.2059crore to the kitty of the Govt of Orissa.

<b>Sl no</b>	<b>Particular</b>	<b>Rs. Crore</b>
1	Dues payable by GOO written off	340
2.	Equity issued to GOO from GRIDCO	253
3	Bonds issued to GOO by GRIDCO	400
4	Equity issued to GOO from OHPC	300
5	Bond issued to GOO from OHPC	766
6	<b>Total</b>	<b>2059</b>

The financial benefits accrued or received or savings by Govt of Orissa from the power sector during the last ten years is Rs.7073crores.

<b>Sr.</b>	<b>Description</b>	<b>Rs Cr</b>
1	Sale proceeds from Sale of:	
1 (a)	TTPS to NTPC (includes benefits of revaluation)	356
1 (b)	49% equity divestment in OPGC to AES	603
1 (c)	51% equity divestment in four Discoms (REL – 117Cr)	159
	Total of (1)	1118
2	Savings in subsidy support	4430
3	Electricity Duty / Inspection Fees	997
4	Dividend from OPGC	528
	<b>TOTAL</b>	<b>7073</b>

With the above financial benefits of over Rs.9000crore from the power sector, GOO has contributed Nil to the sector since 1<sup>st</sup> April 1996. The sector has achieved no power cuts, no Tariff increase over last seven years without any support from GOO. Any State can not deny the responsibility or obligation to such a vital infrastructure sector which is the backbone for the economic development. It is needless to mention that other State Govts like Delhi, Andhra Pradesh has continued their support in terms of Subsidy or proactive administration support to see that the sector turn around and yield the anticipated results.

The following views and suggestion of Sri D.P.Bagchi, Member, MoP Committee of Experts to Study “Impact of Restructuring of SEBs” & Ex. Chief Secretary, GoO has deep relevance in this context.

“The Deepak Parekh Committee had recommended setting up of a Power Sector Reforms Fund (PSRF). The OERC has recommended setting up of such a fund. Last year, the State had a record collection of Rs.320crore of electricity duty. Over a period of time, such a fund can be created by crediting all the duty collected. Money raised through divestment of the State’s share should also be credited to this fund.”

“Stringent escrow mechanism, which resulted in poor maintenance of network. As a result, quality of power supplied to consumers was adversely affected”

“Non-existence of special courts as envisaged in the EA, 2003”

“No retail tariff hike for the last six years, which resulted in absorbing the inflation and other rise in the costs of DISCOMs. There is always paucity of funds with the DISCOMs for expenditure on O&M of the distribution system”

“DISCOMs are operating in an extremely negative business environment”

## **PERFORMANCE PARAMETER TARGETS**

Across the state, the geo-social & cultural environment is almost same. For any geographical problem, like coastal saline belt or wide spread areas in southern or Western Orissa, the capital investment should take care off such problems. The losses can be allowed on voltage basis i.e. LT, HT, & EHT which should be same for all the licensees. While doing so, the feasibility of the lowest performing licensee

need to be ensured, so that the better performing operators shall get the incentives for better performance, which can be a motivating factor even for the lowest performing licensee. This shall encourage COMPETITION in this sector.

Based on the yearly SMD all the generating capacity in this state is required to be allocated to the DISCOMs, any surplus after the allocation may be allocated to meet any gap in the ARR. Any additional allocation of power of 500MU shall generate around Rs.100crore surplus funds which can be utilized to recover the total Regulatory Assets (on an average Rs.500crore per company) of the companies over five years.

### **OPEN ACCESS IMPACT**

The Distribution sector shall become fully vulnerable after full phased implementation of the Open Access. The subsidizing consumers shall move away and avail the power from the generators directly, leaving the DISCOMs with the high loss and subsidized consumers. This shall not only impact the financials of the DISCOMs, it may also result in huge increase in the Tariff of the subsidized consumers. In order to achieve the financial stability, a pragmatic approach needs to be taken to recover the cost without any deferment.

### **CHANGE IN MINDSET**

A change in the mindset of all the stake holders is the key for success of distribution, which not only involve Government, Regulator, Media, Employees, it also involves a large Public. The operations of generation & to larger extent of the transmission are managed within a boundary or out of reach of public, whereas distribution is spread widely across a licensed area and susceptible to any type of risk as well as hazards. Dealing with public is also another problem.

As the Distribution Sector is already thrown to competition with the implementation of the Open Access, the employees has to take the more proactive role like the Banking sector and Telecom sector. The existence of the Distribution sector business shall lie with the best service provider for which great deal of involvement is required from the employees. There is great need of paradigm shift in mindset and attitude to cop up with a competitive and regulated business from a monopoly and subsidized utility.

The important stakeholder of power sector mainly in case of Distribution is the Consumers. Consumer awareness is the biggest grey area of concern, which may be tackled more sensitively. Consumers should be aware and demand for his rights as well as rightful consumption of electricity with payment of the price for electricity.

### **THREATS TO ORISSA POWER SECTOR - TRADING MARGIN**

In the event of the applicability of the Trading margin to GRIDCO or the Generators, DISCOMs may trade the incidental surplus power. Generating capacity of the state may be allocated to the DISCOMs on the basis of the peak demand, the incidental surplus of power due to the seasonal and peak variations can be traded by the DISCOMs. The above sale can be included in the ARR of the DISCOMs and the projected rate in the ARR can be trued up in the end of the year. The price can also be fixed by the DISCOMs in a transparent bidding process as per the directions of the Regulators. The consumers of Orissa has borne the fixed costs of the Generators over the years, there are huge Regulatory Assets left

in the sector which need to be amortised; therefore the benefits of the lower power cost should not be passed on to the other rich states where the per capita income is much higher than Orissa consumers. This process of allocating the generating capacity to DISCOMs not only help in retaining the trading profits to the sector but also this can be used for amortization of the regulatory assets out of the profits of trading over the years, thereby Tariff Shock of the Regulatory Assets in the future years can be avoided.

#### **INITIATIVES PLANNED AND UNDER IMPLEMENTATION BY DISCOMS**

- \* **IT & Automation Initiatives** :These initiatives are required to reduce manual interface in the operations and move towards a leaner IT driven organization. The initiatives proposed by the DISCOMs in their Business Plan includes automation in Commercial Areas, Power Supply Module, Meter Management System, Enforcement Module, CAPEX module, Website, Mobile Customer Care Van, IVRS (Interactive Voice Response System) and Interactive and Automatic Meter Reading and Billing system etc which shall be the key for the success of future distribution.
- \* Reorganisation of Divisions into New Divisions and Sub-Divisions
- \* Capacity building of MRT Department and its activities
- \* Capacity Building of Vigilance Department and its activities
- \* Monthly Review Meetings
- \* Training and Development
  - \* DISCOMs have already planned and are organising to cover all the employees one week training for improvement of their skills and abilities.
- \* The capital expenditure plan has been developed based on the detailed analysis of the distribution network requirements of the DISCOM's. The investments have been planned in the following areas
  - \* To meet the growth in load across the consumer categories
  - \* To achieve reduction in losses as targeted
  - \* To increase efficiency and productivity
  - \* To augment / replace/ retrofit old/ obsolete/ under-rated equipment
  - \* To meet Environmental, Safety, Regulatory and other Statutory requirements
  - \* To purchase routine Tools and equipments
  - \* Other miscellaneous expenditure of a capital nature
- \* Key features of the Capital Expenditure for the next five years are
  - \* Increase in 33 kV and 11 kV lines to bring down LT/HT line ratio and implementation of HVDS
  - \* Increase in 33 kV substations to improve voltage levels and extend reach areas

- ✿ Installation of breaker on 33 KV and 11 KV side
- ✿ DTR metering and Consumer indexing to support energy audit
- ✿ Rural Electrification works under RGGVY scheme
- ✿ Automation of the processes by IT intervention in technical as well as commercial areas

## LOOKING FORWARD

Sitting together to find out a solution shall yield any result only if all the stake holders volunteered to contribute in a meaningful commercial terms with economic prudence. The autonomy to the licensees with a ceiling of the tariff or a Multi Year Tariff (MYT) shall enable them to improve upon for better incentives. There should also be matching concept for the revenue and expenditures in a particular year, any creation of regulatory assets to defer the incidence of the cost in a year has cascading impact and not in the public interest. Rather this disables the licensees to take necessary measures to arrest losses as well as it results in weakening the T&D networks.

In the entire value chain of the electricity, the weakest link is the distribution, which is primitively neglected by all. The extension of the LT licenses for few kms and loading the transformer with the load of double capacity are some of the examples of the abuses done to the distribution system.

The timely action is an essence for success of any business or organization. Orissa Power sector had yet to solve the basic issues for which the reform was undertaken in Orissa. The main objectives of Govt. of Orissa to undertake reform were as under.

- ✿ Unbundling of OSEB by structural separation and corporatisation of generation, transmission and distribution.
- ✿ Progressive privatization.
- ✿ Establishment of an independent authority for power sector regulation
- ✿ Cost-related electricity tariff regime

The enabling Act, Orissa Electricity Reform Act, 1995 was enacted keeping in view achieving the above objective. The Act also provides that the cost of electricity shall be recovered in a reasonable manner. While there were consecutive deficits in the ARR of the Discoms for last few years due to different compulsions and reasons, the matter which ought to have raised and resolved much earlier. A weaker child, who is not properly nourished for a longer period only leads to collapse at the end. Sooner it is noticed and properly nourished, it is better. There is great need of balancing of the Sector.

In a subsidy withdrawal regime, the tariff should be resultant of the reasonable cost of supply of electricity or through a decision of the market driven forces. On the contrary in our attempt to achieve no tariff revisions, without factoring the inflation, it means compelling the system to impair; may left with defunct organisation. The need of the time is to make the system, a self sufficient, reliable and commercially viable one, which can deliver uninterrupted reliable quality power.

The investment in this situation is a far cry if the system itself does not generate funds. At present each DISCOMs are in a situation where all the DISCOM assets are hypothecated to others, the total revenue

of DISCOMs are escrowed, accumulated losses are more than Rs.500crores and no light of profitability in near future due to huge increase in input power purchase cost. Under this financial status of the DISCOMs, no Investor will venture to engage their funds. While putting forth the aspirations or expectations from the investors, there is side by side requirement to boost investors' confidence to engage their resources. This, not necessarily promising for immediate and big dividends, but it may by way of comfort, better business avenues, opportunities for growth of business etc. The government should patronage the industrial growth in infrastructure projects not only in electricity but also in road, communication, water transport etc.; in that environment, the Regulators shall play a role of referee.

All the above efforts shall yield any result if all the stakeholders shall work in a cohesive and conducive environment.



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