

Reforms in Vulnerable Power Distribution Sector in Odisha – BOT Model

Asit Mohanty

Sachet Parida

Prelude

The connection between energy demand/consumption and economic growth is crucial for determining the future growth path of the state. Several research studies on energy and GDP nexus in India reveal that power consumption influences the economic growth in India both in long run and in short run¹. Power Sector not only facilitates functioning of the economy and social sectors but also accelerates economic growth with development. The estimated consumption of electricity with respect to GDP in India is 0.95 indicating for 1% rise in electricity consumption, the GDP will go up by 0.95%.²

The State Government is continuing its effort to improve the power sector through several programmes and projects in its various policy documents. The power sector, along with gas and water supply sub-sectors, contributes in real terms at 2004-05 prices, about 3 percent of Odisha's GSDP. The share of this sector in the industry sector in real terms at 2004-05 prices is about 12 percent. This is very low as compared to other states in the country. The Economic Survey 2012-13 of Govt. of Odisha has envisaged that the Power Sector will grow at 3.5 percent in real terms. Since it is a vital sector of the economy, it has positive linkages with industrial activities, trade and commerce.

Therefore, adequate availability or deficiency of power influences the economic performance or the economic activities of the state.

Overview of Power Generation

Taking the data from the Economic Survey of Odisha, since FY 2005-06, the gap between installed capacity and availability of the power is alarmingly going up, which is a major concern for the business activities of the state. On an average, the availability to installed capacity of power ratio has been very low at around 34% in last seven years which is lower than national average. At the same time, The power consumption has increased by 5.33% in last five years on compound average growth rate basis. If we look at the segment of the consumers almost 90% of the power is consumed by Industrial sector followed by commercial sector and domestic sector. Therefore, rise in consumption demand is mainly triggered by these three segments. Out of this consumption, the share of rural consumers is around 70% during FY 2011-12 consuming 23% of total consumption in Odisha. The domestic consumer constituting 90% of the total consumer consume 30% of total consumption. At the end of the FY 2011-12, the demand of power is 102% of the availability of power. Since the demand for power is stock

concept and consumption is a flow concept, therefore, there is a need to raise the power availability to meet the consumption. Making a state-wise comparison of percentage of villages electrified, Odisha's position is in last three next to Nagland and Tripura with 79% electrification. The peak demand in FY 2011-12 was 3300 MW whereas the availability in the peak hour is 2600 MW which reflects 21% shortfall. The maximum peak demand in Odisha as forecasted by the

Central Electrical Commission is at 9768 at FY 2016-17 from the present level of 3300MW at FY 2011-12 showing a compound average growth rate of 110%.

The following table depicts the projection of peak demand, energy requirement and installed capacity during the 12th Plan Period by Central Electrical Authority based on some assumptions for our State.

Table 1:Electric Power Survey by CEA

The Report of 17th Electric Power Survey (EPS) of India published by CEA in March, 2007 made the forecast for the power demand of Odisha for 11th, 12th & 13th plan as shown in Table below :

FY	2011-12 end of 11th Plan	2012-13	2013-14	2014-15	2015-16	2016-17 end of 12th Plan	2021-22 end of 13th Plan	Remarks
Peak Demand (MW)	4459	4783	5130	5502	5902	6330	10074	As per table 6.4 of 17th EPS of CEA, Energy Requirement and Peak Demand have been computed for 12th Plan @ 7.57% and 7.26 respectively.
Energy Requirement (MU)	27149	29204	31415	33793	36351	39096	63,098	
Installed capacity Required (MW)	6670	7154	7687	8245	8828	9469	15069	

The Problems in Distribution Sector in Odisha and State wise Comparative View

However, the focus of the analysis is distribution segment of the power sector. The question is whether the availability power which is discussed earlier will be able to meet the peak demand and requirement of energy. The biggest challenge of the power sector is the high T&D losses. A combination of technical and non-

technical factors is contributing to high Transmission and Distribution losses. Lack of consumer education, political interference, and inefficient use of electricity is further aggravating the problem. As T&D loss figures did not capture the gap between the billing and the collection, the concept of Aggregate Technical & Commercial (AT&C) loss was introduced in 2001-2002 to capture total performance of the utility.

Table 2: Performance of DISCOM

State	Utility	AT&C Losses		
		AT & C Losses (%)		
		2009 -10	2010-11	2011-12
Andhra Pradesh	Northern Power Distributioun Company of Andhra Pradesh Ltd.	17.00	17.42	17.11
	Central Power Distribution Company of Andhra Pradesh Limited	18.41	17.34	15.93
	Southern Power Distribution Company of Andhra Pradesh Limited	11.94	N/A	11.82
	Eastern Power Distribution Company of Andhra Pradesh Limited	10.17	8.56	6.89
	Average	14.38	14.44	12.94
Assam	Assam Power Distribution Limited	33.50	31.00	27.49
Bihar	Bihar State Electric Board	38.32	43.59	42
Chhattisgarh	Chhattisgarh State Power Distribution Company Limited	34.7	33.24	32
Delhi	BSES Rajdhani Power Limited	23.11	19.8	17.83
	BSES Delhi Power Limited	19.03	16.8	17.81
	North Delhi Power Limited	14.47	13.2	13
	Average	22.83	20.76	20.16
Gujarat	Paschim Gujarat Vij Company Limited	35.31	29.03	29.89
	Dakshin Gujarat Vij Company Limited	19.37	16.23	17.36
	Madhya Gujarat Vij Company Limited	13.04	11.83	11.8
	Uttar Gujarat Vij Company Limited	16.87	6.63	10.13
	Average	21.15	15.93	17.30
Haryana	Uttar Haryana Bijli Vitran Nigam Limited	32.16	24.9	24.22
	Dakshin Haryana Bijli Vitran Nigam Ltd.	26.97	24	23
	Average	29.57	24.45	23.61
Himachal Pradesh	Himachal Pradesh State Electric Board Ltd	26.28	24.12	19.38

Jammu & Kashmir	Jammu & Kashmir Power Development Department	N/A	60.55	56.76
Jharkhand	Jharkhand State Electricity Board	47.09	41.42	40.6
Karnataka	Gulbarga Electricity Supply Company Ltd.	41.4	30.56	34.46
	Hubli Electricity Supply Company Limited	26.44	25.39	23.11
	Chamundeswari Electricity Supply Company Limited	23.88	18.9	15.24
	Bangalore Electricity Supply Company Limited	16.35	14.55	14.5
	Mangalore Electricity Supply Company Limited	12.64	11.92	10.98
	Average	24.14	20.26	19.66
Kerala	Kerala State Electric Board	17.71	16.09	15.56
Madhya Pradesh	Madhya Pradesh Poorv Kshetra Vidyut Vitaran Company Limited	39.55	34.48	31.76
	Madhya Pradesh Madhya Kshetra Vidyut Vitaran Company Limited	N/A	31.82	29
	Madhya Pradesh Paschim Kshetra Vidyut Vitaran Company Limited	28.62	26.41	24
	Average	34.09	30.90	28.25
Maharashtra	Maharashtra State Electricity Distribution Company Limited	21.41	17.28	16.27
Odisha	Southern Electricity Supply Company of Odisha Limited	50.26	52.15	48.93
	Western Electricity Supply Company of Odisha Limited	35.74	42.94	40.6
	Northern Electricity Supply Company of Odisha Limited	35.73	36.04	34.04
	Central Electricity Supply Utility of Odisha	39.43	37.59	24.76
	Average	40.29	42.18	37.08
Punjab	Punjab State Power Corporation Limited	20.12	18.71	17.54
Rajasthan	Ajmer Vidyut Vitran Nigam Limited	30.68	22.93	21.00
India		26.58	26.15	27.15

Source: Power Line Research

From the table, it is evident that the AT&C losses of DISCOMs in our state is much more than national average and, the quantum of loss is the second highest. In simple, it implies, if AT&C losses of our State Discoms is 40%, then power purchased from GRIDCO of amounting Rs.100 crore, the Discoms are able to pay only Rs.60 crore, incurring a loss of Rs.40 crore. This affects the financial position of both GRIDCO and DISCOMs. To corroborate this, the Economic

Survey of Odisha 2012-13 has identified both GRIDCO and OPTCL as loss incurring units.

The interesting point is estimating the losses from the transmission sector. In the table below, in case of Odisha, the loss witness in case of OPTCL is around 3.9% which is comparatively low as compared other transmission utilizes. The Transmission Loss here is only technical loss. Therefore, it proves that the technical loss and commercial loss are very large and significant in the DISCOMs of our State.

Comparative View of Transmission Utilities in India

Table 3: Transmission losses

Utility	Losses (%)			Utility	Losses (%)		
	2009-10	2010-11	2011-12		2009-10	2010-11	2011-12
BSEB [^]	38.32	43.59	42.00	HPPTCL	3.31#	1.55	1.51 ^{^^}
MeECL [^]	33.95	NA	28.38	DTL	1.38	1.28*	1.21
KSEB [^]	17.71	16.09	15.56 ^{^^}				
UPPTCL	3.98	3.56	5.22	BSEB: Bihar State Electricity Board; MeECL: Meghalaya Energy Corporation Limited; KSEB: Kerala State Electricity Board; UPPTCL: Uttar Pradesh Power Transmission Corporation Limited; HVPNL: Haryana Vidyut Prasaran Nigam Limited; CSPTCL: Chhattisgarh State Power Transmission Company Limited; PSTCL: Punjab State Transmission Company Limited; Mahatransco: Maharashtra State Electricity Transmission Company Limited; AEGCL: Assam Electricity Grid Corporation Limited; AP Transco: Transmission Corporation of Andhra Pradesh Limited; RVPNL: Rajasthan Rajya Vidyut Prasaran Nigam Limited; KPTCL: Karnataka Power Transmission Corporation Limited; GETCO: Gujarat Energy Transmission Corporation Limited; OPTCL: Odisha			
HVPNL	4.66	4.21	4.79*				
CSPTCL	5.00	4.67	4.50				
PSTCL	4.63	5.05**	4.50				
Mahatransco	4.61	4.31	4.28				
AEGCL	5.50	4.50	4.25				
AP Transco	4.65	4.50	4.23*				
RVPNL	6.06	4.40	4.20				
KPTCL	4.20	NA	3.98				

GETCO	4.28	3.85	3.94	Power Transmission Corporation Limited; MPPTCL: Madhya Pradesh Power Transmission Corporation Limited; WBSETCL: West Bengal State Electricity Transmission Company Limited; PTCUL: Power Transmission Corporation of Uttarakhand Limited; HPPTCL: Himachal Pradesh Power Transmission Corporation Limited; DTL: Delhi Transco Ltd. * As of September 2011; ^ T&D losses; ** As of June 2011; # HPSEB losses; ^^ Projected; NA: Not available
OPTCL	3.90	3.90	3.80	
MPPTCL	3.88	3.74	3.51	
WBSETCL	2.74	NA	3.10	
PTCUL	1.36	1.92	1.88	

Source: Power Line Research

It is estimated that 1% reduction in T&D losses would generate savings of over Rs.700 to Rs.800 crores in India. Reduction of T&D loss to around 10% will release energy equivalent to an additional capacity of 10,000-12,000 MW. However, from the internal calculation 1% AT&C will be not less than 10,000 crores for Odisha. This has a direct impact on the upside of the electricity tariff.

Tariff and AT & C Losses

The revenues realised can be decomposed by the following equation:

$$R = U \times T \times (1 - L)$$

Where:

R: Revenues realised (in Rupees billions), before subventions.

U: Energy units input (in Million Kilowatt Hours).

T: Effective Tariffs (in Rupees/Energy Unit input).

L: Aggregate Technical and Commercial Losses (in percentage).

This gives a clear picture about the tariff. If AT&C increases, tariff has to go up to compensate the fall in revenue realization.

Otherwise, fall in revenue realization will adversely affect the financial position of DISCOMs as well as GRIDCO. This is typically applicable to the power distribution sector of Odisha.

The revenue losses consequent upon high AT&C losses has paralysed the distribution sector of our state. First of all the DISCOMs and GRIDCO are incurring losses. Because of lack of funds, DISCOMs are not in a position for capital expenditure (CAPEX) which could have reduced technical losses. Because of lack of CAPEX, the consumers are not getting the quality power supply at a desired level. This triggers the consumers not to pay the electricity bill due to them. Hence, there is a vicious circle.

Inadequate CAPEX by DISCOMs, lack of requisite expertise coupled with poor financial positions have resulted in inadequate and ageing sub transmission and distribution network leading to frequent power cuts, local failure and faults, large scale theft, and inefficient use of the electricity by the end user. Consumers encounters day to day problem on getting new connections, enhancement of loads, stiff procedures, unfriendly commercial policies, tardy metering, inflated

billing, collection inefficiency, hostile Discom staff, lack of employee ownership, massive churning of consumers, poor dispute resolution mechanism. The low voltage operation in the distribution is a major reason of higher technical losses due to inherent properties of the network.

In addition to the above, poor infrastructure in DISCOMs due to lack of renovation and modernization, overloading, poor operation & maintenance, non configuration of feeder lines & distribution transformer so as to reduce the length of LT lines, non usage of smaller size energy efficient distribution transformers, software error, low employee efficiency and obsolete technology aggravates the neglected distribution sector.

Way forward

The logical thinking will be to would be to fix the leaking bucket (AT&C) rather than to persistently emphasize shortages of power and forever make exaggerated estimates of future demands for power. Then, it is pertinent to look for a sustainable strategy with a single objective of reducing AT & C Losses to break the vicious circle.

In order to reduce the AT & C Losses, the DISCOMs in various states has adopted Built-Operate – Transfer (BOT) model in Public Private Partnership Mode. Planning Commission has coined this model as Distribution Franchise (DF) Model. The DF/BOT model was first implemented by Maharashtra. By implementing this model AT&C losses has reduced from 21.41% in 2009-10 to 16.27%. By adopting DF Model, Torrent has been able to curb AT & C losses in Bhiwandi. As indicated in Table 1 above, those states like **Chhattisgarh, Delhi, Gujarat, Karnataka, Madhya Pradesh, Maharashtra who have implemented BOT-DF Model have successfully reduced their**

AT & C Losses. In some of the states, **BOT-DF** model has been implemented selectively in some of their electrical divisions.

Table 4: Success Rate of BOT-DF Model

AT & C Losses (2011-12)		Bhiwandi	Aurangabad
Opening AT&C loss level (%)		48%	25%
Actual Loss Level		21.87%	22.88%

BOT-DF model was implemented in 2011-12 in **Bhiwandi, and Aurangabad** location. It is clear from the Table 4 that the AT&C losses has been dropped in both the location. Looking at the success story, BOT-DF Model is going to be implemented at **Agra, Meerut, Moradabad, Bareilly, Kanpur, Allahabad, Varanasi, Aligarh etc.**

View of the Task Force on BOT Model

A Task Force on Private Participation in Power Distribution was constituted on November 09, 2010 under the chairmanship of Shri B. K. Chaturvedi, Member, Planning Commission to develop a framework for enabling private participation in the distribution of electricity, especially by way of Public Private Partnership (PPP). In this scenario of high AT & C losses by DISCOMs, efforts must be made to harness private sector efficiencies to restore the financial health of the power distribution sector. During the course of discussions, it was also emphasized the need for segregation of wire or the network business from the supply of electricity (implying separation of natural monopoly from the competitive elements of power supply) and open access in the distribution sector.

The fourth meeting of the Task Force was held on 14 February, 2012. In this meeting, the Report of the Sub-Group on the Franchisee

Model was considered. The Task Force endorsed both the PPP Model and the Franchisee Model, leaving it to the states to choose a model that they think is more useful to them. During the course of deliberations, the Infrastructure Division of the Planning Commission raised a number of issues on the Franchisee Model. While deciding that there was no need to question the legal validity of the Franchisee Model at this stage, the Task Force felt that it is up to MoP and the State Governments to address the issues while adopting the Franchisee Model.

The expected outcomes of this BOT-DF model are Improvement in the Distribution System, Reliable and quality supply of electricity, Savings in resources and time given the paucity of budgetary resources and the deteriorating financial health of the Discoms, Elimination of regulatory risk, Government's overarching role to continue etc.

Given the fact that AT & C losses of our state around 40% and in some of the electrical divisions it, in fact, exceeds 40%, we need to assess the relevance of the BOT-DF Model.

References:

www.orierc.org/

<http://www.business-standard.com/energy/storypage.php?autono=80038>

<http://www.business-standard.com/india/news/raise-energy-supply-for-8-gdp-growth-planning-commission>

<http://cercind.gov.in/>

http://www.smartgridnews.com/artman/publish/article_303.html

<http://www.cea.nic.in>

<http://www.powermin.gov.in/distribution/apdrpbestprac/index.htm>

<http://www.indianexpress.com/news>

<http://planningcommission.nic.in/plans/planrel/11thf.htm>

<http://www.eia.doe.gov/>

Narayan, P.K., Prasad, A. (2008), "*Electricity Consumption-Real GDP Causality Nexus: Evidence from a Bootstrapped Causality Test for 30 OECD Countries*", *Energy Policy*, 36, pg 910-918.

Mrinal Madhav & Shivika Mehta (2004), "Case of Reforms in the Indian Power Distribution Sector: A Move Towards Eradicating Energy Poverty, Organization: Hindustan Petroleum Corporation Limited.

Asit Mohanty, Professor in Finance, XIMB, Bhubaneswar- 751013

Sachet Parida, Almuni, XIMB, Bhubaneswar- 751013.