

## **DISCUSSION PAPER**

### **ON Fixing a Price cap by KERC for Short-term Power Procurement by the Distribution Licensees**

1. The Commission, vide its order dated 7.9.2009, had fixed a price cap of Rs. 6.00/unit for short-term purchase up to a period of six months. The Commission had stipulated the following conditions while approving the above Price Cap:

- a) As the Commission is approving the required power purchase quantum & Costs while approving the ARR, the need for short-term purchase would arise only when there is inadequate rainfall affecting the hydro-generation or major break down of thermal generating units or unforeseen coal shortage. Hence, the distribution licensee shall resort to purchase under short-term, only when there is a shortfall in the availability vis-à-vis the availability approved by the Commission and only to the extent of shortage in the quantum of power.
- b) In case the purchase of power has to be made beyond the above ceiling price or quantum, the licensees shall obtain prior approval of the Commission by filing suitable application.
- c) The short-term purchase shall be made only by following a transparent process of bidding initiated well in advance.
- d) The licensees shall source the short-term power only from firm sources and the generating plants which are already producing electricity at the time of calling for bids.
- e) The short-term power purchases shall not be resorted to from a generating station/ trader with whom the ESCOMs have a PPA, unless the power to be supplied is beyond the contracted quantum.
- f) The quantum of short-term power purchase shall be arrived at by the ESCOMs by considering the availability from the thermal generating units and the water inflows

in the hydro dams up to end of September of each year as per the information obtained from KPCL.

- g) The priority for choosing the successful bidder shall be in the ascending order of the rates quoted by the bidders.
- h) The ESCOMs shall enter into contracts with the generators for up to six months at one stretch.
- i) The above maximum ceiling rate is not applicable to day ahead purchases made by the Licensees through power exchanges.

The above order was made applicable for a period of 1-year from the date of issue of the order or till it is modified, which ever is earlier. The period of 1-year has expired on 6.9.2010.

2. It is observed that, the shortage of power has been persistent all over the Country in general and in Karnataka in particular, despite significant capacity additions having been made by the Gol & the State Government. One of the reasons for this shortage is that the demand for electricity has grown faster than the supply. The other reason is the high level of T & D losses in the system. To overcome the shortage situation, the States are forced to buy short-term power at high cost from whatever source available. The recovery of the high cost of power purchase generally has been through an increased tariff to consumers and exceptionally through payment of subsidy by the State Government. While the steep increase in tariff may result in resentment by the consumers, there is a limit to Government increasing the subsidy also. The shortage situation has also put the power Generators in a strong position to dictate the price, in the short-term market.

It is worthwhile to mention here that as per the Load Generation Balance Report published by the CEA in May 2010, the power supply shortages are as indicated here under:

Region	Peak Shortages		Energy Shortages	
	FY-10 Actual	FY-11 Projected	FY-10 Actual	FY-11 Projected
All India	12.7%	12.1%	10.1%	10.6%
Southern	9.7%	16.9%	6.4%	14.1%
Karnataka	13.2%	16.7%	7.7%	13.3%

3. CERC on 6.1.2010 has published a Staff Paper titled "Consultation Paper on Framework for intervention in short-term market". In this paper, various issues regarding Price Cap have been discussed. The paper has discussed the following two alternatives for price cap:

Alternative 1 - Differential Price cap based on cost plus principle with appropriate assumption for Return on Equity, plant capacity utilization, fuel cost .The price cap should be applicable only for portfolio sellers and coal /

lignite / hydro based plants as they are making abnormal profits and should not be applicable to any liquid fuel or gas based generation. The price cap level suggested is Rs 5/ Kwh. The cap should be applicable to OTC market only as average prices have been higher in these markets and the buyers and sellers have unequal bargaining power in a supply deficit condition. The price cap should not be applicable to Power Exchanges as it is not possible to implement a differential price cap with the existing price discovery mechanism, the buyers and sellers have equal bargaining power, prices reflect market conditions even though the market size is small.

Alternative 2 - A Uniform price cap based on the most expensive fuel type should be applicable to all types of generators (coal / lignite/ Hydro/ Liquid /Gas based) and it should be applicable to both OTC markets and Power Exchanges.

In view of the fact that the shortage would continue this year also, the Commission proposes to continue the price cap. However, considering the latest developments in the power sector and the present situation, there is a need to review the price cap determined by the Commission last year.

Therefore, the Commission has decided to issue this Discussion Paper to invite the views, comments and suggestions from all the stakeholders on revising the price cap for short-term purchase of power by the distribution licensees of the State.

#### 4. Analysis of Short-Term Power Market in the Country

The CERC is publishing monthly reports on short-term transactions of electricity. As per the reports the Volume of short-term transactions & price is indicated as under:

##### a. Volume traded

Transaction	Aug 08-Dec 08 MU	Jan 09-Dec09 MU	Jan 10-May 10 MU
<b>Bilateral</b>	11977 (4.0%)	30427 (4%)	14688(4.5%)
<b>UI</b>	9027 (3.1%)	23783(3.2%)	11292 (3.4%)
<b>Power Exchange</b>	1735(0.6%)	5793 (0.8%)	3570 (1%)
<b>Total</b>	22739	60003	29550
<b>Total Electricity Generated in the country</b>	295309	751158	330578
<b>Short-term Market Share as % of Gen.</b>	7.7%	8.0%	8.9%

% indicates the share in total electricity generated in the country excluding Renewable & captive plants

It is noted from the above that the market share of the short-term power purchase, (in terms of quantity) which was 7.7% in 2008 has increased to 8.9% in 2010. The share of Bilateral Transactions is 4% to 4.5%, UI is 3.0%- 3.5% and that of the power exchange is 0.5% to 1% in the above years.

**b. price -Rs/unit**

Transaction	Aug 08-Dec 08			Jan 09-Dec09			Jan 10-May 10		
	Max	Min	Ave.	Max	Min	Ave.	Max	Min	Ave.
<b>Bilateral</b>	9.54 to 13.19	1.39 to 2.44	7.07 to 7.98	7.19 to 13.54	1.04 to 2.44	4.64 to 7.43	7.43 to 10.57	1.84 to 2.83	4.94 to 6.17
<b>IEX</b>	9.50 to 11.00	0.92 to 2.50	6.64 to 8.32	5.70 to 17.00	0.13 to 2.98	3.16 to 10.10	5.75 to 13.90	0.10 to 2.00	3.24 to 7.75
<b>PXIL</b>	9.10 to 11.00	3.0 to 5.50	6.58 to 7.57	5.60 to 15.0	0.0 to 2.00	3.07 to 10.18	7.00 to 12.50	0.0 to 2.50	3.30 to 7.43

**Note: For the purpose of price comparison UI is not considered, as it is not a market mechanism.**

In the above table, the range of prices during the months considered for the respective years is indicated. It is noted that the variation in average price is much more in power exchange than in bilateral transactions.

A comparison of the data for Aug-08 to Dec-08 with Aug-09 to Dec-09 indicates the following:

- i. The average price per unit for traders, which was in the range of Rs. 7.07 to Rs. 7.98 in 2008 has come down to Rs.4.64 to Rs. 5.33 in 2009.
- ii. The average price per unit for IEX, which was in the range of Rs. 6.64 to Rs. 8.32 in 2008 has come down to Rs.3.16 to Rs. 7.40 in 2009 [except in august, price was less than Rs.5.00].
- iii. The average price per unit for PXIL, which was in the range of Rs. 6.58 to Rs. 7.57 in 2008 has come down to Rs.3.07 to Rs. 6.15 in 2009 [except in august, price was less than Rs.5.18].

Similarly, a comparison of the data for Jan-09 to May-09 with Jan-10 to May-10 indicates the following:

- i. The average price per unit for traders, which was in the range of Rs. 6.58 to Rs. 7.43 in 2009 has come down to Rs.4.94 to Rs. 6.17 [Except for Apr-10/May-10, it was around Rs.5.00] in 2010
- ii. The average price per unit for IEX, which was in the range of Rs. 6.16 to Rs. 10.10 in 2009 has come down to Rs.3.24 to Rs. 7.75 in 2010 [except in Apr-10, price was less than Rs.5.58]
- iii. The average price per unit for PXIL, which was in the range of Rs. 6.86 to Rs. 10.18 in 09 has come down to Rs.3.30 to Rs. 7.43 in 2010 [except in Mar/Apr-10 price was less than Rs.5.00]

An analysis of IEX daily data from June 09 to May10 indicates that, 42% of the days the maximum price was less than Rs.5.00 and around 56% of the days it was less than Rs.6.00/unit.

From the above it may be concluded that the average short-term price has come down when compared to previous years and is hovering around Rs.5.00 since august 09, barring a few months.

## 5. Power Purchase cost:

The power purchase cost as approved by some of the State Commissions in the Country is as follows:

### i. DERC:

#### a. BSES\_YPL [Tariff Order for FY09-10]

Source	Quantum- MU	Cost-Rs. Crs.	Rs./unit
NTPC-Gas based	379	104.98	2.77
NTPC- Coal based	1310	246.96	1.86
NHPC	438	83.03	1.89
Tehri, NJPC & Tala HEP	304	94.25	3.10
NPC	48	10	2.08
Delhi Stations- based Gen. Coal	1373	390.44	2.84
Delhi Stations- based Gen. Gas	2283	572.61	2.51
New Stations	1145	327.94	2.86
Other	382	175.31	4.59

#### b. NDPL [Tariff Order for FY-10]

Source	Quantum- MU	Cost-Rs. Crs.	Rs./unit
NTPC-Gas based	407	117.45	2.89
NTPC- Coal based	1403	263.32	1.88
NHPC	470	88.90	1.89
Tehri, NJPC & Tala HEP	326	99.58	3.05
NPC	51	11.24	2.20
Delhi Stations- based Gen. Coal	1427	404.63	2.84
Delhi Stations- based Gen. Gas	2373	581.86	2.45
New Stations	1227	351.30	2.86
Other	571	254.12	4.45

### ii. West Bengal:[Tariff Order of WBPDCCL for the year 2009-2010]

For FY-10		
Station	MU	Rs/unit
Kolaghat	7152.37	1.88
Bakreswar	4017.69	1.86
Bandel	2153.34	1.96
Santaldih	1331.69	2.06
<b>Total</b>	<b>14655.09</b>	<b>1.90</b>

iii. APERC:[Tariff Order for 2009-10]

Source	Rs/unit			
	CPDCL	EPDCL	NPDCL	SPDCL
APGenco-Thermal	2.47	2.47	2.47	2.47
APGenco-Hydel	1.01	1.01	1.01	1.01
CGS	1.85	1.85	1.85	1.85
Simhadri-I	1.81	1.81	1.81	1.81
APGPCL	1.08	1.08	1.08	1.08
IPPS	2.90	2.90	2.90	2.90
NCE & Others	2.93	3.43	2.93	3.10

iv. Gujarat: [Order on APR for FY2009-10 & ARR for FY2010-11]

Source	Rs/unit			
	DGVCL	UGVCL	MGVCL	PGVCL
State Thermal-Coal/Lignite	1.97 to 4.68	1.97-3.14	1.97-4.68	1.97-3.14
State Hydro	-	0.49	-	0.49
State -oil	4.61	-	4.61	-
State-gas	4.15 to 5.63	-	4.15-5.63	5.63
IPP-Lignite	-	2.17	-	2.17
IPP-gas	2.32 to 6.39	2.18-6.39	2.32 to 6.39	2.22-5.59
NPC	2.03 to 2.73	0.94-2.03	2.03 to 2.73	0.94
NTPC-Coal	1.63 to 5.30	0.96-2.78	1.63-5.30	0.96-2.78
NTPC-gas	4.21 to 5.82	-	4.21 to 5.82	-
Captive	2.34	2.34	2.34	-
Wind	1.75-3.37	1.75-3.37	1.75-3.37	1.75-3.37

v. Chatisgarh:[CSERC Tariff Order FY10]

Source	Rs/unit
State Thermal-	1.41-1.62
State Hydro	0.74
State-Co-Gen	2.20
IPP-Thermal	2.43-3.10
NPC	3.30
NTPC-Coal	1.27-3.30
NTPC-gas	1.97-2.22
Captive	1.61-2.32
Biomass	2.74

## vi. MERC

### a. BEST/TPC [Order on APR for FY2008-09 & tariff order for FY 2009-10]

Source	Rs/unit
Thermal	2.20-4.01
Hydro	1.82
RE	3.80
Thermal-oil	5.43

### b. MSEDCL [Order on APR for FY2008-09 & tariff order for FY 2009-10]

Source	Rs/unit
State-Thermal	2.16-2.29
State-Hydro	0.71-2.00
RE	2.67
CGS-Coal	0.96-2.06
CGS-Gas	4.98-6.68
NPC	2.12
RGPL	3.62
Other-hydro	2.04-2.44

A perusal of the above orders indicate that:

- Coal/lignite based power purchase cost is in the Rs.0.96 to 4.68/unit. Barring a few stations, the cost of Coal based Generation is less than Rs. 3.00/unit. CERC in its discussion paper has estimated coal based power generation at Rs. 3.60 to 6.16/unit based on the distance of coal transport & coal blending.
- Gas- based power purchase cost is in the Rs.1.97 to 6.68/unit. Barring a few stations, the cost of Gas based Generation is less than Rs. 4.00/unit. CERC in its discussion paper has estimated LNG based power generation at Rs. 5.19/unit.
- Purchase cost from Hydro generators is in the range of Rs.0.49-3.10/unit
- Purchase cost from Nuclear Power generators is in the range of Rs.0.49-3.10/unit
- Purchase cost from RE sources is in the range of Rs.1.75-3.80/unit

**Thus while determining the price cap the cost of purchase, market trends and consumers interest are to be considered.**

## 6. Sensitivity Analysis of short-term purchases on power purchase cost

For the purpose of knowing the effect of short-term purchase of high cost power on the overall power purchase cost, a sensitivity analysis has been carried out. For this purpose the power purchase requirement for Karnataka for FY 11 as per 17<sup>th</sup> EPS is considered at 49500 MU. The sensitivity of power purchase cost is estimated for two scenarios, one with normal monsoon & another with 20% reduction in monsoon. With normal monsoon the short-term purchase is estimated at 7286 MU and with 20% reduction it is estimated at 9634 MU.

The sensitivity analysis for short-term price at Rs.4.00/unit is indicated below:

Source	Scenario-1		Scenario-2	
	MU	Cost-Rs Crs	MU	Cost-Rs. Crs
KPC-Hydro	11876	683.33	9528	548.24
KPC-Thermal	12114	3782.58	12114	3782.58
CGS	11507	2652.20	11507	2652.20
IPPs	716	602.46	716	602.46
NCE	4082	1484.16	4082	1484.16
Lanco	1930	602.52	1930	602.52
Shorterm -	7286	2914.38	9634	3853.50
<b>Total</b>	<b>49510</b>	<b>12721.62</b>	<b>49510</b>	<b>13525.64</b>
Increase over FY10	5134.65	1745.05	5134.65	2549.07
% increase	12%	16%	12%	23%
<b>Ave. PP cost</b>		<b>2.57</b>		<b>2.73</b>
Increase in ave.PP cost in paise		9.59		25.83
% Increase		4%		10%

From the above table it may be seen that for 20% reduction in hydropower and corresponding power being met by high cost short-term power, the power purchase cost would go up approximately by 6%.

Further, sensitivity analysis for average short-term price of Rs.3.0/unit and Rs. 5.0/unit is also carried out, which is indicated below:

Reduction in Hydro	Normal	20%
% Increase over FY10 rate for Rs.3/unit	-2.0%	3.0%
% Increase over FY10 rate for Rs.5/unit	10%	18%

Thus the power purchase cost would go up by approximately by 3.0% to 18.0% [depending on short-term price] for power being met by short-term purchase if there is 20% shortfall in hydropower.

## 7. Why a Price Cap?

The price cap introduction needs a cautious approach. The high price of short-term transactions may be due to shortages, increase in fuel prices or higher UI rates. However the price cap should not in any way hinder investments of new capacity additions. The price cap to be fixed should be such that, the short-term traders in electricity earn adequate returns, keeping in view the inherent risks/uncertainties involved in short-term transactions. While ensuring adequate returns to the sellers, the price cap should also protect the consumers' interest during a shortage situation.



In case a uniform cap is introduced, generators like Hydro may get undue profits and more and more investors may invest in such sources, which would earn them more profits. On the other hand source wise cap will be difficult to implement and buyers would always quote for the sources, which are cheap. In such a case, with more than one buyer, Price cap would lead to the classical problem of rationing.

**Keeping the above discussion in view, the Commission hereby invites suggestions, comments and views of the stakeholders on the following:**

- 1. Whether it is necessary to revise the price cap for short-term power purchase?**
- 2. Should such price cap be applicable to power procurement through exchanges also?**
- 3. Should the price cap be uniform or different for different sources of generation namely coal based, gas based, liquid fuel based or renewable?**
- 4. In case source wise cap is fixed, should the price cap be in absolute terms [ie a margin of 4 paise/unit] or in percentage terms [ie say 4% over the tariff fixed by the Commission for the particular source of generation]?**
- 5. In case of fixation of uniform price cap, what should be the per unit cost?**
- 6. What should be the basis for price cap? Ie., Should it be based on tariff impact on retail supply? What can be the maximum Tariff impact in terms of percentage?**
- 7. With the price cap regime, how to incentivise merchant plants, in order to bring in new investments, without allowing them to dominate the market?**
- 8. In addition to price cap, whether a cap on quantum of short-term purchase should be imposed? If so what should be the quantum cap?**
- 9. What should be the tenure for short-term purchase? Ie 1-month, 3-months, 6-months or 9-months.**
- 10. Whether the additional cost incurred over and above the average power purchase cost due to short-term purchase should be passed on only to a specific category of consumers or to all the consumers across the State?**

**The views/comments and suggestion of the stakeholders may please be furnished within 30 days from the date of issue of this paper, to enable the Commission to take further decision in the matter.**

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