CENTRAL ELECRICITY REGULATORY COMMISSION

Consultation Paper on Framework for intervention in short term market

Price Cap Principles and Methodologies

Staff Paper
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This document analyses the markets prices, the reason for high prices, different principles of price cap and methodologies which can be used to determine the price cap level and suggests alternatives for deliberation.

Table of Contents

A. Background

Concerns have been raised in certain quarters about trading in electricity in short term markets at very high prices and some of the problems it poses. On one hand, this is adversely impacting the financial health of the distribution companies (discoms) of power deficit states as they have little choice other than buying power at high prices to meet their demand. On the other hand, sellers including generators and power surplus states are making abnormal profits in the power markets. It is being said that CERC has turned a Nelson's eye to the issue and there is regulatory capture.

B. Legal Provisions

Electricity Act 2003 entrusts the Commission with the responsibility of development of the market including trading .It also provides the Commission powers to set the maximum and minimum tariff in case of a shortage of power. These two provisions are required for a calibrated and orderly development of market. These provisions are to be used with prudence to pace the opening of the market and create confidence among market participants on the functioning of the market. This is achieved when the regulator acts as a watchdog and maintains constant market oversight.

The proviso to Section 62 (1) (a) mandates the following :

"Section 62. (Determination of tariff): *--- (1) The Appropriate Commission shall determine the tariff in accordance with the provisions of this Act for –*

(a) supply of electricity by a generating company to a distribution licensee:

> *Provided that the Appropriate Commission may, in case of shortage of supply of electricity, fix the minimum and maximum ceiling of tariff for sale or purchase of electricity in pursuance of an agreement, entered into between a generating company and a licensee or between licensees, for a period not exceeding one year to ensure reasonable prices of electricity;"*

This legal provision empowers the Regulatory Commission to regulate tariffs. The regulator can fix the maximum and minimum tariff in case of shortage of supply. CERC had imposed a price cap of Rs.8/- per unit for 45 days last year on transactions in day ahead market for both power exchanges and bilateral inter-state transaction. The power of CERC to intervene in short-term interstate market was upheld by APTEL.

"Section 66. (Development of market):

> *The Appropriate Commission shall endeavour 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."*

The Central Commission is entrusted with the mandate for development of electricity market including trading as in accordance with the National Electricity Policy.

CERC however cannot intervene in the intra state markets as this is under the purview of SERC. This was reiterated by the Supreme Court ruling. The state commissions are responsible to protect the consumer interest in the state and hence

are not inclined to look beyond the boundary of the state. For the national market to develop harmoniously, the central commission has to have a holistic view and look at the pan India picture and address interstate power trading issues.

Hence, the only way CERC can regulate short term prices rise is by capping the sale price of interstate transactions undertaken by inter-state electricity traders. If interstate traders are restrained from selling power to buyers beyond a certain price level in the interstate market, they would not be interested to procure power even in intra state market from sellers at any price beyond the CERC defined price level.

C. Objective of the Consultation Paper

The purpose of the consultation paper is to discuss what can be done about the present situation and to set the principles and create framework for any limited and temporary market intervention by the regulator as and when there is a compelling situation to do so. This will allay any fears over a knee-jerk regulatory response to short term price rise that could undermine investor willingness to commit capital in the power markets. This will also bring predictability and regulatory certainty in the power sector. At the same time it has to be ensured that the action is not counterproductive and stalls generation capacity addition and energy efficiency programs.

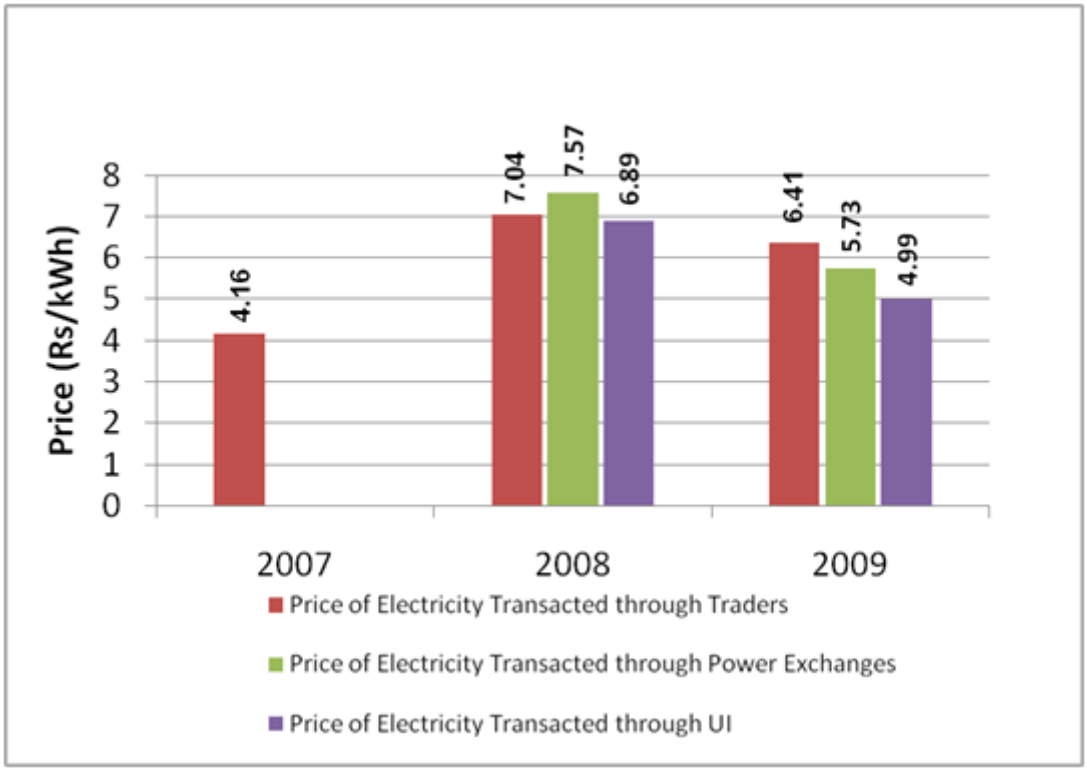
D. Market Structure and Market Prices

1. The average short term power prices in the year 2009 in OTC electricity trader market and power exchange have been Rs 6.41 / Kwh and Rs 5.73 / Kwh and 25 BU and 5 BU were traded respectively. The size of short-term market is

only 3- 4% of the total generation, the short term market size in absolute terms (approx Rs 15,000 Cr)

2. Presently in India, discoms, who ultimately supply electricity to the consumers at the retail level, source almost 92% of their power requirements through long term power purchase agreements (PPAs). The balance eight percent is secured through short-term transactions of electricity, comprising of: transactions through interstate trading licensees (about 3.2 -3.3 percent), transactions through power exchanges (about 0.8 percent), direct transactions between the discoms (about similar to what is transacted through power exchanges), and unscheduled interchange (about 3.1-3.2 percent). Unscheduled interchange (UI) is not a market mechanism, however, electricity transacted under UI is often considered a part of short term transaction. Also, electricity transactions bilaterally between the discoms, although happening directly and without involving trading licensees or power exchanges, are also considered a part of short term market. Excluding UI and transactions bilaterally carried out between the discoms, transactions through interstate trading licensees and power exchanges thus account for about four percent of the yearly total power purchase/procurement by the discoms.
3. As can be seen from the data below, though the weighted average prices in 2009 have fallen as compared to the year 2008, the weighted average price for purchase of electricity through traders has become higher than the weighted average price of transactions through power exchanges. This is contrary to the normal perception that day ahead prices should be higher than the prices (price premium due to desperation of last minute procurement) in the contracts through trading licensees which are entered into many weeks or months ahead. This tendency is particularly worrisome because the size of the short-term

market through trading licensees is three-to four times the size of market being transacted at power exchanges.

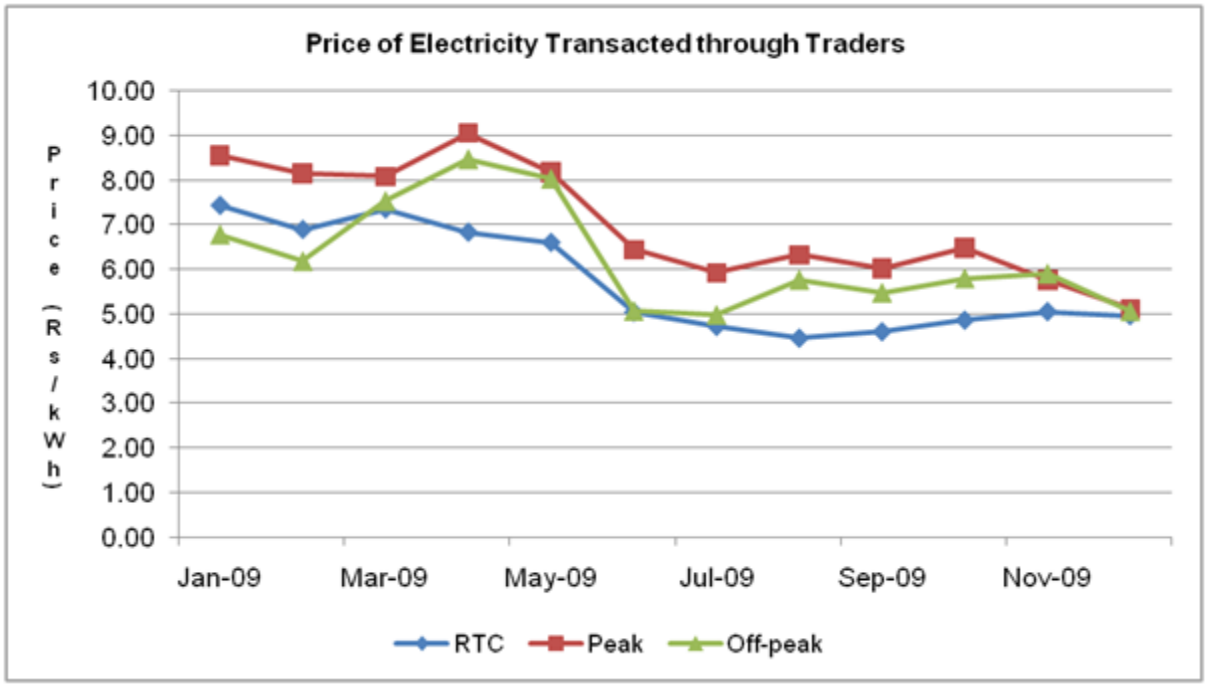


Price Trends in Short Term Market –Figure 1

Power Price	Traders	Power Exchange
Maximum (Rs/ Kwh)	9.05	17
Minimum (Rs / Kwh)	4.46	0.13
Weighted Average	6.41	5.73

Short Term Price Range in 2009 – Table 1

5. Price analysis through the year shows a seasonal effect in prices. The prices are high in summer months when demand is high and reduces during the monsoon months and early winter. It again rises in severe winter when demand picks up.



Seasonal Price Behavior Figure-2

6. An international electricity price comparison of countries where electricity markets function and price discovery happens through the market shows that the electricity prices in India are much higher than these countries. However these countries do not face any large scale supply shortage or transmission / open access issues and the markets function competitively to discover the prices.

International Electricity Prices					
Wholesale Exchange	Country	Units	Delivery	Base Price	Peak Price
Nordpool	Norway	Euro/ MWH	May-10	49	51
		Rs/ MWH		2806.72	2921.28
APX	UK	Pound/ MWH	May-10	54	61
		Rs/ MWH		3600.72	4067.48
EEX	Germany	Euro/ MWH	May-10	50	54
		Rs/ MWH		2864	3093.12
EEX	France	Euro/ MWH	May-10	50	57
		Rs/ MWH		2864	3264.96
PJM	US East Coast	$/MWH	May-10	38	44
		Rs/ MWH		1715.32	1986.16
MMC Report	India		Avg of	Power Exchange	Electricity Trader
		Rs/ MWH	2009	5730	6410

11th May , RBI	Rs
Euro	57.28
Pound	66.68
Dollar	45.14

International Electricity Prices -Table 2

7. Cost of Procurement of power for state and estimated profit margins

(a) The average procurement cost of these portfolio sellers (State trading companies or distribution companies) is not more than Rs.2.76/- per unit. This has been calculated from the data collated from tariff orders of various SERC for financial year 2007-08 and 2008-09. The procurement cost ranges from Rs 1.48/ - per unit to Rs 2.57 per unit excluding transmission costs. The procurement cost in case of States selling free hydro power like

Himachal Pradesh would be much lower even if one takes into account the opportunity cost of the resources provided by the State Government.

(b) Following would be the approximate gain per unit of electricity with respect to the average price of transactions in OTC markets which was about Rs.6.41 per unit :-

(i) For a portfolio having average power procurement cost of Rs 2.76, profit will be Rs.3.65 per unit ;

(ii) States selling free hydro power assuming the economic valuation of its resources at Re.1/- per unit – profit of Rs.5.41per unit ; and

(iii) A new imported coal based power plant having a cost of generation of Rs.3.50 per unit – profit of Rs.2.90 per unit.

8. With the introduction of new UI regulations which stipulates stiff charges in case of schedule violation in low frequency condition, there is a concern that the market prices will increase as UI rates are considered as benchmark prices for negotiations in the bilateral market.

E. Why power Price in short term OTC market is high?

They could be several reasons, why the power prices in the short-term OTC markets are high. However, principally the prices could be high either because of the scarcity rent seeking on the portfolio sellers or generators or they could be high because of the market conditions. The data shows that the prices in the year, 2009 are lower compared to the prices prevalent in the year 2008 (As against 7.04 per unit in 2008, the price in 2009 was 6.41 per unit). The data for the first three months of 2010 indicates that the weighted average OTC price of electricity has

further come down to a level of 5.07 per unit. If we leave the first five months of the year 2009, which was the period when price was, generally, high because of the general elections in the country, the weighted average price for the period June, 2009 to March, 2010 works out to only about 4.59 per unit. It is seen that the prices have not been consistently high but have varied over the period and are generally, showing a downward trend. This perhaps is indicative of the fact that the prices are reflective of the market conditions rather than scarcity rent seeking on the part of some of the portfolio seller and generators. If we study the data of the top 10, sellers of electricity in the OTC market for the year 2009 we find that the weighted average price of these sellers is Rs. 6.39 per unit while that the weighted average price of electricity sold in 2009 in the entire OTC market is Rs 6.41 per unit .Given that the top 10 sellers account for about 60.7 per cent of the total sale during the year 2009,it can be inferred that the other sellers in the OTC market have, in fact, sold the power at an average price which is higher than these the top 10 sellers.

Together, these two facts (downwards trend in prices and lower average price of top 10 sellers) perhaps indicate that the high cost of electricity in the short-term OTC market is more due to market factors such as demands-supply mismatch, lower liquidity, rather than due to scarcity rent seeking on the part of the portfolio sellers or generators. It is also to be noted that since majority of the buyers of OTC market are Government owned discoms and the procurement process followed for purchase of electricity by these buyers is generally a tendering process. Similarly portfolio sellers who are also Government Companies when offer their electricity for sale may also follow tendering process. Under this kind of competitive sale and purchase mechanism, there will be a very little scope for any rent seeking behavior. The higher prices, therefore, is more of a reflection of shortages prevalent in the market because of which prices are being bid up to what buyers are prepared to pay.

F. Negative Impact of High Prices

1. It is being alleged that one of the reasons open access is not succeeding and the states hesitation in providing open access is that they stymie CPP and private producers from availing open access. This reduces the market access for the power producers and hence are compelled to sell cheap power to the state power trading companies. They in turn sell this power in the interstate market at much higher prices.
2. The profits made by the state governments is high and may be used to keep the retail tariff in the state low. The surplus generated is not being ploughed back to bring in additional generation capacity in the state.
3. It is also said that high price have provided the perverse incentive to discoms to curtail power supply to its own domestic consumers and sell power outside the state at high prices.

G. Market Intervention Method - Price Cap

Ideally, in a fully competitive market, price discovery is the result of demand and supply interaction. In such a situation both the sellers & buyers maximize their benefits consumers' surplus & producers' surplus is maximized simultaneously. Sellers will not be able to charge any price above their marginal cost due to competition among sellers. Imperfect markets can be as a result of entry – exit barriers, limited numbers of players, information asymmetry or supply shortage. In a supply deficit market the sellers are able to charge a scarcity rent and increase prices and extract undeserved revenue.

In the present market conditions one would assume that substantial number of generators are recovering a large part of their capital cost or capacity availability charge through long term contract with customers over an extended period of time. Considering this and analyzing variable fuel prices it would lead us to believe that prices in the short term market are high and that generators are making abnormal profits.

This being the case, regulators role to ensure just and reasonable prices for consumers become critical. Such market distortions need to be removed by market intervention.

Price Cap on wholesale prices on the other hand, if extended over a long period of time, have the potential to affect investment in new capacity. It is opined by economists and experts that price cap should be a temporary phenomenon and needs to be complimented with actions that increase supply and reduce demand. Putting it differently, the fundamental drivers which lead to the need for price cap imposition needs to be removed; otherwise it is like treating a symptom and not the cause. An increase in price in a free market automatically triggers the corrective mechanisms of expanded capacity and intensified conservation. These necessarily needed to be replicated along with imposition of a price cap.

Any framework for price cap implementation needs to address three important issues and these are as follows:-

1. When to impose a price cap? – Is the price rise phenomenon a transient event or a systemic increase?
2. At what level (price per kWh) should the price cap be imposed? - What is the principle and model to arrive at the value?
3. How long should the price cap prevail? - Should it be seasonal, once it is removed will the prices rise again?

In a way the level of the price cap is linked to the other two questions. The level of the cap is the central question and the philosophy for that needs to be settled. The competing issue in determination of the level are that the price cap should not thwart long term generation investment, should not provide abnormal profit to existing generators and should not stall energy efficiency program.

For example if the price cap is too conservative it would disincentivise generation investment on one hand and the buyers would not be motivated enough to try and carry out demand side response like energy efficiency, load levelising and bring in supply/ distribution efficiency (AT& C Loss reduction) .

On the other hand if the price cap is too liberal it will allow abnormal profiteering to generators and portfolio sellers and undermines credibility of a competitive market.

These being the basic concerns, any decision on the price cap level has to take into consideration these three issues- new capacity addition, abnormal profits, energy efficiency possibilities.

Internationally regulators have mostly relied on the following five alternatives to decide on the cap level[1]:-

1. Cap based on the marginal cost of the most expensive fuel unit- This method of setting price cap level ensures that no generation is left out and is especially relevant in a supply deficit scenario like India where all available generation the capacity needs to be utilized. This also ensures that capacity addition of peak plants is not discouraged. In this case if the cap level it too low, certain expensive suppliers will simply not offer their power in the market.

[1] This discussion is based on literature from "Making Competition work in Electricity", Sally Hunt, Page 101- 102

2. Cap based on cost plus principle with appropriate assumption for ROE, Heat rate, capacity utilization of the plant and fuel cost. However adopting this methodology would require specifying multiple cap levels depending on fuel (Coal / Oil / Gas) and technology and other defined parameters.
3. Cap based on previous bidding behavior – In this case, pre defined rules are set, to restrict bidders orders beyond a certain previous average market price. This approach would capture any time based affects like seasonal variations, time of day variations, and event based affects on prices. Any transient phenomenon that leads to a sudden spike in price should not influence the decision making. The average price should show a definite regime change for price cap to be imposed. These can be based on historic moving average prices and volatility of prices
4. Cap based on consumers opportunity cost of electricity – This is based on customers valuation of electricity (the utility she assigns to electricity and invests to get an alternative supply like self generation - cost of diesel generation set, cost of inverter etc) and is applied only when load is actually shed due to high price.
5. Full Profit Controls- Use of this principle signals that pro competitive reforms have failed and tariff based regulation is being reinstated.

H. Price Cap level Determination

This section attempts to arrive at actual price cap levels based on the different principles mentioned in the last section and the rationale if they are justified.

1. Price Cap based on the marginal cost of the most expensive fuel unit – The maximum price worked out based on the representative prices of power based on expensive fuel like Naptha and RLNG are as follows:

Fuel Type	Fixed Cost (Rs/ Kwh)	Variable Cost (Rs/ Kwh)	Total (Rs/ Kwh)
RLNG	1.37	3.82	5.19
Naptha	1.37	8.33	9.7

Table 3

The Fixed cost taken is for any new gas based plant being set up and with a plant capacity utilization of 65 %. The variable charges have been calculated based on January 2010 fuel prices.

This principle is easy to implement in both OTC and power exchange as it does not differentiate between different types of generators .It is also easy to monitor. The drawback of this method is that it would allow very high level of profit to generators using coal and hydro as their fuel cost is relatively low.

2. Price Cap based on cost plus principle with appropriate assumption for Return on Equity, Heat rate, capacity utilization of the plant and coal cost. The table below shows the prices for coal based plant with domestic coal hauled over different distances.

Cost based Levellised Power Price for Indian Coal	
ROE= 50 %	
Heat Rate = 2618 Kcal /Kwh	
Plant Load factor = 67%	
GCV 3400 Kcal/kg	
	Indian Coal Levellised Tariff (Rs/ kwh)
Pithead	3.6
Upto 100Km	3.73
Upto 500Km	4.07

Upto 1000Km	4.49
Upto 2000Km	5.33
Upto 3000Km	5.8

Table 4

The table below shows the prices for coal based plant using a mix of domestic coal and imported coal hauled over different distances. The blending ratio of 85:15 (Domestic: Imported) has been considered.

Cost based Levellised Power Price with Imported Blended Coal		
ROE= 50 %		
Heat Rate = 2618 Kcal /Kwh		
Plant Load factor = 67%		
Indian Coal GCV 3400		
Imported Coal 6200		
Blending 15 % Imported	Coal Type 1, Rs 4900/T	Coal Type 2, Rs 5700/T
500 Km Both	6.13	6.5
500Km Indian, 0 Km Imported	6.07	6.44
500 Km Imported, 0 Km Indian	5.73	6.11
1000 Km Both	6.54	6.91
1000 Km Indian, 0 Km Imported	6.42	6.79
1000 Km Imported, 0 Km Indian	5.79	6.16

Table 5

There could be several variations to this model such as:-

(a) Cap based on only marginal coal cost and no fixed cost allowed, as the generators are already recovering the fixed cost through long term contracts in place

(b) Cap based on 100 % plant load factor, ROE 50 %, as the generators are already recovering the fixed cost through long term contracts in place so no leeway is needed for liberal fixed cost recovery.

This is a differential fuel based cap with a cap on low cost coal based generation but not on liquid fuel based generation. However such selective cap is difficult to implement.

3. Cap based on previous bidding behavior- The average power price for transaction through electricity traders is as follows:-

Month	Electricity Traders Price (Rs/Kwh)	3 Month Moving Average Price (Rs/Kwh)
Apr-09	7.21	
May-09	6.82	
Jun-09	5.05	6.36
Jul-09	4.75	5.54
Aug-09	4.64	4.81
Sep-09	4.73	4.71
Oct-09	5.07	4.81
Nov-09	5.33	5.04
Dec-09	4.99	5.13
Jan-10	5.26	5.19
Feb-10	5.05	5.10
Mar-10	4.94	5.08

Table - 6

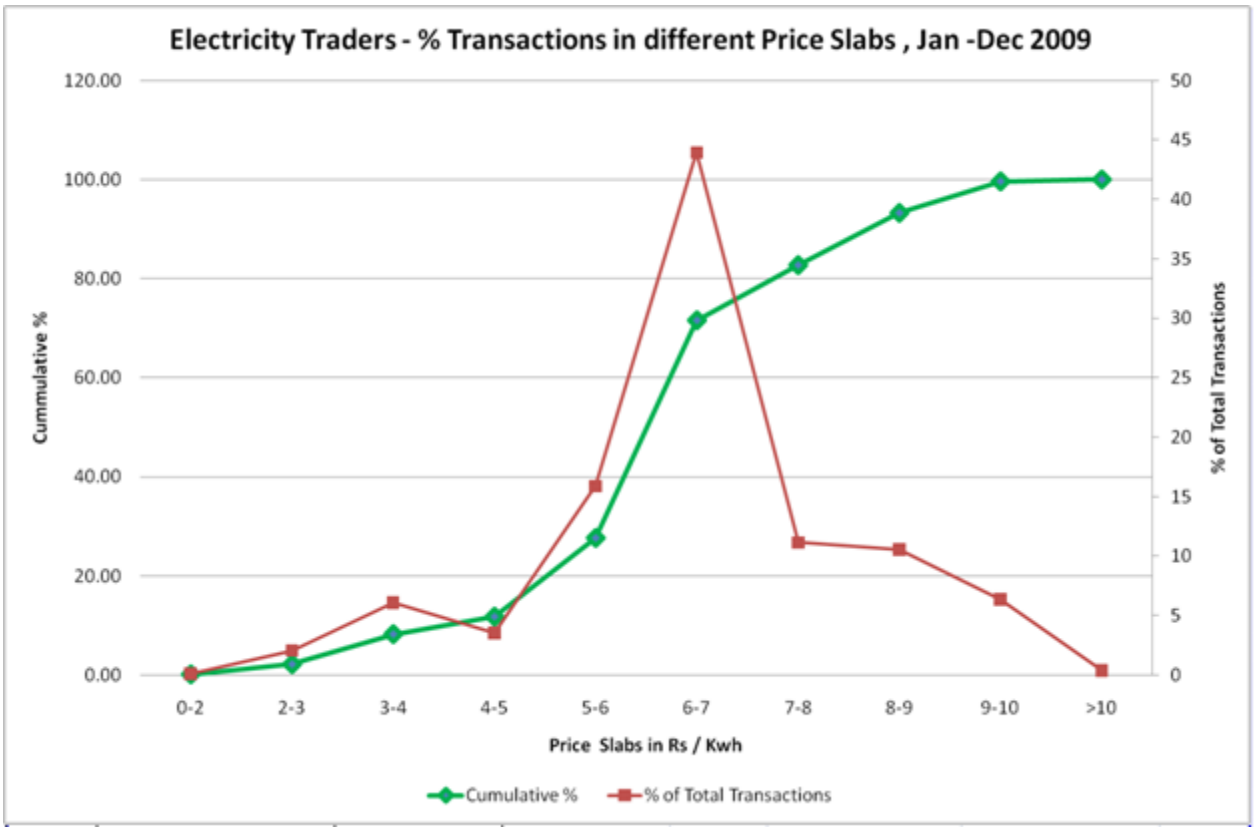


Figure- 3

Around 40 % of the transactions were executed in the price slab of Rs 5-6 / KWh and 45 % of transactions were executed in the price lab of Rs 6 - 7/KWh. Hence, for the price cap to be effective the price has to be around this price range.

The average power price for transaction through power exchange is as follows:-

Month	IEX	3 Month Moving Average Price (Rs/Kwh)	PXIL	3 Month Moving Average Price (Rs/Kwh)
Mar-09	8.33		8.54	
Apr-09	10.10		10.18	
May-09	6.84	8.42	8.74	9.15
Jun-09	7.39	8.11	9.60	9.51

Jul-09	4.81	6.35	4.85	7.73
Aug-09	7.40	6.53	6.15	6.87
Sep-09	4.00	5.40	4.32	5.11
Oct-09	4.73	5.38	5.18	5.22
Nov-09	3.16	3.96	3.39	4.30
Dec-09	3.22	3.70	3.07	3.88
Jan-10	3.46	3.28	3.33	3.26
Feb-10	3.24	3.31	3.30	3.23
Mar-10	5.58	4.09	6.47	4.37

Table -7

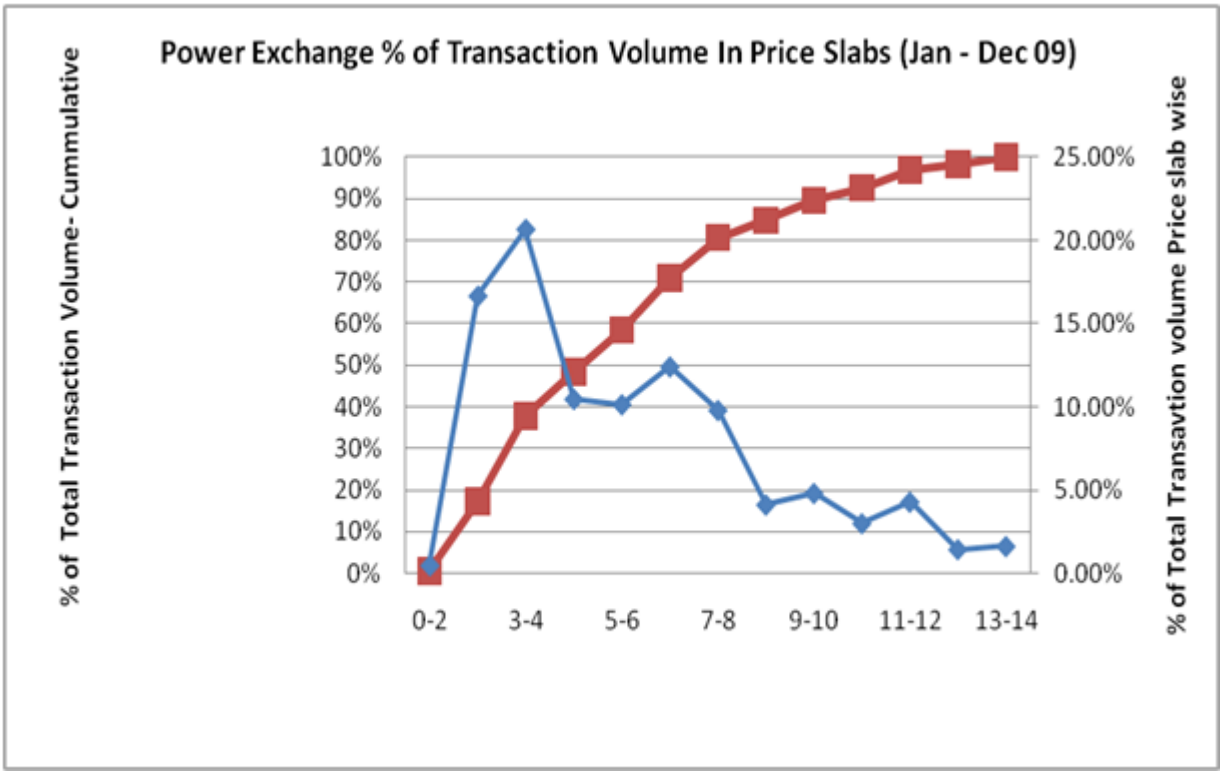


Figure - 4

Around 50 % of the transactions were executed at prices less than Rs 5/ Kwh and 50 % of transactions were executed at price higher than Rs 5/Kwh Hence, for the price cap to be effective the price has to be around this price range. This

method is used to calculate the price levels prevailing and analyze the degree of impact on transactions executed in the market.

4. Price Cap based on consumers opportunity cost of electricity and alternative source of supply –

Many of the consumers who are faced with power cuts and load shedding resort to self generation through diesel generating sets or use inverters. The cost of electricity supplied through generator and inverter are in the range of Rs 11 and Rs 17 per unit respectively. Thus it can be said that consumers are willing to pay as much as Rs 17 per unit to avail uninterrupted power supply. Looking from this perspective it could be said that any price in the market ,as long as it is below this level is not high price because consumers are willing to pay this price for getting the electricity. This principle has been used in the Australians markets where the maximum spot energy price has been kept equal to the value of lost load (VOLL) / unserved energy.[2] The maximum price there has been fixed at $12500/ Mwh (Australian dollar). However, the opportunity cost of electricity of different class of people in a society is different. On one hand certain section of people use inverters, DG sets as alternative source of supply, there are others sections of society who are unable to afford such prices and reconcile to load shedding. Using this as a benchmark may be skewed perception.

Alternative Supply Cost - Inverter	
	Cost (Rs)
Inverter Capacity (VA)	500
Inverter Capital Cost (Rs)	7000

[2] National Electricity Rules Version 36 Chapter 3, Sec 3.9.4

Battery Cost (Rs)	8000
Total Cost	15000
Inverter Life (Years)	15
Battery Life (Years)	3
Capital Recovery Factor for Inverter	0.1315
Discount Rate	10%
Yearly Cost of Inverter	920
Capital Recovery Factor for Battery	0.4021
Yearly Cost of Battery	3217
Total Yearly capital Cost	4137
AMC	900
Total Yearly Fixed Cost	5037
Fixed Cost per Unit	9
Power Produced @.8 Power Factor	400
No of Hours used in day (Hrs)	4
Total Energy produced in 365 days	584
Efficiency of Inverted	50%
Power Drawn from Grid to charge inverter	1168
Cost of electricity per unit drawn (Rs/ Kwh)	4
Variable cost per Unit (Rs/ Kwh)	8
Total Cost per Unit of electricity from Inverter (Rs/Kwh)	17

Table -8

Capital recovery factor = $i(1+i)^n/ ((1+i)^n-1)$

Where i = discount rate and n = life of the equipment

I. Effect of Market Intervention - Price Cap

1. Competitive markets connote efficiency, economy and innovation. By imposition of a price cap, the States which have been slow in adding generation capacity for meeting the expected demand or undertaking any demand side

management programmes further get reasons not to act. They would continue to get away with their inefficiencies.

2. Generators would see such market interventions as interference in their commercial transactions leading to reduction in their confidence. It may lead to slow down in much needed private investments in generation capacity addition.
3. Generators in the regime of price caps in the short term market and to compensate for loss of revenue, would readjust their long term contract pricing upwards to attain their overall expected rate of return. This may lead to marginal increase in long term contract prices.
4. Price cap will arrest the phenomenon of wealth transfer from power surplus states (who are sellers) to power deficit states (who are forced to buy power at high prices).
5. Electricity capacity addition has certain gestation period and one cannot increase supply at the flick of a switch. Markets need to function for a definite period of time to show its full impact and in the interim period patience is needed. Short painful periods of high prices are followed by long periods of economical prices, which would be in the long term interest of the consumer.

J. Market Structure issues related to High prices

1. In the present scenario, the short term market essentially is a combination of capacity market and energy market. Uncontracted generators try to recover the fixed cost and the variable cost both through this market in a short period of time thereby increasing power prices. One way to handle these high power prices is by creation of a separate installed capacity market. In the capacity market, the Load serving entities / discoms would need to buy long term capacity from power producers based on their projected demand growth and

projected peak demand growth. Once the capacity is bought by the discom, it can call for the contracted capacity to provide energy any time in the contracted period. The energy price paid by the discom would be based on the short term market price running in the market at the time of supply. The short term price in a competitive market (in a few years when sufficient capacity gets added) typically would reflect only the marginal fuel cost and hence the discom will be paying a competitive price then. For the power producer, the assurance of dependable revenue from long term capacity contracts, will reduce cash flow fluctuations and help recover the investment consistently. The urgency to quickly recover the full cost though short term markets will hence reduce. Thus creation of a capacity market will reduce the energy prices in the short market on one hand and incentivize capacity addition on the other. In the US markets namely PJM, New England, and New York markets the regulators have mandatorily imposed capacity market contracts for load serving entities with modest energy price caps.[3] These structural changes however take time to implement and cannot be seen as immediate measures.

2. Retail tariff to respond to wholesale prices - Presently the retail consumers of electricity pay a fixed retail tariff. They neither face nor respond to wholesale spot price fluctuations. Fundamentally, a structure where the wholesale price is market determined and retail price is regulated is flawed. The Discom will go bankrupt, especially if compelled to supply and not resort to load shedding. Fortunately in India, presently the wholesale short term market it is only 5% and discoms have the choice to shed load. This problem will accentuate when the share of short term contracts in the portfolio of discoms increases. It is needed that the consumer at the far end of the value chain responds to whole

[3] Installed Capacity Requirements and Price Caps: Oil on the Water, or Fuel on the Fire? By Benjamin F. Hobbs (consultant to FERC),Javier Inon,Steven E. Stoft,(Author of Power System Economics: Designing Markets for Electricity), May, 2001 ,Page 2

sale price fluctuations. Consumers response has to be achieved through the trinity of demand side management, Real time metering and time of day pricing [4]. In the Indian context it may be difficult to fully and squarely pass on the high cost to the end consumer.

K. What will price cap achieve?

The moot question is what fundamental change it will bring. Imposition of price Cap no doubt will reduce the prices in the short term. However, given that the weighted average price of power in the OTC market over the past 10 months has been of the order of Rs. 4.59 /Kwh, the price paid by buyers in the market will in fact be lower if the present trend of low OTC prices continues in the future. September, 2008 staff paper of CERC had suggested a price Cap of 5 per unit be imposed. The present level of OTC prices already lower than the Cap suggested in September, 2008. The fundamental drivers of the high price seem to be market conditions, specially the demands - supply mismatch. The price Cap per se is not expected to contribute towards the alleviation of this problem. Thus, apart from moderating prices in the short term, the cap will achieve very little in moderating the fundamental drivers of prices, thereby indicating that once Cap is removed and if similar market conditions prevail the prices are likely to rise again.

L. Challenges / Limitations in Implementation

This section discusses some of the challenges and limitation in implementation and monitoring Price cap in OTC and Power Exchange markets

[4] Energy Regulation Brief. The adequacy of prospective returns on generation investment under price control mechanism ,NERA, by Dr A E Kahn, Advisor to FERC, Feb2002

1. Differential price cap (Cap on coal/ lignite / hydro and not on gas /liquid fuel based plants) will be difficult to implement in Power Exchange since their price discovery mechanism is based on the aggregation of the all supply bid curves and a uniform price is discovered for all participants. In a capped scenario if the price discovered by the interaction of demand – supply curves is higher than cap level then a surplus generator fund will get created as the coal based generators will not be paid beyond the price cap level. Alternatively, separate bidding for coal based and gas based auctions will be required but this will negatively impact the gas based markets as all buyers will quote in the coal based market where there is a cap imposed. The present price discovery mechanism on exchange will become irrelevant. Similarly in the OTC markets, all buyers would rush to coal based generators, drying up the liquidity for gas based markets. Buyers would also overbid their quantity requirements as they would expect some form pro- rating to be done by sellers.
2. Price Cap will also lead to the classical problem of rationing. Rationing of supply will be required as there will be a large number of buyers ready to purchase electricity at the price cap level (demand will outstrip supply) and pro rating of available supply to total willing purchasers will need to be done. The present practices of sellers to call for sale tenders by advertising surplus power available with them to sell will need to be reworked. Seller will have to devise a mechanism by factoring equity considerations (fair and equal opportunity to all) to select buyers (like First come first serve basis or pro rate basis the limited supply quantity available) or come out with other alternative mechanisms.
3. Short term market is defined as a market for contracts for delivery of power upto 3 months ahead (as the corridor booking under Short Term Open Access Regulation is upto 3 month in advance only). The different types of contracts

signed presently could be for delivery of power for week- starting from next week; for supply of power for upto 3 month -starting next week etc. Hence OTC markets are essentially upto 3 month forward market.OTC day ahead market / spot market virtually do not exist. The fact that the cap cannot ordinarily be made applicable for contracts already entered into, would mean the full impact of the price cap directive will reflect only after a period of 3 months.

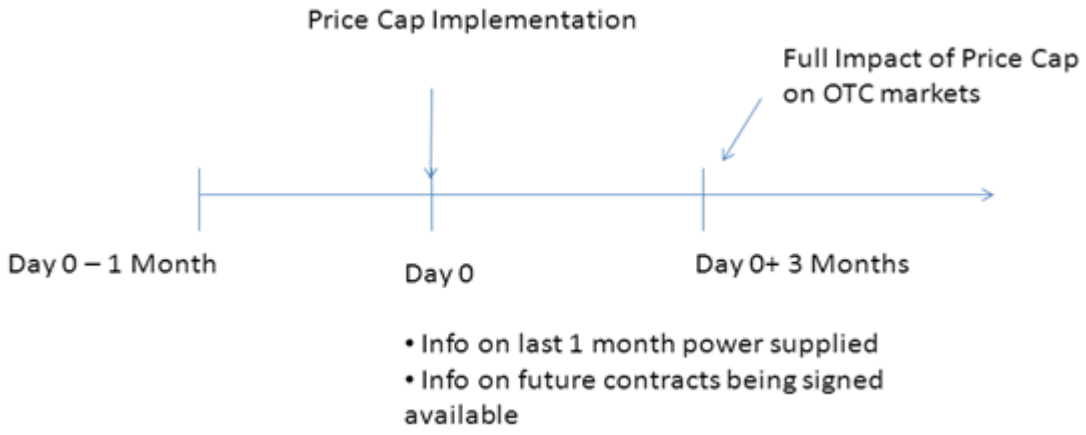


Figure-8

4. Market needs to be clearly communicated on the applicability of price cap.Issues like nature of contracts , type of participants on whom price cap will be applicable or will it have any retrospective affect will need to be settled.

M. Deliberation Points

As mentioned earlier, the objective of the consultation paper is to establish a framework for execution of price cap. The suggested approach is combination of two ideas mentioned above. The first is Cap based on previous bidding

behavior. This should be used to decide when price cap needs to be introduced and removed. Presently the 3 month moving average prices is suggested for the OTC markets as well as Power Exchange. Whenever the price crosses a threshold level arrived through this methodology, the price cap may be introduced. For the level of the price cap following two alternatives are suggested and need to be deliberated:-

1. Alterative 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 not should applicable to any liquid fuel or gas based generation. The price cap level suggested 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 have reflected market conditions and the market size is small.
2. Alternative 2 - A Uniform price cap based on most expensive fuel type should be applicable all types of generators (coal / lignite/ Hydro/ Liquid /Gas based) and it should be applicable to both OTC markets and Power Exchanges.

N. Conclusion

1. Short-term price should naturally be higher than long-term PPA rates because of the inherent uncertainty in returns in the short-term and to balance the risk - reward payoff of short term transactions.

2. Any price cap imposition has to be accompanied by concerted efforts to remove the fundamental drivers that lead to increase in prices like less demand – supply deficit, low competition, low liquidity, congestion in power exchanges, and inefficient operation of discoms. Once this is achieved and markets work on competitive forces, market intervention may not be necessary at all. Presently these interventions should be seen as an edifice to the foundation of the market.