



**Central Electricity Regulatory  
Commission**

**Report on Trading Margin**

July 2009  
This report contains 64 pages

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## **1.1 Disclaimer**

Our work for the interim report under this engagement commenced on May 21st, 2009 and was completed on July 15th, 2009. We have not undertaken to update our report for events or circumstances arising after that date. Post submission of this report, we have no obligation to update or revise the contents of this report because of events or transactions that may occur or arise subsequent to the date of the Final Report. The Client is advised to perform its own independent investigation/ validation through primary research study, if deemed to be necessary. This document is intended to facilitate and is not a substitute for such an independent validation.

The report contains KPMG's analysis of secondary sources of published information and incorporates the inputs gathered through meetings with industry sources, which for reasons of confidentiality, cannot be quoted in this document. Information obtained from the public domain has not been verified for authenticity.

Our analysis is based on the prevailing market conditions and regulatory environment and any change may impact the outcome of our review.

Our report makes reference to 'KPMG Analysis' or 'Internal Analysis'; this indicates only that we have (where specified) undertaken certain analytical activities on the underlying data to arrive at the information presented; we do not accept responsibility for the underlying data.

In performing this engagement and preparing this Report, KPMG:

- has used and relied solely on data, material gathered through research reports and discussions with personnel within KPMG and our networks in the industry.
- has not independently investigated or verified such Information.
- assumes no responsibility for the accuracy and completeness of the Information and will not be held liable for it under any circumstances.
- has neither conducted an audit, due diligence, nor validated the financial statements and projections provided by any of the quoted companies

## 1.2 Objective of this report

In this draft report we have analyzed the operational environment of the traders to arrive at the various costs and risks that they should be allowed to recover in the form of a trading margin or an alternate mechanism.

Additionally, we have attempted to simulate a market with non back-to-back contracts to understand the degree of additional risks borne by traders in such cases and possible ways to compensate the traders for the same.

Finally, we have proposed possible margin cap structures for various types of contracts. We are submitting this report to the CERC for their comments and feedback based on which we shall come up with the final report on the matter.

## 1.3 Context of this Assignment

The Central Electricity Regulatory Commission (CERC) has appointed KPMG to conduct a study on trading margin with the following scope of work:

- 1 To make an empirical study on the implications of imposing trading margin cap on the volume of electricity traded and its impact on the development of electricity trading market.
- 2 To study the historical price of power traded and the commercial impact of change in prices of traded power on the margins of the trader.
- 3 To study whether the existing trading margin needs to be reviewed in the context of emergence of power exchanges and new trading regulations.
- 4 To assess the risks involved in various products in power trading business in the current environment and whether the return of trader is commensurate with the size of the risk and investment made by him.
- 5 To assess the possibility of trading margin to be sensitive to volume/ period of the transaction
- 6 To suggest an appropriate trading margin that encourages healthy trading market and protection of consumers' interest.

## 1.4 Background

The Distribution Utilities who have the obligation to provide electricity to their consumers mainly rely on supplies from long-term contracts. However, given the nature of demand pattern across the day and across seasons, it is essential for these Utilities to meet short term, seasonal or peaking demand through power trading contracts.

Similarly, Generators – Govt Owned, IPPs or Captives, also have some short term surpluses/ merchant components that can be utilized to meet the variations in demand. Trading market provides the Generators a market based mechanism to supply power to deficit consumers.

However, given the power deficit scenario in the country, prices of short term power have witnessed a sustained upward bias over the past few years. In a bid to restrain the prices of short term power and prevent traders from taking advantage of the situation to make super normal profits, CERC, empowered under Section 79 (1) (j) of the Electricity Act of 2003, imposed a flat trading margin cap of Paise 4/ kWh on each unit of electricity traded in January, 2006.

Considering the change in market conditions through factors such as rise in prices of traded power, notification of new trading regulations, emergence of Power exchanges in the country, it has been felt by some stakeholders that the flat trading margin of 4 paise/kWh may prove detrimental to the growth of trading market in the medium to long term.

The overall objective, therefore, of the study is to facilitate the growth of mature bilateral trading market in the country that, among others, helps the Distribution Utilities in meeting their overall demand of power at optimum costs and promotes investments in generation by providing avenues for sale of power.

## 1.5 Executive Summary

This study relates to the trading margin cap implemented by the CERC in its Regulation on Fixation of Trading Margin, dated 23<sup>rd</sup> January, 2006. The CERC appointed KPMG to suggest an appropriate trading margin structure that encourages healthy trading market while protecting consumers' interest.

Given the above mentioned objective, we have considered that a trader must be allowed to cover the following expenses through the trading margin:

SN	Expenses that a trader must be allowed to recover through trading margin
1	Expenses borne to mitigate operational risks
2	Expenses borne to mitigate market risks (only in case of non back-to-back contracts)
3	Operations and Maintenance Expenses of trader
4	Return on Net Worth

### 1.5.1 Approach followed

In order to understand the current trading market dynamics in detail, we held interviews with key traders, buyers and sellers. During the course of these interviews, the stakeholders mentioned the issues and risks they were facing and possible resolution mechanisms.

In order to quantify the risks, we required relevant information. However, we were constrained by information availability on two counts:

- 1) Some data was not being archived by the traders and they mentioned their inability to provide us with the data
- 2) For quantifying market risks, we required data related to non back-to-back contracts, however, these contracts are non existent in the market currently.

As a result, based on interviews, financial statements of traders, transaction details of bilateral transactions in the past two years, market clearing data of Power Exchange and trading related data available with the CERC, we have made efforts to quantify the risks on the basis of best estimates available with us.

We discuss below each of the expense items and the trading margin cap structure that would incorporate the same for various types of contracts.

## 1.5.2 Operational Risks

Electricity Trader, by virtue of his operations, bears certain types of risks. These can be broadly categorized into two types:

- **Operational risks** - defined as risk borne by traders in their day to day operations on account of risk factors relating to parties with which they trade (Buyers and Sellers) such as credit worthiness, timely payment performance, fairness of business practices etc;
- **Market Risk** - defined as the risk borne by traders on account of taking positions in the market i.e. ownership of power to be transacted in the market. This risk occurs when contracts signed by traders with buyers and sellers are not back-to-back in nature.

We have identified the following types of operational risks that may be incident upon the trader in the current power trading market:

Types of Operational Risk		
Default Risk	Late Payment Risk	Contract Dishonor Risk
Regulatory Risk	Contractual language interpretation risk	Inflationary Risk
Compensation for Low scheduling Risk	<i>Note: Detailed explanations of these risks have been provided in the main report</i>	

For the risks listed above, we have conducted an analysis of whether these risks are being justifiably incurred by the trader and if these are being justifiably incurred, whether trading margin is the right mechanism to help traders mitigate these risks.

Based on this analysis, we have considered that the following operational risks are being justifiably incurred by the trader:

- Default risk
- Late payment risk
- Contract dishonor risk
- Inflationary risk

Due to various reasons as highlighted in the main report, most traders mentioned that they did not have an archive of accurate information that could be shared with us to quantify the above mentioned risks. As a result, the calculations of the above mentioned risks are based on data shared only by PTC – which is the largest trader and had a 46% market share in FY 2007-08. The margin that may be charged by the traders to mitigate the operational risks are as follows:

Types of Operational risk	Margin for (P/ kWh)
Default risk	1.04
Late Payment risk	0.57
Contract dishonor risk	0.88

### 1.5.3 Operations and Maintenance Expenses

Operations and Maintenance (O&M) Expenses can be broadly categorized into fixed (license fee, Office maintenance costs, etc.) and variable expenses (Bank Charges, legal expenses etc.). Through regression analysis on the data provided by various traders, an equation for O&M expenses was determined.

$$\text{O\&M Expense (in Rs Lakh)} = 57.92 \text{ Lakh} + 0.1749 \text{ (Lakh/ MU)* (MUs traded)}$$

This equation was used to calculate expenses for different categories of traders as shown below.

Trader Category	MUs traded	O&M Expenses (Rs Cr)	Trading Margin (p/ kWh)
III	50	0.67	13.33
III	100	0.75	7.54
II	500	1.45	2.91
I	1000	2.33	2.33
I	5000	9.32	1.86
I	10000	18.06	1.81
I	20000	35.55	1.78

### 1.5.4 Return on Net Worth

The actual billing cycle duration is 15 days as per industry accepted practice; we have accordingly calculated the margins on the basis of capital adequacy requirement for 15 days @ 16% (post tax) return on net worth. The return on net worth allowed through trading margin is



the net of the return generated through interest earned, which we have kept at 10% in our calculations.

Trader Category	MUs traded	Margin for 15 days' billing cycle capital adequacy (Paise/ kWh)
III	50	2.93
III	100	2.93
II	500	2.93
I	1000	2.93
I	5000	2.93
I	10000	2.93

### 1.5.5 Overall Margin

Overall Margin for different category of traders has been arrived at by taking sum total of margin requirements for Operational Risks, O&M Expenses and Return of Net Worth. Total margin requirement is higher for smaller traders, Category II and Category III, than that of Category I traders primarily because of O&M expenses which are largely independent of volume of trade.

Trader Category	MUs traded	Default Risk	Late Payment Risk	Contract Dishonor Risk	O&M Expenses	Return on Net Worth	Overall Margin
	MU	(All figures in Paise/ kWh)					
III	50	1.04	0.57	0.88	13.33	2.93	18.75
III	100	1.04	0.57	0.88	7.54	2.93	12.96
II	500	1.04	0.57	0.88	2.91	2.93	8.33
I	1000	1.04	0.57	0.88	2.33	2.93	7.75
I	5000	1.04	0.57	0.88	1.86	2.93	7.28
I	10000	1.04	0.57	0.88	1.81	2.93	7.23
I	20000	1.04	0.57	0.88	1.78	2.93	7.20

## 1.6 Market Simulation to determine market risks

We used Monte Carlo Simulation (it runs multiple simulations using variables that reflect market conditions and arrives at outcomes) to capture market risk, a trader would be subjected to if he starts executing non back-to-back contracts.

Given the volatility of market prices, a trader would witness different results in terms of gains/losses that he makes on the portfolio at different points in time. Data for simulation was obtained from NTPC Vidyut Vyapar Nigam Ltd (NVVN) and PTC India Ltd. Assumptions and Inputs have been detailed in the report. The Simulation was run for 300000 (Three Lakhs) iterations to create data points.

It was observed from the results that a trader can expect to make losses 43% of the time and weighted average gain/ loss (probability of occurrence being the weight) came out to be 38 Paisa/kWh. Also a trader needs to be given an extra margin if we want him to make profits X%, say 50%, of the time.

## 1.7 Recommendations on Margin Cap

Type of Contract	Definition	Margin cap structure	Justification
Long Term Buy – Short Term Sell	Power purchase agreement is of duration more than one year whereas sell agreement if of duration less than one year	No Margin cap	In a fast evolving market with high price volatility, such contracts put significant risk on the trader
Long Term Buy – Long Term Sell	Both Power purchase and sell agreements are of duration more than one year	No Margin cap for contracts where long term power has been procured through competitive bidding else trading margin cap as proposed for short term buy – short term sell transactions.	Value addition by a trader in long term trade is different than that in case of short term trade. Margin cap has been proposed, barring contracts that involve competitive bidding, to avoid scenarios where a trader is able to dictate margins after securing a major chunk of short term power
Short Term Buy – Short Term Sell	Duration of both buy and sell contracts is of less	Trading Margin Cap structure has been discussed	A cap structure has been proposed that will enable a trader to recover his

	than one year	below	expenses and returns and compensates for his operational risks in a reasonable manner.
Trading through Power Exchanges	Any trade of power executed at Power Exchange	No Margin Cap for all trades	Traders should be given same liberty as exchange members.

### 1.7.1 Short Term Buy – Short Term Sell Trading Margin Cap Structure

To ensure viability of Category II and Category II traders a higher trading margin has been proposed for them. However, they are free to charge less than the permissible Trading Margin to remain competitive.

#### Trading Margin Structure for Power Prices greater than Rs. 3/ kWh

Trader Category (A)	MUs traded (min) (B)	MUs traded (max) (C)	Trading Margin (D)	Trading Margin Cap (E)
	MU	MU	%	Paisa/ kWh
III	0	100	4	19
II	101	500	2.5	13
I	501	-	1.5	8.5

For power purchase prices greater than Rs.3/kWh, Trading Margin will be a function of price of power as shown in column D above. However, the margin shall be capped at the levels (in Paisa/ kWh) as shown in column E.

#### Trading Margin Structure for Power Prices less than Rs. 3

Trader Category (A)	MUs traded (min) (B)	MUs traded (max) (C)	Trading Margin Cap (D)
	MU	MU	Paisa/ kWh
III	0	100	13
II	101	500	8.5
I	501	-	4

For power prices less than Rs. 3 we are proposing a flat trading margin cap. However a trader is free to provide its service at a lower margin to remain competitive in the business. It is not possible to keep Trading Margin proportionate to power prices in this range as the proportionality factor will have to be kept too high and will vary significantly at short intervals to ensure appropriate profit.

## 1.8 Risks borne by a Trader in the current Short Term Electricity Market

**Operational Risk** is defined as risk borne by traders in their day to day operations on account of risk factors relating to parties with which they trade (Buyers and Sellers) such as credit worthiness, timely payment performance, fairness of business practices etc;

**Market Risk** is defined as the risk borne by traders on account of taking positions in the market i.e. ownership of power to be transacted in the market. This risk occurs when contracts signed by traders with buyers and sellers are not back-to-back in nature.

SN	Risk Name	Brief Description	Risk Type	Justifiably borne by Trader?	Mitigation through Margin?	Alternate Mitigation mechanisms?	Data limitations in margin quantification
1	Default <sup>1</sup> Risk	<p>Default by a Buyer on payment of electricity purchased through a trader</p> <p>What causes the risk?</p> <ul style="list-style-type: none"> <li>Absence of a regulation which would mandate a buyer to provide Payment Security to the trader</li> <li>Poor financial position/ credit history of Buyer</li> </ul>	Operational	<p>Yes</p> <p>Though Payment Security Mechanisms such as Letter of Credit / Bank Guarantee can alleviate this risk. There is neither any regulation on this nor it is always possible to put these in place due to:</p> <ul style="list-style-type: none"> <li>Short notice at which a trade happens</li> <li>Poor financial situation of</li> </ul>	<p>Yes</p> <p>Possible options:</p> <ol style="list-style-type: none"> <li>Traders may be provided flexibility to charge additional margin to buyers based on their credit profile</li> <li>Additional margin applicable to all trades – though not a</li> </ol>	<p>Yes</p> <p>Set up mechanisms similar to Power Exchanges where Buyers/ Sellers need to maintain sufficient cash in order to mitigate default risk</p>	

<sup>1</sup> Default implies non-payment by buyer. Payment made beyond due date does not fall under default and is categorized in late payment



SN	Risk Name	Brief Description	Risk Type	Justifiably borne by Trader?	Mitigation through Margin?	Alternate Mitigation mechanisms?	Data limitations in margin quantification
				buyers resulting in difficulty to secure LC/BG from Financial Institutions	fair practice		
2	Late Payment Risk	<p>Payment delayed by a Buyer beyond the payment due date</p> <p>Delayed payment results in additional working capital requirement for Trader. The cost of carrying this working capital erodes the margin</p>	Operational	<p>Yes</p> <p>Though Payment Security Mechanisms such as Letter of Credit / Bank Guarantee can alleviate this risk, there is neither any regulation on this nor it is always possible to put these in place due to reasons mentioned above</p>	<p>Yes</p> <p>Possible options:</p> <p>1) Traders may be provided flexibility to charge additional margin to buyers based on their credit profile</p> <p>2) Additional margin applicable to all trades – though not a fair practice</p>	<p>Yes</p> <p>Set up mechanisms similar to Power Exchanges where Buyers/ Sellers need to maintain sufficient cash in order to mitigate late payment risk</p>	<p>Traders that we spoke with mentioned that they do not keep accurate records of payment due dates and payment received dates for all invoices raised. The data provided by them, therefore, is at most an approximation</p>
3	Contract Dishonour Risk	<p>Risk of violation of a contract by either a buyer or a seller</p> <p>The Trader, as an</p>	Operational	<p>Yes</p> <p>The Trader may face issues in recovering the penalty</p>	<p>Yes</p> <p>Possible options:</p>	<p>Yes</p> <p>A common platform accessible to all</p>	<p>Traders expressed their inability to provide accurate data on the cost of</p>



SN	Risk Name	Brief Description	Risk Type	Justifiably borne by Trader?	Mitigation through Margin?	Alternate Mitigation mechanisms?	Data limitations in margin quantification
		<p>intermediary, may have to pay penalty pursuant to contract dishonour to the affected party while not being able to recover the same from the counter party or incurring cost of litigation in recovering these charges</p> <p>Related point to be noted is that Traders do not get into litigation for small amounts to maintain relationships in a market comprising of a few Govt owned dominant buyers and sellers</p> <p>A case in point is the Tamil Nadu utility cancelling its power procurement contracts with a Trader post the Lok Sabha elections held in May, 2009 (based on our discussion with a Trader).</p>		amounts from the defaulting parties	<p>1) Additional margin applicable to all trades to recover penalty – though not a fair practice</p> <p>2) Additional margin applicable to all trades for a specified period to allow traders to build a sufficient corpus for litigation</p>	traders may be created where Traders share information about such dishonours. Based on this data, Traders may be allowed to charge differential margins reflecting the history of the party	litigation



SN	Risk Name	Brief Description	Risk Type	Justifiably borne by Trader?	Mitigation through Margin?	Alternate Mitigation mechanisms?	Data limitations in margin quantification
4	Regulatory Risk	In extreme cases, CERC has threatened to restrict a utility that has defaulted on its UI dues from bilateral trading of power until it settles its UI dues	Operational	Yes  Trader operates in a market regulated by the Commission and has to bear the consequences of any action/s taken by the Commissions that have a direct/ indirect impact on him	No  Such incidents may happen infrequently on a case by case basis	Standardization of contracts to include such cases in the definition of “force majeure” events	
5	Contractual language interpretation risk	Intentional interpretation of clause/s by the buyer or the seller, in a manner inconsistent with the spirit of the contract, or confusion relating to clause/s that results in unfair advantage to one party over the other	Operational	Yes  Buyers and Sellers have their own terms and conditions of contract. Trader might not always have the opportunity to get the terms and conditions in the manner that it deems fit	No  Interpretation of contractual language should leave no scope for ambiguity. Signing of contracts with standard well understood terms and conditions should be a market practice	Yes  CERC may, in consultation with stakeholders, evolve standard terms and conditions clearly specifying the spirit of each term and condition to ensure that there is no ambiguity in interpretation	



SN	Risk Name	Brief Description	Risk Type	Justifiably borne by Trader?	Mitigation through Margin?	Alternate Mitigation mechanisms?	Data limitations in margin quantification
6	Inflationary risk	<p>Inflation driven rise in trading related expense driving up the costs while revenues not increasing in the same proportion</p> <p>Given that the current cap structure does not have inflationary impact built in, the Trader is exposed to macro-economic factors that drive inflation</p>	Operational	<p>Yes</p> <p>Trader does not have any control over inflationary factors that are driven by macro-economic factors</p>	<p>Yes</p> <p>Margin cap specified, if any, should have inflationary rise built in</p>	No	
7	Compensation for low scheduling	If the seller fails to schedule less than a specified percentage (say 80%) of the contracted supply, the trader shall reimburse the open access charges beyond the delivery point to the buyer for that period	Operational	<p>No</p> <p>The Trader has to reimburse open access charges, however, it must recover the same from the Seller on whose account the scheduling was low</p>	No		
8	Price Risk	Trader getting into a situation where he has a Buy contract	Market	Yes	Yes		Difficult to estimate as traders





SN	Risk Name	Brief Description	Risk Type	Justifiably borne by Trader?	Mitigation through Margin?	Alternate Mitigation mechanisms?	Data limitations in margin quantification
		<p>but not a counter Sell contract with same volume and duration. In such case he may need to sign multiple sell contracts for selling the power.</p> <p>Such multiple Sell side contracts beginning at different start dates expose the Trader to the fluctuations in market prices of power</p>		In situations where Trader has to match Buy and Sell requirements through multiple sell contracts with different start dates, the Trader is exposed to Price risks	<p>This would require the Regulator to make reasonable assessment of market price volatility and provide the Traders a commensurate margin to insulate them from market volatility</p> <p>In practical situations, however, this may be difficult to calculate</p>		are currently signing contracts with back-to-back arrangement <sup>2</sup>
9	Volume Risk	Trader getting into a situation where he has a Buy contract but not a counter Sell contract with same volume and duration. In such case he may need to sign multiple sell contracts for selling the	Market	<p>Yes</p> <p>In situations where Trader has to match Buy and Sell requirements through multiple contracts, the Trader is exposed to Volume</p>	<p>Yes</p> <p>This would require the Regulator to make reasonable assessment of market price volatility and provide the Traders a</p>		Difficult to estimate as traders are currently signing contracts with back-to-back arrangement

<sup>2</sup> By Back-to-Back arrangement, we mean an arrangement where the trader executes contracts with both parties – Buyer/s and Seller/s at the same time such that the trader does not own the commodity (in this case, electricity) at any point in time



SN	Risk Name	Brief Description	Risk Type	Justifiably borne by Trader?	Mitigation through Margin?	Alternate Mitigation mechanisms?	Data limitations in margin quantification
		power.  It may not always be possible for the Trader to get buyers for the entire quantum of power and some power may remain unsold.		risks	commensurate margin to insulate them from market volatility  In practical situations, however, this may be difficult to calculate		

### 1.9 Other issues faced by Traders as a result of current Margin Cap structure

SN	Issue	Brief Description	Impact on Trader
1	Impact of power prices on Trader's returns and consequently on the trading margin	Businesses are required to maintain capital that allows a firm to absorb its losses, and in the worst case, allow the firm to wind down its business without loss to customers, counterparties and without disrupting the orderly functioning of Markets.  CERC, in its Concept Paper on Eligibility	CERC mandates traders to maintain capital adequacy in the form of net worth requirements that are specified from time to time.  Capital adequacy of a trader is a function of the MUs traded by him and the average price at which the trades have been executed. Capital adequacy requirements would, therefore, go up as the prices of power rise in the short term market.

SN	Issue	Brief Description	Impact on Trader
		<p>Conditions for Grant of Power Trading License, September 2003, had calculated capital adequacy requirements based on the then prevailing generation prices in the country that was in the range of Rs 2/ kWh – Rs 3/ kWh</p> <p>However, in the past few years, these rates have risen manifold and short term rates of Rs 6/ kWh – Rs 8/ kWh are now quite commonplace.</p>	<p>Since the Trader is entitled to a return on Net Worth, his absolute returns should also go up as the Net Worth requirements go up. The Trader earns his returns through the trading margin.</p> <p>Any cap on margin should, therefore, be reflective of the market prices of power and should allow Trader to recover a reasonable return on the Net Worth employed by him.</p> <p>CERC’s Concept Paper on Eligibility Conditions for Grant of Power Trading License, September 2003 has calculated Capital Employed based on a 30 day billing cycle<sup>3</sup> for Trader.</p> <p>Using the same criteria and an average power purchase rate of Rs 2.5/ kWh, the net worth requirement of a trader who trades 1000 MUs annually should be Rs 20.8 Crore. However, as the power prices rise to, say, Rs 5/ kWh, the net worth requirement rises to Rs 51.6 Crore.</p>
2	Impact of “window of support” provided by Trader in a long term PPA <sup>4</sup>	<p>In case a trader wishes to enter into a long term PPA with a Generator, the Generator’s lenders ask for payment security at Trader’s end to grant financial closure.</p> <p>In order to provide such payment security, the Trader needs to maintain a “window of support” i.e.</p>	<p>CERC’s Concept Paper on Eligibility Conditions for Grant of Power Trading License, September 2003 has calculated Capital Employed based on a 30 day billing cycle for Trader.</p> <p>However, in case of long term PPAs with generators, the capital adequacy requirement goes up from 30 days to as high as 3 to 6 months. The return on net worth in such cases would rise in a commensurate</p>

<sup>3</sup> Reference: Foot Note 12 on Page 18 of the Concept Paper on Eligibility Conditions for Grant of Power Trading License, September 2003

<sup>4</sup> PPA implies a Power Purchase Agreement signed between the Generator and the Party that commits off take of power

SN	Issue	Brief Description	Impact on Trader
		maintain an amount equivalent to the estimated payments required to be made to the generator for a specified time period. Typically, the window of support provided ranges between three to six months.	<p>manner.</p> <p>In a long term power procurement arrangement, therefore, the trader's margin requirement is higher.</p>
3	Trading vs. Broking	<p>Trader<sup>5</sup>: "a person who buys and sells in search of short-term profits"</p> <p>Broker: "an agent who negotiates contracts of purchase and sale"</p> <p>The essential difference between a Trader and a Broker, therefore, is that the Trader purchases and sells the goods (or in other words he takes market positions and therefore, bears the market risks) while the Broker acts as an agent who facilitates the meeting of buyers and sellers and charges a commission in the process (without buying or selling the goods and taking market risks)</p>	<p>Trading margin, broadly, should compensate the trader for his operational expenses, operational risks (default risk, late payment risk etc), market risks (price volatility risk, volume risk) and return on net worth.</p> <p>Market risks borne by the Trader would yield favorable (profitable) results for the trader as well as non-favorable (loss) results. The trader, to compensate for the losses, would try and recover sufficient margin in profitable trades to remain profitable at an overall level.</p> <p>With the current cap structure, the traders have no floor<sup>6</sup> on the losses that they can incur in the market, however, their profits are capped at 4 p/ kWh. As a result, the current bilateral trading market is not witnessing contracts where traders are actively taking positions in the market.</p> <p>They are focusing more on getting the buyers and sellers together and arrange for a back-to-back contract; thereby acting as Brokers rather than Traders</p>

<sup>5</sup> Source of Definitions: Merriam Webster Dictionary

<sup>6</sup> 'Floor' implies a lower limit, opposite of 'cap' that implies an upper limit

SN	Issue	Brief Description	Impact on Trader
4	Incentives for innovation	With greater flexibility in pricing products, Traders can devise products better suited to market needs	<p>As evident from some recent tenders, buyers are asking for firm power price at their state periphery. Sellers, on the other hand specify prices at their state periphery or in some cases at their bus bar.</p> <p>The issue that arises in the current context is that the “sell” and “purchase” points need to be matched as the trader cannot charge an amount over and above the margin to pay for transmission charges, losses and other related charges himself.</p> <p>With some flexibility in charging margins, Traders can get contracts signed with different “sell” and “purchase” points and manage the charges for “connecting” the “sell” and “purchase” points themselves.</p> <p>The CERC, in its Regulation on Fixation of Trading Margin, dated 23<sup>rd</sup> January, 2006, has clarified that the charges on account of scheduled energy, open access and transmission losses shall not be part of the trading margin cap. However, in case of any confusion in the above matter, the traders may seek a clarification.</p>
5	Risk on trader on account of default by one party in a Power Swap Arrangement	In a power swap arrangement, there is no monetary transaction between buyer and seller. Rather power is bartered. Such arrangements are possible when the surplus and deficits of buyers and sellers are complimentary in nature i.e at the time one is in deficit the other is in surplus and vice versa.	<p>In the event of the party not returning the predetermined quantum of power, the trader is mandated to arrange for the supply of an equal quantum.</p> <p>Even though the defaulting party is liable to pay penalty on account of default, given the price volatility of power this penalty may not be sufficient for the trader to arrange the same quantum of power from</p>



SN	Issue	Brief Description	Impact on Trader
		In such cases the two parties enter into a contractual arrangement with one party supplying to the other in return for the assurance to be returned back a predetermined quantum in a future time period. Trader gets margin on both legs of the trade.	alternate source/s.

## **1.10 Other relevant issues**

Along with the issues related to margin cap structure, Traders discussed some issues that, though not directly related to trading margin cap, are affecting their day to day operations. Key issues are listed below.

### **1.10.1 UI acting as a parallel market**

Traders mentioned that UI mechanism was evolved as a grid discipline mechanism where parties that were causing grid destabilization were forced to pay high rates depending on the UI vector and these were passed on to the parties that, through opposite transactions, assisted in grid stability.

However, over the years, given the rise in prices of short term power, UI mechanism has come to be treated as a parallel market rather than a grid discipline measure. Traders were of the view that the UI prices should be much higher than the prices of short term power to incentivize the utilities towards better demand estimation and match the demand-supply through short term transactions rather than depending on UI mechanism.

We are of the view that raising the UI prices further may not serve the desired purpose as UI prices serve as benchmarks for the short term power market. As long as a utility can get power cheaper than UI prices, it would buy the power. The prices of power in the short term, as a result, are not guided by cost economics of power production but by the cost of avoiding the alternate source i.e. UI mechanism.

In that sense, we believe that the Regulation on Unscheduled Interchange charges and related matters issued by the CERC on 30<sup>th</sup> March, 2009 is a step in the right direction as, other than higher economic penalties, it also imposes some non-economic penalties on the defaulting utilities. Any efforts by utilities towards better demand estimation and matching of demand-supply gaps through short term transactions would not only be beneficial for utilities but also for traders in the long run.

### **1.10.2 Increasing role of Power Exchanges**

In our discussions with various stakeholders, it came out that the Power Exchanges were not being viewed currently as serious competitors to bilateral traders largely due to the fact that only day-ahead power could be traded on exchanges.

However, the CERC has accorded an in-principle approval to Power Exchanges to offer term-ahead (week-ahead, month-ahead and quarter-ahead products) also. This places power exchanges in direct competition with bilateral traders. An exchange has certain advantages with the key one being that the price determination happens in a transparent manner.

However, an additional advantage that the members of the exchange enjoy over the bilateral traders is that they are neither bound by the 4 paise/ kWh margin cap nor are they mandated to disclose their transactions related information in the public domain.

Traders felt that they had to put in significant business intelligence in discovering potential buyers and sellers with matching requirements and any measure that requires them to disclose this information while not requiring other parties to do the same would put them in a disadvantageous position.

We understand that some traders are also members of Power Exchanges and transact some part of their power portfolio on the exchanges. We feel that, to ensure a level playing field, traders may not be obligated to publish the transactions that they conduct on the exchange in line with other exchange members who do not have such obligation. Similarly, given that exchanges work on price discovery principle, traders may not be obligated, like other exchange members, to charge a margin within a given cap for the transactions that they conduct on the exchange.

### 1.11 Is trading margin cap required in the current situation?

Various view points that support competitive pressures to prevail and obviate the need for margin cap were put forth before us and are listed below:

- **Multiple active traders:** In the current market, there are multiple active traders and the bilateral market is not defined by the over riding strength of one trader over the others. The largest trader has less than 50% of the market share. In such a situation, it is very difficult for any trader to exercise any influence over the buyer/ seller in recovering a high trading margin.
- **Emergence of Power Exchanges:** Power Exchanges have emerged as a platform where the power prices are discovered in a transparent manner. Any measures by traders to recover higher margin would result in higher cost to the buyer and would put the trader in a disadvantageous position vis-à-vis power exchange. Since Power Exchanges have been designed to reflect market based power prices, it would be difficult for any trader to charge a higher sum.
- **Load shedding by Buyers as the last resort:** Unlike in developed countries where utilities are under an obligation to supply uninterrupted power to consumers (except in force majeure situations), Utilities in India have been historically resorting to load shedding to match their demand-supply gaps. In case the prices charged for short term prices tend to become unreasonably high, the Utilities can always resort to load shedding rather than buying power

However, there are counter views that support the imposition of margin cap in the current environment. These are listed below:

- **Utilities' decision to purchase based on non-economic considerations:** For a firm guided by business principles, it does not make economic sense to buy a good or service at a rate higher than the rate at which it can sell the same. However, most Power Utilities in India are public owned and under constant pressure to meet social obligations. Especially in times of crisis (such as peak summer or winter) or prior to any political event (such as elections), social obligations tend to become the driving force.



Under such situations the desperation to secure power makes the utilities vulnerable to unreasonable power prices. This provides any entity, whether seller or trader, the potential to charge them higher than reasonable prices or margins. The root cause of this issue ultimately arises in the power deficit situation that India is currently in. As a result, it is argued, that any margin cap that allows the trader to recover his expenses and returns and compensates for his risks in a reasonable manner should remain in place.

- **Possibility of unethical practices:** With absolutely no control over the functioning of traders, the market may become witness to unethical practices. The cost of power can vary significantly depending on the source (Coal, Gas Hydro etc) and location (pithead). In a situation where a trader can exercise control over cheap power sources through unethical methods, it can make super normal profits as the prices of power in the market are not linked to their sources. It is, therefore, that some degree of regulatory supervision is called for.

In our view, therefore, doing away with a margin cap altogether may be a little too premature in the current context. However, the Regulator may start taking steps to ensure that:

- Regulatory intervention in the market is gradually minimized and competitive forces allowed a greater role by putting in place mechanisms that protect against abuse of power by any entity
- For the period that the margin cap is in place, the cap structure should be such that it accommodates the differing degrees of risks in various types of contracts and allows the trader to recover his expenses and returns and compensates for his risks in a reasonable manner

## **1.12 Quantification of risks undertaken by the Trader**

At the outset, we wish to highlight that due to various reasons it is difficult to quantify the risks borne by a trader in an accurate manner however, we have made attempts to quantify the same in a reasonable manner. Some of the reasons that made risk quantification difficult are as follows:

- Traders mentioned that risks such as default risk and late payment risk were higher than what would be evident from their books. They mentioned that on several occasions, factors such as past relationships are more helpful in recovering the dues rather than business practices. Going purely by business practices, there risks would be higher
- Some traders also observed that certain services such as legal services were in the nature of shared services in their parent organization. As a result, even though they have utilized these services towards dispute resolution, they do not have an accurate assessment of the exact cost that should have been borne by them had they procured these on their own
- Risks related to Market such as Price risk, Volume risk are difficult to quantify as traders are not executing any contracts that exposes them to such risks in the current environment. Almost all the contracts they are currently signing are on a back-to-back basis

The approach that we have followed to quantify the risks is as follows:

As detailed in the section on operational risks borne by the trader, we have considered that the following risks should be allowed to be recovered through trading margin or an alternate mechanism:

- Default risk
- Late payment risk
- Contract dishonor risk
- Inflationary risk

The approach taken by us to arrive at the margin for all the risk factors mentioned above is as follows:

**Default risk:** Default implies non-payment by buyer. Payment made beyond due date does not fall under default and is categorized in late payment. Every year, certain amount goes into default. Of this amount, the trader, through his business processes, is able to recover a certain percentage. For the purpose of this exercise, we have considered that margin should be provided only for that amount which could not be recovered by the trader even after following the business processes for recovery of the same.

Based on the data shared by the traders, we have calculated the amount that could not be recovered as a % of the total revenue and have used this parameter to estimate the trading margin to be provided on account of default risk.

**Late payment risk:** Late payment risk implies the risk of payment being delayed by a Buyer beyond the payment due date. Certain percentage of the invoices raised receive payment beyond the due date.

Based on the data shared by the traders, we have calculated the payment delayed as a percentage of the total sales. Based on this parameter we arrive at the additional working capital that the trader would need to maintain purely on account of payments getting delayed. Based on the prevalent working capital interest rates, we have calculated the cost of servicing this working capital. The total cost of servicing the working capital has been considered for calculating the margin on account of late payment risk.

**Contract dishonor risk:** Contract dishonor risk implies the risk of violation of a contract by either a buyer or a seller. Even though in such cases the party that has dishonored the contract must be made liable to pay for penalties imposed, if any, it has been observed that the trader has been made to pay to the suffering party but has not been able to recover the penalties from the defaulting party.

Of the contracts dishonored, we have considered only those contracts where the trader could not recover the penalty amount from the defaulting party for the purpose of determining contract dishonor risk. We have calculated the amount of penalty that the trader had to pay and could not

recover as a percentage of the total revenue. This has been used to calculate the trading margin on account of contract dishonor risk.

**Inflationary risk:** In absence of an inflation linked hike in trader’s margin cap, the trader is unable to recover the increase in expenses through an increase in revenue accruing from margins.

As per our analysis, for a trader with, say, 5000 MU of annual trade, fixed costs would represent less than 10% of the total costs. In such a scenario, it would be difficult for a trader to recover higher expenses on account of inflation through higher sales.

Margin cap could therefore be reset on periodic basis based on expense data shared by traders or be linked to inflationary indices such that the margin gets automatically recalculated at the beginning of each financial year or be linked to the prices of power purchased by the trader.

The results of quantification of operational risks are listed below. Detailed working has been presented in Annexure 1.

Types of Operational risk	Margin for (P/ kWh)
Default risk	1.04
Late Payment risk	0.57
Contract dishonor risk	0.88

### 1.13 Operations and Maintenance Expenses

Operations and Maintenance expenses (O&M) expenses can broadly be categorized into fixed and variable expenses. Fixed expenses would include:

- Annual license fees to the CERC
- Power Exchange Membership fees (if membership taken)
- Employee expenses for bare minimum operations
- Office maintenance related fixed costs

Other expenses that are variable/ semi-variable in nature include:

- Bank charges (for LC/ BG etc)
- Employee expenses

- Business development expenses (Traveling, communication, EMD etc)
- Legal expenses
- Other miscellaneous expenses (Stationery, Security, Auditors fees, CSR etc)

In order to understand how trader's expenses rise with an increase in MUs traded, we conducted a regression analysis to arrive at a linear equation for estimating a trader's O&M expense given his volume traded. For the purpose of this analysis, we took the O&M expenses of six traders for whom the data of their trading operations was separately available.

Name	O&M Expenses (P/kWh) FY08	MUs FY08
Reliance Energy Trading	2.44	912.73
JSW Power Trading	1.29	1478.58
Tata Power	2.68	1711.00
Lanco Electric	1.40	2600.00
NTPC Vidyut Vyapar Nigam	1.68	3324.00
PTC India Ltd	1.81	9889.29

The results of this analysis are shown below.

<b>O&amp;M Expense (in Rs Lakh) = 57.92 Lakh + 0.1749 (Lakh/ MU)* (MUs traded)</b>
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<i>Regression Statistics</i>	
Multiple R	0.986
<b>R Square</b>	<b>0.973</b>
Adjusted R Square	0.966
Standard Error	1.083
Observations	6

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.57924	0.65485	0.88453	0.42637
MUs FY08	0.00175	0.00015	12.01814	0.00027
	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
	-1.23892	2.39739	-1.23892	2.39739
	0.00134	0.00215	0.00134	0.00215

An R Square value of 0.97 indicates that 97% of the variance in O&M expense can be explained by the variation in MUs traded. Since the R Square value is high, we have used the equation above for the purpose of estimating O&M expenses. The O&M expenses (in Rs Cr) and the amount recoverable as trading margin for various volumes of trade is shown in the table below.

Trader Category	MUs traded	O&M Expenses (Rs Cr)	Trading Margin (p/ kWh)
III	50	0.67	13.33
III	100	0.75	7.54
II	500	1.45	2.91
I	1000	2.33	2.33
I	5000	9.32	1.86
I	10000	18.06	1.81
I	20000	35.55	1.78

### 1.14 Return on Net Worth

The two key questions that need to be answered for determining a margin that allows trader to earn an appropriate return are:

- What is the right net worth base on which a trader should be allowed to get returns?
- What is the right rate of return for the trading business considering the risk profile of this business?

With respect to the first question, the CERC, in its Concept Paper on Eligibility Conditions for Grant of Power Trading License dated September, 2003 has considered a billing cycle of 30 days for a trader. Accordingly, the net worth requirements have been calculated.

However, over the evolution of market since 2003, weekly billings have become a norm. Additionally, a week's time is allowed to the buyer to make payments. The total billing cycle period, therefore, is 15 days. Accordingly, it needs to be decided whether the trader should be asked to maintain capital adequacy for a billing cycle of 15 days or 30 days.

The return on net worth applicable to a trader is an issue that merits detailed deliberations. However, given that the returns allowed in power sector in India have varied between 14% and 16% post tax, we have conducted an analysis on the margin implications of both these rates.

The net worth requirements specified by the CERC in its Regulations on Procedure, Terms and Conditions for grant of trading licence and other related matters, dated February, 2009 are as follows:

Trader Category	From (MU)	To (MU)	Net Worth (Rs Cr)
III	0	100	5
II	101	500	25
I	501	No limit	50

Based on the billing cycle considerations and the minimum net worth requirements specified by the CERC in its Regulations, we list down the net worth requirements for various amount of power trade.

To arrive at the power purchase cost to be considered for the purpose of determining net worth, we have calculated the average power cost for some of the traders for FY 2007-08 and present the, below.

Name of the Trader	Average Power Cost in FY 08 (Rs/ kWh)
PTC India Ltd	3.85
Tata Power Trading	5.19
JSW Power Trading	5.20
NTPC Vidyut Vyapar Nigam (NVVN)	2.24
Reliance Energy Trading	4.95
Lanco Electric	2.54

Since Traders like PTC have long term power as part of their portfolio while NVVN gets NTPC stations' unrequisitioned power to trader, we have not considered their average power cost as representative. For traders, who completely depend on short term market for buying power, the average cost is closer to Rs 5/ kWh.

Accordingly, the assumption made here is that the average cost of power for the trader is Rs 5/ kWh. This is based on the most prevalent rate of power purchase by the traders.

Trader Category	MUs traded	Net Worth (Rs Cr) as per		
		CERC Regulation	15 days' billing cycle	30 days' billing cycle

III	50	5	1.04	2.08
III	100	5	2.08	4.16
II	500	25	10.42	20.84
I	1000	50	20.83	41.66
I	5000	50	104.17	208.34
I	10000	50	208.33	416.66

From the above table it is clear that while the CERC regulations specify minimum net worth requirements, the actual net worth that large traders would need to maintain to be seen as financially credible entities in the market would be much higher.

An additional point to be noted here is that when a trader signs a PPA with a generator to buy power on a long term basis, he is asked by the developer to provide a 'window of support' i.e. maintain an amount equivalent to the estimated payments required to be made to the generator for a specified time period. This time period may range between three to six months. Assuming that a trader has, say, 30% of the power in his portfolio coming from long term PPAs and the price of this power is Rs 2.50/ kWh, the capital adequacy required to provide a 'window of support' for, say, 4.5 months would be:

Trader Category	MUs traded	MUs from long term PPAs (30%)	Capital Adequacy (Rs Cr)
III	50	15	1.41
III	100	30	2.81
II	500	150	14.06
I	1000	300	28.13
I	5000	1500	140.63
I	10000	3000	281.25

The capital adequacy requirements in this case are higher than the capital adequacy requirements as per billing cycle requirements.

Let us now calculate the impact of capital adequacy requirement under various scenarios for different rates of return.

A point to be noted here is that the capital maintained by a trader is not kept idle. Rather, it is invested in interest bearing securities. The interest borne by these securities should, therefore, be included in the return allowed. The return on net worth allowed through trading margin should,

therefore, be net of the return generated through interest earned. In our calculations, we have considered that the capital would be parked in deposits that would yield an annual interest rate of 10%.

**Return on Net Worth: 14% post tax (21.1% pre tax)**

Trader Category	MUs traded	Returns to be allowed net of interest earnings (Rs Cr) as per			
		CERC Regulation	15 days' billing cycle	30 days' billing cycle	Capital Adequacy (Rs Cr)
III	50	0.55	0.12	0.23	0.16
III	100	0.55	0.23	0.46	0.31
II	500	2.77	1.15	2.31	1.56
I	1000	5.54	2.31	4.62	3.12
I	5000	5.54	11.54	23.08	15.58
I	10000	5.54	23.08	46.17	31.16

Trader Category	MUs traded	Returns to be allowed in trading margin (Paise/ kWh) as per			
		CERC Regulation	15 days' billing cycle	30 days' billing cycle	Capital Adequacy (Rs Cr)
III	50	11.08	2.30	4.61	3.12
III	100	5.54	2.30	4.61	3.11
II	500	5.54	2.31	4.62	3.12
I	1000	5.54	2.31	4.62	3.12
I	5000	1.11	2.31	4.62	3.12
I	10000	0.55	2.31	4.62	3.12

**Return on Net Worth: 16% post tax (24.1% pre tax)**

Trader Category	MUs traded	Returns to be allowed net of interest earnings (Rs Cr) as per			
		CERC Regulation	15 days' billing cycle	30 days' billing cycle	Capital Adequacy (Rs Cr)
III	50	0.70	0.15	0.29	0.20
III	100	0.70	0.29	0.59	0.40
II	500	3.52	1.47	2.93	1.98
I	1000	7.04	2.93	5.87	3.96
I	5000	7.04	14.67	29.33	19.80
I	10000	7.04	29.33	58.67	39.60



Trader Category	MUs traded	Returns to be allowed in trading margin (Paise/ kWh) as per			
		CERC Regulation	15 days' billing cycle	30 days' billing cycle	Capital Adequacy (Rs Cr)
III	50	14.08	2.93	5.86	3.97
III	100	7.04	2.93	5.86	3.96
II	500	7.04	2.93	5.87	3.96
I	1000	7.04	2.93	5.87	3.96
I	5000	1.41	2.93	5.87	3.96
I	10000	0.70	2.93	5.87	3.96

### 1.14.1 Overall Margin Requirement

The overall margin requirement to cover trader's Expenses, operational risks and return on net worth are summarized below.

#### Operational Risks

Types of Operational risk	Margin for (P/ kWh)
Default risk	1.04
Late Payment risk	0.57
Contract dishonor risk	0.88

#### Operations and Maintenance Expenses

Trader Category	MUs traded	O&M Expenses (Rs Cr)	Trading Margin (p/ kWh)
III	50	0.67	13.33
III	100	0.75	7.54
II	500	1.45	2.91

I	1000	2.33	2.33
I	5000	9.32	1.86
I	10000	18.06	1.81
I	20000	35.55	1.78

### Return on Net Worth

Note: Given that the actual billing cycle duration is 15 days as per industry accepted practices, we have accordingly calculated the margins on the basis of capital adequacy requirement for 15 days @ 16% (post tax) return on net worth.

Trader Category	MUs traded	Margin for 15 days' billing cycle capital adequacy (Paise/ kWh)
III	50	2.93
III	100	2.93
II	500	2.93
I	1000	2.93
I	5000	2.93
I	10000	2.93

### Overall Margin

Trader Category	MUs traded	Default Risk	Late Payment Risk	Contract Dishonor Risk	O&M Expenses	Return on Net Worth	Overall Margin
	MU	(All figures in Paise/ kWh)					
III	50	1.04	0.57	0.88	13.33	2.93	18.75
III	100	1.04	0.57	0.88	7.54	2.93	12.96
II	500	1.04	0.57	0.88	2.91	2.93	8.33
I	1000	1.04	0.57	0.88	2.33	2.93	7.75
I	5000	1.04	0.57	0.88	1.86	2.93	7.28

I	10000	1.04	0.57	0.88	1.81	2.93	7.23
I	20000	1.04	0.57	0.88	1.78	2.93	7.20

For a trader with a sizeable portfolio (1000 MU or more of annual trade), at an average power procurement cost of Rs 5/ kWh, the trading margin is in the range of Paise 7.75/ kWh – Paise 7.20/ kWh.

In terms of trading margin as a percentage of power purchase price (Rs 5/ kWh), this turns out to be 1.55% - 1.44%, or broadly, 1.5% of the power purchase price.

## 1.15 Market simulation to determine market risks

Before discussing the simulation in detail it is important to familiarize ourselves with the concept of Monte Carlo Simulation.

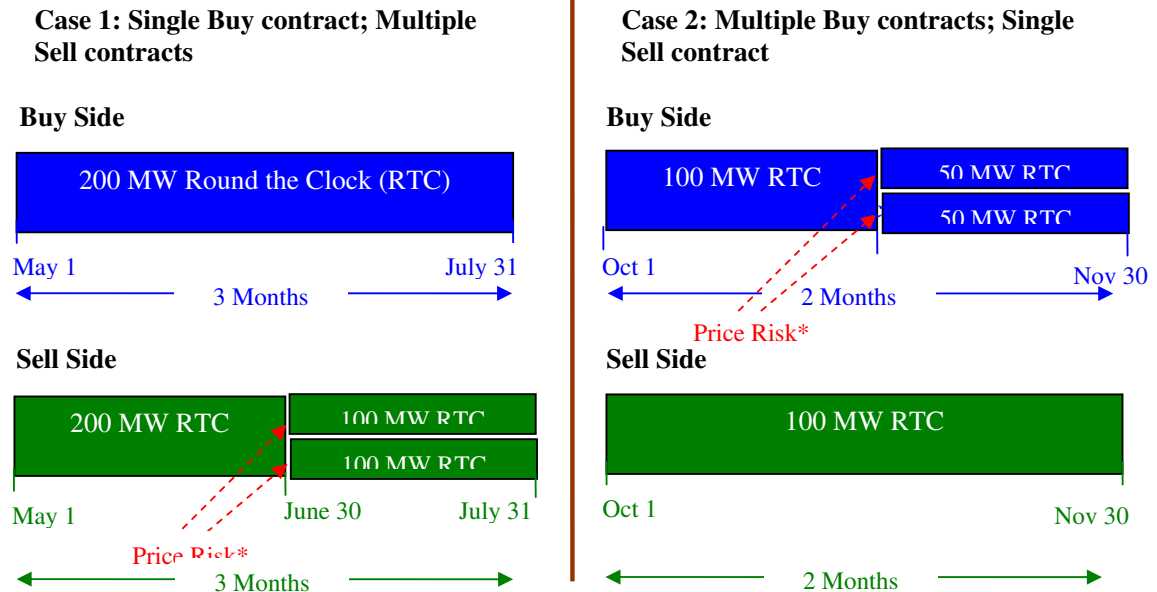
**Monte Carlo Simulation:** A problem solving technique used to approximate the probability of certain outcomes by running multiple trial runs, called simulation, using random variables. Monte Carlo model randomly selects factor values that are bound by certain predetermined conditions and runs a number of trials with the variables; the simulation creates a distribution that includes all the possible outcomes and the probability of their occurrence. This probability distribution provides a picture of risk which helps in decision making and determining VaR.

Given that the market prices are volatile, a trader who has a portfolio of power would witness different results in terms of gains/ losses that it makes on the portfolio at different points in time. In order to quantify the market risk, therefore, Monte Carlo simulation technique runs multiple simulations using variables that reflect market conditions and arrives at the outcomes i.e. gains/ losses made by the trader in each simulation. Various techniques can then be applied on the plot of gains/ losses so obtained to get an estimate of the market risk.

### Assumptions:-

- 1) All transactions are successfully conducted by the trader. Risks resulting out of unsuccessful transactions (Contract dishonor risk) have been dealt with separately under operational risks.
- 2) The data that we have used for simulating market conditions is the actual transaction data for NTPC Vidyut Vyapar Nigam Ltd (NVTN) and PTC India Ltd since these were the only data compilations that had all the data points required for simulation.
- 3) In case of non back-to-back arrangements, a trader can buy power for a given volume and duration and split this into multiple sell contracts. Alternatively, it can have one sell contract and procure power from multiple sources for this contract. This has been shown through illustrations below.
- 4) A trader might find it difficult to split a buy contract of, say 1 week, into multiple sell contracts as the notice period (duration between the date of floating the tender for sale of power and the actual start date of power flow) for such contracts is generally too low for the trader to take market risk. We have, therefore, considered that the trader will take market risk and get into non back-to-back arrangements only for buy contracts of duration more than or equal to one month.
- 5) Data on which this exercise is based is for a market where almost all agreements are back-to-back in nature. This data has been used for simulating a market with non back-to-back agreements. This may have an impact on the results. However, in the absence of accurate data, this data can be considered to be the most reasonable approximation of market data with non back-to-back agreements

### Illustrative Cases



\* As an example of Price risk, say in Case 1 the Trader bought 200 MW RTC power at Rs 4 per unit on May 1. He could find a buyer for the entire quantum (i.e. 200 MW RTC) at a desirable rate upto June 30. Post June 30, given the price volatility, the trader may or may not be able to get the desired price or even the cost price of power in the market thus exposing him to price risk

#### Fixed Inputs:-

- 1) Trader's portfolio has been considered to be a total of 1000 MUs, which is spread across multiple contracts on the buy side.
- 2) Five categories of contracts have been considered on the sell side to keep our simulation as close as possible to the actual portfolio. These categories are: Contracts with duration up to 1 day, 2-15 days, 16-28 days, 29-31 days, greater than 1 month
- 3) Given that prices of power show a decline as the duration of contract goes up (A contract for sale of power for, say, 3 months would typically have a lower price of sale than a contract for, say, 1 week) we have considered that the trader would try to buy power for longer duration and sell the same in either same duration contracts or shorter duration contracts where his chances of realizing better prices are higher. Hence it has been assumed that a trader will split power of duration greater than or equal to 1 month into contracts of smaller durations to realize more profits.

Trader's portfolio of contracts on the Sell side		
Contract Type	Sell Volume - Actual (%)	Sell Volume – Estimated for simulation (%)
1 day	0.7%	5%
2-15 days	10.5%	20%
16-28 days	14.7%	25%
29-31 days	63.2%	25%
> 1 month	10.9%	25%
<b>Total</b>	<b>100%</b>	<b>100%</b>

### Variable Input

- 1) **Cost of power to the trader** – The potential gains/ losses that the trader could make in the market would depend on his weighted average cost of power i.e. the price at which power is available to the trader for each contract weighted by the volume of power under that contract. The prices at which a trader will be able to buy power have been simulated are also based on the actual transaction data. The simulation picks up randomly from the set of prices for contracts of duration greater than or equal to more than one month.
- 2) **Selling price of Power** – The prices that the trader would be able to secure have been simulated are also based on the actual transaction data. The simulation picks up randomly from among the set of prices at which transactions had actually happened.

In a single iteration, to simulate market conditions, on the sell side and the buy side the model picks values at random based on actual transaction data and calculates profit or loss on the whole portfolio. The profit or loss value so obtained is stored. Currently, the simulation performs 3,00,000 (Three lakh) iterations to create the data points. As a result of the simulation runs, we now have 3,00,000 probabilistic values of profits or losses that would accrue to the trader for a given portfolio.

The results of this simulation are discussed below.

#### 1.15.1 Discussion of Results

The graph below shows the results for a trader whose average cost of power is Rs 6/ kWh.

**Maximum possible loss:** As seen in the graph, the maximum possible loss that the simulation results have generated (i.e. the maximum loss value that occurred in the 3,00,000 iterations) is Rs 9245 Million. Given that the portfolio size was 1000 MU this translates into a loss of Rs 9.24 per unit.

**Maximum possible gain:** Similarly, the maximum possible gain that the graph shows is Rs 8803 Million i.e. a gain of Rs 8.80 per unit.

**Percentage of the time trader makes loss:** The vertical red line in the graph below shows the point at which trader's gain/ loss on the portfolio becomes zero. On the left hand side of this line is the area where trader makes losses and on the right side is the part where trader generates profit as a result of taking positions in the market.

The orange curve indicates the cumulative frequency i.e. at any point on the curve, the value shows what % of gains/ losses of the total of 3,00,000 such values have been covered starting from the maximum loss value. For example, at the zero gain/ loss point, if we look at the value of the cumulative frequency curve, it is about 43% (as shown in the intersection of the horizontal red line with the axis). This implies that out of the 3,00,000 iterations, losses showed up in 43% of iterations, or in other words, the trader made losses about 43% of the time on his portfolio.

**Weighted average gain/ loss:** Weighted average gain/ loss indicates that on an overall basis, what was the gain/ loss that the trader made i.e. if the trader constructed a portfolio with contracts of durations of one month or more on the buy side and sold this in the market, repeated this exercise 3,00,000 times (number of iterations in the simulation), what would his overall gain/ loss be per unit of power traded.

We arrive at this by multiplying the gains/ losses with the probabilities with which they have occurred. To take an example, let us look at the table below:

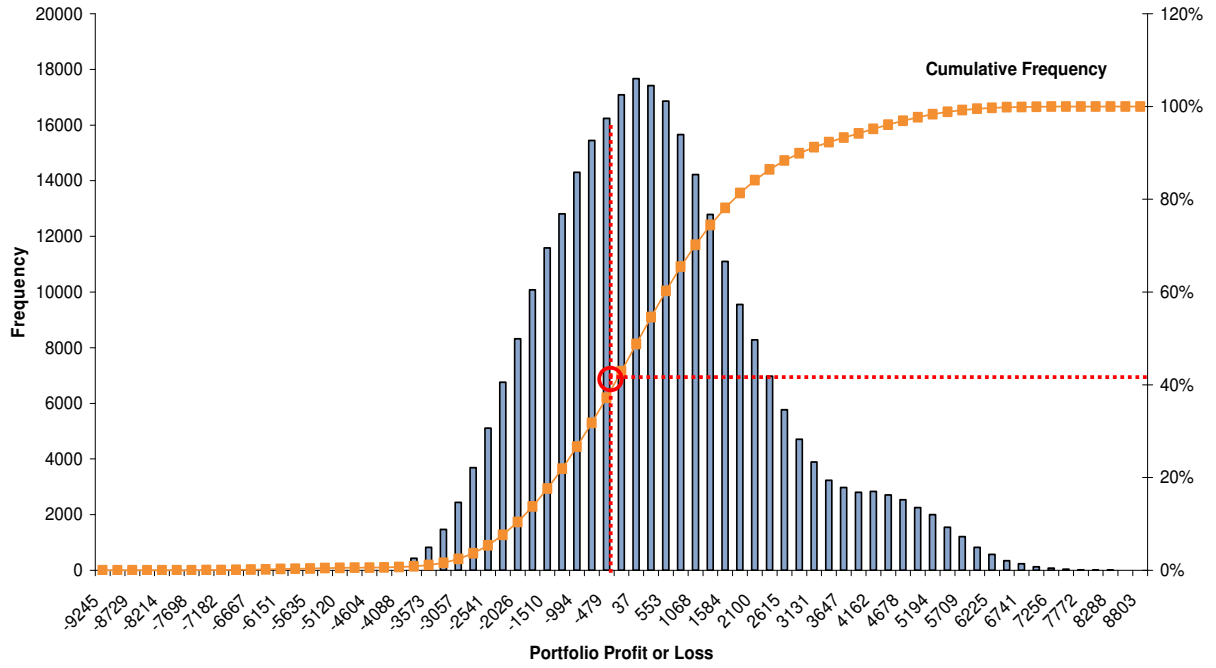
Gain/ Loss (in Rs)	Probability
- 1000	15%
- 500	25%
- 100	15%
+ 200	15%
+ 400	20%
+ 600	10%

When we multiply the gains/ losses with the probabilities with which they occur, the overall gain/ loss comes to a loss of Rs 400.

### 1.15.2 Summary of Results

Summary of results of the simulation exercise is provided below.

**Histogram**





Max Loss: Rs 9.2/ kWh	Max Gain: Rs 8.8/ kWh	% of time trader makes loss: 43%	Overall gain/ loss: Rs 0.387 / kWh
Standard Deviation: Rs 1.988/ kWh	Margin for securing trader against loss 90% of the time: Rs 2.71/ kWh	Margin for securing trader against loss 80% of the time: Rs 2.10/ kWh	Margin for securing trader against loss 70% of the time: Rs 1.70/ kWh

The simulation results above show that in the current market if the trader starts executing non back-to-back contracts for buy contracts with a duration of one month or more, he would end up making marginal gains of Rs 0.38/ kWh (Weighted average gain/ loss). However, this trader can expect to make losses 43% of the time. We have also listed out the additional margins that would need to be provided to ensure that he does not make a loss X% of the time. For example, to ensure that the trader does not make losses 70% of the time, we would need to provide an additional margin of Rs 1.70/ kWh.

**Points to be noted:**

1. A potential method for incentivizing traders to enter into non back-to-back arrangements is to allow them an additional margin that compensates them for the market risks. Since this margin would be dependent on the average cost of power as shown above, a reasonable estimate of average cost of power for the trader can be made to arrive at the additional margin. However, there would be a few limiting factors for this approach. These are mentioned below.
  - 1.1. Going forward, prices of short term power would be governed by multiple factors. Key factors are listed below:
    - 1.1.1. Continuing or increasing demand supply gap would put an upward pressure on short term prices. Thus, the actual capacity addition vis-à-vis target capacity addition would play a significant role in determining short term prices
    - 1.1.2. Merchant capacity additions that bring greater availability for short term markets would help in restricting the short term prices. Given the interest being shown by firms on setting up merchant generation capacities, prices may witness significant impact through these capacities
    - 1.1.3. Any measures taken by the CERC and State Regulators to restrain the prices of short term power may also put downward pressure on power prices
2. In light of the factors mentioned above, the dynamics of the short term power Market may vary significantly as this market matures. Margins set in today's context may become irrelevant in a short span of time and may require periodic resetting.
3. The method adopted by us for determining additional margin suffers from data limitations for which we have taken some assumptions. For the additional margin to be acceptable to traders, these assumptions would need to be agreed upon by them.

## 1.16 Recommended Structures for Trading Margin

Type of trade	Brief description	Justification for Margin cap	Remarks
Long Term Buy – Short Term Sell	Trader buys power through long term contract/s and sells through short term contract/s	<p>Buying power on a long term basis and selling on a short term basis puts significant risk on the trader.</p> <p>Besides, in a fast evolving market with high price volatility, the risk in long term contracts is even higher.</p> <p>Hence, capping the margin in such cases could put the trader under high risk.</p>	No Trading margin cap on the trader
Long Term Buy – Long Term Sell	Trader buys power through long term contract/s and sells through long term contract/s	<p>In the short term power trade market, the trader adds value by acting as a market maker and ensuring that the surplus power reaches deficit regions. In the process, the trader bears some degree of risk and is compensated for the process through a margin.</p> <p>In a long term buy – long term sell scenario, however, the value addition by a trader could be entirely different. The trader, through a PPA with the generator, could help get financial closure for a project. Alternatively, the trader, through an optimization of PPA and merchant components, maximize the realized value for generator</p>	<p>Since the value addition performed by a trader could be entirely different from the typical value addition that it does in the short term power market, we believe that the trading margin in such contracts should be left for the market forces to decide.</p> <p>However, given that Traders are in the process of accumulating long term capacities, a situation could arise where Traders corner enough chunk of the capacity to dictate margins. In such situation, a margin cap may be required.</p> <p>As a result, we feel that long term buy – long term sell contracts where the trader enters into the power sale contract on the basis of competitive bidding (Case I/ Case II), trading margin</p>

			<p>cap may not be imposed.</p> <p>However, in case of negotiated power sale contracts, same margin cap as proposed for short term buy – short term sell may apply.</p>
Short Term Buy – Short Term Sell	Trader buys power through short term contract/s and sells through short term contract/s	<p>In such cases, the trader adds value by acting as a market maker and ensuring that the surplus power reaches deficit regions.</p> <p>In a back-to-back arrangement, as discussed in the earlier sections, the trader bears only operational risks and not market risks.</p> <p>In contracts without back-to-back arrangements, the trader not only bears operational risks but also market risks</p>	<p>As discussed earlier, we are of the opinion that it might be a little premature to do away with a margin cap altogether however, the cap structure should allow the trader to recover his expenses and returns and compensates for his operational risks in a reasonable manner.</p> <p>Cap structure should also provide appropriate incentive to a trader to encourage him to take market risk. However, we are not proposing any additional margin on this account.</p>
Short Term Buy – Long Term Sell	Trader buys power through short term contract/s and sells through long term contract/s	Such contracts would be difficult for traders to operate in a feasible manner	<p>Given that short term power is costlier than long term power, it would be difficult for a trader to operate by buying in the short term market and selling in the long term market.</p> <p>We have, therefore, not considered this scenario for the margin cap structure.</p>
Trading on Power Exchange	CERC will soon introduce a regulation which will power exchanges to offer new	CERC has not imposed any cap on trading margin on trade taking place through power exchanges. Hence it becomes necessary that traders are given same liberty as exchange members while trading though	We are of the opinion that the traders trading through Power Exchanges should be treated at par with other exchange members – no margin cap should be imposed on the trade taking

	products such as week-ahead, month-ahead, quarter ahead	power exchanges.	place through Power Exchange.
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### 1.16.1 Recommendations on Margin Cap

Type of Contract	Definition	Margin cap proposed?	Margin cap structure
Long Term Buy – Short Term Sell	Long Term Buy shall be defined as a buying arrangement where the trader has entered into a power purchase agreement with the Seller where the duration of this agreement is one year or more	No Margin cap	N/A
Long Term Buy – Long Term Sell	Long Term Buy shall be defined as a buying arrangement where the trader has entered into a power purchase agreement with the Seller where the duration of this agreement is one year or more  Similarly, Long Term Sell shall be defined as a selling arrangement where the trader has entered into a power sale agreement with a duration of one year or more	No Margin cap in cases of long term power sale through competitive bidding routes  Margin cap as proposed for short term buy – short term sell transactions in cases of negotiated long term power sale agreements	If the long term power has been procured through competitive bidding then no margin cap should be imposed on such contracts else trading margin cap will be applicable as discussed below
Short Term Buy –	Short Term Buy/ Short Term Sell shall be	Margin cap	Trading Margin Cap structure has been discussed below in the section

Short Term Sell	defined as contracts with buy/ sell durations respectively of less than a year	proposed	on Short Term Buy – Short Term Sell Trading Margin Cap Structure
Trading through Power Exchanges	Any trade of power taking place on Power Exchange	No Margin Cap for all trades	N/A

### 1.17 Short Term Buy – Short Term Sell Trading Margin Cap Structure

From Trading Margin requirement calculations (discussed in detail in previous sections) it can be observed that Margin requirement of small traders, category III and category II, is significantly more than that of large traders, category I, as O&M expenses, such as license fee, employee expenses, etc., are largely independent of volume of trade. Hence to ensure the viability of small traders, higher Trading Margin has been proposed for them. However, they are free to charge less than the permissible Trading Margin to remain competitive.

#### Trading Margin Structure for Power Prices greater than Rs. 3/ kWh

Trader Category (A)	MUs traded (min) (B)	MUs traded (max) (C)	Trading Margin (D)	Trading Margin Cap (E)
	MU	MU	% of Power Purchase Price	Paisa/ kWh
III	0	100	4	19
II	101	500	2.5	13
I	501	-	1.5	8.5

For power purchase prices greater than Rs.3/kWh, Trading Margin will be a function of price of power as shown in column D above. However, the margin shall be capped at the levels (in Paisa/ kWh) as shown in column E.

A trader would be free to charge a margin lower than what can be deduced from the proposed margin structure. To illustrate, a category II trader will earn 13 Paisa/ kWh for trading power at Rs. 6 per unit whereas he will earn 12.5 Paisa/ kWh for trading power at Rs. 5 per unit.

#### Trading Margin Structure for Power Prices less than Rs. 3

Trader Category	MUs traded (min)	MUs traded (max)	Trading Margin Cap
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	MU	MU	Paisa/ kWh
III	0	100	13
II	101	500	8.5
I	501	-	4

For power prices less than Rs. 3 we are proposing a flat trading margin cap. However a trader is free to provide it's service at a lower margin to remain competitive in the business. It is not possible to keep Trading Margin proportionate to power prices as in this range the proportionality factor will have to be kept too high to ensure appropriate profit.

### 1.18 Recommendations on Short Term Buy – Short Term Sell Trading Margin Cap Structure based on additional data received from Traders

Post submission of this report to the Commission, a few other Traders also shared risk related historical data with the Commission. These Traders are Tata Power Trading Company, JSW Power Trading Company Limited, Adani Power Trading, LANCO Electric Utility Ltd's Power Trading Arm and Reliance Energy Trading Ltd.

Also, the returns earned by Traders in FY 2007-08 on the deposits made in interest bearing securities averages to around 10%. We had considered this return for calculating the Return on Net Worth allowed to be recovered through trading margin. However, we have fine tuned the returns to account for the movements in interest rate cycles. We have taken the average interest rate on bank deposits of 365 days for the past four years. This interest rate is around 8.25%. Hence we have now used 8.25% rate as the basis for calculating the Return on Net Worth that should be allowed to be recovered through trading margin.

The result of this exercise is shown below.

Trading Margin Calculations							
Margin on account of:		PTC	Tata Power Trading	JSW	Adani Enterp rises	Lanco	RETL
For Power Price Rs 5 per kWh							
Reasonable Operations and Maintenance Expenses	(P/ kWh)	1.86	1.86	1.86	1.86	1.86	1.86
Default risk	(P/ kWh)	0.00	0.49	0.00	0.00	1.19	0.18
Late Payment Risk	(P/ kWh)	0.57	0.10	0.00	0.00	0.35	0.12
Contract Dishonour Risk	(P/ kWh)	0.88	0.90	0.00	0.00	0.63	0.00
Other Risks	(P/ kWh)						
Return on Net Worth	(P/ kWh)	3.30	3.30	3.30	3.30	3.30	3.30
<b>Total Margin</b>	<b>(P/ kWh)</b>	<b>6.61</b>	<b>6.66</b>	<b>5.17</b>	<b>5.17</b>	<b>7.33</b>	<b>5.47</b>
Average of Power Traded in the last two years	MU	9720	1458	1223	1583	1671	912
<b>Weighted Average Margin</b>	<b>(P/kWh)</b>	<b>6.75</b>					

Accordingly, we are revising our suggested Short Term Buy – Short Term Sell Trading Margin Cap Structure as follows:

**Trading Margin Structure for Power Prices greater than Rs. 3/ kWh**

Trader Category (A)	MUs traded (min) (B)	MUs traded (max) (C)	Trading Margin (D)	Trading Margin Cap (E)
	MU	MU	% of Power Purchase Price	Paisa/ kWh
III	0	100	4	17.5
II	101	500	2.5	11.5
I	501	-	1.5	7

For power purchase prices greater than Rs.3/kWh, Trading Margin will be a function of price of power as shown in column D above. However, the margin shall be capped at the levels (in Paisa/ kWh) as shown in column E.

**Trading Margin Structure for Power Prices less than Rs. 3**

Trader Category	MUs traded (min)	MUs traded (max)	Trading Margin Cap
	MU	MU	Paisa/ kWh
III	0	100	11.5
II	101	500	7
I	501	-	4

For power prices less than Rs. 3 we are proposing a flat trading margin cap. However a trader is free to provide it's service at a lower margin to remain competitive in the business.



## **B Annexure 2: Key issues mentioned by Traders in Discussions held**

### **Minutes of meeting – Power Trading Corporation**

Meeting took place at Meeting Room in PTC

Present	Mr. Rakesh Kumar (Exec. Vice President) Mr. Sanjeev Mehra (Exec. Vice President)
In attendance	Arun Kumar  Peeyush Mohit  Sidharth Sarawgi

#### **Introduction**

- KPMG explained to PTC that we are currently reviewing the need for cap on power trading margins, thus PTC's views are sought in understanding the market dynamics and various kinds of risk involved in the contracts executed by the traders.

#### **Trading Price and Margin**

- PTC thinks that the trading margin of 4 paisa per unit suits long term contracts more, where the price of power traded is low and the contracts are less risky. In these contracts 4 paisa roughly comes out to be 2 % to 3 % of the contract value as the power prices, on an average, ranges between Rs. 2 to Rs. 3 per unit. On the other hand short term power trading has more risk, if a trader is unable to sell 100MW power for one month it can get wiped off totally.
- PTC feels that trading margin is insufficient for traders to make healthy profits and boost their working capital and credit worthiness. These are prime reasons why traders are unable to explore international markets.
- PTC thinks that price of power is an instrument for power allocation. It believes that fixing prices in the short term market will be detrimental as then the allocation might be based on the political will instead of the need and paying capacity of the buyer. Also, PTC asserts that it is just 2-3% of the overall power generated which gets traded in the market, rest has already been regulated. Hence the market forces should be given a free hand in discovering the price of the premium power. In a free market, PTC believes, there will be more traders, more competition and more supply of power which will bring the power prices down.

- PTC believes that there is a strong correlation between UI charges and Power prices in the short term market. If UI charges come out to be lesser than the price of power available in the short term market then the buyers will be more inclined towards overdrawing from the grid then buying power on the short term basis. Apart from bringing average spot prices down, any decrease in UI charges increases the risks on the long term contracts as traders will not be able to sell power in the market at a predetermined or expected price and can run into the risk of incurring losses on the contract. Hence, PTC believes that UI charges should be set very high than the average spot prices, to promote grid discipline and to foster the growth of short term power market.

## Trading Regulations

- PTC commented on that the clause which requires the traders to maintain a minimum net worth according to the number of units traded by saying that it keeps a trader A, who trades 20000 MW of power at par with a trader B, who trades 1000 MW of power. This, according to PTC, is unjust as the level of risks the two player will be exposed to will be very different.
- PTC told KPMG that before the introduction of Regulations, PTC was active in offering innovative products which were more suitable to meet the market demand. It cited a case of pooling of power where PTC bought power for the whole day but sold it in two slots i.e. the morning slot and the evening slot. Power in the evening slot was sold for a loss but PTC made profits in the morning slot, good enough to compensate for the loss. But with limited profit margin, PTC is unable to take positions in the market and cannot offer innovative products.
- On market manipulation, PTC holds the view that CERC can empower market monitoring cell more and ensure transparent market activities.

## Sample Contracts

- Post Elections Tamil Nadu has terminated all its power purchase contracts. Although the Government will be liable to pay penalties but there might be unjustified delays.
- Power from Bhutan – Government of India assigned PTC the task of trading Bhutanese Power in Indian market and it was then decided that PTC will get 5 paise per unit as service charges. Further, in the contract, PTC provided a discount of 50% on the service charges for timely payment. However CERC raised concern on the contract that according to the regulations PTC should not charge 5 paise per unit to the seller. The matter is still in litigation. PTC's view is that Regulator should have a holistic view on the contracts rather than treating them on a piece meal basis.
- Power Swap between GRIDCO and NDPL - PTC has entered into a power swap agreement with GRIDCO and NDPL. Here PTC will be the counterparty for both of them and all contractual liability lies with it. Under the arrangement NDPL will supply 150 MW of Power to GRIDCO from Feb 25<sup>th</sup>, 2009 to March 31<sup>st</sup>, 2009 and GRIDCO will

return this much power along with extra 5% from September 1<sup>st</sup>, 2009 to October 15<sup>th</sup>, 2009. PTC is charging trading margin to both the parties. In case one of the parties fails to supply power then money will have to be paid at a predetermined price for the amount of units defaulted in both the transactions. Here, apart from other risks, PTC will have to fulfill the contract even when one of the parties gets debarred from trading power due to non compliance to the regulations.

- Tolling Arrangements – Under these are the arrangements, PTC has started behaving as a generator. Here PTC provides coal to a generator and gets power in return, on payment of a mutually agreed fee. This power is completely owned by PTC and can be traded by it in the market.
- Case I bidding- As now Government has made competitive mandatory for all long term power contracts, it has become difficult for PTC to compete with generators on price points. This has restricted PTC to get into long term power supply contracts.

### **Risk and Expenses associated with contracts**

- PTC provided insight on various risk associated in these contract, which are as follows:-
  - Price Volatility – Price of power in short term market is a function of demand and is highly sensitive as the volume of electricity traded in the market is just 2-3% of the total power produced.
  - Default Risk – PTC told that till now it has not observed any case of default but most of the buyers delay on payments and PTC has not been able to either charge interest on the amount or impose penalties on them. PTC is not able to extract rebate which was originally offered for timely payment. To safeguard itself from default risk PTC takes Letter of Credit from the sellers and prefers to keep a clause in the contract that PTC reserves the right to divert power in case of defaults in payment. Although, according to PTC, it is practically difficult to divert power.
  - Regulatory Risk - Trading regulations are still undergoing a lot of change and might take a lot more time to stabilize. In these circumstances as small change in regulation in future could greatly enhance the risk in the existing contracts. PTC sighted an example, according to a new regulation those sellers and buyers who will default on UI charges will be debarred from trading power. So if an entity, currently in contract with PTC, is suddenly debarred from trading it will become difficult for PTC to meet its obligations.
  - Litigation Risk – Contracts are still not standardized in current market regime and clauses are some times open to interpretations. Multiple interpretations may land up traders in legal hassles and there have been cases where the trading margin was less than the amount PTC ended paying as penalty. Also the cost of arbitrage is high enough to pass.

- Risks due to unforeseen circumstances – Unforeseen circumstance could be delay in completion of generation projects, unavailability of transmission lines at the time of execution of contract etc. All these events may run PTC in the risk of incurring heavy losses.
- PTC told KPMG that expenses to be incurred in the trading contracts are on a rise whereas the trading margin has been kept constant for last two years. Following are some of important cost elements:-
- Cost of providing performance guarantee, EMD, Letter of Credit – PTC explained that most of the contracts these days require submission of LC, EMD etc and the cost of these instruments increase the working capital required for the business.
- Open Access charges - PTC told KPMG that in a long term contract general conditions on open access charges state that if PTC is able to provide at least 80% of the power then the OA charges will be paid on Pro rata basis otherwise if the availability provided is less than 70% then the OA charges will not be full refunded. Hence PTC thinks that the existing trading margin does not cover the actual charges which a trader might have to bear according to the prevalent contracts. Also Power Grid demands for 6 months transmission charges as a guarantee since PTC is not a regular player. PTC thinks that this is also one of the costs which is rendering current trading margin insufficient for sustainable operations.

## Minutes of meeting – Reliance Energy Trading Limited

Meeting took place at Meeting Room in RETL

Present	Mr. Mahendra Kumar (CEO)
In attendance	Arun Kumar
	Peeyush Mohit
	Sidharth Sarawgi

### Introduction

- 1 KPMG explained to RETL that we are currently reviewing the need for cap on power trading margins, thus RETL's views are sought in understanding the market dynamics and various kinds of risk involved in the contracts executed by the traders.
- 2 Mr. Mahendra shared his knowledge of how PTC started its operations. He told us that when power trading started PTC was the first and only trader in the market. Then PTC had the responsibility to build the market and to develop trust in buyers and sellers so that they start trading through PTC in the market. Initially PTC used to charge 5% trading margin for a standard contract and in case of any variation from standard contract, as requested by buyers or seller, PTC used to charge a higher margin depending on the increase in costs and risks. Mr. Mahendra also told us that there were instances of traders charging unfair margins. In these cases such traders used to approach north eastern states and offered them incentives for agreeing to higher margins.

### Trading Price and Margin

- RETL believes that to develop trading market it is necessary to do away with trading margin cap. RETL further nullified the idea of market manipulation, by traders, by saying that today buyers and sellers have various ways to transact power. They are:-
  - Bilateral Trading Agreements
  - UI mechanism which act as a virtual market
  - Power Exchange
  - Upto 15 active traders
- RETL said that with so much competition traders cannot charge high margins, otherwise it will become difficult for them to retain buyers and sellers.
- Trading Volume

RETL - Largest Transaction – 55 MW for 6 months

- Smallest Transaction – 5 MW for a week

PTC - Largest Transaction – 800 MW for 25 years

- Smallest Transaction – 50 MW for 6 hrs

In Global market short term power trade is 25% - 30% of the total trade whereas in America it ranges from 5% to 25%.

## Trading Regulations

- RETL told KPMG that though CERC has mandated that no power flow should happen before submission of bank guarantee or letter of credit, still in 95% of the cases, traders have to supply power before completion of these formalities. Buyers are mostly state utilities and they don't have enough bank limits to provide bank guarantees or letter of credits .
- On reforms Mr. Mahendra commented that there first reaction on Andhra Pradesh's imposition of restrictions on free power policy was that the reforms have suffered a setback of atleast 20 years. Mr. Mahendra also told KPMG that Maharashtra's Governement gives permission to set up a power plant in Maharashtra only if the generator agrees to sell its entire power to Maharashtra and this, Mr. Mahendra feels is against free power policy.
- Transmission Prices – RETL told KPMG that although economies of setting up a power plant should be seen from landed cost of power, including transmission charges, perspective still current transmission charges are location insensitive e.g a generator at Jharkhand supplying to Delhi will have to pay same transmission charges as a generator at Badarpur will have to.
- On international market, RETL said that there risk is allowed to be taken to only those who can bear it.
- On CERC's paper on Trading margin cap, RETL commented that all the costs and risks have not been factored in by CERC

## Sample Contracts

### Case study I-

Andhra Pradesh's utility informed RETL of power requirement and requested them to start supply of power as soon as possible without completion of other formalities. RETL provided power as requested. Later on the same day the utility insisted on withdrawl of power supply. This created a lot of trouble for RETL as it had already procured power from generators. Also the utility refused to pay for the power already consumed by it on account that no formal

contract was signed between the two parties. RETL also mentioned that these risks are relatively low for companies like PTC and NVVN

#### Case Study II

In one of the transaction, Karnataka, as a seller, stalled power supply citing Force Majeure as the reason and refused to pay penalties and open access charges to buyer, whereas according to SLDC it was not a Force Majeure event. The matter had to be taken to court and the decision is still pending on that matter.

### **Risk and Expenses associated with contracts**

RETL cited following kinds of risks :-

- SEBs function in an unprofessional manner. As a buyer they mostly make delayed payments and frequently dishonor contracts but as a seller they are strict on receiving timely payments.
- It frequently happens that contractual terms and conditions are interpreted differently by the parties. Hence they may have to take legal help to sort out matters. Legal cases may stretch for a long durations and add additional burden of legal expenses over traders.
- Power Accounting – By a standard contract, quantum of energy flow shown by seller's SLDC/RLDC is to be considered for payment but sometimes buyers refuse to agree when there is a sizeable difference in the quantum of energy showed by buyer's and seller's SLDC/RLDC. Difference could arise due to difference in rounding off methodology etc.

RETL believes that risks should be equally divided between a trader and a seller. For e.g if in a particular transaction power is flowing from West Bengal to Punjab then the power will take the following route – West Bengal - ER - ER NR interlink– NR – Punjab. Here, RETL believes that risk of congestion is there at all stages, so the seller should bear the risk for say first two regions and the trader can take risk of remaining regions.

RETL told KPMG about various costs involved in the trading business

- Cost of Participating in the contract – RETL mentioned that many times tender needs to be bought, visits have to be made to meet the concerned officials, EMD has to be provided etc.
- Cost of maintaining net worth and working capital
- Cost of Marketing – RETL stated that the competition has increased in the market and a lot of efforts are required to be made by a trader to position itself in the market.

### **Power Trading Market**

- On current market dynamics, RETL commented that the market is suffocating and it is only the sellers who are enjoying all profits. RETL argued that not all generators

are taking same risk as some generators have been assigned coal blocks or coal linkages whereas other have to buy coal from market. Hence, according to RETL, some restrictions should be posed on former type of generators so that the profits made by them are commensurate with the risk they are taking. RETL also added that right now sellers are dictating terms in the market and transferring all risks and costs to buyers. Also, RETL raised a concern about current market practice in which sellers are inviting bids for selling power and here it becomes difficult for RETL to bid as they can do only back to back positions in the market.

### **Risk Quantification**

For the purpose of quantification of risk, Mr. Mahendra provided following estimates :-

- Risk of open access charges can be taken into account for 15 days.
- A delay of 7 to 10 days can be considered for 10% of the cases in main energy charges

Mr. Mahendra advised that instead of considering costs to be uniform for all contracts, cost should be split into a fixed component and a variable component. Variable component, which will include cost of financing etc., should depend on size of the contract whereas fixed component will include operating and marketing cost which will be grossly same for most of the contracts.



## Minutes of meeting – Power Trading Corporation

Meeting took place at Meeting Room in PTC

Present	Mr. Shashi (Managing Director) Mr. Rakesh (Exec. Vice President) Mr. Sanjeev (Exec. Vice President)
In attendance	Arun Kumar  Peeyush Mohit  Sidharth Sarawgi

### Introduction

- KPMG explained to PTC that we are currently reviewing the need for cap on power trading margins, thus PTC's views are sought in understanding the market dynamics and various kinds of risk involved in the contracts executed by the traders.

### Trading Price and Margin

- On Trading Margin PTC commented that fixation of margin by CERC has induced unethical market practices in the market and has inhibited traders to innovate new financial products. PTC believes that the ability of a trader to tap surplus power does not depend on professional capacity of the trader anymore and that a trader's role has been reduced to mix and match activities.
- PTC also said that now the market (buyer and sellers) knows that traders can work at 4 Paisa margin so it will be difficult for traders to fetch more money in no cap regime.

### Power Trading Market

- PTC said that states are hindering development of power market by refusing to provide open access.
- PTC said that in international power market 60% of the power is traded in long term basis whereas 40% on short term basis and out of 40% short term trade 10%-15% is traded on daily basis.
- PTC thinks that SLDC should play the role of the market developers instead of functioning as just another government firm.
- PTC commented on unbundling of SEBs by saying that it is creating conflict in the states as the generator is more focused on smooth operations whereas the trader utility is keener on realizing profit in volatile markets and ask generators to align their generation with

market demand, which generators decline. PTC also said that the utilities in general have become conservative.

- On exchange, PTC commented that it is not a firm buyer.
- PTC believes that low UI rates are hindering market development. Internationally there is not concept of UI, instead it is called as balancing power and the cost of this power is very high. In case where supply exceeds demand they ask the generator of the costliest power to shut down.
- PTC believes that market abuse can be checked with tight monitoring. CERC can ask traders to show cause in cases where trader is making unreasonable profits.
- On market manipulation by traders in the absence of trading margin, PTC said that utilities always have the option of not to buy power and stop power supply in deficit conditions. This might function as an automatic cap on market prices. Internationally, in free markets, the cap is kept at 150 to 200 times the maximum price in the current market
- PTC believes that the absence developed power trading market is hampering the development of renewable energy in the country. For example, no state is able to develop Wind energy, a relatively unreliable source of energy, primarily because of underdeveloped trading market. As is wind unreliable so is wind energy. So a State, which is expanding and banking on wind energy, will have to keep an operational reserve (power accessible at a short notice) for the times when there is no wind and in developed power markets, power would be both accessible and relatively cheaper than undeveloped markets. Hence states can focus more on power from renewable sources only if they have easy access to cheap power.

## Sample Contracts

- PTC mentioned that before capping of trading margin, some traders made huge profits by buying power from NE states and selling it in the market.
- PTC cited a case where they made a contract with a seller to trade power for one year. There they had to provide assurance of minimum price of 7 Rs. The contract was from September last year to August of the current year. Pre elections PTC somehow managed but post elections there has been a phenomenal drop in prices and PTC is struggling to recover losses on this contract.
- In some cases sellers are not happy with low margins so they insist traders to review contracts quarterly and forge new and profitable contracts. Here all the upside will go to the seller but any downside will have to be borne by the trader. Such sellers increase the risk of the traders. PTC cited some examples of short term trading where sellers in hesitantly moved to those traders who they thought would realize them high profits. This results in higher pressure on traders

- PTC commented that transmission infrastructure in India is inadequate. So there are chances that a trader may not be able to supply power to the buyer if the lines break down.

### **Risk and Expenses associated with contracts**

- PTC told KPMG that for the months of June July and August there are only 2-3 buyers e.g. Punjab and Haryana. So the buyers are few and on top of it there is a risk that the corridor may get blocked due to infrastructural limitations. These risks will have to be borne by no other than traders.
- On difference in interpretation of contract, PTC cited one example where a seller stopped supplying power and refused to pay penalty on grounds that according to the contract he was supposed to provide only surplus power and argued that during that duration when power was not supplied he was not surplus. The decision on this matter is pending in court.
- Some state regulators have instructed state utilities to buy power only for a limited period say six months. This limits the number of trading options of a trader can have and increases its risk.
- Costs - PTC told KPMG that 4 Paisa is not sufficient to cover all the expenses. As a professional trader they have to create infrastructure for proper monitoring of the market, invest in technology, do appropriate marketing and bear costs of bidding in a tender.

### **Long Term Contract**

- Long Term Contracts extend to 25 years. PTC said that 4 paisa margin is insufficient to take a risk of 25 years and as PTC has to pass on full profit to the seller, it cannot create a reserve to save itself from the contingencies. PTC believes that margin in long term contracts should either be linked to price and volume of the contract or kept free. Another way could be fixing margin to 3% of base tariff and allowing to PTC have a share in profits. Also in such contracts many times buyer asks not to schedule power for a small duration and is ready to pay fixed charges but this surplus power needs to be sold in the market to either recover money or make profits. this only a trader can do. PTC also told KPMG that changes in regulations over a long duration is inevitable as currently the market has not matured and regulations are required to be revisited timely. In such a scenario, a trader needs greater margin to be prepared for unforeseen risks e.g. increase in transmission costs etc. PTC also shared with KPMG that in a typical contract PTC has to provide assurance of Off-take of 80% to 90% of the availability estimated by the generator.

### **Medium Term Contracts**

- Duration is for 10-12 years. In these contracts, sellers demand a minimum tariff and insist traders to sell major portion short term market to realize more profits e.g. balihar contract is for 12 years for 225 MW of power with J&k Genco, here 75 MW is to be kept as merchant power and rest can be traded on long term basis. Minimum tariff in this contract has been kept at 3.6 rupees. Also for the month of Nov, Dec, Jan and Feb PTC can sell power only to utilities in J&K.

## Estimates for financial model

- Window of support – 3-4 months
- Working capital requirement has gone up considerably in last 2-3 years.
- PTC suggested that KPMG should try to benchmark cost of short term power trading contracts by collecting data from few traders.

## Minutes of meeting – NTPC Vidyut Vitran Nigam (NVVN)

Meeting took place at a Meeting Room in NVVN

Present	Mr. A K Maggu (Addl. General Manager) Mr. K.S. Bandyopadhyay
In attendance	Arun Kumar  Peeyush Mohit  Sidharth Sarawgi

## Introduction

- KPMG explained to NVVN that we are currently reviewing the need for cap on power trading margins, thus NVVN's views are sought in understanding the market dynamics and various kinds of risk involved in the contracts executed by the traders.
- NVVN told KPMG that it trades all available power in India. URS power from NTPC plants was only 10% of the portfolio as according to the last year statistics. Rest 90% of the power comes from state utilities.
  - Coal URS is the cheapest power. It becomes available when there is failure in transmission line or power remains un requisitioned due to monsoon etc. It has the smallest volume of all URS powers.
  - Liquid fuel URS – has the largest volume and is most expensive.

- NVVN signs only back to back contracts.
- NVVN has not observed any defaults. Although late payments have been there in some cases.
- NVVN started swapping 2 years ago and in a swapping arrangement it gets margin from both the parties. NVVN told KPMG that it does not participate in case 2 bidding.
- NVVN told KPMG that buyers usually pay after 7-10 days of raising the bill.

### **Trading Price and Margin**

- NVVN thinks that return should be linked to Net Worth and minimum return should be assured to a trader. At fixed margin, risk increases with the increase in price of power.
- NVVN believes that trading margin should have some relationship with the risk. It can be comprise of two components fixed and variable. According to NVVN trading margin should be done away for long term contracts. NVVN told KPMG that current regulations are not clear about trading margin. NVVN said that current regulations don't tell if trading margin should be on every unit scheduled or volume of the contract.
- NVVN told KPMG that as a policy it does not try to raise price in the market.
- NVVN told KPMG that no entity is interested in bringing down price of power. All are fighting for the same pie which results in the increase of prices.
- NVVN thinks that trading margin is pretty low and they effectively get 1.5 paisa per unit after deduction of rebates and taxes.
- NVVN believes that no cap should be imposed on traders as exchanges, which are functioning more or less like traders, have come up on which are more or less unregulated.
- NVVN trades power from NTPC plants at CERC defined rates and charge trading margin over and above it. URS power mostly goes to northern region. NTPC plants benefit from selling power as they can run on higher PLF.

### **UI Charges**

- In NVVN's opinion UI plays role in determination of prices in short term power market. Say if UI power is available for Rs 7 per unit then a generator may sell its firm power at a rate of 6.5 per unit. According to NVVN UI has become a commercial mechanism and behaves like a spot market.

## Trading Regulations

- NVVN suggested that CERC can come up with standard contract with fixed margins for traders. Such contract should prevent traders from liability. If a need arises to deviate from standard contract then CERC can monitor such contracts.
- When a buyer defaults on payments it is charged with 2% late payment penalty. NVVN told KPMG that it is not clear whether this amount can be taken over and above trading margin

## Power Trading Market

- NVVN told KPMG that though generation has increased by 100 billion units but the increase in trading volume is not commensurate.
- According to NVVN utilities can directly sell their power but traders bring their experience and market information with them and help utilities in getting better deals.
- NVVN thinks that traders can play an important role by bringing renewable power and power from captive plants to the main stream. At the time of recession many steel plants survived by selling their captive power in the market.
- NVVN thinks that traders will only be able to bring innovative products when they get flexibility of pricing the power. Then only they will be able to square loss on one transaction with profit on another.
- NVVN told KPMG that it has not been able provide blended power (fulfilling requirement through different sources at different prices) to buyers because such transactions are difficult to record.
- NVVN thinks that power insurance products have not been able to come in the market because of tight regulations. Power insurance means assuring power supply for a premium.
- NVVN thinks that current transmission infrastructure is inadequate as only 2000 MW power can come to NR.
- NVVN thinks that it is inappropriate to fine traders for open access booking as a trader is not a grid connected entity.