

**CUTS Institute for Regulation & Competition, New Delhi &  
Rachna Management Consultants and Studies (P) Ltd. Mumbai**  
3 - Day Workshop on  
**"The Tariff Fixation Process in the Electricity Sector"**  
**(Generation, Transmission, Distribution & Renewables)**  
**December 18-20, 2014**

### *Background*

Electricity Regulatory Commissions are mandated to promote competition, efficiency and economy in the power sector and to regulate tariffs of power generation, transmission and distribution with a view to protect the interest of the consumers and other stakeholders. Discharge of such a complex role demands a high degree of technical, legal, economic, financial and general management skills. Collaborative learning involving officials of both regulatory commissions and utilities is the method to achieve this. With this background, this workshop aimed at educating and familiarizing the technical and non-technical personnel, in the utilities and at the regulatory commissions, engaged in the process of Tariff fixation, and dealing with tariff regulations, provisions, requirements and stipulations.

### *Proceedings*

Senior Industry and consulting professionals along with power sector regulatory experts acted as facilitators for the three day workshop and provided an in depth understanding and analysis of the power sector scenario. The programme began with a welcome address by Mr Arun Talwar, Chief Operating Officer, CIRC who expressed his gratitude for everyone taking out time to be a part of this intellectual exercise. Shri Rakesh Nath, technical member APTEL inaugurated the workshop. He professed that regulators play an important role in generation and development of power sector and that in current scenario 'Performance of regulators can be gauged by the performance of the sector which in turn depends on performance of Government'. For country like India, "to come out of vicious cycle of poverty, it is necessary to have sustained growth of 8 to 9 percent every year in GDP; which in turn requires a growth of about 10 percent augmentation of Electricity generation every year", said V.P.Raja, former chairman of Maharashtra Electricity Regulatory Commission (MERC), in his message sent for the workshop. The workshop was spread over a period of three days, for a better understanding and detailed discussions on developments and loopholes of tariff determination in electricity sector, case studies and implications. There was a lively panel discussion accompanied by concluding remarks and valedictory address by Smt Neerja Mathur, Chairperson Central Electricity Authority, and concluding remarks by Shri V.J. Talwar, Former Member, APTEL, New Delhi



### ***Session 1: Introduction by Shri P.D. Sudhakar, Chairman, DERC***

The first session of the day was taken by Shri P.D. Sudhakar, Chairman, DERC. He began his session by giving a brief introduction about the importance of the Electricity Regulation and Regulatory commissions. To initiate, the session he gave a brief introduction about the evolution and transformation of the power sector, where he talked about The Indian Electricity Act, 1910; The Electricity (Supply) Act, 1948; The Electricity Regulatory Commission Act, 1998 and The Electricity Act, 2003. Moving ahead he emphasised on the main objectives of the EA 2003; whereby he dealt specifically with the Section 61 and 62 of the Act.

In later half of his session, he dealt with the National Tariff Policy; its objectives (Such as: availability of electricity to consumers at reasonable rates, ensuring financial viability, promotion of transparency, efficiency, competition etc.). He also emphasised that tariff regulations have to be formulated in accordance with Section 61 of the EA 2003 and regulations cannot be challenged before the APTEL (Appellate Tribunal for Electricity) and appeal lies only before the High Court and Supreme Court. The speaker also dealt with the concept of Multi Year Tariff (MYT) regime, where it was emphasised that MYT was adopted to provide regulatory certainty to utilities, ensure financial viability, promote operational efficiency etc. The policy direction period for MYT was from 2002-2007 and first MYT control period was from 2007-08 till 2011-12 and the subsequent third control period is in pipeline. In the end, Tariff Order procedure was discussed and the session ended with the discussion on the recent initiatives undertaken by DERC: DERC (Net Metering for Renewable Energy) Regulations, 2014; DERC (Demand Side Management) Regulations, 2014 etc.

### ***Session 2: Historical Perspective of Tariff Determination (Shri Sudhir Karkhanis, Regulatory Expert, Mumbai)***

The second session was taken by Shri Karkhanis, Regulatory Expert, Mumbai on the historical perspective of tariff determination. To begin his session, the speaker stated that at any point of time electricity tariff may differ as per: region, location, season, time of day and other factors. As far as India is concerned, during 1897-1910 there began generation and distribution of electricity around Kolkata, Mumbai and major cities, period from 1960-1973 marks as a period for agricultural policy, setting up of electricity boards, grids etc. In 1973, there was emergence of economic crisis in power sector, and period from 1998 to 2004 marks for continuous evolution of regulations and policies. Moving ahead, he discussed about the determination and adoption of tariff, where he enriched the knowledge bank of participants on different tariff determination routes: Single and Two part tariff (advantages

and disadvantages), availability based tariff (ABT) - what lead to adoption of ABT, components of ABT etc. In the second half of the session, focus was given on Performance based regulations (PBR) and Cost plus based regulation (CBR), wherein characteristics, merits and demerits of both the regulations were discussed upon. The session concluded by making a point that in India, hybrid of Cost Plus and Performance Based Regulation is followed.



***Session 3: Process of Tariff Determination for Generation- With case study (Shri Sudhir Karkhanis, Regulatory Expert, Mumbai)***

The next session of the day was on the Process of tariff determination for generation, delivered by Shri Sudhir Karkhanis. The speaker began the session by giving a brief introduction about reforms and the generation business; including unbundling of the State power cos in India, renewable energy power plants etc. An important point made during the discussion was that there are various methods of generating Electrical Energy and the basket of generating utility may contain all types of Generating plants. Ideally, the ARR process should, cover all of them. Moving ahead, the speaker dealt with the process of ARR, where he stated that through ARR process, the Generating Utility makes accurate estimate of costs in generating electricity, and projects how it intends to recover the costs through tariff on sale of electricity. In addition to this, the concept of fixed costs and variable costs were also discussed upon, where it was pointed out that fixed costs components are directly associated with the capital cost, finance and operation and maintenance cost of operations; on the other hand variable cost is the sum of costs incurred on fuels (such as indigenous coal, fuel oil etc.). Moving ahead the process of the determination of variable cost was also discussed. The process of determination is a 5 step process involving estimation of gross energy availability, estimation of cost of fuel, projection rate of energy charges among others. To have a practical idea on the process of determination various hypothetical case studies were also discussed. Apart from this light was also thrown on various methods used to assess or review the performance of variable

cost and that of fixed costs; for supporting certain points made different case studies were also discussed. Finally, to end the session, factors affecting the performance were listed out: Uncontrollable factors and Controllable factors. The session concluded with a statement made by the speaker that, the generator should have a focussed business plan with solid foundation of facts and above all there should be an environment of Honesty, Clarity, Truthfulness.

***Session 4: Power Procurement by DISCOMs and its impact on tariff (Shri Sudhir Karkhanis, Regulatory Expert, Mumbai)***

The last session of the day was related to the Power procurements and its impact on tariff rates. The session initiated with an introduction about market, electricity and factors that are in favour of electricity as compared to any other form of energy. During the discussion it was also pointed out that from 1879-80 to 2014-15 there have been large number of reforms that have undertaken in the power market and now retail market is considered as more or less free. Moving ahead, generation capacity market was discussed, where issues faced and resultant effects were discussed; similar discussions were also carried out for transmission capacity market.

In the end, the issues related to distribution segment were pointed out: inaccuracies in load projection, heavy dependence on cross-subsidisation between consumer categories, inability to meet RPO targets, weak dispute settlement mechanisms etc. Finally, the session ended with certain recommendation to meet above challenges: (a) enhance efficiencies through innovation, flexibility etc. (b) optimize the costs (c) emphasize on growth through accurate long term and short term projections, quicker clearances and (d) following fair practice through competitive controls and transparency in information flow.

***Day 2: 19<sup>th</sup>.December.2014***

***Session 5: Process of Tariff Determination for Transmission and Distribution Business – With Case Study (Shri V.J.Talwar, Former Member , APTEL, New Delhi )***

This session by Shri Talwar was related to ARR and tariff determination for transmission and distribution business. As regards process of tariff determination, an important point to draw out was that regulators not approve retrospective tariff and normal time frame is of 4 months from acceptance of Petition with all data. Moving ahead the detailed process of tariff determination was discussed. In addition to this, the relation between demand and energy was discussed. During the discussion, it was pointed out that category wise demand projections are determined by factors such as number of consumers, connected/contract demand and projected sales. With regards the same, a case study on UPCL Tariff Order 2010-11 was debated. The last sub session dealt with the concept of Multi Year Tariff: control period; applicability; controllable and uncontrollable factors; business plan & forecast and annual review of performance & mid-term performance review.

***Session 6: Financial Principles of ARR (Shri Suresh Gehani, Regulatory Expert, Mumbai)***

Shri Gehani spoke on financial principles concerned with Annual Revenue Requirement (ARR). During his session, he has drawn insights about the details to be submitted along ARR and tariff petition, issue of capital expenditure vs capitalisation, normative debt-equity ratio (70:30), concept of depreciation, MERC tariff regulation 2005, interest on working capital, and various other topics. The main stress was given to issue of debt-equity ratio, where he also pointed out that if actual equity deployed is than 30 per cent of the cost of capitalisation asset, the actual equity shall be considered for determination of tariff. In case of retirement or replacement of assets,



equity capital approved shall be reduced to extent of 30 per cent, and loan capital shall be reduced to extent of 70 per cent of Original Capital Cost of Replaced Asset (OCRA). Further, he cleared the thin line between Return on Equity and Return on Capital employed, by stating that ROE is allowed on equity invested in business at specified rate and is easy to compute, whereas on contrary ROCE is complicated to compute and is allowed on total capital employed including debt and equity. Apart from these major topics, concept of time over run, over heads, case study of – **Hon'ble ATE Judgment on Parli and Paras TPS Capital Cost** on project costs were also discussed.

### [Day 3: 20<sup>th</sup>.December.2014](#)

#### *Session 7: Regulatory Framework & Policies for Renewables Energy (Shri Sudhir Karkhanis, Regulatory Expert, Mumbai)*

The session began with a brief introduction about renewable energy and its increasing importance. The increasing role of Re cannot be undermined because **Renewable energy** is considered as the escape route for humanity against causing environmental pollution, creating greenhouse gases, and causing ionospheric disturbance. Moving ahead discussions were made about the mandate given in EA2003 about the RE (Section 86 of EA 2003). In addition to this, structure of tariff regulation for REs was also discussed; where Chapter 1 specifies general principles of tariff (Control period, tariff period etc.), Chapter 2 relates to financial principles of tariff (Capital cost, debt equity ratio, depreciation etc.) and Chapter 3 relates to technology specific parameters (Wind, Biomass, solar biogas etc.).

The second half of the session dealt specifically with tariff related to renewable energy: Generic tariff and Project specific tariff. It was also pointed out that the tariff for renewable energy technologies is single part tariff consisting of the following fixed cost components: (a) Interest on loan capital; (b) Depreciation; (c) Interest on working capital; (d) Operation and maintenance expenses; (e) Return on equity. To judge the performance techniques such as Capital Utilisation Factor (CUF); Plant Load Factor (PLF); O&M expenses etc. are used. The last session was devoted to state specific policies relation to Renewable energy/Solar Energy. The session concluded by a remark that **Much healthier regulatory environment needs to be created quickly through Supportive State Policies, supplemented by Regulatory Discipline.**

#### *Session 8: Important decision of APTEL and Supreme Court related to Electricity Tariffs (Shri V.J.Talwar, Former Member, APTEL, New Delhi)*

In this session, Shri Talwar discussed various important judgments of APTEL on tariff related issues.

##### **(i) Appeal No. 131 of 2011 (Date of Judgement: February 2013)**

For this appeal, appellant was Haryana Power Generation Company and Haryana Commission was respondent. In this case, the Appellant, has stated that the Haryana Commission has not followed the guidelines laid down by the CERC and principles laid down by the Tariff Policy issued by the Government of India in accordance with Section 3 of the 2003 Act. With regards the same, APTEL observed that while framing such regulations, State Commissions are required to be guided by the principles laid down in by the Central Commission, National Electricity Policy, and Tariff Policy etc. It shall also ensure that generation, transmission and distribution are conducted on commercial principles; factors which would encourage competition and safe guard consumer's interest.

**(ii) Appeal no. 265 of 2006 (Date of Judgement: 23rd May 2007)**

For this appeal, appellant was North Delhi Power Limited and Delhi Commission was respondent. The issue addressed was: Whether Depreciation is permissible on APDRP Grant? In this case, APTEL said that unless the Commission is able to say that APDRP grant will be available every year and there is no need to create funds for replacement of such assets, it cannot say that no depreciation on such asset may be given. Thus, **Ratio: Depreciation is permissible on grant.**

**(iii) Appeal no. 61 of 2012 (Date of Judgement: 28.11.2014)**

For this appeal, appellant was BSES Rajdhani Nigam Limited and Delhi Commission was respondent. The issue here was whether higher expenditure incurred for one or some of the components in O&M charges is permissible under normative regime. In this case, APTEL observed that under normative regime, the licensee cannot be permitted to claim additional expenditure it is likely to suffer on account of increased expenditure on one component and any gain on reduction in expenditure on other components is kept by the licensee.

***Panel Discussion: Tariff determination process and challenges thereof for Regulators***

In consonance with the sessions on The Tariff Fixation Process in the Electricity Sector, this session focused on '**Tariff determination process and challenges thereof for Regulators**'. The session was chaired by Shri H.L. Bajaj; Shri V.J. Talwar, Sh. V.S. Verma, Shri Shyam Wadhwa and Shri Buddy Rangandhan being the panellists.

Shri Bajaj (Former Member APTEL & Ex Chairman CEA and Ex. CMD NTPC) moderated the session by introducing the theme. He pointed out that power sector is struggling from long time. If distribution companies get all it sells at appropriate tariff, then there is no reason why every 10 year we needed bailouts. In 1990s, power losses accounted to huge amount, and have been increasing over time. Thus, tariff and process of tariff determination plays important role. With these words, he opened the floor for other panellists.

***Panel Member 1: Shri V.J Talwar***

Shri Talwar drawing from his sessions given over last two days recommended that one should read all the judgments of respective states as well as of other states also. He also talked about commissions wearing coloured glasses.

***Panel Member 2: Shri V.S Verma***

Shri Verma began by appreciating the efforts for organisers to arrange such event. He added that regulatory system is a complex system and having this sector for more than 40years now, still complete understanding of sector cannot be claims. The personnel who are managing regulatory sector are very important, lawyers and advocates are one important aspect. He professes that one should not undermine the importance of engineering and role of engineers in the process of determination of tariff. Other issues such as installing equipment's, capital expenditure needs to considered but this is not the matter of law but plays an important role in the process of tariff determination. He emphasised on the role of competitive bidding, leading to better and affordable price for consumers. He pointed that as according to him government has gone wrong for determining tariff based bidding. Thus amendments are required; system needs to be more knowledge based. In end he stated that in electricity sector **Lawmakers are the Law breakers**, which needs to change thus to stop this knowledge plays a

significant role for which such kind of training courses needs to be arranged to increase the awareness and enhance the knowledge bank of the personnel's involved.



***Panel Member 3: Shri Shyam Wadhwa***

He emphasised the role of state regulators in the process of tariff determination. There should be a balancing act as far as electricity regulation concerned, so that both regulators and consumers are at equal footing. Utility should not be ignored, but should be made cost effective. Most utilities claim their tariff is 70-80% of power purchase cost and one of the challenges faced by Delhi Commission is to manage power purchase cost. For this Delhi has entered into Long term contract for power purchase agreements to cover the peak requirements years in advance. So challenges for utilities is to enter into Long term agreement and meet requirements or go by market strategies which may or may not lead to meeting the peak requirement or end up buying power at very high rate. So, these concerns are needed to be looked upon closely by regulators. One of the problems we have been grappling is the question of surplus power and its usage. One suggested way is to sell this surplus power to large scale enterprises in and around Delhi where power is generated at very high captive rate, if that can be done then it would be a win-win situation for all parties involved.

***Panel Member 4: Shri Buddy Rangandhan***

He started with a point the challenges that regulators face in tariff determination is a absence of public hearing process. The problem that regulators really face is how to have a educative or interactive public hearing process. One way is by improving consumer advocacy, funds to be utilised for consumer representative to appear before tribunal, setting up a consumer representative to balance the two parts of spectrum. Second issue is to balance the interests of different stakeholders. One of the ways in which a lot of commissions have done is by simply ignoring views of consumers. It needs to ensure that consumers get reasonable priced electricity, distributors get reasonable returns. 80percent cost of power distributor is related to power purchase cost, over which he has no control. Finally he professed for need of Multi Year Tariff regime, with which cost of certain year can be

controlled. One other way is to plan strategies where utilities know well in advance the future demand, for which prudence test needs to be as robust as possible. In the end, he professed on the continuous training for the personnel's involved at different levels of tariff determination- for which one of the best way is to sit and attend hearing and judgement processes; always look at one judgment before that respective judgment and one judgements after.

#### **Valedictory Address by Smt Neerja Mathur, Chairperson, CEA, New Delhi**

Mr. Arun Talwar, COO, CIRC welcomed the chief guest, Smt. Neerja Mathur. Smt. Mathur began by giving a brief introduction about tariff fixation and defined it as whatever is spent for generation, transmission and distribution. She tagged electricity sector to be very complex and integrated-owing to the fact electricity being a concurrent subject. With this background, she professed that the entire chain has to be most efficient and optimum. She also added that transmission is also assuming greater importance, where she pointed out that issue 10 years back was lack of capacity but at present we have sufficient capacity installed but the main issue today is to make that capacity available to consumers at reasonable and affordable prices.

The session ended with few participants coming forward to express their views, wherein they thanked for being benefitted out of the training programme. Few of them also made certain suggestions for further improvements. All the participants were awarded certificates by Smt Neerja Mathur, Chairperson, CEA along with Shri H.L Bajaj and other dignitaries.

The day concluded by Vote of Thanks which was given by Mr S.D. Mathur, CEO & Director RMCS who thanked all the esteemed guests, presenters, speakers, participants and team of CIRC.

#### **Feedback**

The workshop achieved its objective; unbundling the issues related to tariff fixation in the power sector. Participants appreciated the efforts of CIRC and RMCS to arrange such workshops that cover power sector as whole-issues concerning the generation, distribution, tariff determination etc.

Suggestions were received to arrange workshops on topics such as: dealing with more case studies relating to latest tariff norms from CERC, tariff fixation process under Solar power, Economics of power sector, Ways ahead in carriage and content amendment of EA 2003.

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**APPENIX- I  
AGENDA**

**Rachna Management Consultants and Studies (P) Ltd. Mumbai &  
CUTS Institute for Regulation & Competition, New Delhi**

**3 - Day Workshop on  
The Tariff Fixation Process in the Electricity Sector"  
(Generation, Transmission, Distribution & Renewables)  
December 18-20, 2014**

**Venue :The Muse Sarovar Portico, A-1, Chirag Enclave , Nehru Place, New Delhi .**

**Objectives:**

This workshop aims at educating and familiarizing the technical and non technical personnel, in the utilities and at the regulatory commissions, engaged in the process of Tariff fixation, and dealing with tariff regulations, provisions, requirements and stipulations.

**For Whom:** Senior/Middle level engineers and managers from electricity regulatory commissions, Officers working in the regulatory cells of the utilities , Planning, operation and maintenance group of utilities of Public Sector/or Private Sector. Consultants and academicians dealing with regulatory affairs. In short anybody and everybody connected with the power sector.

**Schedule**

<b>Thursday 18<sup>th</sup> December 2014</b>		
<b>Time</b>	<b>Topic</b>	<b>Faculty</b>
0900-0930 hrs	<b>Registration</b>	
0930-1030 hrs	<b>Inauguration</b> By Hon'ble Shri Rakesh Nath Technical Member Appellate Tribunal for Electricity New Delhi	
1030-1045 hrs	<b>Tea Break</b>	
1045-1145 hrs	Tariff Policy and Regulations regarding Tariff	Shri P.D.Sudhakar Hon'ble Chairman Delhi Electricity Regulatory Commission, New Delhi
	Historical perspective of tariff determination • Scope of Regulations and extent of Application	Shri Sudhir Karkhanis Regulatory Expert Mumbai

1145-1315 hrs	<ul style="list-style-type: none"> <li>Terminology and concepts used in Tariff determination</li> <li>Performance based Regulation (PBR) and Cost plus based Regulation (CBR)</li> </ul>	
1315-1415 hrs	<b>Lunch Break</b>	
1415-1545 hrs	<p>Power Procurement by DISCOMs and its impact on Tariff</p> <ul style="list-style-type: none"> <li>Indian Power Market and Load curves</li> <li>Demand Forecast (Long term &amp; Short Term)</li> <li>Consumer mix and its effect on Distribution Tariff</li> <li>Issues with Power market</li> </ul>	Shri Sudhir Karkhanis Regulatory Expert Mumbai
1545-1600 hrs	<b>Tea Break</b>	
1600-1730 hrs	<p>Process of Tariff Determination for Generation – With Case Study</p> <ul style="list-style-type: none"> <li>Basic Principle of ARR for Generation Business</li> <li>Approval of Capital cost</li> <li>Process of Approval of ARR and determination of Generation Tariff</li> <li>Performance Review and MYT Principle</li> <li>Case Studies</li> </ul>	Shri Sudhir Karkhanis Regulatory Expert Mumbai
<b>Friday 19<sup>th</sup> December 2014</b>		
0930-1330 hrs Tea Break- ( 1100-1115 hrs)	<p>Process of Tariff Determination for Transmission and Distribution Business – With Case Study</p> <ul style="list-style-type: none"> <li>Determination of ARR and its procedures</li> <li>Basic principles of ARR determination</li> <li>Determination of tariff for Intra State Transmission System and determination of ARR for Transmission licensees</li> <li>General Principles of MYT <ul style="list-style-type: none"> <li>Multi-Year Tariff Framework</li> <li>Control Period</li> <li>Applicability</li> <li>Business Plan &amp; Forecast</li> <li>Annual review of performance &amp; Mid-term performance review</li> </ul> </li> </ul>	Shri V.J.Talwar Former Member APTEL New Delhi
1330-1415 hrs	<b>Lunch Break</b>	
1415-1715 hrs (Tea Break 1545-1600 hrs)	<p>Financial Principles of ARR</p> <ul style="list-style-type: none"> <li>Capital Cost and capital structure</li> <li>Debt : Equity ratio</li> <li>Depreciation</li> <li>Return on Capital of G/T/D</li> </ul>	Shri Suresh Gehani Regulatory Expert Mumbai

	<ul style="list-style-type: none"> <li>• Interest on borrowed capital</li> <li>• Tax on income</li> </ul> <p>Interest on working Capital of G/T/D</p>	
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<b>Saturday 20<sup>th</sup> December 2014</b>		
0930 – 1100 hrs	<p>Regulatory Framework &amp; Polices for Renewables Energy</p> <ul style="list-style-type: none"> <li>• Various sources of Renewable Energy</li> <li>• Tariff determination for Renewable Energies.</li> <li>• Polices of State Governments and Regulations /Orders of SERCs regarding Renewable energy</li> <li>• Overview of Renewable / Solar energy generation</li> </ul>	<p>Shri Sudhir Karkhanis Regulatory Expert Mumbai</p>
1100-1115 hrs	<b>Tea Break</b>	
1115-1330	<p>Important decision of APTEL and Supreme Court related to Electricity Tariffs</p>	<p>Shri V.J.Talwar Former Member APTEL, New Delhi</p>
1330-1415 hrs	<b>Lunch Break</b>	
1415-1600 hrs	<p>Panel Discussions Tariff determination process and challenges thereof for Regulators.</p>	<p>1. Shri H.L.Bajaj , Former Chairman, CEA and Member APTEL (Moderator) 2 Shri V.J.Talwar Former Member, APTEL 3. Shri V.S.Verma , Former Member, CERC 4. Shri Shyam Wadhera Former Member, DERC 5. Adv.Buddy A.Rangandhan</p>
1600-1615 hrs	<b>Tea Break</b>	
1615-1715 hrs	<p><b>Wrap-up and Valedictory Function</b></p> <p><b>Chief Guest</b> Smt. Neerja Mathur Chairperson Central Electricity Authority New Delhi</p>	
<b>High Tea</b>		

