CENTRAL ELECTRICITY REGULATORY COMMISSION

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Minutes of the Commission meeting held on 26th November, 2009

1.0 The following were present:

1. Dr. Pramod Deo, Chairperson **In Chair**
2. Mr. Rakesh Nath, Chairperson, CEA (Ex-officio Member, CERC)
3. Mr. S. Jayaraman, Member
4. Mr. V.S. Verma, Member
5. Mr. Alok Kumar, Secretary
6. Mr. K. Biswal, Chief (F)
7. Mr. Pankaj Batra, Chief (E)
8. Dr. Vijay Deshpande, Consultant (Economics)
9. Mr. Trilochan Rout, Jt. Chief (Law)
10. Mr. Vijay Menghani, Jt. Chief (E)
11. Mr. Rahul Banerjee, Power Market Consultant
12. Mr. S.K. Chatterjee, DC(RA)
13. Mr. H.T. Gandhi, DC(F)
14. Ms. Navneeta Verma, Asst. Chief (E)

2.0 Item No. 1: Status of compliance of decisions of the Commission in previous meetings.

The Commission perused the status and gave directions for expediting the action on pending decisions.

3.0 Item No.2: Revised formulation on transmission pricing framework after incorporating the decisions of the Commission in the presentation made by the Consultant on the comments received from the stakeholders:

The Commission noted the progress and directed to submit the draft regulations by 2nd week of December, 2009 and complete other steps by the end of December, 2009, after incorporating the modifications suggested by the Commission during the discussions.

4.0 Item No.3: Proposed model for benchmarking of capital cost of transmission lines:

The model prepared for benchmarking the capital cost of transmission lines was discussed. The Commission approved circulating the model for comments of the stakeholders, along with certain directions for reviewing the escalation formula.

5.0 Item No.4: Issue regarding revised rate of MAT in the context of tariff regulations for period 2009-14

After discussions, the proposal in the Agenda note was approved.

6.0 Item No.5: Proposal from CEA to include cost of Human Resource Development in the project cost.

The proposal from CEA was discussed and agreed to with certain modalities for implementation.

7.0 Item No. 6: Status of the petitions pending for listing including the technical validation by Finance and Engg. Division

The Commission noted the status and directed the all concerned to ensure that the matters are disposed expeditiously and within the laid down timelines.

8.0 The meeting ended with vote of thanks to the chair.

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Formulating Pricing Methodology for Inter-State Transmission in India

Central Electricity Regulatory Commission

November 26, 2009

Work done since Commission Meeting in August 2009

- The Mercados team, along with IIT Bombay have undertaken the simulations for the current grid conditions. The following measures were undertaken by the consultants:
  - AC load flow analysis was used for the computations and convergence achieved after "rationalising" the data for the current network state furnished by NLDC;
  - Instead of a distributed slack bus approach, the slack buses have been selected using the AP method and thereafter applied for running the load flows (HYBRID METHOD);
  - The Mercados team has worked with PGCIL to identify the ARR of the individual network elements and used the same for the pricing computations;
  - The price computations have been undertaken using the *actual levels of line utilisation* as directed by CERC. The balance costs were allocated through a uniform postage stamp to all grid users
  - **CEA has been consulted on the results obtained.**

Guidance from Commission in August 2009

1. Network Data – 2009-10 and 2011-12 to be used for comparison with present charges as well as indication of prospective charges ✓
2. Computations to be based on AC Load Flow ✓
3. Slack bus selection to be improved based on electrical distances. CEA was to be consulted in this regard ✓
4. The results of the base-case load flow to be validated by CEA or any other commercial software ✓
5. Historical costs to be used instead of the benchmark costs ✓
6. Based on the data made available by CTU on the ARR/Project Costs of various projects/systems, reasonable allocations to be made to various lines and sub-stations ✓

Guidance from Commission in August 2009

7. Transmission charges to be presented in a *To* and *From* Matrix format for long term transactions… and compared with existing burden ✓
8. For under loaded lines, the recovery based on AP or MP is to be only for the "utilised" component. The rest of the ARR is to be recovered based on postage stamp ✓
9. Transmission charges for these networks using AP, MP and Z-t-Z method to be undertaken. Clear identification of advantages and disadvantages to be done based on data. CEA to be consulted on results
10. Loss allocation to be aligned with allocation of transmission charges and conducted simultaneously (to use same base load flows)

Charging on the basis of actual level of line Utilization

Grid Snapshot	% of lines loaded less than 50% of their capacity (Total lines in NEW Grid considered = 2360)
Summer Peak	77%
Winter Peak	76.4%
Monsoon Peak	75.4%
Summer Off-Peak	82.4%
Winter Off-Peak	86.86%
Monsoon Off-Peak	82.33%

Extent of over loading: Voltage-wise distribution (example: Summer Peak)

Voltage Level	Number of lines loaded greater than 50% (total number = 537)	Number of lines loaded greater than 75% (total number = 264)
66 kV	13	4
132 kV	294	174
220 kV	164	72
400 kV	66	13

- Most of the under loaded lines are 220 kV and 400 kV lines
- Most of the over loaded lines belong to the STUs / SEBs
- The above leads to more than 70% of the ARR being charged through the postage stamp component.

Key Issues Faced With Revised Basis

- The use of the concept of “utilisation” results in a very low distance and direction sensitive component and a large “postalised” component
  - Will be prone to disputes
  - Could run counter to policy objectives
- ARRs based on historical costs were used. Since ARR of state lines are not available, if they are reduced to “nil” after the load flows, this results in distortions
  - Alternative proposed by CEA was truncation of the network to CTU nodes only after developig the base load flows

Work Done in consultation with CEA…

- CEA indicated that the network be truncated at the interface of the state with the PGCIL network
  - Truncation was jointly carried out in PTI software with Director (SP&PA), CEA
  - It was found that a 'neat' truncation was not feasible – leads to at least 15 islands – and the observation was conveyed to Member (PS), CEA
- Such a truncation needed consideration of certain selective lines in Maharashtra, Gujarat, Rajasthan and Uttar Pradesh to obviate islanding and facilitate convergence of LFA – this was deemed to be potentially contestable and as having commercial implications
- Thereafter CEA advised truncation at the level below 400 kV – while considering all the assets up to 400 kV irrespective of ownership
  - There were no problems in this truncated network, except that the 220 kV assets of PGCIL are left out
  - Treatment of such assets can however be undertaken after the approval of the Commission through some approximations and application of true-up principles

Truncation of the Network for the purposes of charging

- In the meeting with Chief (Engineering), CERC inter-alia the following were agreed:
  - Charging will be done only for the ISTS lines - where these lines include PGCIL lines and also the state lines approved by the RPCs to be charged as carriers of inter-state power.
  - Basic Load Flow Analysis - for computation of flows on various lines has been conducted using the entire network - 400 kV, 220 kV and 132 kV (especially NER, where such assets are owned by PGCIL)
  - Based on the above load flow analysis, the interface nodes of the states and PGCIL should be identified for truncation of the network for the purposes of charging (i.e. using MP and AP method).
  - Entire injection into a state at such interface points will be treated as inter-state power and charged as such.

The above addresses most of the aspects except for a relatively small issue relating to “embedded” 220 KV network of PGCIL

220 kV assets in NR	ARR (Rs. Crores)
Anta Transmission System	9.51
Auraiya – Sikandara	3.68
RAPP Transmission System	10.54
FGPP Transmission	2.36
Unchahar	17.87
Tanakpur	3.91
Salal-1	7.33
Salal-II	13.69
Bairasuil	1.80
Hisar	0.50
Wagoora – Pampore	1.13
Jallandar - Dasuya	4.18
Jallandur – Hamirpur	7.96
Transmission sub-systems in UP	4.72
Unchahar – Stage III	8.59
Total	97.77

220 kV assets in WR	ARR (Rs. Crores)
Gandhar (Jhanor) - Bharuch (Haldwara)	1.11
Kawas - Navasari	1.74
Kawas - Haldarwa	2.89
Kawas - Vav	0.66
Kawas - Ichchapur	0.05
Ichchapur - Vav	0.60
Kakrapar - Vav	1.49
Kakrapar - Vapi	4.07
Kakrapar - Haldarwa	2.57
Korba - Budipadar	4.40
Tarapur - Boiser	13.83
Vapi - Magarwada line	2.49
Vapi - Kharadpada line	1.81
Total	37.78

220 kV assets in ER	ARR (Rs. Crore)
Dalkhola – Purnea	4.57
Sasaram – Ara	16.42
Ara – Khagaul	7.09
Dehri - Sasaram (LILO portion)	0.36
Sasaram - Sahupuri (LILO portion)	0.36
Ranchi - Patratu (LILO portion)	0.66
Ranchi - Chandil (LILO portion)	0.66
Birpara - New Siliguri	5.63
New Siliguri – Siliguri	1.63
Chukha – Birpara	2.94
Siliguri – Dalkhola	5.68
Dalkhola – Malda	5.23
Birpara – Salakati	7.26
Chukha – Birpara	0.86
Salakati - BTPS	0.14
Total	59.48 + 19.94 (132 kV and below assets)

Suggestion – Treatment of 220 kV assets

- ARR of PGCIL assets (220 kV and below) in NEW Grid: Rs. 215 Crores (Approx)
- Total ARR of PGCIL (NEW Grid): Rs. 3797 Crores
- Mostly these assets are linked to generation assets – for which the transmission charges can be charged similar to other CGS at 400 kV in the adjoining areas
  - This will cover most of the Rs. 215 crores indicated
  - Any over/under recovery of ARR can be “postalised” or trued up on a rolling basis

Based on the “Revised” approach the progress undertaken is as follows:

- Basic Load Flow Analysis done for NEW Grid for Monsoon – Off Peak condition
- Network truncation done at 400 kV level for the NEW Grid
- Generation and load input conditions prepared for other conditions. Load flow and truncation in progress

Schedule of Work Proposed Hereafter

Load Flow Analysis for other Grid Conditions (NEW GRID) for 2009-10	Nov 30
Network Truncation for other Grid Conditions (NEW GRID) for 2009-10	December 5
Execution of AP / MP algorithms on truncated network - results	December 10
Review of results by CEA and CERC	December 10 - 16
Draft regulations on transmission cost allocation	December 20
Development of losses computations using MP and AP	December 17-31
Development of Load Flows for SR for 2009-10, truncation and MP/AP application for load and losses	December 17-31
Truncation for 2011-12 Grid and application of MP/AP framework for load and losses	January 1 - 15

Decisions and Guidance Required from the Commission

1. Changing over basis for charging lines from “utilisation” to design capacity
2. Approval of the methodology of network truncation to the entire 400 KV network after the basic load flows are conducted on the whole power system
3. Capping tariffs for select users – e.g. hydro in NER, and postalising this component
4. Approval of the basis of charging of the 220 kV lines of PGCIL
5. Use of average ARR of 400 KV lines of PGCIL for for 400KV the 400 KV lines of the states (only for the computation of representative participation factors and preventing distortions)

Thank You