

**CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI**

Coram

1. Shri Ashok Basu, Chairman
2. Shri K.N.Sinha, Member
3. Shri Bhanu Bhushan, Member

Petition No. 83/2002

In the matter of

Approval of charges for Unified Load Despatch & Communication Scheme
in Southern Region

And in the matter of

Power Grid Corporation of India Ltd.

.... **Petitioner**

Vs

1. Karnataka Power Transmission Corporation Ltd., Bangalore
2. Transmission Corporation of Andhra Pradesh Ltd., Hyderabad
3. Kerala State Electricity Board, Thiruvananthapuram
4. Tamil Nadu Electricity Board, Chennai
5. Electricity Department, Govt. of Pondicheery, Pondicheery
6. Electricity Department, Govt. of Goa, Goa

....**Respondents**

The following were present

1. Shri Umesh Chandra, PGCIL
2. Shri V.K. Prasher, PGCIL
3. Shri U.K. Tyagi, PGCIL
4. Shri D.D.Dhayaseelan, PGCIL
5. Shri P.C.Pankaj, PGCIL
6. Shri V.K.Gupta, PGCIL
7. Shri C.Kannan, PGCIL
8. Shri V.C.Jagannathan, PGCIL
9. Shri T.S.P.Rao, PGCIL
10. Shri R.P.Padhi, PGCIL
11. Shri Y.K.Dixit, PGCIL
12. Shri A.K.Sharma, PGCIL
13. Shri Ramesh Bahri, PGCIL
14. Shri R.Balachandran, KSEB
15. Shri P. Thangavelu, TNEB
16. Shri G.Thirumurthy, TNEB
17. Shri K.R.Adisheshan, KPTCL

ORDER
(Date of Hearing: 15.6.2004)

In this petition originally filed under Section 13 of the Electricity Regulatory Commissions Act, 1998 and subsequently under Section 79(1) of the Electricity Act, 2003, the petitioner, Power Grid Corporation of India Ltd., has sought approval of the tariff for the Unified Load Despatch and Communication Scheme (hereinafter referred to as “the Scheme”), in Southern Region.

2. At the outset it is necessary to observe that the Scheme has been designed to strengthen the load despatch infrastructure in the country. The Scheme covers investment in RLDC and SLDCs. The scope of the present petition, therefore, covers determination of fees and charges for the regional load despatch centres under sub-section (10) of section 55 of the Electricity (Supply) Act, 1948 or sub-section (4) of Section 28 of the Electricity Act, 2003. We, therefore, proceed on that basis, instead of determining tariff for the Scheme as a transmission asset.

3. Central Electricity Authority had accorded techno-economic clearance for the Scheme in Southern Region vide its letter dated 27.1.1994 at an estimated cost of Rs. 552.34 Crore, including IDC of Rs. 70.65 Crore, based on 4th quarter 1992 price level. The investment approval and expenditure sanction was accorded by the Central Government in Ministry of Power by its letter dated 16th February 1995 at an estimated cost of Rs. 621.57 Crore, including IDC of Rs. 125.98 Crore.

4. During execution of the Scheme there has been an increase in the cost on account of change in scope of approved items of work, Foreign Exchange Rate Variation and other reasons. As such, based on the recommendations of Public Investment Board, the Central Government vide its letter dated 25.2.2002, accorded its fresh approval to the Revised Cost Estimates of Rs. 683.80 Crore, including IDC of Rs. 118.09 Crore, consisting of (i) Power Grid's portion of Rs. 559.04 Crore, including IDC of Rs. 92.24 Crore and (ii) SEBs' portion of Rs. 124.75 Crore, including IDC of Rs. 25.85 Crore, based on 2nd quarter 2001 price level. As per the revised approval, the Scheme was to be commissioned by June 2002.

5. The scope of the Scheme includes:

(a) Establishment of Control Centres in States and at Regional level for SCADA (Supervisory Control and Data Acquisition) and EMS (Energy Management System).

(i) RLDC (Regional Load Despatch Centre) at Bangalore

(ii) CPCC (Central Project Coordination Centre) at Bangalore

(iii) SLDC/Sub LDC (State Load Despatch Centres/Sub Load Despatch Centres at Hyderabad, Warangal and Cuddaph (Andhra Pradesh), Bangalore, Hubli and Davangere (Karnataka), Chennai, Erode and Madurai (Tamil Nadu), Kalammassery, Kannur and Trivandrum (Kerala), Pondicery (UT of Pondicery).

(b) RTUs (Remote Terminal Units – 201 Nos.) to be installed at various 400 kV/220 kV/132 kV Sub-Station and generating stations in SR.

(c) Adaptation work at sub-stations and generating stations to meet the

requirement of data acquisition through RTUs (201 Nos.)

(d) Associated dedicated communication network comprising fibre optic (2324 Kms), Microwave (35 hops) and PLCC system (201 Nos.).

(e) Auxiliary power supply system comprising UPS (Uninterrupted Power Supply – 9 nos.), DG set (9 nos.) and DC power supply system (24 Nos.)

(f) Other infrastructural facilities such as air-conditioning, fire-fighting, construction/renovation of building etc.

6. Date of commissioning of the Scheme is 1.7.2002. Though there is minor delay of about one month in commissioning, this is being ignored keeping in view the fact that the estimated completion cost of the Scheme is still less than the approved cost.

7. Due to nature of equipment/services under the Scheme, the high initial cost and financial position of the constituents, a concept similar to levelised tariff has been proposed in the petition, entailing uniform charges over period of assumed life of the Scheme of 15 years for recovery of capital cost. The other components namely, O&M expenses and Interest on Working Capital have not been proposed to be levelised. The petitioner has proposed the following methodology for computation of tariff:

(a) **Return on equity:** ROE @ 16% on equity has been proposed by the petitioner for the system both for Regional and State portions. Further, recovery of total equity has been proposed during the period of 15 years.

(b) **Interest on loan and loan repayment:** Interest on loan capital has been computed on the outstanding loans. Interest on loan has been considered

by applying weighted average interest rate(s) applicable on actual loan and deployed by the petitioner for the Scheme, both for Regional and State portions. Repayment of total loan for State and Regional /Central Sector portions has been considered by the petitioner during the period of levelised charges of 15 years.

(c) **Operation and maintenance (O&M) Expenses:** The petitioner has proposed O&M charges for first two years @ 7.5% for Regional/Central Sector portion with provision of annual escalation linked with AICPI /WPI. According to the petitioner, this should be adjusted after the end of 2nd year based on actual O&M expenses. O&M expenses for the State portion have been proposed to be undertaken by the concerned State utility.

(d) **Interest on Working Capital:** Interest on working capital has been proposed by adopting the following principles.

(a) Operation and maintenance expenses (cash) for one month;

(b) Maintenance spares at a normative rate of 1% of the capital cost less 1/5th of the initial capitalised spares. Cost of maintenance spares for each subsequent year has been revised at the rate of 6%; and

(c) Receivables equivalent to two months' average billing.

(d) Interest on working capital at the rate of 11.50%.

(e) **Levelisation of charges:**

(i) For State portion: Annual charges comprising all the above parameters except O&M and interest on working capital levelised

for 15 years with discounting factor equal to ROE for equity portion and weighted average interest rate on loan for loan portion.

- (ii) For Regional /Central Portion: O&M and interest on working capital components of tariff are not levelised and charged extra for each year. This component has been proposed to be adjusted at the end of each year based on actual O&M expenses.

8. Based on the above noted facts, the petitioner has sought approval for the charges for the Scheme as under:

(Rs. in lakh)

	Central Portion		State Portion
	2002-03	2003-04	2002-03 & 2003-04
Annual Capital Recovery Charge - Loan	1164.23	1164.23	3849.10
Annual Capital Recovery Charge - Equity	282.20	282.20	933.00
Annual Capital Recovery Charge - Total	1446.43	1446.43	4782.10
O&M Expenses	924.49	979.96	0.00
Interest on Working Capital	69.82	72.31	93.45
Total charges	2440.74	2498.76	4875.55

9. The petitioner has claimed interest on working capital as per the details given below:

(Rs. in lakh)

Interest on Working Capital	Central Portion		State Portion
	2002-03	2003-04	2002-03 & 2003-04
Maintenance Spares			
Less Initial capitalised spares			
Maintenance spares for working capital	123.27	130.67	0.00
O&M Expenses	77.04	81.66	0.00
Receivables	406.79	416.45	812.59
Total	607.10	628.78	812.59
Rate of Interest on Working Capital	11.50%	11.50%	11.50%
Interest on Working Capital	69.32	72.31	93.45

10. KPTCL and KSEB have raised objections stating that O&M charges sought by the petitioner are too high.

11. On the issue of reasonability of O&M charges, the petitioner has submitted that O&M charges for Central Sector portion @ 7.5% of the capital cost are proposed on normative basis only for the initial two years which would be adjusted based on the actuals. This has been proposed in view of the fact that project of this nature and magnitude has been established for the first time in India and no past data is available for arriving at normative O&M charges. Moreover, in view of the system being predominant with communication facilities and computer hardware and software, royalty charges for microwave links, spares, consumables, AMC for computer etc., the rate of 7.5% has been recommended by its consultant to the petitioner. On consideration of the reasons furnished by the petitioner, O&M charges @7.5% of the admitted capital cost are being allowed, subject to retrospective adjustment based on actuals after prudence check by the Commission. O&M expenses for RSCC portion should be shared by all the respondents

12. The petitioner had sought to apply escalation for O&M expenses based on the formula as applicable to transmission sector as specified in the tariff notification dated 26.3.2001. However, in our opinion, this formula is not suitable in case of the Scheme due to following reasons:

- (a) The weightage of 55% to CPI and 45% to CPI may not be considered appropriately for the Scheme.
- (b) Similarly, the escalation formula for RLDC expenses with 90% weightage to CPI component is also not suitable for the Scheme.

13. We, therefore, direct that special formula for escalation of O&M expenses for the Scheme shall be evolved after sufficient details about prudent O&M expenditure are available.

14. After hearing the petitioner, the respondents, and deliberating on the mechanism evolved by the petitioner, this Commission is inclined to accept the proposed methodology for calculation of fees and charges for the Scheme by adopting the following principles:

- (a) Annual capital cost recovery shall be based on the levelised tariff for 15 years,
- (b) IWC and O&M charges shall not be levelised,
- (c) O&M charges shall be payable initially @ 7.5% of the admitted cost,
- (d) The actual O&M expenses shall be reimbursed with retrospective effect after a thorough scrutiny and verifying their prudence.

15. Accordingly, charges for the Scheme in Southern Region has been calculated taking into account the following factors:

- (i) Capital cost as on the date of commissioning,
- (ii) Debt: Equity ratio of 91.60:8.40,
- (iii) Weighted average rate of interest @ 6.7801%,
- (iv) Return on Equity (RoE) @16%,
- (iv) Levelised tariff in lieu of depreciation, interest and RoE.
- (v) Interest on Working Capital @ 11% i.e. prevailing PLR rate of State Bank of India as on date of commercial operation, and

- (vi) Additional Capitalisation after date of commercial operation shall be considered in the next period.

Capital Cost

16. On the analogy of the provisions laid down in the notification dated 26.3.2001, the project cost as approved by CEA or an appropriate independent agency, other than Board of Directors of the petitioner company, has been adapted on the basis for computation of tariff.

17. Based on the audited expenditure details submitted by the petitioner, the gross block is worked out as under:

(Rs. in lakh)

	CENTRAL PORTION	STATE PORTION					Total
	RSCC	APTRANSCO	KPTCL	TNEB	KSEB	PONDICHERRY	
Expenditure up to date of commercial operation 1.7.2002	11969.63	17096.97	2212.49	9242.54	7846.08	2180.49	50548.20
Gross Block on date of commercial operation	11969.63	17096.97	2212.49	9242.54	7846.08	2180.49	50548.20
Expenditure from date of commercial operation to 31.3.2003 (As per audited A/C)	146.31	578.65	167.48	226.65	195.61	45.09	1359.79
Gross block on 31.3.2003	12115.94	17675.62	2379.97	9469.19	8041.69	2225.58	51907.99
Expenditure from 1.4.2003 to 30.9.2003 (As per books of A/C)	7.42	27.34	0	19.32	12.17	2.9	69.15
Total	12123.36	17702.96	2379.97	9488.51	8053.86	2228.48	51977.14
Balance estimated Expenditure	203.21	256.55	128.18	161.47	238.71	114.58	1102.70
Estimated completion cost	12326.57	17959.51	2508.15	9649.98	8292.57	2343.06	53079.84
Mandatory spares on date of commercial operation	1032.17	313.79	135.52	476.04	185.25	150.44	2293.21

Cost Over-run

18. A comparison of the approved cost for each system as furnished by the petitioner vide affidavit dated 4.9.2002 and the estimated completed cost is given below:

(Rs. in crore)

Portion of the scheme	Approved Cost	Gross Block on date of commercial operation	Estimated Competition Cost
RSCC	161.30	119.70	123.27
APTRANSCO	162.87	170.97	179.60
KPTCL	26.36	22.12	25.08
KSEB	85.45	92.43	96.50
TNEB	100.67	78.46	82.93
PONDECHERRY	22.39	21.80	23.43
TOTAL	559.04	505.48	530.80

19. It is observed that even though gross block on date of commissioning operation and/or estimated completion cost for some portions of the Scheme is more than its approved cost, the total estimated completion cost as well as gross block on date of commissioning (Rs. 530.80 crore) of the Scheme executed by the petitioner is less than the Revised Cost Estimates approved by the Central Government (Rs 559.04 crore). Hence, there is no cost overrun.

Recovery Factor

20. Based on Weighted average rate of interest and RoE, recovery factor for 15 years have been arrived at as under:

$$\text{Recovery Factor: } i \times (1+i)^n$$

$$\frac{\text{-----}}{(1+i)^n - 1}$$

Where, i= Weighted average rate of interest and RoE respectively and

n= period

$$\begin{aligned} \text{Recovery factor for loan} &= \frac{0.067801 \times (1.067801)^{15}}{(1.067801)^{15} - 1} \\ &= 0.1083 \\ \text{Recovery factor for equity} &= \frac{0.16 \times (1.16)^{15}}{(1.16)^{15} - 1} \\ &= 0.1794 \end{aligned}$$

21. Interest on Working Capital has been considered at prevailing cash credit rate of nationalized banks. Working Capital for Regional/Central Sector portion is comprised of 2 months receivables, 1 month's O&M spares @ 1% of capital cost of the Scheme. For State portion, working capital is comprised of 2 months receivables only as operation and maintenance is proposed to be done by the respective states. Spares are escalated on the similar basis as the O&M expenses for the purpose of working capital component.

22. Based on the foregoing principles and methodologies, the annual fees and charges for the Scheme for Southern Region are calculated as under:

Rs. in Lakh			
	Calculation of ULDC Charges		
	Central Portion		State Portion
	2002-2003 @	2003-2004	2002-2003 & 2003-2004
Capital Cost	11969.63	11969.63	38578.57
Gross Loan	10964.74	10964.74	35339.77
Equity	1004.89	1004.89	3238.80
Annual Capital Recovery Charge@ 0.1083 Loan	1187.74	1187.74	3828.13
Annual Capital Recovery Charge @ 0.1794 Equity	180.23	180.23	580.90
Annual Capital Recovery Charge –Total	1367.97	1367.97	4409.03
O&M Expenses	897.72	897.72	0.00
Interest on Working Capital	50.70	50.70	82.34
Total charges	2316.39	2316.39	4491.37

@ For full year. Charges for part of the year shall be reduced proportionately.

23. The detailed calculations in support of interest on working capital are extracted below:

INTEREST ON WORKING CAPITAL

(Rs. in lakh)

Interest on Working Capital	Central Portion		State Portion
	2002-03	2003-04	2002-03 & 2003-04
Maintenance Spares	119.70	119.70	
Less Initial capitalised spares	206.43	206.43	
Maintenance spares for working capital	0.00	0.00	0.00
O&M Expenses	74.81	74.81	0.00
Receivables	386.06	386.06	748.56
Total	460.87	460.87	748.56
Rate of Interest on Working Capital	11.00%	11.00%	11.00%
Interest on Working Capital	50.70	50.70	82.34

24. In addition to the charges worked out above, the petitioner shall be entitled to other charges like income tax, incentive, surcharge and other cess and taxes in accordance with the notification dated 26.3.2001 subject to directions, if any, of the superior courts. The petitioner shall also be entitled to recovery of filing fee of Rs. 2 lakh, which shall be recovered from the respondents in five monthly installments of Rupees forty thousand each and shall be shared by the respondents in the same ratio as charges.

25. It is to be noted that the full capital cost shall be recovered over a period of 15 years with interest/return. After full capital recovery, the assets shall be transferred to the respective constituents at nominal value

26. The petitioner is already billing the respondents on provisional basis in accordance with the Commission's interim order. The provisional tariff charged shall be adjusted in the light of final charges now approved by us. Also, the

petitioner has been charging RLDC fees and charges based on order dated 8.5.2003 in petition No.109/2000 as summarised below:

(Rs in lakh)

	2002-03	2003-04
A. Escalatable Charges	485.37	519.35
B. Non-escalatable Charges	45.89	45.89
C. Sub- Total (A)+(B)	531.26	565.24
D. Interest on Working Capital	4.91	5.23
Total RLDC charges - (C) +(D)	536.17	570.47
Working Capital (WC)	44.68	47.54

27. At the hearing on 10.10.2002, it was stated on behalf of the petitioner “the tariff to be approved in the present petition would replace RLDC charges approved by the Commission earlier”. Accordingly, RLDC fees and charges recovered from the respondents based on order dated 8.5.2003 shall be proportionately adjusted against the fees and charges approved in this order, for the period 1.8.2002 to 31.3.2004.

28. This disposes of petition No. 83/2002.

Sd/-
(BHANU BHUSHAN)
MEMBER

Sd/-
(K.N. SINHA)
MEMBER

Sd/-
(ASHOK BASU)
CHAIRMAN

New Delhi Dated 13th September 2005