

**Before the Appellate Tribunal for Electricity
Appellate Jurisdiction**

Appeal No. 120 of 2005

POWERGRID

...Appellant

Versus

**Central Electricity Regulatory Commission
& Others**

...Respondents

Under Section 111 (2) of Electricity Act, 2003

**Present: Hon'ble Mr. Justice Anil Dev Singh, Chairperson
Hon'ble Mr. A. A. Khan, Technical Member**

Dated 5th April, 2006

Counsel for the appellant (s): Mr. M.G. Ramachandran, Ms. Taruna S. Baghel, Ms. Saumaya Sharma, Mr. Sudhir Mishra, Mr. Samesh Jerath,

Counsel for the respondent(s): Mr. Pradeep Mishra for PSEB, Mr. Keshav Mohan for HVPNL, Mr. S. Pushkarna for Delhi Transco., Ms. Madhu Dogra General Attorney, Delhi Transco Mr. R.K. Arora, Xen. HPGCL, MR. T.P.S. Bawa, OSD & Mr. V.K. Gupta, consultant PSEB,

Judgment

Per Hon'ble Mr. A.A. Khan, Technical Member

This Appeal is directed against the Order dated 21st June, 2005 of the Central Electricity Regulatory Commission (CERC) which, while allowing the request of the Appellant for the procurement of two new Converter

Transformers for Rihand – Dadri HVDC-Transmission system has also stipulated that the new acquisition will be to replace the two existing defective Converter-Transformers as a “Complete Package” subject to certain conditions for additional capitalization for the purpose of recovery of tariff.

2. Ministry of Power, Government of India, vide their letter dated 19.04.1995 had approved the revised cost estimates for setting up of Rihand Transmission System at a cost of Rs. 1460.58 Crores including IDC (Interest During Construction). The scope of work as approved included Rihand – Dadri 500 KV D/C Bi-pole comprising of Pole-I and Pole – II, which after erection were declared under Commercial Operation on 10.01.1992 and 20.05.1999 respectively. The CERC has approved the tariff for Rihand Transmission System for block year 2001-2004 considering the Capital cost of Rs. 1294.13 crores.

3. **Background:**

- 3.1 Construction, supply and Commissioning work for Rihand-Dadri HVDC Bi-pole link was awarded to BHEL (Bharat Heavy Electronics Ltd.) in collaboration with ABB, Sweden along with the Transfer-of-Technology to manufacture Converter-Transformers from ABB to BHEL. The contract involved supply of ABB make 8 Nos. of Converter-Transformers and 6 Nos. manufactured at BHEL Works. The supply, installation and commissioning, amongst others, also included six single-phase Converter-Transformers at each pole (i.e. Pole – I and Pole – II) of Rihand-Dadri HVDC link. In addition one spare Converter-Transformer was provided at each terminal of Rihand and Dadri. Thus, seven Converter-Transformers including one spare were installed at each terminal of Rihand and Dadri making a total of 14. Out of these 14 Converter Transformers, 8 are reportedly manufactured and supplied by OEM (Original Egypt Manufacturer) ABB, Sweden and the remaining 6 by BHEL under transfer-

of-technology between BHEL and ABB, Sweden. ABB, manufactured Converter-Transformers are stated to have been installed at Pole-I and BHEL make at Pole-II.

- 3.2 Appellant has stated that after three years of Commissioning, BHEL make converter-Transformers started failing at regular intervals despite repairs undertaken by BHEL under the contract. In order to ensure un-interrupted system availability to the beneficiaries one additional BHEL make converter-transformer was procured for Rihand Terminal making a total of 3 spare Converter-Transformers for the entire system. Thus number of Converter-Transformers procured for the entire system totalled to 15. BHEL at the intervention of Ministry of Power committed to supply an additional Converter-Transformer free of cost in May, 2005 making the total number deployed in the system to 16. Faced with unsatisfactory performance of BHEL make converter-Transformers, the Appellant approached CERC for approval to replace two defective BHEL make Converter-Transformers by procuring from ABB on a single-bid basis and sought direction that the price of two ABB make converter-transformers proposed to be purchased be capitalized for the purposes of tariff. It may be noted that with the procurement of two additional Converter-Transformers the total population of Converter-Transformers will increase to 18 as against 14 envisaged in the system i.e. 50% spare as against 16.6% provided in the original system-design.
- 3.3 CERC has on 26.03.2004 notified the Central electricity Regulatory Commission (Terms and Conditions of Tariff) Regulation-2004 (hereinafter called the Tariff Regulations-2004) inter-alia governing the tariff determination for the activities of the Appellant for the period from 01.04.2004 to 31.03.2009.

3.3.1 Regulation 51 of the Tariff Regulations – 2004 provides for Target Availability for recovery of full transmission charges and at 51(2) specifies it to be 95% for “HDVC bi-pole links and HVDC back to back stations”. It further stipulates that while no recovery of fixed charges at zero availability is allowed it shall be on pro-rata basis for below the target – availability of 95%. Also regulation 60 (1) and (2) provide for the entitlement of incentive on achieving annual availability more than the target availability of 95% up to 98.5% for HVDC System.

3.3.2 Regulations 53 (2) (ii) For additional capitalization provides that “... *the capital expenditure of the following nature actually incurred after the cut-off date may be admitted by the commission, subject to prudence check;*

- (i) *Deferred liabilities relating to works/service within the original scope of work;*
- (ii) *Liabilities to meet award of arbitration or compliance of the order or decree of a court;*
- (iii) *On account of change in law; and*
- (iv) *Any additional works/service which have become necessary for efficient and successful operation of the project, but not included in the original project cost.”*

Note – 2 of the above regulation, however, states that “*any expenditure on replacement of old assets shall be considered after Writing-off the entire value of the original assets from the original capitalized cost*”.

3.4 CERC by their Order dated 21.06.2005 on the Petition filed by the Appellant approved the procurement of two additional Converter-Transformers as “a complete package” but subject to the following conditions:

- (a) The cost of one Converter-Transformer, proposed to be imported, shall alone be allowed to be capitalized as additional Capitalization at a cost adjusted by the depreciated cost of the two replaced Converter-Transformers which in turn shall be de-capitalized.
- (b) The second additional Converter-Transformer shall be procured by Appellant at its own cost and the same shall not be allowed to be capitalized for the purpose of tariff.
- (c) Restricting the incentive payment which is to be based on original gross block and not on the new gross block.

3.4.1 CERC in their order have also stated that the approval is based on “Special Circumstances” and have cautioned that permission as at (a) above shall not be quoted as a precedent in future either by the Appellant or any other Company/Licensee/Organization. As recorded in the Order it is stated that in response to a query the Petitioner explained that ABB make Converter–Transformers installed at other HVDC-links were also facing breakdowns, though the Converter-Transformers of ABB make installed in Rihand-Dadri Transmission link were functioning to the complete satisfaction of the petitioner as no failures have been reported. The Order further recorded that in view of the above, the complete breakdown of ABB make Converter – Transformers can not be ruled out and that the approval is not exclusive for procurement of ABB make Converter–Transformers and the Petitioner shall be guided by the prudent procurement practices and policies

3.5 **Consultations of Appellant to obtain the approval of the Beneficiaries**

The principal beneficiaries of the Rihand-Dadri Transmission System used for evacuation of power from NTPC Rihand Generating Station to Dadri are Respondents no. 2 to 13. In the existing cost-plus regime coupled

with 2-part tariff approach, the capital cost, expenditure on account of O & M, insurance etc. forming the 'fixed cost' are being recovered from the beneficiaries through tariff. Any unusual expenditure on the system impacting the tariff, therefore, needs to be formally accepted by CEA and the respective Regional Electricity board (in this case Northern Regional Electricity Board-NREB) of which, beside CEA, all the beneficiary utilities in the region are the members. It was this reason that the Appellant's request for new acquisition of converter-Transformer was discussed in the various Meeting of Technical Coordination Committee (TCC)/NREB since July 2001. The decision taken on Appellant's request as per Minutes of various Meetings held are briefly enumerated in the succeeding paragraphs:

(a) **Decision for 121st TCC Meeting held on 06.0.2001**

- (i) As per the agreement between the SEBs/Utilities and POWERGRID, POWERGRID has to transmit power to SEBs/Utilities. As such losses caused to SEBs due to non availability of power due to damage of equipments of PGCIL has to be borne by PGCIL who in turn may recover these charges from the supplier of the equipments.
- (ii) POWERGRID informed that failure of converter-transformers supplied by BHEL has been investigated in detail by three leading consultants of the world and the recommendations have already been conveyed to BHEL. They further informed that these transformers were manufactured by BHEL under the contract wherein the technology has been transferred from ABB Sweden. TCC was of the opinion that having known the causes of failure there was no reason to believe that the repaired converter-transformers of BHEL would not be reliable in future.

- (iii) Regarding the procurement of four additional spare converter-transformers from ABB, TCC opined that the constituents will not bear the cost of these additional spare transformers. POWERGRID will have to bear the entire cost on this account. Therefore, it is for POWERGRID to decide the number of additional units to be procured and also to identify the supplier.
- (b) **Decisions of 125th NREB Meeting held on 0.07.2001 for procurement of 4 Nos. Converter – Transformers from ABB**
- (i) As per the agreement between the SEBs/ Utilities and POWERGRID, POWERGRID has to transmit power to SEBs/ Utilities. As such losses caused to SEBs due to non-availability of power due to damage of equipments of PGCIL has to be borne by PGCIL who in turn may recover these charges from the supplier of the equipment
 - (ii) Having known the causes of failure there was no reason to believe that the repaired converter-transformers of BHEL would not be reliable in future.
 - (iii) Regarding the procurement of four additional spare converter transformer from ABB, Boards opined that the constituents will not bear the cost of these additional spare transformers. POWERGRID will have to bear the entire cost on this account. Therefore, it is for POWERGRID to decide the number of additional units to be procured and also to identify the supplier. Regarding recovery of charges through tariff, it was for CERC to decide.
- (c) **Decision of 129th NREB Meeting held on 14.12.2002 for procurement of 4 Nos. Converter-Transformers.**

- (i) Regarding the proposal for procurement of additional spare converter transformers from ABB, TCC reiterated the decisions taken by 125th NRE Board meeting held in July, 2001.
 - (ii) POWERGRID will make arrangement to ensure that one spare transformer is always available at both ends of HVDC Rihand-Dadri lines so that it could be used in case of failure of any converter transformer.
 - (iii) There appears to be a need for review of the norms set for calculation of availability of transmission elements of Powergrid so that poles of HVDC line are given higher wastage.
 - (iv) During the period of outage of pole(s) of HVDC line the contingency plan, issued by NRLDC, will be followed by all the Constituents.
- (d) **Decision in a special Meeting held on 9th February, 2005 and taken by Chairman, CEA For procurement of 2 Nos. Converter-Transformers from ABB**

After deliberations, Chairperson, CEA requested Chairman, NREB to decide the issue. Chairman, NREB, keeping in views expressed by constituents decided that POWERGRID should not delay the technically required procurement of 2 nos. converter-transformers from ABB and approach CERC to decide alternatives viz.

- (i) 2 Nos. converter transformers to be treated as additional new assets and additional capitalization shall be allowed for tariff

OR

- (ii) 2 Nos. converter transformers to be treated as replacement of old assets and cost of the depreciated value of old assets shall be deducted from new assets

OR

- (iii) Any other methodology considered fit by CERC for allowing tariff on hearing the views of POWERGRID and beneficiary states.

4. **Facts and Observations:** From the foregoing and submissions made before us, the following are observed:

- (a) BHEL –make Converter-Transformers installed at Pole-II of Rihand – Dadri link have been in use for nearly 16 years.
- (b) It has taken nearly 4 years for the Appellant to persuade CEA and beneficiaries to grudgingly accord approval to procure 2 nos. Converter-Transformers from ABB. Appellant initially sought to procure 4 Nos. ABB-make Converter-Transformers, which subsequently was scaled down to 2 nos. However, the issue whether the acquisition was to be treated as additional new assets or as a replacement of old assets was left to CERC to Consider {refer paragraph 3.5(d)}
- (c) With the procurement affected for 2 nos. new Converter-Transformers the level of spare of 16.6% (2 Nos.) as envisaged in original system-design, shall increase to 50% (6 Nos.) of total 12 Nos. of on-line Converter-Transformers required in the System.
- (d) In April, 2005 Appellant in their petition to CERC stated that the total no. of failures of BHEL make Converter-Transformers is 14 till that date. Also in their submission they have stated as under:

“It won’t be out of place to mention here that failure of HVDC Converter-Transformer is not unique phenomenon occurring only in Rihand-Dadri HVDC link. A large number of failures are reported in CIGRE JTF B4.04/A2-1. As per the CIGRE report, the average failure rate o Converter Transformers is high and the figures are as follows:

<i>From 1970 to 1990</i>	<i>:</i>	<i>2.85%</i>
<i>From 1991 to 2002</i>	<i>:</i>	<i>2.31%</i>
<i>Combined from 1970 to 2002</i>	<i>:</i>	<i>2.52%</i>

It may be mentioned here that the failure rate of AC transformers with OLTC worldwide as per CIGRE survey published I May 1983. ELECTRA No. 88 is 1% in the voltage range of <700KV

It is to be submitted here that in POWERGRID, the failure rate of BHEL converter Transformers is 2.2% compared to the overall failure rate of 0.97% for all converter Transformers put together in POWERGRID. Though the failure rate of BHEL make Converter Transformers in POWERGRID are marginally lower than the world average, such failures causing HVDC pole outage results in wide spread power disruption to the consumers mainly due to lack of adequate redundancy as compared to other developed western nations. Further the wide gap of failure rate between BHEL and other make Converter Transformers point to some undiscovered inherent defect, which BHEL is still not in a position to address”.

- (e) It is claimed in (d) above that the failure of HVDC Converter-Transformers is not unique and failure-rate of BHEL make converter transformers is 2.2% which is well below the world average failure rate of 2.52%. If that is so, the system design of such links world-over would have resulted in minimum acceptable availability, which in case of Rihand-Dadri link is set at 95%. However, during the submissions before us, the Appellant confirmed that availability of Transmission links have been maintained at much higher level than the threshold of 95% and they have been claiming incentive as per the Tariff Regulations-2004. While we do not grudge claiming of incentive by resorting to efficient operation procedure and effective preventive maintenance it becomes unacceptable if excessive investment are made to have standby equipment at 50% level as against 16.6% of the on-line equipments envisaged in System Design.
- (f) RVPN (Rajasthan Vidyut Parsaran Nigam) has stated that the Appellant had earned 42 crores and 50 crores as incentive for higher than minimum stipulated line availability in year 2002-03 to 2003-04 respectively and have suggested that the cost of new Converter Transformers be recovered from this. These respondents have opposed the prayer made in the petition. They have submitted that with the procurement of two additional converter-Transformers, the availability of HVDC Bi-pole link shall improve as a result of which the petitioner will earn extra incentive. It has been, therefore, submitted that the petitioner should bear the cost of additional Converter-Transformers. These respondents have further submitted that in case procurement of two additional Converter-Transformers is approved, these should be treated as replacement of old assets and cost of the depreciated value of two

BHEL – make converter Transformers proposed to be replaced should be adjusted against the cost of new assets.

- (g) The additional converter-transformers now proposed to be procured had been catered for in the revised cost estimates approved by the Central Government (refer paragraph 6 CERC's Order). However, as acceptance of cost for additional capitalization by the CERC is subject to the "prudence check" (Refer para 3.3.2.) CERC appears to have examined the justification of the additional expenditure sought to be incurred and its burden on the consumers. Arising out of the "prudence check", CERC in their order have recorded their "...concern that sufficient safeguards were not built in the contract to protect the public interest against repeated failures..."
- (h) It is observed from the rate of failure data of all BHEL-make Converter –Transfer installed at Pole-II of Rihand – Dadri Transmission link submitted by the Appellant that out of a total of 14 failures observed in Pole-II, 12-failures (covered by 4 converter transformers) have occurred in converter-transformers installed at Rihand-end and only 2 failures (covered by 1 Converter-Transformers) at Dadri-end. Thus 12 out of 14 failures (Over 85% of the failures) are somehow related to BHEL make Converter-Transformers installed at Rihand-end of link, even though ABB-units installed for Pole-I at Rihand-end have never failed.
- (i) Appellant has submitted that approach to indigenization of the Converter-Transformers through transfer-of-technology to BHEL had reduced the cost of the equipment supplied to 28% of their imported cost from ABB Sweden. Appellant has submitted that arrangements of procuring Converter-Transformers from BHEL under their Technology-Transfer Agreement with ABB, Sweden,

beside indigenization was finalized essentially for the purpose of reducing the total project cost resulting in substantial cost advantage to Respondent beneficiaries and they acted bonafide in the larger public interest.

- (j) CERC's order as brought out at paragraph 3.4 (a) above allowed capitalization of one of the two converter-transformers' to be additionally imported provided its cost is adjusted by the residual cost of the two replaced converter-transformers which in turn shall be de-capitalized.
 - (k) Appellant has pleaded that "*BHEL make transformers can continue to be used productively as a standby transformer and no useful purpose will be served by removing the transformer from the above system by de-capitalization particularly, in view of the low depreciated value of such transformer. It is in the interest of the Respondents 2 to 13 that such transformers is continued to be used as a spare transformer and not de-capitalized and written off*".
5. **Analysis / Conclusion:** Considering the fact that Appellant have been, year after year, claiming incentive {Ref. paragraph 4 (f)} for achieving annual transmission-availability above the target-availability of transmission assets, it could well be said that the cost of additional procurement be met by the Appellant out of the incentive earned. On the other hand, the subject Rihand-Dadri HVDC link was not available upto the required level on account of failure of Converter-Transformers, the loss suffered by the beneficiaries for nearly 12 years, though difficult to be quantified, also can not be ignored. Moreover, as claimed by the Appellant if the rate of failure of BHEL make Converter – Transformers is well within the world average rate of failure, a question arises as to why should it not be expected to meet parameters of minimum acceptable

availability considered during system-design of the Rihand- Dadri link? Availability could always be increased by providing more redundant equipment but that will not meet the criteria of optimum design. In the instant case, if the replaced converter-Transformers on procurement of additional converter-transformers are not de-capitalized, the level of spare would increase from 16.6% to over 50%. CERC's order also indicate that the Appellant had not built-in sufficient safeguards in the contract to protect the public interest against repeated failures. While the cost of the proposed procurement is within the approved revised cost estimate {Refer para 4 (g)}, we also note that beneficiaries had approved the proposal of additional procurement purely on technical grounds with tariff implications to be decided by CERC. Appellant's approach of original procurement of HVDC-equipment through Transfer-of-Technology to BHEL for reducing the capital cost and indigenization appears bonafide as for nearly 16 years beneficiaries have enjoyed lower tariff.

In view of the above reasons and in order to maintain fair and just balance of interests between Appellant and Consumers and accepting the reasoning of Appellant at paragraph 19 of Submission dated 17th March, 2006 {Ref. paragraph 4 (k)}, we rule as under :

The two replaced units of Converter-Transformers shall be productively used as spare-standby along with those proposed to be imported and, therefore, not to be de-capitalized, provided:

- (a) that the cost of one converter-transformer to be imported is borne by the Appellant and not capitalized for tariff fixation.
- (b) that two units of existing-in-service converter-transformers continue to be capitalized for tariff fixation.
- (c) that the cost of second imported converter-transformer shall be capitalized for tariff purposes.

- (d) Subject to the foregoing conditions, incentive will be available to the Appellant in accordance with the regulations.

The appeal is allowed to the extent indicated above.

(A. A. Khan)
Technical Member

(Justice Anil Dev Singh)
Chairperson