



Policy and Regulatory Obligations in R&M Proposals

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HYDRO POLICY 1998 & 2008 ON R&M

- Renovation, Modernisation and Uprating of old hydro power plants was accorded priority
- To tide over resource constraint
- to overcome Shortage of Power
- Considered a cheaper and faster way of capacity addition than installing new capacities.



TARIFF POLICY DATED 6.1.2006 ON R&M

- Renovation and modernization to be encouraged
 - for higher efficiency levels needs (not to include periodic overhauls)
 - A multi-year tariff (MYT) framework may be prescribed
 - should cover capital investments necessary
 - to be assessed by the Appropriate Commission
 - an incentive framework to share the benefits of efficiency improvement between the utilities and the beneficiaries
 - revised and specific performance norms to be fixed by the Appropriate Commission.



Legal Framework

Electricity Act, 2003- Mandate for CERC

- **Tariff Regulation**
 - Generating companies owned or controlled by the Central Government.
 - Generators having a composite scheme of generation and sale of electricity in more than one State.
 - Tariff for inter-State transmission of electricity.
- **Additional responsibility of licensing, development of market, grid security etc.**



Legal Framework....

- Section 61- Guiding principles for tariff determination.
 - Factors encouraging competition, efficiency, economical use of resources, good performance and optimum investment
 - Safeguarding of consumer interest and at the same time recovery of cost of electricity in reasonable manner
 - Principles rewarding efficiency in performance
 - Guided by National Electricity Policy and Tariff Policy



Regulatory Approach

- Transparency
- Balancing the interest of Generators on one hand & beneficiaries on the other
- Encourage efficiency & Economy
- Encourage Investment
- System of incentive and disincentive for performance



Tariff Policy- General Approach to Tariffs

- ✕ Promote Multi-Year Tariff (MYT) framework.
- ✕ Tariff design : Linkage of tariffs to cost of service
- ✕ Encourage efficiency in operations by sharing of gains between licensees and consumers.
- ✕ To encourage better operating performance, norms
 - should be efficient,
 - relatable to past performance ,
 - capable of achievement and progressively reflecting increased efficiencies



Renovation & Modernisation

- Expenditure resulting in the extended life of the unit/station beyond useful life.
- Expenditure necessary for sustaining the operation of the plant on account of obsolescence or changed working conditions etc.



CERC Tariff Regulation 2014

15. Renovation and Modernisation

(1) The generating company or the transmission licensee, as the case may be, for meeting the expenditure on renovation and modernization (R&M) for the purpose of extension of life beyond the originally recognised useful life for the purpose of tariff of the generating station or a unit thereof or the transmission system or an element thereof, shall make an application before the Commission for approval of the proposal with a Detailed Project Report giving complete scope, justification, cost-benefit analysis, estimated life extension from a reference date, financial package, phasing of expenditure, schedule of completion, reference price level, estimated completion cost including foreign exchange component, if any, and any other information considered to be relevant by the generating company or the transmission licensee.

(2) Where the generating company or the transmission licensee, as the case may be, makes an application for approval of its proposal for renovation and modernisation, the approval shall be granted after due consideration of reasonableness of the cost estimates, financing plan, schedule of completion, interest during construction, use of efficient technology, cost-benefit analysis, and such other factors as may be considered relevant by the Commission.

(3) Any expenditure incurred or projected to be incurred and admitted by the Commission after prudence check based on the estimates of renovation and modernization expenditure and life extension, and after deducting the accumulated depreciation already recovered from the original project cost, shall form the basis for determination of tariff.



Renovation & Modernisation for Extended Life

- A Detailed Project Report giving complete scope & justification,
- Cost-benefit analysis,
- Estimated life extension from a reference date,
- schedule of completion,
- Reference price level,
- Estimated cost



R&M Proposal for Barasuil HEP (3x 60 MW) of NHPC

- The project COD is 01.04.1982 and would be completing its stipulated useful life of 35 years during 2017. Capital Cost as on 1.4.2016 is 208 Crore and resultant annual Fixed charges are 133.55 Crore.
- Life of the power station is estimated to be increased by 25 years after completion of R&M works i.e. from 01.04.2021.
- Uprating of units not envisaged.
- Design Energy revised to 740 MU from existing 779 MU due to revised hydrology data
- Schedule of R&M
 - Unit #1: Dec 2017 to Dec 2018
 - Unit #2: Jan 2019 to Jan 2020
 - Unit #3: Feb 2020 to Feb 2021



Breakup of R&M Cost for Bairasul HEP of NHPC

Sl. No.	Description	Amount (Rs. Crore)
A	Civil works	
1	Direct charge, I- works	
	C-works & J-power plant civil works	52.32
	K- Buildings	16.76
	O-Misc.	2.14
	Establishment, T&P & losses on stock	9.31
	Total Direct charges	80.53
2	Indirect charges	0.36
	Total civil works	80.89
B	Electrical works	200.47
	Total cost (Civil + Electrical)	281.36
	IDC & FC	79.43
	Total cost	360.79 (Rs 2.0 Cr/MW)



HYDRO R&M UNDER VARIOUS PLANS

PLAN	Central/State	Installed Capacity (MW)	Estimate (Rs Cr)	Actual (Rs Cr)	Benefits (MW)
VIII	2/11	1282	125	127	429
IX	8/12	4892	598	570	1093
X	5/27	4337	1016	1029	829
XI	4/14	4821	413	295	735
XII	2/18	4015	1266	1049	534

Source- CEA



Cost Benefit Analysis for Barasuil HEP (3x 60 MW) of NHPC

- The cost/MW of R&M works of Baira Siul Power Station is about Rs. 2 Crore only as against Rs.8-10 crore/MW for new hydroelectric power plant of similar size.
- The Levellised tariff works out as Rs. 3.96/unit after completion of R&M as against Rs 6.37 /unit for a new hydro Project of similar capacity, considering the capital cost of Rs. 10 Crs./MW & design energy of 740 MU. The approved tariff of the generating station is Rs. 1.54/Unit for 2013-14. therefore, R&M of the station is cost effective proposal.
- The life of station would extend by another 25 year post R&M from 1.4.2021.
- Design energy considered is 740 MU as against existing of 779 MU.



Factors considered by the Commission

- The R&M proposal has been prepared based on CEA recommendations described under “Chapter- 7, of Best practices for RMU & LE of hydro power plants”.
- Post R&M Station/ Unit Capacity has been decided based on proper "Power Potential Studies"
- The levellised tariff calculations as submitted by the petitioner were found to be in order.
- The post R&M tariff compares well with the tariff of Rs.5 to 6/kWh for newly constructed hydro power projects.
- DPR, the R&M cost and Design Energy has been vetted by CEA subject to certain conditions.
- CEA in its report dated 8.2.2016 has vetted R&M proposal.



Commissions In-Principle Approval

In-principle approval to the R&M proposal for life extension of the Bairasiul generating station by 25 years w.e.f 1.4.2021 at capital cost of Rs. 341.41crore including IDC of Rs.68.35 crore subject to the following conditions:

(a) The petitioner shall engage one of the Independent Agencies designated by the Commission, during execution of the R&M which shall be vetting completion capital expenditure on R&M of the project.

(b) During the period of unit shut down/station shut down for the purpose of carrying out R&M activities, the petitioner shall keep the following two separate records and shall submit the same to the Commission along with the tariff petition for approval of capital cost after R&M of the generating station:

(i) IEDC including man power cost, construction power cost, water charges etc. booked to R&M activities;

(ii) Normal O&M expenses of the generating station (not booked to R&M expenditure) which are not avoidable even when the unit/s/station is under shut down.

(c) As per CEA`s report dated 8.2.2016, the petitioner shall conduct a model study in respect of the losses in water conductor system in the post renovation scenario to take into account any improvement in the lining etc. of the water conductor system and the design energy from the project would be firmed up based on the same as well as the efficiency of the TG units in the post renovation scenario.



Regulatory View

- Supportive towards R&M of Hydro plants considering
 - Slow pace of hydro development in the country
 - Inherent advantages of continuation of existing hydro projects
 - Cost effective option
- Subject however, to looking into cost benefits, consumer benefit and other intangible benefits

THANKS