Before

UTTARAKHAND ELECTRICITY REGULATORY COMMISSION

Pet. No. 18 of 2014

In the matter of:

Petition for approval of "Capital Investment for Renovation & Modernization" of 3x66 MW Ramganga HEP of UJVN Ltd.

And

In the matter of:

UJVN Ltd. Dehradun ……. Petitioner

Coram

Shri Subhash Kumar **Chairman**
Shri K.P. Singh **Member**

Date of Order: February 12, 2016

ORDER

This Order relates to the Petitions filed by UJVN Ltd. (hereinafter referred to as "UJVN Ltd." or "the Petitioner") under Regulation 25 of UERC (Terms and Conditions for Determination of Tariff) Regulations, 2011 for seeking approval of the Capital Investment for Renovation & Modernization (R&M) of 3x66 MW Ramganga HEP.

2. UJVN Ltd. vide its letter No. 4196/MD/UJVN/U-6 dated 08.07.2013 had filed an Application seeking prior approval in the matter of Capital Investment for Renovation & Modernization of 3x66 MW Ramganga HEP.

3. The works proposed under Renovation and Modernization (R&M) of Ramganga HEP, broadly categorised in Civil and Hydro-mechanical Works, Power Plant and Accessories (E&M) alongwith other various heads viz. Preliminary expenses, maintenance, ordinary T&P etc. The estimated cost submitted for the proposed works is as follows:-

Sl. No.	Item	Cost (₹ in Lac)
A	**Works**	
1	Preliminary	76.80
2	Civil & Hydro Mechanical Works	403.00
3	Maintenance @1% of Civil Works	4.03
4	Power Plant & Accessories (E & M)	33561.91
	Total A- Works	**34045.74**
B	Establishment @ 4% of Civil Works & E& M (being an RMU Project)	1358.60
C	Ordinary T&P @1% of A-Works	340.46
D	Losses on stocks @ 0.25% of Civil Works	1.01
E	Receipt & Recoveries	-2.94
	Total Direct Charges	**35742.86**
F	Indirect Charges (Audit & Account @1% of A-Works)	340.46
	Grand Total	**36083.32**
	IDC	9437.45
	Total Cost Including IDC	**45520.77**

Thus, the Petitioner has submitted proposal of ₹455.21 Crore including IDC for R&M works of Ramganga HEP.

4. The Petitioner has submitted that the project will be financed with Debt-Equity ratio of 70:30 and equity will be provided by the Government of Uttarakhand with the budgetary support while debt would be arranged from the financial Institutions/Banks.

5. The proposal was examined and following deficiencies were sent to UJVN ltd. vide letter No. 991 dated 14.10.2013:

"

1. *UJVN Ltd. is required to provide and executive summary according to the provisions made in Regulation 25 of UERC tariff Regulations, 2011 viz. detailed project report giving complete scope, justification, cost benefit analysis, estimated time extension from a reference date, financial package, phasing of expenditure schedule of competition, reference price level estimated completion cost(inclusive of foreign exchange) record of consultation with beneficiaries and any other information considered to be relevant etc.*

2. …

3. *In Annexure-II of UJVN Ltd.'s application, the cost estimate and fund requirement and the gross prices of the equipment are shown, however, the detailed cost estimate*

equipment/ parts wise need to be provided.

4. *…*

5. *UJVN Ltd. is required to submit the relevant document assuring that Govt. of Uttarakhand is ready to provide 30% equity.*

6. *UJVN Ltd. in its submission has proposed that the reverse engineering to be done after opening of the machine. This will require design, preparation of specifications, placing of order and model testing. UJVN Ltd. is required to submit a detailed bar chart for the same in order to be adhered with the time schedule.*

7. *…"*

6. The Commission directed UJVN Ltd. to make a Power Point Presentation covering the above point and seek a convenient date and time from the Commission for the Presentation. Meanwhile, following additional deficiencies were also issued to UJVN Ltd. vide letter No. 1063 dated 31.10.2013 for submitting the information/clarification:

"

1. *UJVN Ltd. to justify the need of the proposed capital expenditure towards RMU of the plant as per the Regulations. UJVN Ltd. should also clarify whether the scope of the proposed RMU works is based on a study conducted by an independent/ external expert Agency or the proposed capex is merely based on the in-house assessment of UJJVN Ltd. The methodology employed for arriving at the scope of work be elucidated.*

2. *The existing generation capacity submitted by UJVN Ltd. of Ramganga LHP is 60 MW against rated capacity of 66 MW and through RMU, UJVN Ltd. intends to attain the rated capacity of 66 MW for which it has estimated a cost of Rs. 455.21. However, basis of capital cost of each element namely E&M, hydro-mechanical and civil works has not been provided. Therefore, UJVN Ltd. should submit the basis of these capital costs.*

3. *Moreover, even after incurring a cost of Rs. 455.21 Crore increase in generation envisaged after RMU is 41.73 MUs which works to an increase of around 9.42%. In this regard, details of month-wise generations of plants which have undergone RMU, like Pathri, Mohammadpur & Galogi post RMU period and pre RMU period for atleast past 3 years must be furnished.*

4. *Section VIII-RM&U Options of the DPR suggests the following three options for RMU works which are given below:*

Option I: *Replacement of the stations auxiliary systems as far as required and refurbishment of the other parts of the equipment, whose maintenance costs are extraordinary high.*

Option II: *Same as Option I plus replacement of vital parts of generating units such as turbine runners, guide vanes, governors, generator stator & rotor and excitation system. This option aims at enhancing the efficiency of the generating units up to an acceptable level at moderate cost.*

Option III: *Full replacement of the generating units with all station auxiliaries. This option aims at the achievement of the maximum power generation of the plant.*

UJJVN Ltd. in the DPR has selected Option II for the RMU works. However, from perusal of Annexure II: Cost Estimate it appears that UJVN Ltd. is proposing to replace the entire Plant & machinery of Ramganga LHP as given in Option III.

Reasons for deviation should be furnished.

5. *Cost-benefit analysis and Pay-back period of the capital cost post RMU of Ramganga LHP should also be furnished.*

6. *Considering that this plant has been achieving 19-20% PLF and runs as and when water is released by irrigation Deptt., UP, rationale of such large investment need to be indicated."*

7. In response, UJVN Ltd. submitted its reply vide letter No. 956 dated 10.02.2014 and the Commission to fixed the date for making the presentation on 18.03.2014.

8. The Presentation was made on the scheduled date and with regard to the discussions held during the Presentation, the Commission vide its letter No. 1774 dated 31.03.2014 directed UJVN Ltd. to furnish details of Generation, water release, outages (Forced/Planned) and details of machine-wise Maintenance Cost of last three years pertaining to Ramganga HEP by 07.04.2014. In compliance to this, UJVN Ltd. vide its letter No. 3044 dated 03.05.2014 and letter No. 456 dated 27.08.2014 submitted its reply.

9. After examining the above submissions, a Report was sent to UJVN Ltd. vide letter No. 1637 dated 28.11.2014 with an advice to prepare a revised estimate alongwith actual generation, realistic energy potential, de-rated capacity at current price level so as to have a financially viable R&M project.

10. In pursuance to the issues pointed out in the aforesaid Report, UJVN Ltd. vide letter No. 123 dated 23.01.2015 submitted that:

"

…Ramganga Power Station is the only storage scheme available with UJVN Ltd with an installed capacity of 198 MW and it will be prudent to restore this capacity so that same could be utilized in case of power requirement in future. It is clear that peaking and or release of water is fully under the control of U.P irrigation Department but it will not be proper to restrict the generating capacity to 165 MW. It is proposed that power station is restored to its maximum capacity without considering any reduction."

3.2 RM measures for Equipments:

…in order to avoid the interfacing problems of old and new equipments….related components shall be changed from the refurbish category to replace category.

3.5 RM measures needing consideration:

***3.5.1** Guide Vanes and Regulation Rings:*

"…the slit related problems are almost negligible, therefore, the same is not proposed to be considered."

3.5.2 Turbine Runners:

"…it has been proposed to replace all the turbine parts except the embedded parts as the slit related problems are almost negligible, therefore, hard coating with tungsten Carbide with ceramic based compound is not proposed to be considered."

3.5.3 Transformers:

The transformers are very old and not considered to be reliable in view of damages which have occurred to the generator transformers at one of our power stations i.e. Khatima HEP. The time for transportation of the transformer to the manufacturer's works and back including its repair is likely to be quite high and it will not be prudent to simply undertake the refurbishment after conducting tests.

The station and Unit auxiliary transformers are ASKREL filled and the similar transformers at other power stations viz. Chibro & khodri have already been replaced as ASKREL oil is considered as dangerous & carcinogenic. Substitution of ASKREL will be difficult at our end along with its disposal, therefore, it is proposed to replace these transformers with latest state of the art Dry Type Transformers which are reliable and safe.

Replacement of lower seals & motors of bypass valves as per S. No. 1.1.9 & 1.3 of Annexure –II respectively is not very significant but on the contrary their refurbishment may not be reliable. Therefore, it has been considered appropriate to replace them.

…it will be ensured that the performance of the refurbished generator is equivalent to the new one.

4.0 R&M Schedule:

The RM is expected to be completed in 43. 5 months as discussed during the presentation but may vary according to the contract conditions. Sequence of taking up different units shall be decided by UJVN Ltd as suggested vide para 2.3 "Conclusion on need for RM".

The extent of refurbishment will be reduced as new generating equipments are proposed and the involvement of transportation of dismantled parts will be restricted. The likely shutdown for each of the Units will be 7 ½-9 months as already expressed during the presentation.

5.0 Energy Potential and Plant Capacity of RGPS:

The point raised in the report regarding determination of average annual generation in para 2 seems to be correct and average annual generation can be considered as 411.926 MU instead of 408.27 MU.

…The consideration of design energy as 450.73 MU seems to be proper & may not be considered as conceptual flaw. Accordingly, the financial analysis has been carried out (Annexure: 1) and the results are as under:

Factor	***Unit***	***DPR cost as approved by UJVNL Board (Dec 2010 price level)***
IRR	*%*	*12.32*
BCR	*-*	*1.35*
Tariff for 1st year	*Rs. per kWh*	*2.07*
Levelized tariff	*Rs. per kWh*	*0.72*
Tariff after repayment of loan	*Rs. per kWh*	*1.50*

…Ramganga has now been in operation for almost 40 years, therefore, it will be appropriate to consider not more than 10 years as the remaining life.

The results on the financial analysis on the above basis are as under (Annexure: 2):

Factor	***Unit***	***DPR cost as approved by UJVNL Board***
IRR	*%*	*15.27*
BCR	*--*	*1.69*

***6.2 Basis of** Cost estimated by UJVN*

The estimated value of the E&M works was Rs. 335.61 Crore as per the DPR submitted to Hon'ble UERC for investment approval and the tender was also floated for the above value. During the pre-bid meeting held on 10.10.2013, the discussions were held regarding replacement of generating equipment 7 generator transformer in place of refurbishment but the issue of estimated value was not raised by any of the prospective bidders. Therefore, cost of the project of Rs. 360.83 Crore without IDC & Rs. 455.20 Crore with IDC seem to be in order along with the estimated value of the E&M works.

6.3 Updated Cost estimate

…the updation cost estimate may not be considered in the present circumstances. However, the updation/revision shall be carried out at an appropriate time & approval shall also be obtained from UJVNL Board, thereafter, the same shall be informed to Hon'ble UERC & lending institution.

6.4 IRR, Benefit/Cost ratio and Tariff

These are already been worked out in the DPR for project cost of rs. 360.83 Crore without IDC & Rs. 455.20 Crore with IDC and are as given below:

Factor	***Unit***	***DPR cost as approved by UJVNL Board (Dec 2010 price level)***
IRR	*%*	*12.97*
BCR	*---*	*1.41*
Tariff for 1st year	*Rs. per kWh*	*2.07*
Levelized tariff	*Rs. per kWh*	*0.72*
Tariff after repayment of loan.	*Rs. per kWh*	*1.50*

However, considering the average annual generation of 411.926 MU, the values have been worked out as follows:

Factor	***Unit***	***DPR cost as approved by UJVNL Board***

		(Dec 2010 price level)
IRR	*%*	*12.32*
BCR	*--*	*1.35*
Tariff for 1st year	*Rs. per kWh*	*2.07*
Levelized tariff	*Rs. per kWh*	*0.72*
Tariff after repayment of loan	*Rs. per kWh*	*1.50*

It is seen that the BCR is more than 1 in both the cases and thus the RMU project is financially viable. "

…

"The need for RMU of the project has been very well recognized in the report but recommendation of the de-rating the plant to 165 MW would defeat the very purpose of RMU and our existing sources will be diminished.

It has become necessary to go for extensive RMU of the Project considering the present scenario of demand-supply gap in Uttarakhnd, further life extension of the Project, non-availability of spares, degradation in the efficiency of the generating units due to 35 years of continues operation, erratic behaviour of the old components, non-availability of automation & SCADA, ever changing requirements of grid and directives of Hon'ble Commission which has also been explained in the above report.

It is therefore humbly requested that approval of Rs. 360.83 Crore without IDC & Rs. 455.20 Crore with IDC of Capital investment for Renovation, Modernization of 3X66 MW Ramganga HEP of UJVN Ltd may kindly be accorded at the earliest."

11. In addition to the above submission, UJVN Ltd. has submitted that need of RMU of the projects has been very well recognized for life extension of the project, however, de-rating of the Plant to 165 MW would defeat the very purpose of RMU. Besides above, UJVN Ltd. has submitted that considering the present scenario of demand-supply gap in Uttarakhand, non-availability of spares due to continuous operation of more than 35 years, degradation in the efficiency of the generating units due to 35 years of continues operation, erratic behavior of the old components, non-availability of automation & SCADA, ever changing requirements of grid etc., it has become necessary to go for extensive RMU for life extension of the Project and requested the Commission to accord approval of ₹360.83 Crore without IDC and ₹455.20 Crore (with IDC) for the proposed R&M works of Ramganga HEP.

Commission's Observations, views and decision

12. On examination of the submissions of the Petitioner, the Commission has observed that:-

(1) Project was originally conceived and constructed for irrigation and flood control purpose. The power station was planned and executed at a later stage as an auxiliary benefit resource. As such its running is dependent on irrigation requirement and availability of water which is under the control of UP Irrigation Department (UPID).

(2) The Ramganga HEP has been rendering service for more than 38 years. The Unit-wise operating hours of all the three Units upto 2008-09 are as follows:

	Units-I (Dec-1975)	**Units-II (Nov-1976)**	**Units-III (Mar-1977)**
Total hours of operations upto 2008-09	78515	63472	93534

(3) Due to non-availability of water discharge based on irrigation requirements, the Plant almost remains closed for more than 5 months in a year during 11 years out of last 14 years as per details given below:

Discharge details of Ramganga HEP during last 14 years

Year	**Maximum discharge Release (Cusec per day)**	**Maximum discharge No. of days during the year**	**Zero discharge No. of day during the year**
1999-00	5261.37	1	163
2000-01	4498.75	1	280
2001-02	5731.00	1	180
2002-03	5008.00	2	151
2003-04	6405.00	1	183
2004-05	5633.33	1	165
2005-06	5464.23	1	141
2006-07	5301.00	2	165
2007-08	5344.00	6	171
2008-09	5767.00	1	163
2009-10	6016.00	4	208
2010-11	5325.00	2	130
2011-12	7480.00	2	129
2012-13	5500.00	6	178

It has been observed from the above table that the water availability for 8 years out of 14 years does not assure the quantum of discharge more than

5500 Cursec in a day against the design requirement of 8100 Cusec in a day. The water discharge of more than 5500 Cusec day was for 10 days only during last 14 years. With discharge of 5500 Cusec in a day the maximum possible generation from the HEP in 131 MW.

Moreover, from the submission of UJVN Ltd. it has also been observed that carrying capacity of the canals due to silting in the downstream limits the discharge to be release from the reservoir even if water is available in the reservoir.

(4) The 9.42% gain in energy after R&M of the HEP is based on assumption that the design efficiency of the Turbine would be achieved. Though, the change in design of runner may improve the efficiency beyond the Design efficiency, however, that is neither the objective nor anything is assured in this regard. The Commission is of the view that consideration of financial viability should generally be based on Actual Annual Average Generation and Realistic Energy Potential of the station based on its past performance on the quantum of water discharge actually available during such period rather than on some unachievable design figures.

(5) With regard to energy potential and Plant capacity of Ramganga HEP it has been observed that the design annual energy potential of the Plant is 450.73 MU and UJVN Ltd. has submitted that after R&M the average gain in generation would be 9.42%. From the records of UJVN Ltd. it has observed that the average annual generation of Ramganga HEP is 295.65 MU since beginning. Therefore, considering the increase of 9.42% generation after R&M, the realistic annual energy potential based on actual average generation would be 323.5 MU, hence, the financial analysis (IRR, Tariff, and Banefit to Cost Ratio) in the DPR carried out on the basis of design energy potential 450.73 MU and average annual generation as 411.92 MU is farfetched and imaginary.

(6) Moreover, recovery of cost through tariff at a lower power output/generation, would necessarily be at a higher rate/tariffs making the project commercially uncompetitive. Such eventual higher generation cost would burden the consumers of the State.

13. The Commission is of the view that till the regulation & control of water comes in the hands of UJVN Ltd., such comprehensive RMU works are not economically justified as the average water discharge in the past has always been and in future would always be less than the design discharge and consequent energy generation from the HEP as proposed by UJVN Ltd. would never reach 450.73 MU. This in turn would impact UJVN Ltd. substantially as the annual generation would never match the design energy and such situation would lead to under-recovery of AFC of UJVN Ltd., which will not be in the interest of the Petitioner Company as well as to the consumers of the State. Therefore, considering the limitation of discharge at this point of time and insignificant gain, the Commission is of the view that the comprehensive RMU of the Plant as proposed by UJVN Ltd. cannot be approved.

14. The Commission has taken note of the submissions made by the Petitioner in the Petition and also during the course of the proceedings. However, the Commission is unable to comprehend the need for making such heavy investments as the water discharge will always be a limitation in achieving the proposed rated design energy. This constraint has also been discussed in detail in the preceding paragraphs of the order. Hence, in view of the above, the Commission does not approve the proposal of the Petitioner to carry out extensive RMU of the HEP till the time the regulation & control of water discharge of the Plant comes in the hand of the Petitioner Company and it is able to establish that after the RMU, the Plant would be able to achieve the original design energy.

Ordered accordingly.

(K.P. Singh)
Member

(Subhash Kumar)
Chairman