

Pre-feasibility (PFR) study based on ground survey of the river basin, its topography and hydrology was to be carried by Uttarakhand Jal Vidhyut Nigam Limited (UJVNL), the nodal agency, for accurate evaluation of the hydro-power potential of a river/stream. However, significant alterations ranging from 22 per cent to 329 per cent in the capacity of 85 per cent of projects, raised serious doubts on the credibility of PFR studies.

There was no technical institutional mechanism to verify the basis of capacity enhancement as variations were noticed in the norms for computing the power potential in the capacity enhancement proposals of project developers.

The systemic deficiencies were used by the project developers in their favour as out of 13 sample projects, nine projects were designed to be pegged just under the threshold of 25 MW to garner maximum benefits from enhanced capacity and to avoid enhanced royalty payment, which would have become due had the capacity been fixed at 25 MW or more.

There were instances of undue extensions, without charging for liquidated damages, for implementing the projects in the garb of capacity revision, implying loss of royalty and deprivation of anticipated benefits from electricity. In addition, the Government also faced the potential of huge financial losses on account of upfront premium.

3.1 Inadequate pre-feasibility studies

UJVNL was responsible for data collection and for conducting pre-feasibility studies relating to the 48 sites, prior to their bidding. For a proper evaluation of the hydro power potential of a river/stream, pre-feasibility studies involving a ground survey of the river basin or sub-basin covering its topography and hydrology, is essential. The river flow volume and the elevation at a particular location are key inputs to assess hydro-power capacity and are thus critical for the identification of potential project sites.

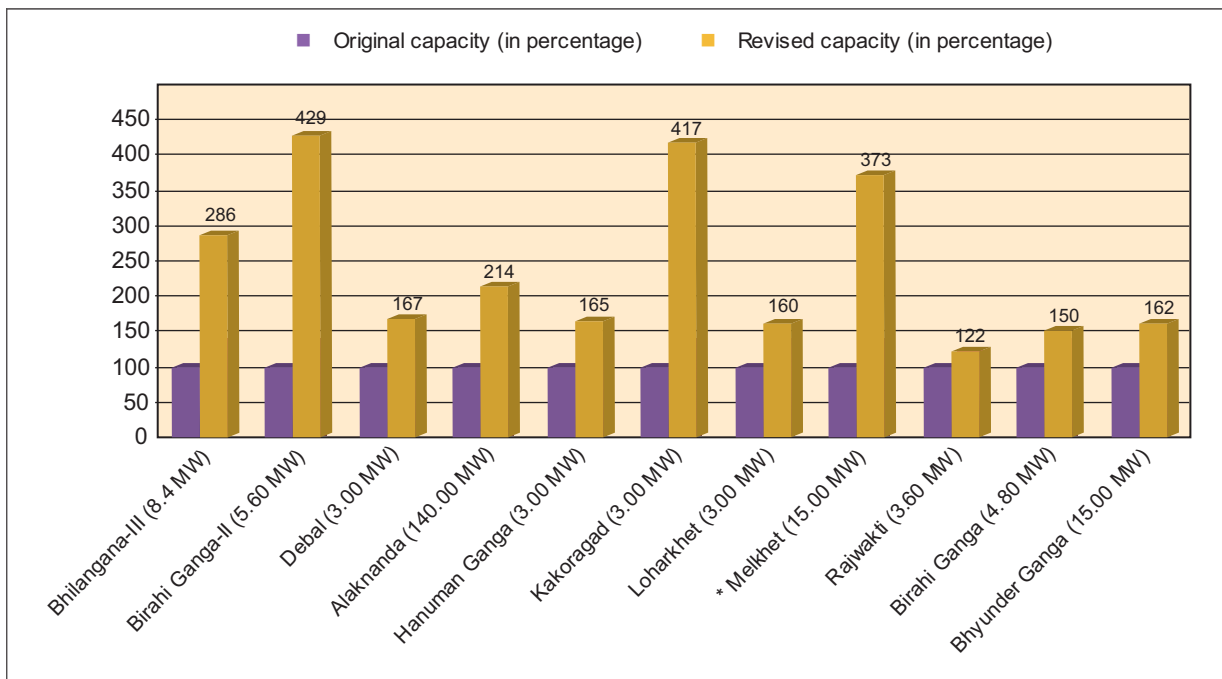
The State's policy for hydropower development identified 48 hydro-power project sites along with their estimated potential. It was informed by UJVNL that these sites were identified by

the erstwhile composite State of Uttar Pradesh based on topographical survey sheets prepared by Survey of India. However, Audit noticed that the topo-sheets were based on a scale⁷ of 1:50000 or 1:25000, and therefore these do not show small differences in elevation that are required for identifying project sites and planning small hydro-power projects.

Audit scrutiny further revealed that, out of the 13 projects test checked, the capacities of 11 projects (constituting 85 per cent of the sample) were significantly revised in the pre-implementation stage as illustrated in the chart :

⁷ Source: Manual on development of small hydroelectric projects.

Chart: 3



Source : Information extracted from the records of UJVNL.

*In case of Melkhet, the approval on revised capacity is awaited from GoU.

This illustrates the fact that the authorities had not diligently carried out the Pre-feasibility (PFR) studies based on ground survey of the river basin, its topography and hydrology for accurate evaluation of the hydro-power potential of a river/stream as significant alterations ranging from 22 per cent to 329 per cent in the capacity of 85 per cent of projects were noticed, which raised serious doubts on the credibility of PFR studies.

Audit scrutiny of records of one of the selected project-Bhilangana-III hydro project revealed that the pre-feasibility study was fraught with lapses. This project was initially estimated to have a potential of 3 MW. Based on the pre-feasibility study, the capacity of the project was enhanced to 8.4 MW. At the DPR stage; the project developer reported a variation both in water discharge (from 9.8 m/sec to 15.5 m/sec i.e. 58 per cent increase) and gross head (from 102 m to 229.2 m i.e. 125 per cent increase)

following which, the capacity of the project was again enhanced to 24 MW.

As a consequence, the deficient pre-feasibility studies and enhancement of capacities of the projects post bidding and allotment led to inordinate delays in project implementation and consequent realization of benefits from the projects, as project developers had to repeat the whole process of obtaining permissions and clearances for the enhanced capacities. This has been elucidated further in **para 4.1** of this report. Very often developers proposed enhancements as a ruse to obviate the threat of penal action for delays. These enhancements and the consequent delays in project implementation also caused financial loss to the Government as discussed in para 3.4 of this report.

The State Government, while accepting the audit observations, intimated that henceforth these studies are being conducted by UIPC which has upgraded the standard of the studies and leaves little scope for variation.

3.2 Allotment of projects

3.2.1 Allotment by Government of Uttar Pradesh

Allotment of hydro-power projects in the erstwhile composite State followed a single stage clearance based on technical and financial strength of the prospective developers. A total of 34 projects got allotted in this manner in the year 1993.

Audit found that the core competence of several of the entities allotted projects by this method lay elsewhere, such as in steel production, tourism, sugar manufacture, water supply projects, general construction etc. and they had no prior experience of working in the power sector. At least two of the developers who were allotted a total of six projects could not qualify in the more rigorous selection process adopted by the GoU as discussed later in the report. One developer was rated D by a reputed financial rating company as it had defaulted on loan repayments. The slow pace of project development and implementation noticed in the case of most of the developers allotted projects under the composite State of UP, raise doubts on their technical/financial credentials and the method used for allotment.

After the creation of Uttarakhand; the State continued with the same developers by entering into fresh Implementation Agreements (IAs) with them. However, despite inclusion of certain clauses in the IAs, the Government failed to enforce these with most of the developers, as mentioned in **para 4.2**.

3.2.2 Allotment by GoU

In terms of the hydro-power policy, UJVNL was designated to undertake the bidding process for allotment of hydropower projects under the policy. The projects were to be allotted on a Build, Own, Operate and Transfer (BOOT) basis. The policy laid down the parameters for

pre-qualification of bidders for the proposed projects. These were based on:

- ◆ Past experience of development, construction and operation of hydro power projects or experience in the power sector.
- ◆ Financial capacity to mobilize the required resources.

Applicants are required to qualify on both the above counts for being considered for competitive financial bidding for project allotment.

Audit scrutiny of the bidding process revealed that bid evaluation at the prequalification stage is based on three sets of criteria:

- i. Technical Strength⁸
- ii. Project Development Experience⁹
- iii. Financial strength¹⁰

For pre qualification, bidders are required to meet the minimum criteria for financial strength, specified for each project. In addition, the bidder has to cross the minimum threshold score of 50 *per cent* both in aggregate and separately for technical strength and project development experience for being treated as qualified for financial competitive bidding. Financial bids are then invited from qualified applicants for premium payable upfront to the GoU. The minimum threshold premium has been kept at

⁸ Based on experience in site investigation & preparation of DPR, Design & engineering, Civil construction, Equipment supply & erection, Operation & Maintenance of hydroelectric power projects/other power projects/similar projects.

⁹ Based on experience in development of hydroelectric projects/other power projects/similar projects as lead developer, co-developer or equity participant.

¹⁰ Indicative of ability to raise equity and debt for the project which is judged on the basis of Net worth, Net cash accruals, Debt raising capacity and profitability.

Rs. 5 lakh per MW for projects upto 100 MW and Rs. 5 crore per project for projects above 100 MW. The project is finally allotted to the bidder making the highest bid.

Audit analysis revealed that, despite elaborate bidding process which was carried out, with the assistance of renowned financial firms, several applicants lacking core competence in the power sector in general, not to speak of hydro-power, have been awarded projects. This primarily was a result of the presence of some clauses in the detailed qualifying criteria which proved to be open-ended. Firstly, applicants merely by tying up with a technical consultant on the basis of a MoU could obtain scores primarily on the basis of the technical strength and experience of the technical consultant. Then applicants could put together a consortium and score points on the basis of the experience and technical strength of consortium partners without their ever acquiring a significant stake in the project. Marks could also be scored on the basis of experience of any project other than hydro projects and other power projects undertaken by the applicant.

Audit further noticed that the decision to recognize diesel generator installations as

power projects also allowed applicants with core interest in very different areas to qualify. Out of a total of 14 hydro-power projects which have been allotted during 2003-06, projects were awarded to applicants with core interest in sectors other than power. Details in table 2:

3.3 Deficient institutional structure for technical approval

After completion of the bidding process, the report on qualified bidders and quoted amounts is sent to the Evaluation and Recommendation Committee. This committee examines the report and finalizes the allocation of hydro-electric projects to the successful bidders. Based on the recommendations of the committee, projects are awarded to the IPPs.

IPPs are thereafter, required to prepare a Detailed Project Report (DPR) after carrying out necessary investigations and surveys. The DPR for each project is scrutinized by Technical Response Committee (TRC) of UJVNL and then forwarded to the Government for final approval after examination by the 'Urja Cell' under the Department of Energy.

Table: 2

| NAME OF THE PROJECT | CAPACITY (IN MW) | PRIVATE DEVELOPER | CORE COMPETENCE | PRIOR EXPERIENCE |
|-----------------------------------|------------------|-------------------------------|---|--|
| Mori Hanol Jimbagad | 63.00 7.70 | Krishna Knitwear | Manufacture of cotton & polyester yarn, knitted fabrics and garments | Installation & operation of diesel gen-sets |
| Nandakini III | 19.50 | Vishal Exports | Export of agro-products | Wind power |
| Birahi Ganga I Birahi Ganga II | 24.00 24.00 | P.E.S. Engineers Pvt. Ltd. | Manufacture, fabrication, erection, testing and commissioning of mechanical equipment | Fabrication & erection of penstock pipes |
| Hanol Tuni | 60.00 | Sunflag Iron & Steel Co. Ltd. | Automobile spring steels | In building sub-stations and laying of transmission lines. |
| Bhilangana-III | 24.00 | Polyplex Pvt. Ltd. | Manufacture of thin polyester film | Installation & Operation of diesel gen-sets |

Source : Information extracted from the records of UJVNL.

Audit analysis revealed that, proposals for enhancement of capacities by developers after the allotment of sites, constitutes a gray area. It is at the stage of undertaking detailed investigations for the purpose of preparing DPRs that project developers often come up with proposals for revision of project capacity. Even though such proposals were made in a large number of projects, eleven out of total thirteen sampled projects, the procedure for approving these proposals was found to be riddled with deficiencies:

- ◆ The approval on the proposals for enhancement in capacity is given by the administrative head of the Department of Energy without the technical scrutiny of UJVNL.
- ◆ There is no technical institutional mechanism available with 'Urja Cell' to cross-verify the basis of capacity enhancement; and claims made regarding variations in water-discharge or elevation of the location are accepted on the basis of statements given by either the irrigation department or the district administration who do not have the required technical expertise in the area of hydro-potential estimation.
- ◆ The projects with capacity marginally below 25 MW pose a real problem with regard to the accuracy with which project capacity can be established. Out of the 13 projects in the audit sample, approvals have been given to nine projects, for enhancing the capacity upto 24 MW. Audit analysis further revealed that projects with a capacity of 25 MW and above are to carry out detailed environment impact assessment and have to obtain environmental clearance from the GOI. Besides, projects below 25 MW enjoy an exemption from paying royalty for the initial 15 years of operation, while projects with a capacity of 25 MW or more are liable to pay 12 per cent of net energy supply as royalty. Thus, the systemic deficiencies were used by the project developers in their favour as out of 13 sample projects, nine

projects were designed to be pegged just under the threshold of 25 MW to garner maximum benefits from enhanced capacity and to avoid enhanced royalty payment, which would have become due had the capacity been fixed at 25 MW or more.

On being pointed out the Department stated that there are various factors linked with the mechanism, i.e deficiency in knowledge pool, shortage of man power, limited resources etc. However, it was assured that efforts are underway to resolve the deficiencies by strengthening the Urja Cell with adequate qualified technical man-power.

The deficiencies described above are corroborated by the audit findings witnessed in the following two projects test checked.

3.3.1 Melkhet Hydropower Project

The Melkhet Hydro-Power Project was identified with an estimated potential of 15 MW. After the creation of Uttarakhand, the GoU entered into an IA with M/s Melkhet Power Private Limited, a subsidiary of the original promoter M/s K.M. Sugar Mills Limited in April 2004.

In terms of the IA, the project developer was required to achieve financial closure and also obtain all statutory clearances and approvals for setting up the project by October 2005 (within 18 months). As the project developer failed to meet this requirement even after a lapse of 20 months, a termination notice was issued (December 2005) by the Government. In response, however, the project developer proposed capacity enhancement from 15 MW to 24 MW, based on claims of increase in water discharge from 33 cumecs to 52.2¹¹ cumecs and sought extension of time for attaining financial closure. However, no

¹¹ The change was justified on the ground that earlier the computation of average year was taken for 50% dependability and six monthly mean flow while in the revised DPR it was computed at 75% dependability and ten days mean flow.

efforts were made by the developer for complying with the other pre-implementation requirements such as getting forest clearances and completing acquisition of private land. Meanwhile, the project's management was handed over to M/s Him Urja Private Limited without obtaining prior permission from the Government and was evidence of project trading (June 2007). As per the IA, a developer can incorporate a new public/private limited company for implementation if the aggregate equity contribution of the company/consortium is not less than 51 per cent during the construction period and until two years following the commencement of commercial operation. Thus, the transfer of the project to another entity was a clear violation of the IA. The matter regarding the ownership of the project is, however, still under the consideration of the Government. The new developer also submitted a revised DPR for the project with an estimated capacity of 56 MW¹², to the Government for its approval. No decision on this issue has also been taken.

In sum, the above example highlights flaws in the planning stage of the process of allocation of hydro-power projects as no mechanism for accurately ascertaining the capacity of a project was in existence. Also, the authorities failed in taking firm punitive action against developers failing to deliver in terms of the IA. Besides, the incidence of a change in ownership of the project developer in gross violation of the IA has been allowed to linger. Eventually, the Government stood to lose both in terms of upfront premium and royalty; the upfront premium is in the ratio of the capacity and as project trading took place, the Government lost the advantage from competitive bidding if the project was initially planned for higher capacity. Moreover, liquidated damages amounting to Rs. 2.28 crore were also not charged from the project developer as a penalty for delays.

3.3.2 Bhyunder Ganga hydropower project

M/s Super Hydro Electric Power Private Limited entered into an IA with GoU (April 2004) for undertaking the implementation of two projects, namely Bhyunder Ganga (15MW) and Pulna Hydropower Projects (13 MW) with a total capacity of 28 MW.

Audit noticed that, as the project developer had requested for integration of the two projects which were initially identified on two different tributaries, the matter was referred to the TRC of UJVNL for assessment of the capacity of the integrated project. The TRC, based on the water discharge data for the last five years, estimated 26 MW as the installed capacity of the project. However, the project developer raised questions about the accuracy and adequacy of the water discharge data. Thereafter, another committee of UJVNL i.e. the Coordination Agency and Task Force (CATF) assessed the capacity of the project as 24.3 MW, based on the following:

- ◆ Water discharge data for the last 25 years.
- ◆ Factoring of the need of 0.8 cumecs of water discharge for the Pandukeshwar project, located in the downstream of the combined project. Based on the above a project capacity of 24.3 MW was approved by the GoU in

October 2005 and a supplementary IA was entered into with the project developer in November 2006. Audit analysis revealed that the whole process was clearly manipulated to keep the project capacity below 25 MW and the following irregularities were evident:

- ◆ All technical aspects had initially been examined by the TRC, but the Government decided to follow the recommendations of another committee.

¹² By taking into account the additional head which would be available through extension of tunnel.

- ◆ The water requirement for the Pandukeshwar project could very well have been met from the tailrace discharge of this project.
- ◆ The combined efficiency of plant and machinery viz. turbines, generator and transformers was taken at 80 per cent, which was less than the norms (84 per cent to 87.9 per cent) laid by the CEA. Even considering an efficiency of 84 per cent the project capacity would have been 25.51 MW¹³.

In sum, besides causing an extraordinary delay in the commencement of the project, the Government also lost on account of royalty, which would have accrued for first 15 years of project operation on account of the capacity enhancement allowed in respect of the project.

The State Government replied (November 2009) that the violations have been taken into notice and assured that due care would be taken in future to deal with such kind of approvals.

3.4 Financial loss in terms of upfront premium

For the 14 projects awarded by GoU, the capacity assessment through feasibility study got grossly altered (varying from 20 to 604 per cent) in the DPR stage. Eventually, the Government faced the prospect of incurring huge financial losses on account of upfront premium. The status with regard to projects allotted by GoU has been tabulated in table 3.

Audit noticed that in the DPR stage, the capacities of almost all projects have undergone significant changes. However, in terms of provisions¹⁴ formulated by the Government, the project developers are required to pay an additional premium of only Rs. 5 lakh per MW

for the additional capacities rather than the premium /pro-rata premium quoted in their initial bids. Audit noticed that:

- ◆ As the bids were invited for relatively low capacity, it fetched less upfront premiums.
- ◆ In three out of nine cases of capacity revision alone, where Government had fixed the additional premium, it lost a premium of Rs. 56.74 crore on account of the difference between the additional premium paid by project developers and premium calculated on the pro-rata basis.
- ◆ The losses on this account are bound to multiply once additional premiums are fixed for other projects where enhancements have been approved or proposed.
- ◆ Owing to the substantial changes in the planned capacities, the project costs would also rise steeply requiring reassessment of the financial strength of the selected developers to undertake the project.

In conclusion, the instances of undue extensions, without charging for liquidated damages, for implementing the projects in the garb of capacity revision, implied potential loss of royalty and deprivation of anticipated benefits from electricity. In addition, the Government also faced the prospect of incurring huge financial losses on account of upfront premium.

¹³ $24.3 \times 84 / 80 = 25.5$

¹⁴ For the projects falling under 25 MW: Rs. 5 lakh per MW for the additional capacity, based on water discharge increment
For the projects falling between 25 MW to 100 MW after enhancement: Rs. 5 lakh per MW for the additional capacity
For the projects above 100 MW after capacity enhancement: Based on a formula

Table: 3

| STAGE | NAME OF THE PROJECT | INITIAL CAPACITY (MW) | UPFRONT PREMIUM (IN CRORE) | ENHANCED CAPACITY (MW) | % ALTERATION | ADDITIONAL PREMIUM AS PER THE PROVISIONS (IN CRORE) | ADDITIONAL PREMIUM ON PRO-RATA BASIS (IN CRORE) |
|-----------------------|--------------------------|-----------------------|----------------------------|------------------------|--------------|---|---|
| Under construction | Bhilangna III | 8.40 | 0.85 | 24.00 | 186 | 1.18 | 1.58 |
| | Rambara | 24.00 | 12.48 | 76.00 | 217 | 2.60 | 27.04 |
| | Phata Byung | 10.80 | 5.67 | 76.00 | 604 | 2.33 | 34.23 |
| DPR approved | Singoli Bhatwari | 60.00 | 30.62 | 99.00 | 65 | Yet to be paid | 19.90 |
| | Alaknanda GMR | 140.00 | 42.12 | 300.00 | | Yet to be paid | 48.14 |
| Approval stage | Birahi Ganga II | 5.60 | 1.82 | 24.00 | 329 | Yet to be paid | 5.98 |
| | Nandakini III | 5.60 | 0.98 | 19.50 | 248 | Yet to be paid | 2.43 |
| | Hanol Tuni | 50.00 | 2.60 | 60.00 | 20 | Yet to be paid | 0.52 |
| | Birahi Ganga I | 3.80 | 1.35 | 24.00 | 532 | Yet to be paid | 7.18 |
| DPR under preparation | Mori-Hanol | 63.00 | 23.31 | -- | -- | -- | -- |
| | Boghudhiyar Sirkaribhyol | 170.00 | 6.50 | -- | -- | -- | -- |
| | Mapang Bogudhiyar | 200.00 | 6.05 | -- | -- | --- | -- |
| | Urthing Sobla | 340.00 | 6.12 | -- | -- | -- | -- |

Source: information provided by UJVNL

Recommendations

- ◆ *Pre-feasibility studies should be carried out with due diligence so that reliable data can be obtained for computation of power potential of projects.*
- ◆ *Sufficient data on stream flows and biota should be collected for a reasonable period of time prior to construction and this baseline data should be used in planning and mitigation processes.*
- ◆ *On account of the implications for upfront premiums and financial capabilities of the developers, the Government should consider and frame guidelines for dealing with all such cases where huge increases in capacities are proposed. A uniform and firm policy for granting extensions and terminating agreements needs to be put in place.*

