
CAG Audit Reports and Hydropower Projects

A Commentary

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PREFACE AND ACKNOWLEDGEMENTS

This work is produced as part of the 'Girish Sant Memorial Fellowship' for the year 2018. The work began in October 2018 by looking into the 'Regulatory Aspect of Hydropower Governance in Uttarakhand' and using CAG audit reports as an entry point. This study resulted in a report, **'CAG Audit Reports and Hydropower Projects: A Commentary.'** The next course of action was to explore an issue that had gathered less attention in the audit reports. Impact on livelihood, along with other socio-cultural impacts of hydropower projects, was one of such pressing issues. In the regulatory framework, this issue comes within the Social Impact Assessment (SIA) framework. Hence, the SIA framework became the focus. The Mahakali river basin in Uttarakhand, where most of the hydropower development in upcoming years is proposed, was selected as the field site. The large scale Pancheshwar Multipurpose Project (PMP) is also part of these proposed developments. In this way, the Mahakali river valley became the field site for the project, and the SIA report of PMP was focussed upon for the study. The fieldwork and extensive desk-based engagement with the SIA framework and Pancheshwar SIA report has resulted in the form of the report, **'Reflections on Social Impact Assessment in Indian Context: An Engagement with SIA report of Pancheshwar Multipurpose Project.'**

Like any journey, this journey also had been possible because of numerous people and factors. This journey, too, had its drivers, fellow passengers, by-standers, and co-travellers. I must acknowledge the support received from the Prayas Energy Group.

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CAG Audit Reports and Hydropower Projects : A Commentary

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Abstract: The paper engages with the CAG audit reports related to the hydropower sector in order to identify the issues pestering the governance of the sector. The study is done by enlisting the relevant audit reports between the years 2009 and 2018, and by categorising the highlighted issues in the reports. In light of the analysis of these audit reports, the paper also makes comments on the importance, strengths, and limitations of the CAG audit reports.

*Keywords : Comptroller and Auditor General, CAG Audit reports
Hydropower,*

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CHAPTER 1

CAG Audit Reports and Hydropower Projects : An Introduction

The Comptroller and Auditor General of India (CAG) has been conducting audits related to the hydropower sector since 1976-77. The first CAG audit report related to hydropower, i.e., ‘A Performance Audit on Loktak Hydroelectric Power Project and Baira Siul Hydroelectric Power Project,’ came out in that year.

For this study, the audit reports which have come out in the ten years (2009-2018) were selected to identify the critical issues highlighted through these reports and understanding the relevant issues pestering the governance of the hydropower sector. Twenty-three audit reports related to hydropower has come out in the mentioned period. This includes stand-alone volumes on hydropower development and other audit reports, which have a significant portion attributed to the hydropower sector. These twenty-three reports pertain to the Union Government and various states, including Himachal Pradesh, Uttarakhand, Sikkim, Arunachal Pradesh, Meghalaya, Punjab, Bihar, Assam, Maharashtra, Odisha. It includes Compliance Audits, Performance Audits of particular hydropower projects, of Public Sector Enterprise, Power Corporations, and Performance review of hydropower developments.

A complete list of all the 23 CAG audit reports is in the Appendix.

Why CAG audit reports?

The CAG has been conducting the scheme or program-specific audits since the early 1960s in the form of an efficiency-cum-performance audit (ECPA).¹ However, as mentioned earlier, the first instance of the audit of a hydropower project is from the year 1976.

¹ ‘CAG of India - A Thematic History 1990-2007’, Vol.2., Chapter 12: Performance Audit

The CAG of India is the Supreme Audit Institution of the country, deriving its duties and power as per Article 148, 149, 150, and 151 of the Indian Constitution. The much-cited quote of Dr. Ambedkar about the duties of CAG being ‘far more important than the duties even of the judiciary’, tells about the significance of this particular institution.²

In spite of these audit reports being available in the public domain and having a great potential to hold the institutions accountable, they are not invoked frequently in the matters of governance.

In popular perception, CAG audit reports are understood as financial audits, bringing out just the financial irregularities. However the role envisaged in the legal framework for CAG audits is far higher than that. Going by the regulations of the Comptroller and Auditor General of India- ‘the broad objectives of the audit are to ensure legality, regularity, economy, efficiency and effectiveness of financial management and public administration mainly through assessment as to:

1. whether the financial statements are properly prepared, are complete in all respects and are presented with adequate disclosures (financial audit);
2. whether the provisions of the Constitution, the applicable laws, rules and regulations made thereunder and various orders and instructions issued by competent authority are being complied with (compliance audit); and
3. the extent to which an activity, program or organization operates economically, efficiently and effectively (performance audit)³

² Ronojoy Sen, ‘Going Beyond Mere Accounting: The Changing Role of India's Auditor General’, *The Journal of Asian Studies*, Vol. 72, No. 4 (NOVEMBER 2013), pp. 801-811, 1035

³ Comptroller and Auditor General of India, ‘Regulations on Audit and Accounts’, 2007. Available at : <https://cag.gov.in/content/regulations-audit-accounts-2007>

CAG Audit Process : The basic pointers

Before we start going in the details of examining the hydro related audit reports, a short comment on the process:

Once the draft of a CAG report is prepared, it is shared with the concerned departments or institution seeking the responses on the audit findings within a specified time. After including the response, the CAG signs the report and is submitted to the President, who causes them to be laid before each House of Parliament.⁴ If the report pertains to a particular state, then it is the Governor of that state in place of the President and similarly the legislative assembly in place of the Parliament. After being placed in the Parliament, they are taken by the Public Accounts Committee (PAC) and the Committee on Public Undertakings (COPU) to hold the concerned bodies accountable.⁵

In the case of the Performance Audit, an ‘Entry’⁶ and ‘Exit’⁷ conference is held. Brief details about the proceedings of both of these conferences are included in the audit report.

The CAG’s Duties, Powers and Conditions of Service Act (DPC Act, 1971) throws detailed light on the Audit process.⁸

⁴ ‘An officer authorised by the Comptroller and Auditor General shall send copies of the audit report duly signed by the Comptroller and Auditor General to the Secretary to the Government, Ministry of Finance or Finance Department as the case may be, who shall take prompt action for the submission of the audit report to the President or the Governor or the Administrator for further action and for the presentation of the report in Parliament or the State or Union Territory legislature.’ (Source : CAG Regulations, *Op.cit.* note 2)

⁵ Article 151 of The Indian Constitution and the rest elaboration from the Rules and Regulations cited in previous footnote.

⁶ ‘Before commencing detailed work of performance audit, the Accountant General (Audit) shall hold an entry conference with the Secretary to Government of the concerned department. The discussions at the entry conference shall inter alia include the scope and coverage of audit, audit objectives and criteria, proposed techniques of evidence collection, overall time frame and tentative time schedule.’ (Source : CAG Regulations, *Op.cit.* note 2, 26)

⁷ ‘The Accountant General (Audit) shall, after the draft performance audit report is ready, hold an exit conference with the Secretary to Government of the concerned department. A written record of the proceedings of the exit conference, duly signed by both parties, shall be kept on record. The Accountant General (Audit) shall give full consideration to the observations and comments of the Secretary while finalising the draft performance audit report for inclusion in the audit report of the Comptroller and Auditor General.’

(Source : CAG Regulations, *Op.cit.* note 2,26)

⁸ Available at : <https://cag.gov.in/content/duties-power-and-conditions-services-act>

CHAPTER 2

The Key Issues

The key issues which come out to the light after reading the 23 hydro related audit reports from the last decade are related to the award of contracts, the implementation agreements which suffer from a non-transparent procedure in many cases, and instances of undue favours being provided to the contractors, the deficiencies in the Detailed Project Reports, and the manner in which surveys and investigation were carried, comments on the hydropower policies, absence of well-laid procedures, the issues pertaining to the maintenance and renovation-modernization-up-gradation of hydropower projects, the environmental negligence and comments on the disaster preparedness aspect and the matters related to local area development.

Not all of these issues have been given an equal amount of space in the audit reports. However, we will come to that in the latter part of this piece. In the following section, the responses of the concerned department to the audit findings, if provided, have been included.

We will see the specific instances of these various issues now one by one :

A.) Regarding Award of Contracts and Implementation Agreements

There are several instances of ‘**undue favours to contractors**’, which gets cited nearly in each audit report with only a little variation in the way the undue favours were given to the contractors. There are examples of - avoidable/extra payments to contractors, delays on behalf of private developers, and these developers or contractors not being accounted for the unjustified extension of time, frequent violation of the terms of the agreement by the contractors.

The issue of **lack of transparency in the award of projects** is a major one. There are the detailed case-based examples of a few private project developers receiving more favourable terms than the terms of standard Implementation Agreement (IA). In a few cases, the agreement was signed with companies that do not have any prior experience of working in the power sector. The awarding of contracts in multiple instances has been done without any competitive bidding. There are undue delays in decision making without reasons being specified for the same.

For example, the ‘**Sawra Kuddu Hydro Electric Project**’ in **Himachal Pradesh**⁹, was scheduled for commissioning in March 2012 and then extended to July 2017. Abnormal delay in completion led to the cost overrun of more than ₹600 crores as estimated in 2014 (when Performance Audit of the same was conducted). Commenting on this abnormal delay the audit stated, ‘Non-adoption of standard contract clauses/procedures and suitable clauses while preparing the bidding documents, subsequent changes in design and poor workmanship by contractors, etc. contributed towards increase in cost. While awarding and executing various civil contractors, the Company did not comply with various contractual provisions, which resulted in avoidable payments to the contractors. The main reason for the delay was non-handing over civil fronts to contractors and delay in rescinding the work from defaulting contractors. The delay in rescinding the contract would result in a consequential delay in the commissioning of HEP. The Company also failed to monitor the works of the contractors. Overall, there was a greater need for supervision, control, and sustained monitoring at all levels.’¹⁰

More or less similar but complex was the story of ‘**Implementation of 1200MW Teesta Stage 3 hydroelectric project in Sikkim.**’¹¹ The State Government failed to ensure adherence to the agreement conditions by the private consortium with regard to change in composition of consortium and committed contribution towards project funding. After the delay in the completion of the project for more than four years (November 2016), the state Government took over the project ultimately. While taking over the project, it also failed in recovering the penalty for delay in commissioning of the project and the additional cost incurred due to the inefficiency of the private developers.

The audit observes in the case of Sikkim’s Teesta stage 3 hydroelectric project, multi-disciplinary committee, and project level welfare committee for monitoring of the project was not constituted. ‘As a result, the implementation of the project had suffered.’¹²

The developer of the Srinagar hydropower project received more favourable terms than other project developers, as pointed out in the ‘**Performance Audit of Hydropower Development through Private Sector Participation in Uttarakhand.**’¹³ The similar audit scrutiny also revealed that ‘there was no evidence of any punitive action being undertaken against any of the developers for defaulting on Implementation Agreement conditions. The Liquidated Damages as

⁹ Comptroller and Auditor General of India, ‘Performance Audit on Sawra Kuddu HydroElectric Project’ in the *Report No. 2 of 2014 - Performance Audit on Public Sector Undertakings (Economic Sector) of Government of Himachal Pradesh*, 2015, 17-36.

¹⁰ *ibid*

¹¹ Comptroller and Auditor General of India, ‘Performance Audit on Implementation of 1200 MW Teesta Stage III hydroelectric project in Sikkim’ in *Report No 3 of 2016 - Social Economic and Revenue Sectors Sikkim*, 2017, 87-108

¹² *ibid*

¹³ Comptroller and Auditor General of India, ‘Performance Audit on Hydropower Development through Private Sector of Government of Uttarakhand’, Report of 2009, 46.

a consequence of undue delays in commissioning of projects, were not recovered in a single case.’¹⁴

In **New Umtru Hydro Electric Project**¹⁵, it was noticed that specific clauses of the contract were modified in favour of the contractors at their request.¹⁶

Instances of lapses in dealing with disputes and legal proceedings were noticed by the performance audit related to the **Department of HydroPower Development, Arunachal Pradesh**.¹⁷ The Department during the period 2008-09 to 2012-13, executed civil works in respect of 38 projects without open tendering. It was ‘contrary to the stipulations of the Central Public Works Department (CPWD) Manual was also detrimental to the financial interest of the Department.’¹⁸

The Department did not include any penal clause in its agreement with the E&M turnkey contractors¹⁹ to safeguard departmental interests in cases where defects in the equipment were noticed during the warranty period. Due to this lapse, the Department could not take any action like forfeiture of the security deposit, repair/replacement of damaged equipment at the risk and cost of the contractor, etc.²⁰

With respect to **nine small hydro projects in Himachal Pradesh**²¹, the Techno-Economic Clearance was accorded between July 2002 and July 2007, but the concerned Independent Power Producers (IPPs) did not turn up to sign the Implementation Agreements as of May 2012. This showed the lack of effectiveness on the part of IPPs in taking up the execution of projects as the delay involved in the signing of the Implementation Agreements ranged between 58 and 119 months as of May 2012. As per the State Government’s guidelines, ‘IAs should be executed with the IPPs within 36 months from the date of signing of MoU.’²²

¹⁴ *ibid*

¹⁵ New Umtru HydroElectric Project is a 40MW capacity project in Umtru River, Meghalaya.

¹⁶ Comptroller and Auditor General of India, ‘Performance Audit of Power Generation activities of Meghalaya Power Generation Corporation Limited’ in *Report No.3 of 2017 - PSU Government of Meghalaya*, 2017, 113-145.

¹⁷ Comptroller and Auditor General of India, ‘Department of HydroPower Development’ in the *Report of 2013 - Financial and Performance Audit on Revenue of Government of Arunachal Pradesh*, 2013, 136-148

¹⁸ *ibid*

¹⁹ Agreement under which a contractor completes a project and then hands it over in fully operational form to the client.

²⁰ CAG Report of 2013 of Arunachal Pradesh, *Op.cit.* note 15

²¹ The nine projects having a capacity of 25.80 MW as brought out in the audit report cited below. (Details of the projects have not been provided in the audit report)

Source : Comptroller and Auditor General of India, ‘Performance Audit on Hydro Power development through Private Sector Participation’ in *Report No. 2 of 2012 - Performance Audit on Social, General and Economic Sector (Non Public Sector Undertakings) of Government of Himachal Pradesh*, 2013,

²² The audit report cited in the previous footnote.

The Department failed to take appropriate action against the defaulting IPPs as per the terms and conditions of the MoU for forfeiture of security deposits, cancellation of projects, and also initiating further process for re-allotment of these projects.²³

A Performance audit on **‘Development of Hydro Power Projects – Public Private Participation in Sikkim’** was conducted in 2009²⁴, which revealed that ‘The State Government commenced award of hydropower projects to IPPs without working out any effective modality and finalising any plan or policy. Projects were awarded at throwaway charges, which compared very poorly with the charges imposed by all other hydropower States in the country in respect of royalty revenue, upfront premium, penalty for delay, local area development, etc. Performance guarantee was not obtained to ensure the earnestness of the developers to execute the projects resulting in the cancellation of a number of agreements due to non-performance by the developers, which resulted in the loss of substantial time and revenue receivable from the projects. Effective safeguards were not incorporated in the agreements against delay in completing various milestones laid down for completion of the projects and negligence in maintaining the projects after commissioning.’²⁵

A Performance Audit²⁶ on **‘Capacity Expansion in Hydro Power Sector by CPSEs’** observes that ‘The process of award of contracts by the Central Public Sector Enterprises (CPSEs) revealed significant departures from the generally accepted financial best practices and instances of inequitable and unfair contracting. The Pre-qualification criteria had been relaxed after the closure of the sale of bid documents, which allowed undue advantage to certain bidders over others.’ The audit report goes on to recommend that ‘CPSEs should adhere to the established best practices for PQ criteria, bidding and contract management to eliminate the possibility of unfair advantage to some bidders over others.’²⁷

²³ ibid

²⁴ Comptroller and Auditor General of India, ‘Performance Review: Development of Hydro Power Projects through Public Private Participation’ in the *Report of 2009 - Performance Audit on Civil of Government of Sikkim*, 2010, 1-23.

²⁵ ibid

²⁶ Comptroller and Auditor General of India, ‘Performance Audit of Capacity Expansion in Hydro Power Sector by CPSEs for the year ended March 2012, Ministry of Power’, Report No. 10 of 2012-13, 93.

²⁷ ibid

B.) Regarding Detailed Project Report (DPR) and the Surveys & Investigations

A 'Detailed Project Report' (DPR), needs to be prepared before any work on the project begins. There are examples of **faulty estimations being made in these DPRs**. There have been instances where **'Pre-feasibility surveys' were not conducted – no surveys were done** before selecting the land in case of few hydropower projects. The deficiencies in DPRs lead to delays in commencement of the project, loss of revenue, etc. as further planning related to the project is done on the basis of DPR.

Strong comments in relation to deficiencies/shortcomings in pre-feasibility studies, DPRs make their frequent occurrence in multiple reports.

A Performance Audit of Power Generation Activities of the Power Department of Meghalaya²⁸ was conducted covering the time period from 2010-11 to 2015-16. The report in its concluding section says that – 'Implementation of projects taken up was beset with the lack of planning and deficiencies in survey and investigation, feasibility studies, DPRs, etc. leading to changes in scope and design of the projects after commencement of work thereby causing significant time and cost overrun'.²⁹

Audit noticed that during the five year period which is covered under audit, the Company did not prepare any perspective plan or annual business plan to prioritise the project for implementation and taking up pre-planning activities (viz. conducting of the feasibility study, survey and investigation (S&I), etc.). As a result, the Company was taking up projects for S&I implementation on an ad-hoc basis without proper recorder justification for their selection. Audit observed that the time allowed for S&I and preparation of Detailed Project Reports (DPRs) was about ten years on average for each project. But there were cases where DPRs are not prepared even after lapse of 10 years.

In the case of **Myntdu Leshka HEP³⁰**, which was commissioned between November 2011 and March 2013, saw a cost overrun of 819.35crores and time overrun of 46 months. The 'Deficient DPR' for this project was prepared on the basis of 'few preliminary data on geological features obtained through a few drilled holes at the project site. Thus, a detailed analysis/assessment of the geological features of the site (viz. soil quality water quality, seismic impact, etc.) at the planning stage, which was essential for the successful implementation of the HEP, was completely missing in the process'. Later at the implementation stage of the project,

²⁸ CAG Report on Meghalaya(2017), *Op. cit.* note 14

²⁹ *ibid*

³⁰ Myntdu Leshka Hydro Electric Project (2 x 42 + 1 x 42) MW is a Run Off River project across Myntdu river in Meghalaya.

the geological features of the site were obtained, data collected, analysed and tests were conducted by engaging agencies like IIT Roorkee, Central Soil and Mineral Research Station, etc. which led to major changes in the design of the project. This change in scope of work caused a delay in the implementation of the project besides an increase in project cost. Apart from changes in the scope of work, the height of the protection wall was also increased during the implementation of the project, which was not adequate to prevent flooding. This decision was taken after the loss of lives as well as damage to the electrical equipment due to the two floods which occurred during construction. As the audit report comments about this, 'The project area was situated in the same hydrological belt of Cherrapunji which experiences heavy rainfall. Therefore, it was necessary to take adequate precautionary measures to prevent loss/damage to the plant due to floods'.³¹

Similarly, the **Ganol Small Hydropower Project**³²'s DPR was deficient too. As audit comments, 'conducting the geological and seismic studies of the project site after the commencement of the project works indicated deficiencies in the S&I works completed by the Company at the planning stage. Failure of Company to consider the above aspects at the time of preparation of DPR resulted in delays and deficiencies, leading to an increase in cost by ₹46.89 crore.'³³

The same audit report in its recommendation section writes that 'the company needs to conduct detailed feasibility studies on a scientific basis before taking up the project for execution so as to avoid subsequent revisions/modifications in the scope and design and avoid delays in project implementation.'³⁴

The **Audit report on Capacity Expansion in Hydro Power Sector by CPSEs (2012)** dedicates a complete chapter on 'Survey, Geotechnical investigation, and Investment Approval'.³⁵ It made some strong comments regarding the approach towards the preparation of DPR.

‘Audit noticed that even the first stage of implementation, i.e., survey and investigation which is the critical activity in the entire process was not accorded due importance by NHPC and SJVNL despite Policy on HydroPower Development (1998) envisaging for thorough survey and investigation of hydro project sites before preparation of DPRs. There were no norms for drilling until 2006, and the drilling by NHPC and SJVNL during the survey stage was significantly inadequate as compared to requirements thereby exposing the CPSEs to several geological surprises causing a cascading impact on the time and cost of the projects.’³⁶

³¹ CAG Report on Meghalaya(2017), *Op. cit.* note 14

³² A 22MW HEP with 35m high dam in Meghalaya

³³ CAG Report on Meghalaya(2017), *Op. cit.* note 14

³⁴ *ibid*

³⁵ CAG Report No. 10 of 2012-13, *Op. cit.* note 24

³⁶ *ibid*

Performance Audit of **Hydropower Development through Private Sector Participation in Uttarakhand** was conducted in 2009.³⁷ It had a separate chapter on 'Pre-Implementation Agreements' in that audit report in which it has findings regarding Pre-Feasibility report. It stated, 'The authorities had not diligently carried out the Pre-feasibility (PFR) studies based on the ground survey of the river basin, its topography and hydrology for accurate evaluation of the hydropower potential of a river/stream as significant alterations ranging from 22 per cent to 329 per cent in the capacity of 85 percent of projects, raised serious doubts on the credibility of PFR studies.'³⁸

Halipani Small Hydroelectric Project³⁹ on the Hali River in Arunachal Pradesh faces the time and cost overrun due to the delays in furnishing accurate water discharge data by the Department; the specification was changed two times after commencement of the work. The executing agencies were changed repeatedly.⁴⁰

The DPR for construction of '**Dusnallah small hydro project**'⁴¹ was approved after limited feasibility studies in November 2001. The entire project got washed away by massive floods in July 2004 at a time when work was in an advanced stage. The audit report⁴² in regard to the Department of HydroPower Development of Arunachal Pradesh, observed that the 'department had not made adequate geological studies and risk assessment for floods in the disaster-prone area before starting the work on the project. The department also admitted that the study conducted was inadequate...Had proper geological studies been done, and these risks been assessed initially, the loss could have been avoided.'⁴³

Gathering sufficient and reliable data is a first and important step for assessment of the viability of a project. Collecting hydrological data such as annual rainfall, discharge, flood data is a vital aspect of DPR. This hydrological data for the purpose of DPR should be based on a minimum period of two years.⁴⁴ But when a review of the micro/mini/small hydro projects executed by the **Department of Hydro Power Development of Arunachal Pradesh** was conducted, it revealed that out of 59 such projects, the viability of 12 projects were established on hydrological data for one to two months only. After commissioning, these projects became non-operative/less

³⁷ CAG report on Uttarakhand (2009), *Op. cit.* note 11

³⁸ *ibid*

³⁹ Halaipani SHP(4X4 MW) in Arunachal Pradesh

⁴⁰ 'The improper planning and frequent changes in installed capacity of Halaipani SHP resulted in unproductive expenditure of 109.56 crore.'

Source: CAG Report of 2013 of Arunachal Pradesh, *Op.cit.* note 15

⁴¹ Lohit District, Arunachal Pradesh

⁴² Comptroller and Auditor General of India, 'Performance Review relating to Department of HydroPower Development' in the *Report of 2010 - Performance and Financial Audit on Civil of Government of Arunachal Pradesh*, 2011, 116-148

⁴³ *ibid*, 133

⁴⁴ Under the section 4.2.6.1 (Page 138) of the audit report cited in the footnote 38.

operative due to less discharge of water. This indicated faulty planning due to reliance on insufficient hydrological data.⁴⁵

In the **DPR of Kashang HEP**, the estimated cost was way less than the actual cost. The audit report⁴⁶ commenting on this 'faulty DPR' said, 'very purpose of preparation of estimates was defeated to that extent'.

About the deficiencies in planning and estimation, the audit observed that, 'that cost of the project was kept below 500 crore in the DPR by providing inadequate / non-providing some essential items presumably to avoid concurrence of the Central Electricity Authority. Due to inadequate / non-provision of items in BOQ of Stage-I, payments of ` 65.46 crore have been made on the extra, deviated and analogous items paid on current market / awarded rates against total contract payment of 250.45 crore (excluding cost escalation) which worked out to 26.13 per cent of contract payments.'⁴⁷

The mentioned report in its recommendation section wrote that 'The Company may consider to ensure preparation of DPR, cost estimates and designs on a realistic basis for its upcoming projects.'⁴⁸

One of the reasons for the delay in the completion of works in the case of **Sawra Kuddu Hydro Electric Project** was, 'inadequate/non-provisioning of certain items of work in the DPR.'⁴⁹

The performance audit on Sawra Kuddu Hydro Electric Project conducted in 2014 says that errors in DPR point towards the fact that the DPR was not prepared after considering all the required parameters in terms of CWC guidelines.⁵⁰

On observing the extra expenditure occurred over the works which were not envisaged in DPR in case of **HEPs in Bihar**, audit report made a comment that, 'It reflects the perfunctory manner in which the survey/investigation, DPRs, and estimates were prepared.'⁵¹

⁴⁵ ibid

⁴⁶ Comptroller and Auditor General of India, 'Performance audit on the Integrated Kashang Hydro Electric Project' in the *Report No.1 of 2018 - Public Sector Undertakings (Economic Sector) Government of Himachal Pradesh*, 2018, 15-40.

⁴⁷ ibid, 20

⁴⁸ ibid

⁴⁹ The cost overrun of Sawra Kuddu HEP was estimated to be ₹ 606.57 crores at the time of the preparation of the audit report in July 2014.

Source: CAG Report no. 2 of 2014 on HP, *Op. cit.* note 7

⁵⁰ The citation in source in the previous footnote.

⁵¹ Comptroller and Auditor General of India, 'Performance Audit of Power Generation Undertakings in Bihar' in the *Report No.4 - Report of the Comptroller and Auditor General of India (Commercial) for the year ended 31 March 2010, Government of Bihar*, 2011,41-78

A Performance Audit⁵² of '**Hydro Power Development through Private Sector Participation**' in Himachal Pradesh revealed the deficiencies in planning and implementation stages like 'Inadequate pre-feasibility', 'Non-conducting of survey/feasibility study.' Throwing more light on the same, the report in its conclusion stated, 'Potential sites of small hydro projects were identified on the basis of preliminary reconnaissance only and no system existed in the Department to conduct pre-feasibility studies and assess power potential accurately to obviate the chances of enhancement of capacity addition at a late stage by the IPPs, bypassing the system of open bidding process and consequent loss of royalty. Due to inadequacies in pre-feasibility studies coupled with non-availability of institutional mechanism with HIMURJA⁵³ to cross verify the basis of capacity addition after allotment of projects. The capacity addition ranging between 40 and 1300 percent was done by IPPs after allotment of 29 small projects up to 5 (five) MW initially having a capacity of 112.50 MW. Due to capacity additions after allotment of projects by HIMURJA, the IPPs avoided the competitive bidding route and were thus benefitted to that extent.'⁵⁴

On the matter of non-conducting of survey and feasibility studies, the audit commented, 'As per the provision of the Hydro Power Policy of Himachal Pradesh, the IPP of a project above 5 MW is required to conduct and convey the feasibility/non-feasibility of the project within a period of one year from the date of signing of MoU. These reports of requisite feasibility, if conducted, were not submitted by concerned IPPs within a time schedule in case of 10 projects whose MoU were signed in between June 2002 and February 2008.'⁵⁵

The non-approval of DPRs also came under Audit scrutiny. It said that the Himachal's Hydro Power Policy is silent on the timeline for approval of DPRs submitted by IPPs. 'However, State Government issued notifications in August 2009 for expeditious clearance of SHPs, instructing that the IPP is required to submit the DPR to HIMURJA/HPSEB Limited, who will check the DPR and forward it to the Directorate of Energy within 10 days of its receipt for according Techno-Economic clearance within three months of the date of receipt of DPR.'⁵⁶

It was noticed that HIMURJA submitted DPRs (between April 2003 and October 2011) of 60 small hydro projects up to 5MW, having a total capacity of 144.05MW to Directorates of Energy for necessary approval but the same remain unattended as of June 2012.

The audit report also gave details about non-adherence to prudent utility practices.⁵⁷

The performance review⁵⁸ on '**Department of Hydro Power Development, Arunachal Pradesh**, says that the 'department does not have a proper planning process involving the

⁵² CAG Audit report on Himachal (2012), *Op. cit.* note 19

⁵³ HIMURJA is the Himachal Pradesh Government Energy Development Agency.

⁵⁴ The same citation as in the footnote 50

⁵⁵ *ibid*

⁵⁶ *ibid*

⁵⁷ *ibid*

⁵⁸ CAG Audit Report of 2010 on Arunachal Pradesh, *Op.cit.*40

preparation of documented plans for augmentation of the generating capacity. Neither short-run plans nor a long term is prepared. The Department executes projects on an ad-hoc basis.⁵⁹

The state Government often sanctioned projects without consultation with Department regarding load demand, resulting in setting up small projects which had unutilized generation capacity, which was in excess of demand and could not be utilised in the absence of a connected grid.⁶⁰

⁵⁹ *ibid*

⁶⁰ *ibid*

C.) Regarding 'Renovation-Modernisation-Upgradation' and Maintenance

Most of these audit reports which deal with the performance of power stations contain a section about 'Output Efficiency', under which comes the 'Shortfall in generation.' From these audit reports, a typical pattern emerges, which goes as – low Plant Load Factor (PLF)⁶¹, which is attributable to Low Plant Availability⁶² and Low Capacity Utilisation⁶³.

Further, these are attributed to an increase in planned and forced outages, deficiencies in the implementation of Renovation Modernisation And Upgradation (RM&U) or life extension programmes, and delay in undertaking the repair and Maintenance of Power Stations. Inadequate Maintenance, delays in repairing lead to an increase in forced outages, which ultimately results in the loss of generation.

As per the Central Electricity Regulatory Commission (CERC) norms, hydro generating stations have a useful life of 35 years.⁶⁴ Hence it becomes essential to timely and efficiently plan for the Renovation, Modernisation, and Upgradation (RM &U). But the 'lackadaisical approach of the concerned authorities' regarding the same gets highlighted again and again.

'As per principle laid down by Central Electricity Regulatory Commission (CERC) in December 2000 in the matter of 'Operational Norms for Hydro Power Stations',

- (i) during the monsoon period all machines were required to be available 24 hours for all types of plants, and
- (ii) during the dry season, run of the river plant (without pondage) is required to the extent that no water is spilled. In plants with pondage facilities, all machines are required to provide maximum capacity for at least three hours per day.

The above norms imply that there should be no outage during the monsoon period, and there should be no spillage of water due to forced outages.⁶⁵

⁶¹ Plant Load Factor refers to the ratio between the actual generation and the maximum possible generation at the installed capacity.

(Source : Comptroller and Auditor General of India, 'Performance review related to Orissa Power Generation Corporation Ltd.' in the Report No. 4 (Commercial) for the year ended 31 March 2010.)

⁶² Plant availability means the ratio of actual hours operated to maximum possible hours available during a certain period. (Source: *ibid*)

The accepted definition of this term in the power sector is a bit different.

⁶³ Capacity utilisation means the ratio of actual generation to possible generation during actual hours of operation. (Source: *ibid*)

The accepted definition of this term in the power sector is a bit different.

⁶⁴ CAG Report on Meghalaya(2017), *Op. cit.* note 15

⁶⁵ CAG Report No. 10 of 2012-13, *Op. cit.* note 24, 18.

Audit report⁶⁶ in the case of **Hydro Power CPSEs (NHPC Limited, SJVN Limited, THDC Limited, and NHDC Limited)** observed that machines of power stations of ‘CPSEs suffered forced outages aggregating 9871 hours during the monsoon season of 2009-14. Due to this forced outages, the power stations of CPSEs suffered a generation loss of 341.99 MUs valuing 27.36 crore.’⁶⁷

‘Audit further analyzed the forced outages of more than six hours and observed that plant and machines of power stations selected for performance audit suffered outage due to long unresolved and recurrent faults which were possible to have been controlled through timely Maintenance. Power stations suffered the loss of a generation of 438.66 MUs due to such avoidable forced outages during the period 2006 to 2014.’⁶⁸

In the case of **Orissa Hydro Power Corporation Limited**, the total forced outages and planned outages of the Company (for the five years ended on 31 March 2009) were 9.20 percent and 13.77 percent of the total available hours respectively. Due to this high percentage of forced outages, the Company sustained avoidable generation loss worth 156.05 crore. The audit report⁶⁹ stated, 'Failure on the part of the Company to undertake planned maintenance results in forced outages of the plants and machinery resulting in loss of generation. Though the Company fixed a norm of 30 days (720 hours) for annual Maintenance of its generating units, no norm was fixed for monthly and quarterly Maintenance.' Delays in completion of annual Maintenance of generating units ranging from 22 to 1,563 hours beyond the norms fixed by the Company were also observed by the audit. These delays led to 'loss of generation of 381 MU valued at Rs. 14.43 crore'.⁷⁰

'The reasons for such high forced outages were mainly attributed to turbine problem (121 times), failure of generator (110 times), protection equipment (186 times) and others (270 times) like excitation problem, stator earth fault, insulator failure of stator winding, intake gate problem, abnormal water/oil leakage in turbine pit, etc., along with lack of internal control measures like non-availability of instruction manual for periodic maintenance of plants and machineries and non-maintenance of history sheets of generating units. Had there been proper preventive Maintenance, the forced outages could have been reduced.'

'During the monsoon period (July to October) of each year, there was neither any constraint in terms of availability of water nor was there any restriction from State Load Dispatch Centre

⁶⁶ Comptroller and Auditor General of India, 'Performance Audit on Capacity Utilisation, Electricity Generation, Sale and Collection of Revenue including Disaster Management by Hydro Power CPSEs, Union Government, Ministry of Power' in the *Report No. 41 of 2015*, 69.

⁶⁷ *ibid*

⁶⁸ *Ibid*, 20

⁶⁹ Comptroller and Auditor General of India, 'Performance Audit on Odisha Hydro Corporation Limited' in the *Report of 2009 (Commercial)*, 23-53

⁷⁰ *ibid*

(SLDC) for generation of power. The Company, however, did not operate the units to their optimum capacity for reasons, not on record.⁷¹

It could not utilise '22.87 percent of the total available hours for generation during the monsoon period despite the availability of water and machines, which resulted in the loss of a generation of 5,508 MU during the five years ending March 2009.'⁷² It translates into a revenue loss of ₹164 crores.⁷³

In case of **Hirakud Hydro Electric Project (HHEP)**⁷⁴ of the Odisha Hydro Power Corporation Limited, the audit scrutiny⁷⁵ revealed that 'absence of proper planning for repair and maintenance of generating units coupled with non-maintenance of required spares led to prolonged shut down of units with consequential loss of revenue ₹18.19 crore towards capacity charges.' (From the audit for the year ended 31 March 2013)⁷⁶

The Company's 'failure to maintain a spare transformer and commissioning of an underrated transformer coupled with inordinate delays in synchronisation resulted in a loss of ₹3.77 crore.' In terms of the number of days, the work was affected for 456 days from November 2010 to February 2012.⁷⁷

A Performance Audit⁷⁸ of the **Power Generation Undertakings in Bihar** brings out the fact that hours lost due to planned outages increased from 20.23 percent (in 2005-06) to 47.17 percent (in 2009-10) of the total available hours. The forced outages during the same period remained stagnant around 27 percent of the total available hours. 'It was more than the norm of 10 percent fixed by CEA in all five years ending 31 March 2010.'

The main reasons for forced outages, as stated in the audit report, are – 'non-availability of water, transmission constraints, system disturbances, i.e., frequent power tripping, flood in Koshi river and high silt in the Koshi and Gandak rivers, etc.'

In the case of **Hydel Power Projects in Punjab**, the forced outages increased from 17.18 percent in 2005 to 26.66 percent in 2010 of total available hours. A performance review⁷⁹ on the

⁷¹ ibid

⁷² ibid

⁷³ ibid

⁷⁴ This is one of the oldest hydel projects of India, situated in Odisha with an installed capacity of 347.5MW.

⁷⁵ Comptroller and Auditor General of India, 'Comments on Odisha Hydro Power Corporation Limited' in *Report No. 2 of 2013 - Report on Public Sector Undertakings for the year ended March 2012, Government of Odisha.*

⁷⁶ ibid

⁷⁷ ibid

⁷⁸ CAG Report no.4 of 2011, *Op.cit.* note 49

⁷⁹ Comptroller and Auditor General of India, 'Performance Review relating to Generation of Power by Punjab State Electricity Board' in *the Report (Commercial) on Punjab for the year 2009-10.*

generation of power of the state says, 'The main reason for excess forced outages in UBDC project was non-carrying out of renovation and modernisation as per approved plan.'⁸⁰

Forced outages in power station decreased from 46.77 to 19.77 percent of the total available hours in the period of 2005-06 to 2009-10 in the case of **Assam Power Generation Corporation Limited**. Though it decreased, it remained more than the CEA prescribed norm of 10 percent. Due to this sharp reduction in forced outages, the shortfall in generation cumulatively came down to less than 3 percent while it was 14.65 and 22.02 percent respectively for the initial two years of audited period.⁸¹

The Audit Report⁸² on **Power Generation Activities of Meghalaya** (dealing with the period 2010-11 to 2015-16) mentions that the shortfall of 14 percent in meeting the consolidated generational targets. While exploring the reasons for shortfall in the generation (or for Low PLF), it states high forced outages, delays in completion of repairs and maintenance, etc. as the primary causes. Giving statistics for total hours available, operating hours, outages, idle hours, etc. it shows that the forced outages increased significantly by 58.08 percent in that period. Audit further comments, 'The high incidence of forced outages and idle hours can be attributed to a deficiency in the implementation of renovation and modernisation/life extension programmes and delay in completing repairs and maintenance of Power Stations.'⁸³

'Audit examined that the repairs and maintenance of Power stations were not being carried out at regular time intervals so as to prevent major damages to generation units and avoid the possibility of forced outages on this account.' The audit made some observations regarding the same, which includes 'Delay in replacement of main inlet valves,' delay in repair and re-assembly of generator damaged by fire accident in Unit 1 of Umiam Stage 3 HEP, Non-rectification of defects in Cooling system of Myntdu Leshka HEP'.⁸⁴

Performance review⁸⁵ on **Department of Hydro Power Development** in Arunachal Pradesh (for the period 2004-05 to 2009-10) reports that there was 'no advance maintenance schedule is prepared. Instead, maintenance is done as and when the necessity arises. For long term sustainable levels of performance, it is important to prepare maintenance schedules and adhere to them. Non-preparation of a schedule of Maintenance carries a risk of forced outages.'

⁸⁰ ibid

⁸¹ Comptroller and Auditor General of India, 'Performance review relation to Assam Power Generation Corporation Limited' in the *Report of 2010 for the year ended 31 March 2010 (Report No. 4) Government of Assam*

⁸² CAG Report on Meghalaya(2017), *Op. cit.* note 15

⁸³ ibid

⁸⁴ ibid

⁸⁵ CAG Audit Report of 2010 on Arunachal Pradesh, *Op.cit.*note 40

The forced outages in power stations in Arunachal Pradesh increased from 61.48 percent in 2005-06 to 67.67 percent of the total available hours in 2009-10.

The same audit report mentions that 'Many of the micro Hydel project in the State have already outlived their normal life requiring total renovation and technology change.' The report gives further detail about the progress happening in regards to 'Renovation and Modernization.' Citing examples of 3 units where department preferred the option of repairing instead of replacement even after lapse of 27 years, the audit comments, 'The repairs do not have the guarantee of enhanced life which would be given by the replacement option.'¹⁸⁶

One other audit report⁸⁷ on **Arunachal Pradesh's Department of Hydro Development** recommends that 'A specific Clause regarding replacement/repair of defective equipment within a specific period by the contractor should be incorporated in the Agreements to safeguard the interest of the department.'¹⁸⁸

Odisha Hydro Power Corporation Limited did not frame any 'Procurement Manual' and 'Inventory Management Policy' as per observation made in performance audit⁸⁹ of 'Odisha Hydro Power Corporation Limited' conducted in 2009. The audit report also quoted the Board of Directors saying that due to the non-availability of essential spares, there was an inordinate delay in bringing the generating units under outage into operation. Hence, they emphasized the need for strengthening the stores' management suitably by the creation of a 'Material Management Cell.'¹⁹⁰

Auxiliary Consumption

Due to the delays in Repair and Maintenance work, the Auxiliary Consumption of power stations also goes high resulting in excess consumption of power, which ultimately becomes a contributing factor to the shortfall in generation.

'In Bairasiul and Tanakpur power stations auxiliary energy consumption consistently exceeded the normative auxiliary energy consumption, and actual auxiliary energy consumption exceeded norms by 23.43 Million Units (MUs) and 6.31 MUs respectively during the last five years ended 31 March 2014. NHPC stated (October 2014) that Tanakpur power station was commissioned in 1992, i.e., 22 years back. As such, the efficiency of old electromechanical equipment like transformers, motors, pumps, and other electrical equipment has an impact on auxiliary energy

⁸⁶ ibid

⁸⁷ CAG Audit Report of 2013 on Arunachal Pradesh, *Op.cit.* note 38

⁸⁸ ibid

⁸⁹ CAG Audit Report of 2009 on Odisha, *Op.cit.* note 67

⁹⁰ ibid

consumption. NHPC further stated (February 2015) that power stations with higher auxiliary energy consumption are going to be addressed through Renovation & Modernization program one by one after the power station had run its initial useful life. The reply is to be viewed against the fact that NHPC had not made any long term plan (February 2015) to take up Renovation & Modernisation of its power stations in a phased manner.¹⁹¹

Silt Deposition and Sedimentation Study

'Silt deposition in a reservoir can be minimised by (i) keeping water in reservoir up to specified level during monsoon and/or (ii) carrying out regular flushing operations for desilting as per specified norms. Non-adhering to the above conditions not only reduces the useful life of the reservoir and power station but also makes flood management more difficult. Due to inadequate flushing and non-maintenance of prescribed reservoir levels, gross and live reservoir capacities of three NHPC power stations reduced during five years ended 31 March 2014.¹⁹²

In **Punjab's Upper Bari Doab Canal** project, the non-carrying of desilting and timely removal of trash of the hydel channel led to generational loss and an overall decrease in capacity utilisation during the period of 2005-06 to 2009-10.⁹³

In the case of **Odisha Hydro Power Corporation Limited**, the sedimentation study of reservoirs was not conducted regularly. Hence, no steps were taken to check sedimentation in the case of Hirakud Power Station, while in the case of Upper Indravati HEP, the steps are taken to check siltation were rendered futile.⁹⁴

Manpower Management

As per the CEA recommendations, 1.79 persons per megawatt of installed capacity was required in each hydropower station.

In the case of Meghalaya, 'the actual manpower deployment in PSs were at wider variance with the CEA norms. In respect of 4 out of 7 PSs in operation, there were shortages of manpower ranging from 25 to 184 compared to CEA norms, whereas the remaining 3 Power Stations there were excess manpower ranging from 4 to 12.⁹⁵

⁹¹ CAG Audit Report No. 41 of 2015, *Op.cit.* note 64

⁹² *ibid*

⁹³ CAG Audit Report on Punjab for year 2009-10, *Op.cit.* note 77

⁹⁴ CAG Audit Report no. 2 of 2013 for Odisha, *Op.cit.* note 73

⁹⁵ CAG Report on Meghalaya(2017), *Op. cit.* note 15

Audit report⁹⁶ on **Meghalaya Power Generation Corporation Limited** states clearly that the 'Company failed to evolve an effective project monitoring mechanism to facilitate completion of the projects within the scheduled period, thereby causing time and cost overruns in the execution of projects.' It explains how the top management did not have a mechanism by which project execution activities viz. survey and investigation, project implementation, generation data were periodically brought to the notice of the Board of Directors (BoD) through periodical returns and progress reports. Through the review of minutes of Board Meetings, audit observed agenda of 'BoD meetings was broadly confined to according of financial concurrence for tendering, procurement and cost revisions, etc. without focussing on the issue relating to supervision and monitoring of the project implementation activities ⁹⁷'

Performance Review⁹⁸ on **Department of Hydro Power Development, Arunachal Pradesh**, while highlighting the issues with 'Manpower Management,' states that the 'department does not have adequate staff and faces a shortage of operation and maintenance staff, especially in the electromechanical wing. The daily operations in many of the micro hydel stations are therefore carried out through untrained/ temporary staff.'⁹⁹

⁹⁶ ibid

⁹⁷ ibid

⁹⁸ CAG Audit Report of 2010 on Arunachal Pradesh, *Op.cit.*40

⁹⁹ ibid

D.) Regarding the Environmental Issues

The audit report¹⁰⁰ on ‘**Power Generation activities of Meghalaya Power Corporation Limited**’_(2016) had a section of the report on Environmental Issues which stated, ‘The impact of the operations of the hydropower stations on the environment includes inter-alia downstream erosion, sedimentation, impact of local climate, etc. Thus, it is imperative that the Company has a system to effectively deal with the possible adverse impacts of generation activities on the environment. Although the Company had created an Environment Division during 2015-16, an appropriate action plan to address the issue was yet to be evolved by the Company (December 2016). Further, no environmental audit had been conducted by the Company in the project areas either internally or by engaging an external agency during the review period.’¹⁰¹

Moreover, the audit report, based on the results of the water quality check of power station reservoirs by the Meghalaya State Pollution Control Board (MSPCB), commented that the quality of water in the reservoirs of Company is ‘non-satisfactory.’ The main reason for this was that the ‘Myntdu River’ was acidic due to the acid effluents from coal mines. The concern which the audit report had regarding this was that the acidic water, in turn, ‘affects the mechanical equipment of MLHEP, which comes in direct contact with the acidic water.’ Furthermore, the Company being dependent wholly on the ‘water of the reservoirs for power generation, the Company needs to take action to improve the water quality for longevity as well as the long term operations of its PSs.’¹⁰²

In the performance review¹⁰³ of **Hydro Power Development through Private Sector Participation in Himachal**, the audit noticed that IPPs of 12 projects had deposited the necessary funds for compensatory afforestation as worked out by the Forest department, but negligible afforestation was done.

The Performance audit¹⁰⁴ related to the **Department of Hydro Power Development, Arunachal Pradesh** stated, ‘The Lower Subansiri project under execution by NHPC and some of the projects proposed to be executed through IPP/private developers have raised various environment-related issues. These include an increase in risks for earthquakes on account of the State. State being located in a risky seismic zone, submergence of agricultural land located in project areas, change of course/alteration/reduction of the flow of water in the downstream of rivers and consequent reduction in fertility of land, etc.

¹⁰⁰ CAG Report on Meghalaya(2017), *Op. cit.* note 15

¹⁰¹ *ibid*

¹⁰² *ibid*

¹⁰³ CAG Report no.2 of 2012 for HP, *Op.cit.* note 19

¹⁰⁴ CAG Report of 2010 on Arunachal Pradesh, *Op.cit.* note 40

The State Government, therefore, needs to adopt a transparent policy regarding the implementation of projects on the environment by studying/disclosing the full impact of the projects and finding a solution to the problems.¹⁰⁵

Performance Audit¹⁰⁶ on **‘Implementation of 1200MW Teesta Stage 3 hydroelectric project in Sikkim’** reveals in the audit scrutiny that the ‘recommendation of the Forest, Environment, and Wildlife Management Department (FEWMD), Government of Sikkim for issue of Environment clearance for implementation of Teesta 3 was not based on any scientific study and development of the project could have an adverse impact on the ecological environment of the State.

Scrutiny of the records of FEWMD and Department of Forest revealed deficiencies in the implementation of Environment Management Plan (EMP), including ‘non-provision of fish ladder for Teesta 3’, ‘Fish Management Plan’ etc.

This leads the audit report to recommend that ‘The State Government may verify the correctness of the scientific study carried out by the project implementation agency before recommending projects for environmental clearances.’¹⁰⁷

Performance audit¹⁰⁸ on **‘Development of Hydro Power Projects – Public Private Participation in Sikkim’** stated in the report that ‘EIA/EMP was being done by agencies about whom the FEWM Department was not aware. In most cases, the mandatory one-year comprehensive data required for preparation of the EIA was not gathered as indicated by the period between the grant of site clearance and the grant of environment clearance.’¹⁰⁹

The facts which auditors came across during the scrutiny also indicate that the EMPs had been prepared through assessment of secondary data without diligent study, observation, and research of the prevailing ground realities over an adequate period of time.

In the same audit report, it was revealed that the Catchment Area Treatment plans were prepared without taking into account the field requirement for the survival of the plantations and were therefore arbitrary and inadequate.¹¹⁰

There was indiscriminate disposal of muck by the developers, thereby causing degradation of land, air, and water. A study conducted by the Mines, Minerals and Geology Department revealed gross negligence by the NHPC in disposal of muck generated from execution of the Teesta Stage 5 project. Spoils were thrown along the river banks raising the river bed of the Teesta, leading to change in flood behavior of the river, acceleration of the toe erosion, and degradation of the overall geo-environment setting of the area.

¹⁰⁵ *ibid*

¹⁰⁶ CAG Report no.3 of 2016 on Sikkim, *Op.cit.* note 9

¹⁰⁷ *ibid*

¹⁰⁸ CAG Report on Sikkim (2009), *Op.cit.* note 22

¹⁰⁹ *ibid*

¹¹⁰ *ibid*

No provision towards protection of fish and other aquatic life inhabiting the river system was made in the EMPs of two projects.¹¹¹

The Performance Audit¹¹² of **Hydropower Development through Private Sector Participation in Uttarakhand (2009)** contained a chapter on ‘Environment Impact’ (Chapter 5). The audit found that 75 percent of the hydropower projects were operational without having mandatory consent to operate from the ‘Uttarakhand Environmental Protection and Pollution Control Board (UEPPCB).’ In similar ways, there were projects under construction without the consent of UEPPCB. The audit noted that ‘No penal action was initiated against project developers who were operating without proper consent and were blatantly defying environmental provisions.’ It also noted how the Board has failed in enforcing the mandatory conditions for certification like ‘submission of monthly reports, proper muck disposal, and ensuring a minimum downstream flow.’¹¹³

Talking about the direct and indirect impacts of hydropower on environment, it stated, ‘The impact due to the construction of hydropower project commences right from the start of the exploration activities, construction of adit tunnels¹¹⁴, head race tunnels and approach roads and may continue up to the stage of commercial operation of the project. The nature and extent of impact, however, varies at different stages of project development.’ Further, in the report, it discussed the hydropower project’s damaging impact on aquatic ecosystems, including the inadequate downstream flow, the cumulative devastating effects of these projects, the muck disposal. It also discussed the impacts on the terrestrial ecosystem and the geophysical impacts. Quoting the significant observations as it is from the reports -

‘The State’s policy on hydropower projects was silent on the vital issue of maintaining downstream flow in the diversion reach (the stretch of the river from the point of diversion into the tunnel to the point where it is released back into its natural stream). The physical verification of four out of five operational projects, showed that river-beds downstream had almost completely dried up, the water flow was down to a trickle, and extremely inadequate for the sustenance of ecology and nearby groundwater aquifers.

Given the current policy of the State Government of pursuing hydropower projects indiscriminately, the potential cumulative effect of multiple run-of-river power projects can turn out to be environmentally damaging. Presently, 42 hydropower projects are in operation, 203 are under construction or clearance stage, while several others are at the conceptual stage.

¹¹¹ *ibid*

¹¹² CAG Report of 2009 on Uttarakhand. *Op.cit* note 11

¹¹³ *ibid*

¹¹⁴ ‘It is an underground opening from hill face whether for facilitating underground construction (construction adit) or for exploration/ instrumentation’

Negligence of environmental concerns was obvious as the muck generated from excavation and construction activities were being openly dumped into the rivers contributing to an increase in the turbidity of water. The projects seemed oblivious to the fact that such gross negligence of environmental concerns lead to deterioration of water quality and adverse impact on the aquatic Biota.

The plantation activity was highly deficient, as 38 percent of projects reported hardly any plantation, posing severe hazards both for natural ecology and stabilization of hill slopes.’¹¹⁵

To assess the implementation of the recommendations and the action on audit observations, a follow-up audit¹¹⁶ on this Standalone Audit Report from 2009 was brought out in 2017. It revealed that there had been no progress in regards to the audit finding pointing out the potential cumulative effect of multiple run-of-river projects. No significant progress has been made on the recommendation about ensuring the minimum downstream river flow as observed. The issue of getting a consent to establish the project from UEPPCB has shown an improvement, although there are projects which are yet to get the consent. The audit report noted that the ‘slow progress in this matter only underscores the lack of urgency on the part of the government in this critical area’. The afforestation and plantation activities have improved a little, but it is still deficient. The follow-up audit also noted that the recommendation based on audit findings on muck disposal had been fully implemented, among other recommendations.

¹¹⁵ ibid

¹¹⁶ Comptroller and Auditor General of India, ‘Follow up audit of the performance audit of Hydropower Development through Private Sector Participation’ in the *Report No.1 of 2018 - Government of Uttarakhand*, 2018, 58-75.

E.) Regarding Disaster Management

Performance audit¹¹⁷ on **Development of HydroPower Projects – Public Private Participation in Sikkim** revealed that the issue on disaster management was incorporated in the Environment Management Plans (EMPs) of only two power projects out of ten. The Land Revenue and Disaster Management Department mandated by State Government to address the issues of disaster management had not been consulted and involved in the process of preparation of disaster management plans either by the State Government or the Project developers.

The audit report also made a comment that ‘unless a robust disaster management plan is prepared and put in place towards prevention and preparedness to face disasters, the State will suffer tremendous loss of life and property besides long term damage to the environment.’¹¹⁸

The Performance Audit¹¹⁹ of **Hydropower Development through Private Sector Participation in Uttarakhand**, which was conducted in 2009, revealed that no specific measures had been planned/designed in any project to cope with the risk of flash floods. Audit also warned that the consequences of flash floods could be far worse in case high capacity hydro projects get affected. The follow up audit conducted in 2017 showed that no progress has been made to address the risk of flash floods.

The audit also pointed out that safety measures adopted by the project developers vary significantly despite the projects being situated in the same seismic zone. In the absence of adequate checks, the implementation of the same cannot be guaranteed.

Audit analysis also revealed that negligence in applying appropriate construction norms and structuring the project without appropriate technical countermeasures might expose projects to enhance seismic vulnerability. Therefore, it is essential that earthquake safety measures are incorporated by adopting a suitable seismic coefficient in the design for various structures forming part of the project.

An audit report¹²⁰ on **Capacity Utilisation, Electricity Generation, Sale, and Collection of Revenue, including Disaster Management by Hydro Power CPSEs (NHPC Limited, SJVN Limited, THDC India Limited and NHDC Limited)** came out in 2015, covering the period from 2009 to 2014. This report had a separate detailed chapter on Disaster Management with significant observations and comments. Some of which are as follows:

Disaster Management Plans (DMP) of all power stations selected for performance audit except Indira Sagar power station of NHDC were not in accordance with CWC guidelines. These DMPs also did not incorporate the Emergency Action Plan as a result of dam break analysis.

¹¹⁷ CAG Report no.3 of 2016 on Sikkim, *Op.cit.* note 9

¹¹⁸ *ibid*

¹¹⁹ CAG Report of 2009 on Uttarakhand. *Op.cit* note 11

¹²⁰ CAG Report No. 10 of 2012-13, *Op. cit.* note 24

Further, the DMPs were not reviewed annually as per the requirement of Disaster Management Act, 2005. Multiple audit report mentions the fact that the department was not able to maintain pace in terms of capacity addition with growing demand with respect to various states hydropower departments.

Damages to **Dhauliganga power station** during floods of June 2013 were possible to have been mitigated by compliance to the provisions of Reservoir Operation Manual/ Disaster Management Plan regarding advance warning system, maintenance of reservoir levels, flushing of the reservoir and lowering of Draft Tube gates in time. After the flood, power generation from Dhauliganga power station remained suspended up to May 2014.¹²¹

Similarly, timely rectification of defects pointed out by the Dam Safety team before monsoon season and operation of barrage gates as per Barrage Regulation Rules could have mitigated the damages suffered by Tanakpur power stations (TPS) while managing the flood of June 2013. TPS also overlooked the provisions of Tanakpur Barrage Regulation Rules during the management of flood of June 2013 and had to be completely shut down from 11 January 2014 to 28 March 2014 for repairs. Yet till December 2014, the power stations failed to conduct mock drills to deal with natural calamities like earthquakes and flooding of powerhouse.¹²²

Effective monitoring of operation and maintenance of hydropower stations is essential for the safe and efficient operation of the power station. Audit, however, observed that a large number of instruments installed at dams and other structures of CPSEs for monitoring their health were found non-functional during inspections by dam safety teams. NHPC and SJVN had committed to repairing/replacement of such instruments. In the case of THDC, most of such instruments were stated to be unapproachable for repair/replacement. However, THDC was yet to take any action to address the issue by preparation of an Instrumentation Manual describing the type, location, and scope of all reliable instruments as recommended by CWC.

Except Tehri Hydro, none of the power stations have the provision in Disaster Management Plan regarding training programmes on disaster caused by natural calamities.¹²³

The Performance audit¹²⁴ on **Odisha Hydro Corporation Limited** reveals that ‘no training was imparted to the employees of the Company on disaster management.’¹²⁵

¹²¹ ibid

¹²² ibid

¹²³ ibid

¹²⁴ CAG Report of 2009 on Odisha, *Op.cit.* note 68

¹²⁵ ibid

F.) Regarding Local Area Development

In the case of **Himachal Pradesh's HydroPower Policy**, 'the IPP is required to build such infrastructure development works in the vicinity of the project area that may be essentially required for the benefit of the local population. The expenditures on such works shall be incurred by the IPP to the extent of one percent of the project cost in respect of projects up to 5 MW and one and a half percent of projects above 5 MW. The amount for such developmental activities is payable during the construction period of the project in equal annual installment in the first quarter of every financial year to the Deputy Commissioner (DC) of the project affected area who has been designated as Chairman, Local Area Development Committee (LADC).'¹²⁶

Audit scrutiny¹²⁷ revealed that 'an amount of ₹4.96 crore was recovered between 2007 and February 2012 for local area development activities from IPPs of 14 test checked projects. Of this, ₹3.22 crore was utilised up to March 2012, leaving an unspent balance of ₹1.74 crore with the LADC as of May 2012.'¹²⁸

In case for **Teesta Stage 3 hydroelectric project in Sikkim**, the Deed of Agreement (DoA) between State Government and Private developer stipulated that Teesta Urja Limited (TUL), as well as its contractors, should ensure that all unskilled/skilled manpower other than executives required for implementation of the project should be recruited only through the employment cell at Gangtok, Sikkim. Further, employment should be given to one member of each of the displaced or adversely affected families as a result of the acquisition of land for the project. In order to ensure the compliance of the above three clauses, the DoA envisages the constitution of a project level welfare committee by the State Government, comprising of local politicians, Gram Pradhans, villagers, local administration, and TUL representatives. It was, however, observed that the State Government did not form the committee as envisaged in the DoA.¹²⁹

The Performance review¹³⁰ on **Development of Hydro Power Projects – Public Private Participation in Sikkim**, which covers the period 2003-08, scrutinized the 23 projects awarded till March 2008 to the IPPs/NHPC. It revealed that the terms of agreements entered into with the project developers were not standard and uniform. Only in seven projects (593MW) out of the twenty three (5107.7 MW), the State Government incorporated a condition in the agreements that the project developer would supply additional one percent free energy or money equivalent thereof from the project for the entire 35 years from the date of commercial operation of the project towards the local area development fund. In the case of the other 16 projects awarded, no

¹²⁶ CAG Audit report on Himachal (2012), *Op. cit.* note 19

¹²⁷ *ibid*

¹²⁸ *ibid*

¹²⁹ CAG Report no.3 of 2016 on Sikkim, *Op.cit.* note 9

¹³⁰ CAG Report on Sikkim (2009), *Op.cit.* note 22

specific conditions on the developers had been imposed towards contribution for local area development.¹³¹

The follow-up audit (2017)¹³² on the performance audit conducted in 2009 on '**Hydropower Development through Private Sector Participation-Uttarakhand**' mentioned that 'Local Area Development Fund policy for hydropower projects in Uttarakhand has been prepared. Approval of the same is under consideration.'¹³³

¹³¹ *ibid*

¹³² CAG Report no.1 of 2018 on Uttarakhand, *Op.cit.* Note 114

¹³³ *ibid*

CHAPTER 3

Significance and Limitations

It becomes clear that the audit reports have gone in-depth into the details of a few issues to make significant audit observations. However, not all the issues touched upon has been examined in detail, for example, environmental concerns with the exception of the audit report on Uttarakhand(2009). The social impacts of hydro projects have not been considered much in these audit reports. For instance, a major impact of hydropower projects, i.e., the impact on livelihood remains one of the matters with which these CAG audit reports have not engaged.

Reading of these audit reports provides ample instances that work as examples to various umbrella terms, which are cited by the reports as reasons for inefficiencies such as ‘administrative’ ‘or ‘mere managerial’ or ‘procedural’ issues.’ Some of these issues may seem small scale or ‘not relevant,’ resulting in an ignorant attitude towards them. However, reading of the audit report shows that the cumulative impact these issues are having is significant, and it forms a large chunk of mal-governance in the hydropower sector.

Reading of these reports also gives the sense that many a time, the reports are unable to make comments on a broader perspective based on the audit findings. This inability of the audit reports is manifested in the recommendation section, which we will discuss in the subsequent section. This limitation might appear as an institutional limitation because the recommendations are supposed to be implementable and have to be within the capability or legal framework of the audited entity as per the wide-scale perception. However, a close reading of the official ‘Guidance Note’ on ‘Developing Recommendations’ gives a different idea. We will engage with this issue around recommendations now.

Recommendations : Prey of Institutional Limitations?

The recommendations provided in the audit reports give a disappointing impression many times as it looks like a mere formality in the light of the conclusion section. The conclusions drawn based on the audit findings frequently are of inefficiency, repetitive non-compliance (that too, in matters of severe life threats), and the recommendation followed has been confined to ensuring compliance.

For instance, see Chapter 8 ‘Conclusions and Recommendations’ of the report on CPSEs¹³⁴, the fifth paragraph under section one (8.1.5) brings out the increased vulnerability of hydropower stations in terms of disaster in the high seismic zones in the Himalayan region. And from the

¹³⁴ CAG Report No. 10 of 2012-13, *Op. cit.* note 24

audit observations, concluded that how ‘Disaster Management Plan (DMP)’ was not updated and the ‘Emergency Action Plan’ or ‘Dam Break Analysis’ which should have been part of the DMP as per the prescribed regulations, were missing. Similarly, it pointed out that the ‘CEA guidelines on disaster management and State Disaster Management Plans, like setting up of advance warning system,’ were not incorporated in DMPs of Power Stations. To such non-compliances, which can lead to disastrous effects and immense loss of lives, the recommendations were just to ensure compliance. While, the need was to go beyond it and address the root cause of the non-compliance.

This is not a singular, isolated instance, but similar instances are spread in many places in the shortlisted CAG audit reports.

Are such recommendations because of the limitation of the institution? Is the role of an institution such that the recommendations has to be within a limit and under the weight of being practical, constructive and implementable by the audited entity?

A source to explore this question would be looking at a wide range of recommendations provided by CAG which produces enough evidence to counter such a thought. For example, from the list of audit reports picked up for this piece, there are instances where the audit reports have critiqued the existing hydro policies and have proposed recommendations accordingly. (See the performance audit on Uttarakhand¹³⁵ and the audit report on Himachal Pradesh¹³⁶)

Another, more authentic source to find an answer to this question is the official ‘Guidance Note’ on ‘Developing Recommendations’ available on CAG of India’s official website.¹³⁷ This note draws attention to the CAG’s Performance Auditing (PA) Guidelines and with examples attempts to elaborate the requirements to be considered while writing recommendations in any audit report (Be it performance audit, financial audit or compliance audit).

The ten page guidance note talks about the objective, significance and the way the recommendations should occur in an audit report. And yes, it does stress on the recommendation being directed towards ‘enhancing the economy, efficiency and effectiveness of the performance of the Government undertaking, program, system, activity or organisation that was the subject of performance audit.’¹³⁸ The first paragraph of the note spells out for the recommendations to be ‘practical and constructive.’ Few sections later, it defines the constructive approach when it says in context of a Performance Audit (PA), ‘A PA report is constructive if it manifests a remedial approach rather than a critical approach.’¹³⁹

¹³⁵ CAG Report of 2009 on Uttarakhand. *Op.cit* note 9

¹³⁶ CAG Audit report on Himachal (2012), *Op. cit.* note 19

¹³⁷ Guidance note on Developing Recommendations, 2014. Available under the ‘Resources’ tab on CAG official website.

¹³⁸ *ibid*

¹³⁹ *ibid*

Furthermore, it gives a list of the Do's and Don'ts while writing recommendations in an audit report. The list of the desirable feature of recommendations says -

- ‘1.) Make recommendations that are implementable
- 2.) Recommendations should be constructive and beneficial to the audited entity.
- 3.) Recommendations should clearly indicate who is responsible for implementation of the recommendation.’¹⁴⁰

The elaborated text provided for the above three points refers to the CAG's PA Guidelines¹⁴¹ and makes it clear that the recommendation aiming at ‘addressing the lacuna of rules or plugging loopholes in legislation may generally be very beneficial.’ Adding more to these it draws from the PA Guidelines which in its Section 5.18 states - “Sometimes, the cause may be outside the control of the entity under audit, in which case the recommendation should direct attention outside the audited entity, the governance structure.”¹⁴²

Hence, makes it clear that the recommendations can go beyond the legal framework of audited entity and can address the other entities from governance structure.

The Don'ts or the points to be avoided in recommendation are listed as follows -

- ‘1.) No truism or self evident propositions.
- 2.) No reiterating of existing instructions.
- 3.) No impractical recommendations.’¹⁴³

Now, while elaborating on these points, the guidelines make it clear that the ‘recommendations should not be a reiteration of existing control/instructions. The reason being, that such recommendations are redundant.’¹⁴⁴

This elaboration throws a light to look at the types of recommendation we have discussed earlier in this section and these points from guidelines verify that such recommendations are redundant. This means we can safely say that, yes, the ‘Office of CAG’ may not have legal powers to take any action against those who have violated the norms, but providing stronger detailed recommendations is doable under the purview of CAG.

¹⁴⁰ *ibid*

¹⁴¹ Comptroller and Auditor General of India, ‘Performance Auditing Guidelines 2014’. Available on : cag.gov.in

¹⁴² *ibid*

¹⁴³ Guidance Note, *Op.cit.* note 135

¹⁴⁴ *ibid*

What after the recommendations?

Procedurally, once the CAG Audit report is tabled in the parliament, it is the Parliamentary Committees - Public Accounts Committee (PAC), and the Committee on Public Undertakings (COPU), which are designated to act on the audit findings by examining the concerned audited entities.

Meanwhile, the Action Taken Notes (ATNs) on the audit paragraphs from the concerned entity should be submitted to the Parliamentary Committees. As per the Paragraph 212 of 'Regulations on Audit and Accounts, 2007'¹⁴⁵, 'The Secretary to Government of the concerned department shall cause preparation of self-explanatory action taken note(s) on the audit paragraph(s) relating to his department, that are included in the audit report, for submission to the Public Accounts Committee/Committee on Public Undertakings.'

Further, the Paragraph 214, of the regulations¹⁴⁶, makes it the responsibility of the Government to ensure timely response, as it says, 'It shall be the duty of the Government to establish and enforce adequate and reliable systems and procedures, clearly defining inter alia the roles and responsibilities at all levels that ensure that (i) the replies to the draft paragraphs, (ii) the self-explanatory action taken notes on matters included in the audit reports and (iii) the action taken notes on the recommendations of the Public Accounts Committee/Committee on Public Undertakings are sent to the appropriate authorities within the time limit prescribed in each case.'¹⁴⁷

The Parliamentary Committees, Public Accounts Committee (PAC), and the Committee on Public Undertakings, which have a role in taking up these reports, have an abysmally low rate of picking up the reports for discussion. As Sen¹⁴⁸ writes in his paper, in 2010-11, for instance, the two parliamentary committees discussed only twenty-nine paragraphs from the forty-two audit reports on the federal government prepared during this period. The numbers have not been much better in previous years.' Similarly, the statistical data for the five years between 2013 to 2018¹⁴⁹, makes it evident that the PAC could discuss only a minuscule number of topics out of the total number selected, which again was a small fraction of the total number of observations contained in CAG reports.

¹⁴⁵ Comptroller and Auditor General of India, 'Regulations on Audit and Accounts', 2007.

These regulations are in pursuance of Section 23 of the Comptroller and Auditor General's (Duties, Powers and Conditions of Service) Act, 1971 (Act No.56 of 1971)

¹⁴⁶ *ibid*

¹⁴⁷ Paragraph No. 214 from the Chapter 15, 'Audit Reports' of the 'Regulations on Audit and Accounts, 2007'.

¹⁴⁸ Sen (2013), *Op.cit. note 1*

¹⁴⁹ Dr. Govind Bhattacharjee, 'Parliamentary Oversight of CAG Auditor and PAC: An Uneasy Relationship', COMMON CAUSE | Vol. XXXVII No. 3, July-September, 2018 | 31

The Follow-up Audit Report

‘Follow-up refers to the situation where the auditor examines the corrective actions the audited entity, or another responsible party, has taken on the basis of the results of previous performance audits. It is an independent activity that increases the value added by the audit process by strengthening the impact of the audit and by improving future audit work. It also encourages the user of the reports and the audited entities to take the reports seriously and provides a useful learning basis and performance indicator for the auditors. A follow-up is not restricted to the implementation of recommendations but focuses on whether the audited entity has adequately addressed the problem and remedies the underlying conditions after sufficient time has been allowed for this process.’¹⁵⁰

As the Paragraph 8.3 of the Performance Auditing Guidelines of CAG of India makes it clear that in what cases a Follow-up audit is preferred - ‘In cases of the performance audits that are not selected for detailed examination, Accountants General will carry out follow-up procedures to examine the extent of the implementation of the recommendations, particularly those which had been accepted by the entity.’¹⁵¹

So, a follow-up audit is conducted at times with an objective to assess the implementation of previous recommendations. For instance, in the case of Uttarakhand, a follow-up audit of the Performance Audit on ‘Hydropower Development through Private Sector Participation’(2009) was brought up in June 2017. It said that the audit findings of the previous audit report had not been taken up for discussion by the Public Accounts Committee till then. Further, it said, ‘the extent of implementation of the accepted audit observations and recommendations by the Government was 52 percent; 35 percent recommendations were partially implemented, and 13 percent were not implemented as of June 2017.’¹⁵²

The recommendations which were not implemented or those who were partially implemented from this audit report have been discussed in a previous section.¹⁵³

¹⁵⁰ Comptroller and Auditor General of India, ‘Follow-up of performance audits’ in *Performance Auditing Guidelines 2014*, 69-73.

¹⁵¹ *ibid*

¹⁵² CAG Audit Report no.1 of 2018 of Uttarakhand, *Op.cit.* note 114

¹⁵³ Section D of Chapter 2 of this piece.

Helpless and Ineffective?

These sections draw attention to the limitations of the Office of the Comptroller and Auditor General of India, but these limitations sometimes loom large so much over the institution that it gives an impression of CAG being a helpless and ineffective institution.

Helpless and ineffective in the sense that despite bringing out significant audit findings and reaching to the conclusion, the trend of non adherence continues. These audit findings serve as testaments to the deep-rooted indifference towards the public and public resources resulting in further non-compliance with the rules and regulations by various authorities holding public offices. In such scenarios, the recommendations provided at the end of audit reports turn out to be a mere formality.

It is due to such reasons that the need for large scale structural reforms related to the CAG has been felt not only by academics, journalists, activists, and civil society but even by those who have served the institution from within.¹⁵⁴

To conclude this piece dealing with CAG and hydro, it can be said that the CAG needs to address and include other aspects (like social aspects) of hydropower as part of the audit reports. Nevertheless, the academicians-researchers-journalists-activists and people need to engage more and make sure these solid fact-based pieces of evidence of non-compliances and ineffectiveness should not be just another report uploaded on the website of CAG. The potential within these reports need to be utilized.

¹⁵⁴ See: 1. Sen (2013), *Op.cit. note 1*

2. Dr. B P Mathur, 'What Ails CAG, What Can Be Done? : Evolving Challenges for the National Auditor', COMMON CAUSE | Vol. XXXVII No. 3 July-September, 2018, 3-12.

3. Ramaswamy R. Iyer, 'Selecting the next CAG', The Hindu, February 21, 2013.

4. K. P. Shashidharan, 'Making CAG More Effective ,Audit Must be a Tool of Good Governance', COMMON CAUSE | Vol. XXXVII No. 3 July-September, 2018, 36-41.

List of Abbreviations

CAG	Comptroller and Auditor General
CERC	Central Electricity Regulatory Commission
COPU	Committee on Public Undertakings
CPWD	Central Public Works Department
CPSEs	Central Public Sector Enterprises
CWC	Central Water Commission
DPR	Detailed Project Report
DMP	Disaster Management Plan
EAP	Emergency Action Plan
EMP	Environment Management Plan
HEP	Hydro Electric Projects
IA	Implementation Agreement
PA	Performance Audit
PAC	Public Accounts Committee
PFR	Pre-feasibility Reports
PLF	Plant Load Factor
IPP	Independent PowerProducers
MoU	Memorandum of Understanding
NHPC	National Hydroelectric Power Corporation
NHDC	Narmada Hydroelectric Development Corporation
SJVN	Satluj Jal Vidyut Nigam Ltd.
THDC	Tehri Hydro Development Corporation

Appendix

CAG Audit Reports having sections/comments about Hydropower (2009-2018)

1. Sikkim

Performance Audit on Implementation of 1200 MW Teesta Stage III hydroelectric project in Sikkim

(Report No 3 of 2016 - Social Economic and Revenue Sectors Sikkim)

<https://cag.gov.in/content/report-no-3-2016-social-economic-and-revenue-sectors-sikkim>

2. Sikkim

Performance Review: Development of Hydro Power Projects through Public Private Participation

(Report of 2009 - Performance Audit on Civil of Government of Sikkim)

https://cag.gov.in/sites/default/files/audit_report_files/Sikkim_Civil_2009.pdf

3. Himachal Pradesh

Performance audit on the Integrated Kashang Hydro Electric Project

(Report No.1 of 2018 - Public Sector Undertakings (Economic Sector) Government of Himachal Pradesh)

<https://cag.gov.in/content/report-no1-2018-public-sector-undertakings-economic-sector-government-himachal-pradesh>

4. Himachal Pradesh

Performance audit on 'Sawra Kuddu Hydro Electric Project' (executed by Himachal Pradesh Power Corporation Limited)

Report No. 2 of 2014 - Performance Audit on Public Sector Undertakings (Economic Sector) of Government of Himachal Pradesh

https://cag.gov.in/sites/default/files/audit_report_files/Himachal_Pradesh_Report_2_2014.pdf

5. Himachal Pradesh

Performance Audit on Hydro Power development through Private Sector Participation
Report No. 2 of 2012 - Performance Audit on Social, General and Economic Sector (Non Public Sector Undertakings) of Government of Himachal Pradesh

https://cag.gov.in/sites/default/files/audit_report_files/Himachal_Pradesh_Report_2_2012.pdf

6.. Maharashtra

Comments about Small hydro power projects under Performance audit on ‘Renewable Energy Sector in Maharashtra’

(Report No 3 of 2016 - Public Sector Undertakings Government of Maharashtra)

<https://cag.gov.in/content/report-no-3-2016-public-sector-undertakings-government-maharashtra-0>

7. Meghalaya

Performance Audit of Power Generation activities of Meghalaya Power Generation Corporation Limited

Report No.3 of 2017 - PSU Government of Meghalaya

<https://cag.gov.in/content/report-no3-2017-psu-government-meghalaya>

8. Arunachal Pradesh

Performance Audit on Execution of Micro, Mini and Small Hydro Power Projects (Department of Hydro Power Development)

Report of 2014 – Compliance, Financial and Performance Audit on Social Public Sector Undertakings (SPSUs) of Government of Arunachal Pradesh

https://cag.gov.in/sites/default/files/audit_report_files/Arunachal_Pradesh_SPSUs_2014.pdf

9. Arunachal Pradesh

Performance Review relating to Department of Hydro Power Development.

Report of 2010 - Performance and Financial Audit on Civil of Government of Arunachal Pradesh

https://cag.gov.in/sites/default/files/audit_report_files/Arunachal_Pradesh_civil_2010.pdf

10. Arunachal Pradesh

Performance Audit of Power Transmission activities of Department of Power, Government of Arunachal Pradesh.

Report of 2013 - Financial and Performance Audit on Revenue of Government of Arunachal Pradesh -Chapter 4

https://cag.gov.in/sites/default/files/audit_report_files/Arunachal_Pradesh_Revenue_2013_chap_4.pdf

11. Odisha

Compliance Audit Observation on Odisha Hydro Power Corporation Limited

Report No. 1 of 2014 - Performance Audit on Public Sector Undertakings of Government of Odisha

https://cag.gov.in/sites/default/files/audit_report_files/Odisha_Report_1_2014.pdf

12. Odisha

Comments on Odisha Hydro Power Corporation Limited

Report No. 2 of 2013 - Report of the Comptroller and Auditor General of India on Public Sector Undertakings for the year ended March 2012, Government of Odisha

https://cag.gov.in/sites/default/files/audit_report_files/Odisha_Report_2_2013.pdf

13. Odisha

Comments (Revenue related) on Orissa Hydro Power Corporation Limited

Report of 2011 - Report of the Comptroller & Auditor General of India, Commercial, Government of Odisha

https://cag.gov.in/sites/default/files/audit_report_files/Odisha_Commercial_2011.pdf

14. Odisha

Performance review of Functioning of Orissa Power Generation Corporation Limited
*Report of 2010 - Report of the Comptroller and Auditor General of India, Commercial,
Government of Orissa*

https://cag.gov.in/sites/default/files/audit_report_files/Odisha_Commercial_2010.pdf

15. Odisha

Performance Audit on Odisha Hydro Corporation Limited
Report of 2009 (Commercial)

<https://cag.gov.in/content/report-2009-report-comptroller-and-auditor-general-india-commercial-government-orissa>

16. Punjab

Performance Review relating to Generation of Power by Punjab State Electricity Board.
Audit Report (Commercial), Punjab for the Year 2009-10

https://cag.gov.in/sites/default/files/audit_report_files/Punjab_Commercial_2010.pdf

17. Bihar

Comments on Bihar Hydel Power

*Report No.4 - Report of the Comptroller and Auditor General of India (Commercial) for the year
ended 31 March 2010, Government of Bihar*

https://cag.gov.in/sites/default/files/audit_report_files/Bihar_Commercial_2010.pdf

18. Assam

Performance review relation to Assam Power Generation Corporation Limited was conducted.
*Report of 2010 - Report of C&AG of India (Commercial) for the year ended 31 March 2010
(Report No. 4) Government of Assam*

https://cag.gov.in/sites/default/files/audit_report_files/Assam_Commercial_2010.pdf

19. Union Government

Performance Audit of Capacity Expansion in Hydro Power Sector by CPSEs, Ministry of Power
Report No. 10 of 2011-12 – Performance Audit of Capacity Expansion in Hydro Power Sector by CPSEs, Ministry of Power

[https://cag.gov.in/content/report-no-10-2011-12-%E2%80%93-performance-audit-capacity-expansion-hydro-power-sector-cpses\)](https://cag.gov.in/content/report-no-10-2011-12-%E2%80%93-performance-audit-capacity-expansion-hydro-power-sector-cpses)

20. Union Government

Comments about Small Hydro Power Projects
Report No.2 of 2018 - Compliance Audit on Scientific and Environmental Ministries/ Departments Union Government

[https://cag.gov.in/sites/default/files/audit_report_files/Report_No.2_of_2018_%E2%80%93_Co compliance_Audit_on_Scientific_and_Environmental_MinistriesDepartments_Union_Government .pdf\)](https://cag.gov.in/sites/default/files/audit_report_files/Report_No.2_of_2018_%E2%80%93_Co Compliance_Audit_on_Scientific_and_Environmental_MinistriesDepartments_Union_Government.pdf)

21. Union Government

Performance Audit on Capacity Utilisation, Electricity Generation, Sale and Collection of Revenue including Disaster Management by Hydro Power CPSEs, Union Government, Ministry of Power

Report No. 41 of 2015

https://cag.gov.in/sites/default/files/audit_report_files/Union_Performance_Commercial_CPSE_Report_41_2015.pdf

22. Uttarakhand

Performance Audit on Hydropower Development through Private Sector of Government of Uttarakhand

Report of 2009 - Performance Audit on Hydropower Development through Private Sector of Government of Uttarakhand

https://cag.gov.in/sites/default/files/audit_report_files/Uttarakhand_Performance_Audit_2009.pdf

23. Uttarakhand

Follow up audit of the performance audit of Hydropower Development through Private Sector Participation

Report No.1 of 2018 - Government of Uttarakhand, 2018

<https://cag.gov.in/content/report-no1-2018-government-uttarakhand-0>

Annexure-1

Few notes on ‘Dam Safety-Disaster Preparedness’¹⁵⁵

The following notes are divided into subsections. The first section has notes on the disaster preparedness of hydropower projects from various CAG audit reports. The notes in the second section are from the relevant readings on the issue. Third section just refers to the current regulatory framework and the fourth section contains the notes on the ‘Dam Safety Bill, 2019’.

Notes on Disaster Preparedness from the CAG audit reports

The critical issues pertaining to hydropower projects which come to light through the reading of a curated list of CAG audit reports related to hydropower include the issue of disaster preparedness of these projects.

However, very few of these audit reports have provided significant comments on the issue, but it is enough to give an idea about the happenings. The non-compliance of various safety measures regarding dam safety is at the forefront. A quick jotting down of the happenings on this issue gives us the following list. The specific instances of each of the following are spread over those¹⁵⁶ hydropower related audit reports :

- a) The issue of disaster management rarely being incorporated into the Environment Management Plans (EMPs). Flood plain maps not being in place.
- b) Not consulting the Disaster Management Department while preparing a project-specific disaster management plan, to be included in the EMPs. (In the rare cases where disaster management plan was prepared)
- c) Absence of specific measures in the planning stage to deal with the risks such as flash floods. Despite repeated warnings of the tremendous impact flash floods can have on high capacity hydropower projects, no progress on the front.

¹⁵⁵ Based on the reading of CAG audit reports related to hydropower, the plan was to focus on a few aspects and to engage with them in detail. The two issues which were taken up by the author in the primary stage after the reading of CAG audit reports were: Dam safety-Disaster Preparedness Aspect and Impact of hydropower projects on Livelihood in Mahakali River basin. In the course of the study, the second issue became the focal point of the research work. Hence, the first one was not dealt with in detail during the study. However, there were several important points from the CAG reports related to Dam Safety-Disaster preparedness, which had come out in the primary stages itself.

It was felt that it would be useful to capture these points in the form of some notes that may appear disjointed, but whose primary purpose is to make sure that these points are culled out and recorded.

¹⁵⁶ The list of 23 audit reports as provided in Annexure 1.

- d) Significant variations and negligence in considering the seismic vulnerability during the construction of hydropower projects.
- e) The Disaster Management Plans (DMPs) not being in accordance with the Central Water Commission (CWC) Guidelines.
- f) The Emergency Action Plan (EAP), based on the dam break analysis, not being prepared.
- g) Non-compliance to the various provisions of 'Reservation Operation Manuals' such as maintenance of reservoir levels, flushing of the reservoirs, timely lowering of draft tube gates, and advance warning systems. Non-adherence to the 'Barrage Regulation Rules'.
- h) Monitoring instruments being non-functional and oblivious attitude in getting the replacements. Failure in the Renovation, Modernisation and Upgradation activities including the safety related equipment. Project-specific Instrumentation Manuals not being in place in spite of repetitive pointing out of the same by inspecting authorities.
- i) Negligence towards the suggestions or recommendations provided as a result of the Dam Safety Inspections.
- j) Training programme as part of the disaster management not being imparted to the employees, ensuring the operation of hydropower projects.

These concerns echoed in various hydropower related CAG Audit reports are reflected at other places as well :

In March 2011, The Ministry of Water Resources (MoWR) prepared its ministry level Crisis Management Plan(CMP). The CMP was to handle the flood forecasting and dam failures. In order to do the same, CMP mandated the establishment of a Dam Safety Organisation (DSO) in each state. The purpose was to look into the safety issues of large dams at the state level. The standalone Performance Audit on Disaster Preparedness in India¹⁵⁷ stated that only 14 states established DSO.

The same Audit report also revealed that the 'only eight states had prepared Emergency Action Plans for 192 large dams against the 4728 large dams in 29 states as of September 2011.'

The Central Water Commission (CWC) in 2006 had issued the guidelines regarding the Emergency Action Plans. The audit report concluded on this matter, saying, 'Non-preparation of

¹⁵⁷ Comptroller and Auditor General of India, 'Performance Audit of Civil Disaster Preparedness in India of Union Government, Ministry of Home Affairs', April 2013.

EAPs by the Project Authorities in respect of 96 percent of large dams render huge area and property left vulnerable to cascading effects of dam failure.’

The poor mechanism for monitoring was reflected by the fact which Audit report on Disaster Preparedness brought out i.e., out of the 4728 reservoirs and barrages in the country as of September 2011, ‘CWC provided inflow forecast to only 28 reservoirs and barrages’. This leaves the huge number of barrages and reservoirs un-monitored in terms of the water levels.

The poor handling of the reservoirs of hydropower projects in case of emergency scenarios increases the disaster potential. The lack of knowledge/training in such situations about handling the operational aspects of a hydropower project has added to the extreme damage the projects have caused in various situations. For instance, the case of floods in Uttarakhand (June 2013) and the floods in Kerala (August 2018). The detail on this instance is in the subsequent section.

The case of disastrous floods in Uttarakhand and Kerala

None of the 61 dams had emergency action plans in the case of Kerala.¹⁵⁸ Various reports,¹⁵⁹ including an Amicus Curiae,¹⁶⁰ have commented on the poor dam management, which worsened the flood situation. Similarly, in the case of Uttarakhand, including the reports of the government-appointed committees¹⁶¹ with various other documentation has validated the same.

It is worth having a quick look over the discussion paper on flood-events in June 2013, which brings out a picture after going into greater detail of the events and places them appropriately in the broader context.

Let us look at the paper by Emmanuel Theophilus, titled as **‘A River Pulse: Discussion paper on flood-events in June 2013, Mahakali basin, Uttarakhand.’**¹⁶²

In order to understand the scale and nature of the impact of the floods of June 2013, the author goes on exploring the Mahakali basin to look for met data, flow data, any historical data that might help in understanding the events precisely. The paper has substantially focussed on telling the details of events at NHPC’s Dhauliganga HEP at Chirkila in the Dharchula subdivision of Pithoragarh District.

¹⁵⁸ Himanshu Upadhyaya, ‘Kerala floods: What to expect when none of the 61 dams have any emergency plan?’, DownToEarth, September 18, 2018.

¹⁵⁹ Himanshu Thakkar, ‘Role of dams in Kerala’s 2018 floods’, SANDRP, October 4, 2018.

Euan Rocha, Rajendra Jadhav, Promit Mukherjee, ‘Did Kerala’s dams exacerbate India’s once-in-century floods?’, REUTERS, October 11, 2018.

¹⁶⁰ The Hindu, ‘Poor dam management blamed for Kerala floods’, April 03, 2019.

¹⁶¹ Himanshu Thakkar, ‘Report of the Expert Committee on Uttarakhand Flood Disaster & Role of HEPs: Welcome recommendations’, SANDRP, April 29, 2014.

¹⁶² Can be retrieved from himalparkriti.org

After going to lengths about the matter and making a series of convincing arguments, the paper concludes that ‘rainfall during the period in question was indeed very heavy, but by no means unprecedented.’ The case of ‘unprecedented’ rain and of a catastrophic weather event was built for two possible evasive agendas - ‘one, to dodge the issues of poor design and fundamental flaws in conceptualization and functioning of such hydropower projects that have contributed to the devastation. And two, to evade the issue of the greatly enhanced erosive power of the rivers in spate, due to blasting of tunnels and dumping millions of tonnes of muck along rivers, as well as the mining of hundreds of thousands of cubic meters of sand and rock for the building of numerous hydropower projects along all the major tributaries of the Ganga in Uttarakhand.’

The paper also makes an important and well-substantiated argument about the way hydropower projects are the contributors to the ‘natural’ disasters. Quoting from the paper, ‘Hydro-power projects are perhaps the greatest contributors to landslides as well as flood damage, not just along their entire tunnel lengths, but all the way down the river-basin. They contribute in two ways. One, by destabilizing slopes along their entire tunnel lengths, and two, by dumping and stacking very large volumes of muck (euphemism for excavated debris) along flood-plains.’

THE REGULATORY FRAMEWORK

The relevant section of the disaster management regulations for hydropower projects :

As per the **Section 37** of the ‘The Disaster Management Act, 2005’,

‘Every Ministry or Department of the Government of India shall—

(a) prepare a disaster management plan specifying the following particulars, namely:—

(i) the measures to be taken by it for prevention and mitigation of disasters in accordance with the National Plan;

(ii) the specifications regarding integration of mitigation measures in its development plans in accordance with the guidelines of the National Authority and the National Executive Committee;

(iii) its roles and responsibilities in relation to preparedness and capacity-building to deal with any threatening disaster situation or disaster;

(iv) its roles and responsibilities in regard to promptly and effectively responding to any threatening disaster situation or disaster;

(v) the present status of its preparedness to perform the roles and responsibilities specified in sub-clauses (iii) and (iv);

(vi) the measures required to be taken in order to enable it to perform its responsibilities specified in sub-clauses (iii) and (iv);

(b) review and update annually the plan referred to in clause (a);’

(c) forward a copy of the plan referred to in clause (a) or clause (b), as the case may be, to the Central Government which Government shall forward a copy thereof to the National Authority for its approval.

As per the **Section 40** of the ‘The Disaster Management Act, 2005’

Disaster management plan of departments of State.—(1) Every department of the State Government, in conformity with the guidelines laid down by the State Authority, shall— (a) prepare a disaster management plan which shall lay down the following :— (i) the types of disasters to which different parts of the State are vulnerable; (ii) integration of strategies for the prevention of disaster or the mitigation of its effects or both with the development plans and programmes by the department; (iii) the roles and responsibilities of the department of the State in

the event of any threatening disaster situation or disaster and emergency support function it is required to perform; (iv) present status of its preparedness to perform such roles or responsibilities or emergency support function under sub-clause (iii); 21 (v) the capacity-building and preparedness measures proposed to be put into effect in order to enable the Ministries or Departments of the Government of India to discharge their responsibilities under section 37; (b) annually review and update the plan referred to in clause (a); and (c) furnish a copy of the plan referred to in clause (a) or clause (b), as the case may be, to the State Authority. (2) Every department of the State Government, while preparing the plan under sub-section (1), shall make provisions for financing the activities specified therein. (3) Every department of the State Government shall furnish an implementation status report to the State Executive Committee regarding the implementation of the disaster management plan referred to in sub-section (1).

It was as per these regulations that the Department of HydroPower Developments or the Central Public Sector Enterprises were to prepare a Disaster Management Plan (DMP) and revise it on an annual basis.

The Dam Safety Bill, 2019

The Dam Safety Bill is supposed to fill the statutory void in the area of dam safety. The bill was passed in Lok Sabha in August 2019. The bill is yet to pass through the Rajya Sabha. (December 2019)

The bill states its objective as ‘to provide for surveillance, inspection, operation and maintenance of the specified dam for prevention of dam failure related disasters and to provide for institutional mechanism to ensure their safe functioning and for matters connected therewith or incidental thereto.’

The bill proposes to constitute a ‘**National Committee on Dam Safety**’ with following members-

- ‘(a) the Chairman, Central Water Commission—Chairperson, ex officio;
- (b) not exceeding ten representatives of the Central Government not below the rank of Joint Secretary to Government or equivalent dealing with matters relating to dam engineering or dam safety, nominated by the Central Government —Members, ex officio;
- (c) not exceeding seven representatives of the State Governments of the level of Engineer-in-Chief or equivalent by rotation, nominated by the Central Government —Members, ex officio; and
- (d) not exceeding three specialists in the field of dam safety and allied fields nominated by the Central Government—Members.’

As per the bill, the committee should be reconstituted within every three year period. And it should discharge its duties to ‘prevent dam failure related disasters and to maintain standards of dam safety.’

This bill also proposes the establishment of another entity, named as , ‘National Dam Safety Authority’. With its headquarters in New Delhi, ‘the authority shall be headed by an officer not below the rank of Additional Secretary to the Government of India or equivalent to be appointed by the Central Government who have knowledge of, and adequate qualification, experience and capacity in, dealing with problems relating to the dam engineering and dam safety management. This authority’s function would be ‘to implement the policy, guidelines and standards evolved by the National Committee for proper surveillance, inspection and maintenance of specified dams and for such purposes, it shall have the power to enforce the attendance of any person and call for any information as may be necessary.’

Similarly, at the State level, the bill has proposed the establishment of Dam Safety Organisation and the constitution of the 'State Committee on Dam Safety'. Specifying the duties of State Dam Safety Organisation, it gives detail about these functions - 'Vulnerability and hazard classification of dams', 'Maintenance of log books', 'Records of dam failures and dam incidents', 'Instruction on safety of specified dams', 'Funds for maintenance and repairs', 'Technical Documentation', 'Operation and maintenance' establishment for the dams.

Fixing up the responsibilities of the owner of specified dams, the bill contains provisions regarding the 'Offences and Penalties.'

For the purpose of regular inspections, it states, 'the owner shall, within the operation and maintenance establishment, provide a dam safety unit consisting of such competent levels of engineers as may be specified by the regulations.' The bill also includes provisions regarding, 'Instrumentations to be installed in every specified dam,' 'Establishment of hydro-meteorological station,' 'Installation of seismological station'.

The bill makes it obligatory for the owner of a specified dam to design a hydro-meteorological network and inflow forecasting system, establish an emergency flood warning system, carry out risk assessment studies and preparation of emergency action plans.

For the preparation of emergency action plans, the owner of the specified dam 'shall undertake a consultation process with all disaster management agencies and other Departments of the State entrusted with disaster management and relief in the area likely to be affected and owners of other dams in the immediate vicinity likely to be affected,so as to bring coordination and transparency and allay any unwarranted fear on dam safety issues.'

It provides detailed regulations to ensure the 'Comprehensive dam safety evaluation.'

Criticism and Limitations of the Bill

The bill is being accused of encroaching the rights of the State and said to be infringing upon the federal structure. The bill does not have provisions regarding compensation for the disaster-affected population.

There are questions about the governance structures proposed by the bill. As per the provisions, the Central Water Commission's chairman would be the ex-officio chairman of the National Committee on Dam Safety. It is the CWC that provides techno-economic clearances to the dam projects, and by being head of the NCDS, it looks like it has been enshrined with the responsibility of self-audit.

The transparency and accountability norms of the bill remain under question.¹⁶³

The Dam Safety Bill is filling a void and is said to be a step in the right direction but with its shortcomings,¹⁶⁴ there are concerns about the bill not being able to bring much change on the ground.

¹⁶³ SANDRP, 'Dam Safety Bill 2019: Will it help prevent Dam Disasters in India?', September 30, 2019

¹⁶⁴ Himanshu Thakkar, 'Why States fear the new Dam Safety Bill', The Hindu Business Line, January 02, 2019