TECHNICAL PAPER ON POLICY LEVEL CHANGES INITIATED BY GOVERNMENT OF INDIA FOR DEVELOPMENT OF HYDRO POWER SECTOR IN INDIA

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ABSTRACT

Hydropower can play a crucial role in India's sustainable development and energy security as it meets the criteria of sustainability, availability and reliability. It is an environmentally benign, non-polluting source of power and is most suitable for balancing renewables. Despite so many benefits from hydropower and huge potential in country, the share of hydropower is not at satisfactory level in overall installed capacity of the country. The Government has accorded high priority to the development of the hydro potential and has time to time taken a number of policy initiatives to address the issues impeding the hydropower development.

This paper mainly focuses on the recent policy level initiatives taken by the Government of India to accelerate the development of Hydro Power Sector in India. Further, special focus has been given to the measures to promote hydropower sector through budgetary support for Flood Moderation component and Enabling Infrastructure i.e. roads/ bridges.

1. INTRODUCTION

India, being one of the world's fastest growing economies, plays a significant role in the future of global energy markets. In recent decades, the country has made significant achievements in the energy sector by introducing various policies and reforms to support the deployment of renewable energy in the country as well as to ensure access to electricity to all its citizens. The Government has focused on laying down an ambitious vision to bring secured, affordable and sustainable energy to all its citizens

Electricity is one of the key enablers for achieving socio-economic development of the country. The economic growth leads to growth in demand of power. Generation and capacity augmentation is the most vital for meeting the ever-increasing demand of power to achieve the targeted growth rate.

In the Nationally Determined Contributions as per the Paris Accord on Climate Change, India has made a pledge that by 2030, 40% of India's installed power generation capacity shall be from clean energy sources and also pledged to reduce emission intensity of GDP by 33-35 % from 2005 level by 2030. Economic growth, increasing prosperity, growing rate of urbanization and rising per capita energy consumption has increased the energy demand of the country.

Keeping this in view and India's commitment for a healthy planet, it was decided during the year 2015 that 175 GW of renewable energy capacity will be installed by the year 2022. This includes 100 GW from solar, 60 GW from wind, 10 GW from biomass and 5 GW from small hydro power. The substantial higher capacity target will ensure greater energy security, improved energy access and enhanced employment opportunities. With the accomplishment of these ambitious targets, India will become one of the largest Green Energy producers in the world, even surpassing several developed countries.

At the United Nations Climate Action Summit in September 2019, the Hon'ble Prime Minister of India, Mr. Narendra Modi has declared that India will be raising its RE targets to 450 GW by 2030 from 175 GW by 2022. In Nov'21, at the COP26 Climate Conference in Glasgow, the Hon'ble Prime Minister of India, Mr. Narendra Modi further raised the nationally determined contribution (NDC) target of non-fossil energy capacity of India to 500 GW by 2030, from 450 GW and mentioned that India will achieve net zero carbon emissions by 2070.

2. REQUIREMENT OF HYDROPOWER

Hydropower is a renewable, economic, non-polluting and environmentally benign source of energy. It has the inherent ability of instantaneous starting / stopping for catering to the load variations and thus helps in improving reliability of power system apart from addressing peaking requirements. The ongoing energy transition is rapidly changing the energy mix in the power system. The increasing percentage of intermittent and variable energy sources introduces several technical challenges in secure and stable grid operation, which include short-term to long-term generation-demand balancing issues, frequency stability, voltage stability, and demand for higher flexibility among the other issues.

The Hydro generation cost is not only inflation free but also reduces with time. Hydroelectric projects have long useful life extending over 100 years with little renovation and modernization cost and help in reducing dependence on fossil fuels. The hydro generation offers greater advantages as economic and environmental friendly power resource in the long run. They also help in opening of avenues for development of remote and backward areas.

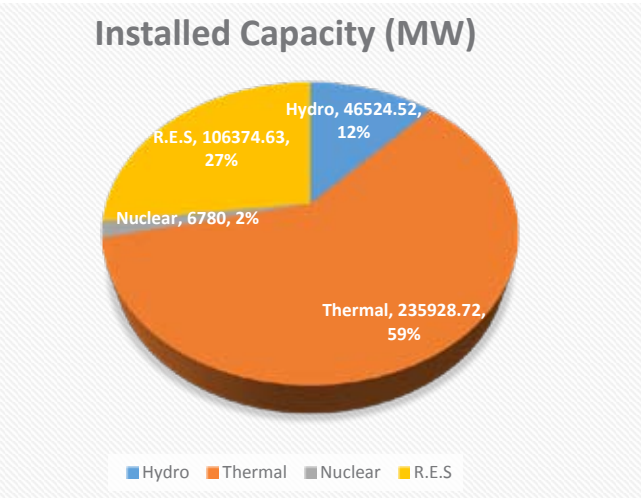
Govt. of India has set a capacity addition target of 450 GW from renewable energy resources by 2030. Considering intermittency & variability of Solar & Wind power generation, the development of Hydro projects becomes more important to provide balancing power for smooth integration of renewables in the power system and for grid security and stability. The tariff of hydro power generation will have a strategic role in future especially in view of large scale additions of renewable energy sources in the grid that has inherent intermittency. India has been endowed with enormous economically exploitable and viable hydro potential assessed to be about 1,50,000 MW and only about 36% of the identified potential has been developed so far.

3. HYDRO SHARE

The share of hydro in the total installed capacity has been consistently declining. At present

(28.02.2022), the total installed capacity in the country is 395607.86 MW and hydro share accounts for 46524.52 MW (11.76%).

Type of Station	Installed Capacity (MW)
Hydro	46524.52
Thermal	235928.72
Nuclear	6780.00
R.E.S	106374.63
Total	395607.86



4. PRESENT GOI INITIATIVES FOR ACCELERATED DEVELOPMENT OF HYDRO POWER PROJECTS

Realizing the huge potential of hydropower in India and considering the impediments to its development, the Government of India has undertaken a number of initiatives in the recent past, supported by various policy-level changes to promote hydropower development and facilitate investment in the sector. Some of the key policy-level changes introduced in recent years that have an impact on the hydropower sector are discussed below:

4.1 Measures to Promote Hydro Power Sector

Ministry of Power, GoI vide OM dated 08.03.2019 issued various policy related measures to promote hydro power sector in India. The salient features of the policy related measures are given below:

4.1.1 *Declaring Large Hydro Power Projects (LHPs, i.e., >25 MW) as Renewable Energy Source*

However, LHPs would not automatically be eligible for any differential treatment for statutory clearances such as Forest clearances, environmental clearance, National Board for Wildlife clearance, related impact Assessment and carrying capacity study, etc., available to Small Hydropower Projects (SHPS), i.e., projects capacity up to 25 MW.

4.1.2 *Hydro Purchase Obligation (HPO) as a separate entity within non-solar Renewable Purchase*

The HPO shall cover all LHPs commissioned after this notification dated 08.03.2019 as well as untied capacity (i.e., without PPA) of the commissioned projects. This HPO will be within the existing Non-Solar RPO after increasing the percentage assigned to it so that existing Non-Solar RPO for other renewable sources remain unaffected by the introduction of this HPO. Necessary amendments will be introduced in the Tariff Policy and Tariff Regulations to operationalize HPO.

4.1.3 *Tariff rationalization measures to bring down hydropower tariff*

Tariff rationalization measures including providing flexibility to the developers to determine tariff by back loading of tariff after increasing project life to 40 years, increasing debt repayment period to 18 years and introducing escalating tariff of 2%.

4.1.4 *The Budgetary Support for Flood Moderation component and Enabling Infrastructure i.e. roads/ bridges*

This support is to be provided by the Govt. for all large hydropower projects to be set up in future with the objective to reduce tariff of hydropower projects by ensuring that consumers are charged cost related to power component only and at the same time project developers are not burdened with these costs as the hydropower projects already tend to be costlier now-a-days.

- Flood Moderation: The budgetary support for Flood Moderation component for storage HEPs shall be provided through the budgetary grant of MoP. The support would be extended to all storage projects to be taken up for construction after 08.03.2019. The value of flood moderation would be worked out by technical agencies viz., CEA, CWC, etc., in accordance to guidelines. The amount required for flood moderation/ storage costs would be reimbursed by Ministry of Power to the project developers after achievement of specific milestones. This is applicable to all eligible projects, which shall be taken up for construction by 31 March 2030.

  Detailed guidelines has been issued by MoP on 28.09.2021

- Enabling Infrastructure: The budgetary support for funding enabling infrastructure for HEPs i.e. roads/bridges shall be provided through the budgetary grant of MoP. The support is to be given to the hydropower projects commencing construction after 8th March 2019. The limit of this support shall be limited to Rs 1.5 Crore per MW for projects upto 200 MW and Rs 1.0 Crore per MW for projects above 200 MW. The amount of Grant is to be reimbursed to project developers after achievement of specific milestones.

  Detailed guidelines has been issued by MoP on 28.09.2021 and revised by MoP on 28.01.2022.

4.2 Hydro Purchase Obligations

In compliance of 6.4(1) of the Tariff Policy 2016 and with the objective to add 30,000 MW of hydropower capacity by the year 2029-2030, a long-term trajectory for Hydro Purchase Obligations (HPO) has been notified by the Govt. on 29.01.2021 considering the Large Hydro Projects commissioned after 8th March 2019. The HPO trajectory varies from 0.18% in 2021-22 to 2.82% in 2030 and would be notified subsequently for 2030-31 to 2040. HPO benefits are to be met from power generated from LHPs commissioned after 8th March 2019 and up to 31.03.2030 in respect of

70% of the total generated capacity for a period of 12 years from the date of commissioning. Hydro Energy Certificate (HEC) mechanism is to devised by CERC in line with the existing Renewable Energy Mechanism (REC) and the HEC would have a capping price of Rs 5.50/unit of electrical energy w.e.f 8th March 2019 to 31st March, 2021 and with annual escalation @ 5% thereafter for purposes of ensuring HPO compliance.

4.3 Constitution of committee to suggest policy measures for promoting the Development of hydropower sector including Pumped Storage Projects in the country

A committee was constituted by CEA on 31.08.2021 to suggest policy measures for promoting the Development of hydropower sector including Pumped Storage Projects in the country.

The Terms of Reference (ToR) of the committee are as under:

(i) Review the clearances required for setting up of hydro projects & suggest measures to fast track these clearances

(ii) Study the impact of Free Power, RoE, Water Cess, Taxes & Duties and other factors on tariff of Hydro Projects and suggest measures to reduce the same & make the Hydroelectric Sector attractive for investment

(iii) Study Survey/ Construction Stage issues & suggest measures for fast tracking of construction of hydro projects

(iv) Study impact of transmission cost on hydro tariff & suggest measures to mitigate the same

(v) Recommend grant/ subsidy on any other facilitation required from the Central Govt. or concerned

The committee suggested various policy measures for development of Hydro Power Sector viz. Increasing involvement of CPSUs in Hydro and PSPs Development, Monetization of Intangible Benefits of Hydro Projects, Stricter enforcement of RPO/ HPO Regime, Rationalization of Tariff, Allocating risk and responsibility with States, Equity participation by State, Waiver of ISTS charges for all Hydro Projects & extension of support beyond 2025 to PSPs as well as all Hydro Projects etc.

4.4 Measures to revive stalled Hydropower projects by promoting greater Involvement of CPSUs

The performance of private sector in hydro power development has been dismal over the years despite a significant push through the Hydro Policy 2008. Unfortunately, none of projects envisaged through private sector have got commissioned in North-Eastern Region especially Arunachal Pradesh having majority of the hydro potential. Therefore, emphasis is now being laid towards larger involvement of CPSUs, apart from Private Sector, in development of conventional hydro schemes as well as Pumped Storage Schemes. A conducive atmosphere needs to be created to harness the largely untapped hydro potential in the country.

In view of above, MoP, GoI vide order dated 22.12.2021 has identified 29 hydropower projects with planned capacity of 32415 MW in Arunachal Pradesh for implementation by CPSUs for development of hydropower in the region based on their presence in the region, size of the projects, etc. The summary of basin-wise CPSUs identified is as under:

Basin/ (CPSU)	Nos.	IC (MW)
Kameng, Subansiri, Tawang, Siang tributaries (NEEPCO)	19	8788
Siang Main Stem (JV of NHPC & NEEPCO)	2	12700
Dibang HEP (NHPC)	1	2880
Dibang basin except Dibang HEP (SJVN)	5	5097
Lohit (THDC)	2	2950
Total	29	32415

4.5 Formation of Evaluation committee facilitating takeover of stalled hydro projects

Ministry of Power (MoP), GoI vide Office Order dated 04.01.2022 constituted a Committee to ensure appropriate valuation of hydro projects of IPPs stalled at initial stage (i.e. physical progress upto 25%) and sought to be taken over by the CPSUs viz. NHPC, NEEPCO, THDCIL, SJVN etc. The committee comprises various members from Central Ministries/Departments/State Governments/ nominated members (retd)/CMDs of CPSUs (as special invitee) etc.

The Terms of Reference (ToR) of the committee are as under:

(i) Only projects which are at initial stages of development will be considered under this dispensation. The physical progress of the stalled project should not be more than 25%.

(ii) The CPSU will undertake due diligence through a professional consultant and do a valuation of the project related assets existing on ground that is being taken over. Examination of the various provisions and terms & conditions of the MoU/MoA/Contract Agreement signed between the State Govt. and the incumbent developer particularly the exit provisions will be carried out to ascertain the role, responsibilities and obligations of respective parties so as to ensure a smooth takeover by the CPSUs. The payments made to various Government agencies will be considered on actual basis. The evaluation will be done only of the assets which the private developer is having undisputed possession of and which the private developer is having undisputed possession of and which can be handed over seamlessly to the CPSUs.

(iii) The CPSU shall submit its valuation report to the above Committee. The Committee will give its final recommendation regarding the valuation within 45 days of the CPSU submitting its valuation report.

(iv) The CPSU will take over the project only after an in-principle approved by the Ministry.

(v) The nominated CPSUs will follow the extant provisions of approval after receiving the recommendation of Evaluation Committee.

(vi) The CPSU invoking the services of the Committee shall provide executive/secretariat assistance to the Committee and also bear their expenditure towards TA/DA.

4.6 Policy Initiatives in Pipeline.

(i) Inclusion of transmission line from the Switchyard of the Power Project to the nearest pooling point under the ambit of “enabling infrastructure”, a Policy has been mooted to include the above component under the ambit of “enabling infrastructure” as the “enabling infrastructure” kitty is found to be largely unused on account of connecting roads and bridges.

(ii) Waiver of Inter State Transmission System (ISTS) charges in respect of power transmission from hydro projects of the North East. A policy proposal has been mooted for waiver of above

charges for initial 12 years of operation of the power plant to improve the commercial viability of NER Power Projects.

(iii) Common Transmission System through High Capacity Power Transmission Corridors for NER- As per extant guidelines, each Central Ministry/Department is expected to spend 10% of its Gross Budgetary Support (GBS) as per prescribed norms in North Eastern Region (NER). Accordingly, full/ part cost of High Capacity Power Transmission System from pooling stations to load centers can be met through budgetary support/grant from GBS of Ministry of Power to improve the viability of NER Hydro projects.

A Policy proposal has been mooted and under discussion stage in MoP.

(iv) Equity infusion scheme is proposed to envisage to provide Central financial Assistance as grant towards equity portion of the State Governments in Joint Venture Companies (JVC - to be incorporated between CPSUs and State Govt. Agency) to the extent as below:

Type of hydropower project	**Central financial Assistance (Grant) by GoI to State Govt for equity holding in JVC upto**
Storage	49%
Run of the River (RoR)	24%

Total estimated financial outlay of the proposed Scheme is about Rs. 37938 Crs. (Say Rs. 38000 Crs) in 28 identified HEPs (3 Storage & 25 RoR type) with aggregate installed capacity of 29535 MW for Arunachal Pradesh . Projects are to be considered between 2022-23 to 2032-33 (to be reviewed subsequently if required)

(v) EC & FC process for hydro projects are also being streamlined through revamp of PARIVESH portal. MoEF&CC is also in process of relaxing of conditions for Environment and Forest Clearance for Hydro Projects including Off Stream Pumped Storage Projects (PSPs).

5. GUIDELINES FOR EXAMINATION OF APPLICATIONS FOR IN-PRINCIPLE APPROVAL BY CEA AND RELEASE OF BUDGETARY SUPPORT TOWARDS COST OF ENABLING INFRASTRUCTURE BY MOP

Ministry of Power (MoP) vide Office Memorandum dated 28.09.2021 furnished the procedure for application, examination and release of budgetary support towards cost of enabling infrastructure of hydroelectric projects including PSPs. Further, MoP vide OM dated 28.01.2022 partially modified the guidelines.

The limit of budgetary support for enabling infrastructure is

(i) ₹ 1.5 crore/MW for projects upto 200 MW

(ii) ₹ 1.0 crore/MW for projects above 200 MW

5.1 Eligibility for budgetary support towards cost of enabling infrastructure

(a) All large hydroelectric projects (above 25 MW) including Pumped Storage projects (PSPs) concurred either by Central electricity Authority (CEA) or the State Government, wherein Letter of Award (LoA) for the first major package (Dam/HRT/Power house etc.) was issued after 08.03.2019 shall be eligible for budgetary support towards cost of enabling infrastructure.

(b) All permanent roads and bridges required to connect major components of the project to nearby National/State Highway including any strengthening/widening works shall be eligible

for budgetary support. However these roads/bridges exclude the works, for which the letter of award have been issued or currently under implementation by any Central/State Agency like NHAI, BRO, PWD, SRRDA, RWD, PWD (Roads), REO (Rural Engineering Organization), etc. or Central schemes like PMGSY (Pradhan Mantri Gram Sadak Yojana), MGNREGA or State specific schemes like Mukya Mantri Sadak Yojana etc.

(c) Cost of roads and bridges generally covered under head "R-Communication" in concurred DPR including the following related costs shall be eligible for release as budgetary support:

(i) Land acquisition cost

(ii) All statutory taxes/ levies, duties cess etc.

(d) The OM shall be applicable to all eligible hydro projects (i) wherein tariff is determined by CERC/SERC under Section 62 of the Electricity Act 2003 (ii) tariff is determined through competitive bidding under Section 63 of Electricity Act 2003 (iii) projects developed by agencies like BBMB which do not approach CERC/SERC for tariff determination/adoption.

5.2 Procedure of getting In-principle approval of budgetary support towards cost of enabling infrastructure

(a) The eligibility of project for budgetary support shall be examined as follows:

- The project should be concurred either by State government or by CEA.
- Installed Capacity of the project shall be above 25 MW
- Letter of Award for first major package of the project issued after 08.03.2019

(b) After the DPR is concurred by CEA/State Govt., the developer has to submit an application for in principle approval of budgetary support to CEA. Only complete application in all aspects shall be considered and examined by CEA.

(c) The cost estimates of enabling infrastructure shall be at latest price level. The price level and cost estimates of enabling infrastructure mentioned in the application shall be compared with respect to enabling infrastructure approved by CEA/ State government during DPR/ Investment Approval stages.

If required, the cost estimates of enabling infrastructure may be forwarded to TCD Division of CEA (which is manned by officers of CWC) or CA (HWF) directorate of CWC for examination and vetting.

(d) The layout of roads considered for budgetary support shall be checked in respect of eligibility for budgetary support.

Further, the layout of roads considered by developer in the application shall be compared with the layout of roads approved by CEA/State government during DPR/Investment approval stages. If any deviations are found, justification must be sought from developer for all such deviations and the revised layout shall be approved by TCD Division, CEA (which is manned by officers of CWC).

(e) After examination, the application submitted by the developer, CEA shall forward its recommendation to Ministry of Power for in principle approval of budgetary support towards enabling infra.

(f) Ministry of Power shall finally issue principle approval for budgetary support after receiving recommendations from CEA.

5.3 Conditions for release of Budgetary Support towards cost of enabling infrastructure

(a) The grant of budgetary support shall be in the form of reimbursement after complete construction of a defined part/full length of the eligible road and complete construction of bridge/bridges and achieving of 25% financial progress w.r.t approved/original project cost.

(b) The developer shall submit a Bank Guarantee to the CEA for an amount equivalent to eligible budgetary support (or the support requested whichever is less) with a validity period up to the date of determination of tariff by regulatory commission. Ministry of Power may encash the bank guarantee, in part or full, upon the recommendation of CEA, in cases where (i) the project is delayed by more than 2 years beyond the scheduled commissioning date excluding any delays attributable to force majeure conditions and (ii) in cases where the funds are found being used/ diverted to purpose other than those related to enabling infrastructure. CEA shall maintain a proper account of the bank guarantee and shall be the custodian of such Bank Guarantee.

(c) The grant shall be limited to the amount as per In-principle approval or actual expenditure incurred on the enabling infrastructure works whichever is lower under ceilings mentioned in para 5 above.

(d) Only those HE Projects in which 25% financial progress w.r.t approved/original project cost is achieved will be considered for reimbursement of budgetary support towards cost of enabling infrastructure.

(e) Developer shall submit the complete application for release of budgetary support for enabling infrastructure works with all relevant documents to CEA.

(f) After examination, CEA shall give its final recommendation to MoP for release of budgetary support towards cost of enabling infrastructure.

(g) On receiving recommendation from CEA, Ministry of Power shall process and obtain the approval of the competent authority for grant as per delegation of power and General Financial Rules issued by Ministry of Finance.

5.4 The Physical progress of the enabling infrastructure works of each of the projects shall be monitored by HPM Division, CEA. The Status of Report, in this regard, shall be submitted to MoP on quarterly basis by CEA.

5.5 By, 15th July of every year, CEA shall send estimates for Annual Budgetary Grants for the next financial year to MoP. These budgetary estimates would be based on projects scheduled for completion of Milestone, as specified in above, during next year.

5.6 CEA shall send a report on the 'In-principle' approvals granted and Budgetary Support released during the year to Ministry of Power every year by 31st May.

5.7 If the Ownership of the project changes before the commissioning of the project, MoP and CEA would be duly informed within three months of such change.

6. GUIDELINES FOR BUDGETARY SUPPORT FOR FLOOD MODERATION COMPONENT OF HYDROELECTRIC PROJECTS:

Ministry of Power (MoP) vide Office Memorandum dated 28.09.2021 furnished the procedure for application, examination and release of budgetary support towards cost of flood moderation component of hydroelectric project.

The cost of flood moderation component shall be reimbursed to the developer in five equal installment during the construction based achievement of milestones relating to dam height above bed level (H) as under:

	Instalment				
	1	**2**	**3**	**4**	**5**
Actual Dam Height (H) above bed level	10% of H	25% of H	40% of H	70% of H	100% of H

7. CONCLUSION

In order to fulfill India's commitment towards achievement of non-fossil energy capacity of India to 500 GW by 2030, many policy level initiatives may be required in Hydropower Sector. Some are already been announced by GoI and many others are in pipeline. Along with policy level initiatives by GoI, there is also need of more involvement of State Governments viz. by making suitable provisions to fast track all the clearances from their various departments required for development of Hydro Project through a single window system and extend necessary support to the project developers for timely acquisition of land required for Hydro Projects.