# **Central Electricity Authority**



## Guidelines for Formulation of Detailed Project Reports for Hydro Electric Schemes

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## SECTION-1

## REQUIREMENT FOR COCURRENCE OF HYDRO ELECTRIC SCHEMES

#### 1.1 **Provisions under the Electricity Act, 2003**

- 1.1.1 As per Section 8 (1) of the Electricity Act, 2003, any generating company intending to set up a hydro generating station shall prepare and submit to the Authority for its concurrence, a scheme estimated to involve a capital expenditure exceeding such sum, as may be fixed by the Central Government, from time to time, by notification.
- 1.1.2 As per Section 8(2) of the Electricity Act, 2003, the Authority shall before concurring to any scheme submitted to it, have particular regard to, whether or not in its opinion,
  - a) the proposed river-works will prejudice the prospects for the best ultimate development of the river or its tributaries for power generation, consistent with the requirements of drinking water, irrigation, navigation, flood control, or other public purposes, and for this purpose the Authority shall satisfy itself, after consultation with the State Government, the Central Government, or such other agencies as it may deem appropriate, that an adequate study has been made of the optimum location of dams and other river-works.
  - b) The proposed scheme meets the norms regarding dam design and safety.
- 1.1.3 As per Section 8 (3), where a multi-purpose scheme for the development of any river in any region is in operation, the State Government and the generating company shall co-ordinate their activities with the activities of the persons responsible for such scheme in so far as they are inter-related.

## **1.2.** Capital Expenditure exceeding which Concurrence is required

- 1.2.1 In compliance with Section 8(1) of the Electricity Act, 2003, the Central Government vide Notification No. SO 550(E) dated 18.04.2006 modified vide Notification No. SO 490(E) dated 28.01.2014 has fixed the following limits of capital expenditure for various categories of hydroelectric schemes exceeding which the scheme is to be submitted to the Authority for concurrence:
- i) ₹ 2500 crores, provided that
  - a) the scheme is included in National Electricity Plan (NEP) as notified by Central Electricity Authority (CEA) and conforms to the capacity and type.
  - b) the site for setting up the generating station has been allocated through the transparent process of bidding in accordance with the guidelines issued by Central Govt.
- ii) ₹ 1000 crores for any other scheme not covered by para (a) and (b) of clause.

#### SECTION -2

#### PREPARATION OF DETAILED PROJECT REPORT

#### 2.1 General

The Detailed Project Report (DPRs) of hydro Electric Schemes required to be submitted to the Authority for concurrence in compliance with the requirement of Section 8 of the Electricity Act, 2003 shall be formulated by Generating Company/ Project Developer as per the guidelines laid down by the Authority considering the following:

- (a) the Hydro Electric Scheme aims at best ultimate development of the river basin,
- (b) the Scheme is designed for optimum benefits and does not adversely affect the operation of the upstream and downstream Hydro Electric Schemes and takes into consideration the impact of the future upstream and downstream developments in the river basin identified at the Central and State levels.
- (c) the Hydro Electric Scheme is consistent with water requirement for drinking water, irrigation, navigation, flood control or other public purposes.
- (d) the Hydro Electric Scheme takes into account the progressive development of consumptive use of water and new water resources development schemes in the river basin due to which the water availability may undergo change over the period,
- (e) the Hydro Electric Scheme meets the requirement of optimum location of dams and other river works.
- (f) the Hydro Electric Scheme meets the norms regarding dam design and dam safety.
- (g) the Hydro Electric Scheme is either included in National Electricity Plan drawn by the Authority under section 3(4) of the Act or results in generation of power at reasonable tariff.
- (h) the relevant chapters/ DPR is prepared after hydrological studies, essential site surveys and investigations are completed.
- (i) the Generating Company/ Project Developer shall refer to the latest edition of the "Guidelines for preparation of Detailed Project Report of Irrigation & Multipurpose Schemes" published by the Central Water Commission for civil works and shall consult the relevant documents listed in **Annex – 2(a)** wherever applicable.

#### 2.2 Intimation to CEA after allotment of the project:

Allotment of any hydroelectric scheme above 25 MW by State Government to Generating Company/ Project Developer shall be immediately intimated to CEA by State Government.

If such allotted project is to be concurred by CEA under Section 8 of the Electricity Act, in such case concerned Generating Company/ Project Developer shall approach CEA within a month.

Further, if the project is to be concurred by State Government, in such case State Government shall send letter of concurrence to CEA after concurrence of DPR of the project.

#### 2.3 Surveys & Investigations:

After signing MoA/MoU with State Government, developer shall carry out topographical survey & geological surface mapping of the project and submit the proposed layout of the project and detailed investigation plans to CEA for appraisal and finalization. In this connection, "Guidelines for Investigations and Explorations required at Detailed Project Report (DPR) Stage of Proposed Hydroelectric Project in Himalayan Terrain" may be referred. CEA along with CWC, GSI and CSMRS shall hold 1<sup>st</sup> consultation meeting with developer to finalize different alternatives of the project layout for which investigations are to be carried out by the developer along with detailed investigation plans to be carried out in first phase.

After completion of the first phase investigations, developer shall submit the results to CEA. CEA along with CWC, GSI and CSMRS shall hold 2<sup>nd</sup> consultation meeting with the developer for finalization of project layout and final phase-II investigations to be carried out by the developer.

For taking clearance on a particular aspect, developer shall submit its report/ chapter only after completing all investigations/ studies as suggested by CEA, CWC, GSI and CSMRS.

After obtaining clearances for Hydrological aspects, PPS aspects, Interstate aspects, GSI aspects, CSMRS aspects, FE&SA aspects and layout from HCD/HE&TD, CEA along with CWC, GSI and CSMRS shall hold 3rd consultation meeting for finalization of layout, broad salient features of the project and submission of chapters for design aspects of the project.

All efforts will be made by the developer to complete the investigations and studies as suggested by the concerned appraising group of CEA, CWC, GSI and CSMRS in time.

Developer may approach CEA, CWC, GSI & CSMRS and other agencies in case of any difficulty in finalization of any study or report/ chapter.

CEA and concerned appraising groups shall review the pre-DPR activities with the Developer quarterly for their timely completion. The review mechanism is given at **Appendix-1**. Developer shall approach CEA for holding the first consultation meeting with in a month of project allotment.

## 2.4 Preparation and approval of Chapters prior to submission of DPR

Prior to submission of DPR to the Authority for its Concurrence, the Generating Company/ Project Developer shall prepare and submit the following chapters to CEA/ concerned appraising groups for their examination/ approval –

	Chapters/ Aspects		Appraising Groups
i).	General Layout	-	HCD Dte., CWC and HE&TD Div., CEA
ii).	Hydrological Aspects	-	Hydrology Dte., CWC
iii).	Power Potential Aspects	-	HPA Div., CEA

iv).	Foundation Engg. and Seismic Aspects	-	FE&SA Dte, CWC
v).	Geological Aspects	-	GSI
vi).	Construction Material & Geotechnical Aspects	-	CSMRS
vii).	Inter-State Aspects	-	ISM Dte, CWC
viii).	ROR/ Storage Aspects/ Pondage (as per IWT, if applicable)	-	Standing Technical Committee, HPP&I Div., CEA
ix)	Design of Transmission System (upto Pooling point)	-	PSP&A Div, CEA
x) [	Dam/Barrage Design	-	CMDD/BCD Dte., CWC
xi)	Gates / HM Design	-	Gates Design Dte. , CWC
xii)	Instrumentation	-	Instrumentation Dte., CWC
xiii)	Hydel Civil Design	-	HCD Dte, CWC
xiv)	E&M Design	-	HE&TD Div, CEA

After above chapters/ aspects are approved by the concerned appraising groups, the Generating Company/ Project Developer shall include the same in the DPR to be submitted to the Authority for Concurrence/ appraisal.

#### 2.5 Preparation of DPR

This process of preparation of Detailed Project Report shall be completed by the Developer indicatively in a period of 840 days from the date of allotment/ signing of MoA/MoU of the project, extendable by 180 days for reasons beyond the control of Developer.

For further delay on part of Developer, State Government may make a provision for resorting to levy of a financial penalty against the developer and/ or cancellation of project allotment.

The Data collected by Developer for preparation of DPR shall be property of concerned State Government and its copy shall be made available to CEA/ CWC.

Typical bar chart showing different activities to be carried out by the project authorities for preparation of DPR and by CEA/ CWC/ MoJS/ GSI & CSMRS for approval of above chapters is given at **Plate-1**. Typical flow chart showing different activities to be carried out by project authorities before submission of DPR and pre-DPR clearances by CEA, CWC, MoJS, GSI & CSMRS is given at **Plate-2**.

The DPR prepared by the Generating Company/ Project Developer shall be structured in the format as described in the succeeding paragraphs.

#### 2.6 Structure of the Detailed Project Report

2.6.1 The structure of DPR/ details to be included in the respective chapters of the DPR is given below. The sections of *"Guidelines for preparation of Detailed Project Report of*"

*Irrigation and Multipurpose Projects" issued by CWC* to be referred are indicated in bracket against the respective components of work.

2.6.2 DPR should include the following chapters:

Chapter -I	Introduction
Chapter –II	Justification of project from power supply angle
Chapter -III	Basin Development
Chapter -IV	Inter-State / Inter-National Aspects (As per already approved chapter/ aspect as referred under para 2.3 above)
Chapter -V	Surveys & Investigations (Section 3.4) (As per already approved chapter/ aspect as referred under para 2.3 above)
Chapter -VI	Hydrology (Section 3.5) (As per already approved chapter/ aspect as referred under para 2.3 above)
Chapter –VII	Reservoir (Section 3.7) (As per already approved chapter/ aspect as referred under para 2.3 above)
Chapter –VIII	Power Potential Studies & Installed Capacity (Refer Appendix-2 of these Guidelines) (As per already approved chapter/ aspect as referred under para 2.3 above)
Chapter –IX	Design of Civil Structures (Section 3.6)
Chapter –X	Electrical and Mechanical Designs
Chapter –XI	Transmission of Power and Communication facilities
Chapter –XII	Construction Programme & Plant Planning (Section 3.13)
Chapter –XIII	Project Organization
Chapter –XIV	Infrastructural Facilities
Chapter –XV	Environmental & Ecological Aspects
Chapter –XVI	Cost Estimates
Chapter –XVII	Allocation of Cost
Chapter –XVIII	Economic Evaluation
Chapter –XIX	Future Utilization of Buildings (Section 3.20)
Chapter –XX	Recommendations
Chapter –XXI	Clearances / Inputs

Chapter-wise detailed information to be included in the Detailed Project Reports has been described hereunder.

## Chapter -I INTRODUCTION

- 1.1 Type of the project (run of river, storage, multipurpose e.t.c.)
- 1.2 Location of the project area including longitude and latitude and district(s) and tehsil/ village etc.
- 1.3 Access by air/rail/road/ferry, sea port & other communication facilities available in area.
- 1.4 General climatic conditions in the project area.
- 1.5 General description of topography, physiography and geology of the project area.
- 1.6 Historical background of the project:
  - a) Earlier proposal/ PFR proposal, if any
  - b) Present proposal
- 1.7 Need for the project, possible options and justification for selected option.
- 1.8 Alternative studies carried out for various major components of the project and final choice of the project parameters.
- 1.9 Natural resources of the India/State.
- 1.10 Socio-economic aspects including tribal, backward and drought areas.
- 1.11 Land required for the project construction forest land, village land and agricultural land, total area of the land being submerged.
- 1.12 Population affected by the project and occupation of the people affected.
- 1.13 Environmental aspects.
- 1.14 Inter State / Inter-national aspects
- 1.15 Defense angle, if any.
- 1.16 Cost and benefits of the scheme.
- 1.17 Construction Programme

## Chapter –II JUSTIFICATION OF THE PROJECT FROM POWER SUPPLY ANGLE

- 2.1 Justification of project from power supply-demand considerations on all India / national basis
- 2.2 Details of scheme for wheeling evacuating power
- 2.3 Resources for power development in the India/state.
  - (i) Coal resources
  - (ii) Hydro resources
  - (iii) Renewable resources
- 2.4 Available generating capacity in the India/state from different sources
- 2.5 Peak load and energy requirement in future in all India/state up to the likely date of project completion.
- 2.6 Likely addition to generating capacity in future in the all India/state indicating power supply position with & without the project under consideration and improvement in the hydro-thermal mix.

## Chapter -III BASIN DEVELOPMENT

- 3.1 The course of the river
- 3.2 Power potential of the river basin and stages of development
- 3.3 Whether trans-basin diversion of waters involved
- 3.4 Fitment of the scheme in the overall basin development
- 3.5 Fitment of the scheme in the power potential assessment studies carried out by CEA
- 3.6 Effect of future upstream/downstream developments on the potential of proposed scheme
- 3.7 Conversion of Storage Scheme to ROR, if any (As per already approved chapter/ aspect as referred under para 2.3 above)

## Chapter -IV INTER-STATE / INTER-NATIONAL ASPECTS

(As per already approved chapter/ aspect as referred under para 2.3 above)

- 4.1 States/countries traversed by the river
- 4.2 Distribution of catchment in states/countries and yields from the catchment of state/ countries concerned.
- 4.3 Effect of the following on the project:
  - a) Inter-state agreement on sharing of waters, sharing of benefits and costs, acceptance of submergence in the upstream state(s), if any.
  - b) Inter-state adjudication, if any
  - c) Inter-State aspects of territory, property etc. coming under submergence, oustees rehabilitation, compensation etc.
  - d) Any other aspect of the project involving inter-state problems
  - e) International aspects, if any
  - f) International Agreement, if any
- 4.4 Existing riparian use, quantum of water presently utilized, commitments for ongoing projects, plans for future development, balance share of the state/country and proposed utilization by this project. (Discuss relevant items both for upstream and downstream usages)

## Chapter -V SURVEY & INVESTIGATION (Section 3.4)

- 5.1 Topographical surveys of river, reservoir, head works, colony layout, head race tunnel/channel, power house, switchyard, surge shaft, tail race tunnel/channel, adits, penstock etc. considering different water levels
- 5.2 Archaeological surveys in the reservoir area.
- 5.3 Mineral surveys in the catchment areas.
- 5.4 Right of way surveys for the reservoirs. These shall cover survey for right of approach roads, which may be claimed by owners to various structures above FRL.
- 5.5 Communication surveys
- 5.6 Geology & geo-technical features (As per already approved chapter/ aspect as referred under para 2.3 above)
- 5.7 Seismicity (As per already approved chapter/ aspect as referred under para 2.3 above)

- 5.8 Foundation investigations of different structures/components of the project indicating boreholes details, soil/rock strata etc. (As per already approved chapter/ aspect as referred under para 2.3 above)
- 5.9 Construction materials investigations (As per already approved chapter/ aspect as referred under para 2.3 above)
- 5.10 Hydrological and meteorological investigations.

## Chapter -VI HYDROLOGY (Section 3.5)

(As per already approved chapter/ aspect as referred under para 2.3 above)

- 6.1 Hydrological inputs for the project planning
- 6.2 Effect of project development on hydrologic regime.
- 6.3 Hydrological studies for water availability, design flood, design flood levels, diversion flood, sedimentation etc.

## Chapter – VII RESERVOIR (Section 3.7)

(As per already approved chapter/ aspect as referred under para 2.3 above)

- 7.1 Catchment area, annual run-off, submergence, suitability of soil/rock, dead storage level
- 7.2 Sedimentation data and studies
- 7.3 Fixation of storage and reservoir levels, {maximum water level (MWL), full reservoir level (FRL), minimum draw down level (MDDL)}, flood cushion etc.
- 7.4 Life of reservoir in years with basis
- 7.5 Capacities at MWL, FRL, MDDL, Dead Storage level etc. at project planning stage and after 25, 50, 75 and 100 years or more of operation
- 7.6 Water tightness of the reservoir
- 7.7 Annual losses (month-wise) (evaporation, seepage etc.)
- 7.8 Flood absorption on regular/flash flood
- 7.9 Effect on subsoil water tables in the adjoining areas upstream and downstream of the dam
- 7.10 Seismic characteristics and effects due to construction of dam
- 7.11 Reservoir rim stability
- 7.12 Length of Reservoir and Area of submergence
- 7.13 Land acquisition
- 7.14 Recreation facilities
- 7.15 Pisci-culture
- 7.16 Other facilities, if any

7.17 Need and recommendations for soil conservation measures in the catchment.

#### Chapter –VIII POWER POTENTIAL & INSTALLED CAPACITY (Refer Appendix-2 of these guidelines)

(As per already approved chapter/ aspect as referred under para 2.3 above)

- 8.1 Type of power plant i.e. run-of-river (with or without diurnal storage) or storage type (As per already approved chapter/ aspect as referred under para 2.3 above).
- 8.2 Assessment of power potential (firm power and 90% dependable year energy, secondary energy) of the scheme considering the E-Flows (if applicable) as mentioned in ToR/approved by MoEF&CC.
- 8.3 Studies for optimization of storage, FRL, MDDL, lean period capabilities etc.
- 8.4 Month wise, 10 daily availability of power and energy, peaking capabilities etc.
- 8.5 Optimization of installed capacity and unit-size studies carried out.

## Chapter –IX DESIGN OF CIVIL STRUCTURES (Section 3.6)

- 9.1 Structures & layout (As per already approved chapter/ aspect as referred under para 2.3 above)
- 9.2 General
  - (i) Head works site and vicinity
  - (ii) Reasons for choice of the layout of the project adopted.
  - (iii) Type of structure dam (earth / rock-fill / masonry etc.)
  - (iv) Layout of dam and spillway / barrage / weir / appurtenants / auxiliary works and power house, reasons for choice of site.
- 9.3 Geology, seismicity and foundations (As per already approved chapter/ aspect as referred under para 2.3 above)
- 9.4 Alternative studies carried out for selection of site and type of structures / dam / barrage / weir, regulators, water conductor system, power house etc.
- 9.5 Choice of final layout of all the major components of the project and reasons with details
- 9.6 Design flood and sedimentation studies
- 9.7 Free board
- 9.8 River diversion arrangements choice of design flood with hydro-graphs
- 9.9 Construction materials (As per already approved chapter/ aspect as referred under para 2.3 above)
- 9.10 Details of Model of studies
- 9.11 Design of dam / barrage / weir/embankment

- 9.12 Design of intake, desilting arrangement, power channel/tunnel, balancing reservoir / fore-bay, surge shaft, penstocks, power house, tailrace, switchyard
- 9.13 Details of instrumentation for various structures

The chapter shall include structural and hydraulic design calculations for dam, spillway gates and energy dissipation arrangements, outlets – regulators, river sluices, intake structures, surge shafts, power house etc. Essential structural calculations shall be furnished. For stability analysis, loading diagrams considering various conditions of water level, earthquake and other forces/stresses considered shall be included.

## Chapter – X ELECTRICAL AND MECHANICAL DESIGNS

- 10.1 Turbine / Pump Turbine
  - (i) Type
  - (ii) Operating heads & outputs
  - (iii) Specific speed and synchronous speed
  - (iv) Setting of turbine/pump turbine
  - (v) Speed & pressure rises
  - (vi) Efficiencies
- 10.2 Generator / Generator Motor
  - (i) Type of generator/motor
  - (ii) Outputs, power factor, generation voltage
  - (iii) Class of insulation
  - (iv) Type of cooling
  - (v) Generator inertia
  - (vi) Starting method (Pumped storage schemes)
  - (vii) Efficiencies
- 10.3 Generator transformer connections
- 10.4 Main Inlet Valve
- 10.5 Surge Protection & Neutral Earthing System
- 10.6 Supervisory Control and Data Acquisition System
- 10.7 Penstock Valves, if any
- 10.8 Main Step-up Transformer
- 10.9 Switchyard Equipment
- 10.10 Single-line Scheme
- 10.11 Control & Protection Equipment
- 10.12 Auxiliary Mechanical Services

- (i) EOT Crane for Powerhouse
- (ii) EOT Crane for GIS, if any
- (iii) EOT Crane for Penstock Valve House, if any
- (iv) Electrical lifts and elevators
- (v) Workshop equipment
- (vi) Test Laboratory
- (vii) Telemetry
- (viii) Ventilation & air conditioning
- (ix) Fire protection
- (x) Cooling water
- 10.13 Auxiliary Electrical services
  - (i) Unit Auxiliary Transformers
  - (ii) Station Service Transformers
  - (iii) A.C. auxiliary services
  - (iv) D.C. auxiliary service.
  - (v) Control and Power Cables
  - (vi) DG Sets
- 10.14 Transport limitations
  - (i) Maximum limiting dimensions (L x W x H) of packages for transport
  - (ii) Maximum limiting weight of the package which can be transported

The design calculations wherever required shall be included.

## Chapter –XI TRANSMISSION OF POWER AND COMMINUCATION FACILITIES

11.1 Transmission of power (upto pooling point) –

Central Electricity Regulatory Commission (Connectivity and General Network Access to the inter-State Transmission System) Regulations 2022, stipulates the following:

Para 12.1:

"In case Connectivity grantee is a generating station or a captive generating plant or a standalone ESS, the dedicated transmission lines shall be established, operated and maintained by such Connectivity grantee".

The specifications for dedicated transmission line may be indicated by CTUIL while granting connectivity.

11.2 Following points may be included in the chapter on Transmission of Power and Communication Facilities for such projects who are required to build dedicated transmission line:

- (i) Whether the HE Project wants to get connected to ISTS or the State Transmission System (Name of the state in case of the State Transmission System). Connectivity to ISTS or intra-state transmission system would be governed by relevant regulations.
- (ii) The voltage level of the transmission line and nearest Pooling station /substation
- (iii) Whether the nearest Substation or pooling station is ISTS or state owned. Also, whether margins are available at their switchyard for accommodating the generation connectivity.
- (iv) Transmission line configuration, i.e. the conductor used and the type of towers utilized.
- (v) For Forest & Crop compensation, the percentage of area covered with respect to the line length, may be provided.
- (vi) Switchyard coordinates needs to be provided.
- (vii) Commissioning Schedule of Generator/ transmission line may be specified.
- (viii) For Projects with capacity greater than 50 MW, generating units should be capable of operating in synchronous condenser mode.
- (ix) Whether the project is to be built in different phases/stages, the details of the same may be provided.
- (x) The developer needs to specify the beneficiaries of the project along with quantum of power so that necessary augmentation/ strengthening for transfer of power could be implemented.
- (xi) If the generation project is to be connected to ISTS, the project developer has to approach CTUIL to seek connectivity as per CERC regulations at least five years before the anticipated commissioning of the project. The transmission system for the project would be firmed up after grant of connectivity.
- (xii) The implementing agency for the construction of the connectivity lines from the generation switchyard to the grid points may be specified.
- 11.3 Transmission of power
  - (i) Consent / Agreement signed between the Generating Company and the purchaser(s) (State utility or other buyers)
  - (ii) Letter of Consent from the appropriate Transmission utility to provide evacuation system
  - (iii) Details of the existing and proposed transmission system
  - (iv) Target date of completion of the proposed system
  - (v) Letter of Comfort from the Transmission Company to enter into a back to

back agreement with the promoter covering risk in case of default/ delay in commissioning by either of the parties.

11.4 Telecommunication aspects

#### Chapter –XII - CONSTRUCTION PROGRAMME & PLANT PLANNING (Section 3.13)

- 12.1 PERT chart giving details of activity-wise construction programme for each of the major components of the civil, electrical and mechanical equipment
- 12.2 Bar charts showing the construction programme quantity-wise, item-wise and yearwise target of construction
- 12.3 Key materials planning
- 12.4 Executing agencies for major works departmental/contractor
- 12.5 Various alternatives for construction programme and proper justification of adopted programme
- 12.6 Plant/equipment planning
- 12.7 Programme for construction of tunnel / channel shall include :
  - (i) Excavation of tunnel/channel cycle time to be given
  - (ii) Lining of tunnel
    - (a) Overt
    - (b) Invert

#### Chapter –XIII PROJECT ORGANISATION

- 13.1 Proposed set up for the project
- 13.1.1 Proposed organization for construction period, Number of staff and expenditure (year-wise)
  - (i) For civil works
  - (ii) For electrical and mechanical works
  - (iii) Administrative & financial set up
  - (iv) Others
- 13.1.2 Proposed organization for Pre-construction period
- 13.1.3 Consultants

#### Chapter –XIV INFRASTRUCTURAL FACILITIES

- 14.1 Access roads
  - (i) Roads to the project
  - (ii) Roads in the project area

- 14.2 Rail head
- 14.3 Port facilities, (as applicable)
- 14.4 Construction power requirement
- 14.5 Power supply facilities
- 14.6 Telecommunication facilities required during construction and after completion of the project
- 14.7 Project colonies / buildings
- 14.8 Workshops
- 14.9 Drinking water facilities
- 14.10 Others

## Chapter –XV ENVIRONMENTAL & ECOLOGICAL ASPECTS

15.1 Status of Environmental clearance

All Hydro Electric Schemes require environmental clearance from MoEF&CC before being taken up for construction. Various information and environmental action plans to be incorporated in the DPR should be as per the latest "Guidelines for Environmental Impact Assessment of River Valley Projects" issued by MoEF&CC. Environmental clearance related aspects such as status of ToR of MoEF&CC/ site clearance, EIA/EMP studies, public hearing, environmental clearance etc. shall be included in the DPR.

15.1 Status of Forest clearance

In case, construction of hydro-electric project involves diversion of forest land, forest clearance would also be required under Forest (Conservation) Act. The case for forest clearance should be submitted to MoEF&CC through State Forest Authorities as per Forest (Conservation) Rules and Guidelines issued by MoEF&CC in this regard from time to time. Details of forest land involved and status of its clearance shall be included in the DPR.

#### 15.3 Cost of proposed remedial & mitigative measures

The cost of the proposed remedial and mitigative measures, if any, to protect the environment must be included in the cost estimates of the project. Mitigative measures may include:

- Rehabilitation measures
- Compensatory afforestation
- Disaster management plan
- Restoration of land in construction areas by filling, grading etc. to prevent further erosion
- Control of aquatic weeds in submerged areas to provide improved habitat for aquatic life

- Measures to salvage/rehabilitation of any rare or endangered species of flora and fauna found in the affected areas
- Enforcement of anti poaching laws
- Measures to prevent forest fires, over grazing of areas etc
- Establishment of fuel depots etc
- Public health measures
- Catchment Area Treatment
- Environmental and ecological studies
- Details about Net Present Value of forest land
- 15.4 Information regarding wildlife sanctuary likely to be affected and status of clearance of project from National Board of Wild Life

## Chapter –XVI COST ESTIMATES

16.1 The Cost Estimates of the project shall be framed at Completion level. Zero Date of the project shall be framed considering sufficient time for pre-construction activities.

In case of projects being developed by CPSUs, revised cost sanctions at completion level for cost variations due to quantity changes (including additions/ alterations/extra items), under estimation and time overruns shall be capped at 10% of Original sanctioned cost.

16.1 (a) The Civil Cost Estimates of the project shall be prepared as per "Guidelines for preparation of estimates for the river valley projects, 1997" issued by CWC ( revised from time to time) and Indian Standard IS: 4877 "Guide for Preparation of Estimate for River Valley Projects".

Wherever any specific stipulation is made in these guidelines (IS: 4877), these shall take precedence over what is stipulated in CWC guidelines.

16.1 (b) The cost estimates at Completion level shall be framed by escalating the phasing of expenditure of present day cost to the mid-point of period in which expenditure is proposed to be incurred (considering the latest WPI/CPI indices) using an average annual escalation factor.

Average annual escalation factor for proposed zero date to completion level may be calculated by averaging the annual escalation for each year prior to present day cost level, for the period equivalent to difference of present day price level and COD. Illustration for calculation of annual escalation factor of E&M works is given at **Annex-2(c)(i).** Similar method may be followed for civil, miscellaneous and transmission works.

- 16.2 The estimates of Hydro Electric Scheme shall be divided under the heads as indicated at **Annex-2(b)**
- 16.2 (a) The estimates of Civil Works of Hydro Electric Scheme shall be divided under the following heads as indicated at **Annex-Civil**.
  - 1. Direct Cost
  - I. Works

- A Preliminary
- B Land
- C Works
- J Power Plant Civil Works
- K Buildings
- M Plantation
- O Miscellaneous
- P Maintenance during construction
- Q Special T&P
- **R** Communications
- X Environment and ecology
- Y Losses on stock

## **Total I-Works**

- II. Establishment
- III. Tools and Plants
- IV. Suspense
- V. Receipt and Recoveries

## Total (A) - Direct Cost

- 2. Indirect Cost
- i. Capitalization of Abatement of Land Revenue

Total (B) - Indirect Cost Total Cost (A+B)

- 16.2(b) Cost of Electro-Mechanical Works (Details as per Annex-E&M)
- 16.2(c) Cost of Miscellaneous Works (Details as per Annex-Misc)

Cost towards miscellaneous items like, security, helicopter service, setting up of ITI, etc. if required, may also be included in the total estimated cost of the project.

16.2(d) Cost of Transmission System works (upto Pooling Point) (Details as per Annex-TS)

## 16.3 **Preparation of Estimates**

- 16.3.1 The capital cost of a project includes all cost associated with surveys and investigations, design, construction and maintenance during construction period of the project.
- 16.3.2 For preparation of cost estimates of civil works, the unit costs of labour, materials and equipment necessary to perform the work designated in the various payitems for the proposed construction shall be determined. Current unit cost shall be used in all estimates and price level of the project estimate shall be mentioned.
- 16.3.3 The analysis of rates for various items shall be worked out taking into consideration the cost of materials, carriage-handling-storing, labour and share

of machines involved in executing various items of the work and overhead charges.

- 16.3.4 The quantitative assessment of material requirement shall be adopted from authentic books/publications or through independent calculations based on the data available at site or other projects. The unit cost of various materials may be taken as those prevalent in the State/ region. The appropriate cost for freight, unloading, cartage, storage, inspection and testing should also be included.
- 16.3.5 The wages of workers are periodically revised by the State under the statutory labour laws. Daily wage rates, therefore, shall be taken as those prevalent in the State at the time of formulation of the project.
- 16.3.6 For working out the use rates of machinery, the norms for life, depreciation, repair provision etc. shall be adopted as recommended by the latest CWC Guide Book on use rate, hire charges and transfer value of equipment and spare parts. Price of various equipment should be taken on the basis of recent quotations/ price list of such equipment. All taxes and freight charges should be taken into consideration while arriving at the cost of equipment at site.
- 16.3.7 Provision for contingencies and work-charged establishment is generally considered up to 3% and 2% respectively of the works' cost and provided in the detailed works estimates prepared on the heads of items rates and quantities of works to be executed. These percentage provisions should not be considered on lump-sum items.
- 16.3.8 Mention shall also be made regarding communication facilities available, terrain through which the roads are passing (hilly, plain etc.), type of road (Black top, water bound macadam, murum, kacha etc.).

#### 16.4 Preparation of detailed Estimates of Cost (I -Works)

16.4.1 A- Preliminary

The provision under this head covers the works relating to various investigations, Surveys, Model tests, ecological studies etc. This should be based on the actual cost likely to be incurred and should not exceed 2% of the total cost of I-Works.

#### 16.4.2 B-Land

The provisions under this head covers Acquisition of land, rehabilitation & resettlement including compensation for property, Interest charges, Solatium charges, demarcation & measurement charges etc. The provision should be made as per actual.

16.4.3 C- Works

The provisions under this head is intended to cover the costs of the Head works viz. Dam, spillway, energy dissipation works, desilting arrangement, outlets (irrigation, power, water supply and scour sluices), pick up weir, barrage, head regulators, etc.

16.4.4 J- Power plant civil works

Important items to be considered under this head are listed below :

#### (a) Intake structures

- i) Excavation
- ii) Foundation treatment
- iii) Cement concrete for foundation, piers and abutments
- iv) Masonry/concrete for guide walls of approach channel
- v) Concrete for trash racks including raking arrangement
- vi) Gates with auxiliary equipment
- vii) Reinforcement steel
- viii) Instrumentation etc.

## (b) Head Race / Tail Race Tunnels (including cut and cover section)

- i) Excavation
  - Open cut
  - Tunnel including temporary supports
- ii) Rock bolts
- iii) Permanent support, ventilation
- iv) Drainage
- v) Cement concrete for lining
- vi) Steel lining
- vii) Drilling and grouting
- viii) Gates and ancillaries, where required
- ix) Reinforcement steel
- x) Instrumentation

## (c) Head Race channel and Tail race channel

- i) Excavation
- ii) Embankment
- iii) Lining with cement concrete in bed and sides with drainage pipes and valves
- iv) Pucca works
  - Cross Drainage(s)
  - Escape(s)
  - Bridge(s)
  - Meter flume
  - Balancing tank
- v) Instrumentation

## (d) Surge shaft

- i) Excavation
- ii) Cement concrete lining
- iii) Drilling and grouting
- iv) Miscellaneous items such as masonry, guiniting, steel lining, ladder, bolts etc.
- v) Reinforcement steel
- vi) Instrumentation

## (e) Penstock

- i) Excavation
- ii) Cement concrete for
  - Bed

iii)

- Anchor blocks
- Intermediate supports
- Steel pipes for
  - Stiffner
  - Reducers
  - Bends
  - Wye pieces
  - Penstock valves

iv) Instrumentation

#### (f) Power House

- i) Excavation
- ii) Concrete for foundation, sub-structure, super structure and supports for turbines and generators
- iii) Masonry/concrete for super-structure and other necessary items for building work
- iv) Scroll casing / Generator barrel
- v) Draft tube
- vi) Bulkhead gates, crane and hoisting equipment
- vii) Power-house crane
- viii) Miscellaneous items such as anchor bolts, grouting etc.
- ix) Instrumentation
- 16.4.5 K Buildings

The provisions under this head covers the Residential / Non-residential buildings, Office buildings, Testing laboratories, Workshops, Other Service Buildings, Community Centre etc. The provision shall be made as per the actual requirement.

## 16.4.6 M – Plantation

The provisions under this head covers the plantation programme including Gardens etc. required for beautification as considered necessary downstream of Dam and appurtenances around Power House and other important structure.

The provision should be made on lump sum basis keeping in view the experience of other projects.

## 16.4.7 O – Miscellaneous

a). The provisions under this head covers the capital cost & maintenance of Water supply, Sewage disposal and drainage works, Recreation, Medical, Fire fighting equipments, Inspection vehicles, School bus, Pay van, Visit of dignitaries, Welfare works etc.The provision under this head should be 3% of the cost of I-Works limited to ₹ 60 crores

b). Cost of construction power/ electrification & its maintenance shall be examined and provided separately based on the estimates submitted by the Generating Company/ Project Developer (Details as per Annex-Construction Power).

## 16.4.8 P - Maintenance during Construction

The provisions under this head covers the cost of maintenance of all works during the construction period. The provision should be 1% of the total cost under the heads of C-Works, J-Power House Civil Works and K-Buildings.

## 16.4.9 Q - Special T&P

The provisions under this head covers the Drilling & Grouting equipment, Transport, Compaction, Electrical equipment, Construction Plant & Earth Moving equipment and other Miscellaneous equipment. Since the projects are presently being executed through limited contracts package and is the responsibility of the contractor to arrange for such equipment. A token provision of Rs. 3-4 crores under this head may be adequate to provide for essential equipment not covered under contract package.

16.4.10 R - Communication

The provisions under this head covers the construction of main approach roads, quarry roads, temporary or permanent river crossing, Railways, Bridges, connecting roads, water ways and airstrip/helipad.

The major items on this account shall be supported by sub estimates. The provisions shall be made in consultation with the concerned authorities.

Ministry of Power vide OM dated 08.03.2019 in principle accorded approval for providing budgetary support through the budgetary grant of Ministry of Power for funding of flood moderation component for storages HE Projects and enabling infrastructure for hydropower projects i.e. roads /bridges. This support shall be applicable for the projects starting construction after notification of this OM. The budgetary support would be provided after appraisal/approval of each project by PIB/CCEA as per extant rules/ due process. The limit of this grant for such roads and bridges would be as follows:

- a) ₹ 1.5 crore per MW for the projects upto 200 MW
- b) ₹ 1.0 crore per MW for the projects above 200 MW

The detailed guidelines for availing grant of enabling infrastructure and Flood moderation component has been issued by MoP letter dated 28.09.2021 and amended vide OM dated 28.01.2022. These guidelines are enclosed as Appendix-(7) and (8). Developer shall refer to the latest version of these guidelines as amended from time to time for availing grant/ budgetary support for enabling infrastructure and flood moderation component of hydroelectric schemes.

#### 16.4.11 X- Environment and Ecology

This sub-head generally covers the provisions for items like, compensatory afforestation, catchment area treatment, establishment of fuel depot, salvage / rehabilitation of any rare or endangered species of flora and fauna, control of aquatic weeds, public health measures to control water or soil borne diseases, Restoration of land, seismological measures etc. The provisions shall be as per actual requirement.

16.4.12 Y- Losses on stock

The provision under this sub-head is generally made at 0.25% of the total cost of C-Works, J-Power Plant Civil Works and K-Buildings only.

#### 16.5 Establishment

The provision under this head covers all the expenses/salaries of manpower of project developer deployed at project site, share of expenses of corporate office, audit and account charges etc. Establishment cost during construction of Hydro Electric Projects shall be as per norms given below depending on concentration/ scatteredness of works, length of gestation period and other factors

- 16.5.1 Definitions of Concentrated Works/ Scattered Works and Gestation Period:
  - Concentrated Works –

Dam/ Barrage and Power House located at different places involving HRT/ tunnels not more than 5 km in length or total approach road length not more than 10 km.

• Scattered Works –

Dam/ Barrage and Power House located at different places involving HRT/ tunnels more than 5 km in length or total approach road length more than 10 km.

- Gestation Period (given in Concurrence Letter)
  - Projects involving construction period up to 6 years.
  - Projects involving construction period more than 6 years.
- 16.5.2 Norms for establishment cost for different slabs of cost of works of projects having concentrated works and gestation period not more than 6 years :

Cost of Civil Works (I-B)	Norms for Establishment cost of civil works					
Up to ₹ 750 Crores	8%					
> ₹ 750 Crores up to ₹ 1500	₹ 60.00 Crores plus 4.00% of cost					
Crores	exceeding ₹ 750 Crores					
> ₹ 1500 Crores up to ₹ 3000	₹ 90.00 Crores plus 3.00% of cost					
Crores	exceeding ₹ 1500 Crores					
> ₹ 3000 Crores up to ₹ 6000	₹ 135.00 Crores plus 2.00% of cost					
Crores	exceeding ₹ 3000 Crores					
> ₹ 6000 Crores	₹ 195.00 Crores plus 1.00% of cost					
	exceeding ₹ 6000 Crores					

i). Civil Works:

These norms would be termed as Basic Establishment Cost for Civil Works (BEC-C) for reference.

ii). E&M Works (¾ of norms of Civil Works) :

Cost of E&M Works (Equipment cost with taxes & duties plus transport, handling & insurance and erection & commissioning)	Norms for Establishment cost of E&M Works					
Up to ₹ 750 Crores	6%					
> ₹ 750 Crores up to ₹ 1500	₹ 45.00 Crores plus 3.00% of cost					
Crores	exceeding ₹ 750 Crores					
> ₹ 1500 Crores up to ₹ 3000	₹ 67.50 Crores plus 2.25% of cost					
Crores	exceeding ₹ 1500 Crores					
> ₹ 3000 Crores up to ₹ 6000	₹ 101.25 Crores plus 1.50% of cost					
Crores	exceeding ₹ 3000 Crores					
> ₹ 6000 Crores	₹ 146.25 Crores plus 0.75% of cost					
	exceeding ₹ 6000 Crores					

These norms would be termed as Basic Establishment Cost for E&M Works (BEC-E) for reference.

16.5.3 Norms for additional provisions of establishment cost in projects having **Scattered Works and/or Gestation Period more than 6 years** : i). Civil Works :

0	Scattered Works :	Additional 1% of BEC-C per km for HRT/ tunnels length more than 5 km or total approach road length more than 10 km.
0	Gestation Period more than 6 years :	Additional 10% of BEC-C per year for the period more than 6 years.

- ii). E&M Works :
- Gestation Period more than 6 years : Additional 7.5% of BEC-E per year for the period more than 6 years.
- 16.5.4 The charges for in-house Design and Engg. services shall be limited to 25% of Basic Establishment Cost (Civil and E&M).

Foreign consultancy shall be limited by in-house D&E ceiling and covered under sub-head "A-Preliminary" in addition to other provisions.

- 16.5.6 Establishment charges shall be supported by organization chart of manpower proposed to be deployed for the project execution/ implementation and any increase shall be justified at the time of RCE.
- 16.5.7 In case of EPC/ Turnkey mode of execution of project, the actual cost depending on the scope of EPC shall be shifted to works and balance shall be taken for Developers own Establishment. Since the decision regarding type of contract & scope of EPC is not known at the DPR stage, the same shall be adjusted as per actual at RCE stage/ completion cost stage.

#### 16.6 Tools & Plants

The provisions under this head covers survey instruments, camp equipment, office equipment and other small tools. A token provision of Rs. 3-4 crores under this head may be adequate.

#### 16.7 Suspense

The net provision under this minor head will be "NIL" as all the outstanding suspense accounts are expected to be cleared by adjustment to appropriate heads on completion of the project.

#### 16.8 Receipts & recoveries on capital account

This head is meant to account for estimated recoveries by way of resale or transfer of temporary buildings and special T&P. Miscellaneous receipts like rent charges of buildings, electricity charges etc. should also be accounted for under this head.

The recoveries on account of temporary buildings may generally be taken at 15% of the cost unless a higher recovery is anticipated due to some special reason such as tubular construction, vicinity to city/village/town industrial undertaking etc. Such special reasons should be indicated in the report. The recoveries on account of special T&P should be indicated as explained in the sub-head Q-Special T&P. Credit on account of resale of electrical installations, water supply

fittings etc., after execution of the project, if anticipated, should also be shown under the head.

## 16.9 Indirect charges

16.9.1 The complete estimate for a project besides including all anticipated direct charges should further include the indirect charges, i.e. the amount required to cover the capitalisation of abatement of land revenue on the area occupied by the works. (Charges for capitalization of abatement of cost of land revenue are generally calculated at either 5% of the culturable land cost or 20 times of the annual revenue lost.

### 16.9 Power Plant and Electro – Mechanical System

- 16.10.1 The provisions under this head cover the Electro-mechanical equipment for the power plant, and associated substation under the sub-heads indicated in **Annex-E&M** "Abstract of Cost Estimates of Electro-Mechanical Equipment".
- 16.10.2 The provision should be realistic and be based on the current orders and latest market rates. The price levels stating month/year for which the rates are applicable should be indicated.
- 16.10.3 The cost may be indicated in foreign currency(ies) (fc) applicable for the imported equipment and in Indian rupees (INR) for indigenous Equipment . The total cost may be given as sum of Foreign Component (equivalent in INR) and Domestic Component (INR)
- 16.10.4 The GST, transportation & insurance, erection & commissioning, contingencies, establishment and T&P may be taken as per 'Abstract of cost estimates'. However, care may be taken that overheads like establishment, contingencies, etc. may not be repeated in cost of civil works.
- 16.10.5 The rate of GST, custom duty and freight & insurance may be taken as per prevailing rates at the time of submission of DPR/ Documents.
- 16.10.6 In case of mega hydroelectric projects, benefits if available as per the policy may be considered.

#### 16.11 Cost of Miscellaneous Works:

The provisions under this head cover the Miscellaneous works (if any) under the sub-heads indicated in **Annex-Misc** "Cost Estimates of Miscellaneous Works".

The provision should be realistic and be based on the current orders and latest market rates. The price levels stating month/year for which the rates are applicable should be indicated.

The cost may be indicated in foreign currency(ies) (fc) applicable for the imported equipment and in Indian rupees (INR) for indigenous Equipment. The total cost may be given as sum of Foreign Component (equivalent in INR) and Domestic Component (INR).

The GST, transportation & insurance, erection & commissioning, contingencies, establishment and T&P may be taken as per 'Abstract of cost estimates'.

However, care may be taken that overheads like establishment, contingencies, etc. may not be repeated in cost of civil works.

The rate of GST, custom duty, freight & insurance may be taken as per prevailing rates at the time of submission of DPR/ Documents.

#### 16.12 Cost of Transmission System (up to Pooling point):

The provisions under this head cover the Transmission System (up to Pooling point) under the sub-heads indicated in **Annex-TS** "Abstract of Cost Estimates of Transmission System works (up to Pooling point)".

The provision should be realistic and be based on the current orders and latest market rates. The price levels stating month/year for which the rates are applicable should be indicated.

The cost may be indicated in foreign currency(ies) (fc) applicable for the imported equipment and in Indian rupees (INR) for indigenous Equipment. The total cost may be given as sum of Foreign Component (equivalent in INR) and Domestic Component (INR).

The GST, transportation & insurance, erection & commissioning, contingencies, establishment and T&P may be taken as per 'Abstract of cost estimates'. However, care may be taken that overheads like establishment, contingencies, etc. may not be repeated in cost of civil works.

The rate of GST, custom duty, freight & insurance may be taken as per prevailing rates at the time of submission of DPR/ Documents.

## Chapter –XVII ALLOCATION OF COST

- 17.1 The details in respect of allocation of cost for each component of the Multipurpose Project shall be based on the cost cleared by Technical Advisory Committee of MoJS. The details in this regard may be clearly spelt out under this Chapter.
- 17.2 In case of projects involving flood moderation, it may clearly be indicated whether the cost of flood moderation as cleared by CWC shall be borne by the concerned beneficiary State/ MoJS/MoP.

#### Chapter –XVIII ECONOMIC EVALUATION

- 18.1 Phasing of expenditure half yearly as per Annex-2(c).
- 18.2 Interest during construction (IDC)
- 18.3 Cost of generation at power house bus bars (with IDC)
- 18.4 Sale rate of energy (with IDC) (with and without free power to home State)
- 18.5 Levelised tariff (with and without free power to home State)
- 18.6 Comparison of cost of generation with alternate source of generation in India/State

## 18.7 Project estimated cost and financial package summary shall be submitted as per Annex-2(d).

Calculations Shall be carried out as per the tariff order of the Appropriate Regulatory Commission.

Suggestive Measures to Reduce to tariff of the project at DPR stage are attached at **Appendix-3** 

## Chapter –XIX FUTURE UTILISATION OF BUILDINGS

- 19.1 Details of buildings to be constructed to meet peak requirements of the project
- 19.2 Departmental requirement of buildings after completion of the project
- 19.3 Requirement of the buildings by other agencies
- 19.4 Utilisation of surplus buildings

## Chapter –XX RECOMMENDATIONS

- 20.1 Economic justification of the project
- 20.2 Socio-economic and other benefits

## Chapter –XXI CLEARANCES / INPUTS

- 21.1 Authenticated Copies of the following Documents/Certificates/Clearances are required to be submitted to CEA for concurrence.
  - Letter from the Registrar of Companies indicating that the company has been registered as a Generating Company under the Companies Act, 2013
  - Article of Association indicating that generation is one of the objectives of the Company
  - Letter from Competent Government authorizing the company to establish, own and operate generating power plant. The letter must contain the following
    - Location of Project-State, District, Taluka, Tehsil, Village, longitude and latitude.
    - Capacity of the power plant
  - Land availability certificate from State Revenue Authorities
  - Water availability certificate from State Irrigation Department/ concerned agency
  - Clearance of Ministry of Jal Shakti / Central Water Commission as the case may be. In case of inter-state/country aspects, necessary clearance from concerned authority
  - Status of Environmental and Forest clearance from Ministry of Environment & Forests, Government of India
  - Defence clearance (if applicable)

- Consent / Agreement signed between the Generating company and the purchaser(s) (State utility or other buyers). In case of CPSU project, the willingness for absorption of power by the beneficiary States/ UTs
- Recommendation of the State Govt. on the project cost in case of private projects.
- Any other Statutory clearance from Ministries / Departments / Organisations for the specific aspects of the project, wherever required in the proposed project
- Letter of Comfort from the Transmission Company to provide evacuation system, details of the proposed system and completion schedule.
- Letter of Comfort from the Transmission Company to enter into a back to back agreement with the promoter covering risk in case of default/ delay in commissioning by either of the parties.
- Following clearances from different appraising groups in CEA/ CWC/ GSI/ CSMRS/MoJS :

i).	General Layout	-	HCD Dte., CWC and
			HE&TD Div., CEA
ii). H	Hydrological Aspects	-	Hydrology Dte., CWC
iii).	Power Potential Aspects	-	HPA Div., CEA
iv).	Foundation Engg. and Seismic Aspects	-	FE&SA Dte., CWC
v).	Geological Aspects	-	GSI
vi).	Construction Material Aspects	-	CSMRS
vii).	Inter-State Aspects	-	ISM Dte., CWC
viii).	ROR/ Storage Aspects/	-	Standing Technical Committee
	Pondage (as per IWT,		HPP&I Div., CEA
	if applicable)		
ix) D	esign of Transmission System	-	PSP&A Div., CEA
-	(upto Pooling point)		
x) Da	am/Barrage Design	-	CMDD/BCD Dte., CWC
xi) G	ates / HM Design	-	Gates Design Dte., CWC
xii) li	nstrumentation	-	Instrumentation Dte., CWC
xiií) ł	Hydel Civil Design	-	HCD Dte., CWC
xiv) l	E&M Design	-	HE&TD Div., CEA

21.2 The DPR shall contain checklists in the beginning of the DPR as given at **Appendix-6(a)** and **Appendix-6(b)**.

## 2.7 Aspects to be appraised

- i. **Hydrology:** An accurate assessment of the hydrology at the project site is crucial as this plays a vital role in the planning of Hydro Electric Schemes and the design of various hydrological structures. An over estimate of water availability may lead to higher installation and larger investment whereas a lower estimate may result in non-utilization of potential optimally. Appraisal of the project hydrology includes water availability studies, design flood estimation, diversion flood estimation and sedimentation studies for estimating the life of the project.
- **ii. Hydro Power Planning:** Power potential studies carried out for all the hydrological years for which data is available including the installed capacity, number and size of units are examined. General layout of the Scheme whether it fits into the overall basin development plan or not is also examined.
- iii. **Dam and Head Works** : Design and safety of the dam and appurtenant works are examined.
- iv. Hydraulic Structures/ Hydel Civil Design: Techno- economic evaluation of water conductor system and power house comprising of intake, de-silting arrangement, head race tunnel, surge shaft, pressure shaft/ penstock, tailrace tunnel/ channel and the type/ layout and dimensions of the power house is made to ensure that the surveys and investigations carried to finalize the layout & designs are adequate, layout is optimum & is evolved after evaluation of various alternatives; project components are safe, planning & design has been carried out utilizing state of the art technology and relevant standards.
- v. Geology : Geology of the project components is appraised to ensure that detailed geological mapping & geophysical surveys have been done, drilling/ drifting carried out and structural features viz. thrusts, folds/faults have been studied in detail to delineate problems during construction.
- vi. Electro-Mechanical Design: Design & layout of turbine-generator sets, main stepup transformer, auxiliary equipment in the power house and switchyard / gas insulated switchgear room etc. are appraised.
- vii. Design of Transmission System (up to pooling point): Design of transmission system (upto pooling point) is appraised.
- viii. Justification of the Project: The Authority examines the need/ justification of the project from anticipated power demand (both energy and peak) and reasonability of tariff of energy generation.
- ix. Construction Material and Geotechnical aspects: Appraisal of the quantity of the local construction material available at project site/ quarries and the properties of rock/ soil for foundation of the structures is carried out.
- **x. Construction Methodology and Machinery:** Appraisal of the construction methodology and equipment used in the project construction.
- **xi.** Inter-State: The inter-state aspects are examined in consultation with CWC/ Ministry of Jal Shakti, which provide necessary suggestions to the Authority.
- xii. Cost Estimates

- a) Cost Estimates of Civil Works: After the designs of various works are frozen, the quantities of various components of civil works are checked for correctness. Analysis of rate of main works like excavation, concreting, RCC works, stripping, filling, grouting etc. based on hourly use rates of equipment is done and the estimated cost of civil works proposed in the DPR is finalized.
- b) Cost of Electro-Mechanical Works: For appraisal of cost estimates of E & M Equipment/ Works, estimated cost is assessed based on cost data of similar equipment/ works in other projects for which concurrence have been accorded recently by CEA or orders have been placed recently or budgetary offers etc.
- c) Cost of Miscellaneous Works: For appraisal of cost estimates of Miscellaneous Works, like security services, helicopter services, if required, setting up of one ITI, if required, etc., the estimated cost is assessed based on cost data of similar works/ services in other projects for which concurrence have been accorded recently by CEA or orders have been placed recently or budgetary offers etc.
- d) Cost Estimates of Transmission of Power and Communication Facilities (up to pooling point): For appraisal of cost estimates of Transmission of Power and Communication Facilities (up to pooling point), estimated cost is assessed based on Schedule of rates, cost data of similar equipment/ works in other projects for which concurrence have been accorded recently by CEA or orders have been placed recently or budgetary offers etc.
- **xiii. Construction Schedule:** Activity-wise, item-wise and year-wise targets/ schedule of construction for each of the major components of works as per detailed PERT Chart are examined.
- **xiv.** Financial and Commercial Aspects: Financing and financial analysis of the project including financial package, interest during construction, financial charges and tariff are examined.
- **xv.** Clearance from Defence Angle: If a hydro electric scheme involves defence aspects, clearance of the project from Ministry of Defence is required.
- xvi. Clearance from MoEF&CC: Development of Hydro Electric Schemes may have adverse impact on environment and ecology viz. deforestation, loss of bio-diversity including disappearance of rare species of animals and plants, soil erosion, faster rate of reservoir sedimentation, socio-economic implications, relocation and rehabilitation of people, increased seismic risk, change in aquatic system, climatic change, change in flow regimes downstream of the dam and outbreak of disease etc.

The Environment Impact Assessment and Environment Management Plans are to be prepared by the Generating Company / Project developer and submitted to MoEF&CC. The same are examined by MoEF&CC and cleared if found satisfactory. In case the project involves diversion of forest land, clearance is also required from forest angle from MoEF&CC under the Forest Conservation Act. For the schemes involving wild life sanctuary/ national park, recommendations/ approval of Indian Board of Wild Life is necessary. Information on rehabilitation and resettlement aspects of the project viz. villages / families / persons affected, details of R&R Plan and its approval by MoEF&CC is also required.

Information on tribal population affected and status of clearance under Forest Rights Act/ from Ministry of Social Justice & Empowerment/ State Government is also necessary, if tribal population is affected.

2.7.1 For accord of Concurrence, the appraising groups in CEA/ CWC/ GSI/ CSMRS would examine following aspects/ chapters:

SI No	Chapters/Aspects	Appraising Groups / Directorate/Division			
<b>31. NO.</b>	Chapters/Aspects	CWC	CEA	OTHERS	
Pre-DP	PR stage				
1	Hydrological*	Hydrology	-	-	
2	Geological	-	-	GSI	
	Foundation Engg. and				
3	Seismic Aspects & Glacial	FE&SA	-	-	
	Lake Outburst Flood Aspects				
4	Power Potential	-	HPA	-	
Б	Project General Layout and				
5	Planning	пср	ΠΕάΤΟ	-	
6	Construction Material	_		COMPO	
0	& Geotechnical	-	-	CONICO	
7	Inter-State	ISM	-	-	
8	ROR/Storage	-	STC/HPP&I	-	
٥	Design of Transmission System		DSD&A	_	
5	(up to pooling point)				
10	Dam/Barrage Design	CMDD/BCD	-	-	
11	Gates / HM Design	Gates Design	-	-	
12	Instrumentation	Instrumentation	-	-	
13	Hydel Civil Design	HCD	-	-	
14	E&M Design		HE&TD		
DPR St	age		1		
16	BoQ of E&M works		HE&TD		
17	Cost of E&M and MiscWorks		HPA		
18	Phasing of E&M and Misc. works		HPA		
10	Cost of Transmission Works upto				
19	Pooling Point		FSFA		
20	Phasing of Transmission Works				
20	upto Pooling Point				
21	Legal aspects		Legal		
22	Construction Power Aspects		HPA		
23	Plant Planning	CMC			
24	Civil quantities		CD		
25	Civil Cost	CA–HWF			
26	Phasing of Civil Works		CD		
27	Financial & Commercialaspects		F&CA		

2.7.2 For hydroelectric schemes selected through tariff based competitive bidding, the Authority shall examine the technical viability consistent with the provisions of the Act.

## List of relevant Documents/ References

- 1. The Electricity Act, 2003.
- 2. The Companies Act, 2013.
- 3. Forest Conservation Act, 1980 and Notifications/Resolutions by MoEF&CC.
- 4. "Guidelines for preparation of DPRs of Irrigation and Multipurpose Projects" issued by CWC.
- 5. "Guidelines for preparation of project estimates for major irrigation and multipurpose project" issued by CWC.
- 6. National Electricity Plan notified by CEA
- 7. Indian Electricity Sector Widening Scope for Private Participation-Issued by Ministry of Power.
- 8. Policy on Hydro Power Development issued by Ministry of Power
- 9. Guidelines for "Investigation of major irrigation and hydro-electric projects" issued by CWC.
- 10. Guidelines for Investigations and Explorations required at Detailed Project Report stage of Proposed Hydroelectric Project in Himalayan Terrain.
- 11. CBIP Technical Report No.19 "Life of Reservoir (1977)"
- 12. IS 5497 : Guide for topographical surveys for river valley projects 13. IS 4890 : Method for measurement of suspended sediment in open rivers 14. IS 13216 : Code of practice for geological explorations for reservoir sites. 15. IS 4186 : Guide for preparation of project report for river valley projects. : Guide for preparation of Estimate for River Valley Projects. 16. IS 4877 IS 5477 17. (Part 1-4) : Methods for fixing the capacities of reservoirs. IS 6939 18. : Method for determining evaporation from reservoirs. IS 7323 : Guidelines for operation of reservoirs. 19. 20. IS 13028 : Guidelines for overall planning of river basin. IS 7560 : Guidelines for allocation of cost among different purposes of 21. river valley projects. : Code of practice for structural design of surface hydel power 22. IS 4247 stations. 23. : Guidelines for selection of hydraulic turbines for medium and large IS 12837 hydro-electric power houses 24. : Guidelines for selection of turbines preliminary dimensioning & IS 12800 layout of surface hydroelectric power houses. 25. IS 10635 : Freeboard requirement in Embankment dams- Guidelines : Criteria for small Embankment Dams 26. IS 12169 : Drainage system for Earth & Rockfill Dams 27. IS 9429 28. IS 8237 : Code of practice for protection of slope for Reservoir Embankment : Code of practice for Stability analysis of Earth dams 29. IS 7894 : Guidelines for Design of large earth and Rockfill Dams IS 8826 30. : Guidelines for design of Grout curtains IS 11293 31. : Guidelines for Design of Under-seepage control measures for Earth IS 8414 32. and Rockfill dams 33. IS 6066 : Pressure Grouting of Rock foundations in River Valley Projects Recommendations 34. IS 11293 : Guidelines for design of Grout curtains

35.	IS 12182	: Guidelines for Determination of effects of sedimentation in planning and performance of Reservoirs
36.	IS 6512	: Criteria for Design of solid Gravity dams
37.	IS 10137	: Guidelines for selection of spillways and energy dissipators
38.	IS 7365	: Criteria for hydraulic design of bucket type energy dissipators
39.	IS 11223	: Guidelines for fixing spillway capacity
40.	IS 6934	: Recommendations for hydraulic design of high ogee overflow spillways
41.	IS 5186	: Design of Chute and side channel spillways
42.	IS 11527	: Criteria for Structural design of energy dissipators and spillways
43.	IS 12966	: Code of Practice for Galleries and other openings in Dams
44.	IS 13551	: Structural design of Spillway pier and crest- Criteria
45.	IS 12720	: Criteria for structural design of Spillway training walls and Divide walls
46.	IS 10135	: Code of practice for Drainage system for Gravity dams, their foundation and abutments
47.	IS 11772	<ul> <li>Design of drainage arrangements of Energy dissipators and training walls of Spillways- guidelines</li> </ul>
48.	IS 11485	: Criteria for hydraulic design of Sluices in concrete and Masonry dams
49.	IS 7720	: Criteria for investigation, planning and layout of Barrages and Weirs
50.	IS 6966	: Hydraulic design of Barrages and Weirs-Guidelines
51.	IS 11130	: Criteria for Structural design of Barrages and Weirs
52.	IS 13623	: Criteria for choice of Gates and Hoists
53.	IS 10210	: Criteria for design of hydraulic hoists for Gates
54.	IS 5620	: Recommendations for structural design criteria for low head Slide Gates
55.	IS 6938	: Design of Rope drum and Chain hoists for Hydraulic Gates-Code of practice
56.	IS 11855	<ul> <li>Guidelines for Design and use of different types of rubber seals for hydraulic gates</li> </ul>
57.	IS 13591	: Criteria for design of Lifting beams
58.	IS 15466	: Rubber seals for Hydraulic gates
59.	IS 4623	: Recommendations for structural design of Radial Gates
60.	IS 4880	: Code of practice for Design of tunnels conveying water
61.	IS 9761	: Hydropower Intakes- Criteria for Hydraulic design
62.	IS 5878	: Code of practice for construction of tunnels
63.	IS 4721	: Code of practice for Drainage and dewatering of
		Surface/Underground Hydroelectric Power stations
64.	IS 9120	: Guidelines for Planning, layout and design of cavities in Underground Hydroelectric Power stations
65.	IS 7916	: Open Power channels- code of practice
66.	IS 4720	: Code of practice for ventilation of Surface Hydel Power stations
67.	IS 7396	: Criteria for hydraulic design of surge tanks
68	B. IS	12967 : Analysis of hydraulic transients in Hydroelectric and pumping
pla	ants-	
_		Code of practice
69.	IS 11625	: Criteria for hydraulic design of Penstocks
70.	IS 10430	: Criteria for Lined canals and guidance for selection of type of Lining

Note: The above listed documents are available either free or as priced documents from the concerned Govt. Department / Agencies/ Govt. publishers. Latest versions of the above references may be referred.

Annex-2(b)

#### **Abstract of Cost Estimates**

Name of Project:

 Present Price level :
 \_\_\_\_\_\_

 Zero Date :
 \_\_\_\_\_\_

 Construction Period :
 \_\_\_\_\_\_

 FE Rate :
 \_\_\_\_\_\_\_

#### i). Cost estimates at Present Price Level :

Item	Item Indian Foreign Component Component		Total	
	(₹ Lakhs)	fc	(Eqvt. in ₹ Lakhs)	
1. Cost of Civil Works				
(As per Annex-Civil)				
2. Cost of Electro-Mechanical Works				
(As per Annex-S)				
3. Cost of Miscellaneous Works				
(As per Annex-Misc)				
4. Cost of Transmission System				
Works (up to pooling point) (As				
per Annex-15)				
Total Cost of Works (Hard Cost)				
(1+2+3+4)				
IDC & FC				
Total Project Cost including IDC & FC				

fc : Foreign Currency, FC: Financing Charges

#### ii). Cost estimates at Completion Level :

Item	Indian Component	Foreign Component		Total
	(₹ Lakhs)	fc	(Eqvt. in ₹ Lakhs)	
1. Cost of Civil Works				
(As per Annex-Civil)				
2. Cost of Electro-Mechanical				
Works (As per Annex-S)				
3. Cost of Miscellaneous Works				
(As per Annex-Misc)				
4. Cost of Transmission System				
Works (up to pooling point) (As				
per Annex-TS)				
Total Cost of Works (Hard Cost)				
(1+2+3+4)				
IDC & FC				
Total Project Cost including IDC & FC				

fc : Foreign Currency, FC: Financing Charges

Average Annual Escalation Factor during pre-construction and construction period:

- 1. Civil Works : ------ %
- 2. E&M Works : ------ %
- 3. Misc Works : ------ %
- 4. Transmission System Works: ------ %

Annex-Civil

#### Abstract of Cost Estimates of Civil Works

Name of Project :

Present Price level : \_\_\_\_\_

Item	Amount (₹ Lakhs) at Present Price Level	Amount (₹ Lakhs) at Completion Level
i). Direct Cost		
I- Works		
A- Preliminary		
B- Land		
C-Civil Works		
J- Power Plant Civil Works		
K-Building		
M-Plantation		
O-Miscellaneous		
P-Maintenance during Construction		
Q-Special T & P		
R-Communication		
X-Environment & Ecology		
Y-Losses on stock		
Total (I- Works)		
II. Establishment		
III. Tools And Plants		
IV. Suspense		
V. Receipt And Recoveries		
Total (Direct Cost)		
ii). Indirect Cost		
a). Capitalization of Abatement of Land		
Revenue		
Total (Indirect Cost)		
Total Cost Civil Works(i+ii)		

Note: 1. Head-wise cost of civil works to be furnished in annex forms as per "Guidelines for preparation for project estimates for River Valley Projects" issued by CWC.

2. The details of civil works under sub-heads shall be given in Annex and numbered in similar way of main head. For example, Annex giving details of works under sub-heads of main head "C-Works" shall be numbered as Annex-C(1), Annex-C(2), etc.
#### **Annex-Construction Power**

#### \_\_\_\_\_ H.E. Project ( \_\_\_\_\_ MW) (Abstract of Cost Estimates of Construction power)

Construction Power Peak demand \_\_\_\_\_ kW

SI. No.	Description	Unit	No. of units	Unit Cost (₹. Lakh)	Amount (₹. Lakh) PI
A.	Construction Power Arrangement				· =
1	KV Transmission line	km			
2	Distribution transformers, Substation, Switchgear and spares etc. as per SLD				
3	Total cost of Construction Power				
	Arrangement - Ex works (1+2)				
4	Total cost of Construction Power Arrangement for Non-works (Street lighting, office buildings, staff colony etc.)				
	Effective cost of construction power				
	arrangements (for Construction Works and Non- Works) (3+4)				
	Franzis Charges for Construction				
В	Energy Charges for Construction Works				
1	Energy required for construction in 1 <sup>st</sup> year	Lakh Units			
2	Energy required for construction in 2 <sup>nd</sup> year	Lakh Units			
3	Energy required for construction in 3 <sup>rd</sup> year	Lakh Units			
4	Energy required for construction in 4 <sup>th</sup> year	Lakh Units			
5	Energy required for construction in 5 <sup>th</sup> year	Lakh			
	Total France for construction	Units			
ю	(1+2+3+4+5)	Lakn Units			
7	Unit rate of electricity from DG sets*	₹./kWh			
8	Unit rate of Electricity from Grid (incl. fixed	₹. /kWh			
	and demand charges, if any)				
9	Average cost of Power considering% Grid Power and% DG power	₹./kWh			
	Energy charges for Construction Works) (6*9)				
С	Energy Charges for Non-Works (5 to 10% of B)				

\* Calculation of Unit rate of electricity from DG sets shall be done as per method mentioned in latest edition of *"Guide Book on Use Rate Hire Charges and Transfer value of equipment and Spare parts*" of CWC (sample table given below)

# Calculation of Unit rate of Electricity from DG set

[	$\mathbf{D}\mathbf{C}$ Set Connectty (U)(A)			
	DG Set Capacity (KVA)			
(;)	Rate of DG (per kVA)			
(1)				
(11)				
(III) (iv)	Life in Fedis			
$(\mathbf{IV})$	Appual Schedule Dreduction Hours			
(v)				
Α	Ownership Cost (Depreciation) :			
(vi)	Yearly Depreciation in ₹ with reference to life in years [0.	9*(i)/(iii)]		
(vii)	Yearly Depreciation in ₹ with reference to life in hours [0	.9*(i)*(v)/	(ii)]	
(viii)	Average Yearly Depreciation in ₹ [Average of (vi) & (vii)]		. /-	
(ix)	Hourly Depreciation in ₹ of Equipment [(viii)/(v)]			
В	Repair and Maintenance :			
(x)	R&M Charges in ₹ @120% of cost of Equipment per hou	ır [1.20*(i	i)/(ii)]	
С	POL Charges :			
(xi)	Diesel Consumption in litre per hour			
(xii)	Cost of One Litre of Diesel in ₹			
(xiii)	Cost of hourly fuel consumption in ₹ by Equipment [(xi)*(	xii)]		
(xiv)	Lubricant consumption in litre/hour	/-		
(xv)	Cost of One Litre of Lubricant in ₹			
(xvi)	Cost of hourly lubricant consumption in ₹ by Equipment	(xiv)*(xv)	)]	
(xvii)	Sundry & Miscellaneous in ₹ @10% of R&M Charges [0.	1*(x)]	-	
(xviii)	POL Charges per Hour in ₹ [(xiii)+(xvi)+(xvii)]			
D	Labour Charges :		1	
		No	Monthly	Hourly
		110.	Rate (₹)	Rate (₹)
(xix)	Foreman [No.*Monthly Rate*12/(v)]			
(xx)	Operator [No.*Monthly Rate*12/(v)]			
(xxi)	Mechanic [No.*Monthly Rate*12/(v)]			
(xxii)	Electrician [No.*Monthly Rate*12/(v)]			
(xxiii)	Helper [No.*Monthly Rate*12/(v)]			
(XXIV)	Watchman [No.*Monthly Rate*12/(v)]			
(XXV)	Direct Charge for Labour [(xix)+(xx)+(xxi)+(xxii)+(	(XIV)		
(sog d)	Indirect Charges @55% for semi-skilled/ unskilled worke	rs		
	[0.55 {(XXIII)+(XXIV)}] Indiract Charges @90% for skilled workers [0.9*((viv)) (v	$(\mathbf{v})$	(vvii))]	
	Total Labour Charges per Hour [(xyy)+(xyyi)+(xyyii)]	X)+(XXI)+	(XXII)}]	
(^^/				
(xxix)	Hourly Use Rate of Equipment in ₹ [(ix)+(x)+(xviii)+(x	xviii)1		
(xxx)	Hourly unit generation(kWh) considering Power factor	or as 0.8		
	Unit Electricity rate (₹/kWh) [(xxix)/(xxx)]			

#### Annex-E&M

# H.E. Project ( \_\_\_\_\_ MW) (Abstract of Cost Estimates of Electro Mechanical Works)

# Present Price level: \_\_\_\_\_

FE Rate : \_\_\_\_\_

SI.	Item Particulars	Cost of E	quipme	ent, Service	s, Overheads and 1	axes & Duties
INO.		Indian Component	F Cor	oreign nponent	То	tal
		Component	(fc)	(Eqvt. in	At Present Price	At Completion
		(₹ Lakhs)	( )	₹ Lakhs)	level (₹ Lakhs)	level (₹ Lakhs)
1.	Preliminary – Annex – S(1)					
	GST (as applicable) on 1					
	Sub-Total (Preliminary)					
2.	Generating Plant and Auxiliaries					
	a) Generating Units and Associated					
	b) Auxiliary electrical equipment for power					
	station – Annex –S(3)					
	c) Auxiliary mechanical equipment and					
	services for power station- Annex-S(4)					
	d) GST (as applicable) on 2 (a), 2(b) & 2					
	(C)					
	e) Transportation, handling and Insurance					
	charges $@6\%$ of 2 (a),(b) & (c)					
	i) GST (as applicable) on 2 (e)					
	g) Erection and commissioning charges @8%					
	of 2(a), (b), (c) & (d) excluding spares					
	h) GST (as applicable) on 2 (g)					
2	Sub-Total (Generating Plant and Equipment)					
3	Services					
	a) Substation equipment, auxiliary equipment					
	and service of switchyard - Annex -S(5)					
	b) GST (as applicable) on 3 (a)					
	c) Transportation, handling and insurance					
	charges @ 6% of 3 (a)					
	d) GST (as applicable) on 3 (c)					
	e) Erection and commissioning charges @ 8%					
	of 3 (a) excluding spares.					
	t) GST (as applicable) on 3 (e)					
	Sub-Total (Substation Equipment, Auxiliary					
	Equipment and Service of Switchyard)					
4	Contingencies @ 1% on items 2 & 3					
5	Tools and Plants @0.5% of item 2, & 3					
6	Sub-Total (Item 1 to 5)					
7	Establishment (As per para 16.5 of Chapter					
	GRAND IVIAL (0+1)					

Annex – E&M(1)

#### H.E. Project ( \_\_\_\_\_ MW) Cost Estimates of Electro Mechanical Works (Preliminary Works)

Present Price level: \_\_\_\_\_ FE Rate : \_\_\_\_\_

SI.	Item Particulars	Quantity	Rate		Services Cost				tal
No.			(₹/ fc)	Indian	Foreig	Foreign Component		At Present Price	At completion
				Component	(fc)	(Eqvt. in ₹	(₹	Level	level (₹ Lakhs)
				(₹ Lakhs)		Lakhs)	Lakhs)	(₹ Lakns)	
1	2	3	4	5	6	7	8=5+7	11=8+10	
1	Design & Consultancy Charges								
2	Model Testing for Turbine								
	Total								

#### Annex – E&M(2)

### \_\_\_\_\_ H.E. Project ( \_\_\_\_\_ MW) Cost Estimates of Electro Mechanical Works (Generating Units and Associated Accessories)

Price lev	vel:
FE Rate	e:

SI.	Item Particulars	Qua	Rate		Equipm	ent Cost		Cu	Istom Duty	То	tal
No.		ntity	(₹/ fc)	Indian	Fo	reign	Total	Rate	Amount	At Present	At
				Componen	Com	ponent				Price Level	Completio
				t	(fc)	(Eqvt. in ₹	(₹ Lakhs)	(%)	(₹ Lakhs)	(₹ Lakhs)	n Level (₹
				(₹ Lakhs)		Lakhs)					Lakhs)
1	2	3	4	5	6	7	8=5+7	9	10=8x9	11=8+10	12
1	a) Turbine-Generator units										
	MW, RPM,										
	m head, 0.85 p.f,										
	kV complete with										
	allied equipment such										
	as MIV, Governor, AVR,										
	b) Cooling water system										
	comprising pump sets										
	valves piping etc										
	c) Drainage and										
	Dewatering systems										
	d) HP & LP Compressed										
	Áir System including										
	pipes and valves										
	e) Spares @ 5% on item										
	1(a) to 1(e) (including										
	one spare runner)										
2	kV, A Isolated Phase										
	Bus Duct/ Segregated Phase										
	Bus Duct for Generator-										
	including LAVT NCT & ICT										
	Surge Protection & Neutral										
	Farthing system										
3	Supervisory Control and Data										
-	Acquisition System (SCADA)										
4	Unit Control & Protection										
	Panels										
5	kV, A, Generator										
	Circuit Breaker (if provided)										
6	Lubricating oil & Governor oil										
	Drocouro Shoft Valua (										
	riessule Shalt valve ( m										
8	Spares @ 3 % on items 2 to 7										
1										1	

Annex – E&M(3)

# H.E. Project ( \_\_\_\_\_ MW) Cost Estimates of Electro Mechanical Works (Auxiliary Electrical Equipment for power station)

Price level: \_\_\_\_\_

FE Rate : \_\_\_\_\_

SI.	Item Particulars	Qua	Rate		Equipr	nent Cost		Cu	stom Duty	Тс	otal
No.		ntit	(₹./ fc)	Indian	Foreign	Component	Total	Rate	Amount	At Present	At
		У	. ,	Component	(fc)	(Eqvt. in ₹	(₹ Lakhs)	(%)	(₹ Lakhs)	Price Level	Completion
				(₹ Lakhs)		Lakhs)				(₹ Lakhs)	Level (₹
		2	4	F	-		0.5.7	0	10 0.0	11.0.10	Lakhs)
1	Z Stop up Transformor	3	4	5	0	1	0=0+/	9	10=8x9	11=8+10	12
·.	(Rating kV MVA										
	Phase,Type)										
2.	Unit Auxiliary Transformer										
	(Rating_kV, _MVA,										
	Type)										
3.	Station Service										
	(Pating k)/ M\/A										
	Type)										
4	HT/LT AC Switchgear for										
	power supply to PH										
	complex, Pothead yard,										
	BFV and Dam site										
5.	DC Batteries, Battery										
	charging equipment, D.C.										
	Distribution Board with										
	D.C. Switchgear (Rating										
	AH)										
6.	Diesel generating set										
	(Rating kV,kVA)										
	(In addition to construction										
7	power)										
7. 8	Cohle Rocks Travs										
0.	Supporting Structure and										
	Accessories										
9	CCTV, Surveillance										
	System &										
	Telecommunication										
40	Equipment										ļ]
10.	Ground Mat & Earthing for										
	Pothead vard										
11											
	complex. BFV house										
	chamber, Pothead vard										
	and Dam site										
12	Electrical Workshop				-						
13.	Electrical Test Lab &										
	Testing Equipment										
14	Sub-Total										
15	(items 1 to 9)	<u> </u>									
10.					1						
		1					1			1	

Annex – E&M(4)

#### H.E. Project ( \_\_\_\_\_ MW) Cost Estimates of Electro Mechanical Works (Auxiliary Mechanical Equipment and Services for power station) Price level: \_\_\_\_\_

FE Rate :

SI.	Item Particulars	Qua	Rate		Equipm	ent Cost		Cust	om Duty	То	otal
No.		ntit	(₹/ fc)	Indian	Fo	reign	Total	Rate	Amount	At Present	At
		У		Component	Com	ponent				Price Level	Completion
					(fc)	(Eqvt. in ₹	(₹ Lakhs)	(%)	(₹. Lakhs)	(₹ Lakhs)	Level (₹
				(₹ Lakhs)		Lakhs)					Lakhs)
1	2	3	4	5	6	7	8=5+7	9	10=8x9	11=8+10	12
1.	Electrical Overhead Traveling crane for PH (CapacityT)										
2.	Electrical Overhead Traveling										
	T)										
3	Electrical Overhead Traveling										
	crane for BFV House										
	(Capacity I)										
4.	Electric lifts and elevators										
5.	Fire fighting equipment with										
	valves etc.										
6.	Heating, Ventilation and Air										
	conditioning										
7.	Potable Water Supply for PH										
	complex and Pothead yard										
8.	Oil handling equipment with pipes, valves, tanks, purifiers										
9.	Workshop machines and										
	equipment										
1 0	Sub-Total (Item 1 to 8)										
1 1	Spares @ 3% for item No.10										
	TOTAL										

Annex – E&M(5)

# H.E. Project ( \_\_\_\_\_ MW) Cost Estimates of Electro Mechanical Works (Switchyard and Pothead Yard Equipment & Services)

Price level: \_\_\_\_\_ FE Rate : \_\_\_\_\_

SI.	Item Particulars	Qua	Rate		Equip	ment Cost		Cust	om Duty	То	tal
No.		ntit	(₹/ fc)	Indian	Fo	oreign	Total	Rate	Amount	At Present	At
		У	` '	Component	Con	nponent				Price Level	Completion
				(₹ Lakhs)	(fc)	(Eqvt. in ₹ Lakhs)	(₹ Lakhs)	(%)	(₹ Lakhs)	(₹ Lakhs)	Level (₹ Lakhs)
1	2	3	4	5	6	7	8=5+7	9	10=8x9	11=8+10	12
1.	kV Pothead yard/	-		•	•			•			
	Switchyard equipment										
	including coupling										
	capacitors, wave traps,										
(a)	kV, A, Circuit										
(b)	leolator/Pantograph										
(0)	with/without earthing blade										
	(RatingkV )										
(c)	Current transformers										
. ,	(RatingKV)										
(d)	Potential transformers										
(-)	/CVI (RatingkV)										
(e)	Lightning arrestors (RatingkV)										
(f)	Post Insulator & VT										
(g)	Wave traps										
	(RatingKV)										
2	KV GIS Bays										
3	(Gas Insulated Bus Duct)										
4	Phase,, MVAR,										
	KV, Type Snunt										
5	Bus conductors bardware										
5	and isolators										
6	Protection Panel for Bus, Line and Reactor										
7	D.C. battery, charger and associated equipment										
8	Fire protection System										
9	PLCC Equipment										
10	Gantry, Foundation for										
	structures &										
	for other equipment like										
	Shield wire, Insulators,										
	Lightning Masts										
11	Fencing and security										
12	Sub-Total (1 to 7)										
13	Spares @ 3% for items 12										
	Total										

Annex – Misc

# H.E. Project (\_\_\_\_\_ MW) Cost Estimates of Miscellaneous Works

Price level:	
FE Rate :	

-											
SI.	Item Particulars	Quantity	Rate	Services Cost				GST		То	otal
No.			(₹/ fc)	Indian	Foreig	n Component	Total	Rate	Amount	At Present	At
			、 ,	Component	(fc)	(Eqvt. in ₹	(₹ Lakhs)	(%)	(₹ Lakhs)	Price Level	Completion
				<b>(3</b>   - - >		Lakhs)	` '		, í	(₹Lakhs)	Level (₹
				(₹ Lakns)		,				Ì ,	Lakhs)
1	2	3	4	5	6	7	8=5+7	9	10	11=8+10	12
1	Security Services										
2	Helicopter Services, if required										
3	Setting up of Industrial Training Institute, if required *										
	Total (Miscellaneous Works)										

fc : Foreign Currency \* : As per CEA recommendation dated 08.10.2009

<u>Annex-TS</u>

\_\_H.E. Project (\_\_\_\_MW)

Abstract of Cost Estimates of Transmission System Works (up to pooling point)

Price level: \_\_\_\_\_

FE Rate : \_\_\_\_\_

S. No.	Description	Amount at Present Price Level (₹ Lakhs)	Amount at Completion Level (₹ Lakhs)
1	Line and Termination Bay (including spares) (as per Annex-TS(1))		
2	Transportation and handling charges		
3	Erection, Testing and Commissioning Charges (excluding spares)		
4	Sub-Total(1,2 &3)		
5	Contingency on 4		
6	Tools & Plant on 4		
7	Sub-Total(4,5 &6)		
8	GST on 7		
9	Establishment Charges		
10	Forest & Land Compensation		
11	Crop & Tree compensation		
	Total		

### Annex-TS(1)

# Cost of Transmission line (up to Pooling Point) and Terminating Bays

Price level: \_\_\_\_\_ FE Rate : \_\_\_\_\_

S.No	Description	Unit	Qty	Rate (₹ Lakhs)	Amount (₹ Lakhs)
					qty*rate
1	Transmission line	Kms		Α	
2	Terminating Bays	No			
3	Spares for above				
	TOTAL				

# CALCULATION SHEET FOR DETERMINATION OF A (cost of transmission line)

	Base Cost of Transmission Line
	Add y% for line less than 100 km
	Add z% for completion of 24 months
	Add for OPGW & communication
A	TOTAL

#### PRESENT DAY AND COMPLETED COST (Phasing of Expenditure of Hard Cost)

Name of the Project :

Capacity : _	MW
Present Price level :	
Zero Date :	
Construction Period :	
FE Rate :	

#### 1. Civil Works :

Average Annual Escalation Factor : \_\_\_\_\_%

SI.	Item	Present	Expendi	Anticipa		6-1	Month	v pha	sina	 Cost at
No.		day ture Cost incurre ex d till tu date to	ted expendi ture up to zero date	6	12	18	24	30	 Completic n level	
	Escalation Factor									
	i) DIRECT COST									
	I- WORKS									
	A- Preliminary									
	B- Land									
	C-Civil Works									
	J- Power Plant Civil									
	K-Building									
	M-Plantation									
	O-Miscellaneous									
	P-Maintenance									
	Q-Special T & P									
	R-Communication									
	X-Environment & Ecology									
	Y-Losses on stock									
	TOTAL (I- WORKS)									
	II- Establishment									
	III- Tools and Plants									
	IV- Suspense									
	V- Receipt and recoveries									
	TOTAL (DIRECT COST)									
	ii) INDIRECT COST									
	of land revenue									
	TOTAL (INDIRECT COST)									
	TOTAL (CIVIL COST)				1					

#### 2. <u>E&M Works :</u>

Annual Escalation Factor (Indian Component) : \_\_\_\_\_% Annual Escalation in FE Rate (Foreign Component) : \_\_\_\_\_%

SI. Item	Presen	Expend	Anticip		6	Completion				
No.	t day Cost	iture incurre d till date	ated expendi ture up to zero date	6	12	18	24	30		Cost
Escalation Factor(IC)					_					
Escalation Factor(FC)										
					-					
II). I.G. Sets										
III). Bus Duct										
IV). Penstock Valves					_					
V). Power Transformer										
vi). Protection and Relay Panels										
vii). AC Supply System										
viii). Switchyard										
ix). GIS										
X). Power and Control Cables										
xi). SCADA										
xii). Electrical Auxiliaries										
xiii). Mechanical Auxiliaries										
xiv). Initial Spares (IC)										
XV). Initial Spares (FC)										
TOTAL (E&M EQUIPMENT)										
i). Preliminary Works					1				1	
ii). Freight & Insurance										
iii). Erection &										
Commissioning										
Total (Services)										
III. TAXES & DÚTIES										
i). Custom Duty										
ii) GST										
TOTAL (TAX & DUTIES)					$\perp$					
				<u> </u>				-		
I). Establishment								-		
iii). Contingencies				-						
TOTAL (E & M COST)				-						+

#### 3. <u>Miscellaneous Works :</u>

Average	Annual	Escalation	Factor:	%
/ o. ago	/	<b>E</b> ooalalloll		/0

										(	(₹ Lakhs)
SI.	Item	Present	Expendi	Anticipate	6-Monthly phasing				Cost at		
No.		day Cost	ture incurre d till date	d expenditur e up to zero date	6	12	18	24	30	·	complet ion level
	Escalation Factor										
	i). Security										
	ii). Helicopter Service, if required										
	iii). Setting up of Industrial Training Institute, if required										
	Total (Misc Cost)										

#### 1. <u>Transmission System Works (upto Cooling Point) :</u>

Average Annual Escalation Factor: \_\_\_\_\_%

									(₹ Lakhs)
ei.	SI. No. ITEMS	Presen		6-1	Nontl	Cost at			
No.		t Day Cost	6	12	18	24	30		completion level
1	Transmission Line Including Transportation and E, T & C								
2	Termination Bay								
3	Taxes and Duties								
4	Overheads								
5	Total Cost (Transmission works up to pooling point)								

Note: Present day cost of each item/ group of items (Annex-2c) will be phased on half yearly basis and escalated at a rate based on prevailing indices to arrive at completed (Escalated) cost.

#### Illustration for calculation of annual escalation factor of E&M works

**Assumptions:** Let us assume that the cost of E&M work of the project is at June, 2022 PL. Tentative Zero date of the project is 01<sup>st</sup> Jan, 2023 and Tentative CoD of the project is 1<sup>st</sup> June, 2027

**Step 1:** Find out the period between present day price level (June, 2022) and COD (June, 2027) -n = 5 years (round off zero decimals)

INDEX		YEARLY INDICES										
INDEX	2017	2018	2019	2020	2021	2022						
<b>Q</b> - Manufacture of Electrical Equipment	109.20	111.20	111.60	112.00	120.30	127.60						
<b>R</b> - Manufacture of Machines and Equipment	108.50	110.80	112.80	113.40	118.40	124.90						
<b>M -</b> MEAN (Q & R)	108.85	111	112.2	112.7	119.35	126.25						
L - Labour	281.2	294.8	317.4	335.1	351.40	372.40						

Step 2: Collect data of relevant WPI/CPI indices of past n+1 years.

**Step 3:** Calculate percentage increase in indices for past n years. Thereafter, calculate average annual increase in indices for the period under consideration. Average annual escalation factor shall be arrived by multiplying weightages to average annual increase in indices.

	Yea	r to Year	Escalatio	on		Av.	Weight						
INDEX	2018	2019	2020	2021	2022	Yearly Escalation	on item	Escalation					
M - MEAN (Q & R)	1.98%	1.08%	0.45%	5.90%	5.78%	3.04%	70%	2.13%					
L - Labour	4.84%	7.67%	5.58%	4.86%	5.98%	5.78%	30%	1.74%					
	Escalatio	Escalation for Indian component (IC) per Annum											

**Step 4:** Similar Method may be used for calculation of annual escalation factor for Foreign Currency. Example is given below:

INDEX	YEARLY INDICES									
	2017	2018	2019	2020	2021	2022				
Average USD FE Rate	65.1216	68.3895	70.4203	74.0996	73.92	78.59				

		Year to	Year Es	calation	Av.	Weight						
INDEX	2018	2019	2020	2021	2022	Yearly Escalation	on item	Escalation				
Average USD FE Rate	5.02%	2.97%	5.22%	-0.24%	6.31%	3.86%	100%	3.86%				
		Escalation for Foreign component (FC) per Annum										

**Step 5:** Cost estimates at Completion level shall be framed by escalating the phasing of expenditure of present day cost to the mid-point of period in which expenditure is proposed to be incurred using corresponding average annual escalation factor for Indian component and Foreign component.

#### Annex-2(d)

# ESTIMATED COST OF PROJECT & FINANCIAL PACKAGE SUMMARY

#### A. ESTIMATED COST OF PROJECT

1	Name of Pro	ject						
2.	Capacity (MV	N)						
3	Name of Pro	moter						
4	Location							
5	State							
SI.	Item	Currency	Foreign	Currency (	Component	Indian	Total Cost	% of
No.			Amount	Exchange	Equivalent	Component	(₹ Crores)	total
				Rate @	in ₹ Crores	(₹ Crores)		cost
(1)	(2)	(3)	(4)	(5)	(6)=(4)x(5)	(7)	(8)=(6)+(7)	(9)
1	Hard Cost	(i)						
	(excluding	(ii)						
	IDC &	(iii)						
	Financing	(iv)						
	Charges)							
					Su	b-Total (1) =		
2	IDC (@@)							
	(i) Debt							
	Package-I							
	(ii) Debt							
	Package-II							
	(iii) Debt							
	Package-III							
3	Financing							
	Charges							
	(i) Debt	(i)						
	Package-I							
	(ii) Debt	(ii)						
	Package-II							
	(iii) Debt	(iii)						
	Package-III							
	(iv) Others	(iv)						
	(if any)							
					Su	b-Total (3) =		
				C	GRAND TO	「AL (1+2+3)		

NOTES:

(i) @ - Exchange Rate prevailing at the time of price level of the cost.

(ii) @ @ - Detailed calculation for interest during construction (IDC) shall be attached separately for each Debt Package (in respective currencies) clearly indicating Drawl of funds, phasing of expenditure & Gestation Period etc.

(iii) If the currencies or Debt Packages are more, the additional Columns / Rows may be suitably inserted.

#### В. FINANCIAL PACKAGE SUMMARY

#### B1. **DEBT FINANCING**

SI.No.	No. Source/ Currency Name of		Foreign Currency Component				Interest rate %		Repayment period		Moratorium period		
	Agency		Amount	Excha rate	ange @	Equiva in ₹ (	lent Cr	(Fiz Floa	xed) ating	(Ye	ars)	(	(if any) Years)
(1)	(2)	(3)	(4)	(5	)	(6)=(4)	x(5)	(	7)	3)	3)		(9)
(a)	Foreign Debt												
1	Source I												
2	Source II												
			Sub-Tota	l (a) =	-								
(b)	Domestic Debt												
1	Source I												
2	Source II												
			Sub-Tota	l (b) =									
		TOTAL DE	EBT (a) + (	(b) =									
B2	EQUITY FI	NANCING											
SI.No.	Source/		Currency		Forei	ign Cur	rency	Con	nponen	t			
	Name of Equ	uity		Am	ount	Exch	ange	Eq	uivaler	it in ₹	R	Rem	narks
	Partners		(-)			rate	e @		Cr	(_)			
(1)	(2)	)	(3)	(	4)	(5	5)	(	6)=(4)>	(5)		(	7)
(a)	Foreign Equ	lity											
1	Promoters												
2	Others			Cub	Tatal	(a)		-					
(b)	Domostic E	auity	₹	-auc	Total	(a) =							
(0)	Promotors	quity	<b>∖</b> ₹										
2	Others		₹		•								
3	Public Issue	(If any)	``										
-		(		Sub-	Total	(b) =							
			TOTAL E	QUIT	Y (a) -	+ (b) =							
	DEBT + EQ	UITY (B1 +	- B2) =			DEBT	: EQI	UITY	RATIO	) =			
FINAN	ICING CHAR	GES #					-						
SI.No.	Item	Upfront	Commit	ment	Gua	rantee	Othe	ərs	Tot	al Fina	incing		Remarks
		charges	charg	jes	Fee	es (₹	(if ar	ny)		Charg	es		
(4)	(0)	(₹ Cr.)	(₹ C	r.)	Cr	<u>.) @</u>	(₹ C	;r.)	(7) (	(₹ Cr	·)		(0)
(1)		(3)	(4)		(	(5)	(6	)	(7)=(.	3)+(4)-	+(5)+(6	)	(8)
1													
1 2	Source II												
2	Source III												
	EQUITY												
1	Public Issue												
	Charges												
							Total						

# -

Financing Charges as applicable for the Project may be indicated. Exchange Rate prevailing at the time of submission of DPR/Documents. @ -

#### Appendix-1

#### Review Mechanism for pre-DPR activities by CEA and concerned appraising groups with the Project Proponent

#### The review/consultation mechanism shall be as under:-

- After signing MOA with State Government., the developer shall carry out topographical survey & geological surface mapping of the project and submit the proposed layout of the project and detailed investigation plans to HP&I Division, CEA along with CWC, GSI and CSMRS for appraisal and finalization.
- CEA along with other agencies shall hold meeting with developer to finalize different alternatives of the project layout for which investigations are to be carried out by the developer along with detailed investigation plan to be carried out in first phase. This meeting would be followed up with subsequent quarterly meetings till first phase investigations are completed.
- After completion of the first phase investigations, the developer shall submit the results to HPP&I Division, CEA along with CWC, GSI and CSMRS. CEA along with other agencies shall hold a meeting with the developer for finalization of project layout and final phase-II investigations to be carried out by the developer. This meeting would be followed up with subsequent quarterly meetings till GSI Clearance is obtained by the developer.
- After obtaining clearances for Hydrological aspects, PPS aspects, Interstate aspects, GSI aspects, CSMRS aspects, FE&SA aspects and layout from HCD/HE&TD, CEA along with CWC, GSI and CSMRS shall hold 3rd consultation meeting for finalization of layout, broad salient features of the project and submission of chapters for design aspects of the project. This meeting would be followed up with subsequent quarterly meetings till the full DPR is actually submitted to CEA for concurrence by the developer.

#### Miscellaneous:-

• For holding the consultation meeting(s)/ taking clearance on a particular aspect, the developer shall submit its request along with concerned report(s) to the concerned Directorates/Divisions/Organizations under intimation to HPP&I Division of CEA.

All efforts will be made by the developer to complete the investigations and studies as suggested by the concerned agencies like CEA, CWC, GSI, or CSMRS, in time.

- The developer may approach CEA and other agencies in case of any difficulty in finalization of any study or report.
- Developer shall submit hydrological studies after collection of hydrological data at site for at least one year.

#### Power Potential Studies and Installed Capacity

After finalization of hydrology, the next step is to determine installed capacity and unit size of the project.

For determination of installed capacity ensure that the-

- i) Various water levels (FRL,MDDL,TWL) are approved by concerned department of State Government.
- ii) Efficiencies of T-G sets are taken correctly as per latest machine available in Market
- iii) Head losses in water conductor system (WCS) and Evaporation losses of the reservoir are approved by CWC.
- iv) Rated head assessments are accurate.
- v) Minimum discharges (E-Flows) as per requirement of MoEF&CC during monsoon & non-monsoon seasons and remaining period for aquatic life are taken.
- vi) Provision has been made for discharges during monsoon season for silt flushing.
- vii) Other requirements of water are met.

#### 1 FOR RoR SCHEMES

#### 1.1 Computation of 90% dependable year

- i) Obtain 10-daily hydrological inflow series in m<sup>3</sup>/sec for all hydrological years, yearwise.
- ii) Calculate unrestricted energy generation in MUs.
- iii) Arrange unrestricted annual energy generation in descending order.
- iv) 0.9(n+1)th year is the 90% dependable year, where n is the number of years for which hydrological inflows data is available.

90% dependable year is a year with probability of energy generation of equal or more than 90%.

#### **1.2** Fixating the installed capacity

- i) Calculate firm power available based on average power generation during the lean months flows in a 90% dependable year.
- ii) Consider a number of alternatives of installed capacities in suitable steps.
- iii) Compute incremental energy generation ( $\Delta$  KWH) for every incremental MW ( $\Delta$  MW) and plot result on a graph.
- iv) Installed capacity is fixed at a value where the fall in the graph is sharp.
- v) B/C ratio and incremental benefit cost ratio ( $\Delta B/\Delta C$ ) is also considered for fixing the installed capacity. An alternative for installed capacities which provides maximum net benefit (B-C) and ensures incremental ( $\Delta B/\Delta C$ ) higher than unity is considered optimum
- vi) Other factors like annual load factor, lean period load factor, peaking requirement, potential utilization etc may also be considered.

#### 1.3 Selecting unit-size & Number of Units

- i) Number of generating units should be kept minimum because the cost of generating units and related equipment increases with the increase in number of units
- ii) Unit-size is decided based on the transport limitations i.e. maximum size (LxWxH) of package of generating units/ transformer which can be transported to site.
- iii) Where more than one units are to be installed in a power house, these should be of the same capacity to facilitate inter-changeability of generating units, spares and other equipment in the station.
- iv) The unit size should be verified for system stability and loss of generation probability criteria.
- v) In case of run-of-river schemes without pondage, numbers of units are decided keeping in view the varying discharge during lean period and turbine operating characteristics.

#### 1.4 Computing Design energy

 i) 10-daily unrestricted energy generation after meeting the water requirement for aquatic life as per MoEF&CC stipulation in TOR/ approval in 90% dependable year is restricted to 95% of the installed capacity of the power house. The total of these 10-daily restricted energies for the year gives the annual design energy generation.

#### 2 FOR STORAGE BASED SCHEMES

2.1 A reservoir is created to store the excess water during the high inflow period and release it as and when required.

The storage provided can be for -

- 1) annual operation i.e. every year the reservoir is depleted to its minimum drawdown level
- 2) carry over operation i.e. waters from good hydrological year is carried over to the bad hydrological years that may follow.
- 2.2 Multipurpose reservoirs are planned to serve more than one purpose. In Indian conditions the multi-purpose reservoirs are planned for drinking water, irrigation, hydro electric power, flood control and flood moderation etc. Planning of such a reservoir requires detailed analysis of past run off records and other hydrological data.
- 2.3 In case of hydro power projects involving flood moderation, in addition to power generation, the reservoirs are planned to have cushion for flood moderation during flood periods.

#### 2.4 Fixing the storage capacity, FRL and MDDL of Reservoir

The capacity of the reservoir shall be fixed based on the guidelines given in IS: 5477 (Part-1, 2, 3 and 4) "Fixing the capacity of Reservoirs".

Live storage is the volume of water stored in the reservoir between FRL and MDDL. It can be provided to meet peak power requirement. For the project governed by

Indus water Treaty (IWT), allowable pondage is computed as per the procedure laid down in IWT. However, topological restrictions may restrict allowable pondage.

After the reservoir capacity is determined, the next step would be to fix the FRL/ MDDL. Area / Elevation Curves of the proposed site are used to determine these levels. While fixing the FRL/ MWL, the factors like upper level of domain of the project allotted by the State Government, submergence in reservoir area, tail water level of upstream development, free flow stretch to be left between two projects as per MoEF&CC stipulations, if any, geological constraints in raising dam height etc. are fully taken in to account.

For determining the MDDL, the considerations like siltation of reservoir during the life of the project, water to be drawn directly from the reservoir for the purpose other than generation, live storage to be provided, safe limit of operating heads of the turbines etc. are considered.

The reservoirs are operated in order to achieve the maximum benefits consistent with their physical characteristics and functions for which they are planned and constructed. For actual operation of reservoir or a system of reservoirs, individual regulation schedules are required to be formulated, after considering all critical factors involved.

Reservoir operation studies are carried out in accordance with IS: 7323 – 1994 "Operation of Reservoirs Guidelines". Levels computed in the above studies are refined considering the optimum benefits/ cost analysis.

### Appendix-3

#### Suggestive Measures to Reduce the Tariff of the Project at DPR stage

#### The list of measures suggested to reduce tariff are as follows:

- Reducing Equity component from existing 30% upto 20%.
- Generating Company/ Project Developer may also explore a long-term loan beyond 18 years, thereby re-financing of loan can be utilized at a later stage.
- Generating Company/ Project Developer may explore back loaded tariff option also by keeping levelized tariff same.
- Generating Company/ Project Developer may explore the option of accepting lowering RoE and O&M expenses.
- To reduce IDC cost, upfront equity infusion may be explored.

#### Measures to be adopted to avert flooding of Power House

- 1. Installation of submersible type dewatering pumps of sufficient capacity in the dewatering sump.
- 2. In addition to drainage and dewatering pumps, provision of suitable number of submersible pumps of adequate capacity at MIV floor with provision for automatic starting by means of level switches.
- 3. Location of control panels for dewatering & drainage pumps at a floor higher than that of turbine floor.
- 4. Provision of suitable float switches in the P.H. building on MIV floor to give closing signal to the MIV in the event of inundation of P.H. due to penstock rupture or leakage in penstock or for some other reasons.
- 5. (i) Provision of hoisting individual mechanism for draft tube gate of each unit for quick closing.

(ii) The draft tube gates to be capable of closing under unbalance condition of water pressure.

- 6. Provision of operation and control of surge shaft gates from remote for quick isolation of water conductor system in case of failure of other line of defense / protection.
- 7. In the catchment area of the project, discharge-measuring system may be installed to give advance warning on the occurrence of flood in the river to take action for timely shut down of powerhouse.
- 8. The unit control panels, unit protection panels etc. to be located at the machine hall to the extent possible.
- 9. D.C. Batteries, batteries chargers & D.C. Distribution Boards to be placed at a floor higher than that of machine hall.
- 10. Location of Station Service Transformers and Station Service Board on floor at higher level. Provision of D.G. set connected to Station Service Board capable of operating dewatering pumps in case of failure of supply from other sources.
- 11. The hydro power station may employ quick methods for determination of silt concentration in the water. One simple method for measurement of silt concentration in the river water is to weigh silted water of a given volume and compare with relatively silt free water of same volume and correlation may be established between the difference in weight and silt concentration. With this, approximate silt concentration will be ascertained quickly and decision may be taken for shut down of powerhouse if silt level exceeds the permissible limit.

**Note:** Provisions under para 5(ii) may be reviewed at detailed design stage.

#### Appendix-5

# Key preventive measures for disaster management in case of dam failure or sudden release of water

- 1. Setting-up of an empowered institutional framework for dam safety both at the Central, State and field unit level.
- 2. Preparation of Operation and maintenance manual for each dam;
- 3. Provisions to keep perpetual surveillance; carry out routine and periodic inspections; and monitor the operation and maintenance of the dam;
- 4. Establishment of well-designed hydro-meteorological network and an inflow forecasting system;
- 5. Establishment of an emergency flood warning system for the probable flood affected areas downstream of the dam;
- 6. Comprehensive safety evaluation of each large dam by the independent Dam Safety Review Panel at the specified interval.
- 7. Make available the information relating to maximum anticipated inflows and outflows including flood warning and an adverse impact of the same, if any, on persons and property towards the upstream or downstream of the dam, to the concerned authorities and also make available such information in public domain;
- 8. Preparation of emergency action plan for each dam. In the emergency action plan, set out the procedures to be followed for the protection of persons and property upstream or downstream of the dam in the event of an actual or imminent dam failure or to mitigate the effect of the disaster; identification of the likely catastrophic flood in the event of any failure of the dam, along with probable areas, population, structures and installations likely to be adversely affected due to flood water released from the reservoir; warning procedures, inundation maps and advance preparations for handing efficiently and in the best possible manner the likely adverse situations especially to avoid loss of human life;
- 9. Provision to put the emergency action plan into action as and when conditions arise which are or likely to be hazardous to a dam or potentially hazardous to public safety, infrastructure, other property or the environment.
- 10. Provision that every owner of the specified dam shall, while preparing and updating emergency action plan, undertake a consultation process with all disaster management agencies and other concerned department 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 transparency and allay any unwarranted fear on dam safety issues.
- 11. Provision for proper cooperation by the dam owner to Disaster Management Authorities under the Disaster Management Act, 2005 to meet or mitigate any disaster or emergency arising out of the specified dams.
- 12. Establishment of an Early Warning System (EWS) is required in Hydro Projects for safety of manpower working at the project site as well as downstream population so

that loss of lives and damage to properties can be avoided. Hydro –electric projects are prone to multiple kinds of disasters such as cloudburst, flash floods, Earthquakes, Avalanches, landslides, Glacial Lake Outburst Flood (GLOF), Landslide Lake Outburst Flood (LLOF), rock fall/rock slides etc. These events may result in flash floods in downstream areas claiming numerous lives, damaging Hydro-electric projects and other infrastructure. Early Warning System is a warning system that can be implemented as a chain of information communication systems and comprises of sensors, event detection and decision subsystems for early identification of hazards. They work together to forecast and send the information regarding disturbances providing time for the response system to prepare for the adverse event and to minimize its impact. Early Warning System is to be provided in all upcoming Hydro Projects and its details are to be included in the DPR as per the checklist attached in Annexure-I.

### Annexure-I to Appendix-5

- 1. Name of Project & Installed Capacity:
- 2. Agency:
- 3. Location:
- 4. Latitude and Longitude of Dam & Powerhouse Site :
- 5. Type of the Project (Storage/ RoR (with/ without pondage)) :
- 6. Name of River & Major Tributaries :
- 7. Upstream Project (if any) :
- 8. Downstream Project (if any):
- 9. Type of Powerhouse (Surface/Underground) :
- 10. Type of Project (Dam Toe/With HRT (with length)) :
- 11. Estimated Cost of the EWS Works :

12. Details of Central Control & Command Station for EWS to be established at project site:

- 13. Whether any Hydro Project located in upstream?
- a) Whether real time information to be tied up from the upstream hydro project?
- b) Details of the Communication system

14. Details of G&D Sites/Sensors sites (flow/ level) etc. to be established in the upstream catchment:

- a) Location of each site :
- b) Approximate lead time available from each site:

c) Whether available lead time would be sufficient for safe evacuation of man power?

15. Type & Details of sensors/instruments to be installed in the upstream of the Project

a) Type of the Sensor(s) & its specifications

- b) Details of Power Source planned for the above system & its specifications
- 16. Details of Communication/Telemetry System (GSM/GPRS/ VSAT/Radio/any other) planned between upstream G&D site(s)/ sensors with EWS control room

17. Details of automated warning system of hooters/sirens/colour coded lights to be placed at the project site(s) for man power working at project site and along the run of the river for downstream population

18. Target date of preparation of project specific Standard Operating Procedure (SOP) for established EWS?

- 19. Frequency of Mockdrills to be conducted?
- 20. Emergency Action Plan & Disaster Management plan have to be prepared for the project as stipulated under section 35 (1) of the Dam Safety Act, 202

# Appendix-6(a)

S. No	ITEM	REMARKS
1.	Name of the project	
2.	Location	
	a) State(s)	
	b) District(s)	
	c) Taluka(s)/Tehsil(s)	
	d) Basin	
	e) River	
	t) Longitude/Latitude	
	g) Survey of India Topographical Map reference No.(s)	
	n) Earthquake Zone number	
	I) Complete address for correspondence along with pin	
	Code/ e-mail, FAX, Telephone numbers of Nodal	
2	Officer and Alternate Nodal Officer.	* Voo / No
ა.	Dian If an whether the connective and type of the cohome	res / no
	are same as given in the NEP	
1	Category of the project	*
4.	a) Power Project	
	b) Power Project having reservoir for flood moderation	
	c) Multipurpose Project	
5.	In case of category 4c) above, whether the clearance of	* Yes / No
-	Technical Advisory Committee of Ministry of Jal Shakti is	
	available.	
6.	Mode of formation of the Generating Company in terms of	*
	Clause-2(28) of Electricity Act, 2003.	
7.	Whether the Generating Company is Registered with the	* Yes / No
	Registrar of the Company. Whether Article of Association	
	has Generation as one of the objectives of the Company	
8.	What is the mode of allocation of the scheme whether	*
	through	
	i) MOU route upto 100 MW	
	ii) Lariff based bidding	
	III) MOU route with equity participation of State Govt. If	
	so %age of State Govt. equity	
0	Whether authorization of the Competent Covernment in	* Voo /No
9.	favour of the company to establish operate and maintain	res /ino
	specific Power Station available	
10	Whether land availability Certificate from State	Yes/No
10.	Government available	
11.	Whether State Govt, authorised the company to utilize	Yes/No
	water of that stretch of river.	
12.	Whether power/energy benefits have been estimated on	*Yes /No
• •	the updated hydrological series.	

# Checklist – 1 (To be examined in HPA Division, CEA)

13.	Whether Cost Estimates enclosed Present Day & Completed Cost - For Generating Companies in Central, State, Private and Joint Sectors	*Yes/No
	and For SEBs & State power Utilities	
14.	Financial Analysis/ How the project is going to be financed.	
15.	Whether arrangement for absorption/ dispatch of power made	Yes/ No
16.	Whether arrangements for wheeling/ evacuation of Power made	Yes/ No
17.	Whether any agreement with the transmission company to provide evacuation system made. If so details of the agreement.	Yes/ No
18.	Whether Consent of STU/ State Govt. for availability of off peak power/energy (for pumped storage scheme) is obtained.	Yes/ No
19.	Whether salient features of the Project filled up in the prescribed format.	Yes/ No
20.	Status of CWC /other affected States clearance from inter- state angle, if applicable	*
21.	Status of Defence clearance, if required	
22.	Whether the area is likely to have any Environmental and Ecological problems due to the altered surface water pattern If yes, whether preventive measures have been discussed	Yes /No
23.	Status of MoEF&CC Clearance from Environment/ & Forest angle	
24.	Status of Clearance from Indian Board of Wild-Life	
25.	Status of Clearance under Forest Rights Act from Ministry of Social Justice & Empowerment/ State Government (In case Scheduled Tribe population is affected)	
26.	Whether Rehabilitation and Resettlement Plan from State Revenue Department enclosed.	Yes/No
27	Whether approvals of CEA/ CWC/ GSI/ CSMRS have been obtained and included in the DPR in respect of following aspects -	*
	i). Gen. Layout by HCD Dte., CWC & HE&TD Div., CEA	Yes/No
	ii). Hydrological Aspects by Hydrology Dte., CWC	Yes/No
	iii). Power Potential Aspects by HPA Div. CEA	Yes/No
	iv). Foundation Engg. and Seismic Aspects and GLOF studies (if any) by FE&SA Dte, CWC	Yes/No
	v). Geological Aspects by GSI	Yes/No
	vi). Construction Material Aspects by CSMRS	Yes/No
	vii). Inter-State Aspects by ISM Dte, CWC	Yes/No
	viii). ROR/ Storage Aspects by Standing Technical Committee/ Pondage (as per IWT, if applicable), HP&I Div., CEA	Yes/No
	ix) Design of transmission system upto pooling point by PSPA Div., CEA	Yes/No
	x) Dam/Barrage Design aspects by CMDD/BCD Dte., CWC	Yes/No
	xi) Gates/HM Design aspects by Gates Design Dte., CWC	Yes/No
	xii) Instrumentation aspects by Instrumentation Dte., CWC	Yes/No
	xiii) Hydel Civil Design aspects by HCD Dte., CWC	Yes/No

	xiv) E&M Design aspects by HE&TD Div, CEA	Yes/No
28	International Clearance by MoJS	Yes/No

Note : In case marked 'Yes' in the Check List, attach the supporting document. \* : Must for examination of DPR

#### Appendix-6(b)

### Checklist – 2 (To be examined in CEA/CWC /GSI/ CSMRS/MoJS)

- A. Following chapters/documents should be available in the DPR
- i) Basin Planning
- ii) Power supply position in the State and justification of the scheme from power demand and supply considerations
- iii) Project layout map and drawings
- iv) Hydrology
- v) Power Potential Studies (Considering E-Flows, if applicable)
- vi) Geology
- vii) Construction Material and Geotechnical aspects
- viii) Foundation Engineering and Seismicity aspects
- ix). Inter-State/ International aspects
- x) Design of civil structures
- xi) Design of Electrical & Mechanical equipment
- xii) Power evacuation aspects (Transmission of Power and Communication Facilities (upto Cooling Point)).
- xiii) Estimated cost along with basis of preparation of cost and documentary support
- xiv) Financial analysis
- xv) Environment and ecology
- xvi) Set of drawings giving general layout of the project, civil components, E&M equipment, Single Line switching scheme etc.
- B. Completeness and relevance of material given in the above chapters needs to be checked.

#### Appendix-7

#### No.15/2/2016-H.I(Pt.)(230620) Government of India Ministry of Power \*\*\*

Shram Shakti Bhawan, New Delhi, Dated, the<sup>28</sup> September, 2021

#### OFFICE MEMORANDUM

# Subject: Budgetary Support towards Cost of Enabling Infrastructure, i.e., roads/ bridges - regarding.

1. Ministry of Power (MoP), vide OM no. 15/2/2016-H-I(Pt.)(230620) dated 08.03.2019, notified various measures approved by the Union Cabinet to promote Hydropower in the country. This included budgetary support for Enabling Infrastructure i.e., roads/ bridges for Hydropower projects on case-to-case basis. The basic objective of budgetary support for enabling infrastructure is to reduce tariff of Hydropower projects by ensuring that consumers are charged cost related to power components only. The budgetary support shall be provided for projects starting construction after 08.03.2019, i.e., date of notification. It was also mentioned that the budgetary support would be provided after appraisal/approval of each project by PIB/ CCEA as per the extant rules/due process and would be provided by MoP through its budgetary grants. The limit of this budgetary support for such roads and bridges would be i) Rs. 1.5 crore per MW for projects upto 200 MW and ii) Rs. 1.0 crore per MW for projects above 200 MW.

#### 2. Eligibility for Budgetary Support towards Cost of Enabling Infrastructure

- i. All large Hydropower projects (above 25 MW capacity) 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 works package (Dam/ HRT/ Power House etc.) is issued after 08.03.2019, shall be eligible for budgetary support towards Cost of Enabling Infrastructure.
- ii. All Roads and Bridges required to connect major components like Dam, Power House, Adits, Surge shaft, Pressure Shaft, TRT, etc. of the project to the nearest

State/ National Highway including any strengthening/ widening works shall be considered eligible for budgetary support. However, these roads/ bridges would exclude the works, for which either the Letter of Award have been issued or are currently under implementation by any Central/ State Agency like NHAI, BRO, PWD, SRRDA, RWD, PWD (Roads), REO(Rural Engineering Organisation) etc. or Central Schemes like PMGSY (Pradhan Mantri Gram Sadak Yojna), MGNREGA or State specific schemes like Mukya Mantri Sadak Yojana etc.

- iii. Cost of roads and bridges normally covered under head "R-Communications" in the concurred DPR including the following related costs shall be eligible for release as budgetary support:
  - a. Land acquisition cost
  - b. All statutory taxes/ levies, duties, cess, etc.

The specifications/ requirements like carrying capacity, turning radius, vertical clearance, width and gradient etc. of the roads/ bridges shall be as per concurred DPR.

3. The grant of Budgetary Support for the 'Enabling Infrastructure' shall be in the form of 'Reimbursement' after achievement of milestones mentioned in succeeding paragraphs related to the construction of project.

4. This 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 the Electricity Act 2003 iii) projects developed by agencies like BBMB which do not approach CERC/SERC for tariff determination/ adoption.

#### 5. 'In-principle' approval of Ministry of Power for Grant of Budgetary Support

The procedure for obtaining 'In-principle' approval of Ministry of Power for grant of budgetary support for 'Enabling infrastructure' prior to commencement of construction is given below:

- a. After the DPR is concurred by CEA/ State Govt., the developer shall submit an application for 'in-principle' approval of budgetary support to CEA in the specified format **(Annexure-I)**. For DPRs concurred before the issue of these guidelines, the developer shall submit the updated cost of Enabling Infrastructure (based on indexation issued by CWC) in the application for 'in-principle' approval.
- b. CEA shall examine applications received in consultation with CWC and forward its recommendations in the specified format (Annexure-II) to Ministry of

Power within one month of the end of the quarter in which application is received.

c. Ministry of Power shall issue 'in-principle' approval for Budgetary Support in the specified format (Annexure-III) to the Developer after receiving recommendations from CEA.

The 'in-principle' approval by Ministry of Power would be only for the purpose of facilitating financial closure, etc. of projects from Banks/ FIs and will not create any obligation or commitment on part of Government to provide Budgetary Support subsequently till all the conditions for grant of the same are satisfied.

#### 6. Procedure for Release of Grant towards Budgetary Support

The grant of Budgetary Support for the 'Enabling Infrastructure' shall be provided to the developer in the form of 'Reimbursement' as per the following procedure:

i. After achievement of 25% financial progress w. r. t. approved / original project cost, the Developer shall submit the application in the specified format **(Annexure-IV)** to CEA for Reimbursement of Budgetary Support towards Enabling Infrastructure.

ii. The developer shall submit a Bank Guarantee in specified format **(Annexure-V)** to the CEA for an amount equivalent to eligible Budgetary Support (or the Support requested whichever is less) with validity period up to the date of determination of tariff by the regulatory commission. Ministry of Power may encash the Bank Guarantee, in part or full, upon the recommendation of CEA, in cases where (a) the project is delayed by more than two years beyond the scheduled commissioning date excluding any delays attributable to force majeure conditions and (b) in cases where the funds are found being used/ diverted for works 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.

iii. The developer shall submit verification records viz., auditor's certificate, selfcertification, etc. along with the application as specified in para 6 (i) above in support of his claim for release of Grant.

iv CEA shall examine the applications received during each quarter in consultation with CWC and forward its recommendations in the given format **(Annexure-VI)** to Ministry of Power within one month of end of each quarter.

v On receiving recommendation from CEA, Ministry of Power shall process and obtain the approval of the competent authority for grant as per delegation of powers and General Financial Rules issued by Ministry of Finance, GoI which would be released through budgetary Provisions of Ministry of Power.

vi The Grant shall be limited to the amount as per "In-Principle' approval or the actual expenditure incurred on Enabling Infrastructure whichever is lower under the overall ceilings mentioned in para 1 above.

7. The physical progress of the enabling infrastructure works of each of the projects shall be monitored by a Monitoring Committee to be constituted by CEA and a Status Report, in this regard, shall be submitted to MoP on quarterly basis.

8. By 15<sup>th</sup> July of every year, the CEA shall send Estimates for Annual Budgetary Grants for the next financial year to Ministry of Power. These budgetary estimates would be based on projects scheduled for completion of milestone, as specified in para 6 above, during the next year.

9. A Report on the 'In-principle' approvals granted and Budgetary Support released during the year shall be sent by CEA to Ministry of Power every year by 31<sup>st</sup> May.

10. If ownership of the project changes before the commissioning of the project, MoP and CEA would be duly informed within three (03) months of such change.

11. This issues with the approval of Hon'ble Minister for Power.

(Raghuraj Rajendran) Joint Secretary

To:

- 1. Principal Secretary/Secretary (Power / Energy), State Governments/UTs.
- 2. Secretary, CERC/FOR, Chanderlok Building, Janpath, New Delhi
- 3. Secretary, State Electricity Regulatory Commissions/Joint Electricity Regulatory Commissions

Copy to:

- 1. Secretary, MNRE, CGO Complex, New Delhi
- 2. Secretary, Ministry of Jal Shakti
- 3. Chairperson, CEA, Sewa Bhawan, RK Puram, New Delhi
- 4. Chairperson, CWC, RK Puram, New Delhi

#### Annexure - I

Application for In-principle approval of budgetary support of Enabling Infrastructure works of Hydropower Projects from Ministry of Power

To,

Central Electricity Authority Sewa Bhawan, Sector-1, R K Puram, New Delhi - 110066.

Sir,

In terms of OM no. 15/2/2016-H.I(Pt.)(230620) dated 28 /09/2021, it is requested to grant "in-principle approval" for budgetary support for cost of enabling infrastructure for \_\_\_\_\_\_ project of \_\_\_\_\_ MW as per details below:

S.	Particulars of the Project	Description
No.		Description
1	Name of the Developer	
2	Date of Implementation Agreement between State Govt. & Developer	
3	Date of DPR Concurrence (TEC Letter enclosed)	
4	Salient features of the project (details enclosed)	
5	Date of award of 1 <sup>st</sup> major civil work (if project construction has started)	
6	Estimated Cost of project as per TEC in Rs	
7	Estimated Cost of Enabling Infrastructure as per TEC (in Rs.)	
8	Amount Claimed for Enabling Infrastructure (in Rs.) as per CWC Indexation	
9	Justification of the proposal (Justification regarding length of road required and existing status of roads in the project area)	
10	Status of clearances:	
	Environmental Clearance, Forest Clearances – I & II from MoEF&CC	
	Wildlife clearance by National Board of Wildlife	
	State Govt. approval for State Sector projects	
	Clearance from MoWR, RD&GR for International aspects	
	Defence Clearance from Ministry of Defence (if required)	

	Clearance from Ministry of Tribal Welfare	(if requir	ed)			1	
11	Timeline of activities of enabling infrastructure works						
	Description		I				
		Y1	Y2	Y3	Y4		(Yn)
	Letter of Award, signing of Contract &					_	
	Mobilization						
	Details of Enabling Infrastructure Works						
	1		2				
	2						

#### We hereby certify and agree as follows:

- a. Information given above is correct as per records maintained for the purpose.
- b. No proposal for approval has been submitted to CEA for the scheme in past.
- c. Work to be carried out under the above project is as per the sanctioned scheme and is in line with Technical Standards / Guidelines issued by CEA or any other such Authority.
- d. The BG is liable to be encashed by the CEA , in part or full, in case of delay in completion of works by the developer by more than two years excluding the delay attributable to force majeure conditions and if fund is found being used/ diverted for works other than that related to enabling infrastructure or if the project gets abandoned.
- e. The amount provided by Ministry of Power as budgetary support for Enabling Infrastructure shall not be claimed as tariff.

Date.....

Signature:....

Name:....

Seal: .....

(Authorized Representative)
# Appendix to Annexure-I

# Certificate by MoRTH/ State/ Local Body (as applicable)

# To Whomsoever it may concern

Ref. No.:

Date:

1.	
2.	
3.	
-	
-	
n.	

> Signature: Name: (Authorized Signatory)

<u> Annexure - II</u>

# Recommendation of CEA to Ministry of Power for 'In-principle' approval of budgetary support for Enabling Infrastructure works

	(to be filled by CEA)						
	Project Proposal No.						
S. No.	Particulars of the Project				Des	criptio	
1	Name of the Developer						
2	Capacity of the project (in MW)		2				
3	Date of DPR Concurrence						_
4	Salient features of the project (details enclo	sed)					
5	Date of award of 1 <sup>st</sup> major civil work (i started)	f proj	ect co	nstruct	ion has		
6	Estimated Cost of project as per TEC in Rs						
7	Estimated Cost of Enabling Infrastructure as	per T	EC (in	Rs.)			
8	Amount Claimed for Enabling Infrastructure (in Rs.) as per CWC Indexation						
9	Justification of the proposal						
10	Status of clearances:						
	Environmental Clearance, Forest Clearances – I & II from MoEF&CC						
	Wildlife clearance by National Board of Wildl	ife					
	State Govt. approval for State Sector projects						
	Clearance from MoWR, RD&GR for International aspects						
	Defence Clearance from Ministry of Defence (if required)						
	Clearance from Ministry of Tribal Welfare (if required)						
11	Timeline of activities of enabling infras	tructu	ire wo	rks			
	Description Year to Year.			L			
a.		Y1	Y2	Y3	Y4		(Yn)
	Letter of Award, signing of Contract & Mobilization						

	Details of Enabling Infrastructure Marke	1 1	а г	-1	Ē.	
	1					
	2					
				2		
	Recommendation of CEA along with reason	s therefor?				-
		1 1				_
-						

Signature of the Competent Authority (CEA)

# Certificate by HPM Division, CEA To Whomsoever it may concern

### Ref. No.:

#### Date:

This is to certify that M/s ......have achieved physical/ financial progress of enabling infrastructure works being in line with the scheduled timelines as per Format- .... under these guidelines.

This certificate is issued without prejudices to the rights vested in this Division.

Signature: Name: (Authorized Signatory)

### Annexure - III

# In-principle approval for Budgetary Support to Enabling Infrastructure

Τo,

Sir,

Please refer to your application no.\_\_\_\_\_ dated \_\_\_\_\_to CEA seeking in-principle approval for budgetary support of cost of enabling infrastructure of Rs. \_\_\_\_\_ on the basis of cost concurred in the DPR of \_\_\_\_\_\_ project of \_\_\_\_ MW.

In this, regard, in-principle approval is hereby accorded for Budgetary Support of Rs. for Enabling Infrastructure works, as recommended by the CEA and as per guidelines issued by Ministry of Power vide OM no. 15/2/2016-H.I(Pt.)(230620) dated & /09/2021 and in terms of OM no. 15/2/2016-H.I(Pt.)(230620) dated 08.03.2019.

This in-principle approval is only for purpose of facilitating financial closure, etc. of projects and will not create any obligation or commitment on part of government to provide budgetary support till all the conditions are satisfied. The funds shall be released only after the project is commissioned and tariff petition (including cost of enabling infrastructure) is approved by CERC/ SERC.

### **Terms and Conditions:**

- a. Enabling Infrastructure works proposed for funding from Ministry of Power shall not be posed for funding under any other scheme of the Government of India.
- b. The developer shall submit Project Status Report to CEA on quarterly basis. CEA would take half-yearly meeting to review progress of enabling infrastructure works.
- c. If there is change in ownership before the projects is commissioned, MoP and CEA would be duly informed within three (03) months.
- d. All other terms and conditions of OM no 15/2/2016-H.I(Pt.)(230620) dated 28/09/2021 shall apply.

Date:

Signature: Name: (Authorized Representative)

# <u> Annexure - IV</u>

# Application for Release of budgetary support for Enabling Infrastructure works

To,

CEA, Sewa Bhawan, Sector-1, R K Puram, New Delhi -66.

### Sir,

In terms of OM no.15/2/2016-H.I(Pt.)(230620) dated 2& /09/2021, it is requested to reimburse the cost of enabling infrastructure i.e., roads/ bridges for \_\_\_\_\_\_ project of \_\_\_\_\_ MW as per details below:

S. No.	Particulars of the Project	Description
1	Name of the Developer	
2	Date of Implementation Agreement between State Govt. & Developer	
3	Date of DPR Concurrence (TEC Letter enclosed)	
4	Salient features of the project (details enclosed)	
5	Justification of the proposal (Justification regarding length of road required and existing status of roads in the project area)	-
6	Details of enabling infrastructure works completed (Length of road, etc.)	1
7	Date of award of 1 <sup>st</sup> major civil work (details enclosed)	
8	Estimated Cost of Project as per TEC in Rs	
9	Estimated Cost of Enabling Infrastructure works as per TEC (in Rs.)	
10	Date of in principle approval (if applicable) for budgetary support for enabling infrastructure works and amount approved (details enclosed)	
11	Date of achievement of 25% financial progress w.r.t. approved project cost for reimbursement of expenditure incurred (enclose details auditor's certificate, self-certification, etc.)	e

12	Details of Bank Guarantee (Amount in Rs. Crore, Validity Period, etc.)	
13	Details of bank account to which funds are to be transferred (details enclosed)	

We hereby certify that the information given above is correct as per records maintained for the purpose.

Date.....

Signature:....

Name:..... Seal: .....

(Authorized Representative)

### Annexure-V

### Format for Bank Guarantee

(To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution.)

In consideration of the ----- [Insert name of the Developer/Project Company] (hereinafter referred to as 'Developer') (which expression shall unless repugnant to the context or meaning thereof include its executers, administrators, successors and assignees) submitting the application for release of grant under budgetary support for Enabling Infrastructure i.e., roads/ bridges for Hydro Electric Projects from Ministry of Power (hereinafter referred to as 'Guidelines') for the Project of the capacity of .......... MW, at ............[Insert name of the place] and as per the terms of the 'Guidelines', the [insert name & address of bank] hereby agrees unequivocally, irrevocably and unconditionally to pay to Ministry of Power at [Insert Name of the Place from the address of the Ministry of Power] forthwith on demand in writing from Ministry of Power or any Officer authorized by it in this behalf, any amount up to and not exceeding Rupees------ [Insert name of the Developer / Project Company]

This Guarantee shall be valid and binding on this Bank up to and including...........[insert date i.e. upto the date of determination of tariff by the regulatory commission] and shall not be terminable by notice or any change in the constitution of the Bank or the term of contract or by any other reasons whatsoever and our liability hereunder shall not be impaired or discharged by any extension of time or variations or alternations made, given, or agreed with or without our knowledge or consent, by or between parties to the respective agreement.

Our liability under this Guarantee is restricted to Rs. -----only.

Our Guarantee shall remain in force until......[insert date] Ministry of Power shall be entitled to invoke this Guarantee till .......[insert date]

The Guarantor Bank hereby agrees and acknowledges that Ministry of Power shall have a right to invoke this BANK GUARANTEE in part or in full, as it may deem fit.

The Guarantor Bank hereby expressly agrees that it shall not require any proof in addition to the written demand by Ministry of Power, made in any format, raised at the above mentioned address of the Guarantor Bank, in order to make the said payment to Ministry of Power.

The Guarantor Bank shall make payment hereunder on first demand without restriction or conditions and notwithstanding any objection by ------[Insert name of the Developer / Project Company] and/or any other person. The Guarantor Bank shall not require Ministry of Power to justify the invocation of this BANK GUARANTEE, nor shall the Guarantor Bank have any recourse against Ministry of Power in respect of any payment made hereunder.

This BANK GUARANTEE shall be interpreted in accordance with the laws of India and the courts at Delhi shall have exclusive jurisdiction.

The Guarantor Bank represents that this BANK GUARANTEE has been established in such form and with such content that it is fully enforceable in accordance with its terms as against the Guarantor Bank in the manner provided herein.

This BANK GUARANTEE shall not be affected in any manner by reason of merger, amalgamation, restructuring or any other change in the constitution of the Guarantor Bank.

This BANK GUARANTEE shall be a primary obligation of the Guarantor Bank and accordingly Ministry of Power shall not be obliged before enforcing this BANK GUARANTEE to take any action in any court or arbitral proceedings against the Developer / Project Company, to make any claim against or any demand on the Developer / Project Company or to give any notice to the Developer / Project Company or to enforce any security held by Ministry of Power or to exercise, levy or enforce any distress, diligence or other process against the Developer / Project Company.

The Guarantor Bank acknowledges that this BANK GUARANTEE is not personal to Ministry of Power and may be assigned, in whole or in part, (whether absolutely or by way of security) by Ministry of Power to any entity to whom Ministry of Power is entitled to assign its rights and obligations under these 'Guidelines'.

Notwithstanding anything-contained herein above, our liability under this guarantee is restricted to Rs. ...... only and it shall remain in force till .....

We are liable to pay the Guarantee amount or any part thereof under this Bank guarantee only if Ministry of Power serves upon us a written claim or demand.

Signature	E-mail ID of the bank:
Name	1
Power of Attorney No	Banker's Stamp and Full Address.
For	
[Insert Name of the Bank]	Dated thisday of, 20
Witness:	Witness:

1. ..... Signature Name and Address Witness: 2. ..... Signature Name and Address

Notes:

The Stamp Paper should be in the name of the Executing Bank and of appropriate value. The Performance Bank guarantee shall be executed by any of the Nationalised or leading Private Sector Banks.

### <u> Annexure – VI</u>

# Recommendation of CEA for release of budgetary support for enabling infrastructure works

	(to be filled by CEA)	
ect Pro	roposal Number:	
0.	Particulars of the Project	Description
Nam	me of the Developer	
Date Deve	te of Implementation Agreement between State Govt. & veloper	
Date	te of DPR Concurrence (TEC Letter enclosed)	
Salie	lient features of the project (details enclosed)	
Justi requ	stification of the proposal (Justification regarding length of road quired and existing status of roads in the project area)	
Deta etc.)	tails of enabling infrastructure works completed (Length of road, :.)	
Date	te of award of 1 <sup>st</sup> major civil work (details enclosed)	
Estin	imated Cost of Project as per TEC in Rs	
Estin	imated Cost of Enabling Infrastructure works as per TEC (in Rs.)	
Date for e enclo	te of in principle approval (if applicable) for budgetary support enabling infrastructure works and amount approved (details closed)	
Date	te of commissioning of project (details enclosed)	
Date proje	te of achievement of 25% financial progress w.r.t. approved iject cost for reimbursement of expenditure incurred.	a.
Deta etc.)	tails of Bank Guarantee (Amount in Rs. Crore, Validity Period, .)	
Deta (deta	tails of bank account to which funds are to be transferred stails enclosed)	
etc.) Deta (deta nmenda	.) tails of bank account to which funds are to be transferred etails enclosed) adation of CEA along with reasons therefor?	a

Signature of the Competent Authority (CEA) Name: Stamp:

### No.15/2/2016-H.I(Pt.)(260640) Government of India Ministry of Power \*\*\*

# Shram Shakti Bhawan, New Delhi, Dated : 28<sup>th</sup> January, 2022

### **OFFICE MEMORANDUM**

# Subject: Budgetary Support towards Cost of Enabling Infrastructure, i.e., roads/ bridges - regarding.

The undersigned is directed to refer to this Ministry's O.M. of even number dated: 28/09/2021 (**copy enclosed**) on the subject mentioned above and to partially modify the guidelines as given below:-

SI. No.	Para in O.M. referred to above	To be read as
1	<b>Para 2(ii):</b> All roads and bridges required to connect major components like Dam, Power House, Adits, Surge Shaft, Pressure Shaft, TRT etc of the project to the nearest State/ National Highway including any strengthening/ widening works shall be considered eligible for budgetary support. However, these roads/bridges would exclude the works, for which either the Letter of Award have been issued or are 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 PMSGY (Pradhan Mantri Gram Sadak Yojana), MGNREGA or State specific schemes like Mukya Mantri Sadak Yojana etc.	All <b>permanent</b> roads and bridges required to connect major components like Dam, Power House, Adits, Surge Shaft, Pressure Shaft, TRT etc of the project to the nearest State/ National Highway including any strengthening/ widening works shall be considered eligible for budgetary support. However, these roads/bridges would exclude the works, for which either the Letter of Award have been issued or are 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 PMSGY (Pradhan Mantri Gram Sadak Yojana), MGNREGA or State specific schemes like Mukya Mantri Sadak Yojana etc.
2	<b>Para –3:</b> The grant of budgetary support shall be in the form of 'Reimbursement' after achievement of milestones mentioned in the succeeding paragraphs related to construction of project	The grant of budgetary support shall be in the form of 'Reimbursement' <u>after</u> <u>complete construction of a defined</u> <u>part/ full length of the eligible road /</u> <u>bridge</u> and achievement of milestones mentioned in the succeeding paragraphs related to construction of project

Contd..P/2

3	<b>Para-3 of Annexure-III:</b> This in- principle approval is only for purpose of facilitating financial closure, etc. of projects and will not create any obligation or commitment on part of government to provide budgetary support till all the conditions are	This in-principle approval is only for the purpose of facilitating financial closure, etc. of projects and will not create any obligation or commitment on part of government to provide budgetary support till all the conditions are satisfied. The funds shall be released <u>in the form of</u> 'Reimbursement' after complete
	only after the project is commissioned and tariff petition (including cost of enabling infrastructure) is approved by CERC/ SERC.	eligible roads and complete construction of bridge/bridges and achieving of 25% financial progress w.r.t approved/original project cost.
4	Certificate attached in page no.12 of O.M. dated: 28/09/2021	Certificate attached in page no.12 of O.M. dated: 28/09/2021 shall now be Appendix to Annexure-VI.

-2-

2. This issues with the approval of Hon'ble Minister for Power.

(Raghuraj Rajendran)

2144

493

Joint Secretary (Hydro)

To:

- 1. Principal Secretary/Secretary (Power/Energy), State Governments/UTs.
- 2. Secretary, CERC/FOR, Chanderlok Building, Janpath, New Delhi
- 3. Secretary, State Electricity Regulatory Commissions/Joint Electricity **Regulatory Commissions**

### Copy to:

- 1. Secretary, MNRE, CGO Complex, New Delhi
- 2. Secretary, Ministry of Jal Shakti
- 3. Chairperson, CEA, Sewa Bhawan, RK Puram, New Delhi
- 4. Chairperson, CWC, RK Puram, New Delhi

Copy also for information to:

- 1. PS to Hon'ble Minister of Power/ Ps to Hon'ble Minister of State for Power.
- 2. Sr. PPS to Secretary (Power)/ Sr.PPS to AS&FA/ PPS to AS(Hydro)/ PPS to JS(Hydro)
- 3. PPS/Ps to All Joint Secretaries/Directors/Deputy Secretaries in the Ministry of Power.

### No.15/2/2016-H.I(Pt.)(260640) Government of India Ministry of Power \*\*\*

Shram Shakti Bhawan, New Delhi Dated, the 15<sup>th</sup> February, 2023

### OFFICE MEMORANDUM

Subject: Budgetary Support towards Cost of Enabling Infrastructure, i.e., Roads/ Bridges - Revision of regarding.

The undersigned is directed to refer to this Ministry's O.M. of even number dated 28/09/2021 and modifications dated 28/01/2022 (copy enclosed) on the subject mentioned above and to partially modify the OM dated 28/01/2022, as given below:-

To be read as
<ul> <li>SI.No2: The grant of budgetary support shall be in the form of 'Reimbursement' after achievement of 25% financial progress w.r.t. approved/original project cost as under: <ol> <li>Grant of budgetary support for a defined part/ full length of eligible roads shall be reimbursed in two stages:</li> <li>First Stage - After operationalization of Motorable road (construction of kachha/ unpaved road)</li> <li>Second Stage- After black-topping/ metalling/ finishing works of defined part/ full length of eligible roads.</li> </ol> </li> <li>Further, the cost of repair &amp; maintenance works of roads between above mentioned stages is not eligible for budgetary support towards cost of enabling infrastructure.</li> <li>Grant of budgetary support for eligible bridges shall be reimbursed only after complete construction of the bridge.</li> </ul>

2. SI.No3: (Para -3 of Annexure-III) This in-principle approval is only for purpose of facilitating financial closure, etc. of projects and will not create any obligation or commitment on part of government to provide budgetary support till all the conditions are satisfied. The funds shall be released in the form of 'Reimbursement' after complete construction of a part/full length of eligible roads and complete construction of bridge/bridges and achieving of 25% financial progress w.r.t approved/original project cost.	<ul> <li>SI.No3: (Para -3 of Annexure-III):</li> <li>This in-principle approval is only for the purpose of facilitating financial closure, etc. of projects and will not create any obligation or commitment on the part of Government to provide budgetary support, till all the conditions are satisfied. The funds shall be in the form of 'Reimbursement' after achievement of 25% financial progress w.r.t. approved/original project cost as under: <ol> <li>Grant of budgetary support for a defined part/ full length of eligible roads shall be reimbursed in two stages:</li> <li>First Stage – After operationalization of Motorable road (construction of kachha/ unpaved road).</li> <li>Second Stage- After black-topping/ metalling/ finishing works.</li> </ol> </li> <li>Grant of budgetary support for eligible bridges shall be reimbursed only after complete construction of the bridge.</li> </ul>
--	--

2. This issues with the approval of Hon'ble Minister for Power & NRE.

(Afzal Mohammad

(Afzal Mohammad) Joint Secretary (Hydro)

To:

- 1. Principal Secretary/ Secretary (Power/Energy), State Governments/UTs
- 2. Secretary, CERC/FOR, Chanderlok Building, Janpath, New Delhi
- 3. Secretary, State Electricity Regulatory Commissions/Joint Electricity Regulatory Commissions

### Copy to:

- 1. Secretary, MNRE, CGO Complex, New Delhi
- 2. Secretary, Ministry of Jal Shakti
- 3. Chairperson, CEA, Sewa Bhawan, RK Puram, New Delhi
- 4. Chairperson, CWC, RK Puram, New Delhi

Copy also for information to:

- 1. PS to Hon'ble Minister of Power/ Ps to Hon'ble Minister of State for Power.
- Sr. PPS to Secretary (Power)/ Sr.PPS to AS&FA/ PPS to AS(Hydro)/ PPS to JS(Hydro)
- PPS/ Ps to All Joint Secretaries/ Directors/ Deputy Secretaries in the Ministry of Power

#### No.15/2/2016-H-I(Pt.) (230620) Government of India Ministry of Power \*\*\*

### Shram Shakti Bhawan, New Delhi, Dated, the 26. September, 2021

### OFFICE MEMORANDUM

# Subject: Budgetary Support for Flood Moderation/Storage Hydro Electric Projects (HEPs) - regarding.

Ministry of Power (MoP), vide OM no. 15/2/2016-H-I(Pt.) (230620) dated 08.03.2019, notified various measures approved by the Union Cabinet to promote Hydropower in the country. This included budgetary support for Flood Moderation component for Storage Hydropower projects to be set up in future. The basic objective of budgetary support for Flood Moderation component is to reduce tariff of Hydropower projects by ensuring that consumers are charged cost related to power components only. The value of flood moderation will be worked by technical agencies, viz., CWC, etc. in accordance with the guidelines. The amount required for flood moderation/ storage costs shall be released, through Ministry of Power budgetary provisions after appraisal of each project, on a case-to-case basis, by Public Investment Board (PIB)/ Cabinet Committee on Economic Affairs (CCEA) as per due process.

2. One of the important objectives is to promote ease of doing business i.e. devising a mechanism without duplication of checking and evaluation by multiple agencies. Accordingly, Central Electricity Authority (CEA) and the CWC shall verify the claims of Developer and recommend expenditure to be reimbursed to MoP for release of funds to the Developer. The Designated Independent Agency (DIA) of CERC/SERC would approve the final project cost/ flood moderation cost at the time of filing of tariff petition by the Developer.

# 3. Eligibility for Budgetary Support for Flood Moderation component

i. Eligible projects shall mean All Central, State and Private Sector storage hydro projects (above 25 MW capacity) having explicit Flood Moderation component which have been concurred either by CEA or the State Government and wherein Letter of Award (LoA) for any major works has been issued or is being issued on competitive bidding basis after the date of notification of above mentioned OM dated 08.03.2019. This is applicable to all eligible projects which shall be taken up for construction by 31st March, 2030.

- ii. Flood Moderation works shall comprise Dam & appurtenant works and other related activities and their respective joint cost would be apportioned. The eligible expenditure shall also include the following:
  - a. Interest During Construction (IDC) and any variation in cost with respect to originally sanctioned amount,
  - b. Land acquisition cost for flood moderation,
  - c. All statutory taxes/levies, duties, cess, entry tax, etc., including any variation thereof.
- iii. Any expenditure, which is not directly related to Flood Moderation works shall be counted as ineligible expenditure. Further, any enhancement of the expenditure on land acquisition after the commissioning of the project shall be treated as ineligible expenditure.
- iv. This 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 the Electricity Act 2003 iii) projects developed by agencies like BBMB which do not approach CERC/SERC for tariff determination/ adoption.

# 4. Ceiling Limit for Reimbursement of Expenditure Incurred

i. There is no normative ceiling limit for reimbursement of expenditure incurred on Flood Moderation. However, the reimbursement of the cost of Flood Moderation component to the Developers shall be limited to the total cost of Flood Moderation component of as per 'In-principle' approval issued by Ministry of Power, on case-to-case basis, based on recommendation of CEA/ CWC as mentioned in succeeding para 5. However, if the awarded cost is less than the estimated cost as per approval then the flood moderation component will be calculated based on the awarded cost. The expenditure on flood moderation works incurred by the developer beyond the expenditure approved by CEA/ CWC, otherwise found admissible by CERC/SERC, shall be charged to the Project and recovered through tariff.

# 5. Methods for estimation of Flood Moderation component

- i The cost towards flood moderation works would be worked out as the least of the apportioned costs arrived out using the following methods:
- a. Bearability Concept
- b. Use of facilities Method
- c. Equal apportionment method

ii. The joint cost to be apportioned shall comprise cost of Dam & appurtenant works incl. Spillway and Outlet works etc., cost of land acquisition and any other related activities. The inputs used in the above cost apportionment methods, as decided by CWC/ CEA, shall be final and binding on Project Proponent.

### 6. 'In-principle' approval of Ministry of Power for Grant of Budgetary Support

The hydro projects costing more than Rs. 1000 Crores are presently being concurred by CEA while projects costing upto Rs. 1000 Crores are concurred by State Governments. The complete technical and financial details on Flood Moderation component shall be incorporated in the Detailed Project Report (DPR) for concurrence either by CEA or the State Government, as applicable, and the Flood Component cost would be estimated as under:

- i. For the DPRs already concurred prior to the issuance of this OM, the cost of Flood Moderation component of Storage hydro projects would be updated by the developer based on indexation which shall be appraised/ vetted by CEA in consultation with CWC in accordance with the extant guidelines.
- ii. For the DPRs concurred after the issuance of this OM, the DPR shall include a chapter indicating technical and financial provisions for Flood Moderation along with a comparison between 'with' and 'without' scenarios of Flood Moderation supported by proper justification. The same shall be appraised/ vetted by CEA in consultation with CWC at the time of DPR concurrence/ appraisal in accordance with the extant guidelines.
- iii. A cost benefit analysis for arriving at the economically viable height of storage Dam by optimizing flood cushion during Monsoon and minimizing cost of energy generation would be incorporated by the Developer in the DPR.
- iv. The application for 'In-principle' approval of funds shall be submitted by the Developer to Nodal Agency (CEA) at least six months prior to the date of start of construction (Zero Date) in prescribed format (Annexure-I). The Zero Date of construction for purpose of this OM shall be the date of Letter of Award for Dam works.
- v. CEA shall examine the applications received in each quarter and forward its recommendations (Annexure-II) to Ministry of Power within one (01) month of the end of each quarter.
- vi. Ministry of Power shall issue 'in-principle' approval for budgetary support in the specified format **(Annexure-III)** to the Developer after receiving recommendations from CEA. This 'in-principle' approval is only for purpose of facilitating financial closure, etc. of projects and will not create any obligation or commitment on part of government to provide budgetary support subsequently till all the conditions for grant of budgetary are satisfied.

# 7. Procedure for Grant of the Budgetary Support through Reimbursement

i. The total cost of Flood Moderation component shall be reimbursed to the developer in five equal instalments during the construction based on achievement of milestones relating to dam height above Bed Level (H) as under:

~			INSTALMENT					
		1	2	3	4	5		
Actual Height above Level	Dam (H) Bed	10% of H	25% of H	40% of H	70% of H	100% of H		

**Note:** The Reimbursement shall be limited to actual expenditure if it is less than the instalment due.

ii. The application for reimbursement of expenditure incurred on Flood Moderation works shall be submitted by the project developer as per **(Annexure-IV)**.

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

iv. CEA shall examine the applications received during the quarter and forward its recommendations **(Annexure-V)** to Ministry of Power within one month after end of each quarter.

v. On receiving recommendation from CEA, Ministry of Power shall process and obtain the approval of the competent authority for grant as per delegation of powers and General Financial Rules issued by Ministry of Finance, GoI which would be released through budgetary Provisions of Ministry of Power.

8. If ownership of the project changes before the commissioning of the project, MoP and CEA would be duly informed within three (03) months of such change.

9. CEA shall constitute a Monitoring Committee to monitor the physical progress of the Flood Moderation works. The developer shall submit progress report on quarterly basis to Monitoring Committee for its review which shall be sent to MOP each quarter. An Annual Report of the 'In-principle' approvals granted and Budgetary Support released during the year shall also be compiled by CEA and sent to Ministry of Power. 10. By 15<sup>th</sup> July of every year, the CEA shall send Annual Budgetary Estimates for the next financial year to Ministry of Power. The budgetary estimates would be based on projects scheduled for achievement of Dam height milestones in the next year.

11. This issues with the approval of Hon'ble Minister of Power.

(Raghuraj Rajendran) Joint Secretary

To:

- 1. Principal Secretary/Secretary (Power / Energy), State Governments/UTs.
- 2. Secretary, CERC/FOR, Chanderlok Building, Janpath, New Delhi
- 3. Secretary, State Electricity Regulatory Commissions/Joint Electricity Regulatory Commissions

### Copy to:

- 1. Secretary, MNRE, CGO Complex, New Delhi
- 2. Secretary, Jal Shakti
- 3. Chairperson, CEA, Sewa Bhawan, RK Puram, New Delhi
- 4. Chairperson, CWC, RK Puram, New Delhi

Copy also for information to:

- 1. All Joint Secretaries/EA, Ministry of Power
- 2. PS to Hon'ble Minister of Power/ PS to Hon'ble Minister of State for Power.
- 3. Sr. PPS to Secretary (Power)/ Sr.PPS to AS&FA/ Sr.PPS to AS(Hydro)/PPS to JS(Hydro).

#### Annexure-I

Application for 'In-principle' approval of funding of Cost of Flood Moderation of Storage Hydro Electric Projects from Ministry of Power

To,

CEA

Sewa Bhawan, Sector-1, R K Puram, New Delhi 110066.

Sir,

In terms of OM no. 15/2/2016-H.I(Pt.)(230620) dated 08.03.2019 and subsequent OM no. 15/2/2016-H.I(Pt.)(230620) dated: 2.8 /09/2021, it is requested to grant "in-principle approval" for budgetary support towards cost of flood moderation for \_\_\_\_\_\_ project of \_\_\_\_\_ MW as per details below:

Sr.	Particulars of the Project	Description
No.		Description
1.	Name of the Developer	
2.	Date of Implementation Agreement between State Govt. &	
	Developer	
3.	Date of Concurrence of DPR (TEC letter enclosed)	22
4.	Salient features of the Project (details enclosed)	
5.	Total Updated Project Cost Estimate as per TEC in Rs.	
6.	The total amount (updated, based on indexation)	
	corresponding to Flood Moderation component in Rs	
7.	Zero Date of Start of Pre-construction works	
8.	Zero Date of Start of Construction	
19.	LoA for Dams Works	
10.	Target Date for completion of River Diversion Works.	
11.	Status of Clearances:	
	Environmental Clearance, Forest Clearances – I & II from MoEF&CC	G
	Wildlife clearance by National Board of Wildlife	
	State Govt. approval for State Sector projects	
	Clearance from MoWR, RD&GR for International aspects	
	Defence Clearance from Ministry of Defence (if required)	
	Clearance from Ministry of Tribal Welfare (if required)	
	PIB/CCEA Approval for Govt. funded/ Central Sector	
	Projects and State Approval for State funded projects	
	Ministry of Home Affairs Clearance for participation of	
	foreign companies in tenders for work packages of	120
	Hydroelectric Projects in sensitive areas.	
12.	Timeline of activities of Flood Moderation works	

Description		Year to Year											
lottor of August discipation of Contract of August	Y1	Y2	Y3	Y4		(Yn)							
Letter of Award, signing of Contract & Mobilization													
Details of Flood Moderation Works 1 2													
						0							

# We hereby certify and agree as follows:

- a. The information given as above is correct as per records maintained for the purpose.
- b. No proposals have been submitted to CEA for approval/vetting for this scheme in the past.
- c. The work to be carried out under the above project is as per the sanctioned scheme and is in line with relevant Standards / Guidelines issued by CEA/CWC etc. or any other such Authority.
- d. The BG is liable to be encashed by the CEA , in part or full, in case of delay in completion of works by the developer by more than two years excluding the delay attributable to force majeure conditions and if fund is found being used for works other than those related to flood moderation or if the Project gets abandoned.
- e. No tariff shall be claimed for the cost of flood moderation to the extent funded/ reimbursed under the Scheme by Ministry of Power.

Date.....

Signature:....

Name:....

Seal:....

(Authorized Representative)

### Annexure-II

# Recommendation of CEA to Ministry of Power for `In-principle' approval of budgetary support for Flood Moderation

	(to be filled by CEA)														
	Project Proposal No.														
Sr. No.	Particulars of the Project	Des	Description												
1.	Name of the Developer														
2.	Date of Implementation Agreement between State Developer	Govt.	&												
3.	Date of Concurrence of DPR (TEC letter enclosed)			12											
4.	Salient features of the Project (details enclosed)														
5. 6.	<ul> <li>Total Updated Project Cost Estimate as per TEC in Rs.</li> <li>The total amount (updated, based on indexation) corresponding to Flood Moderation component in Rs.</li> </ul>														
7.	Zero Date of Start of Pre-construction works														
8.	Zero Date of Start of Construction														
19.	LoA for Dams Works				_										
10.	Target Date for completion of River Diversion Works	5.		_											
11.	Status of Clearances:		1												
	Environmental Clearance, Forest Clearances – I & MoEF&CC	m		4											
	Wildlife clearance by National Board of Wildlife														
	State Govt. approval for State Sector projects														
	Clearance from MoWR, RD&GR for International asp														
	Defence Clearance from Ministry of Defence (if requ														
	Clearance from Ministry of Tribal Welfare (if required	d)													
	PIB/CCEA Approval for Govt. funded/ Central Projects and State Approval for State funded project	or													
	Ministry of Home Affairs Clearance for participa foreign companies in tenders for work packa Hydroelectric Projects in sensitive areas.	tion ges	of of												
12.	Timeline of activities of Flood Moderation wor	ks													
	Description		Year	r to	Yea	r									
		Y1	Y2	Y3	Y4		(Yn)								
	Letter of Award, signing of Contract & Mobilization			18											
	Details of Flood Moderation Works 1														
leco hero	ommendation of CEA along with reasons efor?				199 <del>7 - 1</del> 997	L									

Signature of Competent Authority (CEA) Signature : Name:

#### Annexure-III

# In-principle approval for Budgetary Support to Flood Moderation/Storage Hydro Electric Projects

Τo,

Sir,

Please refer to your application no.\_\_\_\_\_ dated \_\_\_\_\_to CEA seeking in-principle approval for budgetary support of cost of Flood Moderation of Rs. \_\_\_\_\_ on the basis of cost concurred in the DPR of \_\_\_\_\_ project of \_\_\_\_ MW.

In this, regard, in-principle approval is hereby accorded for Budgetary Support of Rs. \_\_\_\_\_ for Flood Moderation works, as recommended by the CEA and as per OM issued by Ministry of Power vide OM no. 15/2/2016-H.I(Pt.)(230620) dated 2% /09/2021 and in terms of OM no. 15/2/2016-H.I(Pt.)(230620) dated 08.03.2019.

This in-principle approval is only for purpose of facilitating financial closure, etc. of projects and will not create any obligation or commitment on part of government to provide budgetary support till all the conditions are satisfied.

#### **Terms and Conditions**

- a. Flood Moderation component works proposed for funding from Ministry of Power shall not be posed for funding under any other scheme of the Government of India.
- b. The developer shall submit Project Status Report to CEA on quarterly basis. CEA would take half-yearly meeting to review progress of flood moderation works. CEA would take periodic review on half-yearly basis of the project progress.
- c. In the event of change in ownership of the project before the commissioning of the project, MoP and CEA would be duly informed within three (03) months of such change in ownership.
- d. All other terms and conditions of OM no. 15/2/2016-H.I(Pt.)(230620) dated \$\mathcal{B}\$ /09/2021 shall apply.

Date:

Signature: Name: (Authorized Representative)

### Annexure-IV

# Application for Reimbursement of expenditure incurred during Financial Year (yyyy-yy) towards Cost of Flood Moderation of Storage Hydro Electric **Projects from Ministry of Power**

Project Proposal Number ..... Date of Submission .....

To,

CEA. Sewa Bhawan, Sector-1, R K Puram, New Delhi -110066.

### Sir.

In terms of OM no. 15/2/2016-H.I(Pt.)(230620) dated 08.03.2019 and subsequent OM no. 15/2/2016-H.I(Pt.)(230620) dated 28 /09/2021, it is requested to reimburse the cost of flood moderation for \_\_\_\_\_\_project of \_\_\_\_\_ MW as per details below:

- a. Total Cost for Flood Moderation as per CWC/ CEA concurrence/approval in Rs.....(enclose details)
- b. Percentage of Dam Height achieved:.....
- c. The amount of expenditure incurred on Flood Moderation during this Financial Year (yyyy-yy) for achievement of milestones of Dam height (in Rs.) ......(enclose details viz., Self Certification, Auditor's Certificate, etc.)
- d. 'In-principle' approval of funding for Flood Moderation component from Ministry of Power (enclose copy)
- e. Authorized Representative and Bank Account to which the funds are to be transferred (enclose details)

# 2. We hereby certify and agree as follows:

- a. The information given as above is correct as per records maintained for the purpose.
- b. No proposals have been submitted to Nodal Agency for recommendation of reimbursement of expenditure incurred during this Financial Year (yyyy-yy) for approval/vetting in the past.
- c. We also undertake that reimbursement of the expenditure incurred on account of Flood Modeartion shall be first utilized for repayment of any outstanding loan amount, whatsoever, to the Banks/ Financing Institutions and thereafter, balance amount if any, may be appropriated by us as deemed fit.

Date.....

Signature:.... Name:.... Seal: ..... (Authorized Representative)

### Annexure-V

# Recommendation of the CEA to MoP

# for reimbursement of funds to Developer

	(to be filled by CEA)	
	Project Proposal No.	
Sr. No.	Particulars of the Project	Description
1.	Name of the Developer	
2.	Date of Implementation Agreement between State Govt. & Developer	
3.	Date of Concurrence of DPR (TEC letter enclosed)	
4.	Salient features of the Project (details enclosed)	
5.	Total Updated Project Cost Estimate as per TEC in Rs.	
6.	The total amount (updated, based on indexation) corresponding to Flood Moderation component in Rs	
7.	Zero Date of Start of Pre-construction works	
8.	Zero Date of Start of Construction	
19.	LoA for Dams Works	
10.	Target Date for completion of River Diversion Works.	
11.	Total Cost for Flood Moderation as per CWC/ CEA concurrence/approval in Rs. (details enclosed)	7
12.	Percentage of Dam Height achieved:	
13.	Cost of Flood Moderation proportionate to height of Dam in Rs.	
14.	Details of bank account to which funds are to be	

Signature of the Competent Authority (CEA)

Signature: Name: Stamp:

# Certificate by HPM Division, CEA

# To Whomsoever it may concern

### Ref.No.:

Date:

This is to certify that M/s ......have achieved physical/ financial progress of enabling infrastructure works being in line with the scheduled timelines as per Format- .... under these Enabling .

This certificate is issued without prejudices to the rights vested in this Division.

Signature: Name:

1

(Authorized Signatory)

### Annexure-VI

#### Format for Bank Guarantee

(To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution.)

In consideration of the ----- [Insert name of the Developer/Project Company] (hereinafter referred to as 'Developer') (which expression shall unless repugnant to the context or meaning thereof include its executers, administrators, successors and assignees) submitting the application for release of grant under budgetary support for Flood Moderation in Hydro Electric Projects from Ministry of Power (hereinafter referred to as 'Guidelines') for the Project of the capacity of ...........[Insert name of the place] and as per the terms of the 'Guidelines', the [insert name & address of bank] hereby agrees unequivocally, irrevocably and unconditionally to pay to Ministry of Power at [Insert Name of the Place from the address of the Ministry of Power] forthwith on demand in writing from Ministry of Power or any Officer authorized by it in this behalf, any amount up to and not exceeding Rupees------ [Total Value equivalent to installment eligible under Budgetary Support] only, on behalf of M/s --------[Insert name of the Developer / Project Company]

This Guarantee shall be valid and binding on this Bank up to and including..........[insert date i.e. upto the date of determination of tariff by the regulatory commission] and shall not be terminable by notice or any change in the constitution of the Bank or the term of contract or by any other reasons whatsoever and our liability hereunder shall not be impaired or discharged by any extension of time or variations or alternations made, given, or agreed with or without our knowledge or consent, by or between parties to the respective agreement.

Our liability under this Guarantee is restricted to Rs. -----only.

Our Guarantee shall remain in force until......[insert date] Ministry of Power shall be entitled to invoke this Guarantee till .......[insert date]

The Guarantor Bank hereby agrees and acknowledges that Ministry of Power shall have a right to invoke this BANK GUARANTEE in part or in full, as it may deem fit.

The Guarantor Bank hereby expressly agrees that it shall not require any proof in addition to the written demand by Ministry of Power, made in any format, raised at the above mentioned address of the Guarantor Bank, in order to make the said payment to Ministry of Power.

The Guarantor Bank shall make payment hereunder on first demand without restriction or conditions and notwithstanding any objection by ------[Insert name of the Developer / Project Company] and/or any other person. The Guarantor Bank shall not require Ministry of Power to justify the invocation of this BANK GUARANTEE, nor shall the Guarantor Bank have any recourse against Ministry of Power in respect of any payment made hereunder.

This BANK GUARANTEE shall be interpreted in accordance with the laws of India and the courts at Delhi shall have exclusive jurisdiction.

The Guarantor Bank represents that this BANK GUARANTEE has been established in such form and with such content that it is fully enforceable in accordance with its terms as against the Guarantor Bank in the manner provided herein.

This BANK GUARANTEE shall not be affected in any manner by reason of merger, amalgamation, restructuring or any other change in the constitution of the Guarantor Bank.

This BANK GUARANTEE shall be a primary obligation of the Guarantor Bank and accordingly Ministry of Power shall not be obliged before enforcing this BANK GUARANTEE to take any action in any court or arbitral proceedings against the Developer / Project Company, to make any claim against or any demand on the Developer / Project Company or to give any notice to the Developer / Project Company or to enforce any security held by Ministry of Power or to exercise, levy or enforce any distress, diligence or other process against the Developer / Project Company.

The Guarantor Bank acknowledges that this BANK GUARANTEE is not personal to Ministry of Power and may be assigned, in whole or in part, (whether absolutely or by way of security) by Ministry of Power to any entity to whom Ministry of Power is entitled to assign its rights and obligations under these 'Guidelines'.

Notwithstanding anything contained herein above, our liability under this guarantee is restricted to Rs. ...... only and it shall remain in force till .....

We are liable to pay the Guarantee amount or any part thereof under this Bank Guarantee only if Ministry of Power serves upon us a written claim or demand.

Signature	E-mail ID of the bank:
Name	
Power of Attorney No	Banker's Stamp and Full Address.
For	
[Insert Name of the Bank]	Dated thisday of, 20
Witness:	Witness:

1. ..... Signature Name and Address

2	Signature
Name and Address	

Notes:

The Stamp Paper should be in the name of the Executing Bank and of appropriate value.

The Performance Bank guarantee shall be executed by any of the Nationalised or leading Private Sector Banks.

Plate-1

# PREPARATION OF DETAILED PROJECT REPORT of HYDRO ELECTRIC SCHEMES (TYPICAL BAR CHART SHOWING DIFFERENT ACTIVITIES TO BE CARIED OUT BY PROJECT AUTHORITY FOR PREPARATION OF DPR) MONTHS 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 0 MOU/MOA WITH STATE GOVERNMENT 1 NOC FROM STATE FOREST DEPARTMENT 2 HYDROLOGICAL STUDIES (a) Setting up Gauge & Discharge Site (b) Hydrological Data Collection (c) Preliminary assessment of water availability (d) Preliminary assessment of Design Flood Estimation (e) Submission of Hydrological report (f) Preliminary assessment of Power Potential (g) Submission of Power Potential Studies (h) E&M Sizing & Finalization of Layout (i) Transmission System (upto pooling point) 3 GEOLOGICAL INVESTIGATIONS (a) Topographic survey & surface mapping (For Dam & PH) (b) Discussion with CEA, CWC, CSMRS & GSI for investigation, Desk Studies & Identification of Alternatives (c) Complete survey, Geophysical investigation, Drilling, Drifting etc. Phase-I (d) Discussion with CEA, CWC, CSMRS & GSI to finalize investigations (e) Final investigation Phase-II (f) Submission of geological Reports 4 SUBMISSION OF HYDEL CIVIL LAYOUT & BROAD SALIENT FEATURES 5 INDUS BASIN SPECIFIC STUDIES 6 SEISMICITY AND FIELD INVESTIGATIONS REPORT SUBMISSION (a) Submission of Report/Proposal for Site Specific Seismic Design Parameters. 7 CONSTRUCTION MATERIAL INVESTIGATIONS (a) Construction material Survey & Investigations- Phase-I (b) Construction material Testing & Rock Testing - Phase-I (c) Construction material Survey & Investigations - Phase-II (d) Construction material Testing & Rock Testing - Phase-II (e) Submission of Material Testing Reports

Plate-1

# PREPARATION OF DETAILED PROJECT REPORT of HYDRO ELECTRIC SCHEMES (TYPICAL BAR CHART SHOWING DIFFERENT ACTIVITIES TO BE CARIED OUT BY PROJECT AUTHORITY FOR PREPARATION OF DPR) MONTHS 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 8 SUBMISSION OF MoJS & INTER STATE RELATED MATTERS 1 9 Discussion with CEA, CWC, CSMRS & GSI to finalize layout 10 SUBMISSION OF DESIGN OFTRANSMISSION SYSTEM (UP TO POOLING POINT) 11 SUBMISSION OF DESGIN OF E&M WORKS 12 SUBMISSION OF DESIGN OF INTAKE, DESILTING, WATER CONDUCTOR SYSTEM, SURGE ARRANGMENTS, POWER HOUSE, TAIL RACE CHANNEL SUBMISSION OF DESIGN OF DAM/ BARRAGE/ EMBANKMENT/ OTHER APPERTUNENT 13 STRUCTURES 14 SUBMISSION OF GATES & HM ASPECTS 15 SUBMISSION OF INSTRUMENTATION ASPECTS 16 PREPAATION OF DPR

Plate-1 (Contd.)

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	MONTHS	1	2	3	4	3	6	1	8	9	10	11	12	13	14	15	16	17	1	5 19	19	20	21	22	23	24 2	5 25	2	2
1	(a) Finalization of hydrological parameters (design flood, diversion flood, sedimentation)																			- 2								1	
_	(b) Water availability Finalization									_						=			t		+		1				+	t	+
2	ROR/STORAGE CLEARANCE FROM STC (CEA & CWC)									_				-	+		I	-	ŧ	+	+	+	1	_		-	+	t	+
3	POWER POTENTIAL STUDIES CLEARANCE BY CEA																				+								
4	GEOLOGY CLEARANCE BY GSI				E										+		1	-	t		+	+	+		_	1	+	+	+
5	CONSTRUCTION MATERIAL CLEARANCE BY CSMRS				T					_					+		Т		t		+		П			T	+	1	+
6	FINALIZATION OF HYDEL CIVIL LAYOUT AND BROAD SALIENT FEATURES																Ι		t										
7	SEISMICITY AND FIELD INVESTIGATIONS CLEARANCE BY CWC							_		_					+	+			t			-				_	+	t	+
8	INTER STATE MATTERS CLEARANCE BY CWC									_					+	+			t		+			_			+	ŧ	+
9	DESIGN OFTRANSMISSION SYSTEM (UP TO POOLING POINT) CLEARANCE BY CEA																		İ										
10	DESGIN OF E&M WORKS CLERANCE BY CEA							_		3	5				+	+	4		+		+		4					-	+
11	DESIGN OF INTAKE, DESILTING, WATER CONDUCTOR SYSTEM, SURGE ARRANGMENTS, POWER HOUSE, TAIL RACE CHANNEL CLEARANCE BY CWC	6	ò							2015	×														8)	1			
12	DESIGN OF DAM/ BARRAGE/ EMBANKMENT/ OTHER APPERTUNENT STRUCTURES CLEARANCE BY CWC																							_					
13	GATES & HM CLERANCE BY CWC												_		+	+			t		+			_	-				
14	INSTRUMENTATION CLERANCE BY CWC	-	-		-					-			-	-	+	+	-	-	+	-	+	-	-	-	-	-	-	+	+

Note : Consultation by project developers with CEA, CWC, GSI and CSMRS in 4th,16th and 24th months for framing/ finalization of Power planning aspects, Geological aspects, Construction material aspects and Hydel Civil Layout and broad sallent features.

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Plate-2

