

- 2.7 In line with above mentioned requirements, Directorate of Energy (DOE), GoHP on 14.06.2017 vide its letter no. HPDOE/CE (Energy)/Chanju-I HEP/2017-2206-2213 stipulated consolidated requirement of free power to be delivered by the Project. Following table summarises the requirement of free power requirement of the Project. The said letter is annexed with the petition.

Table 2: Percentage of deliverable energy to be provided to GoHP by the Project

Time band	Free Power to be provided as per Policy of GoHP	Free power to be provided for increase in capacity	Free power to be provided on account of LADF	Total free power to be provided
First 12 years	12%	0.43%	1%	13.43%
Next 18 years	18%	0.43%	1%	19.43%
Last 10 years	30%	0.43%	1%	31.43%

### Saleable Design Energy

- 2.8 Although, the free power to be provided GoHP ranges from 13.43% to 31.43% over the life of the projects, it is submitted that in accordance to National Tariff Policy, 2016, Saleable Design Energy of the Chanju-I HEP, based on which the tariff shall be computed, is being arrived at after deducting the auxiliary consumption and 13% free power (12% on account of royalty and 1% on account of LADA) to GoHP.
- 2.9 In accordance with section 37 (6) (a) (ii), auxiliary consumption for Chanju-I HEP which is surface hydro generation station with static excitation system, is, 1%.
- 2.10 The computation of saleable design energy is provided in the table below:

Table 3: Saleable design energy (in MU) of Chanju-I HEP

Sl. No.	Particulars	01.06.2018 to 31.03.2019	2019-20	2020-21	2021-22	2022-23	2023-24	...	01.04.2053 to 31.05.2053
1.	Design Energy (MU)	132.73	157.84	157.84	157.84	157.84	157.84	...	25.11
2.	Less: Aux. Consumption (1%)	1.33	1.58	1.58	1.58	1.58	1.58	...	0.25
3.	Net Energy after Aux. consumption	131.40	156.26	156.26	156.26	156.26	156.26	...	24.86
4.	Less: Free Power to GoHP (13%)	17.08	20.31	20.31	20.31	20.31	20.31	...	3.23
5.	Saleable Design Energy (MU)	114.32	135.95	135.95	135.95	135.95	135.95	...	21.63

## Evacuation of power

- 2.11 In order to facilitate evacuation of power, the Petitioner has constructed about 6 km long 132 kV double circuit transmission line from the Chanju-I substation to the LILO point of 132 kV Kurthala Bathri double circuit transmission line of H.P. Power Transmission Corporation Limited at Nakrod.
- 2.12 Further, the 132 kV single circuit Bathri Jassure transmission line is linked to the 132/220 kV substation at Jassure of STU's.
- 2.13 The interconnection agreement between the H.P. Power Transmission Corporation Limited, IA Energy and the Himachal Pradesh State Electricity Board was signed on 08.10.2015 and the same are annexed.

### 3. Capital Cost of the Project

- 3.1 The Unit-II of the Project achieved COD as on 18.02.2017 followed by Unit-I on 23.02.2017 and Unit-III on 26.07.2017. Letters from DOE, GoHP declaring CODs is annexed with the petition.
- 3.2 The final project cost upon completion (3<sup>rd</sup> COD on 26.07.2017) was Rs.630.64 Crore. The major heads of capital expenditure are enumerated below:

Table 4: Capital cost of the project as on respective CODs (in Rs. Crore)

Sl. No.	Particulars	As on 1st COD	As on 2nd COD	As on 3rd COD
1	Land – Freehold	1.91	1.91	0.77
2	Site development	0.00	0.00	1.15
3	Land – Leasehold	10.38	10.38	10.38
4	Roads And Bridges	12.57	12.57	12.57
5	Buildings	3.10	3.10	3.10
6	Hydraulic Works (Dams, Water Conductor system, Hydro mechanical gates, tunnels)	319.98	319.98	327.59
7	Hydro Mechanical Equipment	28.76	28.76	28.91
8	Generating Plant And Machinery	38.77	56.80	74.48
9	Civil Construction power house	135.17	135.17	135.47
10	Plant & Machinery - Transmission Line	13.19	13.19	13.19
11	Plant And Machinery - Others	18.38	18.38	17.48
12	Water Supply System/Drainage And Sewerage	0.02	0.02	0.02
13	Electrical Installations	3.76	3.76	3.71
14	Vehicles - Four Vehicle	0.98	0.98	0.98
15	Vehicles - Heavy Vehicle	0.59	0.59	0.29
16	Furniture And Fixture	0.10	0.10	0.10
17	Computers	0.19	0.19	0.19
18	Office Equipment	0.24	0.24	0.25

19	<b>Total Capital Cost</b>	<b>588.11</b>	<b>606.14</b>	<b>630.64</b>
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- 3.3 The auditor certificate in support of the capital cost as on COD is annexed with the petition.
- 3.4 The Project was conceived with a SCOD on 22.01.2015, 42 months from the award of the first civil work on 23.07.2011. The plant achieved COD on 26.07.2017. The initial project cost was envisaged as Rs. 295.09 Crores at the time of award of contracts. The completion cost of the project at the time of COD was Rs. 630.64 Crores.
- 3.5 The Petitioner submits that the delay in project implementation and increase in project cost is due to various Force Majeure events beyond the control of the Petitioner, as described in the following paragraphs.
- 3.6 This Detailed Project Report for the Project was submitted to the GoHP in July 2008. As per the DPR, the construction of the infrastructure and on main project components was scheduled to start in May 2009 and October 2009 respectively and the project was planned to be commissioned in December 2012.
- 3.7 Although the DPR was submitted to the approving authority on 04.07.2008 but the approval was accorded only in April 2010. Further, the environmental clearance and forest land diversion were applied before the concerned authorities in February 2008 and May 2009 respectively, but these clearances were accorded after 2-3 years in April 2011 and June 2011, respectively.
- 3.8 It is to be brought to kind notice of the Hon'ble Commission that while there was delay in obtaining requisite clearances and approval which was uncontrollable, once all the clearances was received by July, 2011, the civil contract was awarded in that month itself (on 23.07.2011). Therefore, Petitioner has acted promptly in order to contain any further delay in project implementation.
- 3.9 During the construction phase too, many uncontrollable geological and weather related factors caused further time overrun which is described here.
- 3.10 The excavation of Barrage complex and Intake was started during February 2012 and it continued in next working season. In the month of February, 2013 there was unprecedented heavy rains in the project area. During the first week of April 2013 when the excavation of barrage and intake area was nearing completion, a massive landslide was triggered on the right bank. Huge quantum of slide debris was accumulated on the barrage foundation area, which also buried the Intakes. To further progress on these structures it became necessary not only remove the slide debris but also re-designing of slope stability measures.
- 3.11 Since the landslide washed the excavated road near the Intake and Barrage axis area away, the road had to be made up by backfilling the concrete or concrete cladding.
- 3.12 As the excavation above the Power House area progressed, thickness of overburden was found to be much more than anticipated. In view of presence of bedrock at deeper

depth, design changes were made to realign the Head Race Tunnel (HRT) and convert surface penstock into the underground vertical and horizontal pressure shaft.

- 3.13 The over breaks in the underground works were estimated to be 5% of the actual tunnel excavation quantity during DPR stage. However during actual tunnelling, huge over breaks were found because of varied geological condition. The following are the reasons attributable to the increase in percentage of over break: (a) Poor rock conditions in comparison to estimation during DPR were encountered; (b) unfavourable orientation of geological structure than as anticipated in the DPR; (c) many Shear seams were encountered during excavation which was not envisaged during the DPR; and (d) many wedge failure or rock failure were recorded resulting in more over break. Further, during the excavation of underground works it was felt that for convenience of construction, the size of the construction adits were required to be increased to facilitate faster construction. These factors not only resulted in additional quantity of underground excavation but also required higher rock supports than anticipated/designed. The over break voids were required to be back filled with concrete.
- 3.14 In month of March 2013, heavy rainfall in the project area caused failure of the excavated back slope of the surface Power House pit. Failure of the back slope caused the slope material and overburden material resting above it to slide into the Power House pit. Carrying out further excavation work in the pit was difficult without further treatment of the slope. Therefore, stability analysis has to be carried out to undertake the slope stabilization work in the powerhouse complex. This resulted into slight adjustment in the layout of Power House, switchyard and tailrace.
- 3.15 Due to the existence of firm rock at deeper depth than anticipated, comparatively heavier retaining structure in the switch yard portion were also required and accordingly had to be re-designed.
- 3.16 As per the DPR, the Head Race Tunnel was aligned flat and proposed to be opened after a length of approximately 1,216 meter after which the valve chamber was proposed. The tail end portion of the underground tunnel was proposed to be steel lined in a length of about 190 meter. An Open Penstock of 2.3m diameter for a length of 124 meter and 2-meter diameter for a length of 21 meter along the hill was proposed after which it was proposed to trifurcate and reduce to 1.2 meter diameter in a length of about 78m. However, the Petitioner has changed to underground Penstock having diameter 2.3 M, length including Y piece junction 1 & 2 is 140.40 M, unit penstock diameter is remain same and length of penstock is 32.3 M, 28.5 M & 38.98 M.
- 3.17 However, when the construction of tunnel from the outlet portal area before proposed valve chamber was started, the rock could not be intercepted even going inside to the extent of 30-40 meter. Thus, as per the consultant's advice seismic refraction test was conducted to ascertain the depth of availability of rock. This test ruled out encountering of rock even up to a depth of about 150 meter. Technical consultant thus suggested realigning the tunnel at a much lower level by providing two shafts to locate them in rock with sufficient rock cover after studying the exposure of the rock in this area.
- 3.18 Due to increase of head at this realigned patch of Head Race Tunnel and relocating of valve chamber at more than double the distance envisaged earlier, the design

considerations required more than 692 meter of tunnel up to the location of the valve chamber to be steel lined. This proposal required extra 498.24 MT of steel.

- 3.19 Further, after commissioning of the two units on 18.02.2017 and 23.02.2017 respectively, the Petitioner was fully prepared for the commissioning of the third unit, but the same could not be achieved, as there was no capacity of the transmission system to evacuate incremental power from the third unit. Officials of Himachal Pradesh State Electricity Board (HPSEB) and H.P. Power Transmission Corporation Limited (HPPTCL) were fully aware of the situation and it was only on 18.07.2017 that HPPTCL allowed testing of the third unit when other two units were shut down. Without any delay on part of the Petitioner, testing was carried out and third unit as well as the Project was commissioned on 25.07.2017, within eight days of obtaining clearance from HPPTCL. The Petitioner would like to highlight that this delay was not on account for the Petitioner and had there been adequate capacity in the transmission system of HPPTCL, the Project could have been commissioned by end of February 2017.
- 3.20 It is to be noted here that the initial delays in getting various clearance and subsequent delay in project construction, because of uncontrollable and force majeure reasons like geological surprises, landslides, change in Tunnelling Methodology, jet grouting, additional work in power house and Barrage area, additional slope stabilization in surge shaft area, change in alignment of pressure shaft, extremely poor geology encountered in the Head race Tunnel etc, not only resulted in time overrun but cost overrun as well, because of following reasons:
- a) Increase in cost of civil works due to geological surprises during excavation above Power House, re-designing of Penstock, realignment of Head Race Tunnel (HRT), slope stabilization works, and removal of debris because of landslide.
  - b) Increase in the material cost due to increase in cement and steel quantities owing to accommodates changed due to unexpected geology, change in design, re-construction of road and other components which got washed away in heavy rain.
  - c) Increase in cost of Electro-Mechanical and Hydro-Mechanical works due to contract escalation owing to increase in completion period of the project.
  - d) Increase in labour charges owing to increase in completion period of the project.
  - e) Increase in Interest during construction (IDC), Incidental Expenditure during Construction (IEDC) owing to increase in completion period of the project.
- 3.21 It is submitted to the Hon'ble Commission that the reasons for delay in project implementation were due to uncontrollable parameters over which the Petitioner had no control. In fact more or less all hydropower projects faces similar challenges and therefore, cost and time overrun owing to geological surprises and adverse weather conditions are not unprecedented in the country.
- 3.22 Realizing that the delay in the project commissioning is due to uncontrollable factor, DoE, GoHP vide its letter No. HPDOE/CE (Energy)/Chanju-I/2018-6004-95 ( as per

annexed) has condoned the delay of 25 months and 29 days against actual delay of 31 months and 14 days. Accordingly, the revised Scheduled Commercial Operation Date (SCOD) is set on 10.02.2017. This revised SCOD is very close to the actual COD of the second unit achieved on 18.02.2017. The Petitioner has further represented to the DOE, GoHP that the delay between COD of second unit on 18.02.2017 to the plant COD of 26.07.2017 is entirely because of lack of evacuation capacity on part of HPPTCL. The Petitioner, therefore, expects that the remaining period of delay will also be condoned by DOE, GoHP in view of the delay being on account of uncontrollable factor.

3.23 Accordingly, the petitioner requests the Hon'ble Commission to approve the capital cost and the various components as detailed in this section.

#### **4. Annual Fixed Charges for the PPA Tenure**

4.1 Regulation 15.3 of the HERC Tariff Regulations 2012 has prescribed that the annual fixed cost (AFC) of a hydro generation company consists of the following elements:

- i. Return on Equity
- ii. Interest and financing charges on loan capital
- iii. Interest on working capital
- iv. Depreciation
- v. Operations and Maintenance expenses
- vi. Foreign exchange rate variation, if any
- vii. All statutory levies and taxes, if any, excluding taxes on income

##### **Additional capitalization for the period FY 2018-19 and FY 2019-20**

4.2 Regulation 18.5.1 of the HERC Tariff Regulations 2012 states that:

*"The Commission may consider allowing, subject to prudence check, any additional capital expenditure incurred or projected to be incurred, after the commercial operation date of a project and up to the cutoff date, on the following provided the same was part of the original scope of work of the project: capital expenditure, in respect of existing generating station or the transmission system including communication system, incurred or projected to be incurred on the following counts after the cut-off date, may be admitted by the Commission, subject to prudence check:*

- (i) Deferred liabilities without any carrying cost;*
- (ii) Works deferred for execution without any escalation;*
- (iii) Procurement of initial capital spares in the original scope of work without any escalation, subject to ceiling specified above;*
- (iv) Foreign exchange rate variation;*
- (v) Liabilities to meet award of arbitration provided that it is not on account of any fault of the generation company or the licensee, as the case may be;*
- (vi) Liabilities on account of compliance of the order or decree of a court;*
- (vii) Liabilities on account of change in law:*

*Provided that details of the works included in the original scope of work along with estimates of expenditure, un-discharged liabilities and works deferred for execution*

shall be submitted along with the application for determination of tariff after the date of commercial operation of the project;

- 4.3 The Petitioner has planned additional capitalisation across freehold land, building, civil work, hydraulic works, plant & machinery, and office equipment. Details for the same are furnished below:

Table 5 Additional Capitalization (in Rs Cr)

Sl. No.	Particulars	2017-18 (post 3rd COD)	2018-19	2019-20
1	Land – Freehold	0.01		
2	Land – Leasehold			
3	Roads And Bridges		1.00	1.00
4	Buildings		1.50	1.50
5	Hydraulic Works (Dams, Water Conductor system, Hydro mechanical gates, tunnels)	1.52	1.00	1.00
6	Hydro Mechanical Equipment		0.50	0.50
7	Generating Plant And Machinery		0.50	0.50
8	Civil Construction power house			
9	Plant & Machinery - Transmission Line			
10	Plant And Machinery - Others	0.21	0.50	0.50
11	Water Supply System/Drainage And Sewerage			
12	Electrical Installations			
13	Vehicles - Four Vehicle			
14	Vehicles - Heavy Vehicle			
15	Furniture And Fixture	0.0021		
16	Computers			
17	Office Equipment	0.01		
18	Total Additional Capitalization	1.76	5.00	5.00

## Capitalization

- 4.4 Capital expenditure, undischarged liabilities and capitalization of capital expenditure is summarised in the following table.

Table 6: Capital expenditure, undischarged liabilities and capitalization (in Rs Cr)

S. No.	Particulars	18-Feb-17 to 22-Feb-17	23-Feb-17 to 31-Mar-17	01-Apr-17 to 25-Jul-17	26-Jul-17 to 31-Mar-18	01-Apr-18 to 31-May-18
1	O/B of Capital Expenditure	588.11	606.14	613.12	630.64	629.57
2	Addition	18.02	7.13	19.79	1.75	0.001
3	Deletion	0.00	-0.15	-2.27	-2.81	-0.39
4	C/B of Capital Expenditure	606.14	613.12	630.64	629.57	629.18
5	Undischarged liability	27.67	25.14	15.62	12.36	11.34
6	Capitalized cost	578.47	587.98	615.02	617.21	617.84

S. No.	Particulars	01-Jun-18 to 31-Mar-19	2019-20	2020-21	...	01-Apr-53 to 31-May-53
1	O/B of Capital Expenditure	629.18	634.18	639.18	...	639.18
2	Addition	5.00	5.00	0.00	...	0.00
3	Deletion	0.00	0.00	0.00	...	0.00
4	C/B of Capital Expenditure	634.18	639.18	639.18	...	639.18
5	Undischarged liability	6.84	0.00	0.00	...	0.00
6	Capitalized cost	627.34	639.18	639.18	...	639.18

### Debt and Equity funding of the Hydro Generation Project

- 4.5 Regulation 19.2 of the HERC Tariff Regulations 2012 states:

*“New projects - For new projects commissioned or whose capacity is expanded on or after 1st April 2012:*

- (a) *A Normative debt-equity ratio of 70:30 shall be considered for the purpose of determination of Tariff;*
- (b) *In case the actual equity employed is in excess of 30%, the amount of equity for the purpose of tariff determination shall be limited to 30%, and the balance amount shall be considered as normative loan;*
- (c) *In case the actual equity employed is less than 30%, then the actual debt-equity ratio, subject to lower limit as per company law, shall be considered;*
- (d) *The premium, if any, raised by the generating company or the licensee while issuing share capital and investment of internal accruals created out of free reserve, shall also be reckoned as paid up capital for the purpose of computing return on equity subject to the normative debt equity ratio of 70:30, provided such premium amount and internal*