Executive Summary – Case No 63 of 2021

1 Overview

This document intends to give overview of the Petition filed by the Mahati Hydro Power Veer Project Private Limited (MHPVPPL), (hereinafter referred to as "Petitioner"), before the Hon'ble Maharashtra Electricity Regulatory Commission (MERC) for the determination of Project Specific Tariff for Veer Hydro Electric Project (Veer HEP) of installed capacity 9 MW (2 x 4.5 MW). The said project intends to restore the abandoned hydropower potential of 9 MW by Renovation and Modernisation (R & M) of the Veer HEP which has overlived after giving services for about 45 years. The power generated, during the extended life of the powerplant after R & M is proposed to be sold to the Distribution Licensee (MSEDCL). Hence, the Petitioner has approached this Hon'ble Commission to seek determination of Project specific tariff for its Project, for sale of electricity generated to the Distribution Licensee MSEDCL.

The said petition has been filed as per Regulation 9.1 (c), 10.2 of MERC RE Tariff Regulations, 2019, Section62 (1)(a) and 86(1)(e) of the Electricity Act, 2003 read with the powers of this Hon'ble Commission to remove difficulties and relax as contained in Regulations 74 and 77 of the said Regulations in respect of Veer Hydro Electric Project (2 x 4.5 MW) filed for determination of Project Specific Tariff.

2 Project Details

Veer HEP is in Krishna Valley, situated near village Wathar colony of Taluka Khandala, District Satara. It is approximately 70 km from Pune. It is a dam foot powerhouse located on the Right bank, of Veer dam across the river Nira.

In Nira system, there exist two reservoirs, one at Bhatghar on river Yelwandi, having live storage capacity of 665.57 MCM and another on downstream side of river Nira at Veer having live storage capacity of 212.22 MCM, constructed primarily for the irrigation.
The rainfall in the catchment of Nira system of reservoirs is assured. In the ghat area of the catchment, rainfall is of the order of 100 to 250 inches (250 to 650 mm) which further tapers to 20 inches (50 mm) on eastern side.

Veer dam was completed in 1965 and Bhatghar dam was completed in British era in 1927. Bhatghar dam has no canals. Water from the Bhatghar dam, after power generation, through its dam foot powerhouse (1x16 MW), is released into the river Nira and is stored on downstream side, in Veer dam. The canals of Nira system, Nira Right Bank Canal (NRBC) and Nira Left Bank Canal (NLBC) originate from Veer dam.

Subsequently, in 1975, Hydro Electric Powerhouse, on the Right Bank of Veer dam, (the powerhouse under consideration) was commissioned to harness the hydropower potential of the site. The water to be released for the purpose of irrigation is routed through this powerhouse. Thus, the water release schedules are planned primarily, for the irrigation requirements and the power generation is incidental. However, the water availability in Nira system is assured. Further, the water Releases from Bhatghar & Veer dams are being managed in co-ordinated manner.

As per the project planning, season wise irrigation requirements of the Nira system are as under.

- Rabi : 470.2 MCM
- Hot Weather : 283.2 MCM
- Kharif : 512.6 MCM.

In view of harnessing the available hydropower potential optimally, 2 Nos. of 4.5 MW Vertical Kaplan turbines are provided. As per the original project planning, the water required for both Nira Right Bank Canal (NRBC) and Nira Left Bank Canal (NLBC) was being routed through the powerhouse located at the right bank and after power generation water requirement of NLBC was transferred to NLBC through an aqueduct constructed across river Nira.

Subsequently, the discharge requirement of NLBC increased and the capacity of aqueduct was found inadequate to cope up the increased discharge requirements of NLBC. The additional water required for NLBC was being released through irrigation outlet on left bank. This was causing generation loss. Hence, it was found prudent to GOMWRD to have an independent Hydro Electric Powerhouse on Left Bank. Accordingly, independent powerhouse (1x4.8 MW) was commissioned in May 2012.

By this time, the Power Plant on Right bank, which was commissioned in 1975 had overlived its normative life of 35 years.

Due to commissioning of the separate powerhouse on Left Bank, the hydrology of the Right Bank Powerhouse has under gone considerable change. The discharge now available for the powerhouse has been reduced by about 35 to 40%. As per the water release program for 75% dependable year, the discharge variation is in the range of 17.86 cumecs (in the month of May) to 39.39cumecs (in the month of December), as against maximum design discharge of 51.2 cumecs (1975 scenario).

3 Installed Capacity & Design Generation:

GOMWRD has provided the planned water release pattern and also the working table for the 75 % dependable year in the Bidding Document and also in the Lease Agreement. . **The annual design generation as approved by the Government of Maharashtra (GOMWRD) is 20.46 Mus**.

The power potential corresponding to monthly planned releases are ranging from 0.908 MW to 8.45 MW during the months from June to May (water year). Hence, the existing installed capacity of 2 x 4.5 MW is sufficient to harness the available hydro potential of the site optimally.

After performing the envisaged R&M plan, the efficiency of Veer HEP would be restored and the annual generation would increase to its design level of 20.46 MUs from the current level of 0 MUs.

4 Need for Renovation and Modernisation

Powerhouse on Right Bank, after commissioning in February 1975 was given on lease basis to the MAHAGENCO for its Operation and Maintenance and the power generated was feed to the grid. After, completion of the lease period of 35 years and the normative life, in 2010, the project was handed over, back to GOMWRD for renovation and modernization. Thereafter, from 1st June 2010 onwards, Operation and Maintenance is being carried out by GOMWRD and electricity generated is sold to MSEDCL. Due to aging of the equipment, the said plant which is continuously in use for about 45 years, is frequently required to be shut down for maintenance in recent years. Unit No. 1 has ceased to operate in May 2017. Unit No. 2 was in partial operation till March 2019 with repeated and prolonged forced outages. **At present both the units have ceased to operate. Average annual generation in last 5 years from 2016-17 to 2020-21 is reduced to 3.04 MUs as against design generation of 20.46 MUs.**

As the powerhouse has totally ceased to generate energy. There were two options; one to demolish and construct the new powerhouse one and another is to carry out life extension of existing powerhouse by way of Renovation & Modernization.

The Option of R & M being attractive has been finalised by the GOMWRD. The comparative benefits of the option of the R & M are as follows.

a) The demolition of power house would disturb the irrigation cycle as the irrigation canal is in close vicinity;
b) Demolishing and Reconstructing the new power house will be comparatively more time consuming. With the R&M, the installed capacity would be restored within 6 months whereas construction of new powerhouse would require about 5 years. Thus, the alternative of new powerhouse would cause loss of generation potential of about 20 MUs per year for about 4 and a half years.
c) Alternative of R & M would involve less capital cost as compared to new powerhouse. The capital cost of the proposed R & M alternative is Rs. 4.7091 Crs. / MW whereas the capital cost of new powerhouse would be about Rs. 9 Crs/ MW. R & M option, due to it's comparatively lower Capital cost would naturally result into lower cost of generation per kWH.
d) Due to hydrological constraints, although alternative of new powerhouse would have been opted there is no scope for uprating the installed capacity of machines;
e) The existing powerhouse after R & M would continue to give full benefits as that of the new one for next 25 years;

5 Selection of the Generating Company

GOMWRD has done the selection of Mahati Industries Private Limited (MIPL) (Formerly known as Mahati Electrics) by following transparent competitive bidding process. GOMWRD, had invited the bids for this work through e-Procurement System of the Government of Maharashtra and also by publishing the tender notice in the newspapers.

Bids were called in 2- Envelope system. The technical competency of the bidders was assessed through the documents uploaded electronically by the bidders in Envelope -1. The electronically uploaded commercial bids, of those bidders who were technically qualified were opened. Highest Upfront premium quoted was the selection criteria for the bidder. Accordingly, MIPL has been adjudged as the successful bidder, on the basis of technical

eligibility and highest bidding offer quoted by it. MHPVPPL, has offered upfront premium of Rs. 63 Lakhs over and above the Threshold Premium, of Rs 990 Lakhs, fixed by the GOMWRD. Accordingly, GOMWRD issued the Notification of Award (NoA) to MIPL on 27 January, 2021.

MIPL, based in Pune, has an experience of, over last 4 decades and have executed turnkey electromechanical erection of Hydro Electric Projects totalling more than 10,000 MW and have executed operation and maintenance of 1000 MW Tehari HEP. Thus, the MPIL has the required credentials, to carry out the work of Renovation, Modernisation, Operation and Maintenance of the Veer HEP (2x4.5MW under consideration.

Subsequently, as per the provisions in the Bidding Document MIPL has formed the SPV named Mahati Hydro Power Veer Project Private Limited (MHPVPPL) for execution of Veer HEP project. **The Petitioner has signed the Lease Agreement with Water Resources Department on 28 April, 2021 for the lease period of 25 years.** As per Lease agreement, Petitioner is responsible for Renovation Modernisation, Operation and Maintenance of Veer HEP for 25 years. **The Petitioner, at the end of lease period of 25 years is expected to transfer back the Project to GOMWRD at no cost.**

6 "As Is" Scenario of the Project

The dam is generally in good condition and it's residual life is more than 50 years. Powerhouse is also structurally in good condition. However, the electro-mechanical equipment, have overlived its normative life. **At present both the units have ceased to operate.** Spare parts of most of the equipment have become absolute. Equipment wise / component wise status is provided in Chapter IV of the DPR annexed to the Petition. Most of the equipment or part thereof need to be replaced and balance need exhaustive refurbishment.

7 Proposed Renovation and Modernisation Activities

The Petitioner, after detailed technical assessment, has come out with Renovation and Modernization plan which is described in the Chapter 5 of the DPR. The Renovation and modernization of the following equipment and component thereof will be carried out by way of replacement, overhauling, refurbishment as per the need.

1. Turbine & Auxiliaries
2. Generator & Auxiliaries
3. Transformers
4. Station Auxiliaries
5. Control and Instrumentation / Automation
6. Online Monitoring System
7. Civil works
8. Hydro-Mechanical Equipment

The envisaged R & M plan has been targeted for:

a) Life extension for 25 years; which as per the Guidelines issued by the Central Electricity Authority, for Renovation and Modernization of Hydro Electric Projects is the maximum life extension possible after R & M. (Para 3.1 of the said guide lines the enhanced power plant life after R & M is 20 to 25 years)

b) Restoration of derated capacity of the plant.

c) Annual generation of 20.46 Mus in 75 % dependable year i.e. at par with the design generation specified in the bidding document.

d) Improvement in reliability, availability & safety.

e) **Maximum possible automation, real time communication, monitoring and coordination by use of State of Art Technology**.

8 Legal and Statutory provisions

- Section 62(1) of the Electricity Act 2003 (hereinafter referred as "the Act") mandates the Hon'ble Commission to determine the tariff for supply of electricity by a generating company to the distribution licensee.
- Section 86 (1) (e) of the Act mandates Hon'ble Commission to promote the generation of electricity from renewable sources of energy.
- National Electricity Policy and National Tariff Policy promotes the generation of the electricity through hydro generation as well as renewable energy sources.
- Section 61 (h) of the Act also stipulate that, while determining such tariff, the Hon'ble Commission shall be guided by the terms and conditions for tariff determination framed there under.
- Hon'ble Commission notified Maharashtra Electricity Regulatory Commission (Terms and Conditions for Determination of Renewable Energy Tariff) Regulations, 2019

- Veer HEP forms eligibility of Small Hydro Power Project as specified in Regulation 2.1(n) (ii) of MERC RE Tariff Regulations, 2019.
- As per Regulation 9 of MERC RE Tariff Regulations, 2019, only the project specific tariff shall be determined the Hon'ble Commission on case to case basis for Small Hydro Projects.
- Though, as per Regulation 3.1 of MERC RE Tariff Regulations, 2019 are applicable to new RE projects, the Principles laid down therein for certain parameters are relevant for R&M projects as well. Also, Clause 11.5 of Lease Agreement also mentions that tariff for sale of energy to MSEDCL or any other distribution licensee shall be as determined by the Hon'ble Commission.
- Government of Maharashtra, vide paragraph 4(2) of " Non-Conventional Energy Generation Policy – 2020 dated 31St December, 2020 has assured that instead of going for competitive bidding, the energy generated from SHPs will be purchased by MSEDCL, through energy purchase agreements at the rate to be decided by Hon'ble Commission.
- **Accordingly, the instant Petition has been filed for determination of the Project Specific Tariff for Veer Hydro Electric Project of capacity 9 MW, as per Regulation 9.1 (c), 10.2 of MERC RE Tariff Regulations, 2019, Section 62 (1)(a) and 86(1)(e) of the Act read with the powers of this Hon'ble Commission to remove difficulties and relax as contained in Regulations 74 and 77 of the said Regulations.**

9 Capital Cost

The Petitioner have claimed the estimated capital cost in accordance with the Regulation 14 and 31 of MERC RE Tariff Regulations 2019. The Petitioner has claimed estimated R&M Capital Cost as per the DPR which is comprised of the cost of Renovation and Modernisation of Veer HEP and the Threshold Premium, payable to GOMWRD. **The Cost estimate of R & M of component has been prepared on the basis of the Guidelines contained in Chapter 1.11 – General – Renovation , Modernisation and Uprating of Standards/Manuals/Guidelines for Hydro Power Development dated November, 2012 published by IIT Roorki, and sponsored by MNRE and Chapter- 7, - Renovation, Modernisation and Uprating of Hydro Power Stations, published by Central Electricity Authority in its documents on Best Practices & Bench Marks in Hydro power Generation. The cost rehabilitation of civil components is based on PWD Schedule of Rates and the cost of Electro-Mechanical and Hydro-Mechanical**

works has been considered on the basis of offers received from leading manufacturers. The sub-head wise cost details are as under:

Sr	Description	Amount (Rs. Lakh)	Applicable Taxes (Rs. Lakh)	Total (Rs. Lakh)
1	Turbine & auxiliaries	606.70	109.21	715.91
2	Generator & auxiliaries	552.75	99.50	652.25
3	Transformers	142.50	25.65	168.15
4	Station auxiliaries	117.25	21.11	138.36
5	Control and Instrumentation & Automation, 132 kV Switchyard metering etc.	510.16	91.83	601.99
6	Online Monitoring System	80.00	14.40	94.40
7	Civil Works	158.84	28.59	187.43
8	Hydro Mechanical Components.	105.00	18.90	123.90
9	Dismantling, Erection, Testing and Commissioning	160.75	28.93	189.68
10	Pre-Operative Expenses	285.30	40.60	325.91
11	Financial Charges Including IDC	99.36	3.10	102.46
12	Threshold Premium payable to GOMWRD as per Lease Agreement	990	178.20*	1168.20
	Total in Rs	**3,808.62**	**660.01**	**4,468.63**

The Ministry of Non- conventional Energy Sources (MNRE), GOI has presently no scheme for SHPs,. Similarly, Renewable Energy Policy -2020 of the GOM do not offer any grant, subsidy or monitory incentives for SHPs. Hence, the Petitioner is not entitled to get any grant or subsidy or incentive.

The Per MW Capital Cost of the project works out as Rs 496.51 Lakhs (including IDC). However, the cost Per MW, excluding the Threshold Premium payable to the GOMWRD is only Rs. 366.71 Crores. Though, the estimated Capital Cost of proposed Renovation and Modernisation work, as indicated by the GOMWRD in the Lease Agreement is Rs. 28 Crore, it is calculated at 2012 price level. The said estimated cost of GOMWRD is excluding the Threshold Premium of Rs. 1168 Lakhs (Rs. 990 Lakhs + GST 178.2 Lacks) and includes the than applicable taxes (Excise Duty on equipment 12.36 %, VAT 4% and Service Taxes 12.36%). This estimated cost at 2012 price level (without Threshold Premium & GST thereon) if adjusted for inflation from FY 2012-13 to FY 2020-21, the estimated Capital Cost comes to Rs 4088 Lakh. **The Petitioner's estimation of Capital Cost excluding the threshold premium is Rs 3231 Lakh (excluding IDC),**

which is substantially lower and extremely reasonable as compared to cost estimated by GOMWRD.

10 Benchmark of Capital Cost

In the past orders, it has been observed that approach of benchmarking of capital cost has been adopted by the Hon'ble Commission. Though the available benchmark for SHP are for new projects and not for R&M project, the same is outlined as under:

- Hon'ble Commission, in Generic Tariff Order dated 30 April, 2019 has approved the capital cost as Rs 578.66 Lakhs per MW to be commissioned in FY 2019-20.
- Hon'ble Commission in recent order in Case No. 208 of 2020 filed by ASPL have approved the capital cost of Rs. 1049.25 Lakh /MW
- **Hon'ble CERC vide its Order dated 21 July, 2020 has specified the normative capital cost for small hydro projects for FY 2020-21 as Rs 900 Lakhs / MW.**
- **Also, in MERC Case No 208 of 2020, the average capital cost submitted by IREDA for Small Hydro Projects is Rs. 11.20 Crore/MW as against Rs 4.97 Crore/MW claimed by the Petitioner for the Veer SHP.**
- Various SERC such as Chhattisgarh, Haryana, Gujarat, Madhya Pradesh, etc have notified capital cost in the range of Rs. 470 Lakh/MW to Rs. 1100 Lakh/MW.

11 Determination of Project Specific Tariff

In line with Regulations 9.1 (c) of prevailing MERC RE Tariff Regulations, 2019, this petition has been filed for determination of Project specific tariff and has proposed a single part tariff as per Regulations 11 of prevailing MERC RE Tariff Regulations, 2019. The performance parameters and financial parameters adopted to determine the tariff are highlighted in the following table:

Parameter	Units	Amount	Rationale
Installed Capacity	MW	9	Irrigation-cum-power Project
Useful Life of Assets	Years	25	As per the lease period specified in Clause 6.1 of the Lease Agreement
Tariff Period	Years	25	GOMWRD has signed Lease Agreement with the Petitioner for 25 years only
Capacity Utilisation Factor	%	26%	As per certified design energy based on 75% dependable water yield

Parameter	Units	Amount	Rationale
Auxiliary Consumption	%	1%	As per Regulations 33 of MERC RE Tariff Regulations 2019
Capital Cost	Rs. Lacs	4,468.63	Estimated Capital Cost
Capital Subsidy	Rs. Lacs	-	MNRE and Renewable Energy Generation Policy 2020 do not offer any grant or subsidy
Debt:Equity	%	70:30	As per Regulations 15 of MERC RE Tariff Regulations, 2019.
Loan Tenure	Year	12	As per Regulations 16.1 of MERC RE Tariff Regulations, 2019
Loan Interest	%	9.07%	As per Regulations 16.2 (c) of MERC RE Tariff Regulations, 2019 equivalent to SBI 1 year MCLR + 200 basis points
Depreciation	%	5.83% & 2.31%	As per Regulations 17.2 and 17.3 of MERC RE Tariff Regulations, 2019. First 12 year – 5.83% and remaining useful life – 2.31%
Return on Equity	%	18.71%	As per Regulations 18.2 of MERC RE Tariff Regulations, 2019. RoE @14% is grossed with Corporate rate of 25.168%
Operation and Maintenance Exp.	% of Capex	2,80%	As per Regulations 34 of MERC RE Tariff Regulations.
Escalation on O&M	%	3.28%	As per MERC RE Tariff Regulations.
Rate of Interest on Working Capital	%	8.57%	As per Regulations 19 of MERC RE Tariff Regulations, 2019 equivalent to SBI 1 year MCLR + 150 basis points
Normative Interest on Working Capital			As per Regulations 19.1 of MERC RE Tariff Regulations, 2019
Discounting Factor	%	8.95%	As per Regulations 12.1 of MERC RE Tariff Regulations, 2019
Charges for maintenance of Intake Structure, Penstock etc		5 paise per unit with escalation of 3.28%	As per Clause 2.2.6 and 4 of the Lease agreement
Land Lease Rent, Royalty Charges and 13% charges		As per Actuals /	• Payment of land lease of rent of Rs. 1/- per kW per annum with 10% escalation

Parameter	Units	Amount	Rationale
((incl. 1% Local Area Development Fund) on Gross Generation		Lease Agreement	• Royalty at rate of 5 paise per unit with 10% escalation • Charges for 13% of the gross units generated (Including 1% for Local area development) per year at the applicable Tariff

The Petitioner has also approached MSEDCL for sale of power from the said project and requested to sign the Energy Purchase Agreement (EPA). Accordingly, MSEDCL has informed that it may purchase the power at the tariff determined by this Hon'ble Commission as a project specific tariff

12 Benefits of the Veer HEP :

a) Capital cost is less as compared to the new SHPs of identical installation.

b) Proposed levelized tariff of Rs. 3.91 / kWh is far below the Average Power Purchase Cost (APPCC) (Rs. 4.27 / kWh for the FY 2021-22) .

c) The water release schedule is fixed on fortnightly basis. Accordingly, power to be fed on day ahead basis can be scheduled. Further, the generation is also available in Rabi season in which the power demand is high in rural areas.

d) This is a green and renewable source of energy.

e) Although, **the system inertia support to the grid through this plant is** limited it can't be ignored and is certainly **qualitatively advantageous as compared to solar installations of identical capacity.**

f) No R & R or environmental issues.

g) The energy generation of this project is more than that of solar plant of identical installation. Further, the area required for this 9 MW plant is only 1.2 Ha.; whereas Solar PV project of identical installation would require about 40 Has. Of land.

13 Proposed Tariff

The Petitioner has calculated the levelized project specific tariff for Veer HEP at Rs. 3.91/kWh for the period of 25 years which is lower than is lower than Average Power Purchase Cost (APPC) (Rs 3.94/kWh for FY 2021-22) of MSEDCL.

In addition, the Petitioner, as specified in the Regulations has prayed for reimbursement of expenses from MSEDCL on Electricity Duty, Water Royalty, Land Lease & Charges for 13 % of free power, which are payable to the GOMWRD as per the relevant provisions in the lease Agreement, and not considered in the calculation of tariff, on the basis of actual cost incurred.