

Executive Summary – Case No 208 of 2020

1 Overview

Ashoka Sthapatya Private Limited (hereinafter referred to as “ASPL” or “Petitioner”) has signed Hydro Power Development Agreement (HPDA) with GoMWRD on December 2016 for the period of 30 years to develop the Mini Hydro Project i.e. Morna (Gureghar) HEP with installed capacity of 1 MW.

Though initially as per this prevailing policy, GOMWRD has selected M/s D M Corporation Ltd. for development of Morna (Gureghar) HEP of capacity 1 MW, the said project was later on allotted to the Petitioner on 4 July 2016.

The Petitioner Firm with a view of harnessing the renewable energy in the State of Maharashtra and promote clean green energy, an initiative for development of Small Hydro Plant has taken up the development of the said project.

Accordingly, since the project is expected to be commissioned shortly within a month, the Petitioner has approached the Hon’ble Commission to seek determination of tariff for its said Project specific small hydro power plant situated at Morna Irrigation Dam.

2 Project Details

The Project is a Mini Hydro Project with installed capacity of 1 MW and is defined under an irrigation cum power project. The said project is located on Morna Irrigation Dam as dam foot of Morna dam of Morna River near Gureghar village Tal. Patan in Satara district. The catchment area of the dam site is 55.94 Sq. km and the valley is surrounded by Koyna catchments on North and West, Wang river catchments on South East. The catchments are a fan shaped & hilly terrain up to village Gureghar and there after the valley is even with slope till its confluence with Koyna River.

Figure 1 Location of Morna HEP



Being the project being irrigation cum power project, the water stored is let down in the canal for irrigation purposes. Further, it is important to note that as per the GoMWRD policy, generation of power in this project is possible as per the irrigation released and not as per the grid requirements. It is submitted that Irrigation project proposes to utilize 48.833 Mcum water for irrigation as a consumptive use from the available 155.780 Mcum of 75% yield. However, the water use for the hydel scheme ex dam being a non-consumptive as total of the planned irrigation use ex dam plus part of the available spills, can be used for optimum generation at the project site. The 1 no. steel penstock along with intake structure is already embedded in the body of dam. To utilize the irrigation releases for power generation a power scheme with appropriate capacity is proposed to be constructed.

The 75% working table shows that the available power generation ranging from 481.282 kW to 1200 kW during months from June to May. An optimum installation of 1 x 1000 KW + 20% OLC has been proposed.

The scheme consists of a small power house at the foot of Morna Dam to be operated from the spills and releases from the reservoir for irrigation, non-irrigation use. No additional storage or forebay is contemplated. As such, no additional submergence or any other activity exclusively related to the Hydro Project is involved which may adversely affect ecology in the area and hence the ecology of the area will not be affected by the said hydro project.

3 Status of the Project

The Present status of the Project is outlined in the following table:

Work	Status
Morna Dam	<ul style="list-style-type: none"> • Earthen dam works are completed in the year 2008 • Irrigation conduit outlet is provided in the right bank in the earthen portion • Dam is 374 m length, with maximum height of 47.02 m in gorge portion with 3 gates.
Civil work	<ul style="list-style-type: none"> • Power House, Penstock, Rising Apron, TRC, OD Switchyard & Superstructure work is completed
E&M Work	<ul style="list-style-type: none"> • All material of E&M including Turbine, generator, panels, allied controlling equipments, ODY equipments of Morna HEP is installed, inspected and ready to commission
33kv Line & Bay Work	<ul style="list-style-type: none"> • Entire work related to Line and Bay is completed. • Work Completion Report (WCR) work is under progress and likely to be completed shortly.

Work	Status
Connectivity and Evacuation Arrangement	<ul style="list-style-type: none"> • Permission to Charge line and bay from MSEDCL is pending • As per TEFRR, the evacuation of power has been envisaged by 33 kV line from nearest sub-station about 4 km from the project site. • MSETCL approved the grid connectivity for the project through 33 kV Single Circuit line from 220/33 kV Nerle Substation, which is approx. 8 km from the project site. • Connectivity is undertaken with a single circuit line. • Permission to synchronized machine with Grid from MSETCL is pending
Power Supply Arrangement	<ul style="list-style-type: none"> • Proposal for supply of power from the project to MSEDCL is submitted. • MSEDCL requested the Petitioner to approach the Hon'ble Commission for determination of tariff and power to be procured if tariff is feasible.

4 Capital Cost

The Petitioner have claimed the capital cost in accordance with the Regulation 14 and 31 of MERC RE Tariff Regulations 2019, including the cost towards evacuation infrastructure. The Petitioner further submits that, the COD is anticipated in next one month based on the present status of the project. The capital cost submitted in the instant petition is estimated capital cost as on COD of the project with the actual capital expenditure incurred till September, 30, 2020, duly certified by Auditor.

Sl. No.	Parameters	CAPEX as per DPR	CAPEX as on September 30, 2020	Estimated CAPEX at CoD
Rs. Lakhs				
1.	Preliminary Work	20.00	129.74	135.20
2.	Civil Works	173.01	192.22	206.88
3.	Hard Cost	428.00	567.22	567.22
4.	Other Works	-	22.28	22.28
5.	Overhead and Establishment Works	10.00	33.60	55.35
6.	Evacuation Works	14.20	173.11	195.25
7.	IDC	87.22	-	-
8.	Grand Total	732.43	1118.16	1,182.18

The Petitioner submits that there has been escalation in cost as compared to projection made at the time of preparation of DPR, the reasons for the same is as highlighted below:

1. Preliminary works

- Expenses includes the Upfront premium of Rs. 10 Lacs/MW and threshold premium of Rs. 50 Lacs/MW paid to GoMWRD ;
- Other expenses incurred related to government fees in relation to stamp duty, registration fee, Grid Connectivity Charges, MEDA clearance, etc

2. Civil works: (Competitive bidding was carried out)

- After completion of work of dam & Irrigation Cum Power Outlet (ICPO), there is murum filling for approaching to ICPO and make a ground for power house during construction by WRD.
- Earth filling up to 8 meter depth at power house location was found.
- The report of bearing capacity of rock and soil highlighted that the bearing capacity of soil is average 25 T/m² which is very low. The same was not envisaged earlier.
- In order to improve the bearing capacity of soil and stability of structure, the foundation with 600 mm thick plum concrete at bottom of raft foundation of power house, rising apron, penstock and bridge were made.
- The raft foundation size was increased due low bearing capacity of soil

3. Cost towards Evacuation Works

- The evacuation of power is proposed through 33 kV feeder from 220/33 kV Nerle Substation, which is approx. 8 km from project location, which was envisaged as 4 km earlier.
- Petitioner has installed the Real Time Unit (RTU) system for monitoring the reliability of the evacuation of hydro power.

5 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. There is no capital cost approved for Mini Hydro project. However, tariff for Mini Hydro projects has been approved as Rs. 0.50 per unit higher than tariff determined for Small Hydro Projects. This capital cost approved was based on the norms specified for 2015 and derived based on indexation formula.

The capital cost in related to hydro projects is majorly dependent on project location. The project locations are generally found in high hydro region and additional expenditure are required to be incurred because of site specific issues such as change in soil conditions, access to the main road, access to connectivity, etc. Hence, the

benchmarking of capital cost with the approved norms specified by CERC or other State Electricity Regulatory Commissions would not be prudent approach. The available benchmark for Hydro projects are as under:

- For recently commissioned small hydro project having capacity less than 5 MW, IREDA submitted the capital cost as Rs. 12.57 Crore per MW for States like HP, Uttarakhand, West Bengal and North Eastern States) and Rs. 8.90 Crore per MW Other remaining States.
- Hon'ble CERC has provided the break-up of the capital cost component which totals to Rs. 11.18 Crs per Mw.
- As per National Mission on Small Hydro issued by MNRE in the year 2015, the cost considered in FY 2015 was about Rs. 8.50 crore to Rs. 9.50 crore per megawatt (MW). Considering, an escalation of 4.48% per year (similar to inflation), the estimated cost is in line with the actual cost incurred by the Petitioner.

6 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
- Morna HEP forms eligibility of Mini Hydro Power Project as specified in Regulation 2.1(n) (iii) 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 Mini Hydro Projects.

- Accordingly, the instant Petition has been filed for determination of Project Specific Tariff for Morna Hydro Electric Project of capacity 1 MW, as per Regulation 10.2 of MERC RE Tariff Regulations, 2019, Section 62 (1)(a) and 86(1)(e) of the Act.

7 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 to determine the tariff is highlighted in the following table:

Parameter	Units	Amount	Rationale
Installed Capacity	MW	1	Irrigation-cum-power Project
Useful Life of Assets	Years	35	As per Regulations 2 (nn) (c) of MERC RE Tariff Regulations, 2019
Tariff Period	Years	30	GOMWRD has signed HPDA with the Petitioner for 30 years only
Capacity Utilisation Factor	%	30%	As per Regulations 32 of MERC RE Tariff Regulations 2019, - Mini Hydro Power Projects
Auxiliary Consumption	%	1%	As per Regulations 33 of MERC RE Tariff Regulations 2019
Capital Cost	Rs. Lacs	1182.18	Anticipated Capital Cost
Capital Subsidy	Rs. Lacs	-	No Subsidy is received yet. Any Subsidy received will be adjusted in future
Debt:Equity	%	70:30	As per Regulations 15 of MERC RE Tariff Regulations, 2019. The project is actually funded through equity only.
Loan Tenure	Year	12	As per Regulations 16.1 of MERC RE Tariff Regulations, 2019
Loan Interest	%	10.16%	As per Regulations 16.2 (c) of MERC RE Tariff Regulations, 2019 equivalent to SBI 1 year MCLR + 200 basis points
Depreciation	%	5.83% & 1.11%	As per Regulations 17.2 and 17.3 of MERC RE Tariff Regulations, 2019. First 12 year – 5.83% and remaining useful life – 1.11%

Parameter	Units	Amount	Rationale
Return on Equity	%	16.59%	As per Regulations 18.2 of MERC RE Tariff Regulations, 2019. RoE @14% is grossed with MAT rate of 15.60%
Operation and Maintenance Exp.	% of Capex	4%	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	%	9.66%	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	%	10.20%	As per Regulations 12.1 of MERC RE Tariff Regulations, 2019
Land Lease Rent, Water Cess and Maintenance Charges		As per Actuals / HPDA	<ul style="list-style-type: none"> • Payment of land lease of rent of Rs. 1/- per kW per annum • Water cess at rate of 5 paise per unit and charges of maintenance of intake structure, penstock, etc. at rate of 5 paise per unit of energy generated. • The above cost shall be increased in every subsequent year by 5% by compounding.

8 Proposed Tariff

The Petitioner has calculated the levelised project specific tariff for Morna HEP as Rs. 8.34/kWh for the period of 30 years.