

Annexure-1

Annual Report on Technical Performance of Kulhal HEP

1.1 Overview

1.1.1 The petitioner in compliance of the relevant Regulations of UERC (Terms and Conditions for determination of Tariff) Regulations, 2015 & UERC (Terms and Conditions for determination of Multi Year Tariff) Regulations, 2018 is providing information with regard to the operational performance related to technical parameters of Kulhal Hydro Power Station.

1.1.2 The information provided in this chapter relates to actual and expected performance in 2016-17, 2017-18 and 2018-19. The operational parameters considered are:

- (a) Gross generation
- (b) AUX (Auxiliary consumption and Transformation losses)
- (c) Plant Availability factor (PAF)

1.2 Power Station Description

1.2.1 The Kulhal Power Station with an installed capacity of 30 MW (3X10 MW) is located downstream of the Asan Barrage at a distance of 4.0 km on the power channel which takes off from the Asan Barrage. The Power Station was commissioned in the year 1975. The surface Power Station comprising 3 units of 10 MW each with Kaplan turbines is located on the power channel which terminates in 39.2 m wide and 6.9 m deep fore bay. There are three 30 m long and 4.5 m dia. steel lined penstocks, one for each unit. In case of tripping of machines full discharge gets bye-passed through a 21m wide gated bye pass channel. The water from the tail race flows towards Khara Power Station in UP. The Kulhal Power Station is a low head scheme located on power channel with a design head of 18 m and design discharge of 198 cum.

1.2.2 There are three generating units having vertical Kaplan turbine directly coupled with synchronous generator. The turbine output is 10.4 MW for a rated net head of 18 m. The generators are designed for a nominal output of 11.1 MVA with lagging power factor of 0.9 and class "B" insulation.

1.2.3 This Power Station was commissioned in the year 1975. The power station has been under operation for past 43 years

1.2.4 Salient features of the Power Station are provided in form F 2.3 of this petition.

1.3 Energy Generation

1.3.1 Actual/Expected/Projected energy generation in FY 2016-17, FY 2017-18, FY 2018-19 & for the control period from FY 2019-20 to FY 2021-22 is given in the table below:

Table -1: Actual, Expected & Projected Energy

Particulars	Norms	2016-17 (A)	2017-18 (A)	2018-19 (E)	2019-20 (P)	2020-21 (P)	2021-22 (P)
Design Energy/ Actual Generation (MU)	153.91	122.31	124.21	134.80	138.00	140.00	140.00
Auxiliary Cons. (%)	0.20%						
Transformation/ other losses and consumption (%)	0.50%	2.61%	1.47%	2.92%	2.84%	2.82%	2.79%
Net Saleable Energy (MU)	152.83	119.07	122.38	131.94	134.08	136.05	136.04

1.3.2 From the above table it is evident that gross generation in FY 2017-18 is less than the design energy & same is expected for FY 2018-19 due to closure of Dakpathar, Asan Barage & Power Channel from 16.03.2017 to 30.04.2017 for works under DRIP.

1.3.3 The auxiliary and transformation losses in FY 2017-18 are more than the normative level. For FY 2018-19 & for the control period, these are also expected to be more than the normative level. In this regard for investigating the reasons for higher AUX an energy audit was conducted through M/s PCRA (Power Conservation Research Organisation), New Delhi, a Government of India undertaking company. The firm submitted the report on energy guzzlers and transformation losses. The study observed that auxiliary losses were near to Norms but transformations losses were on higher side.

1.4 Plant Availability Factor

1.4.1 The recovery of the Annual Fixed Charges is dependent on the Plant Availability achieved by the Power Station. The principle for recovery of fixed charges on the

basis of the availability achieved by the plant has been introduced by the Hon'ble Commission by its regulations UERC (Terms and Conditions for determination of tariff) Regulations, 2015 & 2018. The petitioner has provided this factor as per the provisions of the above regulations.

Table 2: Plant Availability Factor

Particulars	Norms	2016-17 (A)	2017-18 (A)	2018-19 (E)	2019-20 (P)	2020-21 (P)	2021-22 (P)
NAPAF/PAFM (%)	65.00%	71.61%	71.64%	74.02%	65.00%	65.00%	65.00%
	65.00%						
Planned Outages (Hrs.)	NA	2,552	3,848	3,600	3,576	3,192	3,192
Forced Outages (Hrs.)	NA	159	725	442	584	513	548

1.4.2 PAFM: The Kulhal Hydro Power Station is likely to achieve the normative plant availability factor determined by the Hon'ble Commission for the FY 2017-18 & 2018-19 as well.

The Kulhal Hydro Power Station is very old HEP & requires more maintenance hence, has to be shut down for longer periods to carry out maintenance.

However, the Petitioner seeks no deviation in NAPAF for the control period from FY 2019-20 to FY 2021-22.

Table 3: Average PAFM (%)

Sl. No.	Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Average
1	2013-14	65.79	74.61	70.27	99.08	97.78	99.50	93.23	73.07	59.45	62.91	67.14	72.88	77.98
2	2014-15	72.84	81.21	89.46	96.05	94.62	84.87	66.97	58.97	58.69	60.75	64.86	69.57	74.91
3	2015-16	81.01	83.27	81.91	95.51	97.51	84.26	60.59	63.00	59.77	60.31	57.53	54.79	73.29
4	2016-17	59.75	68.33	77.10	93.77	93.45	93.71	79.70	67.14	61.51	54.03	67.14	43.64	71.61
5	2017-18	11.11	66.24	66.22	68.71	100.00	99.56	97.42	89.45	77.31	57.85	64.53	61.29	71.64
6	2018-19	62.56	63.87	74.44	92.04	98.82	99.45	79.58	70.32	63.35	59.17	64.24	60.44	74.02

1.4.3 Planned Outages: Planned outages on account of annual/capital maintenance in the control period FY 2019-20 to FY 2021-22 are given below. The Petitioner shall continue to lay emphasis on preventive and planned maintenance of machines for the year 2018-19 onwards for better power station availability.

DGM (Tech.)
UJVN Ltd.

Table 4: Planned Outages

FY	Unit No.	Date of Start	Date of Completion	No of Days	Remarks
2019-20	Unit 1	01-04-2019	30-04-2019	29	AM
	Unit 2	15-11-2019	14-03-2020	120	CM
	Unit 3	-	-	-	-
2020-21	Unit 1	15-11-2020	30-12-2020	45	AM
	Unit 2	01-01-2021	14-02-2021	44	AM
	Unit 3	15-02-2021	31-03-2021	44	AM
2021-22	Unit 1	15-11-2021	30-12-2021	45	AM
	Unit 2	01-01-2022	14-02-2022	44	AM
	Unit 3	15-02-2022	31-03-2022	44	AM

AM- Annual Maintenance, CM-Capital Maintenance


DGM (Tech.)
UJVN Ltd.


(Purushottam Singh)
Director (Operation)
UJVN Ltd.
Dehradun