

Analysis of ARR & Tariff Proposal of OHPC for FY 2023-24

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Presentation Outline

- Installed capacity, NAPAF and design energy
- Project cost
- Components of annual fixed cost
- ARR and Tariff

Installed Capacity and Design Energy

Installed Capacity of OHPC Stations and NAPAF



- Total installed capacity of OHPC owned hydro station is 2099.8 MW (2039.8 MW from OHPC hydro power plant + 60 MW from share of Machhkund). After completion of RM & U works of Unit-5&6 of HHEP, Burla, each unit was uprated from 37.5MW to 43.65MW.
- The Commission in its order dated 20.03.2020 vide case no. 52 of 2019 has re-determined NAPAF of OHPC Stations for the control period from 01.04.2019 to 31.03.2024 for recovery of Capacity Charges.

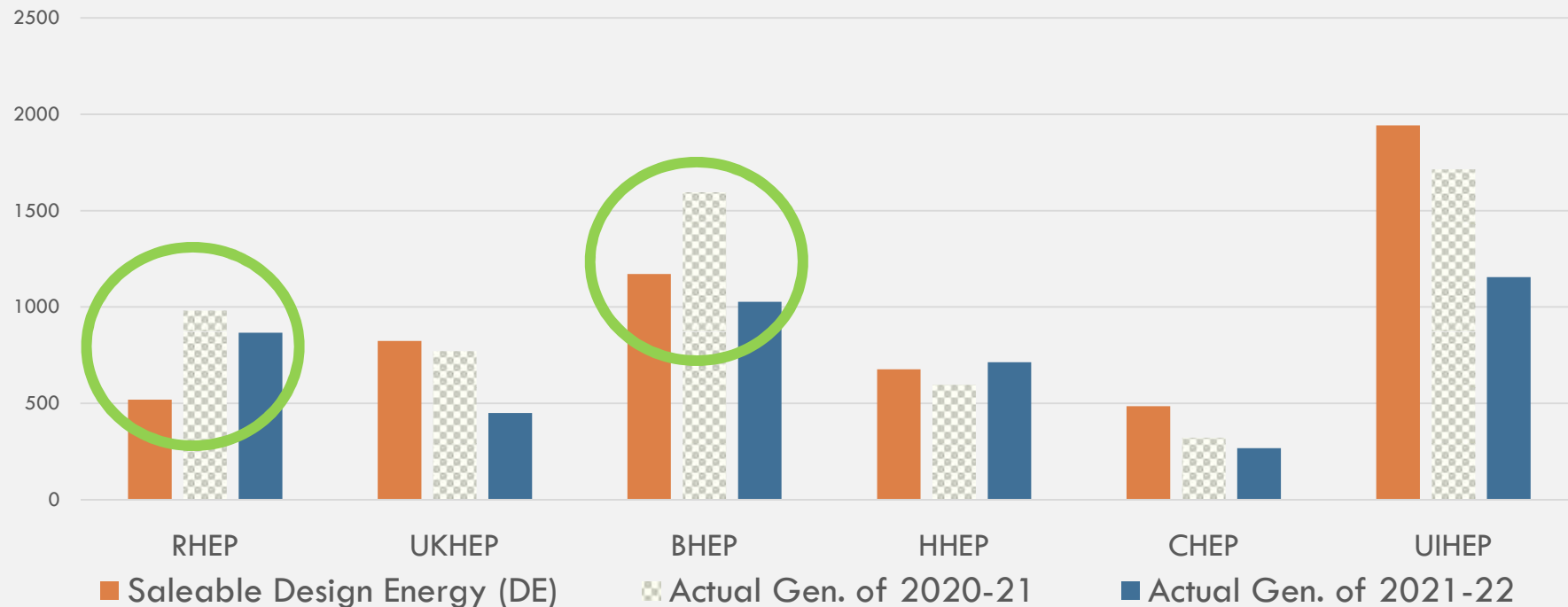
| Power Stations | RHEP | UKHEP | BHEP | HHEP | CHEP | UIHEP |
|-----------------------------------|------|-------|--|------|------|-------|
| Approved for 2019-24 block period | 80 | 87 | 83- for first 3 years, 87 – for next 2 years | 75 | 75 | 88 |
| OERC approval for FY 22-23 | 80 | 87 | 87 | 75 | 75 | 88 |
| OHPC proposed for FY 23-24 | 80 | 87 | 87 | 75 | 75 | 88 |

Design Energy vs Actual/Anticipated Generation in FY 2022-23

| Name of HEP | Commission approval for FY 2022-23 (Saleable) (MU) | Reservoir Level and Generation for FY 2022-23 | | Reservoir Level and Generation for FY 2021-22 | | Increase in generation in FY 2022-23 over FY 2021-22 |
|--------------|--|---|-----------------------------|---|------------------------|--|
| | | Reservoir level as on 15 Nov 2022 | Anticipated generation (MU) | Reservoir level as on 15 Nov 2021 | Actual generation (MU) | |
| RHEP | 519.75 | 122.62 mtr. | 920.905 | 122.33m | 866.36 | 6.30% |
| UKHEP | 823.68 | 855.55 mtr. | 524.359 | 851.76 m | 450.90 | 16.29% |
| BHEP | 1171.17 | 1482.80 ft. | 1135.365 | 1483.80 ft | 1026.65 | 10.59% |
| HHEP | 660.52 | 628.43 ft. | 901.415 | 629.33 ft | 714.26 | 26.20% |
| CHEP | 485.10 | | 341.334 | | 268.42 | 27.16% |
| UIHEP | 1942.38 | 637.94mtr | 1475.069 | 631.31 m | 1155.19 | 27.69% |
| Total | 5602.60 | | 5298.448 | | 4481.78 | 18.22% |

Note: The reservoir level as on Nov 2022 are noted to be high (Except BHEP, HHEP) compare to the level recorded as on Nov 2021; also, anticipated generation for FY 2022-23 is projected to be higher than FY 2021-22 by around 18%. Hon'ble Commission may review the same. If the factors behind the increase are controllable, then the tariff may be set accordingly.

Design Energy vs Historical Actual Generation



- RHEP and BHEP are performing well and having positive fund amount in Secondary fund.
- Generation of CHEP is on lower side, w.r.t design energy (only 66%).
- In FY 21-22, total generation was considerable low (lowest in last 5 years).

Project Cost

Proposed Project Cost for ARR 2023-24 (Rs. Cr)

| Name of power station | Historic cost as on 01.04.96 | New additions from 01.04.96 to 31.03.21 (Approved) | New additions during FY 2021-22 (Audited) | Estimated addition in FY 22-23 & FY 23-24 | Asset reduction during FY 2011-12 to FY 2021-22 | Less PSDF Grant for FY 2021-22 | New additions proposed in tariff calculation FY 2023-24 | Project cost considered Tariff calculation FY 2023-24 based on Historic Cost | Project cost approved for 2022-23 for Tariff calculation based on Historic Cost |
|-----------------------|------------------------------|--|---|---|---|--------------------------------|---|--|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8=3+4+5 | 9=2+8-6-7 | 10 |
| RHEP | 91.09 | 63.30 | 0.76 | 0.00 | 0.089 | 0.000 | 64.06 | 155.06 | 154.3 |
| UKHEP | 108.31 | 27.83 | 0.401 | 4.30 | 0.494 | 0.609 | 32.529 | 139.74 | 135.65 |
| BHEP | 115.42 | 226.46 | 61.221 | 61.003 | 7.214 | 1.169 | 348.679 | 455.72 | 341.35 |
| HHEP | 72.75 | 283.88 | 132.926 | 37.00 | 14.261 | 0.425 | 453.805 | 511.87 | 345.11 |
| CHEP | 92.23 | 119.79 | 0.314 | 38.81 | 6.928 | 0.011 | 158.911 | 244.20 | 205.09 |
| Sub Total | 479.80 | 721.264 | 195.621 | 141.113 | 28.986 | 2.214 | 1057.984 | 1506.59 | 1181.51 |
| UIHEP | 1194.79 | 56.63 | 32.549 | 45.259 | 4.912 | 1.161 | 134.441 | 1323.16 | 1246.51 |
| Total | 1674.59 | 777.90 | 228.171 | 186.372 | 33.898 | 3.375 | 1192.425 | 2829.75 | 2428.02 |

Proposed Project Cost for ARR 2023-24

Observations



- OHPC has considered the historical cost of its power stations as on 01.04.1996 plus new capitalization and decapitalization after 01.04.1996 up to FY 2023-24 (FY 21-22 audited and projected for FY 22-23 and FY 23-24) for computation of tariff for FY 2023-24.
- Already approved additional capitalization of Rs 777.9 Cr (Up to FY 20-21), additional capitalization of Rs 228.171Cr (FY 21-22 audited) and Rs 186.372 Cr (projected FY 22-23 and FY 23-24) are claiming for tariff determination of FY 2023-24. PSDF grant of Rs 3.375 Crs, was deducted. Capitalization mainly in HHEP, BHEP may be reviewed as per the OERC Generation Regulations. Capital asset not in put to use may not be considered. Details of cost overrun and time overrun, if any, may be submitted. Increased capitalization may lead to increased energy generation.
- Historical cost Rs. 1674.59 Cr., new addition Rs. 1192.425Cr. and decapitalization Rs. 33.898Cr. have been considered for Project cost of Rs. 2829.75 Cr for tariff calculation.

Components of Annual Fixed Cost

- Return on Equity
- Interest on Loan
- Depreciation
- Operation and Maintenance
- Interest on Working Capital

Return on Equity (Amt in Cr)

| Name of the Power Station | Capital Addition considered for RoE for FY 2023-24 (in Crs) | Share of Equity (%) | Value of Equity capital (in Crs) | ROE Proposed for 2023-24 (in Crs) | RoE approved by OERC for 2022-23 (in Crs) |
|---------------------------|---|---------------------|----------------------------------|-----------------------------------|---|
| 1 | 2 | 3 | 4=2*3 | 5=15.5 or 16% of 4 | 6 |
| RHEP | 64.06 | 30 | 19.218 | 2.979 | 2.944 |
| UKHEP | 31.92 | 30 | 9.577 | 1.484 | 1.294 |
| BHEP | 347.51 | 30 | 104.254 | 16.159 | 10.530 |
| HHEP | 453.38 | 30 | 136.014 | 21.082 | 13.200 |
| CHEP | 158.90 | 30 | 47.671 | 7.389 | 5.570 |
| UIHEP | 1323.16 | 25&30 | 337.453 | 53.993 | 50.313 |
| Total | 2378.94 | | 654.187 | 103.086 | 83.852 |

Page 60 of TO FY 22-23: “(vii)...The Commission scrutinised the PPA of the OHPC plants and it is found that for old plants the Return on Equity is 15.5% and for UIHEP the RoE is 16%.” However, for old stations, decapitalization must be deducted from capital cost.

Interest on Normative Loan (FY 2023-24) Proposal



(In Rs. Cr.)

| Item | RHEP | UKHEP | BHEP | HHEP | CHEP | UIHEP | Total |
|--|--------------|--------------|--------------|---------------|--------------|--------------|---------------|
| Normative Loan | | | | | | | |
| Average outstanding principal | 3.42 | 5.19 | 82.89 | 125.79 | 63.79 | 64.273 | 345.353 |
| Normative Loan Interest rate (%) | 9.8 | 9.8 | 9.6 | 8.75 | 9.8 | 7.0 | - |
| Interest Amount (Rs. Cr.) FY 23-24 | 0.335 | 0.508 | 7.958 | 11.006 | 6.251 | 4.499 | 30.557 |
| Approved Interest Amount (Rs. Cr.) FY 2022-23 | 0.583 | 0.334 | 0.374 | 1.922 | 4.182 | 1.043 | 8.438 |
| Government loan | | | | | | | |
| Interest Amount (Rs. Cr.) FY 23-24 | - | - | - | - | - | - | - |
| Approved Interest Amount (Rs. Cr.) FY 2022-23 | - | - | - | - | - | - | - |
| Total Interest claimed (Normative Loan+ Govt Loan) FY 2023-24 | 0.335 | 0.508 | 7.958 | 11.006 | 6.251 | 4.499 | 30.557 |

Interest on Loan : Observations and Submission

- OHPC has not considered interest on government loan and normative loan (Rs 78.74 cr) of UIHEP for FY 2023-24 as per the directives of Hon'ble Commission given in previous orders. Cumulative interest of these two loans is also not claimed.
- The normative loans of CHEP, RHEP & UKHEP is considered @ 9.8% as per Clause No. 22 of OERC (Terms & Conditions for determination of Generation Tariff) Regulation, 2020. The normative loan of BHEP, Balimela and HHEP, Burla is considered based on PFC interest rate. The Normative loan of UIHEP is considered @7% being the prevailing rate of interest for State Govt. Loan.
- OHPC has considered additional capitalization based on audited account of FY 2021-22 and estimated additional capitalization for FY 2022-23 and FY 2023-24. Interest payment with respect to estimated capitalization may not be approved. Some of the loans have repayment period of only 5 years; OHPC may try to refinance the same with longer repayment period.

Depreciation, O&M and IoWC : Proposal

(Rs. in Crore)

| Power Station | Depreciation Claimed | | O&M Expenses | | Interest on Working Capital | |
|---------------|-------------------------|-------------------------|-------------------------|-------------------------|-----------------------------|-------------------------|
| | Approved for FY 2022-23 | Proposed for FY 2023-24 | Approved for FY 2022-23 | Proposed for FY 2023-24 | Approved for FY 2022-23 | Proposed for FY 2023-24 |
| RHEP | 3.97 | 3.99 | 68.49 | 61.33 | 2.566 | 2.303 |
| UKHEP | 3.49 | 3.59 | 54.35 | 55.67 | 2.028 | 2.078 |
| BHEP | 8.77 | 11.72 | 55.87 | 60.21 | 2.264 | 2.618 |
| HHEP | 9.31 | 20.79 | 56.15 | 58.97 | 2.329 | 2.785 |
| CHEP | 5.27 | 7.61 | 24.67 | 25.49 | 1.08 | 1.184 |
| Sub Total | 30.81 | 47.7 | 259.53 | 261.66 | 10.266 | 10.968 |
| UIHEP | 32.04 | 42.75 | 78.39 | 77.166 | 3.874 | 4.044 |
| Total | 62.40 | 90.45 | 337.92 | 338.828 | 14.140 | 15.012 |

Depreciation :Observations and Submission

- OHPC has computed depreciation for FY 2023-24 @ 2.57% of historic project cost (excl. decapitalization) plus additional capitalization. The unit wise depreciation so calculated has been compared with loan repayment and which ever is higher has been considered as depreciation.
- OHPC in the present tariff application has claimed the normal depreciation of Rs 90.45 Crs for FY 2023-24.
- Depreciation was allowed as per clause 23 of the OERC Generation Tariff Regulations, 2020, i.e. for existing plants of OHPC, as per the direction of the High Court of Orissa, depreciation will be calculated at pre-1992 norms notified by Government of India.

O& M expenses : Observations and Submission



- OHPC has claimed expenses on O&M following clause no. 25 of the OERC (Terms & Conditions for determination of Generation Tariff) Regulation, 2020
- OHPC has escalated average O&M of different power stations for FY 2020-21 and FY 2021-22, @5.72% twice to arrive at the O&M expenses for FY 2023-24. OHPC has deducted Rs. 11.07 Cr. from O&M expenses of UIHEP, Mukhiguda for FY 2023-24 on account of dam maintenance expense receivable from DoWR.
- The average O&M cost may be verified as per audited account. The escalation factor may be approved as per the provisions given in OERC (Terms & Conditions for determination of Generation Tariff) Regulation, 2020.
- Hon'ble Commission may verify the amount to be received from DoWR towards Dam Maintenance Sharing of UIHEP .

Interest on Working capital and Non-tariff income: Observations and Submission



- OHPC has claimed interest on working capital on normative basis as per provision under clause no. 24(4) of the OERC (Terms & Conditions for determination of Generation Tariff) Regulation, 2020 .
- Interest is calculated based on the SBI Marginal Cost of Funds based Lending Rate (MCLR) prevailing on 01.04.2022 plus 300 basis points; i.e. 10%.
- Working capital may be approved based on approved O&M cost and receivable according to annual fixed cost.
- **Non-tariff income:** OHPC claimed NTI as per Clause 26 and 41 of OERC Generation Tariff Regulations, 2020. Claimed Rs 11.23 Cr as 50% of deductible non-tariff income. Further, as per review order, OHPC has adjusted 1st installment of recovery of excess NTI deducted by the Commission in FY 2021-22.

ARR and Tariff

Proposed ARR (Rs Cr) and Tariff (FY 2023-24) Considering Saleable D.E.of 5602.60MU



| Detail Expenses | RHEP | UKHEP | BHEP | HHEP | CHEP | Sub Total | UIHEP | Total | Approved for FY 2022-23 |
|--------------------------------------|---------------|---------------|---------------|----------------|---------------|----------------|----------------|----------------|-------------------------|
| Existing Saleable Design Energy (MU) | 519.75 | 823.68 | 1171.17 | 660.52 | 485.10 | 3660.22 | 1942.38 | 5602.60 | 5602.60 |
| Return on Equity | 2.979 | 1.484 | 16.159 | 21.082 | 7.389 | 49.094 | 53.993 | 103.09 | 83.852 |
| Interest on Loan | 0.335 | 0.508 | 7.958 | 11.006 | 6.251 | 26.058 | 4.499 | 30.56 | 8.438 |
| Depreciation | 3.99 | 3.59 | 11.72 | 20.79 | 7.61 | 47.700 | 42.745 | 90.45 | 62.4 |
| O & M expenses | 61.327 | 55.668 | 60.214 | 58.967 | 25.485 | 261.662 | 77.166 | 338.83 | 337.924 |
| Interest on Working Capital | 2.303 | 2.078 | 2.618 | 2.785 | 1.184 | 10.968 | 4.044 | 15.012 | 14.140 |
| Less: non tariff income | 0.923 | 0.515 | 0.652 | 4.095 | 2.493 | 8.676 | 2.554 | 11.230 | 2.402 |
| Add: Adjustment of recovery of NTI | 0.607 | 0.777 | 1.239 | 0.699 | 0.175 | 3.497 | 1.457 | 4.954 | |
| Less Sale of power to CSPDCL | | | | 3.524 | | 3.524 | | 3.524 | 3.04 |
| Total ARR (23-24) | 70.618 | 63.591 | 99.257 | 107.711 | 45.601 | 386.777 | 181.350 | 568.127 | 501.31 |
| Approved total ARR (22-23) | 78.43 | 61.45 | 77.59 | 77.46 | 40.76 | 335.69 | 165.62 | 501.31 | |
| Average Tariff FY 23-24 (P/U) | 135.87 | 77.20 | 84.75 | 163.07 | 94.00 | 105.67 | 93.36 | 101.40 | 89.48 |

Percentage Increase in Tariff of 2023-24 over Tariff of FY 2022-23



- During FY 2023-24, OHPC proposes to sale an estimated energy of 5602.60 MU at an average tariff of 101.4 paise/unit.
- During FY 2022-23 , 5602.60 MU was approved by the Commission at an average tariff of 89.48 paise/kWh
- Over all increase of **13.32%** is proposed by OHPC during FY 2023-24 tariff .

Comparison of proposed Tariff of FY 2023-24 (With Saleable D.E. of 5602.60 MU)



| Power Station | Average tariff (P/U) FY 2019-20 | Average tariff (P/U) FY 2020-21 | Average tariff (P/U) FY 2021-22 | Average tariff (P/U) 2022-23 | Average tariff (P/U) 2023-24 | Increase in P/U (% increase) |
|---------------|---------------------------------|---------------------------------|---------------------------------|------------------------------|------------------------------|------------------------------|
| RHEP | 125.78 | 129.34 | 128.10 | 150.89 | 135.87 | -15.02 (-9.95%) |
| UKHEP | 76.47 | 80.49 | 80.91 | 74.61 | 77.20 | 2.59 (3.47%) |
| BHEP | 60.70 | 65.95 | 64.89 | 66.25 | 84.75 | 18.5 (27.9%) |
| HHEP | 126.46 | 129.36 | 126.29 | 117.28 | 163.07 | 45.79 (39.04%) |
| CHEP | 74.06 | 74.69 | 74.02 | 84.03 | 94.00 | 9.97 (11.86%) |
| UIHEP | 88.52 | 92.14 | 88.06 | 85.27 | 93.36 | 8.09 (9.49%) |

FY 23-24 proposed, all others are approved

Proposed Capacity Charge and Energy Charge (FY 2023-24)



| Name of power station | Annual Fixed Cost (ARR) (Rs. in Crs) | Annual Capacity Charge (ACC) (50% of ARR) in Rs. Cr. | Annual Energy Charge (AEC) (Rs. in Crs) | Salable design energy (MU) | Energy Charge Rate (ECR) (in p/u) |
|-----------------------|--------------------------------------|--|---|------------------------------|-----------------------------------|
| RHEP | 70.618 | 35.309 | 35.309 | 519.75 | 67.934 |
| UKHEP | 63.591 | 31.795 | 31.795 | 823.68 | 38.601 |
| BHEP | 99.257 | 49.628 | 49.628 | 1171.17 | 42.375 |
| HHEP | 107.711 | 53.856 | 53.856 | 660.52 | 81.535 |
| CHEP | 45.601 | 22.801 | 22.801 | 485.10 | 47.002 |
| UIHEP | 181.350 | 90.675 | 90.675 | 1942.38 | 46.682 |

Comparison of Two-Part Tariff

| Name of power station | Approved Tariff (2022-23) | | <u>Proposed Tariff (2023-24)</u> | |
|-----------------------|---------------------------|--------------------------|----------------------------------|---------------------------------|
| | Capacity Charge (Rs Cr) | Energy Charge Rate (P/U) | <u>Capacity Charge (Rs Cr)</u> | <u>Energy Charge Rate (P/U)</u> |
| RHEP | 39.21 | 75.45 | 35.309 | 67.934 |
| UKHEP | 30.73 | 37.30 | 31.795 | 38.601 |
| BHEP | 38.79 | 33.12 | 49.628 | 42.375 |
| HHEP | 38.73 | 58.64 | 53.856 | 81.535 |
| CHEP | 20.38 | 42.01 | 22.801 | 47.002 |
| UIHEP | 82.81 | 42.63 | 90.675 | 46.682 |

Details of Reimbursement

| Component of Costs | RHEP | UKHEP | BHEP | HHEP | CHEP | UIHEP | Total (FY 23-24) | FY 22-23 (approved) |
|--|-------|-------|-------|-------|-------|-------|------------------|---------------------|
| (a) License fee for use of water for generation of electricity for FY 2023-24. | 0.893 | 1.414 | 2.011 | 1.163 | 0.833 | 3.335 | 9.649 | 9.082 |
| (b) ED on Auxiliary Energy Consumption for FY2023-24. | 0.289 | 0.458 | 0.651 | 0.376 | 0.270 | 1.079 | 3.122 | 3.122 |
| (c) SLDC charges for FY 2022-23. | | | | | | | 1.554 | 1.47 |
| (d) Application fees and publication expenses for FY2023-24 | | | | | | | 0.270 | 0.270 |
| (e) Differential publication expenses for FY2021-22 | | | | | | | | 0.004 |
| (f) ERPC charges for FY2023-24 | | | | | | | 0.16 | 0.16 |
| (g) Differential ARR of MHEP for FY2020-21 | | | | | | | | 4.039 |
| (h) Income Tax as per Audited Account of FY 2021-22 | | | | | | | 21.89 | 35.189 |
| (i) Working capital equal to 15% of O&M budget of FY 2020-21 for MHEP | | | | | | | | 7.74 |
| Total (Rs cr) | | | | | | | 36.645 | 61.076 |

Proposed Tariff for Machhakund HEP (FY 2023-24)

- Orissa has a share of 262.5 MU (50% of total generation) power in Machhakund Hydro Electric Project.
- As per the provisions made in the Agreement dated 23 Oct 2020, for acquiring additional 20% share of the Joint Scheme, Govt. of Odisha / OHPC made payment of Rs 27.42 Crores to GoAP/APGENCO towards present depreciated cost of the Project and shared the expenditure on account of RM & U works for all the generating units along with auxiliaries and switchyard system in the ratio of 50:50

| Particulars | Amount (Rs CR) |
|--|----------------|
| 1. Total Audited Cost of O&M Bill of MHEP (Jt.) for the FY 2021-22 | 54.3944 |
| 2. 50% O&M Expenditure share (Orissa share of Actual O&M Expenditure for 2021-22) | 27.1972 |
| 3. O&M Expenditure for FY 2023-24 applying the escalation factor | 30.3983 |
| Total Expected Expenditure during the FY 2023-24 | 30.3983 |
| Tariff (Tariff of MHEP(Jt.) Scheme for FY2023-24 (paisa/ kWh) | <u>116.972</u> |

- Tariff approved by Commission for FY 2022-23 – **110.903 Paise/Unit**

Conclusion

- Hon Commission may consider submissions of the consumer counsel on following parameters –
 - Capital cost and additional capitalization: based on historical cost and review of proposed additional capitalization
 - return on equity: allowed as per regulations
 - Interest on loan: as per previous orders of Commission
 - Depreciation: allowed as per regulations
 - Interest on working capital: based on approved components
- Hon Commission may decide the ARR and tariff accordingly.

Thank You