



**PERFORMANCE AUDIT REPORT
ON
GOLEN GOL HYDROPOWER PROJECT
CHITRAL
AUDIT YEAR 2020-21**

AUDITOR GENERAL OF PAKISTAN

PREFACE

The Auditor General conducts audit subject to Articles 169 and 170 of the Constitution of the Islamic Republic of Pakistan, 1973 read with Sections 8 and 12 of the Auditor General's (Functions, Powers, Terms and Conditions of Service) Ordinance, 2001. The Performance Audit of Golen Gol Hydropower Project was carried out accordingly.

The Directorate General Audit Water Resources conducted performance audit of the project during March to June, 2021 with a view to report significant findings to the relevant stakeholders. This report is based on performance audit of Golen Gol Hydropower Project, Chitral covering the economy, efficiency and effectiveness of expenditures for the period up to March, 2021. In addition, Audit also assessed, on test check basis, whether the management complied with applicable laws, rules and regulations in managing the Golen Gol Hydropower Project, Chitral.

Audit findings indicate the need for taking specific actions to realize the objectives of Golen Gol Hydropower Project, Chitral besides instituting and strengthening internal controls to avoid recurrence of violations and irregularities.

Audit observations have been finalized in the light of discussion held in meeting of Departmental Accounts Committee.

The Audit Report is submitted to the President in pursuance of the Article 171 of the Constitution of the Islamic Republic of Pakistan, 1973 for causing it to be laid before the both Houses of Majlis-e-Shoora [Parliament].

Dated: 28 FEB 2022
Islamabad

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(Muhammad Ajmal Gondal)
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Abbreviation and Acronyms

BoQ	Bill of Quantity
CDM	Clean Development Mechanism
CDWP	Central Development Working Party
CER	Certified Emission Reductions
COD	Commercial Operation Date
CPPA	Central Power Purchasing Agency
DAC	Departmental Accounts Committee
DLP	Defect Liability Period
ECC	Economic Coordination Committee
ECNEC	Executive Committee of the National Economic Council
EoT	Extension of Time
E&M	Electrical & Mechanical
FC	Foreign Component
GFR	General Financial Rules
GGHPP	Golen Gol Hydropower Project
GLOF	Glacial Lake Outburst Flood
GM	General Manager
GWh	Giga Watt Hour
IPC	Interim Payment Certificate
JV	Joint Venture
KFAED	Kuwait Fund for Arab Economic Development
KM	Kilo Meter
KV	Kilo Volt
KW	Kilo Watt
KWh	Kilo Watt Hour
LC	Local Component
m ³	Cubic Meter
MoWR	Ministry of Water Resources
MW	Mega Watt
NEC	National Economic Commission
NEPRA	National Electric Power Regulatory Authority
NHA	National Highway Authority
NOL	No Objection Letter

OFID	OPEC Fund for International Development
O&M	Operation & Maintenance
PC-I	Planning Commission Proforma-I
PD	Project Director
PDU	Project Development Unit
PPRA	Public Procurement Regulatory Authority
PSDP	Public Sector Development Programme
PSR	Preliminary Survey Report
SFD	Saudi Fund for Development
ToRs	Terms of References
UNDP	United Nation Development Programme
USAID	United States Agency for International Development
US\$	United States Dollar
WAPDA	Water and Power Development Authority
WCSR	WAPDA Composite Schedule of Rates

EXECUTIVE SUMMARY

Directorate General Audit Water Resources conducted performance audit of Golen Gol Hydropower Project, Chitral from March to June, 2021. Main objectives of the audit were to evaluate whether the project transactions and activities were carried out in economical, efficient, and effective manner. The audit was conducted in accordance with the prevailing rules and regulations.

Golen Gol Hydropower Project was included in Vision-2025 Programme approved by the Chief Executive on January 17, 2001. The original PC-I of the project was approved by ECNEC on September 02, 2002 for Rs.7,035.13 million. The project is located in District Chitral. Total installed capacity of the power plant is 106 MW with annual energy generation of 436 GWh. The prime objective of this hydropower project is to provide cheaper and much needed power, keeping in view the present and future power requirements of Pakistan.

After arrangement of funds in 2008 from various donor agencies and PSDP, the execution of the project was initiated with the preparation of detailed engineering design. However, the contracts for various works were awarded in 2010. Due to various natural calamities, the project suffered from abnormal delays and cost overruns. Accordingly, 1st revised PC-I of the project was approved by ECNEC on September 30, 2016 for Rs.29,077.17 million but the project could not be completed within the revised timelines and financial limits.

Though the project was commissioned in January, 2018 but it could not achieve its prime objective of generating annual energy of 436 GWh. Design deviations carried out during the implementation stage proved detrimental for the project in the shape of blocking of intake area due to instances GLOFs and damages to transmission line due to avalanches. Despite the fact that recurring expenditure has been incurred on temporary rehabilitation works but huge expenditure is required for carrying out permanent rehabilitation works in order to make the project viable.

a. Key Audit Findings

Following are the key audit findings:

Organization and Management

- i. Design deviations from its initial feasibility study and PC-I during project execution phase resulted in an ineffective project

- ii. The project suffered a loss of Rs.2,429.95 million due to non-adoption of proposed route of transmission line
- iii. Violations of the loan agreement resulted in delay of project implementation and excess payment of Rs.489.85 million to the contractor
- iv. The project was implemented with a time overrun of 13 years and cost overrun of Rs.30,189 million
- v. The payback period of the project was increased from 7 years to 48 years which is more than its useful life of 30 years

Financial Management

- vi. The contracts of the project were awarded in excess of PC-I provisions
- vii. Non-recovery of Rs.748.47 million of double payment from contractor
- viii. Irregular expenditure amounting to Rs.8,146 million was incurred over and above the financial limits of 1st revised PC-I

Procurement and Contract Management

- ix. The contract of civil works of project was awarded at 41.66% higher than the Engineer's estimate at exorbitantly high rates
- x. The delay in award and execution of the contract of transmission line resulted in increase in cost of the contract by Rs.2,240.63 million and generation loss of Rs.2,430.64 million
- xi. Procurement from unapproved manufacturer caused undue favour of Rs.284.71 million to the contractor
- xii. Non-issuance of COD certificates on completion of the project resulted in non-recovery of Rs.1,946.71 million on account of capacity charges

Achievement of Targets

- xiii. The project was unable to achieve its prime objective to generate annual energy of 436 GWh. The project could not even achieve its break even annual production of 325 GWh
- xiv. The project has suffered heavy generation losses of Rs.4,094 million due to GLOF and non-clearance of intake area
- xv. The project lost its financial viability due to non-recovery of Rs.563.67 million as per clean development mechanism since its commissioning in January, 2018

b. Recommendations

In view of the audit findings, following audit recommendations are made to help the management to take corrective actions:

- i. Different activities during project execution should be properly planned and coordinated so that planned objectives could be achieved effectively
- ii. Project execution and award of contracts must only be initiated upon financial closure and availability of unencumbered land in accordance with the guidelines of Manual for Development Projects
- iii. Project must be implemented as per parameters of approved PC-I and any major changes or deviations in scope and design having huge financial implications must only be implemented by seeking prior approval of the competent forum
- iv. Design and supervisory consultants should be timely hired in order to ensure detailed designing before award of contracts
- v. Technical parameters of the project should be analyzed through independent consultants on the basis of latest updated hydrology studies and surveys to rectify the design faults of the project so that the project could withstand future floods, GLOFs and other natural calamities
- vi. WAPDA needs to bring efficiency in its processes related to grant of extension of times and approval of variation orders to avoid adverse financial implications
- vii. PPRA Rules must be adhered to in letter and spirit to ensure economy and transparency
- viii. An inquiry be constituted at apex level to carry out technical probe to ascertain the design deviations and other causes of non-achievement of objectives of GGHPP so that the lessons learnt from the project could be leveraged to avoid such issues in future projects of WAPDA

1. INTRODUCTION

Golen Gol Hydropower Project (GGHPP) is located in district Chitral 25 km North of Chitral at the confluence of Golen Gol River with Mastuj River. The powerhouse is located about 2 km upstream of Koghuzi Village. The project has the installed capacity of 106 MW with an annual energy of about 436 GWh.

The main objective of this project is to provide adequate facilities for the generation of electrical energy keeping in view the acute power shortage in the country during period of April to June when other hydel power generating stations are at minimum capacity due to minimum reservoir levels. The GGHPP will utilize a gross head at about 435 meters by diverting the Golen River flows from Golen to lower limits of Mastuj River through a 3.8 km long headrace tunnel system.

The whole work of the project was divided in following five Lots under the supervision of M/s Fitchner JV as consultants:

- i. Lot-1 Construction of O&M Staff Colony and other allied works.
- ii. Lot-2 Intake & pressure Tunnel works
- iii. Lot-3.1 Civil Works of Powerhouse, Tailrace and Switchyard Area
- iv. Lot-3.2 Electrical & Mechanical (E&M) Works of Powerhouse
- v. Lot-4 132 KV Transmission Line & Grid Station.

The original PC-I of the project was approved by Executive Committee of the National Economic Council (ECNEC) on September 02, 2002 for Rs.7,035.13 million (LC of Rs.4,397.01 million and FC of Rs.2,638.12 million). The 1st revised PC-I of the project was approved by ECNEC on September 30, 2016 for Rs.29,077.17 million (LC of Rs.18,297.29 million and FC of Rs.10,679.88 million). Original PC-I provides the completion period from July 2002 to June 2006. 1st revised PC-I provides the completion period from February, 2011 to December, 2018.

The local component of the project was financed by the Government of Pakistan through PSDP. Foreign component was financed by foreign loans from OPEC Fund for International Development (OFID) of US\$ 30 million, Saudi Fund for Development (SFD) of US\$ 97.80 million, Kuwait Fund for Arab

Economic Development (KFAED) of US\$ 37 million and USAID grant of US\$ 35.6 million.

The project activities were abnormally delayed resulting into time overrun of 13 years with cost overrun of Rs.30,189 million. Design deviations from PC-I regarding maximum floods and mismanagement resulted in ineffective project. The project could not achieve its prime objective of annual generation of 436 GWh electricity, even it could not achieve its breakeven annual generation of 325 GWh. Moreover, the project has lost its viability as the payback period of the project has increased from 7 years to 48 years. With the current status, the project would not be able to recover its cost even during its useful life over 30 years unless permanent rehabilitation works at huge cost are undertaken.

2. AUDIT OBJECTIVES

The main audit objectives were:

- i. Whether the project succeeded in achieving its objectives as envisaged in PC-I;
- ii. To analyze economy and efficiency in the acquisition of resources and operation of the project;
- iii. To analyze effectiveness of activities carried out during project, and
- iv. To assess the factors which caused delay in completion of project.

3. AUDIT SCOPE AND METHODOLOGY

3.1 Audit Scope

The performance audit was conducted for each phase of the project since preparation of feasibility study in 1997, approval of PC-I in 2002, preparation of Detailed Engineering Design (DED) in 2008, awarding of contracts from 2010 to 2014, completion of the project in October 2019 and O&M phase of the project up to March, 2021. During this period an expenditure of Rs.37,223.64 million was incurred. Auditable record of the project was available at office of PD GGHP Chitral and GM Project North office, Peshawar.

3.2 Audit Methodology

The audit work was initiated by formulating detailed Preliminary Survey Report (PSR) and development of audit program. Following audit methodology

was adopted during the course of performance audit:

- i. Discussions with project management;
- ii. Examination of samples selected from record / documents of the project;
- iii. Review of original PC-I and 1st revised PC-I of the project;
- iv. Review of contract agreements;
- v. Review of consultancy agreements;
- vi. Review of bid evaluation reports;
- vii. Examination of the progress reports of the project, and
- viii. Site visits.

4. AUDIT FINDINGS AND RECOMMENDATIONS

4.1 Organization and Management

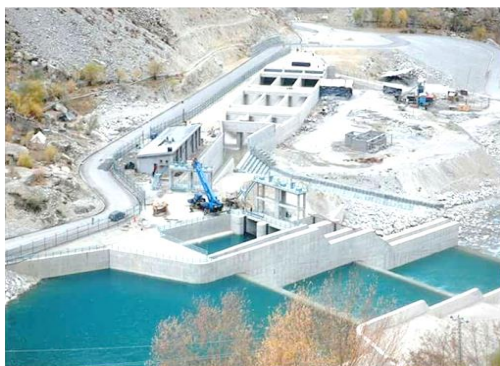
4.1.1 Design deviations from PC-I resulted in ineffective project

As per Para 12.B.1 (i) (a) spilling /overflow section of original PC-I and Para 6.5 (i) (a) spilling /overflow section of 1st revised PC-I of GGHPP, “the Weir Crest has an elevation of 2052 m.a.s.l and length of 60 meters. The spilling section is designed for a maximum spilling capacity of 1156 m³/s, which corresponds to high flood with 1000 years return period”. Moreover, as per Clause 3.4 of Consultancy Services Agreement regarding the liability of the consultants, “the consultants are liable for the consequence of errors and omissions on his part or on the part of his employees in so far as the design of the project is concerned to the extent and with the limitations that if the client suffers any losses or damages as a result of proven faults, errors or omissions in the design of a project”.

During performance audit of GGHPP Chitral, it was noticed that as per PC-I and the feasibility study of 1997, the project was required to be designed for flood by taking 1000 years return period with maximum flood of 1156m³/s, whereas the project was constructed on a reduced flood estimation of 583m³/s and on a reduced weir length of 40 meters instead of 60 meters. Despite the fact that the design consultants later on updated their hydrological study after the flood of 2010, wherein, it was concluded that the estimated flood peaks would be 681m³/s as compared to their earlier estimate of 583m³/s. However, design of the project against flood was not revised in the light of the updated hydrological study and project was constructed at the maximum flood level of 583m³/s. After commissioning of the project, a GLOF having intensity of 659m³/s was witnessed on July 07, 2019. As a result whole of the intake area was submerged and the power house remained shut for 64 days till September 11, 2019 due to accumulation of huge boulders and stones in the weir area. During next year, GLOF of about same intensity was again witnessed on July 13, 2020 and the power house remained closed for 41 days till August 23, 2020. A third flash flood resulted in shut down of power house for 19 days till September 15, 2020.

Non-adherence to the parameters of feasibility study and PC-I resulted in damage of intake area and failure of the project to achieve its full capacity.

Before GLOF Event



After GLOF Event



The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that the project was designed for discharge of 583 m³/s in order to optimize the Project cost. Design of project for 1156 m³/s would have doubled the cost of project components.

The reply was not tenable as the project was executed on flood of 583m³/s with reduced weir width of 40 meter against the approved flood of 1156m³/s and weir width of 60 meters in the PC-I.

The DAC in its meeting held on September 01, 2021 directed Member Water WAPDA to refer the matter to MoWR for hiring of independent consultants under PDU. The consultants would carry out a detailed study and technical probe to ascertain the design deviations and other causes of non-achievement of objectives of GGHP so that the lessons learnt from the project could be leveraged to avoid such issues in future projects of WAPDA. Further progress was not intimated till finalization of the report.

Audit recommends the management to fix responsibility for deviations in design parameters given in the feasibility study and approved PC-I of the project.

4.1.2 Delay in preparation of detailed design after project approval

As per Clause 4.5 of the Manual for Development Projects, "Within six months of project approval, detailed design and costing should be finalized and submitted to the competent authority. Implementation of such project components, which require detailed designing, should be started only when these have been finalized".

During performance audit of GGHP Chitral, it was observed that PC-I

costing Rs.7,035.13 of the project was approved by ECNEC in its meeting held on September 02, 2002 with completion date of June 30, 2006. As per implementation schedule of the PC-I the detailed design should have been completed by March 31, 2003. However, the consultancy services contract for preparation of detailed engineering design of the project was signed on July 01, 2007 for a period of 9 months i.e. up to March 31, 2008 which was further extended for 21 months i.e. up to March 31, 2009. The task of detail engineering design and preparation of tender documents was completed in May 2008. As such detailed design was finalized with a delay of more than six years from the date of approval of PC-I.

Non-adherence to the Manual for Development Projects resulted in delay of 6 years in implementation of the project due to delay in preparation of detailed engineering design.

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that work could not be started due to non-arrangement of funds and bad security situation in the project area. However, EoTs to the consultants were approved by the Authority.

The reply was not tenable because the management has not substantiated its stance with documentary evidence and EoTs were granted contrary to the consultancy contract.

The DAC in its meeting held on September 01, 2021 directed the management to provide justification of delay along with documentary evidence. Moreover, EoT given may also be justified in the light of deleted clause of EoT in the consultancy contract. Further progress was not intimated till finalization of the report.

Audit recommends the management to implement DAC's decision.

4.1.3 Delay in appointment of supervisory consultants

As per Clause 7.6 of Manual of Development of Projects, (project execution / supervision-development of management information system), "The Project Director, supported by ancillary staff, will coordinate day-to-day activities and through effective management ensure that the project achieves its development objectives and deals with the problems that arise during

implementation. Besides, significant milestones could be determined and regularly monitored by the project management, the sponsoring agency and line department or ministry to ensure that actions are taken in time, especially for the appointment of consultants, contractors, procurement of inputs, inter-agency coordination and fund releases”.

During performance audit of GGHPP Chitral, it was noticed that ECNEC in its meeting held on September 02, 2002 approved the project at a total cost of Rs.7,035.13 million with stipulated completion date as June 30, 2006. The process of inviting request for proposals for consultancy services for supervision of the project was started in December 2008 with delay of six years. It took 2-3 years in bidding and evaluation process and the contract for supervisory consultants was finally signed on May 14, 2011 with Joint Venture led by M/s Fichtner, Germany even after award of civil work contracts under Lot-1, Lot-2 and Lot-3.1.

Non-adherence to the guidelines contained in Manual for Development Projects resulted in delay in appointment of supervisory consultants.

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that besides funding issues, the procurement process for hiring of supervisory consultants was delayed due to non-submission of bids by the shortlisted firms keeping in view the law and order situation in Khyber Pakhtunkhwa.

The reply was not tenable because the management has not substantiated its stance with documentary evidence.

The DAC in its meeting held on September 01, 2021 directed the management to provide justification of delay along with documentary evidence. Further progress was not intimated till finalization of the report.

Audit recommends the management to fix responsibility for delay in appointment of supervisory consultants besides bringing in efficiency in the procurement process.

4.1.4 Delay in issuance of construction drawings - Rs.203.78 million

As per Clause 3.4 of Consultancy Services Agreement regarding the

Liability of the consultants, “the consultants are liable for the consequence of errors and omissions on his part or on the part of his employees in so far as the design of the project is concerned to the extent and with the limitations that if the client suffers any losses or damages as a result of proven faults, errors or omissions in the design of a project, the consultants shall make good such losses or damages, subject to the conditions that the maximum liability as aforesaid shall not exceed twice the total remuneration of the consultants for design phase in accordance with the terms of the contract”.

During performance audit of GGHP Chitral, it was noticed that contract of Civil Works under Lot-2 and Lot-3.1 was awarded to M/s Sambo-Sarco on December 21, 2010 and December 28, 2010 with completion period of 1460 days and 1400 days respectively. As per provisions of contract, the consultant was required to issue the construction drawings to the contractor within a reasonable time to enable him to start the work. However, issuance of construction drawings was delayed by the consultant for 204 days in Lot-2 and 73 days in Lot-3.1 respectively. As the delay was not on the part of the contractor, EoT cost claim of Rs.187.04 million for Lot-2 and Rs.16.74 million for Lot-3.1 had to be borne by the project.

Audit held that delay in issuance of construction drawings by the project consultant resulted in increase in project cost by Rs.203.78 million (Rs.187.04 million + Rs.16.74 million) and delay of 277 days in completion of the project for which responsibility needs to be fixed upon the project consultant which was not done.

Non-adherence to the contract clauses resulted in increase in cost of Rs.203.78 million and delay of 277 days in completion of project due to delay in issuance of construction drawings to the contractor.

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that drawings were delayed due to non-availability of consultant’s design team. On the basis of delayed design drawings, non-compensable EoTs were granted and the recommendations of the consultants for cost verification of EoTs were not agreed to. The contractor’s EoT cost claims are now under the process of arbitration.

The reply was not tenable because no responsibility was fixed on consultants for non-availability of design team.

The DAC in its meeting held on September 01, 2021 directed the management to vigorously follow the case under arbitration and share the outcome with Audit. Moreover, DAC also directed the management to get the mobilization record of consultant verified from Audit. Further progress was not intimated till finalization of the report.

Audit recommends the management to fix responsibility upon the consultants for delay in issuance of construction drawings and in case EoT claims of the contractor are decided against the employer the same may be recovered from the consultants.

4.1.5 Non-adoption of proposed route of transmission line - Rs.2,429.95 million

As per Para 9.28.2 of Section 9 of the Design Report 2008, “The line will pass through areas of harsh climate with high speed of winds, intensive snow falling, heavy ice accumulation and avalanches especially on the lowari pass. Better option for the line in lowari pass area was to cross the lowari pass by cable through tunnel which is under construction. It will avoid maintenance and risk of break-down of line on lowari pass and abnormal delay in restoration of the supply due to difficult terrain”.

During performance audit of GGHPP Chitral, it was noticed that contract for construction of transmission line under Lot-4 Package-I was awarded to M/s Netracon-NEIE/Holley Consortium on February 11, 2014 and Package-II on November 05, 2014. The construction of the transmission line was completed on December 30, 2018. However, towers on the lowari pass got badly damaged due to snow fall and avalanches in January 2019 and January 2020. As a result, the power house remained disconnected from the national grid and kept running in isolation mode to the extent of local energy demand of 6-7 MW for five months during 2019 and six months during 2020. Disconnection from the national grid resulted in generation loss of Rs.2,407.29 million. Further, an amount of Rs.22.66 million was incurred for restoration of the damages.

Audit held that the recurring generation loss and maintenance costs had to

be borne due to non-adherence to the proposal of design consultants of passing the transmission line through Lowari tunnel. Moreover, National Highway Authority (NHA) had also agreed to allow the line through the tunnel and provided drawings to WAPDA but this option was dropped with the plea that tunnel would complete after completion of the project. In fact, the tunnel was completed on July 20, 2017 and the transmission line was completed and connected to National Grid on September 18, 2018.

Non-adoption of the proposal of the design consultants resulted in huge loss of Rs.2,429.95 million (Rs.2,407.29 million + Rs.22.66 million).

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that damages to the transmission line due to avalanches in the year 2019 and 2020 were force majeure events. Moreover, re-routing of some towers at lowari top area to a safer location would ensure future reliable operation of the transmission line.

The reply was not tenable because the recommendations of Design Report, 2008 were not implemented.

The DAC in its meeting held on September 01, 2021 directed the management to get detailed evidence of correspondence with NHA along with other supporting record verified from audit. Further progress was not intimated till finalization of the report.

Audit recommends the management to ensure rerouting of transmission lines at the earliest to avoid damages due to future events of avalanches besides implementing DAC's decision.

4.1.6 Increase in cost due to non-preparation of detailed design of transmission line – Rs.2,104.65 million

As per Para 4.5 of Manual for Development Projects, “within six months of project approval, detailed design and costing should be finalized and submitted to the competent authority. Implementation of such project components, which require detailed designing, should be started only when these have been finalized. The decision of the NEC should be strictly followed by the executing agency”.

During performance audit of GGHPP Chitral, it was noticed that PC-I of

the project was approved in September 02, 2002 at a cost of Rs.7,035.13 million. The tender for transmission line under Lot-4 was invited in March, 2012 without preparation of detailed drawings and design. The work on Package-I and Package-II of Lot-4 were awarded to M/s Netracon-NEIE/Holley Consortium at a cost of Rs.3,441.25 million and Rs.1,462.99 million, respectively. Due to non-preparation of detailed drawings and design, the scope of work / design had to be substantially changed through six variation orders during execution of the project which resulted in increase of contract cost by Rs.2,104.65 million. Audit held that due to non-preparation of detailed design of transmission line, the work was completed with a delay of 23 months and with an additional cost of Rs.2,104.65 million.

Non-adherence to Manual for Development Projects resulted in delay of 23 months and increase in project cost by Rs.2,104.65 million due to award of work without detailed design.

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that the change in scope of work was necessitated due to design review by the consultants in accordance with site requirements.

The reply was not tenable because the design for transmission was not finalized before award of contract.

The DAC in its meeting held on September 01, 2021 directed Member Water WAPDA to provide a report to Audit within 45 days on the reasons / justification for delay in transmission line. Further progress was not intimated till finalization of the report.

Audit recommends the management to fix responsibility for non-finalization of design before award of contract and frequent changes in scope of work through variation orders.

4.1.7 Excess payment to the contractor due to mismanagement and violation of loan agreement – Rs.489.85 million

As per Section 4.07 of the Loan Agreement signed on March 21, 2007 between the Islamic Republic of Pakistan (Borrower) and Kuwait Fund for Arab Economic Development (Fund), “The awarding of contracts for the execution of the project and any amendments thereto shall be subject to the fund’s approval”.

During performance audit of GGHPP Chitral, it was observed that award of the E&M work to M/s Andritz under Lot-3.2 was approved by WAPDA on December 27, 2013 and contract was signed with the contractor on February 19, 2014 without taking approval of the donor before awarding the work. The donor refused to process the first mobilization advance claim due to non-taking approval of the award of the project from the donor. The donor issued no objection letter and released 1st mobilization advance after a period of nine months upon reviewing the bid evaluation report in accordance with the requirements of the loan agreement. As such non-taking of approval of the donor by the management caused a delay of nine months. Subsequently, 2nd mobilization advance was certified by the engineer after a delay of more than 19 months from submission of invoices by the contractor. Moreover, the project consultants refused to carry out the design work of the project until Amendment No.2 to their consultancy agreement was approved by WAPDA. It took ten months in approving Amendment No.2 of the consultancy agreement by the project management. Resultantly, payment equivalent to Rs.489.85 million (Rs.78.79 million, Euro 2,358,379 and US\$ 37,167) was paid in addition to the contract cost to the contractor due to negligence of the project management and consultant.

Non-fulfilment of essential contractual obligations under loan agreement and delay in approval of Amendment No.2 to the consultancy agreement by the project management resulted in 747 days delay in completion of the project and extra payment of Rs.489.85 million to the contractor.

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that delay was on part of the donor and the consultant with regards to mobilization advance. The matter of Amendment No.2 to the consultancy agreement required detailed scrutiny and due diligence before its approval.

The reply was not tenable because the delay in payment of mobilization advance and approval of Amendment No.2 to the consultancy agreement resulted in issuance of EoT of 747 days with additional cost to the contractor.

The DAC in its meeting held on September 01, 2021 directed Member Water WAPDA to provide a report to Audit within 45 days on the given ToRs:

(a) Reasons for delay in signing of Amendment No.2, (b) Record relating to NOL of the donor prior to award of the contract, and (c) How sub-contractors were hired against the agreement by contractor. Further progress was not intimated till finalization of the report.

Audit recommends the management to fix responsibility for violation of donor guidelines and delays on the part of management and consultants which resulted in extra financial burden on the national exchequer.

4.1.8 Increase in cost and time due to delay in finalization of site location for switchyard – Rs.221.39 million

As per Clause 12 of Part-A Special Provisions of the Contract Agreement, “The site shall be deemed to include all areas on which temporary and permanent works are to be constructed under the Contract and all other areas made available to the contractor for the execution of the works”.

During performance audit of GGHP Chitral, it was noticed that a contract of civil work under Lot-3.1 was commenced by M/s Sambo-Sarco on February 01, 2011 with completion period of 1400 days i.e. up to December, 2014. As per work schedule the construction of switchyard was to commence in January, 2013 but location of the switchyard could not be finalized, which resulted in delay of possession of the land for switchyard. Finally, the land for switchyard was handed over to the contractor in December, 2015. Due to delay in acquisition / selection of site for switchyard by the employer construction activities were delayed for 1039 days, for which EoT having financial implication of Rs.221.39 million was certified by the project consultants. Audit held that EoT of 1039 days was due to fault of the employer for which responsibility needs to be fixed.

Non-fulfilment of contractual obligations by the employer resulted in increase in project cost by Rs.221.39 million and time by 1039 days.

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that delay was beyond the control of management as the previous site was not safe. However, the matter is under the process of arbitration.

The reply was not tenable because the repeated change in site of switchyard showed inefficiency of the management.

The DAC in its meeting held on September 01, 2021 directed the management to vigorously follow the case under arbitration and share the outcome with Audit. Further progress was not intimated till finalization of the report.

Audit recommends the management to fix responsibility for initial wrong site selection and delay in finalization of new site for switchyard besides implementing DAC's decision.

4.1.9 Time overrun of 13 years with cost overrun of Rs.30,189 million

As per Clause 7.5 of Manual for Development Projects referring ECC's decision dated December 27, 1988, "Those responsible for not undertaking forward planning and causing delays in implementation of projects should be taken to task".

During performance audit of GGHP Chitral, it was noticed that ECNEC in its meeting held on September 02, 2002 approved the project at a total cost of Rs.7,035.13 million with completion date of June 30, 2006. But the project could not be executed as per implementation schedule of PC-I. Detailed design of the project was prepared in 2008 with delay of 6 years. Contracts for civil works under Lot-2 and Lot-3.1 were awarded during 2010. The contract for supervisory consultancy was awarded during May, 2011 even after award of civil contracts. Contracts for E&M and transmission line were awarded in 2014. Later on, 1st revised PC-I of the project was approved by ECNEC in September 2016 with cost of Rs.29,077.17 million. There was time over run of 10 year at the time of approving the 1st revised PC-I with cost overrun of Rs.22,042 million. As per revised PC-I, completion date for Unit-1 was December 31, 2017 and for all units was May 2018. However, 1st Unit of the project was completed on January 23, 2018 and 2nd and 3rd units achieved COD on October 23, 2019. Actual expenditure incurred on project was Rs.37,223.65 million up to June, 2020 resulted in cost overrun of Rs.30,189 million (**Annex-1**) as compared to the cost of original PC-I.

Non-adherence to guidelines of Manual for Development Projects resulted in time overrun of 13 years and cost overrun of Rs.30,189 million as compared to original PC-I.

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that increase in cost was due to various reasons such as: (a) claims for Civil, E&M works and transmission line works, (b) amendments in consultancy services agreement, (c) post flood / GLOF temporary rehabilitation works, (d) damages of 132 KV Transmission Line.

The reply was not tenable because an inquiry was constituted by CDWP at the time of approving the 1st revised PC-I, whereby it was concluded that delays and cost overruns occurred due to lack of coordination between WAPDA, consultants and contractors which resulted in economic loss to the national exchequer. No action was taken against the officers held responsible by the inquiry committee for the time and cost overrun.

The DAC in its meeting held on September 01, 2021 was of the view that the matter of time and cost overrun is a systemic fault in development projects which need to be looked as such. However, detailed report of the independent consultant would identify the causes of time and cost overrun. Further progress was not intimated till finalization of the report.

Audit recommends the management to fix responsibilities for the extraordinary delay besides implementing DAC's decision to address the systemic fault in future projects.

4.1.10 Non-viability of the project due to increase in payback period from 7 years to 48 years

As per Clause 11.4.1.5 of 1st revised PC-I regarding payback period, "The payback period of the project is about 7.05 years and 7.10 years with and without CDM benefits respectively".

During performance audit of GGHP Chitral, it was noticed that ECNEC in September 2016 approved 1st revised PC-I of the project at the total cost of Rs.29,077.17 million. The payback period of the project was calculated as 7.05 years with revenue of CDM and 7.10 years without CDM benefits. The payback period is key indicator to show the success of the project. It was noticed that the project was abnormally delayed and there was huge increase in the cost of the project as compared to the cost approved in 1st revised PC-I i.e. Rs.29,077.17 million to Rs.37,223.65 million.

The project was commissioned in January 2018 but the generation remained very low as compared to its annual estimated generation of 436 GWh. Total generation of the project in 3.25 years (Jan 2018 – Mar 2021) was 263.046 GWh. As per current scenario, at an average annual generation of 80.94 GWh (**Annex-2**) the payback period would increase from 7.05 years (as per PC-I) to 48 years. If the conditions remained the same and the issues of design regarding maximum flood and avalanches are not resolved, the project would not be able to recover its cost even in its whole useful life of 30 years.

Huge increase in the cost of the project and non-achievement of requisite estimated generation output resulted in increase of payback period from 7 years to 48 years.

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that the project could not achieve its targeted generation due to operation of hydropower project in isolation mode and breakdowns due to avalanches, GLOFs and faults in 132 KV transmission line during 2019-20 and 2020-21.

The reply was not acceptable because the project lost its viability due to design deviations from feasibility study and PC-I.

The DAC in its meeting held on September 01, 2021 directed Member Water WAPDA to refer the matter to MoWR for hiring of independent consultants under PDU. The consultants would carry out a detailed study and technical probe to ascertain the design deviations and other causes of non-achievement of objectives of GGHP so that the lessons learnt from the project could be leveraged to avoid such issues in future projects of WAPDA. Further progress was not intimated till finalization of the report.

Audit recommends the management to implement DAC's decision.

4.2 Financial Management

4.2.1 Award of contracts in excess of PC-I provision – Rs.15,836.08 million

As per Para 2 of the Planning and Development Division letter No.20(15)DA/PD/95 dated January 16, 1996, it was decided that the executing agencies, while continuing the work on the approved project, should immediately submit the revised PC-I for approval of the competent forum as soon as they

realize at any point of time during the execution of the project that the cost is likely to exceed the sanctioned cost by more than 15% after allowing for cost increase due to variation in exchange rates. Moreover, as per Clause 4.14(h) of the Manual for Development Projects, when the need of revision of cost becomes evident due to higher bids received in response to a tender, the revised scheme based on the accepted tender cost should be submitted to the competent authority for fresh approval. In the exceptional case where the revised PC-I cannot be prepared in time, anticipatory approval of the Chairman, ECNEC had to be obtained.

During performance audit of GGHP Chitral, it was noticed that PC-I of the project was approved on September 02, 2002 at a cost of Rs.7,035.13 million with stipulated completion date of June 30, 2006. The project comprising of five lots was initiated in 2010 upon an out-dated PC-I and contracts costing Rs.15,836.08 million (**Annex-3**) were awarded in excess of approved PC-I provision. Audit is of the view that award of contracts over and above the PC-I provisions upon out-dated PC-I were irregular.

Non-adherence to the provisions of Manual for Development Projects resulted in irregular award of contracts costing Rs.15,836.08 million in excess of PC-I provision.

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that it took almost 6 years in arranging funds from the foreign donors and repetitive tendering caused extensive delays. Contracts awarded beyond original PC-I were approved by ECNEC in the 1st revised PC-I.

The reply was not tenable because while approving the 1st revised PC-I of the project, an inquiry committee was constituted to probe the matter regarding delay in execution of the project and expenditure over and above the approved PC-I by Ministry of Water & Power on the directions of ECNEC. The inquiry concluded that project was implemented on an outdated PC-I at higher bids than approved costs. The matter should have been referred to the Government for decision.

The DAC in its meeting held on September 01, 2021 directed the management to provide justification regarding the reasonability of rates. DAC

further directed Member Water to look into the matter for updating of WCSR within 3 months, the aspect of underground works needs to be incorporated in the WCSR. Moreover, the BoQs of Neelum Jhelum, Dasu and other projects as far as possible may be incorporated in the WCSR. Further progress was not intimated till finalization of the report.

Audit recommends the management to fix responsibility in the light of inquiry report besides implementing DAC's decision.

4.2.2 Non-recovery of double payment from the contractor – Rs.748.47 million

As per GFR Rule 10, "Every officer, incurring or authorizing expenditure from public funds, should be guided by high standards of financial propriety among the principles on which emphasis is generally laid that every public officer is expected to exercise the same vigilance in respect of expenditure incurred from public moneys as a person of ordinary prudence would exercise in respect of expenditure of his own money.

During performance audit of GGHP Chitral, it was observed that upon submission of IPC No.14, 15, 16, 17, 18, 19 and 21, the project authorities paid an amount of Rs.748.47 million to M/s Sambo-Sarco of civil work under Lot-3.1 from WAPDA funds during March 2017 to February 2019. Payment for the same invoices was also made from the donor KFD. However, written undertaking was obtained from the contractor that the amount will be reimbursed in the account of the project on release of funds from the donor. However, after receipt of funds from KFD, the contractor did not transfer the amount to the project account due to non-settlement of his pending claims. Despite expiry of defect liability period on December 17, 2018, issues with the contractor have not yet been cleared and a huge amount of Rs.748.47 million is still recoverable from the contractor as on April 30, 2021.

Non-adherence to the general principles of financial propriety resulted in double payment to the contractor amounting to Rs.748.47 million.

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that the contractor submitted a cheque amounting to Rs.605.26 million and held an amount of Rs.143.21

million. The project office is in consultation with Director Legal and also using its full efforts to recover the balance amount of Rs.143.21 million from the contractor.

The reply was not tenable because recovery of the double payment could not justify the irregularity.

The DAC in its meeting held on September 01, 2021 directed the management to submit revised reply and justification for making the payment. DAC further directed the management to provide record relating to recovery i.e. cheque and bank statement verified from Audit. Moreover, make vigorous efforts to recover the remaining amount from the contractor. The recovery of Rs.605.26 million has been verified. The remaining balance of Rs. 143.21 million is still recoverable. However, no justification was provided for making double payment to the contractor. Further progress was not intimated till finalization of the report.

Audit recommends the management to expedite the recovery of the balance amount besides implementing DAC's decision.

4.2.3 Irregular expenditure over and above the financial limits of 1st revised PC-I – Rs.8,146 million

As per Annexure XIII of Manual for Development Projects issued vide Planning and Development Division vide letter No. 20(15)DA/PD/95 dated January 16, 1996. Where it was advised that if substantial modification in the project or its cost are required during the execution of approved project then they should continue the work within the total approved cost and simultaneously prepare a revised PC-I and get it approved from the competent authority well before the amount previously sanctioned for the project is exceeded. However, it has been observed over time, that the executing agencies submit the revised PC-I for approval very late, sometimes even after spending the entire approved cost of the project. This practice is against the spirit of the letter under reference, and tantamount to the financial indiscipline.

During performance audit of GGHP Chitral, it was observed that ECNEC constituted an inquiry at the time of approval of 1st revised PC-I of the project in 2016 to inquire the expenditure of Rs.12,311.18 million incurred over & above the approved cost of original PC-I. As a result, responsibilities were

fixed for the delays and expenditure over & above the approved cost of PC-I by the inquiry committee but no action was taken against the responsible. Despite that an expenditure of Rs.37,233 million was incurred over and above the approved cost of Rs.29,077.17 million under 1st revised PC-I up to June 30, 2020 against. As such, once again an amount of Rs.8,146 million has been incurred in excess of the approved revised PC-I without getting approval from ECNEC. The 2nd revised PC-I had not yet been submitted to the MoWR which showed that the cost would further increase as rehabilitation works were still under execution.

Non-adherence to the directions of the Planning and Development Division resulted in irregular expenditure amounting to Rs.8,146 million.

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that 2nd revised PC-I will be submitted after incorporating the final cost of permanent rehabilitation works amounting to Rs.773.73 million and cost of consultancy services shortly.

The reply was not tenable because no action was taken against the persons held responsible by the inquiry committee which once again resulted in over expenditure.

The DAC in its meeting held on September 01, 2021 directed the management to provide justification regarding the reasonability of rates. DAC further directed Member Water to look into the matter for the updating of WCSR within 3 months, the aspect of underground works needs to be incorporated in the CSR. Moreover, the BoQs of Neelum Jhelum, Dasu and other projects as far as possible may be incorporated in the CSR. Further progress was not intimated till finalization of the report.

Audit recommends the management to take action as recommended by the inquiry committee besides getting over expenditure regularized from the competent forum.

4.3 Procurement and Contract Management

4.3.1 Award of work at high rates – Rs.2,838.83 million

As per clarification of PPRA to question No.12 of Frequently Asked Questions (FAQs), “Whenever a procuring agency is confronted with such a situation whereby the rate quoted by the single bidder cannot be compared so as

to declare it as the lowest rate or otherwise it may make a prudent decision. While making a decision, these factors may be kept in view: (a) the comparison of price of the goods works or services, if procured during the current financial year, (b) market price of the goods works and services to be procured, and (c) in case abnormal Increase in prices is observed, the procuring agency may like to re-advertise the procurement opportunity, if time permits. Re-advertisement would be a preferred option.”

During performance audit of GGHP Chitral, it was noticed that four firms were prequalified for civil works under Lot-2 in February, 2008 but none of the firms participated in the bidding process. Later on, open tenders were invited on post qualification basis in July 2008. Single bidder M/s Sambo-Sarco submitted its bid for Rs.7,521.64 million which was 41.66% above the engineer’s estimate of Rs.5,309.76 million. As per evaluation report of the consultants, bid rate of some individual BoQ items were 4 to 77 times higher than the engineer’s estimate. Resultantly, the contract was awarded over and above the engineer’s estimate amounting to Rs.2,211.87 million (Rs.7,521.64 million – Rs.5,309.76 million). Moreover, scrutiny of executed quantities revealed that the items with higher quoted rates were over-executed which resulted in extra profit to the contractor amounting to Rs.626.94 million (**Annex-4**).

Non-observance of the guidelines of PPRA resulted in unjustified award of contract at higher rates which caused undue benefit to the contractor amounting to Rs.2,838.83 million.

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that the work was awarded to the single bidder keeping in view security situation and general principles of procurement like economy, efficiency and value for money. Moreover, payment was made as per actual work done measured in accordance with contract provision.

The reply was not acceptable because the project consultant also highlighted this issue to the employer that contractor has exorbitantly increased rates for items of schedule G, H and I which was required to be negotiated to bring these at reasonable level.

The DAC in its meeting held on September 01, 2021 directed Member Water WAPDA to provide a report to Audit within 45 days on the given ToRs: (a) detailed justification regarding the reasonability of rates and, (b) grounds of approval for setting aside consultants' opinion and award of contracts. Further progress was not intimated till finalization of the report.

Audit recommends the management to fix responsibility for awarding the contract at 41.66% higher than the Engineer's estimate at exorbitantly high rates and setting aside of consultants opinion.

4.3.2 Increase in cost due to delay in award of contract of transmission line – Rs.2,240.63 million

As per Para 2.2 of donors guidelines for the procurement of goods and contracting for the execution of works, “the funds require the use of the prequalification process in case of tenders for large or complex civil engineering works or the supply of specialized equipment, or turnkey contracts to ascertain the capability and seriousness of bidders. The prequalification should be based entirely on the ability of the concerned company or firm to perform the required work”. All those who have been qualified in accordance with these procedures should be allowed to bid.

During performance audit of GGHP Chitral, it was noticed that initially the prequalification process for bidding of construction of transmission line (Lot-4) was completed on February 24, 2009. Five firms were pre-qualified and conveyed to the donor on February 27, 2009. The procuring agency was required to invite tenders for the works from prequalified firms immediately after completion of the prequalification process but the same was not done. Open tenders were invited in 2012 after lapse of three years without considering the pre-qualified firms with the plea that they might have engaged in other projects. Only two firms submitted their proposals and were declared technically non-responsive. Later on, the work under Lot-4 was divided into two packages in 2013 with the condition that one bidder can participate in only one package. Single bidder M/s Netracon-Neie Holey Consortium participated in Package-I and work was awarded at a bid cost of Rs.3,441.25 million on February 11, 2014. However, Package-II was re-advertised with revised qualification criteria by removing the condition that one bidder can participate in one package only.

Package-II was also awarded to the M/s Netracon-Neie Holey Consortium at bid cost of Rs.1,462.99 million on November 05, 2014 i.e. the contractor of Package-I. Audit held that violation of donor's guidelines regarding adopting of prequalification process and award of contract on open tender resulted in delay of 68 months in award of the contract and increase in cost of the contract by Rs.2,240.63 million for Lot-4 (bid cost Rs.4,904.24 million – Engineer's estimate Rs.2,663.61 million).

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that the bidders were not interested and those who participated did not fulfil the qualification criteria. The contract of transmission line was split up into two packages to ensure early completion of the project.

The reply was not tenable because the completion of transmission line was delayed instead of early completion.

The DAC in its meeting held on September 01, 2021 directed Member Water WAPDA to provide a report to Audit within 45 days on the given ToRs: (a) to thrash out the facts regarding why pre-qualified contractors were not selected and open tender was adopted vide approval dated February 01, 2011, and (b) why Package I & II were not awarded to different contractors. Further progress was not intimated till finalization of the report.

Audit recommends the management to fix responsibility for irregularities and delays besides implementing the DAC's decision.

4.3.3 Loss due to delay in completion of transmission line – Rs.2,430.64 million

As per Clause 7.6 of Manual for Development Projects, "The Project Director, supported by ancillary staff, will coordinate day-to-day activities, and through effective management ensure that the project achieves its development objectives and deals with the problems that arise during implementation. Besides, significant milestones could be determined and regularly monitored by the project management, the sponsoring agency and line department or ministry to ensure that actions are taken in time, especially for the appointment of consultants, contractors, procurement of inputs, inter-agency coordination and fund releases".

During performance audit of GGHPP Chitral, it was observed that the award of contract of transmission line under Lot-4 was initiated in February 2008. The process of award of contracts for transmission line took 6 years and 9 months. Finally, contract of Lot-4.1 was awarded on February 11, 2014 and Lot-4.2 was awarded on November 05, 2014. The transmission line was connected with the national grid on September 18, 2018. On the other hand, the E&M contractor completed the power house on June 11, 2018, however, the required mandatory tests could not be performed in contractually agreed scheduled time due to non-completion of transmission line in June, 2018. Due to delay of more than 3 months in commissioning of transmission line, the Authority had to bear generation loss of Rs.2,216.88 million. Moreover, the required full load tests could also not be performed due to non-availability of required water in September, 2018. In order to perform the pending full load tests in the high flow season of 2019, Defect Liability Period (DLP) of Unit-2&3 was extended from July 07, 2019 to October 15, 2019 with additional cost implication of Rs.213.76 million in E&M contract.

Non-adherence to instructions contained in Manual for Development Projects resulted in delay in completion of transmission line resulting into unjustified additional payment of Rs.213.76 on account of extension in DLP and generation loss of Rs.2,216.88 million.

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that the consultants recommended the extension in DLP with certain financial implications which was approved by WAPDA.

The reply was not tenable because approval of DLP by consultants could not justify the delay in completion of transmission line.

The DAC in its meeting held on September 01, 2021 directed Member Water WAPDA to provide a report to Audit within 45 days on the reasons and justification for delay in completion of transmission line. Further progress was not intimated till finalization of the report.

Audit recommends the management to implement DAC's decision.

4.3.4 Procurement of material from manufacturers other than approved in the contract – Rs.284.71 million

As per Schedule A-4 to bid (source of goods and material), battery chargers were required to be purchased from any one out of the three manufacturers i.e. SIEMENS Pakistan, PEL Pakistan, ABB Sweden and batteries from ALPHA Batteries USA and Transformers from Daltan North Instrument Transformer Co. Ltd. China at given BoQ rates. Moreover, as per Clause 19.4 Part-II particular conditions of the contract, “The contractor shall, so far as may be consistent with the contract make the maximum use of materials, supplies and equipment indigenous to or produced in Pakistan and services available in Pakistan or operated in Pakistan provided such materials, supplies and equipment and services shall be of required standard”.

During performance audit of GGHP Chitral, it was observed that contracts under Lot-4.1 and Lot-4.2 for construction of transmission line were awarded to M/s Netracon-Neie Holey Consortium on February 11, 2014 and November 05, 2014 respectively. The contractor was required to supply equipment such as batteries, current & voltage transformers from approved manufactures in the contract. Similarly, 220 KV towers and fog insulators were required to be procured from local manufacturers. Contrary to the contract clauses, these equipment were purchased from other manufacturers instead of approved manufacturers and without any preference to the local manufacturers in case of towers. No rate analysis and market survey was conducted while changing the already approved manufacturers. Audit held that the change of manufacturers resulted in purchase of equipment by the contractor at lesser cost as compared to the BoQ rates, whereas, payment to the contractor was made as per BoQ rates which caused undue benefit to the contractor amounting to Rs.229.09 million. Moreover, custom and excise duties paid on import of towers amounting to Rs.55.63 million were also got reimbursed to the contractor which was unjustified as these were to be procured locally.

Non-adherence to the contract clauses resulted in undue benefit to the contractor amounting to Rs.284.71 million.

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that material was purchased from new suppliers at much lower cost as compared to the BoQ rates. Moreover,

only manufacturers of 132 KV towers were listed in the contract but there was no approved list of vendors for 220 KV towers being an additional BoQ Item. Therefore, the contractor supplied towers from China with approval of consultants and custom duties were paid to the contractor as per contract.

The reply was not tenable because payment was made at BoQ rates instead of lower rates at which the equipment was purchased.

The DAC in its meeting held on September 01, 2021 directed the management to get the record of actual payment made to contractor verified from Audit and to provide consultants approval regarding change in design to Audit along with the provisions contained in the relevant contract clauses. Furthermore, DAC also directed Member Water WAPDA to provide a report to Audit within 45 days on the applicability of saving of Rs.202 million due to import of 220 KV tower instead of 132 KV Tower.

The record was provided by the management for verification which also confirmed that purchases were made at lower rates and payments were made at higher rates as per BoQ.

Audit recommends the management to recover the excess paid amount from the contractor besides implementing DAC's decision.

4.3.5 Non-recovery of capacity charges from CPPA – Rs.1,946.71 million

As per Clause 28.9 of the contract regarding test certificate, “as soon as the works or any section thereof has passed the tests, the engineer shall issue a certificate to the contractor and the employer to that effect.”

During performance audit of GGHPP Chitral, it was noticed that Unit No. 2&3 of the project started generation and supplying electricity to the National Grid since October 2019. However, the consultants have not issued COD certificates of the units till March 31, 2021. Due to non-issuance of COD certificates, Central Power Purchasing Agency (CPPA) is not entertaining invoices of capacity charges. As such a huge amount of Rs.1,946.71 million (**Annex-5**) on account of capacity charges is pending with the CPPA for capacity invoices up to June 2021.

Non-issuance of the COD certificates for Unit No. 2&3 by the consultants resulted in non-recovery of capacity charges amounting to Rs.1,946.71 million.

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that consultants vide their letter dated June 07, 2021 had submitted the COD certificates.

The reply was not tenable because COD certificates were not produced to audit for verification.

The DAC in its meeting held on September 01, 2021 directed that the record relating to acceptance of COD by CPPA and status of capacity claims lodged be shared with Audit. Further progress was not intimated till finalization of the report.

Audit recommends the management to expedite the recovery of capacity payments from CPPA.

4.4 Achievement of Targets

4.4.1 Non-achievement of prime objective of the project as per PC-I

As per Part A “Project Digest” Para 9 of PC-I of GGHPP, the prime objective of this hydropower project is to provide cheap and most needed power, through installation of 3 Pelton Wheel Type Turbines with a total installed capacity of 106 MW and annual energy generation of about 436 GWh from the date of commissioning.

During performance audit of GGHPP Chitral, it was noticed that ECNEC in its meeting held on September 02, 2002 approved the project at the total cost of Rs.7,035.13 million. Completion date of the project as per PC-I was June 30, 2006. Later on 1st revised PC-I of the project was approved in 2016 at the total cost of Rs.29,077.17 million with stipulated completion date of May 2018. Despite incurrence of expenditure of Rs.37,223 million on the project the total generation of the Power House was just 263.05 GWh in 3.25 years i.e. since commissioning from January 2018 up to March 2021 against the target generation of 436 GWh per year as per PC-I. The detail of planned versus actual generation is given in **Annex-6**. This scenario shows that the project has been unable to achieve its prime objective of generation of 436 GWh annually since its commissioning in January, 2018 hampering the effectiveness of the project.

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that the project required

rehabilitation works as a result of GLOF events which would be carried out under the supervision of sitting consultants after completion of codal formalities.

The reply was not acceptable because the event of GLOF occurred in 2019 and despite lapse of almost three years, permanent rehabilitation works could not be initiated.

The DAC in its meeting held on September 01, 2021 directed Member Water WAPDA to refer the matter to MoWR for hiring of independent consultants under PDU. The consultants would carry out a detailed study and technical probe to ascertain the design deviations and other causes of low performance of GGHPP so that the lessons learnt from the project could be used to avoid such issues in future projects. Further progress was not intimated till finalization of the report.

Audit recommends the management to expedite hiring of independent consultants to remove the design faults in order to avoid further generation losses.

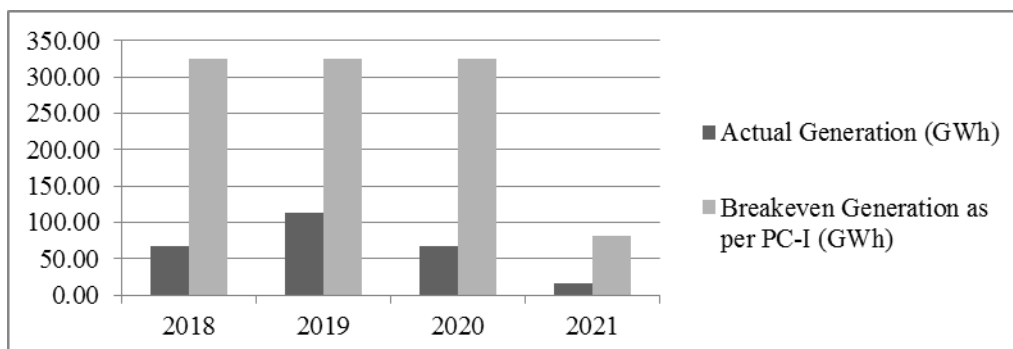
4.4.2 Non-achievement of Break Even Point of the project

As per Clause 11.4.1.4 of 1st revised PC-I, “The Breakeven point is a production which determines the number of unit of energy required to recover the recurring expenditure (Operating costs + Debt + Interest obligations). The maximum break even production volume of the project is about 325 GWh per annum”. Expected annual production of the project will be 436 GWh.

During performance audit of GGHPP Chitral, it was noticed that since commissioning of the power house during January, 2018 up to March, 2021, the annual production of the project remained substantially less than the break even production which is shown in the following table:

Year	Actual Generation	Breakeven Generation as per PC-I	Less Generation than Break Even Point	Remarks
Jan - Dec	GWh	GWh	GWh	
A	B	C	D = C - B	E
2018	66.32	325	258.68	1 st Unit operative
2019	112.91	325	212.09	2 nd & 3 rd Units added
2020	67.70	325	257.30	Due to GLOF
2021	16.12	81.25	65.13	For Jan to Mar
Total	263.05	1056.25	793.20	Falling trend

ACTUAL GENERATION VS BREAKEVEN GENERATION IN GWh



The above table shows that average actual annual production is 80.88 GWh ($263.05/39 \times 12 = 80.88$) against the annual break even production of 325 GWh. It means that the project is not even achieving its breakeven generation required to recover the annual recurring expenditure of the project. At present, average actual annual generation of the power house is 24.61% of the break even annual generation and mere 18.55% of the annual generation of 436 GWh targeted in the PC-I. As such, the power house is running on loss instead of earning revenue.

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that after permanent rehabilitation works, total hydrology would be utilized and breakeven point of the project would be achieved.

The reply was not acceptable because the design deviations from PC-I resulted in non-achievement of breakeven generation.

The DAC in its meeting held on September 01, 2021 directed Member Water WAPDA to refer the matter to MoWR for hiring of independent consultants under PDU. The consultant would carry out a detailed study and technical probe to ascertain the design deviations and other causes of non-achievement of objectives of GGHP so that the lessons learnt from the project could be leveraged to avoid such issues in future projects of WAPDA. Further progress was not intimated till finalization of the report.

Audit recommends the management to expedite hiring of independent consultants to ascertain the causes of non-achievement of breakeven point.

4.4.3 Higher per unit O&M cost as compared to tariff determined by NEPRA – Rs.125.16 million

As per NEPRA Tariff Determination of GGHP for the financial year 2017-18 up to 2019-20, O&M tariff was Rs.0.228/KWh, and for financial year 2020-21 O&M tariff was Rs.0.344/KWh.

During performance audit of GGHP Chitral, it was observed that per unit O&M cost of the power house was Rs.0.57 /KWh, Rs.0.46/KWh, Rs.0.77/KWh and Rs.1.24/KWh for the financial year 2017-18, 2018-19, 2019-20 and 2020-21 respectively. The O&M cost per unit of electricity generated by the GGHP was higher as compared to the O&M tariff determined by NEPRA which resulted in loss of revenue on each unit produced by the project as depicted in the table below:

Financial Year	NEPRA Determined Tariff Cost	Actual O&M Cost	Loss of Revenue	Net Electric Output	Revenue Loss
	Variable Rate	Variable Rate	Per Unit		
	Rs./KWh	Rs./KWh	Rs./ KWh	KWh	Rs.
A	B	C	D = C - B	E	F = D x E
2017-18	0.228	0.5748	0.3468	18,850,600	6,537,388
2018-19	0.228	0.4613	0.2333	97,512,160	22,749,587
2019-20	0.228	0.7700	0.5420	84,290,800	45,685,614
2020-21	0.344	1.2914	0.9474	52,975,722	50,189,199
Total					125,161,788

Non-achievement of breakeven point of generation resulted in revenue loss and higher per unit O&M cost as compared to tariff determined by NEPRA amounting to Rs.125.16 million.

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that GGHP could not run on full capacity till date because it was mostly running on isolation mode due to repeated GLOF events, avalanches at lowari top and non-clearance of debris and boulders intake.

The reply was not acceptable because major design deviations from the feasibility study and PC-I were carried out.

The DAC in its meeting held on September 01, 2021 directed Member Water WAPDA to refer the matter to MoWR for hiring of independent consultants under PDU. The consultants would carry out a detailed study and technical probe to ascertain the design deviations and other causes of non-achievement of objectives of GGHPP so that the lessons learnt from the project could be leveraged to avoid such issues in future projects of WAPDA. Further progress was not intimated till finalization of the report.

Audit recommends the management to take steps to avoid further generation losses in order to bring per unit cost within NEPRA approved limit.

4.4.4 Loss on account of temporary rehabilitation works – Rs.43 million

According to Section III (1) of WAPDA Guidelines for Enforcing Responsibility, all losses whether of public money or of store, shall be subjected to preliminary investigation by the officer in whose charge they were, to fix the cause of the loss and the amount involved.

During performance audit of GGHPP Chitral, it was noticed that event of GLOF occurred in Golen River on July 07, 2019 causing flash flood resulting into excessive damages to access road and three bridges. Moreover, accumulation of heavy boulders in intake area resulted in closure of power house. Contract for temporary restoration of site was awarded to M/s AA Construction Company on July 21, 2019 at the cost of Rs.43 million but these works were completely washed away during subsequent GLOF event on July 13, 2020. The temporary restoration work was once again awarded to another contractor for Rs.34.34 million which was completed on August 21, 2020. However, another flash flood was experienced on August 26, 2020 causing damages to the restoration works. Keeping in view the recurring GLOF events and design faults of the project, appropriate steps should have been taken for permanent removal of design faults instead of wasting money on temporary works every year. Audit held that due to non-execution of permanent rehabilitation works in time Authority sustained a loss of Rs.43 million on temporary works for which no investigation was held.

Bridge at Left Bank



Bridge at Right Bank



Non-adherence to the Authority's instructions resulted in loss of Rs.43 million on account of temporary rehabilitation works.

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that after the GLOF event of July 07, 2019, it took all necessary actions for carrying out permanent rehabilitation works.

The reply was not acceptable because no permanent rehabilitation works have yet been initiated.

The DAC in its meeting held on September 01, 2021 directed Member Water WAPDA to provide the report of independent consultants hired by WAPDA for rehabilitation works to Audit. Further progress was not intimated till finalization of the report.

Audit recommends the management to fix responsibility for delay in execution of permanent rehabilitation works instead of incurring recurring expenditure on temporary works.

4.4.5 Generation loss due to GLOF and non-clearance of intake area – Rs.4,094 million

As per study conducted after flood of 2010, it was concluded that peak flood can be of 681 m³/s instead of 583 m³/s. According to the study of United Nation Development Programme (UNDP), heavy GLOF can hit the Golen Gol intake areas which would submerge whole of the intake area of the project.

During performance audit of GGHPP Chitral, it was noticed that GLOF of 659 m³/s was witnessed on July 07, 2019 and power house remained on forced outage for rehabilitation for more than two months i.e. July 07, 2019 to September 11, 2019. Next year the same flood was experienced on July 13, 2020 and power house remained on forced outage till August 24, 2020, and 3rd flash flood was experienced on August 28, 2020 and again Power House remained on forced outage till September 15, 2020. Project authorities as well as project consultants didn't take the warning of UNDP seriously and weir and Intake areas were completely submerged with heavy boulders and stones due to heavy floods and GLOF in July, 2019 and August, 2020 which resulted in generation loss amounting to Rs.794.59 million. Later on, after flood and GLOFs events the project could not achieve its original capacity due to non-clearance of intake area and permanents remedial measures could not be executed. Generation loss of 387 million energy units equivalent to Rs.3,300 million was sustained by the national exchequer due to non-clearance of intake area.

Non-taking of protection measures regarding necessary changes in design and extra precautionary measures to safeguard the intake and weir area from accumulation of boulders shows a serious negligence on part of the project management and consultants which resulted in generation loss amounting to Rs.4,094.59 million as mentioned below:

Sr. No.	Reason of Generation Loss	Energy Units Loss in MKwh	Amount Rs. in million
1.	Due to flood and GLOF	93.37	794.59
2.	Due to non-clearance of Intake area	387.86	3,300.00
Total		480.37	4,094.59

The detailed working is given as Annex-7.

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that GLOF is a natural calamity and temporary rehabilitation works were carried out.

The reply was not tenable because the recommendations of the studies were not implemented during execution of the project.

The DAC in its meeting held on September 01, 2021 directed Member Water WAPDA to refer the matter to MoWR for hiring of independent

consultants under PDU. The consultants would carry out a detailed study and technical probe to ascertain the design deviations and other causes of non-achievement of objectives of GGHP so that the lessons learnt from the project could be leveraged to avoid such issues in future projects of WAPDA. Further progress was not intimated till finalization of the report.

Audit recommends the management fix the responsibility of generation loss and to clear the intake area without any further delay besides implementing DAC's decision to permanently remove design faults.

4.4.6 Non-recovery of income as per Clean Development Mechanism under Kyoto protocol – Rs.563.67 million

As per Clause 10.1 of 1st revised PC-I regarding Clean Development Mechanism (CDM) under Kyoto Protocol, "The sale of Certified Emission Reductions (CER) could bring Pak Rupees 173.44 million annually as additional funding to the Project, which in turn will allow implementing all activities in full scope and bearing the high costs of financing which are results of escalated capital expenditures on the project".

During performance audit of GGHP Chitral, it was noticed that ECNEC in its meeting held on September 02, 2002 approved the project at the total cost of Rs.7,035.13 million. Completion date of the project as per PC-I was June 30, 2006. But the project was delayed and revised PC-I of the project was approved in 2016 amounting to Rs.29,077.17 million. The project was not viable at the time of approval of 1st revised PC-I because its cost benefit ratio was less than 1 i.e. 0.97. However, the project was made viable with the inclusion of income from CDM amounting to Rs.173.44 million annually. WAPDA in its clarification to the MoWR guaranteed for the CDM income. On the basis of which the 1st revised PC-I was approved. As such, an additional annual income of Rs.173.44 million (**Annex-8**) was to be earned through the sale of CER against the total capacity of 106 MW with annual energy of 436 GWh. A separate Project Developer or CDM consultant was required to be hired for CDM Consultancy Services as per clause 7.1.8(b) of the revised PC-I but needful was not done. CDM income amounting to Rs.563.67 million (Rs.173.44 million / 12 month = Rs.14.45 million/month x 39 months = Rs.563.67 million) was required to be earned since commissioning of the project in January, 2018 till March, 2021 but

no effort was made by the Project management to avail financial benefits under CDM.

Non-adherence to the PC-I clause resulted in non-availing the additional income of Rs.563.67 million as per CDM under Kyoto Protocol.

The matter was taken up with the management in June, 2021 and reported to MoWR in July, 2021. The management replied that the value of CER reduced from 12 Euro to less than 1 Euro in 2012. Moreover, no validator at that time gave its consent to visit Pakistan for validation of CER / CDM benefit for GGHPP due to security concern.

The reply was not tenable because the PC-I was approved in 2016 with CDM income despite reduction of CER value in 2012.

The DAC in its meeting held on September 01, 2021 directed the management to provide justification along with documentary evidence to Audit within 15 days. Further progress was not intimated till finalization of the report.

Audit recommends the management to implement DAC's decision.

4.5 Overall Assessment

Overall assessment of the project with reference to its intended objectives is as follows:

i. Relevance

The project was included in Vision-2025 Programme approved by the Chief Executive on January 17, 2001.

ii. Efficacy

Efficacy referred to the ability to produce a desired or intended results. The project could not reap its envisage benefits of 436 GWh annual generation. Average annual generation was just 80.94 GWh, therefore, the project has lost its viability. Moreover, the payback period of the project has also increased from 7 year to 48 years. If the current status continues, the project would not be able to recover its cost in its entire useful life of 30 years.

iii. Economy

Economy means spending only that much which is barely essential to

achieve the project goals. The executing agency was required to implement the project in accordance with the PC-I provisions, however, GGHP exceeded over the original approved cost of the project by 313% i.e. from original PC-I's cost Rs.7,035.13 million to Rs.29,077.17 million in the 1st revised PC-I. It was observed that contracts were awarded in excess of PC-I provisions. All the contracts were awarded on single bids and at exorbitantly high rates. Over execution of the BoQ items was also observed against the items having high rates than the items having lower rates. Actual expenditure of Rs.37,233 million has so far been incurred up to June 30, 2020 against the approved cost of Rs.29,077.17 million as per 1st revised PC-I.

iv. Efficiency

Efficiency implies maximising output from the given resources or minimizing the input for the given outputs. Excessive delays were observed on the part of implementing agency at all levels of execution which resulted in overall time overrun of 13 years and cost overrun of Rs.30,189 million. A lot of design changes were observed during the course of the implementation of the project especially in case of Lot-4 for transmission line. Almost entire contract was changed from its original contracted work, which caused huge increase in contract cost in the shape of variation orders. Execution of all the contracts was delayed causing EoT cost implications. Interface activities were not in line with each other, turbines were ready for generation but the transmission line was not ready which caused huge generation loss to the national exchequer.

v. Effectiveness

Effectiveness referred to the extent the objectives have been achieved. The project could not be termed effective at all because it could not achieve its prime objective of generating 436 GWh annual generation. It could not even achieve its breakeven generation of 325 GWh due to poor project management. Moreover, the project management was unable to reap the benefits of CDM, even the process of hiring of CDM consultants has not yet been initiated.

vi. Compliance with Rules

Various instances of non-compliance with applicable rules and regulations were observed during the course of the performance audit. Instances

of non-compliances were noticed in procurement process, violation of contract clauses and deviations from PC-I with regards to design parameters and financial limits.

vii. Performance rating of project

Performance rating of the project was considered as unsatisfactory.

viii. Risk rating of project

Risk rating of the project was considered high on the basis of non-achieving of its intended objectives since project's commissioning.

5. CONCLUSION

It is concluded that GGHPP is an example of a mismanaged project which was abnormally delayed with exorbitant cost overrun. As a result of performance audit it can be inferred that project was mismanaged at all stages after approval of PC-I, from detailed designing to award and execution of contracts and till commissioning.

5.1 Key issues for future:

Project was designed on less adequate hydrological and geological studies. Especially the maximum flood design was considerably reduced to 583 m³/s against 1156 m³/s prescribed in the feasibility study. It is also pertinent to mention that the design was not revised during the course of execution even after witnessing heavy consecutive floods and GLOFs of 2010, 2013 and 2015. Therefore, the design parameters be got reviewed from an independent consultants to provide the permanent remedial and protection measures to mitigate the damages due to future floods, GLOFs and avalanches.

5.2 Lessons Identified

Project execution and award of contracts must only be initiated upon availability of unencumbered land, availability of funds, timely hiring of design and supervisory consultants. Moreover, project must be implemented as per parameters of approved PC-I and any major changes or deviations in scope and design having huge financial implications must only be implemented by seeking prior approval of the competent forum.

ACKNOWLEDGEMENT

We wish to express our appreciation to the management and staff of GGHPP, Chitral for their assistance and cooperation extended to the auditors during this assignment.

ANNEXURES

PROJECT DIGEST

NAME OF THE PROJECT

The name of the Project is Golen Gol Hydropower Project (106 MW).

LOCATION

The Project area covers part of the administrative region constituting Chitral, the northern most district of Khyber Pakhtunkhwa. The Project is located about 22km north of Chitral town, at the confluence of Golen Gol River with Mastuj River. The powerhouse is located about 2 km upstream of Kaghozi village. The scheme situated between an altitude of 1625m a.m.s.l. (powerhouse latitude 35°57'11" N; Longitude 71°57'28" E) and 2050m a.m.s.l. (Weir, 35°55'20" N; Longitude 71°59'30" E).

AUTHORITIES RESPONSIBLE FOR

- | | | |
|------|----------------------------|--|
| i. | Sponsoring | Government of Pakistan through Ministry of Water and Power |
| ii. | Execution | Pakistan Water and Power Development Authority (WAPDA) through General Manager (Projects) North, Wapda House, Peshawar |
| iii. | Operation and Maintenance | Pakistan Water and Power Development Authority (WAPDA) through General Manager (Hydel) Operation, WAPDA House, Lahore |
| iv. | Concerned Federal Ministry | Ministry of Water and Power |

Project Stage

The whole work was divided in five (5) Lots under the supervision of M/s Fitchner JV as Consultants of the project as detailed below:

Contract Packages:

- Lot-1 Construction of O&M Staff Colony and other allied works.
- Lot-2 Intake & pressure Tunnel works
- Lot-3.1 Civil Works of Powerhouse, Tailrace and Switchyard Area
- Lot-3.2 Electrical & Mechanical (E&M) Works of Powerhouse
- Lot-4 132 KV Transmission Line & Grid Station.

The detail of Progress of Project is given below:

Description	Status
Lot-1 Colony (PSDP Rs.149.726 million)	<ul style="list-style-type: none"> Construction for O&M Staff Colony at Koghuzi Chitral is substantially completed.
Lot-2 (Civil Work) Contract Cost Rs.7.521 billion financed by Saudi Fund. Contractor Sambu-Sarco JV	<ul style="list-style-type: none"> All structural works completed on 29.08.2017, Defect Liability Period completed on 29.08.2018 Overall Physical Progress achieved is 100%.
Lot-3.1 (Civil Works of Powerhouse) Contract Cost Rs.1.9 billion Financed by Kuwait Fund. Contractor Sambu-Sarco JV	<ul style="list-style-type: none"> All structural works completed on 18.12.2017 Defect Liability Period completed on 18.12.2018. Overall Physical Progress achieved is 100%.
Lot-3.2 (E&M Works) Contract Cost Rs.5.565 billion Financed by Kuwait Fund Contractor M/s Andritz	<ul style="list-style-type: none"> Unit-1 commissioned on 23.01.2018. Unit-2 & 3 are ready for Commercial operation when required discharge available. Overall physical progress is 100%.
Lot-4 (Transmission Line) Package-I - Cost Rs.3.441 billion Contractor M/S NETRACON- NEIE/HOLLEY Financed by OFID.	<ul style="list-style-type: none"> Package-I: 132 KV Jutilasht Grid Station Chitral Commissioned on 23.01.2018. Transmission Line from Power House to Chukiatan:(Total Towers =484 & 117.5 KM) 100% completed. Overall physical progress 100%.
Lot-4 (Transmission Line) Package-II- Cost Rs. 1.456 B Contractor M/S NETRACON Financed by OFID.	<ul style="list-style-type: none"> Package-II = 9.89 % / 8.90 % (Planned / Act) Section-I (Chukiatan to Timergara) Total Towers = 220 (61.43 KM) 100% completed Section-II (Timergara to Chakdarra) Total Towers = 121 (28.743 KM) 100% completed Overall progress is 100%.

Annex-1**STATEMENT SHOWING COST & TIME OVERRUN**

Cost of revised PC-I Rs.in million	Date of Approval	Revised Completion Date as per PC-I	Cost of Original PC-I Rs.in million	Start Date as per PC-I	Completion Date (as per original PC-I)	Cost over Run Rs.in million	Time Overrun Years
29,077.17	Sep, 2016	May 31, 2018	7,035.13	Jun, 2002	Jun 30, 2006	22,042	10.18
	Actual Completion Date	Actual Expenditure (30.06.2020) Rs.in million	Cost of Original PC-I Rs.in million	Start Date as per PC-I	Completion Date (as per original PC-I)	Cost over Run Rs.in million	Time Overrun Years
	Oct 23, 2019	37,223.65	7,035.13	Jun, 2002	Jun 30, 2006	30,189	13.32

Notes:

ECNEC directed the Ministry of Water and Power to complete the project by the new given time line of May 2018 and that operation of first turbine will start by end of 2017.

Annex-2

GENERATION OF THE PROJECT SINCE COMMISSIONING OF THE PROJECT

(From January 2018 to March 2021)

Year / Month	Planned Generation GWH	Actual Generation 2018	Actual Generation 2019	Actual Generation 2020	Actual Generation 2021
Jan	14.18	0.596	6.302	5.624	6.201
Feb	11.47	3.770	4.934	4.364	5.123
Mar	12.32	3.981	5.041	4.322	4.799
Apr	15.41	2.537	4.149	4.347	
May	32.03	3.408	7.415	4.868	
Jun	66.57	4.855	25.234	5.490	
Jul	78.92	5.210	6.148	3.142	
Aug	78.92	5.860	-	2.706	
Sep	57.92	4.454	16.565	2.992	
Oct	31.47	12.481	17.651	10.802	
Nov	20.48	10.692	11.474	10.591	
Dec	17.29	8.472	7.997	8.449	
Total	436.98	66.316	112.91	67.6971	16.123

Total Generation 3.25 Years: 263.046 GWh

Average Generation per Month: 6.74 GWh

Average Generation Per Year : 80.94 GWh

PAYBACK PERIOD AS PER PC-I

Particulars	Unit	Amount	Remarks
Cost of the Project	Rs.in million	29,077.17	As per 1 st revised PC-I
Annual estimated generation in GWh	GWh	436	As per 1 st revised PC-I
Per unit sale price	Rs.	9.46	To achieve the cost of project in 7.05 years
Generation in 7.05 years @ 436 GWh/Year	GWh	3,074	
Payback period as per PC-I	Year	7.05	As per PC-I

ACTUAL PAYBACK PERIOD

Particulars	Unit	Amount	Remarks
Cost of the Project	Rs.in million	37,223.65	Expenditure up to 30.06.20
Annual average actual generation in GWh	GWh	80.94	on the basis of units generated from Jan 2018 to Mar 2021
Per unit sale price	Rs.	9.46	as used to achieve the payback period of 7.05 years (Calculated above)
Units required to recover the cost of project	GWh	3935	Required generation also increased due to increase in cost of the project from Rs.27 billion to Rs.37 billion
Payback Period on average generation of 61.89 GWh in a year	Year	48.62	Current Payback period

Annex-3

**STATEMENT SHOWING AWARD OF CONTRACTS
IN EXCESS OF PC-I PROVISION**

Sr. No.	Name of contractor	Original PC-I Cost Rs. In million	Lot No.	Contract Cost in Equivalent Rs.	Contract Cost in Equivalent (Combine Rs. in million)	Cost excess against original PC-I (Rs.in million)	Percentage above PC-I Provision																													
A	B	C	D	E	F	G = C - F	H = (G / C) * 100																													
1	Civil Work & Hydraulic Steel Structure	2,059.280	2	7,521,644,991	9,433.817	(7,374.537)	-358%																													
2			3.1	1,912,171,584				3	Hydro mechanical and Electrical Equipment	1,316.100	3.2	5,650,121,256	5,650.121	(4,334.021)	-329%	4	Transmission System and Expansion	1,412.000	4.1	3,441,158,890	4,904.157	(3,492.157)	-247%	4.2	1,462,997,706	5	Engineering & Supervision	115.570	CSA	750,923,925	750.924	(635.354)	-550%	Total		4,905.950
3	Hydro mechanical and Electrical Equipment	1,316.100	3.2	5,650,121,256	5,650.121	(4,334.021)	-329%																													
4	Transmission System and Expansion	1,412.000	4.1	3,441,158,890	4,904.157	(3,492.157)	-247%																													
			4.2	1,462,997,706				5	Engineering & Supervision	115.570	CSA	750,923,925	750.924	(635.354)	-550%	Total		4,905.950		20,739,018,357	20,739.018	(15,836.068)	-323%													
5	Engineering & Supervision	115.570	CSA	750,923,925	750.924	(635.354)	-550%																													
Total		4,905.950		20,739,018,357	20,739.018	(15,836.068)	-323%																													

Annex-4

STATEMENT SHOWING UNDUE PROFIT TO THE CONTRACTOR DUE TO OVER EXECUTION BOQ ITEMS

Item	Schedule G, H, I	Unit	Engineer estimated Rate	Bidder Quoted Rate	Profit of Contractor on execution of each item	%age increase	Qty	Quantities Executed	Over executed	Amount of over executed quantities
			Rs.	Rs.	Rs.	%	as per contract	Certified	increased quantities	Rs.
		A	B	C	$D = C - B$	$E = (D/B) * 100$	F	G	$H = G - F$	$I = H * D$
G.4.02	Pressure shaft excavation underground excavation rock Class A including disposal of excavated material with 7500 m lead measured from tunnel portal	m ³	11,840	87,313	75,473	637%	832	2,586.99	1,754.99	195,247,896
Pressure Tunnel Rock Support and Steel liner										
H.4.06	Shotcrete plain 10.0 cm thick	m ²	1,248	13,890	12,642	1013%	455	2,876.97	2,421.97	36,370,655
H.15.01	Steel liner wall thickness 33.8mm	ton	345,920	617,535	271,615	79%	1,051	1,443.31	392.31	392,023,559
Access Tunnel to Headrace Tunnel Portal										
I. 3.01	Portal shotcrete sealing 10cm	m ²	1,224	6,510	5,286	432%	300	623.66	323.66	3,296,667
Total										626,938,777

Annex-5**STATEMENT SHOWING NON-RECOVERY OF CAPACITY INVOICES**

Month	Amount Rs.in million
Oct + Nov 2019	123.80
Dec-19	95.94
Jan-20	95.94
Feb-20	95.94
Mar-20	95.94
Apr-20	95.94
May-20	95.94
Jun-20	95.94
Jul-20	95.94
Aug-20	95.94
Sep-20	95.94
Oct-20	95.94
Nov-20	95.94
Dec-20	95.94
Jan-21	95.94
Feb-21	95.94
Mar-21	95.94
Apr-21	95.94
May-21	95.94
Jun-21	95.94
Total	1,946.71

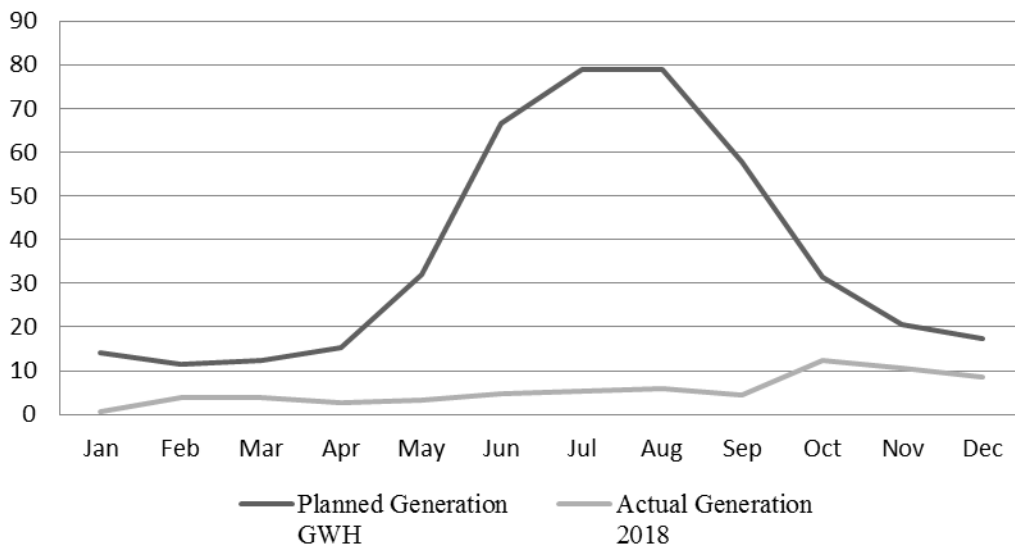
Annex-6

**ACTUAL GENERATION VS PLANNED GENERATION
SINCE COMMISSIONING**

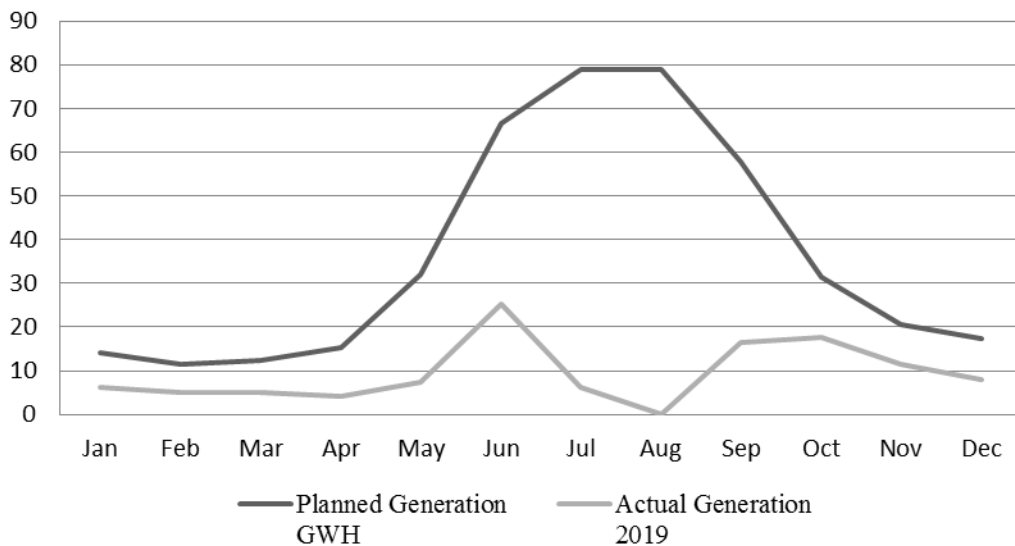
(Generation in Gwh)

Year / Month	Planned Generation GWh	Actual Generation 2018	Actual Generation 2019	Actual Generation 2020	Actual Generation 2021	
Jan	14.18	0.596	6.302	5.624	6.201	
Feb	11.47	3.770	4.934	4.364	5.123	
Mar	12.32	3.981	5.041	4.322	4.799	
Apr	15.41	2.537	4.149	4.347		
May	32.03	3.408	7.415	4.868		
Jun	66.57	4.855	25.234	5.490		
Jul	78.92	5.210	6.148	3.142		
Aug	78.92	5.860	-	2.706		
Sep	57.92	4.454	16.565	2.992		
Oct	31.47	12.481	17.651	10.802		
Nov	20.48	10.692	11.474	10.591		
Dec	17.29	8.472	7.997	8.449		
Total	436.98	66.316	112.91	67.6971		16.123
Total Generation Since Commissioning (From Jan, 2018 to Mar, 2021)						263.05

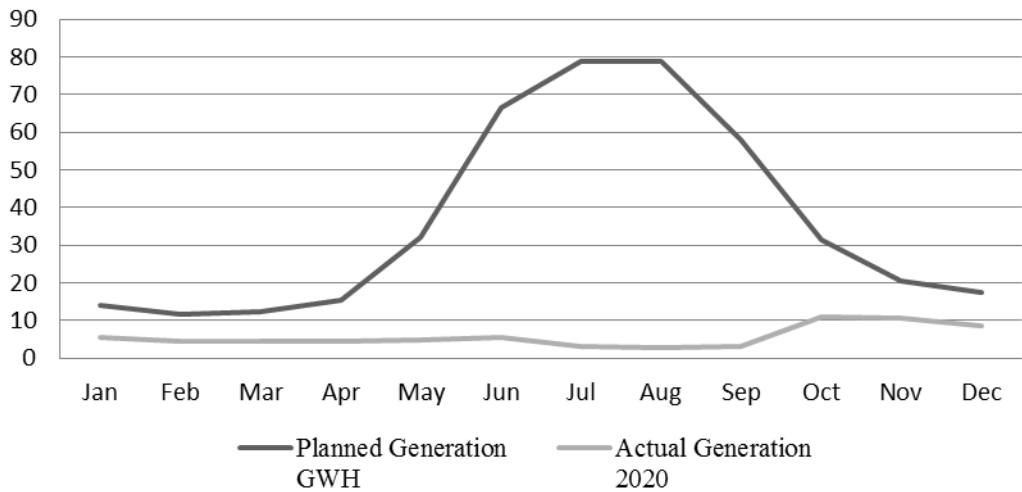
Planned Vs Actual Generation



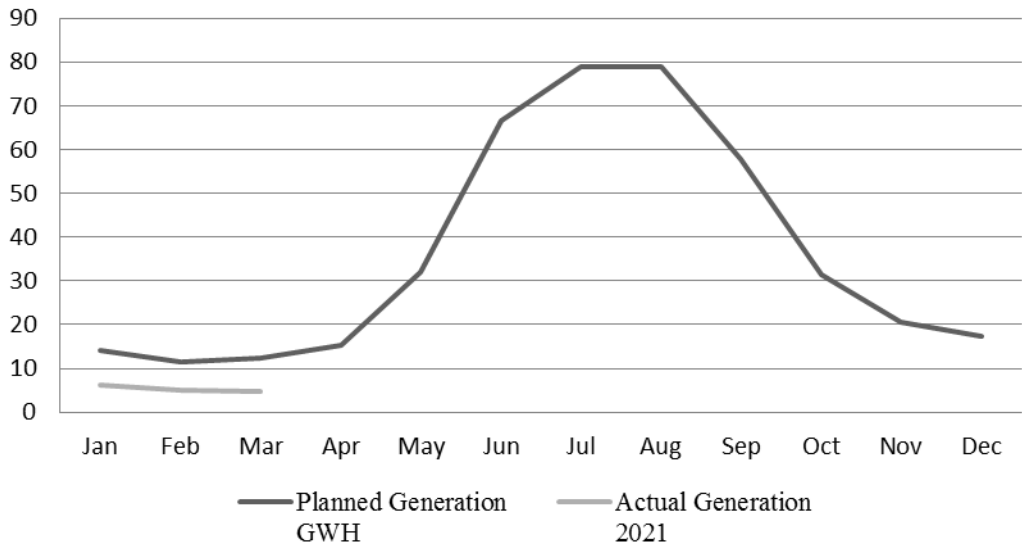
Planned Vs Actual Generation



Planned Vs Actual Generation



Planned Vs Actual Generation



Annex-7

Sr. No.	Reason of Generation Loss	Energy Units Loss in MKwh	Amount Rs.in million
1.	Due to Flood and GLOF	93.37	794.59
2.	Due to Non clearance of Intake area	387.860	3,300.00
Total		480.37	4,094.59

1. GENERATION LOSS DUE TO FLOOD AND GLOF

Break Down		Capacity MW	Plant Factor as per PC-I	Day	Hrs	for KW	Units (KWh)	Per Unit Rate as per PC-I	Total Rs.
From	To								
A	B	C	D	E	F	G	H = C*D*E*F*G	I	J
07/07/19	11/09/19	36	0.44	66	24	1000	25,090,560	8.51	213,520,666
13/07/20	24/08/20	106	0.44	42	24	1000	47,013,120	8.51	400,081,651
27/08/20	15/09/20	106	0.44	19	24	1000	21,267,840	8.51	180,989,318
Total							93,371,520		794,591,635

Note:

- i. Only Unit No.1 was commissioned up till September 11, 2019, therefore Capacity of 36 MW is used;
- ii. All units were commissioned on July 13, 2020, therefore Capacity of 106 MW is used,
- iii. Average plant factor of 0.44 was used in PC-I.

Dates of GLOF & Floods

Year	From	To
2019	07/07/2019	11/09/2019
2020	13/07/2020	15/09/2020

2. GENERATION LOSS DUE TO NON-CLEARANCE OF INTAKE AREA

Year	Generation Loss	Revenue Loss
Jan - Dec	In KWh	In Rs.
2019	75,156,778	639,584,180
2020	255,158,062	2,171,395,107
2021	57,545,656	489,713,532
Total	387,860,496	3,300,692,819

**DERIVATION OF CDM INCOME FOR GOLEN GOL HYDROPOWER
PROJECT**

Description	Unit	Quantity/ Amount
Installed Capacity of Project	MW	106
Average Annual Plant Factor	Percentage	44%
Grid Emission Factor	tCO ₂ /year	0.51
Annual Certified Emission Reductions (CERs)	tCO ₂ /year	208,369
Price per CER	US \$/ tCO ₂	10
Annual CDM Revenue (Gross)	US \$/ year	2,083,689
CDM Consultancy, Validation and Verification Cost	US \$	313,920
CDM Consultancy, Validation and Verification Cost	PKR	30,764,160
Net Annual CDM Income	US \$/ year	1,769,769
Exchange Rate	PKR / US\$	98.00
Net Annual CDM Income	PKR/Year	173,437,327