



**Registrar**

# **National Electric Power Regulatory Authority**

## **Islamic Republic of Pakistan**

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No. NEPRA/R/LAG-496/ 7857-64

May 22, 2024

**Project Director**

Madyan Hydropower Project  
Pakhtunkhwa Energy Development Organization  
PEDO House, 38/B-2, Room No. 105, Phase-V  
Hayatabad, Peshawar

**Subject: Grant of Generation Licence No. GL(HYDEL)/21/2024**  
**Licence Application No. LAG-496**  
**Pakhtunkhwa Energy Development Organization (PEDO)**

*Reference: PEDO letter No. 06/PEDO/CE-WEB/01 dated 13.10.2020*

Enclosed please find herewith Determination of the Authority in the matter of application of Pakhtunkhwa Energy Development Organization (PEDO) for the grant of generation licence for its 157.0 MW Madyan Hydrel Power Plant located near Madyan Town on River Swat, District Swat, in the province of Khyber Pakhtunkhwa. The Generation Licence No. GL(Hydel)/21/2024 granted by the National Electric Power Regulatory Authority (NEPRA) to PEDO for the above said project, pursuant to Section-14(B) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997/(NEPRA Amended Act 2018) is annexed to the determination.

2. Please quote above mentioned Generation Licence No. for future correspondence.

Enclosure: As Above

**(Engr. Mazhar Iqbal Ranjha)**

**Copy to:**

1. Secretary, Power Division, Ministry of Energy, 'A' Block, Pak Secretariat, Islamabad
2. Secretary, Energy & Power Department, Government of Khyber Pakhtunkhwa, 1st Floor, A-Block, Abdul-Wali Khan Multiplex, Civil Secretariat, Peshawar.
3. Managing Director, Private Power & Infrastructure Board (PPIB), Ground & 2nd Floors, Emigration Tower, Plot No. 10, Mauve Area, Sector G-8/1, Islamabad
4. Managing Director, NTDC, 414 WAPDA House, Lahore
5. Chief Executive Officer, CPPA(G), 73 West, Shaheen Plaza, A.K. Fazl-ul-Haq Rd, Blue Area, Islamabad
6. Chief Executive Officer, Peshawar Electric Supply Company, 166 WAPDA House, Shami Road, Peshawar
7. Director General, Environmental Protection Agency (EPA), 3rd Floor, Old Courts Building, Khyber Road, Peshawar

**National Electric Power Regulatory Authority**  
**(NEPRA)**

**Determination of the Authority**  
**in the Matter of Application of Pakhtunkhwa Energy Development**  
**Organization for the Grant of Generation Licence**

**May 22, 2024**  
**Case No. LAG-496**

**(A). Background**

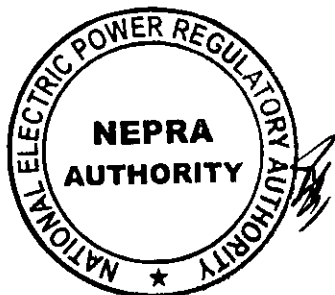
(i). The province of Khyber Pakhtunkhwa is blessed with huge hydropower potential. In order to harness hydropower potential in the province, the Government of Khyber Pakhtunkhwa has set up the Pakhtunkhwa Energy Development Organization (PEDO).

(ii). PEDO has identified around 6000 MW hydropower potential at various sites all over the province. The identified/selected sites are at different stages of implementation. One such site in the province is on Swat River, near Madyan, district Swat.

**(B). Filing of Application**

(i). PEDO submitted an application on October 19, 2020 for the grant of generation licence in terms of Section-14B of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (the "NEPRA Act") read with the relevant provisions of the NEPRA Licensing (Application and Modification Procedure) Regulations, 1999 (the "Licensing Regulations").

(ii). The Registrar examined the submitted application to confirm its compliance with the Licensing Regulations and observed that the application is in substantial compliance with Regulation-3 of the Licensing Regulations. Accordingly, the Registrar submitted the application for consideration of the Authority to decide the admission of the same or otherwise. The Authority considered the matter and found the form and content of the application in substantial compliance with Regulation-3 of the Licensing Regulations. Accordingly, the Authority admitted the application on



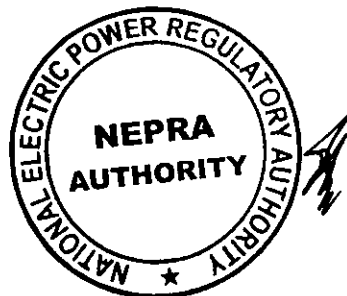
November 19, 2020 for consideration of the grant of generation licence as stipulated in Regulation-7 of the Licensing Regulations. In this regard, a notice of admission for inviting comments of the general public, interested and affected persons in the matter as stipulated in Regulation-8 of the Licensing Regulations was published in one (01) Urdu and one (01) English newspaper on January 01, 2021.

(iii). In addition to the above, the Registrar sent letters on January 07, 2021 to different stakeholders including Govt. Ministries, their attached departments and other representative organizations, soliciting/seeking their views and comments for the assistance of the Authority in the matter, in terms of Regulation-9(2) of the Licensing Regulations.

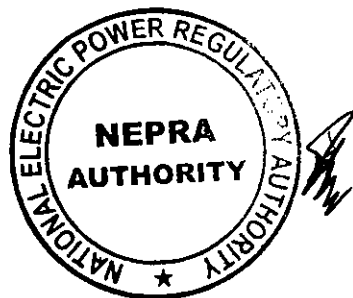
### **(C). Comments of Stakeholders**

(i). In reply to the above, the Authority received comments from five (05) stakeholders. These included the Ministry of Planning, Development & Special Initiatives (MoPD&SI), Central Power Purchasing Agency (Guarantee) Limited (CPPA-G), National Transmission and Despatch Company Limited (NTDC), Energy Department of Govt. of Punjab (EDGoPb) and Indus River System Authority (IRSA). The salient points of the comments offered by the said stakeholders are summarized below:-

- (a). MoPD&SI submitted that as the proposed power project is source of clean energy therefore, it supports the grant of generation licence subject to fulfilment of all technical/codal formalities and concurrence of CPPA-G and NTDC;
- (b). CPPA-G submitted that the regulatory requirements for issuance of generation licence are envisaged in the NEPRA Licensing (Generation) Rules, 2000 (the "Generation Rules"). In this regard, Rule-3(5) of the Generation Rules stipulates that the project must satisfy the 'least cost option criteria'. In this regard, the company has not submitted approval of the Grid Interconnection Study (GIS) from NTDC and Peshawar Electric Supply Company Limited (PESCO). Rule-3(2) of the Generation Rules requires an entity filing an application for the grant of Generation Licence to satisfy

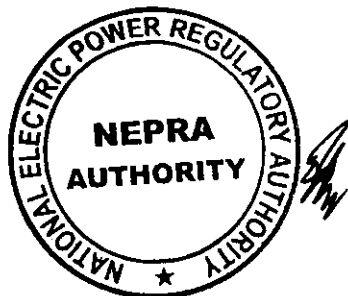


the Authority that the proposed generation facility has interconnection arrangement in place and that it meets the technical limits/specifications with respect thereto. It states that: *"The location, size, technology, interconnection arrangements, technical limits, technical functional specifications and other details specific to the generation facilities of the licensee shall be set out in a schedule to the generation licence"*. The significance of interconnection arrangement is also evident from Rule-3(5)(e) of the Generation Rules and various previous decisions of the Authority stating that approval of the GIS and issuance of Power Evacuation Certificates by NTDC/PESCO are necessary for processing and implementing the projects, specifically the renewable energy projects, so that the stability of the National Grid is ensured, and the provisions of the Grid Code are strictly followed. In this regard, PEDO approached NTDC for provision of Consent for Power Evacuation without any Interconnection Study with the assurance that PEDO will execute the GIS in the future. However, as per record of CPPA-G, PEDO has not yet executed the GIS of project under consideration. Further, with reference to minutes of meeting held between representatives of PEDO and NTDC on November 15, 2019, it was proposed that a comprehensive Integrated Evacuation Study should be conducted in four corridors of Khyber Pakhtunkhwa namely Swat, Chitral, Kohistan and Mansehra to assess the true potential of these localities. However, NTDC opined that such integrated study should only be conducted after the approval of the Indicative Generation Capacity Expansion Plan (IGCEP) to ensure its effectiveness. CPPA-G submitted that the formulation of IGCEP is still in process and its approval from the Authority is awaited. Hence, an integrated evacuation study is yet to be carried out in the region to assess the evacuation constraints in detail. Further, Regulation-5(2) of the Licensing Regulations stipulates that the Authority may decline to issue a licence if it determines in writing that the investments associated with the facility or system are not justifiable in view of needs of the electric power industry or where



the applicant has failed to demonstrate, in the opinion of the Authority the existence of the demand for the proposed facility or system. In consideration of the said, the project has failed to satisfy the existence of demand for the proposed facility in the application. It is pertinent to note that the project intends to sell power to the National Grid, whereas, PEDO has neither obtained a consent nor Power Acquisition Request (PAR) from the power purchaser. It may also be noted that neither CPPA-G nor any other entity has issued any consent for purchase of power from the project nor a power evacuation certificate has been issued with respect to the Project. In addition to the said, with reference to the Minutes of the Meeting held on July 04, 2018 in the Ministry of Energy (Power Division) regarding the resolution of outstanding issues pertaining to hydel projects in Khyber Pakhtunkhwa, it was decided that for all future projects (excluding the Pehur, Machai, Ranolia and Daral Khwar hydropower projects), PEDO will engage a consultant for conducting integrated power evacuation study in the available corridors in Swat and Chitral, thus enabling the NTDC to consider the same in the formulation of Demand forecasting. It was also decided that PEDO will not initiate any future project (excluding the Pehur, Machai, Ranolia and Daral Khwar hydropower projects), without following due legal and regulatory framework and necessary consents of the relevant stakeholders. However, PEDO has started the construction of the power project without obtaining the required consent/approvals from the relevant stakeholders;

- (c). NTDC commented that it is in the process of revision of IGCEP. The selection and timelines of the future power plants including the Madyan Hydel Power Project (HPP) shall be decided on the basis of least cost generation analysis in IGCEP. Further, the proposed interconnection scheme for the said HPP as mentioned in Schedule-III in the application is not based on any grid interconnection studies. In fact, an integrated interconnection study along with transmission corridor assessment study is



required to propose realistic interconnection schemes for power evacuation of all the HPPs in Khyber Pakhtunkhwa including the Madyan HPP; and

- (d). EDGoPb raised certain observations which include: (i). whether the project qualifies under Rule-3(5) of the Generation Rules regarding least cost option criteria or otherwise; (ii). no information is given in the application about approval of GIS from PESCO and NTDC; (iii). it is not mentioned that the project will sell electric power to PESCO or CPPA-G and whether it has obtained consent for the acquisition of power from the same or not; and (iv). has the Authority approved PAR in terms of NEPRA Interim Power Procurement (Procedures and Standards) Regulations, 2005? and
- (e). IRSA submitted that the Authority may ask the sponsors to provide it a copy of PC-1, along with a feasibility report, of the project and also apply for a No Objection Certificate (NOC).

(ii). The Authority examined the above comments of stakeholders and in view of the observations, considered it appropriate to seek the perspective of PEDO. On the said, it was submitted that the said comments were mostly related to: (a). Grid Interconnection Study (GIS); (b). Power evacuation certificate from CPPA-G/NTDC; and (c). NOC(s) from IRSA and Environment Protection Agency (EPA), Govt. of Khyber Pakhtunkhwa. Regarding the GIS of the project, PEDO informed that it has hired Management Consultant for conducting integrated studies for all projects in the Swat region which is still under process and the issuance of power evacuation certificate is dependent on the approval of the said study. Further, Madyan HPP is included in the list of committed projects in the approved IGCEP 2021-30 and ECNEC approved PC-I of the project on October 01, 2020 with certain milestones requiring the sponsor to obtain feasibility stage tariff after six months of the said approval. About NOC from IRSA and EPA, Govt. of Khyber Pakhtunkhwa, it was stated that the matter has been taken up at relevant forums. Later on, PEDO submitted the required documents/approvals for consideration of the Authority.



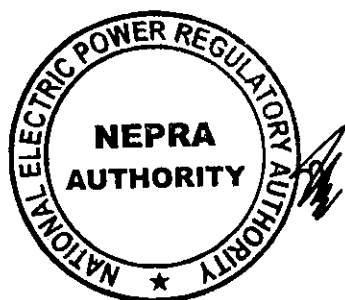
(iii). The Authority considered the above reply of PEDO and considered it appropriate to proceed further in the matter as stipulated in the Licensing Regulations and the Generation Rules.

**(D). Evaluation/Findings**

(i). The Authority has reviewed the submissions of PEDO including the information provided in its application for the grant of generation licence, comments of stakeholders and rejoinder of PEDO in the matter. Further to the said, the Authority has also considered the feasibility study of the project, interconnection & dispersal arrangement and Environmental Impact Assessment (EIA) of the project and the relevant rules & regulations.

(ii). The Authority has observed that PEDO is an autonomous organization governed by its Board of Directors and is under the administrative control of the Irrigation and Power Department of Khyber Pakhtunkhwa. It is pertinent to mention that under Section-24 of the NEPRA Act, the licensees are required to be companies registered under the Companies Ordinance, 1984 (XLVII of 1984) except WAPDA and PEDO. In view of provisions of the NEPRA Act, PEDO fulfills the said basic criteria for the consideration of a licence. PEDO has successfully completed seven (07) small and medium sized hydel power projects. These include (a). 81.00 MW Malakand-III; (b). 18.00 MW Pehur; (c). 1.80 MW Shishi; (d). 4.20 MW Reshun; (e). 2.40 MW Machai; (f). 17.00 MW Ranolia; (g). 36.60 MW Daral Khwar; and (h). 10.20 MW Jabori Projects.

(iii). Currently, PEDO is working on a number of hydropower projects which are at different stages of implementation. These hydropower potential sites are mainly located in the Northern districts of Khyber Pakhtunkhwa i.e. Chitral, Dir, Swat, Mansehra and Kohistan. The major source of funding for financing these projects had been the Hydel Development Fund (HDF) and the Annual Development Program (ADF) of Govt. of Khyber Pakhtunkhwa. PEDO is developing Madyan HPP with financial assistance from the World Bank, under the 'Pakhtunkhwa Hydropower and Renewable Energy Development Program'. According to the submitted information, the total outlay of the project will be approximately USD 498.64 million which will be financed through an 80% (USD 99.728 million) contribution from the World Bank and 20% (USD 49.85 million) from ADF/HDF of Govt. Khyber Pakhtunkhwa. In view of the

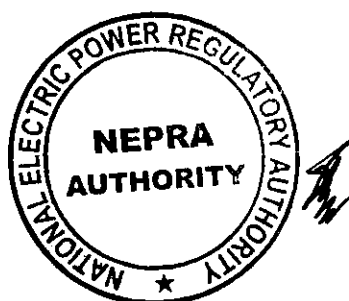


above, the Authority considers that PEDO has the required financial and technical capability to implement the hydel power projects.

(iv). The Authority has reviewed the feasibility study of the project and observed that the project of Madyan was conceived as a run of the river scheme with storage for peaking during the study conducted for Swat Valley (Region-4) under the Hydropower Development Master Plan for the Northern Areas of the Khyber Pakhtunkhwa. The study was jointly carried out by the Sarhad Hydel Development Organization (SHYDO) (now renamed as PEDO) in collaboration with the German Agency for Technical Cooperation (GTZ) during 1990-1995. The same was updated in 2006 by Cascade Study done through Mirza Associates Engineering Services (Pvt.) Limited which proposed the development of a cascade of the five HPPs in the Swat Valley including: (a). Gorkin-Matiltan-84 MW; (b). Gabral-Kalam-101 MW; (c). Kalam-Asrit, 197 MW; (d). Asrit-Kedam-209 MW; and (e). Madyan, 148 MW. Later on, the German Consultant Fichtner GmbH carried out the bankable Feasibility Study to assess the technical, economic and environmental viability of the Project. Fichtner appointed Pakistan Engineering Service (PES), a local sub-consultant to assist in the elaboration of the said study. ECNEC approved PC-I of the project on October 01, 2020 with a projected cost of Rs. 79,374.85 million and FEC of Rs. 57,339.33 million.

(v). As explained above, PEDO has submitted the current application for the grant of generation licence for its project of Madyan HPP which is 157.0 MW Run of River project proposed to be developed on Swat River, near Madyan town, district Swat in the province of Khyber Pakhtunkhwa. The proposed weir site of the Madyan HPP is located on the Swat River some 14 km north of Madyan town and the powerhouse is just 1.2 km upstream where the approximately 35 km long V-shaped gorge section of the Swat River ends and continues further as a river with wide flood plains.

(vi). According to the feasibility study of the project, a concrete weir of 19 m in height (above the riverbed) is proposed at Kedam village for the diversion of part of the river flow for power generation. In the central part of the weir structure, a spillway with 3 tainter gates is arranged discharging into a stilling basin where the excess hydraulic energy is dissipated. At the weir structure, two flushing outlets are provided to evacuate sediments that may deposit in front of the power intake arranged

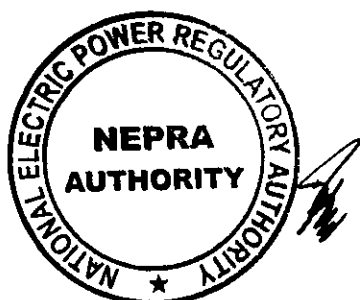




on the left side of the weir. The weir structure is designed to safely withstand floods up to a return period of 10,000 years and the earthquake without major damages.

**(vii).** For diversion of the Swat River during the construction of the weir, stilling basin and power intake, conventional diversion works are designed. The diversion works consist of a conventional upstream rock fill cofferdam sealed by jet grouting, a downstream cofferdam and a diversion tunnel. The existing Madyan-Kalam road needs to be relocated over a length of approximately 250 m at the weir site. The headrace tunnel starts at the power intake and has a length of 11.8 km. Its alignment was selected for conventional drill and blast excavation method nearly parallel to the Swat River. Three adits are planned to ensure tunnel construction within a reasonable period. The desanding facilities are arranged 2.1 km downstream of the weir and consist of three desanding caverns with the corresponding ducts and gates for the evacuation of sediments. At the downstream end of the low pressure headrace tunnel a surge tank is arranged to limit pressure rise in the headrace tunnel and ensure the required flexibility of the hydropower plant in operation. A vertical pressure shaft leads the flow to the elevation of the three Francis turbine units arranged in an underground powerhouse. The steel lined pressure tunnel and manifolds are kept short to achieve an economic design. The transformer and Switchyard are arranged underground as well in a cavern parallel and at 30 m distance from the powerhouse cavern. From the powerhouse cavern a short tailrace tunnel releases the flow back to Swat River.

**(viii).** The Authority has observed that the total installed capacity of the HPP is 157.0 MW consisting of three (03) Vertical axis Francis turbines (3x52.43 MW). The said capacity of the project has been optimized keeping in view the design discharge of 129 m<sup>3</sup>/s. The Madyan HPP is a medium head (gross head of 154.4 m and net head of 138.2 m) run of river project with mean annual energy of approximately 765.5 GWh at plant factor of 56.0%. The project is expected to be completed by January 31, 2028. It is pertinent to mention that Madyan HPP is already included in approved IGCEP 2022-31 as a committed project having an expected commissioning date of November 2027.



(ix). Regarding the GIS of the project, the Authority has noted that PEDO through its consultant Power Planners International has carried out Integrated GIS for the evacuation of power from hydropower projects in Swat Valley. According to the said study, the Madyan HPP will be ultimately connected to the system by making an In-Out of one circuit of 220 KV Double Circuit on twin bundled Plano conductor carrying power from 215 MW Asrit Kedam HPP to Chakdara-New 220/132 KV grid station with all HPPs commissioned in the region. In this regard, PEDO submitted the said study to NTDC for approval which has already approved the said dispersal/interconnection arrangement of the generation facility/HPP.

(x). The Authority has observed that the proposed project, for which generation licence is being sought, is based on clean water source and does not cause pollution as in the case of conventional power plants. However, the operation of the generation facility/HPP may cause soil pollution, water pollution and noise pollution during construction and operation. In this regard, the Authority has observed that PEDO carried out the EIA for the project and submitted the same for the consideration and approval of EPA, Govt. of Khyber Pakhtunkhwa. In this regard, EPA, Govt. of Khyber Pakhtunkhwa has already issued an NOC to PEDO for the construction of the project.

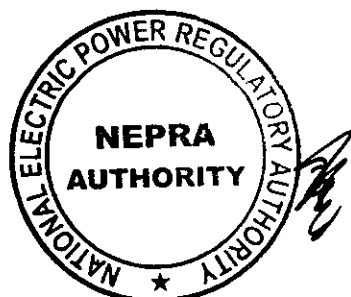
(xi). In terms of Rule-3 of the Generation Rules, the Authority may grant a generation licence to any person to engage in the generation business. The said rule stipulates various conditions pertaining to the grant of generation licence as explained in Rule-3(2), Rule-3(3), Rule-3(4) and Rule-3(5) of the Generation Rules. In the particular case under consideration, the Authority considers that conditions of Rule-3(2) and Rule-3(3) stand satisfied as PEDO has provided details of location, technology, size, net capacity/energy yield, interconnection arrangements, technical limits, technical functional specifications and other details specific to the generation facility/HPP. The provision of Rule-3(4) of the Generation Rules regarding holding a public hearing is not applicable as there was no issue that required this exercise.

(xii). Rule-3(5) of the Generation Rules stipulates that the Authority may refuse to issue a generation licence where the site, technology, design, fuel, tariff or other relevant matters pertaining to the generation facility proposed in an application for a generation licence are either not suitable on environmental grounds or do not



satisfy the least cost option criteria. In this regard, Rule-3(5) of the Generation Rules also stipulates the conditions pertaining to the least cost option criteria which include (a). sustainable development or optimum utilization of the renewable or non-renewable energy resources proposed for generation of electric power; (b). the availability of indigenous fuel and other resources; (c). the comparative costs of the construction, operation and maintenance of the proposed generation facility against the preferences indicated by the Authority; (d). the cost and right-of-way considerations related to the provision of transmission and interconnection facilities; (e). the constraints on the transmission system likely to result from the proposed generation facility and the costs of the transmission system expansion required to remove such constraints; (f). the short-term and the long-term forecasts for additional capacity requirements; (g). the tariff resulting or likely to result from the construction or operation of the proposed generation facility; and (h) the optimum utilization of various sites in the context of both the short-term and the long-term requirements of the electric power industry as a whole.

(xiii). In consideration of the above, the Authority considers that the proposed project will result in optimum utilization of the RE of the province of Khyber Pakhtunkhwa which is untapped, resulting in pollution free electric power. Further, the project is included in the list of committed projects in IGCEP. As explained in the preceding paragraphs, the sponsor of the project carried out the integrated GIS which concludes that the project will not face any constraints in the transmission system. Further, being located at a reasonable distance from the thin population of the area, the project will not likely result in cost and right-of-way issues for the provision of transmission and interconnection facilities. In view of the said, the Authority considers that the project of PEDO fulfills the eligibility criteria for the grant of generation licence as stipulated in the NEPRA Act, rules, regulations and other applicable documents.



## **(E). Grant of Generation Licence**

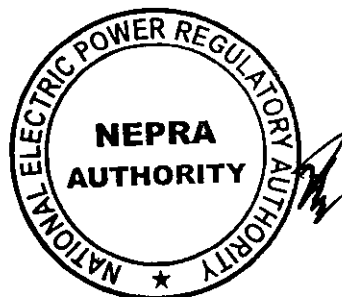
(i). Sustainable and affordable energy/electricity is a key prerequisite for the socio-economic development of any country. The economic growth of any country is directly linked with the availability of a safe, secure, reliable and cheaper supply of energy/electricity. In view of the said reasons, the Authority is of the considered opinion that for sustainable development, all indigenous power generation resources including hydel must be developed on priority basis.

(ii). In order to achieve sustainable development, it is imperative that indigenous resources are given priority for power generation and their development is encouraged. The Authority considers that the proposed project of PEDO will not only help in diversifying the energy portfolio of the country but it will also enhance the energy security of the country by reducing the dependence on imported furnace oil and will also help in reduction of carbon emissions by generating clean electricity, thus improving the environment.

(iii). The Authority has noted that PEDO is setting up a hydel based generation facility/HPP on Swat River near Madyan town, district Swat, in the province of Khyber Pakhtunkhwa having an installed capacity of 157.0 MW. As explained in the preceding paragraphs, PEDO has provided the details of location, technology, size, net capacity/energy yield, interconnection arrangements, technical details and other related information for the proposed generation facility/HPP.

(iv). In view of the above, the Authority considers that the proposed project fulfils the eligibility criteria for the grant of generation licence as envisaged in the existing regulatory regime. Further, the proposed project of PEDO will help in diversifying the energy portfolio as well as increasing the share of RE in the country. It will not only enhance the energy security of the country by reducing the dependence on imported fuel but will also help in reducing carbon emissions by generating clean electricity, thus improving the environment.

(v). Rule-5(1) of the Generation Rules stipulates that the term of a generation licence is to be consistent with the maximum expected useful life of the units comprised in a generating facility, except where an applicant consents to a shorter term. According to the information provided by PEDO, the expected



Commercial Operation Date (COD) of the generation facility/HPP is January 31, 2028 and will have a useful life of more than thirty (30) years from its COD. In this regard, PEDO has requested that the term of the proposed generation licence may be fixed as thirty years. In consideration of the said, it is clarified that the submissions of PEDO are in line with the industry standards and norms. In view of the said and considering the fact that PEDO has consented to a shorter term of thirty (30) years, the Authority fixes the term of the generation licence as thirty (30) years from COD of the project, subject to the Section 14B of the NEPRA Act.

(vi). Regarding the tariff, it is hereby clarified that under Section-7(3)(a) of the NEPRA Act, determining tariff, rates and charges, etc. is the sole prerogative of the Authority. In view of the said, the Authority considers it appropriate to direct PEDO to charge the power purchaser/CPPA-G only such tariff which has been determined, approved, or specified by it. Accordingly, the Authority decides to include a specific article in the generation licence and directs PEDO to adhere to the said in letter and spirit without any exception.

(vii). About the compliance with the environmental standards, as discussed in the preceding paragraphs, PEDO has provided the NOC from EPA, Govt. of Khyber Pakhtunkhwa and has confirmed that the project will comply with the required standards during the term of the Generation Licence. In view of the importance of the issue, the Authority has decided to include a specific article in the Generation Licence along with other terms and conditions making it obligatory for PEDO to comply with relevant environmental standards at all times. Further, the Authority directs PEDO to submit a report on a bi-annual basis, confirming that operation of its generation facility is compliant with the required environmental standards as prescribed by the concerned environmental protection agency. As the proposed generation facility/HPP of PEDO will be using hydel source for generation of power, therefore the project may qualify for the Carbon Credits. In this regard, an article for carbon credits and sharing its proceeds with the power purchaser has been included in the generation licence.



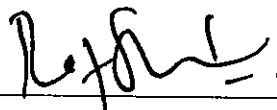
(viii). In view of the above, the Authority hereby approves the grant of Generation Licence to PEDO for its Madyan HPP on the terms and conditions set out in the generation licence annexed to this determination. The grant of generation licence is subject to the provisions contained in the NEPRA Act, relevant rules, regulations framed thereunder and other applicable documents.

**Authority**

Engr. Maqsood Anwar Khan  
(Member)



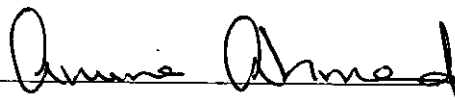
Rafique Ahmed Shaikh  
(Member)



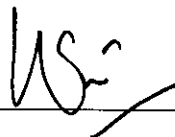
Mathar Niaz Rana (nsc)  
(Member)



Amina Ahmed  
(Member)



Waseem Mukhtar  
(Chairman)



**National Electric Power Regulatory Authority  
(NEPRA)  
Islamabad – Pakistan**

**GENERATION LICENCE**

**No. GL(Hydel)/21/2024**

In exercise of the powers conferred upon under Section-14B of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997/Amendment Act, 2018, the Authority hereby grants a Generation Licence to:

**Pakhtunkhwa Energy Development Organization/PEDO**  
**Set up under the PEDO Act of 2014 of Government of**  
**Khyber Pakhtunkhwa**

**for its Hydel Based Generation Facility/Madyan**  
**Hydel Power Plant Located near Madyan Town on River**  
**Swat, District Swat, in the Province of Khyber Pakhtunkhwa**

(Total Installed Capacity: 157.0 MW Gross)

to engage in generation business subject to and in accordance with the Articles of this Licence.

Given under my hand this on 22<sup>nd</sup> day of May Two Thousand  
& Twenty Four and expires on 30<sup>th</sup> day of January Two  
Thousand & Fifty Eight.

  
\_\_\_\_\_  
Registrar

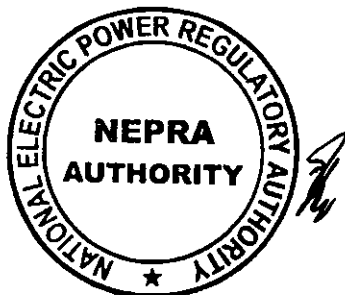




## **Article-1** **Definitions**

### **1.1 In this licence**

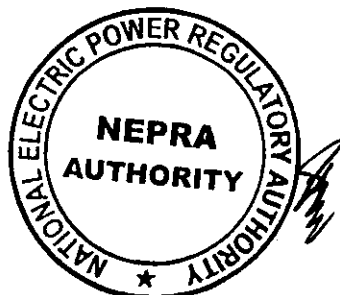
- (a). "Act" means the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 as amended from time to time;
- (b). "Applicable Documents" means the rules and regulations framed by the Authority under the Act, any documents or instruments issued or determinations made by the Authority under any of the foregoing or pursuant to the exercise of its powers under the Act, the Grid Code, the applicable Distribution Code, the Commercial Code, or the documents or instruments made by the Licensee pursuant to its generation licence, in each case of a binding nature applicable to the Licensee or, where applicable, to its affiliates and to which the Licensee or any of its affiliates may be subject;
- (c). "Applicable Law" means the Act and all the Applicable Documents;
- (d). "Authority" means the National Electric Power Regulatory Authority constituted under Section-3 of the Act;
- (e). "Bus Bar" means a system of conductors in the generation facility/Hydel Power Plant of the Licensee on which the electric power from all the generators is collected for supplying to the Power Purchaser;
- (f). "Carbon Credits" means the amount of Carbon Dioxide (CO<sub>2</sub>) and other greenhouse gases not produced as a result of generation of electric energy by the generation facility/Hydel Power Plant and other environmental air quality credits and related emissions reduction credits or benefits (economic or otherwise) related to the generation of electric energy by the generation facility/Hydel Power



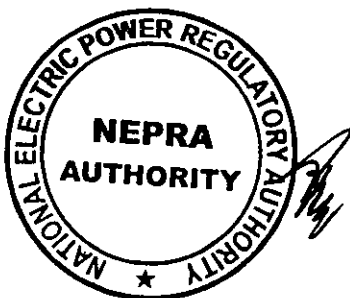


Plant, which are available or can be obtained in relation to the generation facility/Hydel Power Plant after the COD;

- (g). "Commercial Operations Date (COD)" means the day immediately following the date on which the generation facility/Hydel Power Plant of the Licensee is commissioned;
- (h). "Commissioning" means the undertaking of the Commissioning Tests of the generation facility/Hydel Power Plant as stipulated in the EPA;
- (i). "CPPA-G" means Central Power Purchasing Agency (Guarantee) Limited or any other entity created for the like purpose;
- (j). "Distribution Code" means the distribution code prepared and revised from time to time by the concerned Distribution Licensee with necessary approval of the Authority;
- (k). "Distribution Licensee" means the a person to whom a licence for distribution of electric power has been granted by the Authority under the Act;
- (l). "Energy Purchase Agreement (EPA)" means the energy purchase agreement, entered or to be entered into by and between the Power Purchaser and the Licensee, for the purchase and sale of electric energy generated by the generation facility/Hydel Power Plant, as may be amended by the parties thereto from time to time;
- (m). "Generation Rules" means the National Electric Power Regulatory Authority Licensing (Generation) Rules, 2000 as amended or replaced from time to time;
- (n). "Grid Code" means the grid code prepared and revised from time to time by NTDC with necessary approval of the Authority;



- (o). "Hydel Power Plant " means a generation facility for production of electric power using water as source;
- (p). "IEC" means "the International Electro-technical Commission or its successors or permitted assigns;
- (q). "IEEE" means the Institute of Electrical and Electronics Engineers or its successors or permitted assigns;
- (r). "Licensee" means Pakhtunkhwa Energy Development Organization (PEDO) or its successors or permitted assigns;
- (s). "Licensing Regulations" mean the National Electric Power Regulatory Authority Licensing (Application, Modification, Extension and Cancellation) Procedure Regulations, 2021 as amended or replaced from time to time;
- (t). "Market Commercial Code" means the market commercial code prepared and revised from time to time by Market Operator with necessary approval of the Authority;
- (u). "Market Operator" means a person responsible for organization and administration of trade in electricity and payment settlements among generators, licensees and consumers;
- (v). "Net Delivered Energy" means the net electric energy expressed in kWh generated by the generation facility/Hydel Power Plant of the Licensee at its outgoing Bus Bar and delivered to the Power Purchaser;
- (w). "NTDC" means National Transmission and Despatch Company Limited or its successors or permitted assigns;
- (x). "PESCO" means Peshawar Electric Supply Company Limited or its successors or permitted assigns;



- (y). "Power Purchaser" means CPPA-G which will be purchasing electric energy from the Licensee either on behalf of all or any single Distribution Licensee, pursuant to an EPA for procurement of electric energy;
- (z). "SCADA System" means the supervisory control and data acquisition system for gathering of data in real time from remote locations to control equipment and conditions;

1.2 The words and expressions used but not defined herein bear the meaning given thereto in the Act or Generation Rules and Licensing Regulations issued under the Act.

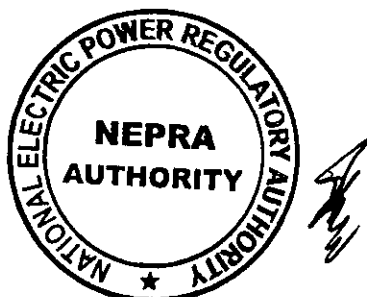
## **Article-2** **Applicability of Law**

This licence is issued subject to the provisions of the Applicable Law, as amended from time to time.

## **Article-3** **Generation Facilities**

3.1 The location, size (capacity in MW), technology, interconnection arrangements, technical limits, technical functional specifications and other details specific to the generation facility/Hydel Power Plant of the Licensee are set out in Schedule-I of this licence.

3.2 The net capacity/Net Delivered Energy of the generation facility/Hydel Power Plant of the Licensee is set out in Schedule-II of this licence. The Licensee shall provide the final arrangement, technical and financial specifications and other specific details pertaining to its generation facility/Hydel Power Plant before its COD.



#### **Article-4** **Term of Licence**

4.1 This licence shall become effective from the date of its issuance and will have a term of thirty (30) years from the COD of the generation facility/Hydel Power Plant of the Licensee subject to Section 14-B of the Act.

4.2 Unless suspended or revoked earlier or Licence ceases to have effect, the Licensee may apply for renewal of this Licence ninety (90) days prior to the expiry of the above term, as stipulated in the Licensing Regulations.

#### **Article-5** **Licence fee**

The Licensee shall pay to the Authority the licence fee as stipulated in the National Electric Power Regulatory Authority (Fees) Regulations, 2021 as amended or replaced from time to time.

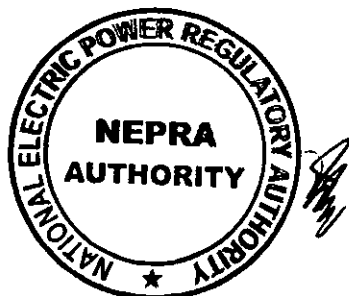
#### **Article-6** **Tariff**

The Licensee shall charge only such tariff from the Power Purchaser which has been determined, approved or specified by the Authority.

#### **Article-7** **Competitive Trading Arrangement**

7.1 The Licensee shall participate in such manner as may be directed by the Authority from time to time for development of a Competitive Trading Arrangement.

7.2 The Licensee shall in good faith work towards implementation and operation of the aforesaid Competitive Trading Arrangement in the manner and time period specified by the Authority. Provided that any such participation shall be subject to any contract entered into between the Licensee and another party with the approval of the Authority.



**7.3** Any variation or modification in the above-mentioned contracts for allowing the parties thereto to participate wholly or partially in the Competitive Trading Arrangement shall be subject to mutual agreement of the parties thereto and such terms and conditions as may be approved by the Authority.

### **Article-8** **Maintenance of Records**

For the purpose of sub-rule(1) of Rule-19 of the Generation Rules, copies of records and data shall be retained in standard and electronic form and all such records and data shall, subject to just claims of confidentiality, be accessible by authorized officers of the Authority.

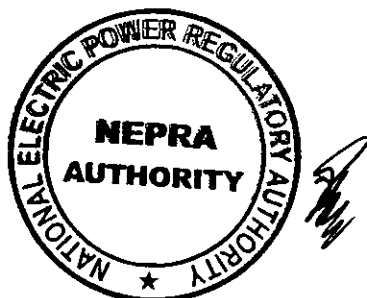
### **Article-9** **Compliance with Performance Standards**

The Licensee shall comply with the relevant provisions of the National Electric Power Regulatory Authority Performance Standards (Generation) Rules 2009 as amended or replaced from time to time.

### **Article-10** **Compliance with Environmental & Safety Standards**

**10.1** The generation facility/Hydel Power Plant of the Licensee shall comply with the environmental and safety standards in accordance with the NEPRA Power Safety Code, 2021 and such other standards as may be prescribed by the relevant competent authority from time to time.

**10.2** The Licensee shall provide a certificate on a bi-annual basis, confirming that the operation of its generation facility/Hydel Power Plant is in conformity with required environmental standards as prescribed by the relevant competent authority.



### **Article-11**

#### **Power off take Point and Voltage**

The Licensee shall deliver the electric energy to the Power Purchaser at the outgoing Bus Bar of its generation facility/Hydel Power Plant. The Licensee shall be responsible for the up-gradation (step up) of generation voltage up to the required dispersal voltage level.

### **Article-12**

#### **Performance Data**

**12.1** The Licensee shall install properly calibrated automatic computerized recording device(s) for measuring flow of water at its generation facility/Hydel Power Plant for recording of data.

**12.2** The Licensee shall install SCADA System or compatible communication system at its generation facility/Hydel Power Plant as well as at the side of the Power Purchaser.

**12.3** The Licensee shall transmit the data for flows of water and power output of its generation facility/Hydel Power Plant to the control room of the Power Purchaser.

### **Article-13**

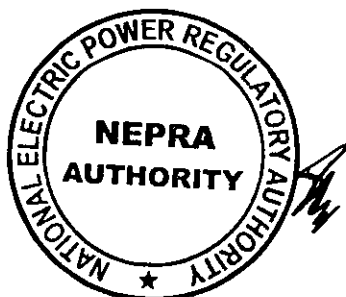
#### **Provision of Information**

In accordance with provisions of Section-44 of the Act, the Licensee shall be obligated to provide the required information in any form as desired by the Authority without any exception.

### **Article-14**

#### **Emissions Trading /Carbon Credits**

The Licensee shall process and obtain expeditiously the Carbon Credits admissible to the generation facility/Hydel Power Plant. The Licensee shall share the said proceeds with the Power Purchaser as per the relevant policy.



**Article-15**  
**Design & Manufacturing Standards**

The generation facility/Hydel Power Plant of the Licensee shall be designed, manufactured and tested according to the latest IEC, IEEE standards or any other equivalent standard in the matter. All the plant and equipment of generation facility/Hydel Power Plant shall be unused and brand new.

**Article-16**  
**Power Curve**

The Power Purchaser shall verify the power curve of the generation facility of the Licensee, as part of the Commissioning tests according to the latest IEC/IEEE standards and shall be used to measure its performance.

**Article-17**  
**Compliance with Applicable Law**

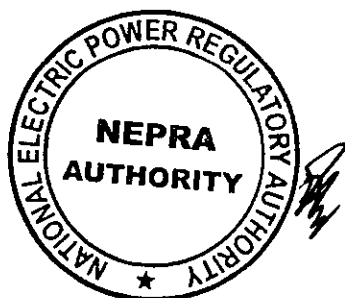
The Licensee shall comply with the provisions of the Applicable Law, guidelines, directions and prohibitory orders of the Authority as issued from time to time.

**Article-18**  
**Corporate Social Responsibility**

The Licensee shall comply with the NEPRA Social Investment Guidelines, 2021, as may be amended from time to time and submit a report on its activities pertaining to Corporate Social Responsibility (CSR) on an annual basis.

**Article-19**  
**Compliance with the Cyber Security Regulations**

The Licensee shall comply with National Electric Power Regulatory Authority (Security of Information Technology and Operational Technology) Regulations, 2022 as amended from time to time.



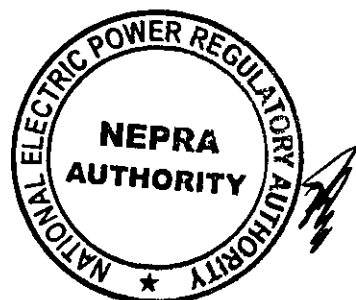
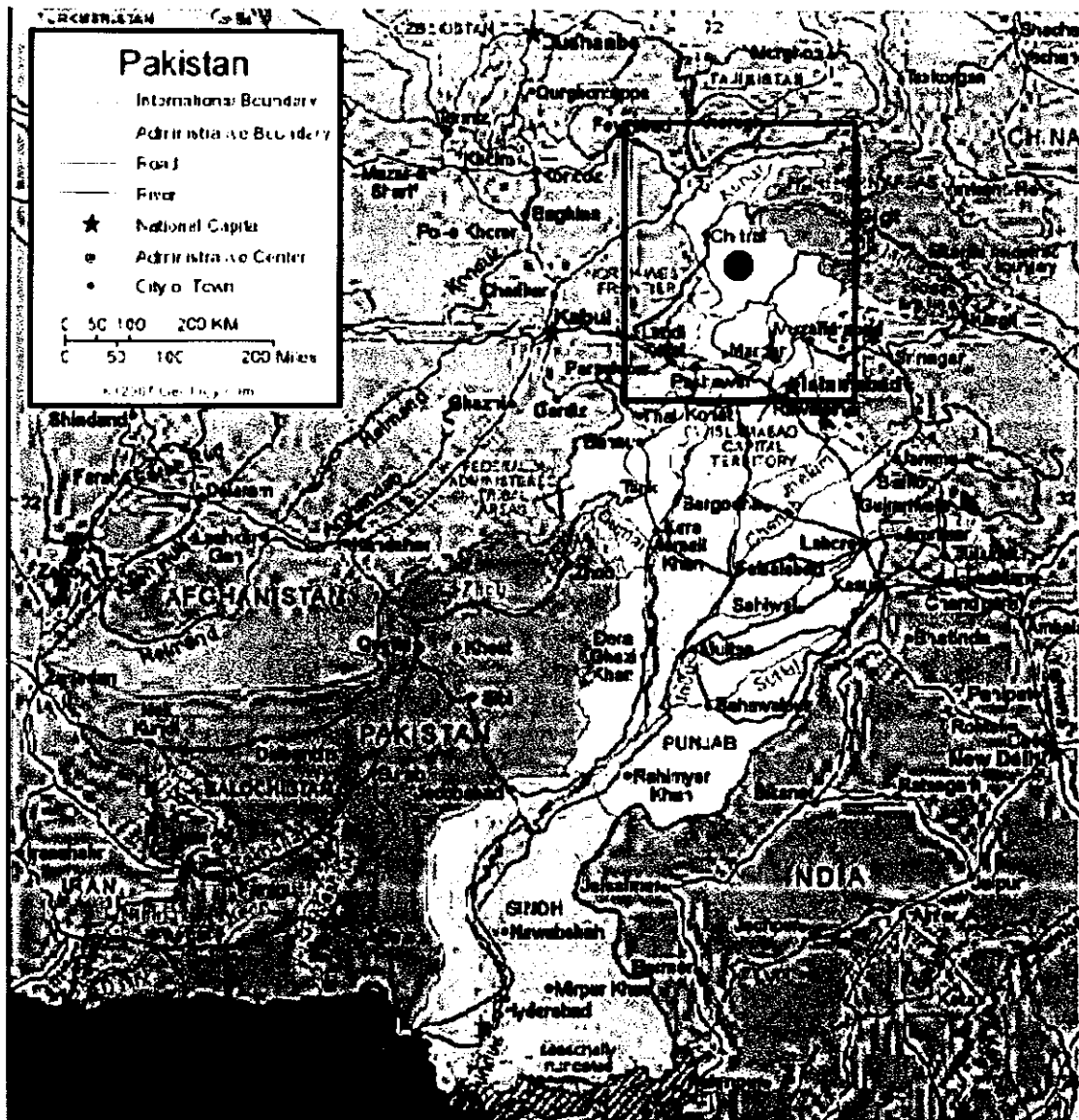
## **SCHEDULE-I**

The Location, Size (i.e. Capacity in MW), Type of Technology, Interconnection Arrangements, Technical Limits, Technical/Functional Specifications and other details specific to the Generation Facilities of the Licensee are described in this Schedule.

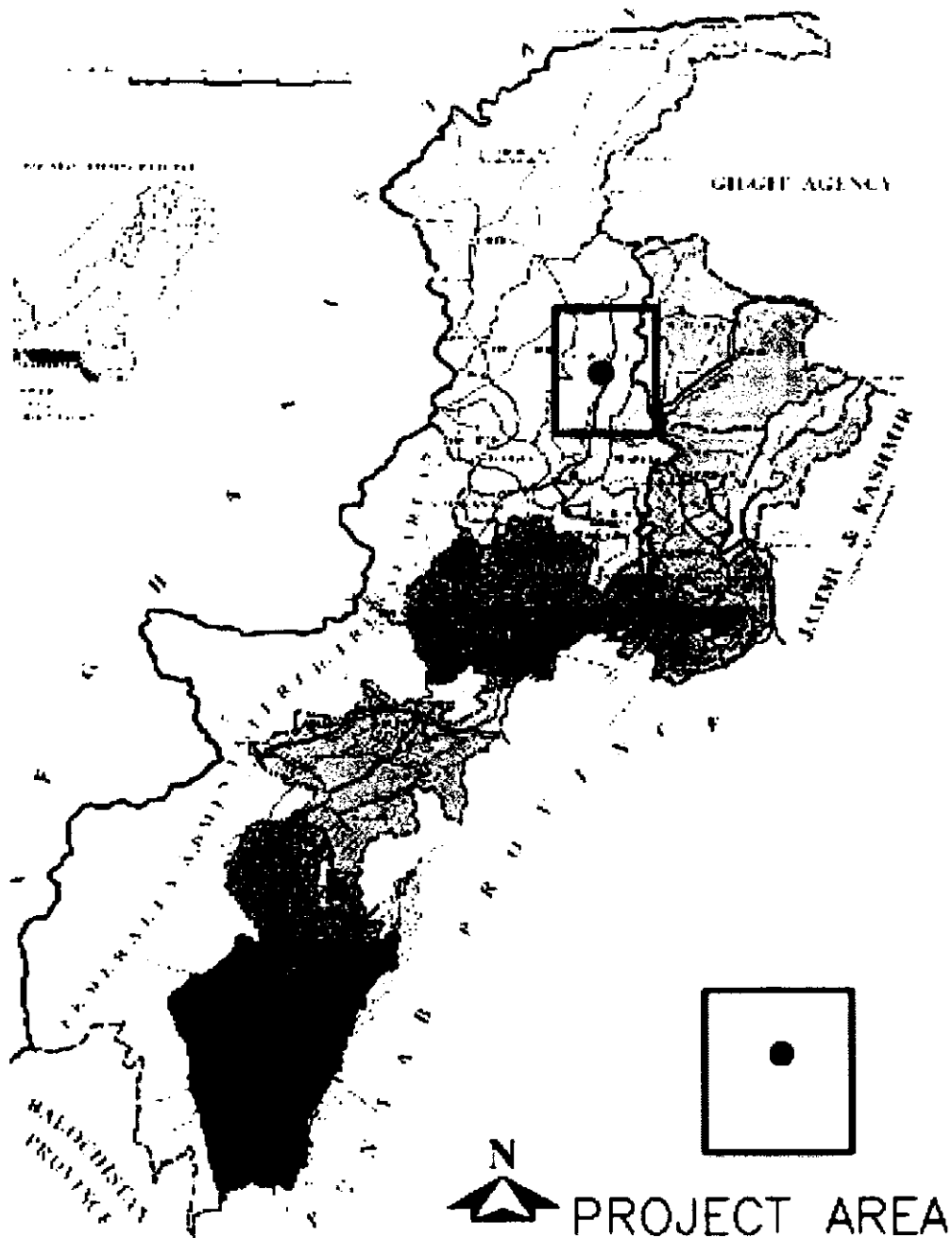




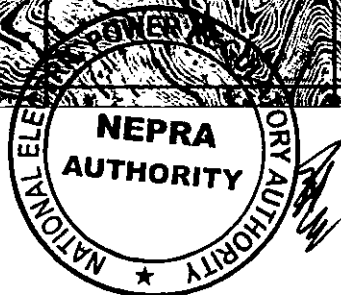
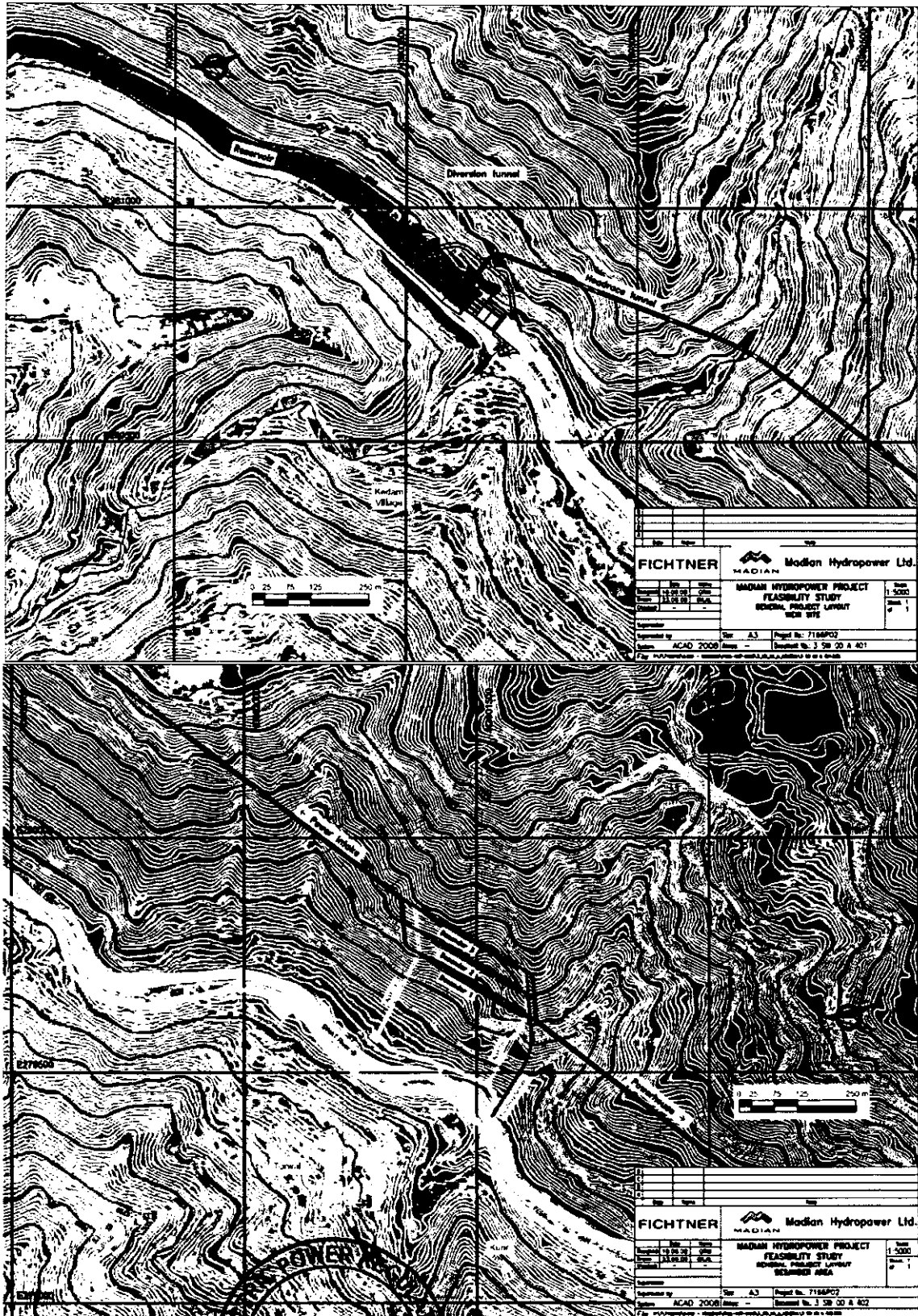
**Location of the  
 Generation Facility/Hydel Power Plant of the Licensee  
 on Map of Pakistan**



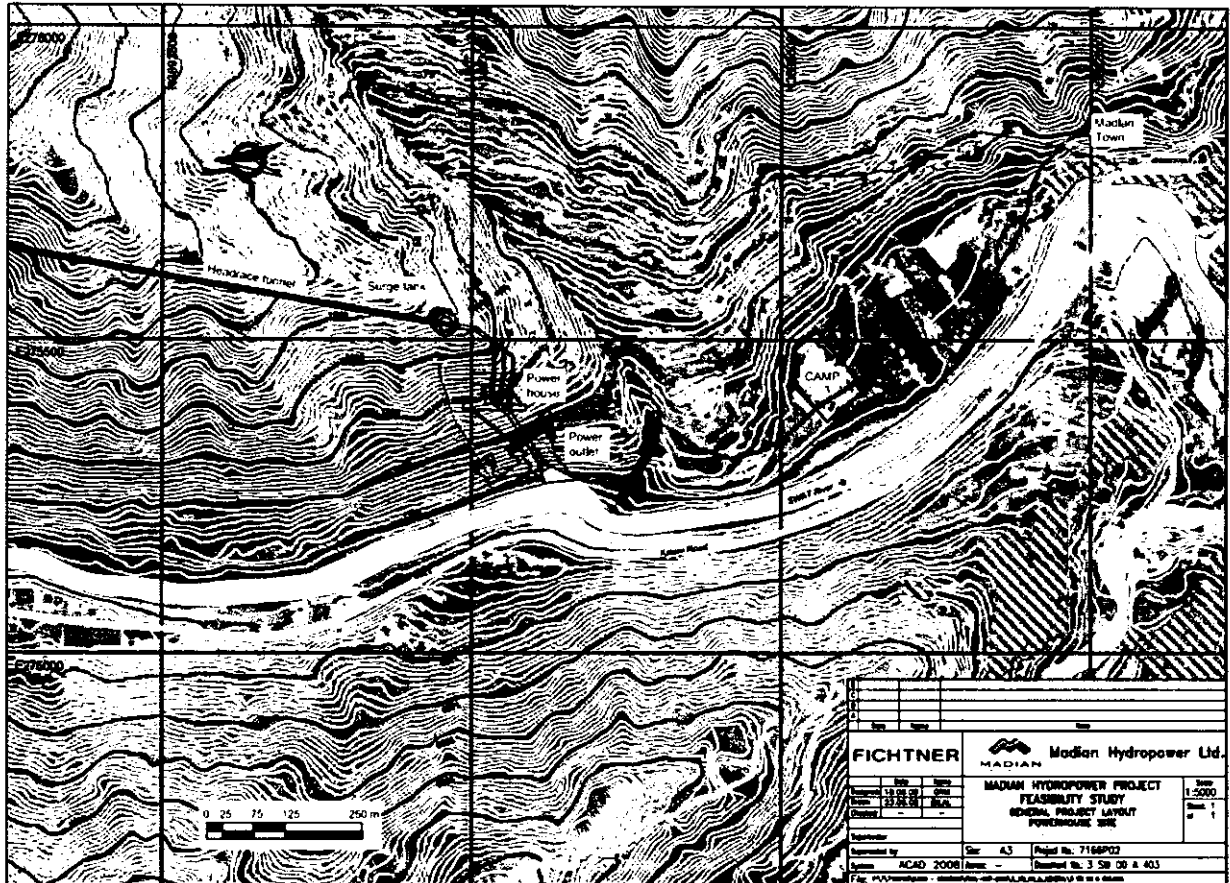
**Location of the  
Generation Facility/Hydel Power Plant of the Licensee  
on Map of Province of Khyber Pakhtunkhwa**



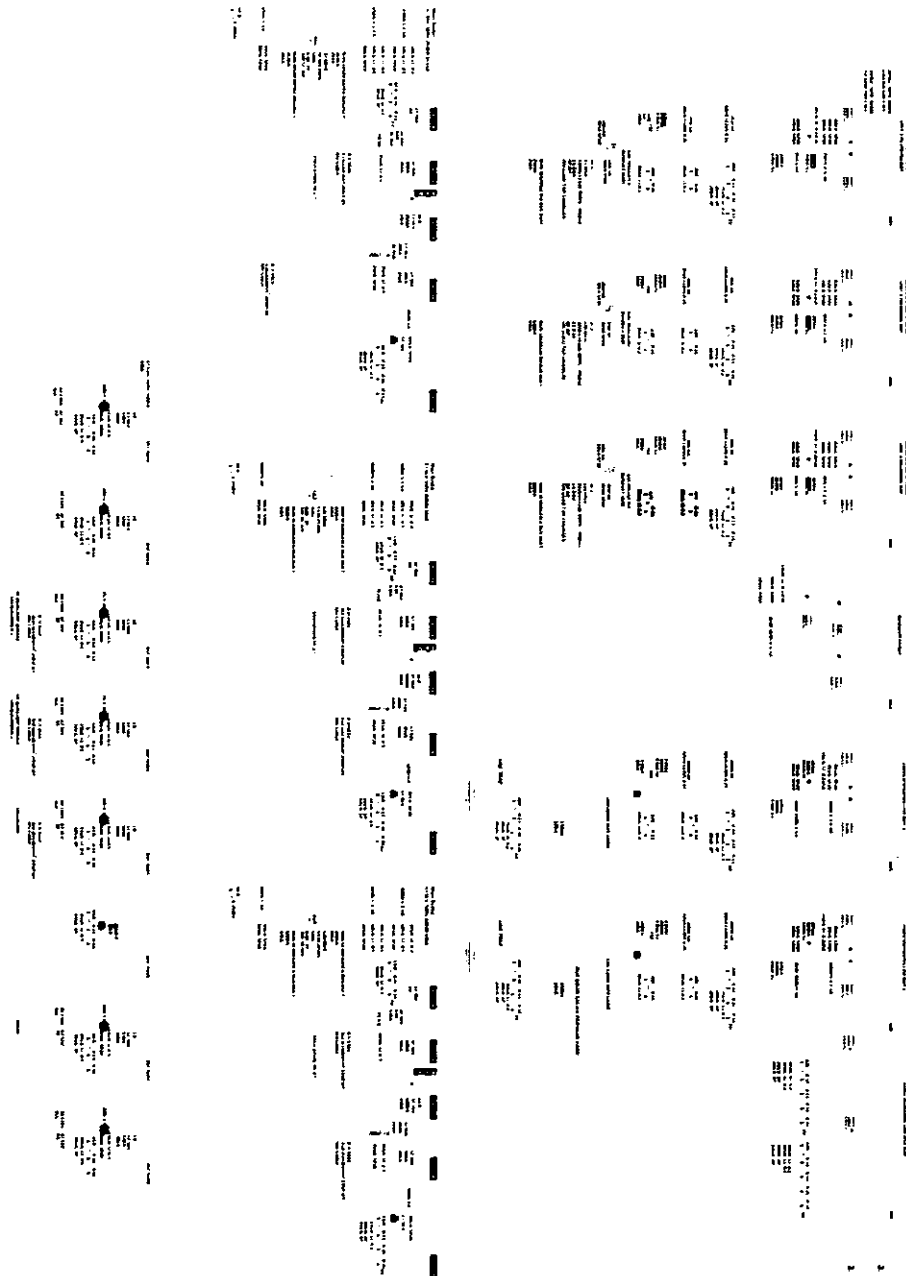
# Lay-out of the Generation Facility/Hydel Power Plant of the Licensee



**Powerhouse of the  
 Generation Facility/Hydel Power Plant of  
 the Licensee**



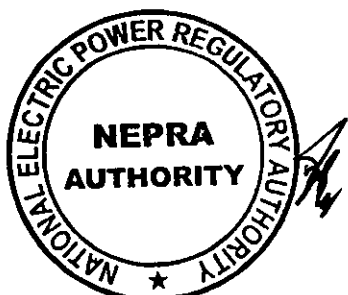
## Single line Diagram (Electrical) of the Generation Facility/Hydel Power Plant of the Licensee



Sl. No.	Legend	Description
1		GENERATOR
2		TRANSFORMER
3		SWITCHGEAR
4		TRANSMISSION LINE
5		BUSBAR
6		CIRCUIT BREAKER
7		RELAY
8		MCCB
9		FUSES
10		CAPACITOR
11		INDUCTOR
12		RESISTOR
13		DIODE
14		TRIODE
15		TETRODE
16		PENTODE
17		HEXODE
18		SEPTODE
19		OCTODE
20		NONODE
21		DECODE
22		UNDECODE
23		DUODECODE
24		TREDECIDE
25		QUADECODE
26		QUINTODE
27		SEXTODE
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**NOTES**

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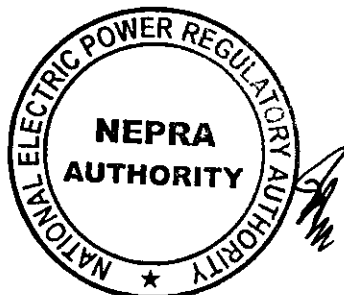


**Interconnection Arrangement for  
Dispersal of Electric Energy/Power from the Generation  
Facility/Hydel Power Plant of the Licensee**

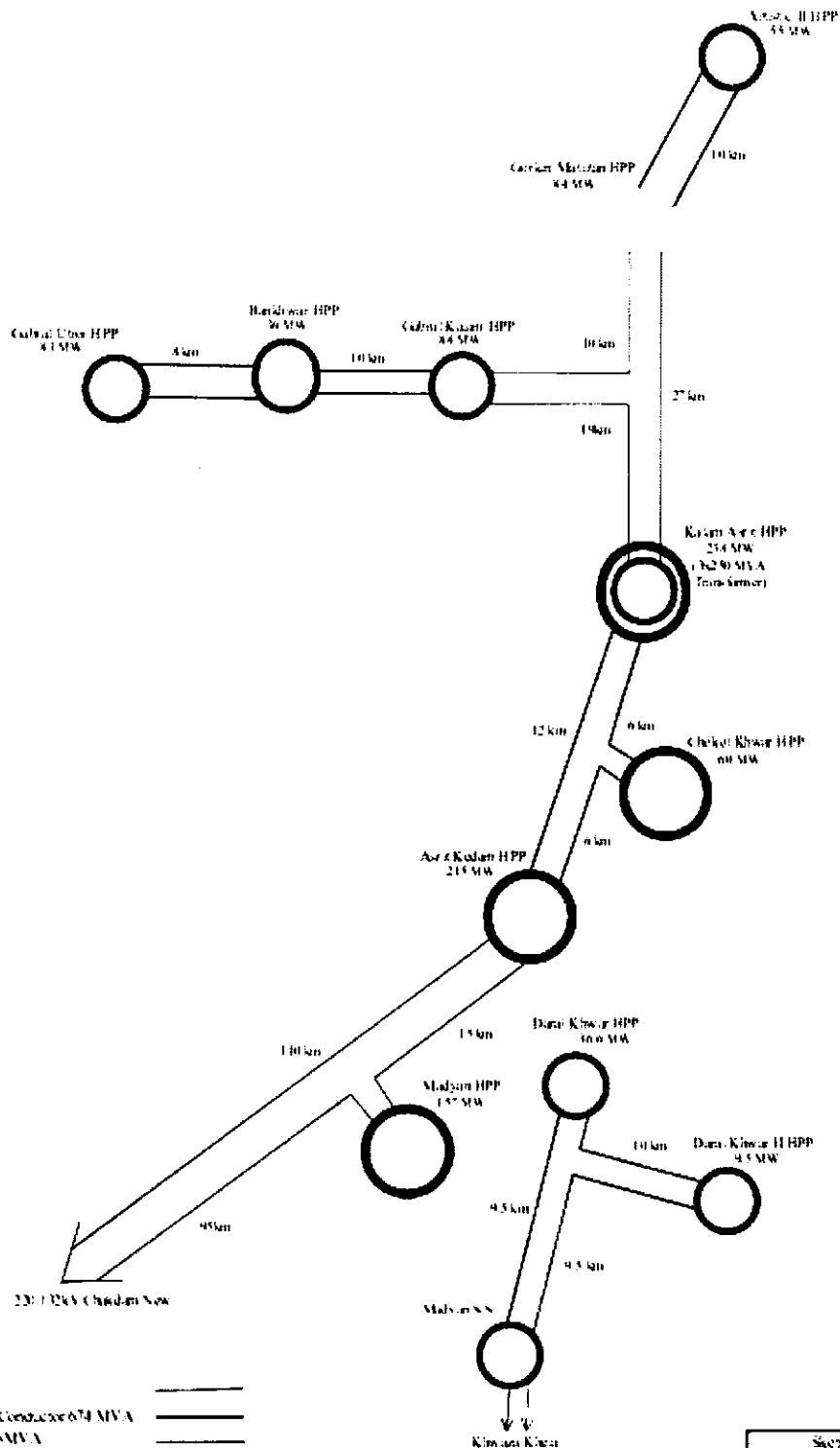
The electric power generated from the generation facility/Hydel Power Plant of the Licensee/Pakhtunkhwa Energy Development Organization (PEDO) shall be dispersed to the national grid.

(2). Regarding the interconnection arrangement/transmission facilities of the project, the Madyan HPP will be ultimately connected to the system by making an In-Out of one circuit of 220 KV Double Circuit on twin bundled Plano conductor carrying power from 215 MW Asrit Kedam HPP to Chakdara-New 220/132 KV grid station with all HPPs commissioned in the region.

(3). Any change in the final Interconnection and Transmission Arrangement(s), for the dispersal of power other than the above, as agreed by the Licensee, NTDC and PESCO shall be communicated to the Authority in due course of time.



**Schematic Diagram for**  
**Dispersal of Electric Energy/Power from the Generation**  
**Facility/Hydel Power Plant of the Licensee**



### Legend

## Practical Relevance

## 220kV To 60kV Bulk Rail Converter 674 MVA

236V Quad Bundle 234MVA

12.5 Ton truck Built under 40MVA

12th Rail Conference 2011A

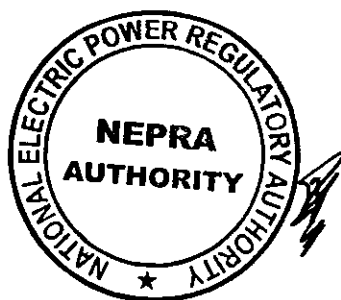
Page 1-22-204

5/27/2024

### Integrated Study for

### Best Value 1994

**Peer-Reviewed Literature**



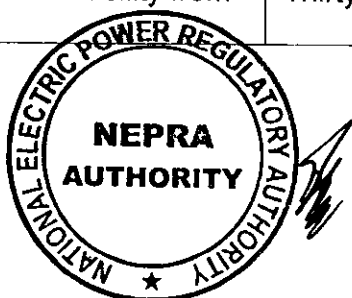
**Detail of**  
**Generation Facility/Hydel Power Plant**  
**of the Licensee**

**(A). General Information**

(i).	Name of the Licensee/ Company	Pakhtunkhwa Energy Development Organization (PEDO)
(ii).	Registered/Business Office of the Licensee/ Company	PEDO House, 38-B2, Phase-V, Hayatabad, Peshawar
(iii).	Location of the Generation Facility	Near Madyan Town, District Swat, Khyber Pakhtunkhwa
(iv).	Type of Generation Facility	Hydel Power Plant

**(B). Configuration etc.**

(i).	Size/ Installed Capacity of the Generation Facility (Gross)	157.00 MW
(ii).	Type of Storage etc.	Run of River based Hydel Power Plant
(iii).	Water Source	Swat River
(iv).	Type of Technology	Three (03) Vertical Shaft Francis Turbines
(v).	Number of Units & Size (MW)	3 x 52.43 MW
(vi).	Turbine Make & Model	To be Provided Later
(vii).	COD of the Generation Facility	January 31, 2028
(viii).	Expected Life of the Generation Facility from COD	Thirty (30) Years





**(C). Hydrology**

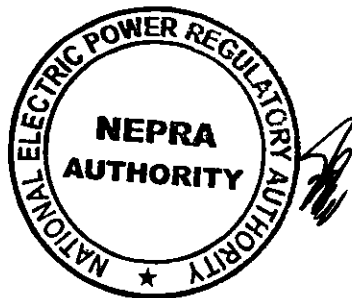
(i).	Catchment Area	2403 Sq.km
(ii).	Mean Annual Flow	118.50 m <sup>3</sup> /sec
(iii).	Design Flood (Q <sub>1,000</sub> )	1450 m <sup>3</sup> /sec
(iv).	Maximum Flood (Q <sub>10,000</sub> )	2002 m <sup>3</sup> /sec

**(D). Reservoir**

(i).	Total Volume	480,000 m <sup>3</sup>
(ii).	Normal Reservoir Operation Level	1494.0 m asl
(iii).	Minimum Operation Level	1994.50 m asl

**(E). Weir Structure**

(i).	Crest Level of Weir	1496.0 m asl
(ii).	Maximum Weir Height	18.0 m asl
(iii).	Length of Weir Crest	77.0 m
(iv).	Invert of Flushing Outlet	1477.0 m asl



**(F). Spillway**

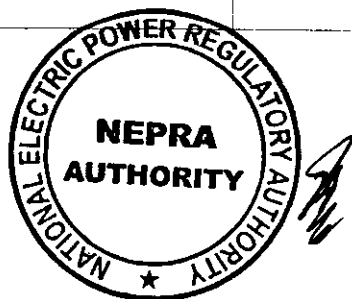
(i).	Level of Spillway Crest	1482.5 m asl
(ii).	Number of Tainter Gates	03
(iii).	Width of Gate	7.60 m
(iv)	Height of Gate	12.0 m

**(G). Desander**

(i).	Design Discharge	129 m <sup>3</sup> /sec
(ii).	Design Particle Diameter	0.2 mm
(iii).	Number of settling chambers	03
(iv).	Effective length of chamber	206.0 m w/o transition
(v).	Width of chamber	13.70 m
(vi).	Average depth of chamber	16.8 m
(x).	Size of Stilling Basin (Combined)	105 m x 30 m

**(H). Low Pressure Headrace Tunnel**

(i).	Length	11.80 km
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(ii).	Net Diameter	7.0 m
(iii).	Maximum Flow velocity	3.35 m/sec

**(I). Surge Tank**

(i).	Diameter	21.0 m
(ii).	Height	69.0 m

**(J). Pressure Shaft and High-Pressure Tunnel**

(i).	Total length (shaft & tunnel)	180.30 m
(ii).	Length of vertical shaft	120.80 m
(iii).	Diameter	5.80 m concrete lined
(iv).	Flow velocity	4.88 m/sec
(v).	Diameter	5.40 m
(vi).	Flow Velocity	5.63 m/sec
(vii).	Steel lining	20 – 28 mm



**(K). Powerhouse**

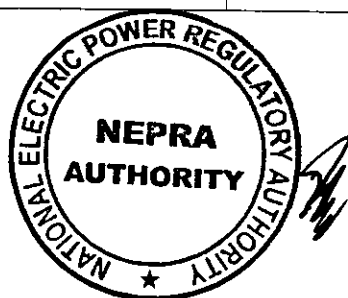
(i).	No. of units	03 Vertical Francis
(ii).	Installed Capacity	3 x 60.80 MW
(iii).	Available Capacity (excluding transformer 3 units in operation)	3 x 52.43 MW
(iv).	Maximum Turbine Design Discharge	43.0 m <sup>3</sup> /sec
(v).	Cavern Width	20.0 m
(vi).	Cavern Length	70.0 m
(vii).	Turbine Setting	1336 m asl

**(L). Electro-mechanical Equipment**

(i).	Number of Transformers	09
(ii).	Type of GIS Switchyard	SF6
(vii).	Velocity at Design Discharge	0.5 m/sec

**(M). Tailrace Tunnel**

(i).	Total length (with manifold)	93.60 m
(ii).	Diameter	7.30 m



(iii).	Diameter of manifold	4.2 m concrete lined
(iv).	Flow velocity	3.08 m/sec
(v).	Mean Annual Energy	765.50 GWh
(vi).	Plant Factor	0.56

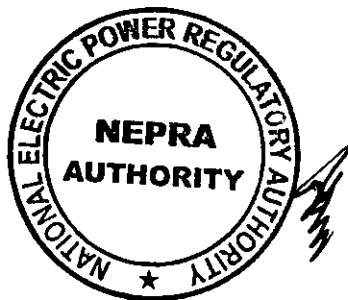
**(N). Plant Characteristics**

(i).	Generating Voltage	11 KV
(ii).	Frequency	50 Hz
(iii).	Power Factor	0.85
(iv).	Automatic Generation Control	No
(v).	Ramping Rate	10 minutes
(vi).	Time Required to Synchronise to Grid	5 minutes



## **SCHEDULE-II**

The Total Installed Gross ISO Capacity (MW), De-Rated Capacity At Reference Site Conditions (MW), Auxiliary Consumption (MW) and the Net Capacity At Reference Site Conditions (MW) of the Generation Facility/Hydro Power Plant of Licensee is given in this Schedule



## **SCHEDULE-II**

(1).	Total Installed Gross Capacity of the Generation Facility/Hydel Power Plant (3 x 52.43 MW Francis Turbines)	157.00 MW
(2).	Total De-Rated Capacity of the Generation Facility/Hydel Power Plant at Mean Site Conditions (3 x 52.43 MW Francis Turbines)	157.00 MW
(3).	Auxiliary Consumption of the Generation Facility/Hydel Power Plant (3 x 0.523 MW Francis Turbines)	1.57 MW
(4).	Net Capacity of the Generation Facility/Hydel Power Plant at Mean Site Conditions Condition (3 x 51.81 MW Francis Turbines)	155.43 MW
(5).	Mean Annual Energy of the Generation/Hydel Power Plant	765.50 GWh

### **Note**

All the above figures are indicative as provided by the Licensee. The Net Delivered Energy available to Power Purchaser for dispatch will be determined through procedures contained in the Energy Purchase Agreement (EPA) or the Applicable Document(s).

