PEDO BUSINESS PLAN

June 2025

Malakand-III 81 MW

Pehur 18 MW

Karora 11.8 MW

Balakot 300 MW

Daral Khwar 36.6 MW

Ranolia 17 MW

Machai 2.6 MW

Shishi 1.875 MW

MMHPs

Solar Installations

Jabori 10.2 MW

Gorkin Matiltan 84 MW

Lawi 69 MW

Koto 40.8 MW

DISCLAIMER

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Acronyms

ADB	Asian Development Bank
ADP	Annual Development Programme
AEDB	Alternative Energy Development Board
AIP	Accelerated Implementation Program
AJ&K	Azad Jammu and Kashmir
AKRSP	Aga Khan Rural Support Programme
ARE	Alternate Renewable Energy
BHU	Basic Health Unit
BPC	Bulk Power Consumer
CAGR	Compound Annual Growth Rate
CAPEX	Capital Expenditure
CCI	Council of Common Interests
CM	Chief Minister
COD	Commercial Operations Date
CPEC	China-Pakistan Economic Corridor
CPI	Consumer Price Index
CPP	Captive Power Plants
CPPA	Central Power Purchasing Agency
CSR	Corporate Social Responsibility
CTBCM	Competitive Trading Bilateral Contract Market
DISCO	Distribution company
DLI	Disbursement Link Indicator
ED	Electricity Duty
EDF	Energy Development Fund
EHV	Extra High Voltage
EIA	Environmental Impact Assessment
EPA	Energy Purchase Agreement
ESCO	Energy Supply Companies
ESMAP	Energy Sector Management Assistance Programme
EWA	Energy Wheeling Agreement
FC	Fuel Charge
FESCO	Faisalabad Electric Supply Company
FY	Financial Year
GDP	Gross Domestic Product
GEPCO	Gujranwala Electric Power Company
GHI	Global Horizontal Irradiance
GoKPK	Government of Khyber Pakhtunkhwa
GoP	Government of Pakistan
GPP	Gross Provincial Product
GS	Grid Station
GST	General Sales Tax
GW	Gigawatt
HDF	Hydel Development Fund
HESCO	Hyderabad Electric Supply Company
HPP	Hydropower Project
HVAC	High Voltage Alternating Current

Acronyms

IEE	Initial Environmental Examination
IESCO	Islamabad Electric Supply Company
IGCEP	Indicative Generation Capacity Expansion Plan
IMF	International Monetary Fund
IPP	Independent Power Producer
JDA	Joint Development Agreement
KE	K-Electric Limited
KHRE	Khyber Pakhtunkhwa Hydropower and Renewable Energy Development Program
KM	Kilometer
KHNP	Korea Hydro & Nuclear Power
KPK	Khyber Pakhtunkhwa
KPEPRA	Khyber Pakhtunkhwa Electricity & Power Regulatory Authority
KPEZDMC	Khyber Pakhtunkhwa Economic Zones Development & Management Company
KPTGCL	Khyber Pakhtunkhwa Transmission and Grid System Company Limited
kV	Kilovolt
LESCO	Lahore Electric Supply Company
LOI	Letter of Intent
LSMI	Large-scale Manufacturing Industries
MEPCO	Multan Electric Power Company
MHP	Micro Hydel Project
MMHP	Mini Micro Hydel Project
MOE	Ministry of Energy
MW	Megawatt
NEPRA	National Electric Power Regulatory Authority
NGC	National Grid Company
NJ	Neelum-Jhelum
NTDC	National Transmission & Dispatch Company
O&M	Operations & Maintenance
PAC	Power Acquisition Contract executed with relevant DISCO
P&D	Planning & Development
PDWP	Provincial Development Working Party
PEDO	Pakhtunkhwa Energy Development Organization
PEPA	Pakistan Environmental Protection Agency
PESCO	Peshawar Electric Supply Company
PGC	Provincial Grid Company
PKR	Pakistan Rupees
PPP	Public Private Partnership
PV	Photovoltaic
QESCO	Quetta Electric Supply Company
RE	Renewable Energy
RFP	Request for Proposal
ROEDC	Return on Equity During Construction
SCOD	Scheduled Commercial Operations Date
SEPCO	Sukkur Electric Power Company
SEZ	Special Economic Zone
T&D	Transmission & Distribution
TESCO	Tribal Electric Supply Company
UOSC	Use of System Charge

Executive Summary

Executive Summary
Rationale for the Assignment

About the Assignment

The Pakhtunkhwa Energy Development Organization (PEDO), under the Government of Khyber Pakhtunkhwa (GoKPK), has been making strides to operationalize its hydroelectric power projects (HPPs) more efficiently, with the ultimate aim of **providing affordable and sustainable energy to the KPK industry and national grid.**

With above objective PEDO is implementing a generation portfolio of hydropower projects for delivering electricity under multiple modes. The sources of funding for development of these projects include (a) allocations under "Annual Development Plan (ADP), (b) Hydel Development Fund (HDF), and (c) foreign loans to GoKPK that are routed to PEDO projects, while other avenues like direct commercial/DFI loans to PEDO and capital market funding possibilities for PEDO to be identified.

This document attempts to set new vision for PEDO (refer Section-3) that is more aligned with GoKPK objectives and identifies underlying challenges and opportunities in achieving such vision along with viable strategies that PEDO may consider to overcome such challenges. This document is designed to set overall strategic direction, tactics and project-wise specific recommendations, compiled as **'business plan for FY 2026 to FY 20235'**. This document also identifies funding gaps as a result of implementing proposed strategy and specific steps required going forward.

Challenges faced by PEDO Generation Portfolio

KPK's hydropower generation potential is 24.5 GW, while 4.79 GW of identified & viable generation potential under GoKPK mandate is as follows (refer section-2):

- 1,870 MW of PEDO's portfolio projects (estimated generation potential 8,000 GWh), out of which 172 MW (generation estimate of 630 GWh) is operational at end of FY 2025, while 506 MW (generation 1,950 GWh) is under construction. Out of 1,870, the development phase projects stand at 1,110 MW.
- 1,245 MW of private sector advanced stage projects with completed feasibility studies (estimated generation potential 5,000 GWh)
- 1,675 MW of feasibility study completed projects in Chitral corridor (estimated generation potential 7,000 GWh

Supply to grid has become competitive – (a) there is no scarcity of base load at grid, (b) price of hydro power might not be able to compete with solar and wind energy (c) Solar and other generation resources can be placed near base loads, while hydro power require expensive transmission networks.

Possibility of carving PESCO's residential customers is very low, even with acquisition of PESCO, the DISCO will remain tied with legacy contracts. On other hand the residential consumers within PESCO and TESCO have a high T&D loss and low recovery rates.

From PEDO's perspective the 1,110 MW development phase-projects (both PPP and own projects) face threat of non-procurement from national grid. Options for increase in supply, rests with (a) increasing KPK industrial demand (b) finding new markets for supply. For this PEDO might require to focus on new solutions for supply to consumers within KPK and outside the province. To reduce cost of generation, PEDO might also consider focusing on hybrid generation (Hydro-Solar Hybrid generation) or type of energy sold (selling hydrogen rather than electricity).

To supply electricity directly to consumers, the generation cost has to be substantially lower than national grid price (10.5 Cents/kWh in 2025 that is expected to decline to 9.5 Cents/kWh by 2035)

Executive Summary

Changing Sector Realities & Steps for Realignment

Steps to Realize PEDO's New Outlook

KPK power sector has remained focused on (a) hydropower generation, and (b) sale of electricity to national grid. Both of these focused areas need to be realigned because of the changing realities, **as discussed in Section-3** and summarized hereunder:

- National grid has surplus capacity and limited hydropower projects can be absorbed by national grid in future. Accordingly, it is recommended that new provincial electricity demand hubs need to be established, as existing KPK's demand will continue to be served by National Grid. For **supply to existing domestic demand hubs the CTBCM can be explored, while for new demand hubs both CTBCM and direct lines can be established.**
- Establishment of KPEPRA is crucial and is to be implemented at earliest, for realization of this 'business plan'. Going forward **with establishment of KPEPRA, generation, transmission and distribution for electricity supply to new demand hubs within KPK will be possible**, this will facilitate electrifying new demand hubs that may include industrial zones and new housing colonies.
- Micro **Distribution/Grid Licenses from KPEPRA will need to be acquired for industrial hubs** established / operated by KPEZDMC and Small Industries Development Board (SIDB), or by related housing colonies/societies.
- **KPT&GSC will need to apply to NEPRA for broadening its scope** of existing license (currently limited to SEZ and four hydropower corridors) and will **also take license from KPEPRA** for transmission lines within KPK (that does not involve interconnection with national grid).
- Generation cost of new power plants (funded from foreign or local commercial loans) is expected to be at par or less than national grid price, accordingly generation arrangements and funding need to be revisited.
- Keeping in view the surplus capacity at national grid and GoKPK's preference for promoting industry within the province, **PEDO with new vision needs to reposition itself. It has now become crucial to coordinate with industry, SEZs (KPEZDMC), upcoming KPEPRA and distribution companies (provincial or ex-WAPDA) to align for each existing and upcoming project. This alignment has to be focused on (a) supporting industrial development within KPK, (b) while ensuring financial viability of each HPP.**

- It is understood that existing viable (legally and commercially) transmission lines, that were constructed by PEDO, will be transferred by PEDO to KPTGSC, which is the right step to separate the functions as per relevant mandate.
- Similarly, **KPTGSC is expected to provide technical solutions within its mandate for evacuation of the projects for transmission within KPK and for national grid**. For this, separate licenses would be required from KPEPRA, besides its existing role as Provincial Grid Company that is focused to facilitate transmission of electrons to national grid.
- It is important to highlight that **new transmission lines, established by KPTGSC, might be used for dual purposes** that is (a) supply to national grid, and (b) supply to electricity distributors that are licensed by KPEPRA.

However, it is important to highlight that **expected industrialization will be slow and to peruse the development of projects, balance is to be retained between supply to national grid, KPK industry's demand and possible supply opportunities for other customers.** Accordingly, GoKPK /PEDO should in parallel continue to peruse inclusion of projects in IGCEP in this regard it was noted that latest iterations of IGCEP are developed in violation of assumptions approved by CCI in 2021/2022, that need to be resisted at all levels.

Project (HPP-wise) specific list of recommendations and steps required is provided in Section-4

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Customers, Modes of Supply & Acceptable Price Levels

Alternate Customers

Other than the National Grid, PEDO can supply electricity to the following alternate customers. **Possibility of supply and related mode of supply, to said alternate customers, is discussed in Section-5**:

- General Industry
- Export Industry
- IT Industry
- Industrial zones under KPEPRA
- Housing Societies (under KPEPRA)
- Supply to other countries
- External Utilities (K-Electric)
- Supply to Gilgit Baltistan

Based on analysis conducted in Section-5, recommended mode of supply for above discussed customers is outlined in the adjacent table, along with acceptable price range of related customers and size of generation capacity that can supply through identified mode in next 10 years.

Mode of Supply	Acceptable Range	Assumption
CTBCM	**US Cents 7.4 – 9.4/kWh** for general industry, export industry, IT industry and industrial zones.	Expected targeted size 400 MW (hydropower capacity). Price range represent all inclusive cost (i.e. capacity balancing and marginal pricing)
Direct Supply	**US Cents 6.9 – 7.4/kWh** for general industry, export industry, IT industry and industrial zones.	For supply to adjacent industry, Individual HPP size can be 10-15 MW, that can be made available to industries in sequence. For supply to industrial zones, supply can be in lots/multiples of 30-50 MW each with 2-3 years gap. Price range represent all available inclusive cost (i.e. cost of transmission line till gantory of consumer)
Direct Lines to Others Customers (Housing Societies, other countries)	**US Cents 3 – 4/kWh from** a sizeable generation resource for other countries. For Housing societies, aceeptable price is expected to be **less than US Cents 5/kWh**	For societies, size will depend on size of colony (rough estimate 40-50 MW in given time slot). Colonization of a hosung and full supply may take 8-10 years. For supply to other countries CASA-1000 may may be explored, a minimum size of 200 MW is expected for supply through CASA-1000. Price range for other countries represents delivery price at HPP gantory.
Direct Lines to K-Electrict	US Cents 8-10/kWh	Expected size 80MW to 450 MW. NTDC wheeling cost & energy losses will be added above supply cost. Price range represent, delivery price at HPPs gantory.
Direct Lines to Gilgit Baltistan	US Cents 5 /kWh	Expected size 40MW to 100 MW. Price range represent, acceptable supply cost at HPPs gantory.

Executive Summary

CTBCM Viability

Viable Capacity for Supply under CTBCM Mode

CTBCM is an acronym for Competitive Trading Bilateral Contracts Market. **CTBCM is a market reform model proposed for Pakistan's electricity sector,** aiming to transition from the current single-buyer system to a more competitive wholesale market where electricity is traded through bilateral contracts. Currently, Pakistan's electricity market operates under a single buyer model, meaning a single entity (CPPA) purchases electricity on behalf of multiple distributors (DISCOs). CTBCM proposes to change this by allowing larger consumers (1MW or more- referred as "BPCs") to directly negotiate contracts with electricity generators.

In past, Wheeling/CTBCM has been pushed back by DISCOs on the premise that it will result in loss to National Grid, however based on recent discussions with various relevant stakeholders there seems to be a consensus on opening the wholesale electricity market by introducing a price discovery mechanism for establishing Stranded cost under UoSC (for CTBCM), which has been one of the main areas of controversy in past. For this **800 MW of firm capacity will be offered through issuance of 'framework guideline' under which 2-3 auctions will be held. Each auction will offer an allocation of 150 MW to 200 MW of firm capacity per year, for competition among interested parties.** Each auction will allow right to bid for a slot for any of the next five years (2027 to 2031), unutilized capacity will be offered in next bidding round. The **framework guideline will remain applicable for next five years, after which market is expected to fully opened with zero stranded cost.**

For offering PEDO's portfolio under upcoming auctions an initial analysis has been done under this business plan, based on which **it is estimated that about 48.27 MW of firm capacity (111 MW Gross Capacity) can be offered under CTBCM.** Projects with price to CTBCM below 8.4 Cents/kWh were considered competitive and proposed to be taken forward for auction under CTBCM at this stage. **However, 111 MW Gross Capacity may be reduced considering viability of direct supply model for certain projects, discussed in next slide.**

Name	Gross Capacity MW	Firm Capacity MW	Price to CTBCM Cents / kWh	Proposed to be taken forward for auction under CTBCM	Firm Capacity that can be offered in CTBCM
Pehur HPP	18	6.08	7.5	Yes	6.08
Daral Khwar HPP	37	17.45	10.1	No	-
Ranolia HPP	17	10.53	12.3	No	-
Machai HPP	3	0.81	13.9	No	-
Shishi HPS	2	0.81	4.6	Yes	0.81
Jabori HPP	10	6.46	7.9	Yes	6.46
Gorkin-Matiltan HPP	84	31.68	10.5	No	-
Lawi HPP	69	28.43	8.3	Yes	28.43
Koto HPP	41	18.96	10.2	No	-
Karora HPP	12	6.49	7.8	Yes	6.49
Gabral Kalam HPP	95	33.42	14.1	No	-
Total	388	161.12			48.27

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Direct Supply Model (DSM) Viability

Viable Capacity for Supply under DSM Mode

The Direct Supply arrangements envisage the supply/sale of electricity by the Projects to the industrial consumers at close proximity of each Project, that is without involving national grid/network. Therefore, to have the Direct Supply arrangement, the electricity should be received by the industrial consumer directly from the outgoing bus bar of the Project without using national grid or its associated facilities.

Three options to supply through Direct Supply Model are:

- Adjacent to HPP
- Along HPP's transmission line
- Existing/new industrial zones near HPP clusters

It is understood that cost of Direct Supply Model is less than cost of CTBCM supply, however from a strategic point of view supply under CTBCM should still be perused by PEDO because (a) it has a much larger reach compared to Direct Supply Model, (b) price dynamics assumed in this plan can change (c) relocating existing industry to KPK will be less attractive for alternate consumers.

However, to catalyze development of domestic industry, it is recommended that in next few years **Jabori** and **Karora** may be offered under direct supply model by inviting alternate customers (discussed above) to establish their manufacturing units or other processing units (IT/data center etc.) adjacent to said power plants. For this, selection process of credible parties may be initiated, followed by execution of agreements and construction of units by related parties. The interconnection cost may be borne by related party while related O&M can be performed by KPT&GSC under license from KPEPRA.

For supply to industrial zones, it is recommended that negotiations may be started with related stakeholders (KPEZDMC and Rashakai Special Economic Zone Development & Operation Company (RSEZDOC)) for following projects:

- **Shishi HPP** for supply to Chitral Economic Zone, followed by **Lawi HPP** once colonization takes pace. If KPEZDMC is of the view that Chitral Economic Zone will not take pace in couple of years, there are two options for Lawi HPP (a) separate line will be required to interconnect with Chakdara to further interconnect with other industrial zones (b) Supply under CTBCM to general industry within KPK. For this business plan it is assumed to supply under CTBCM will be implemented for Lawi HPP.
- **Gokin Matiltan** and **Gabral Kalam** can be interconnected with Rashakai SEZ, Buner SEZ and other upcoming industrial zones. The tariff of Gabral Kalam is higher than expected acceptable price range of SEZs. In case RSEZDOC does not agree to the acquire electricity from Gabral Kalam, it can be either (a) continued with National Grid or (b) Discussion may be held with K-Electric for supply of electricity from project, along with Madyan if considered appropriate. For this business plan it is assumed that **Madyan may continue with National Grid.**
- For **Koto HPP**, either (a) new industrial zone is considered (or project of Koto Industrial Zone may be reconsidered) within the vicinity, till colonization of said industrial zone Koto HPP may continue with national grid till its colonization, or (b) Discussion may be held with K-Electric for supply of electricity from project.
- The energy supply variations and supply gaps from HPP, will be subject to SEZ's / Zone's own arrangements for which backup to be arranged via (a) national grid connection or (b) thermal power at site.

It is important to highlight, that for supply to industrial zones, KPEPRA has to be functional that issues respective licenses and tariffs for the electricity supply chain of industrial zone. Note that Shishi, Jabori, and Karora have been recommended for Direct Supply Model although they were viable for CTBCM, as cost of Direct Supply Model is less than cost of CTBCM supply and there are opportunities in their respective vicinities.

Executive Summary

Proposed Way Forward for Each Project

The following table summarizes recommendations for various supply modes and steps required along with relevant dates for each project.

Project Name	Size (MW)	Forecasted Energy (GWh)	Proposed way forward	COD Targets	Tariff True-up/ Indexation Targets	Assumed under CTBCM	Firm Capacity for Bid under CTBCM	Assumed under Direct Supply Model (adjacent industry)	Assumed for supply to SEZs/ Zones
Malakand-III HPP	81	384	Either new indsutrial zone or housing	Achieved	Achieved				Q1 FY 2035
Pehur HPP	18	53	Convert wheeling to CTBCM	Achieved	2026	Q1 FY 2027	6.08		
Daral Khwar HPP	37	153	To be evaluated for Direct Supply Model or Supply to Zone	Achieved	2026			Q3 FY 2029	
Ranolia HPP	17	92	High tariff- continue with National Grid	2027	2029				
Reshun HPS	5	15	Social uplift- off-grid sale	Achieved	NA				
Machai HPP	3	7	High tariff- continue with National Grid	Achieved	2026				
Shishi HPS	2	7	Supply to Chitral Economic Zone	Achieved	Not Required				Q1 FY 2028
Jabori HPP	10	60	Adjacent Industry by 2028. Bidding process complete at earliest.	Achieved	2026			Q3 FY 2028	
Balakot HPP	300	914	High tariff- continue with National Grid, or may be offered to K-Electric	2029	2031				
Gorkin-Matiltan HPP	84	212	Supply to Rashakai SEZ- RSEZDOC	2026	2027				Q3 FY 2029
Lawi HPP	69	249	If KPEZDM agrees then to Chitral Economic Zone, otherwise Bid under CTBCM framework	2026	2028	Q1 FY 2029	28.43		
Koto HPP	41	166	Explore possibility of Economic zone (Koto economic zone) adjacent to HPP (continue will national grid till that time)	2025	2027				Q1 FY 2030
Karora HPP	12	57	Adjacent Industry by 2028. Bidding process complete at earliest.	2026	2028			Q1 FY 2029	
Gabral Kalam HPP	95	293	Offer RSEZDOC and K-Electric, or continue with national grid	2030	2032				
Madyan HPP	215	671	High tariff- continue with national Grid or discuss with K-Electric	2030	2032				
Chapri Charkhel	14	65	Final EPC cost and update project tariff. Assumed grid supply.	2030	2032				
Mujaheden HPP	7	33	If approved then will taken as social uplift- off-grid sale	2030	2032				
Sub Total	**1,008**	**3,431**					**34.51**		
Lower Spat Gah (26%)	470	1,925	Discuss possibility of lowering project cost and funding costs with KHNP. Not assumed in business plan at the moment.	2032	2034				
Grand Total	**1,478**	**5,356**					**34.51**		

Executive Summary

Funding Requirements

At PEDO Level

From PEDO's perspective all funding requirements are met by GoKPK (directly or through Hydel Development Fund-HDF), with one exception that is of "Khyber Pakhtunkhwa Hydropower and Renewable Energy Development Program (KHRE program)" under which underlying obligations are allocated to PEDO by GoKPK.

KHRE program is designed to fund two major upcoming projects i.e. Gabral Kalam and Madyan. Under the said program, besides funding from IDA and IBRD (routed through EAD- federal government), additional funding sources to be explored and utilized that (a) GoKP/PEDO equity funding (b) domestic commercial loan and (c) foreign commercial loans. Accordingly, at PEDO level there is a requirement to raise following foreign and domestic commercial loans:

- Gabral Kalam (a) foreign commercial Loan US$ 29.53 M and (b) local commercial loan of PKR 8.2 Billion.
- Madyan are (a) foreign commercial Loan US$ 84.4 M and (b) local commercial loan of PKR 23.5 Billion.

Further it is understood that above two projects are facing resistance from National Grid. Accordingly, debt process may be initiated once there is more clarity from national grid in this regard. Based on assessment of two projects it is expected that resultant tariff of Madyan might be higher than Gabral Kalam, because of which it might face more resistance and delays for extended time.

Lastly, the debt repayments of KHRE's foreign loans (IDA & AIIB) are scheduled to start in FY 2025-2028. It is proposed that the KHRE loan agreement is renegotiated to ensure that (a) repayments start post COD of said projects that is now envisaged in 2030 and (b) excess funds. if any, are utilized to fund shortfalls of other projects emanating at GoKPK level.

At GoKPK Level

Net funding requirement at GoKPK level is analyzed under two scenarios that are:

a) **"AS IS"** All projects are perused and constructed as planned (excluding lower spat gah which has not been assumed as discussed in last section)

b) **"Eliminated Projects"** All assumptions are same as per "Scenario-a" above except that it further excludes (i) Madyan (ii) Chapri Charkhel and (iii) Mujaheden, as status of these three projects is not clear at the moment.

Under both of above scenarios funding gap is expected to arise only in 2026 which can be divided in two parts (I) loss emanating from PEDO funding needs, and (II) estimated repayments/ debt servicing of existing loan portfolio parked at GoKPK (currently adjusted under NFC), as tabulated hereunder:

Funding Shortfall at GoKPK level in FY 2026

Scenario	Scenario-a "AS-IS"	Scenario-b "Eliminated Projects"
If debt servicing of loans parked at GoKPK is recovered from PEDO		
PEDO related funding shortfall	PKR 11.40 B	PKR 4.02 B
Servicing of existing debts raised for PEDO	PKR 11.12 B	PKR 10.86 B
Funding Gap in FY 2026	**PKR 22.53 B**	**PKR 14.88 B**
If debt servicing of loans parked at GoKPK is continued by GoKPK own resources		
Funding Gap in FY 2026	**PKR 11.40 B**	**PKR 4.02 B**

Please note that above funding shortfall assessment is subject to (a) actual change in economic variables is in line with this document, (b) achievement of targets as set on last page and (c) project cost incurrence as per Section-4.

Section 01: Background & Scope of Business Plan

Background

About SEED Program and this assignment

About SEED Program

Sustainable Energy and Economic Development (SEED) is a six-year programme, funded by the UK's Foreign, Commonwealth & Development Office (FCDO), with the objective of engaging counterparts within Government of Khyber Pakhtunkhwa (GoKPK) and undertaking detailed scoping studies and assessments and providing relevant and real-time technical assistance to the GoKPK. It aims at improving economic and urban planning in KPK, while also addressing Pakistan's energy crisis by providing innovative financial solutions for the adoption of sustainable energy practices.

Within SEED, Adam Smith International (ASI) has been contracted to deliver the first component, 'Improved Economic and Urban Planning in Khyber Pakhtunkhwa', to help the province plan and finance the investments and infrastructure it needs for growth, job creation and prosperity. The programme's longer-term outcomes include generating higher levels of public and private investments, enhancing public investment management efficiencies and ensuring that investments made produce greater economic, social, and environmental returns.

About this Assignment

The Pakhtunkhwa Energy Development Organization (PEDO), under the Government of Khyber Pakhtunkhwa (GoKPK), has been making strides to operationalize its hydroelectric power projects (HPPs) more efficiently, with the ultimate aim of providing affordable and sustainable energy to the KP industry and national grid.

With above objective PEDO is implementing a generation portfolio of hydropower and solar projects, for delivering electricity under multiple modes. The sources of funding for development of these projects include (a) allocations under "Annual Development Plan (ADP), (b) Hydel Development Fund (HDF), and (c) foreign loans to GoKPK that are injected in respective PEDO projects, while other avenues like direct commercial/DFI loans to PEDO and capital market funding possibilities for PEDO to be identified.

However, all these endeavors, resource requirements and funding plans for each project are to be captured in the shape of a comprehensive business plan to understand overall size of funding gap and the timing of the gap in the next 5-10 years to strategize the fund availability for continued construction of projects.

Background

Scope and Basis of PEDO's Business Plan

Principle	Description
Lean, dynamic and scalable plan	This business plan is developed based on a Financial Model to keep it a dynamic document which is capable of being continuously updated and aligned with changing realities and status of project portfolio to forecast funding requirements and shortfalls for appropriate and timely decision making. For this reason, a fully integrated and option-sensitive financial model has been developed that (a) captures status and funding requirements of each project and (b), is capable of calculating tariffs/revenue & forecasting cost streams, and (c) can project funding gaps after adjusting for available funding sources (surplus revenues, GoKPK funding (ADP), inflows from HDF, equity funding, DFI funding and commercial loans), if any. The results of this financial model provide visibility on each project based on applicable economic conditions, that could help in revising funding plans, every year. The envisaged strategic options are already built-in the financial model and can be revised every year.
Interactive process of development	Development of a dynamic financial model was to be based on an interactive process to ensure following: a) Base data availability: Outputs of a financial model are based on accuracy and level of details plugged-in the financial model. Limited data will result in use of more hypothetical assumptions, accordingly during the development process PEDO team has provided project-wise requisite information that is the basic foundation of this model, however the same can be revised as per the requirement of PEDO. b) Functionality and Output: During interactive sessions, the PEDO management guided their requirements on the expected outputs of the financial model. The existing Financial Model is capable of projecting (a) financial statements for the next five-ten years and (b) funding gaps (if any) of PEDO based on the given data, projected tariffs, mode of supply and assumptions. To fill in funding gaps, the Financial Model has certain built-in options to see the impact on projected financial statements, while new options can also be built-in over time as may be required.

Scope of Business Plan

Financial Model Structure

Main inputs to this Module were taken from related projects, for which a questionnaire was designed and filled forms obtained, which formed the basis of project.

Project Input Module

Define projects and their expected timelines, including CAPEX , OPEX, and energy numbers over the life of each project.

Regulated Tarrif Module

Based on NEPRA tariff methodology and data from the input module, the module projects benchmark, COD, and indexed tariffs, using projected economic indicators. For upcoming projects, project data has been used to set the benchmark tariff.

Existing tariff determinations from NEPRA were reviewed, and details were incorporated in the tariff module

For marginal prices, publicly available data from CPPA is used, along with data on Fuel Price Adjustments from NEPRA.

Bilateral Module

This covers both CTBCM and Direct Supply model. CTBCM analysis also covers balancing of both energy and capacity. The base and projected sale price to the industry is based on indexed regulated tariffs and projected economic indicators.

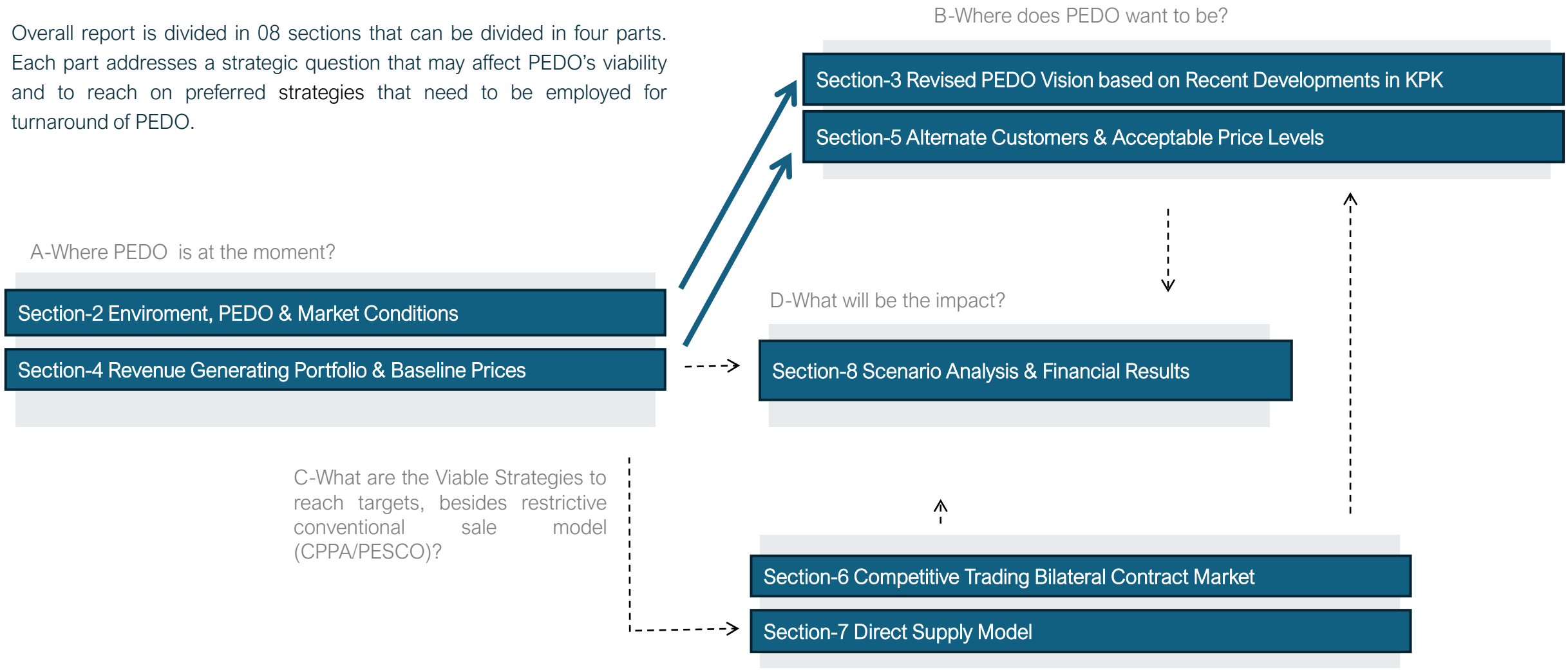
Financial Module

The project's financial statements and Funding gaps identified can be analyzed under different scenarios and in various economic conditions. For the calculation of Interest During Construction (IDC), a separate module has been used.

Existing audited financial statements (as available- 2021) and management accounts (up to 2024) have been used for the financial module

Structure of this Report

Overall report is divided in 08 sections that can be divided in four parts. Each part addresses a strategic question that may affect PEDO's viability and to reach on preferred strategies that need to be employed for turnaround of PEDO.



Section 02: Environment, PEDO & Market Conditions

Economic Environment- Pakistan

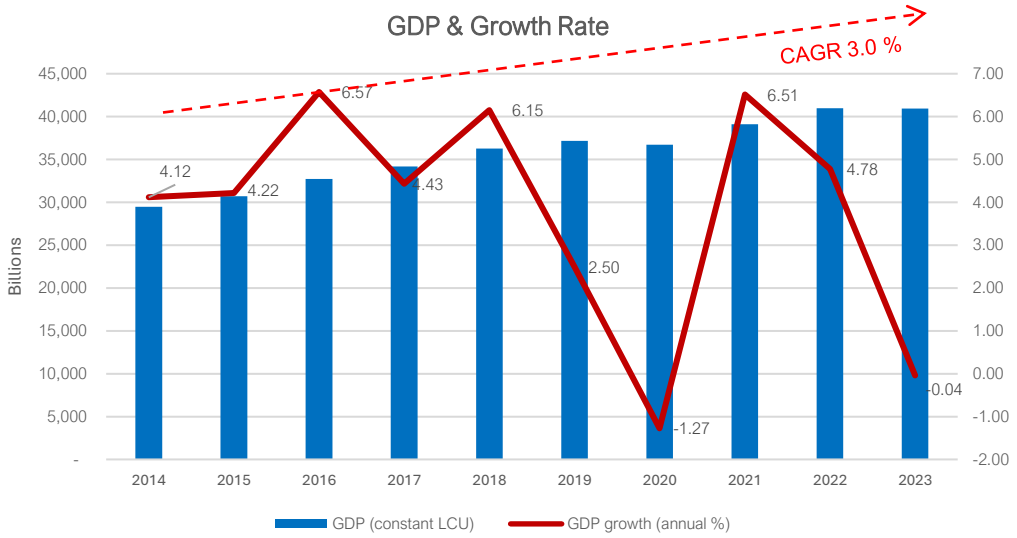
Stabilization & growth

Over the last decade, Pakistan's GDP growth rate has fluctuated, averaging around 3% CAGR. The country experienced its highest growth rates in 2016 (6.57%) and 2018 (6.15%), largely driven by an overvalued pegged exchange rate and an expansionary monetary policy that stimulated short-term domestic demand but weakened macroeconomic fundamentals.

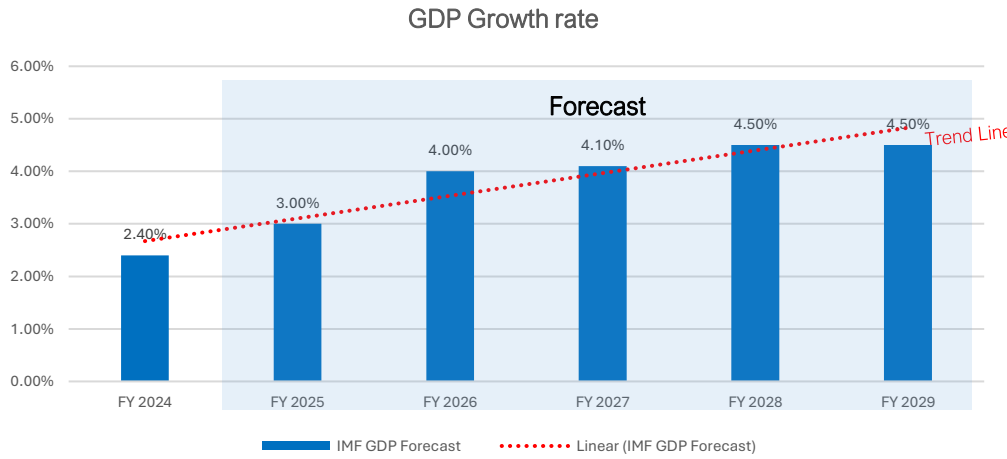
By 2019, economic stabilization efforts led to improvements in the exchange rate, international credit outlook, and business environment, contributing to a GDP growth of 2.5%. However, this transition was abruptly disrupted by the COVID-19 pandemic, resulting in a contraction of -1.27% in 2020 as the economy went into partial lockdown.

Pakistan rebounded strongly in 2021, achieving a 6.51% growth rate, supported by post-pandemic recovery measures. However, growth slowed to 4.78% in 2022 before stagnating in 2023 at -0.04%.

Despite recent volatility, IMF projections indicate a recovery, with GDP growth expected to reach 3% by FY2025. Post-2025, growth is anticipated to rise further, ranging between 4.1% and 4.8%, potentially surpassing the current CAGR of 3%.



Source 2014-2023 Data-World Development Indicators



Source IMF Forecasted Trend- Mar 2025

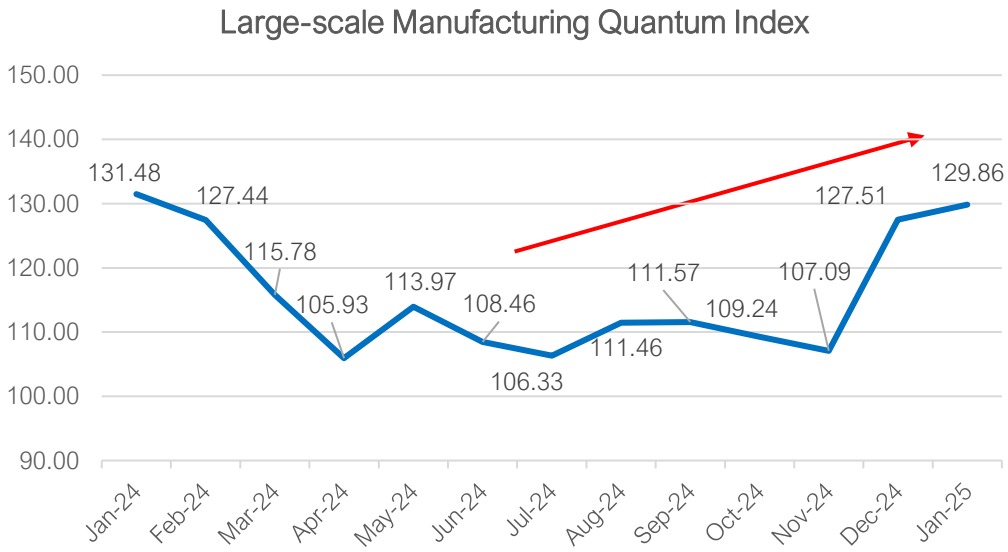
Economic Environment- Pakistan

Large-scale manufacturing industry

In light of recent economic developments, Pakistan's Large-Scale Manufacturing Industries (LSMI) sector has exhibited notable fluctuations, reflecting both external and internal economic conditions. The Large-Scale Manufacturing Quantum Index (LSMQI) stood at 131.48 in January 2024 but declined to 127.44 by February 2024, continuing its downward trajectory to 105.93 in April 2024 due to inflationary pressures, high input costs, and global economic uncertainties. However, a gradual recovery began in May 2024, with the index rebounding to 113.97, supported by improved market demand and stabilizing policies.

Despite fluctuations, LSMQI maintained an upward trajectory in the latter half of the year, reaching 129.86 in January 2025. This recovery highlights the manufacturing sector's resilience, driven by the SBP's financing options, increased industrial activity, and improvements in cement dispatches, energy supply, and policy interventions. GDP growth projections for FY 2025 are expected to improve, with SBP's continued focus on exports.

With easing inflation, a stable outlook for manufacturing and export-led growth, alongside infrastructure investments, is likely to sustain momentum; however, long-term stability will require consistent policy and investment support.



Source: SBP Data: Production of Selected Large-scale Manufacturing

Projected GDP Growth Rate Scenarios of Pakistan				
	FY 2025	FY 2026	FY 2029	CAGR
Conservative	3.00%	3.5%	4.0%	3.5%
Base Case	3.00%	4.0%	4.5%	3.83%
Targeted	3.00%	5.0%	6.5%	4.83%

*IMF's most recent projection (as of January 2025) for Pakistan's GDP growth in FY 2025 is 3.0%.
*base Case GDP growth rate for 2029 is based on https://www.imf.org/en/Countries/PAK

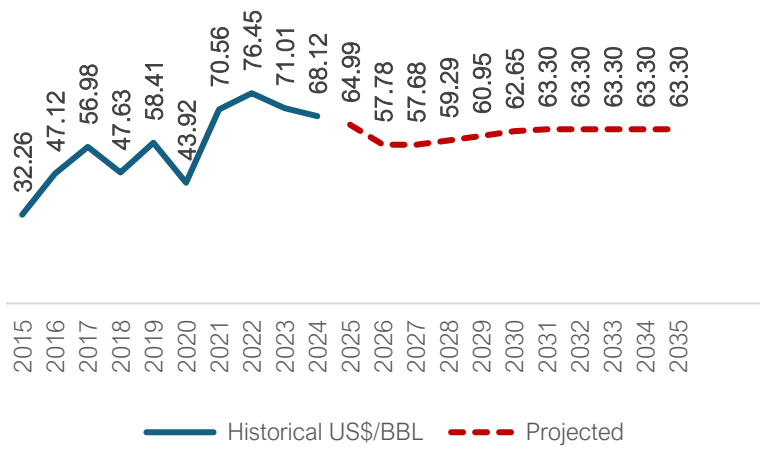
Source: The State of Pakistan's Economy. Annual Report 2023-24. State Bank of Pakistan.
Source: Global Cement News. Available at https://www.globalcement.com/news/item/11702-pakistani-five-month-cement-dispatches-rise
Source: https://www.imf.org/en/Countries/PAK

Economic Environment- Pakistan

Global Economic Variables Impacting Pakistan

Crude Oil (US$/BBL)

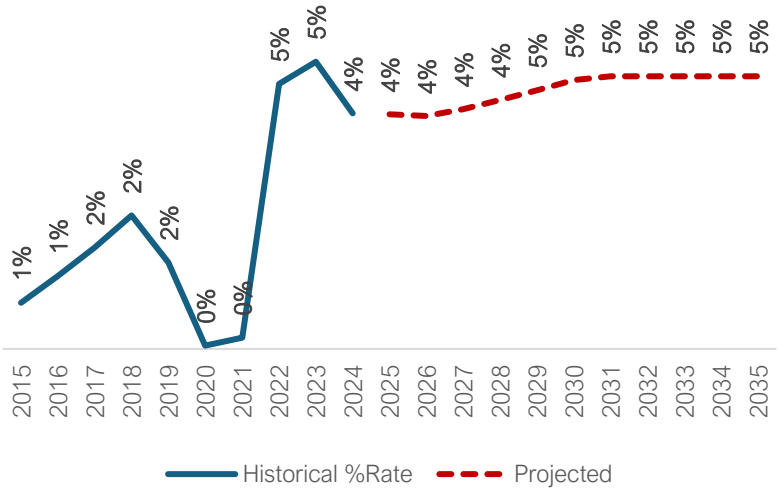
The projected crude oil assumes a short-term annual growth rate of -12.5% for the first two years (2025–2026), followed by a long-term annual growth rate of 2.8% till 2030. After 2030, the crude oil has been kept at US$/BBL 63.30.



Recent data indicate a persistent oversupply in global crude oil markets, driven by rising output from non-OPEC+ producers such as Brazil, Canada, and the UK. Meanwhile, demand growth has slowed amid global economic uncertainty. As a net oil importer, Pakistan benefits from lower prices, which ease its import bill, reduce inflation (especially in energy and transport), and support stable or reduced energy tariffs.

SOFR (% Rate)

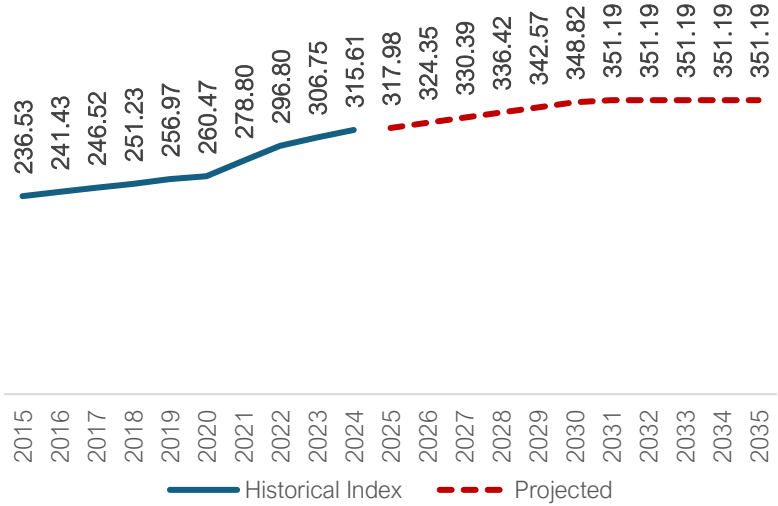
The projected SOFR assumes a short-term annual growth rate of -1.0% for the first two years (2025–2026), followed by a long-term annual growth rate of 3.8% till 2030. After 2030, the SOFR has been kept at 5.0%.



The 90-day average SOFR has stabilized around 4.35% as of June 2025, signaling a pause in U.S. monetary tightening.[2] For economies like Pakistan, this reduces uncertainty in external borrowing costs and supports more predictable assumptions in tariff modeling.

US CPI Index

The projected US CPI index assumes a short-term growth rate of 2.0 % for the first two years (2025–2026), followed by a long-term annual growth rate of 1.8% till 2030. After 2030, the US CPI has been kept at 351.19



After peaking in mid-2022 due to post-COVID stimulus and supply shocks, US inflation has declined steadily through 2023–24.Cooling inflation eases global price pressures, supporting assumptions of stable imported inflation and controlled O&M costs in Pakistan.

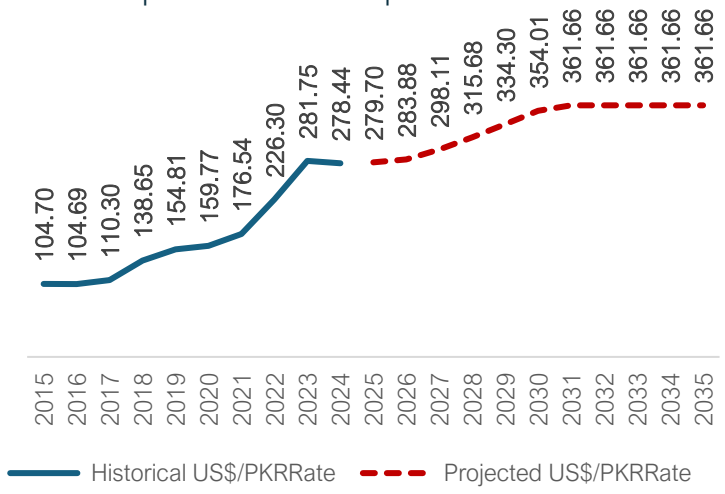
Sources
1. Vortexa
2. Newyorkfed

Economic Environment- Pakistan

Forecasted macro-economic Indicators

Exchange Rate (US$/PKR Rate)

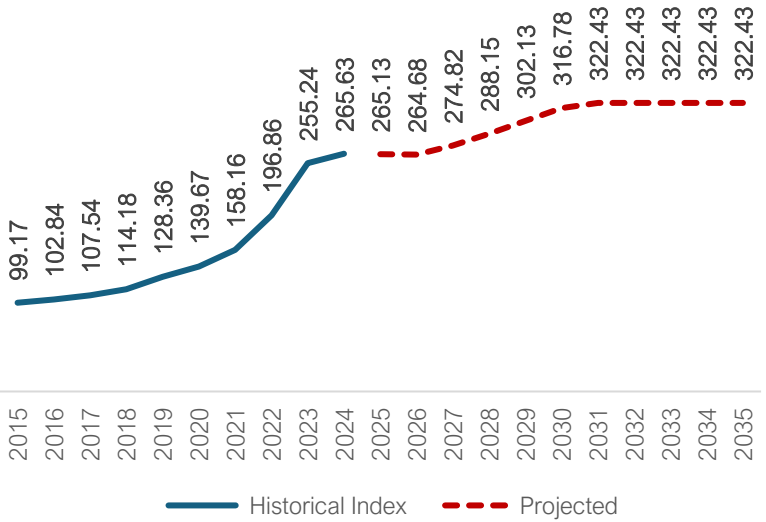
The projected exchange rate assumes a short-term annual growth rate of 1.20% for the first two years (2025–2026), followed by a long-term annual growth rate of 5.8% till 2030. After 2030, the exchange rate has been kept at PKR 361.66 per USD.



The pace of PKR depreciation is projected to moderate as external account pressures ease. Lower oil import costs and potential improvement in exports and remittances could help stabilize the current account, reducing FX volatility and supporting a gradual, predictable currency path.

Pak CPI Index

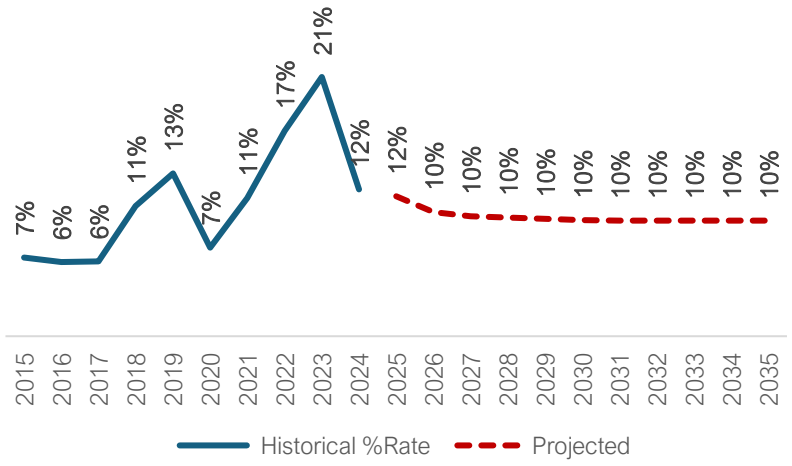
The projected Pak CPI index assumes a short-term growth rate of -0.5% for the first two years (2025–2026), followed by a long-term annual growth rate of 4.8% till 2030. After 2030, the Pak CPI has been kept at 322.43



Domestic inflation is projected to decline in the near term, supported by cooling global inflation, reduced fuel prices, and tight monetary policy. This helps contain O&M cost escalations, anchoring future tariff adjustments. A stable CPI path reflects an improving supply-demand balance and fiscal discipline.

KIBOR (% Rate)

The projected KIBOR assumes a short-term annual growth rate of -12.5% for the first two years (2025–2026), followed by a long-term annual growth rate of -1.1% till 2030. After 2030, the KIBOR has been kept at 10%.

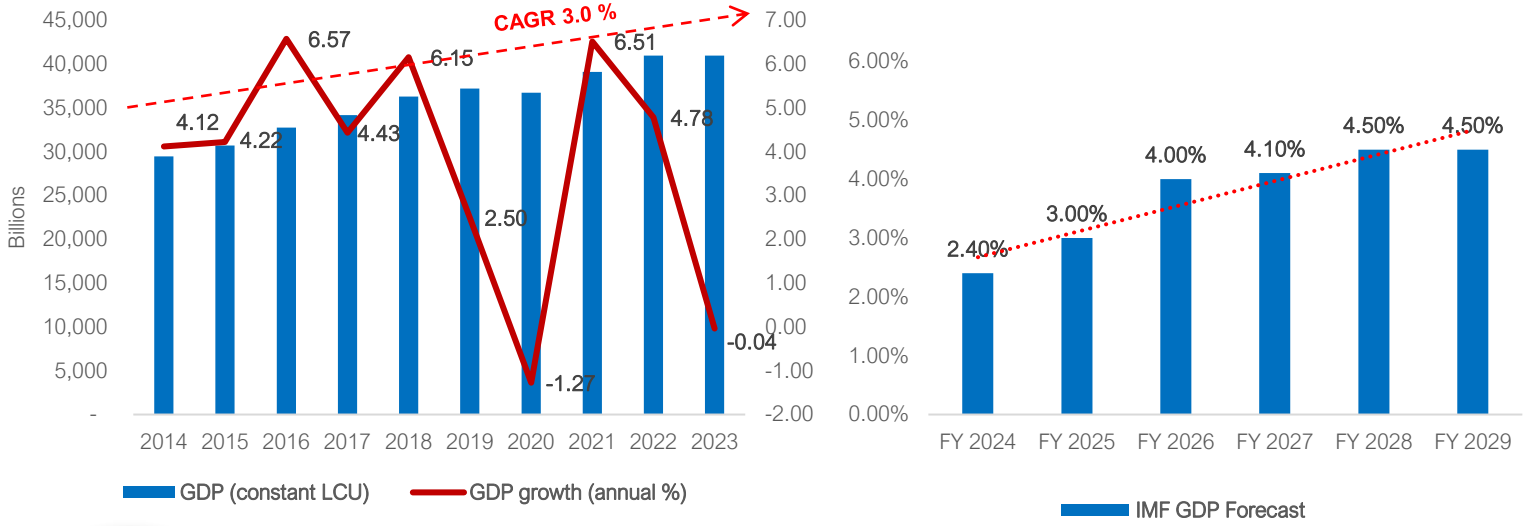


KIBOR is projected to decline in the short term, reflecting expectations of easing inflationary pressures and improved macroeconomic stability. A lower interest rate environment reduces borrowing costs, supports domestic investment, and enhances the viability of infrastructure projects. Over the medium term, stable interest rates support predictable cost assumptions in tariff modeling and reduce uncertainty in capital cost projections.

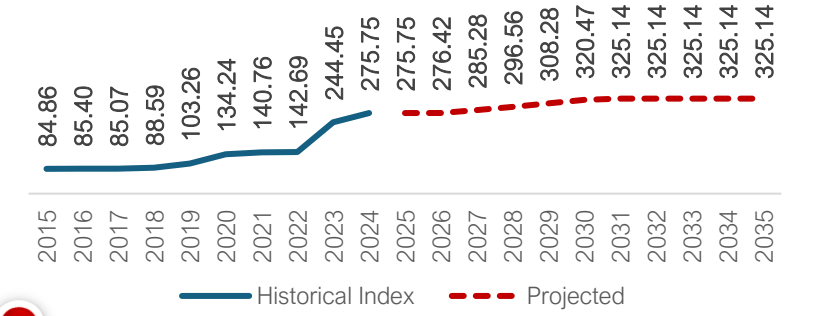
Economic Environment- Pakistan

Forecasted GDP Growth and sectoral indexes

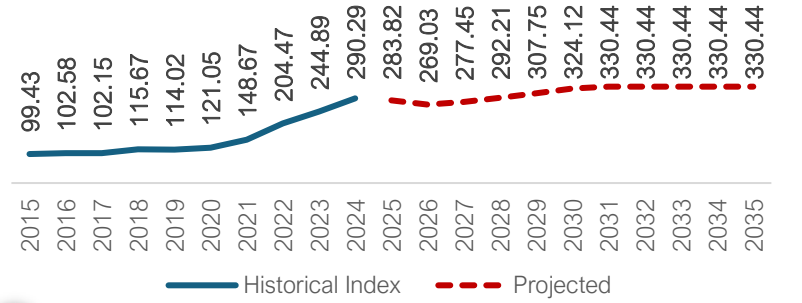
GDP Growth Rates



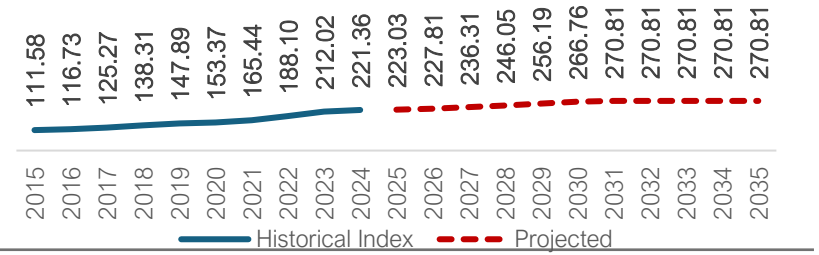
Steel CPI Index



Cement CPI Index



Labour CPI Index



Stability

- The PKR Exchange Rate is projected for managed stability, minimizing import cost volatility.
- A significant disinflationary trend is anticipated across the broad Consumer Price Index (CPI) and key sectoral CPIs (Cement, Steel, Fuel, Labour), indicating a more predictable cost environment.

Outlook

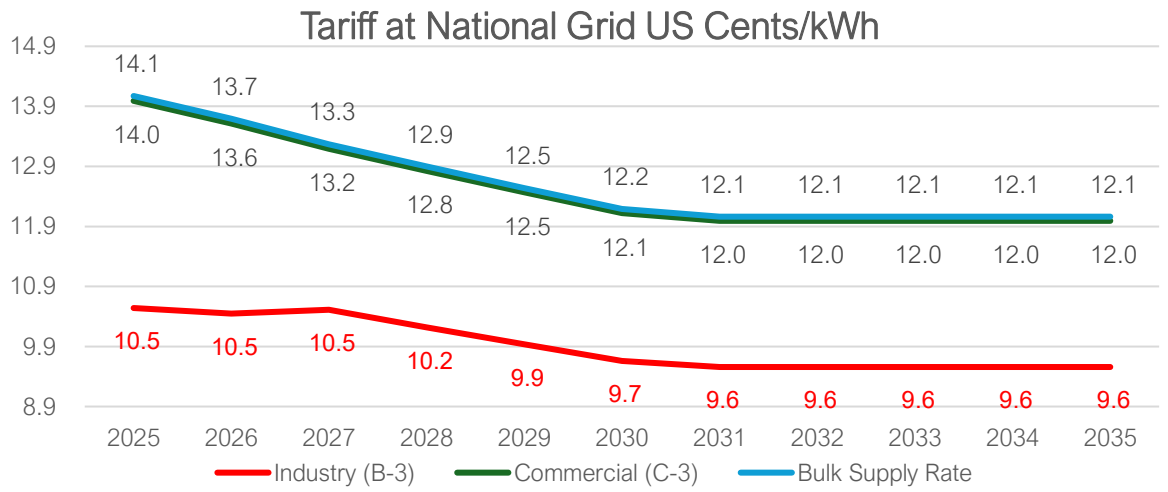
- Despite recent volatility, IMF projections suggest a recovery, with GDP growth expected to reach 3% by FY 2025. Post-2025, growth is anticipated to rise further, ranging between 4.1% and 4.8%, potentially surpassing the current CAGR of 3%.
- Domestic financial rates like KIBOR are expected to show a gradual easing, supporting credit expansion. Global benchmarks such as SOFR are projected to remain stable.

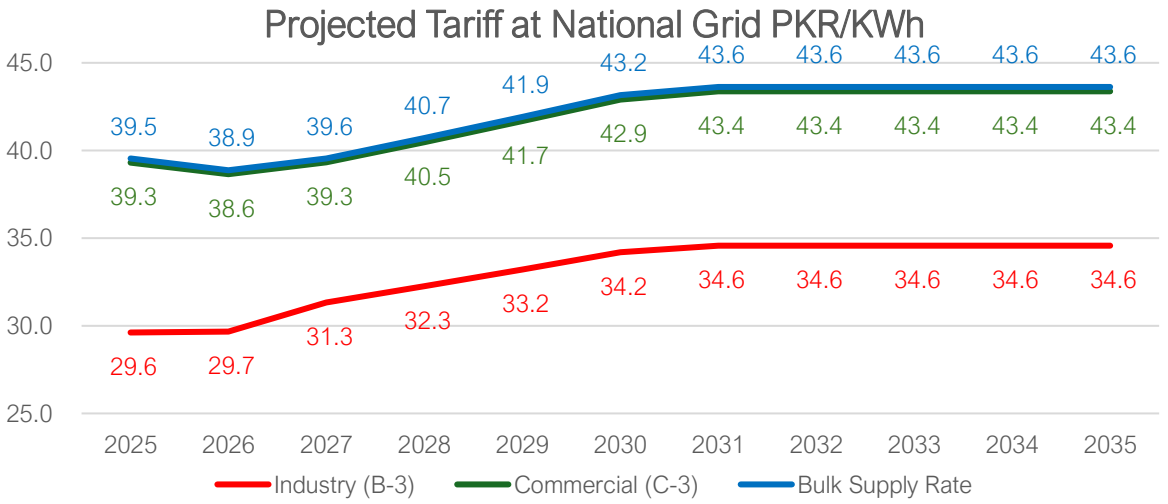
Economic Environment- Pakistan

Projected Electricity Prices of National Grid

The crude oil prices, inflation and interest rates have declined in 2025, that resulted in electricity price reduction in May 2025. The forecasted electricity price assumes impact of global and reginal economic indicators, discussed above. However, it does not assume further decline in electricity demand. Even if there is substantial adoption of solar and wind, the forecasted price trend in US cents/kWh is expected to hold that is **from 10.5 Cents/kWh in 2025 will decrease to 9.5 Cents/kWh by 2035.**

Applicable Tariff for B-3 Category Loads up to 5000 kW (at 11,33 kV)	May 2025	Comments
Weighted Average Base Tariff	30.80	
Fixed Charges (MDI)	1.68	
Quarterly Adjustment	-1.55	3rd Quarter FY25 Tariff Adjustment
Quarterly Adjustment	-1.90	2nd Quarter 2024-25 Tariff Adjustment
Fuel Price Adjustment	-0.29	Relief of FPA of March 2025 will be given in May 2025 bills
Fuel Price Adjustment	-0.90	Relief of FPA of May 2025
FC Surcharge	3.23	PHL Loan Markup
Total	31.06	
Electricity Duty	0.26	1% of variable cost (base tariff + quarterly adjustment + FPA)
GOP Subsidy	-1.71	Subsidy is expected disappear in one year period
Applicable Tariff	**29.62**	





Outlook of Khyber-Pakhtunkhwa (KPK) Province

Strategic Location & Trade Connectivity

Key Facts

Name: Khyber Pakhtunkhwa (KPK)
Capital: Peshawar
Major Languages: Pashto

AREA
74,521 sq. km

ECONOMY SIZE (GDP)
US$ 34 billion, 10.5% of national GDP

POPULATION
40.85 million

LABOUR FORCE
11.2 million of population

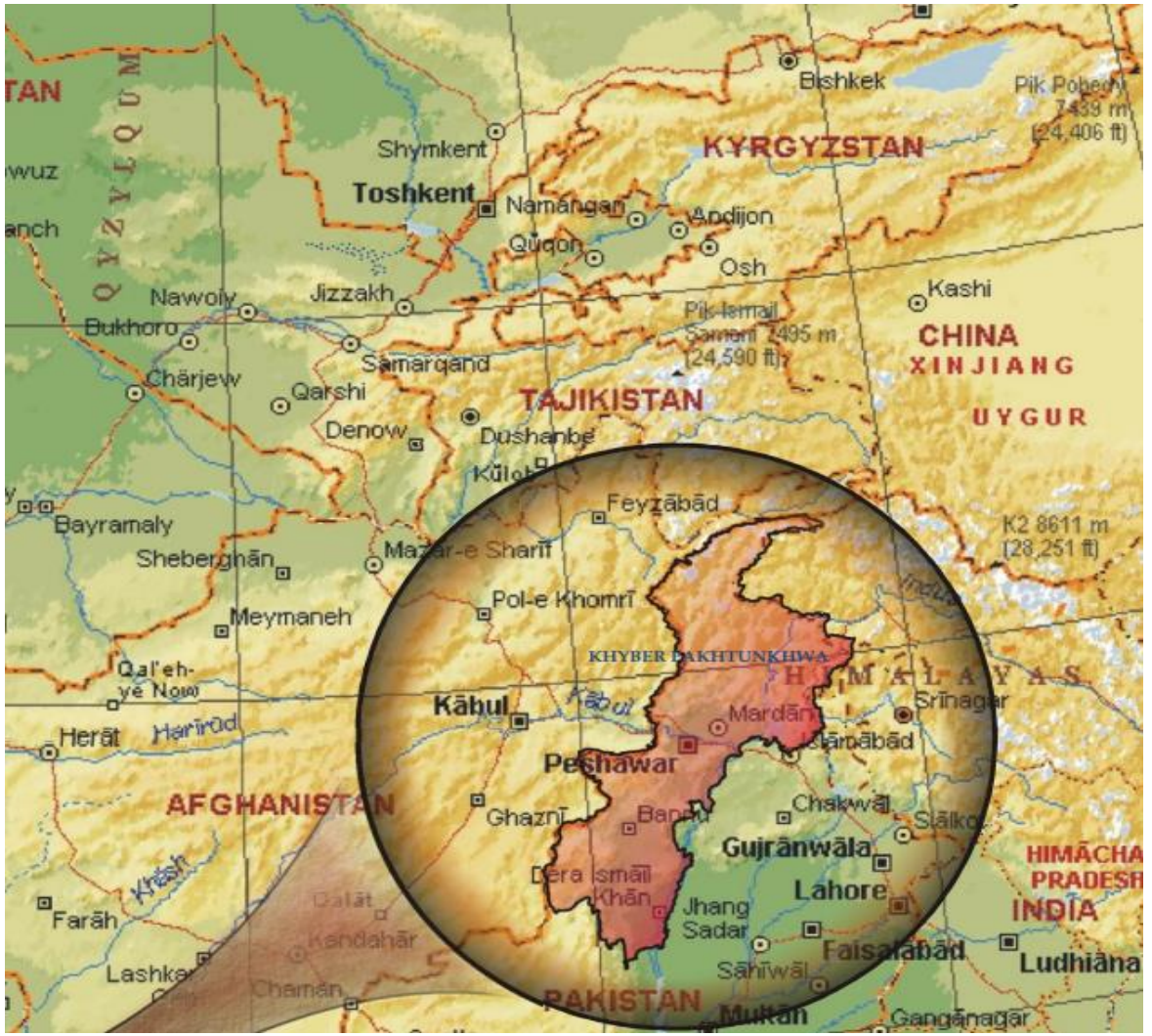
POPULATION GROWTH
2.38%

UNEMPLOYMENT RATE
8.8 %

KPK has strong economic potential, with a 3.9% GDP growth rate in 2023-24, surpassing the national average.

Strategically located near Punjab, KPK benefits from access to a major consumer and industrial market. It also serves as a key trade hub, linking Pakistan to Central Asian Republics (CARs) and TAN countries, including Uzbekistan, Tajikistan, and Kazakhstan.

The province's economy is diverse, with agriculture contributing 20% of the GDP, while mining and manufacturing, valued at PKR 36 billion, play a key role in the production of marble, limestone, and gemstones.



Source: Bureau of Statistics ,Planning & Development Department , Government of Khyber Pakhtunkhwa

Outlook of Khyber-Pakhtunkhwa (KPK) Province

Limited market size and locational disadvantage (high freight for raw materials and finished goods)

The Government of Khyber Pakhtunkhwa (GoKPK) has been actively working towards industrial development by establishing new economic zones in Ghazi, Chitral, Jalozai, and Nowshera (extension), aimed at boosting investment and employment opportunities. The province's industrial policy is designed to promote sustainable and balanced industrial growth while capitalizing on its geostrategic position along the China-Pakistan Economic Corridor (CPEC).

A key initiative in this effort is the Rashakai Special Economic Zone (SEZ), a flagship project under CPEC's industrial cooperation framework, spanning 1,000 acres and developed through a partnership with China Road and Bridge Corporation. This SEZ is envisioned as a hub for pharmaceuticals, engineering, steel, and food processing industries, with Phase 1 completed and partial electricity infrastructure in place.

Other major industrial projects include the Buner Economic Zone (126.5 acres), focused on marble processing, with development approved and land possession awaited; the Industrial Park Dir (62.75 acres), planned for agriculture, food, and marble processing, pending government approval; the Chitral Economic Zone (40 acres), set to cater to mineral, food, and marble industries, awaiting utility connections; and the Industrial Park Swat (126.28 acres), designed for food, textiles, cosmetics, and minerals, with land acquisition in progress and a power requirement of 10 MW. By 2031, these zones are expected to become key industrial centers, benefiting from CPEC incentives and advanced infrastructure.

However, industrial growth in KPK faces challenges due to high freight costs and a relatively limited market size. To enhance competitiveness, ensuring low-cost electricity through hydel power generation remains a critical requirement.

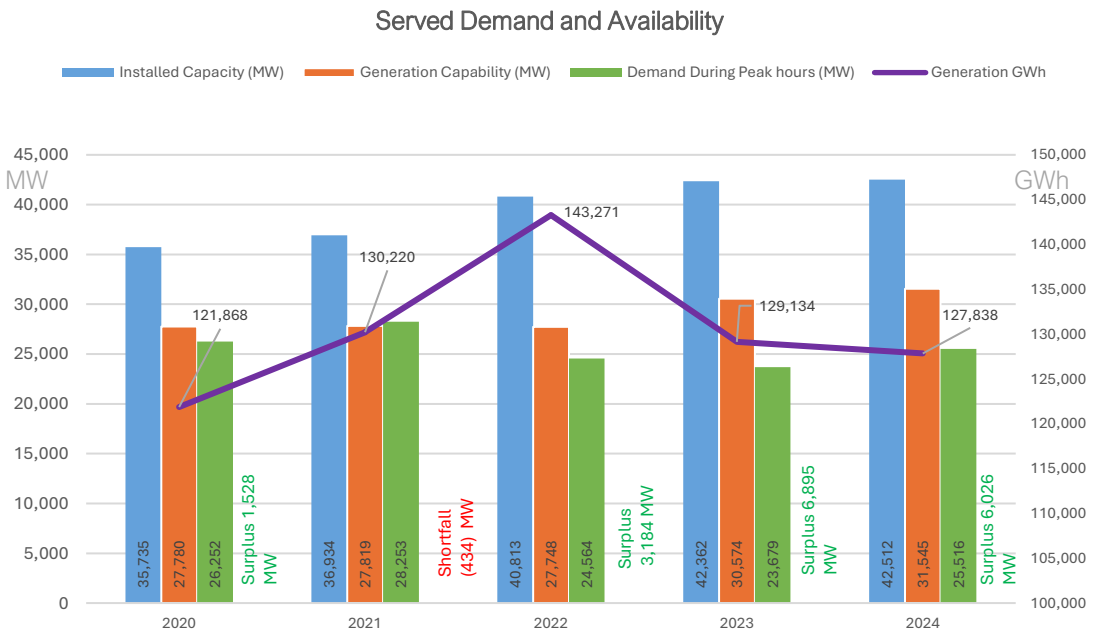
Source: Khyber Pakhtunkhwa Economic Zones Development & Management Company – Company Profile
Source: KP Government Unveils Draft of New Industrial Policy. Retrieved from https://www.pakistantoday.com.pk/2020/03/02/kp-government-unveils-draft-of-new-industrial-policy/
Source: KP Government Keen on Bringing About Industrial Revolution. Retrieved from https://www.thenews.com.pk/print/480881-kp-government-keen-on-bringing-about-industrial-revolution

Status of National Grid

National Grid is limited to128 Billion units purchase, currently in surplus state that may continue next 5-7 years

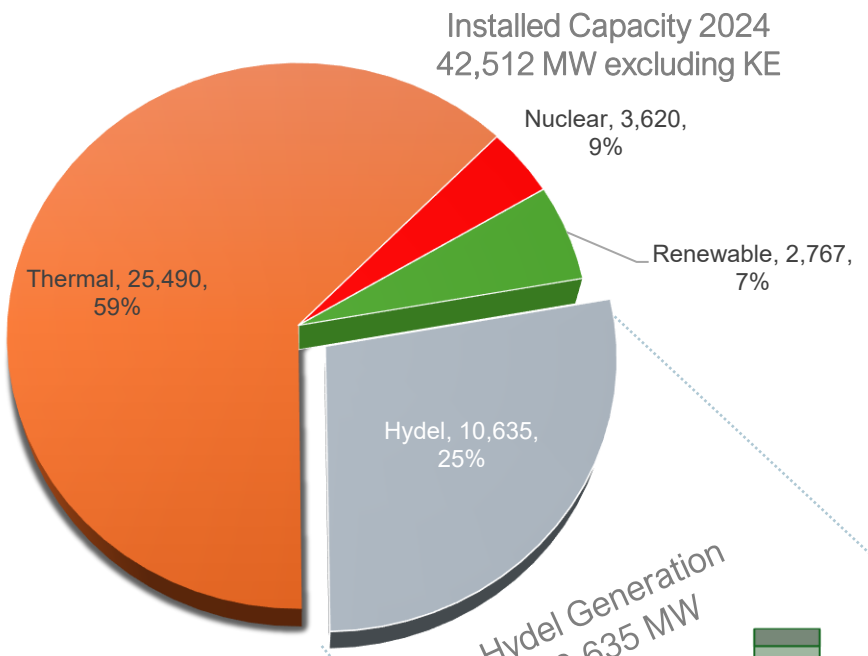
Trend of Peak Demand, Installed Capacity and Capability

Since FY 2020, Pakistan's generation capability has surpassed peak demand, except for a deficit in FY 2021. By FY 2024, the surplus reached 6,026 MW. The focus has now shifted from capacity expansion to cost optimization and greater reliance on indigenous energy sources.



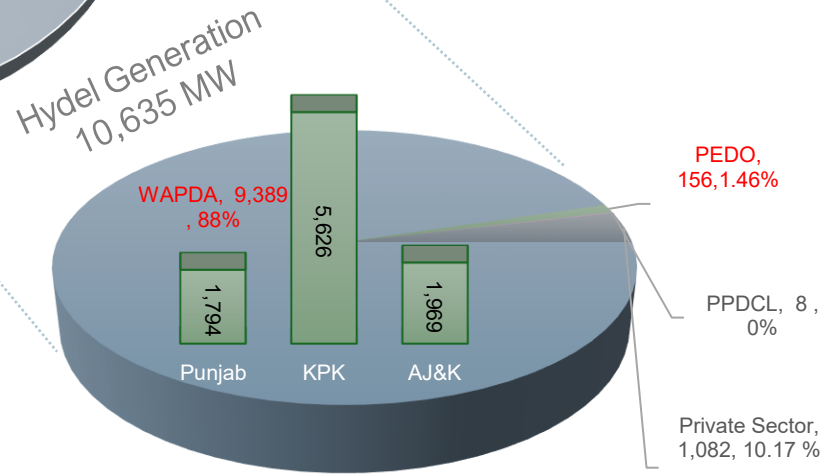
Generation Capability is the maximum generation capability of any day recorded during the year and Peak Demand is the maximum demand of any day recorded during the year.

Pakistan's Generation Portfolio – 2024 (CPPAG / NTDC)



Pakistan's installed generation capacity of 42,512 MW is heavily skewed towards thermal (59%) with hydel sources accounting for 25% of the total capacity.

A bulk of the operational hydel generation capacity i.e. 9,389 MW is owned by WAPDA.



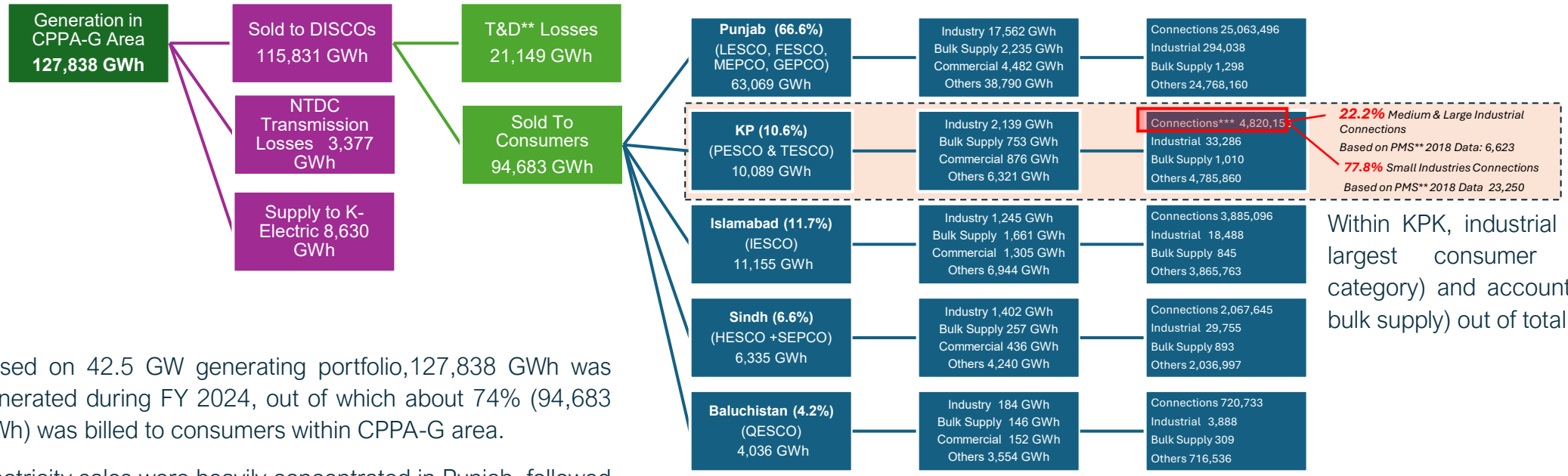
PPDCL = Punjab Power Development Company Limited

Source: State of Industry Report 2024 Table 5, 9 and 50

Status of National Grid

From National Grid, KPK consumes 10 Billion Units that includes Industrial Consumption of 2.2 Billion Units

The Government of Pakistan (GoP) is prioritizing the acceleration of renewable energy adoption, with a strategic shift towards strengthening and expanding the country's transmission and distribution (T&D) infrastructure. This infrastructure has long been a critical bottleneck to achieving reliable electricity delivery across residential, commercial, and industrial segments. As of FY 2024, the electricity consumption status is summarized below:



Within KPK, industrial sector is the 2nd largest consumer (after domestic category) and accounts to 21.2% (excl. bulk supply) out of total billed units in KP.

Based on 42.5 GW generating portfolio,127,838 GWh was generated during FY 2024, out of which about 74% (94,683 GWh) was billed to consumers within CPPA-G area.

Electricity sales were heavily concentrated in Punjab, followed by Islamabad and KPK. Within the CPPA-G region, 10.6% (10,089 GWh) of the total billed units were sold in KP through PESCO and TESCO.

Electricity consumption in KPK is 10,089 GWh, out of which majority of consumption is of the residential segment, served mainly by PESCO (which has high T&D losses and a low recovery rate). The second largest consumer is industry, at 2,139 GWh. With attractive electricity prices, the sector in KPK can grow; however, assuming an average growth rate of 4%, industrial consumption might reach 3,166 GWh or slightly higher by 2035.

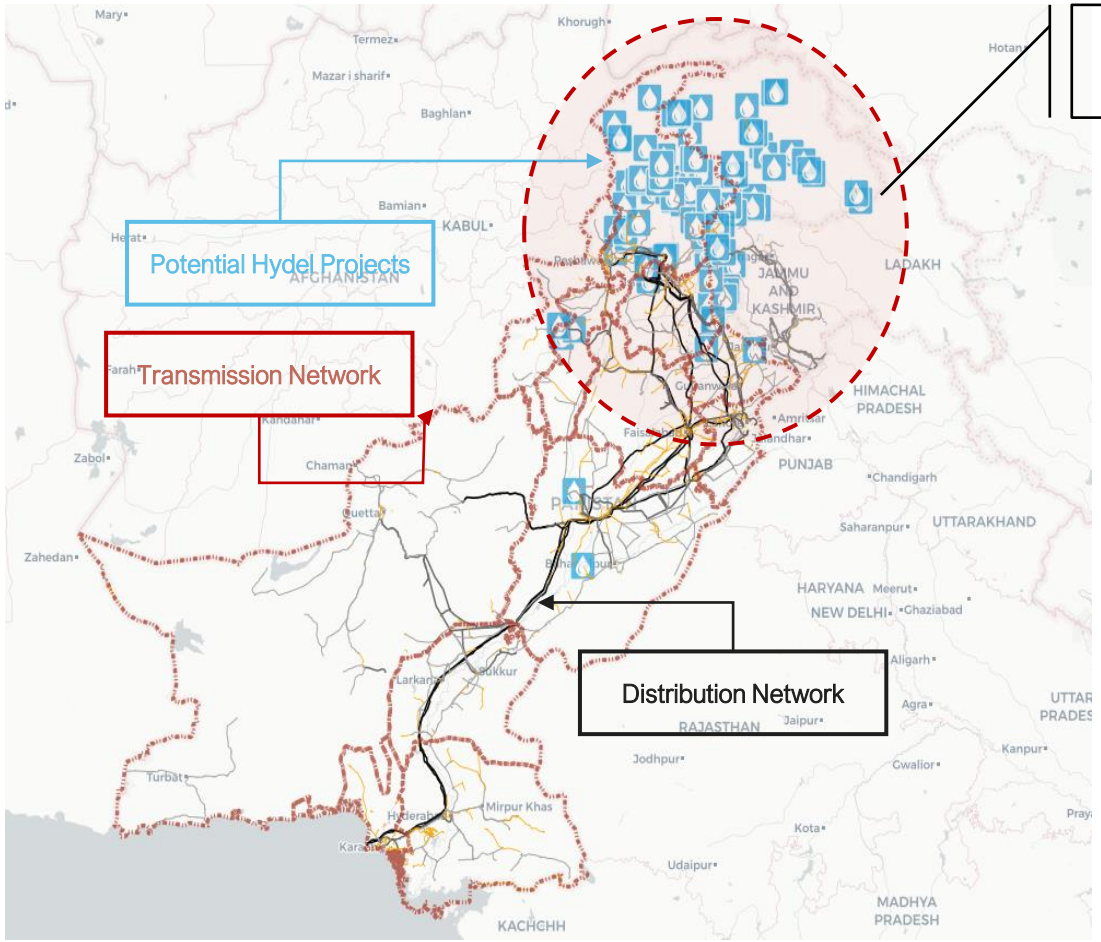
Source: State of Industry Report 2024 Table 60, 65, & 67
** T&D Losses = Transmission & Distribution Losses
*** Power Market Survey published in Aug 2019

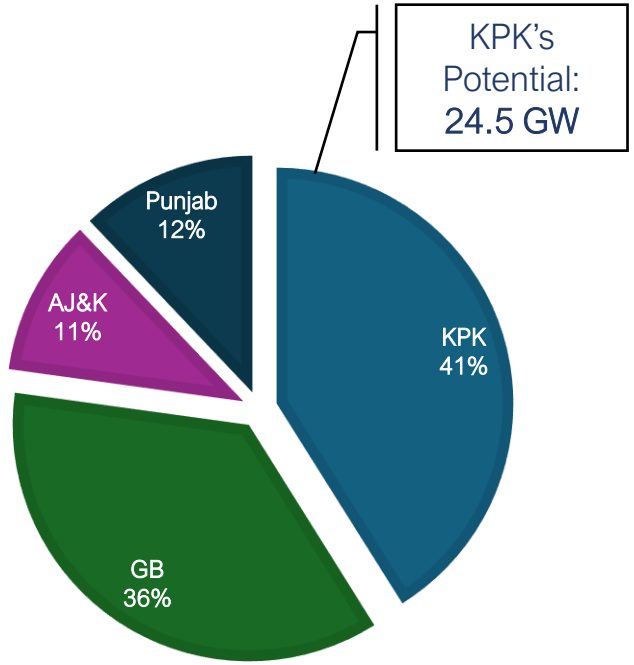
KPK Generation Pipeline – Hydro Resource in KPK

Majority of hydropower resources are in KPK

Out of 60GW of hydropower potential of Pakistan, the largest chunk 41% is of KPK.

Only 16%–20% of Pakistan's total hydropower potential has been harnessed to date. A key constraint is the limited transmission and distribution infrastructure in the northern region, as shown in Map[2]. This underutilization highlights a clear investment opportunity in light of the proposed energy sector framework.





1 Hydropower & Dams World Atlas.
2 Sourced from NREL database for Pakistan

KPK Generation Pipeline – Hydro Resource in KPK

About Pakhtunkhwa Energy Development Organization (PEDO)

Article 157 (2) of the Constitution of Pakistan

The Government of a Province may-

a. to the extent electricity is supplied to that Province from the national grid, require supply to be made in bulk for transmission and distribution within the Province:

b. levy tax on consumption of electricity within the Province;

c. construct power houses and grid stations and lay transmission lines for use within the Province; and

d. determine the tariff for distribution of electricity within the Province.

KPK is legally entitled to establish a provincial regulatory framework to manage its energy resources effectively.

- Provinces can develop power projects, transmit and distribute electricity generated within the province and set tariffs for said purpose (Article 157)
- Section (7)(4) of the NEPRA Act 1997 also acknowledges that provinces had been allowed to construct power houses and grid stations and lay transmission lines for use within the province and determine the tariff for the distribution of electricity within the province.
- KPK Hydropower Policy 2016: Supports power projects in KPK through private, public-private, and IPP models.

Upcoming regulatory authority and transmission line company are discussed in the next Section of this report

PEDO Legal Structure

- PEDO is not registered as a separate company under corporate laws, but it is a corporate body established under a provincial law, having perpetual succession and a common seal, with powers subject to the Pakhtunkhwa Energy Development Organization Act, 2020 (PEDO Act).
- PEDO can enter into agreements and contracts, acquire, hold, and sell property, both movable and immovable, undertake projects, generate, transmit, and distribute within the Province, and has the power to sue and be sued.
- Under the PEDO Act, the Organization can procure commercial loans from DFIs, institutions, and the capital market for its financial sustainability rather than relying on government funding.

KPK Generation Pipeline – Hydro Resource in KPK

About Pakhtunkhwa Energy Development Organization (PEDO)

Reorganization of PEDO

Under the Pakhtunkhwa Energy Development Organization Act, 2020, PEDO has been reconstituted as a body corporate having perpetual succession and a common seal, with power, subject to the provisions of the Pakhtunkhwa Energy Development Organization Act, 2020 (PEDO Act), to enter into agreements and contracts, acquire, hold and sell property, both movable and immovable, undertake projects, generate, transmit, distribute and regulate electricity, issue licenses within the Province and shall have the power to sue and be sued.

Exclusivity of GoKPK

Under the Pakhtunkhwa Energy Development Organization Act, 2020, it has been clarified that all the hydro power project sites, within the Province of KPK, exclusively vest in the KPK Government. The KPK Government shall develop the hydro power project sites in the public sector or on a public-private partnership basis, and the hydro power project sites may be allocated to the private sector for hydro power project development with the permission of the KPK Government.

Major functions & powers of PEDO

- Provide cost-effective and sustainable power generation
- Attract private sector investment through full cost recovery and competitive returns.
- Ensure transparent and expedited development of power projects.
- Promote investor participation in hydropower and other renewable energy projects.
- Ensure the development and welfare of all stakeholders.
- Expand green energy solutions, including thermal, solar, wind, hydro, and waste-to-energy projects.
- Approve and undertake power projects of any financial value.
- Regulate, generate, transmit, and distribute electric power services.
- Conduct feasibility studies, engineering designs, and research for power sector development.
- Establish companies for energy projects with the approval of the KPK Government under the Companies Act.
- Acquire land for public-purpose energy projects as per the Land Acquisition Act, 1894.Perform any other necessary functions or powers related to energy sector development.

KPK Generation Pipeline

PEDO's investment portfolio

PEDO's Project Portfolio
1,869.58 MW

Operational Projects
172 MW

- Malakand III – 81 MW
- Pehur – 18 MW
- Machai – 2.6 MW
- Shishi – 1.8 MW
- Daral Khwar – 36.6 MW
- Reshun – 4.2 MW
- *Ranolia – 17 MW
- Jabori – 10.2 MW

*Ranolia is non-operational as was damaged by floods and is under rehabilitation.

Under Construction Projects (near completion)
505.6 MW

- Koto - 40.8 MW
- Balakot – 300 MW
- Gorkin Matiltan – 84 MW
- Lawi – 69 MW
- Karora – 11.8 MW

Under Development Projects
330.51 MW

- Gabral Kalam – 95 MW
- Madyan- 215 MW
- Mujahidin – 6.95 MW
- Chapari Charkhel–13.56 MW

MMHPs & Solarization Projects
81.47 MW

- MMHP's- 34.7MW
- Solar- 46.77 MW

Under Development Share in Projects on PPP basis
780 MW

- Lower Spat Gah* – 496 MW
- Naran Batakundi – 235 MW

(Naran -Batakundi is under consideration for PPP arrangements)

*The scope of this segment is limited to the Lower Spat Gah project, because of its current advanced status.

Other Projects

- Chitral Corridor Projects

(The Chitral Portfolio is briefly discussed, however due to lack of visibility, same have not been assumed in this business plan)

KPK Generation Pipeline

Private sector HPPs at relatively advanced stage

After the successful evacuation of the Swat and Chitral corridors, private sector potential hydropower projects under IPP mode will be developed.

S.No	Project	Capacity (MW)	Sponsor Name	District	GWh	Estimated Cost (MUSD)	Targeted COD
1	Kalam Asrit HPP	238	KOEN (Korea)	Swat	945.8	399.73	2034
2	Asrit Kedam HPP	229	KOEN (Korea)	Swat	944.7	371.57	2034
3	Shigo Kas HPP	102	Saifco Energy	Lower Dir	512	306.77	2032
4	Sharmai HPP	150	Sapphire Electric	Upper Dir	689	369.57	2032
5	Arkari Gol HPP	99	Master Hydro	Chitral	372	214.55	2032
6	Gabral Utror	79	Markhor Energy	Swat	310.88	199.65	2032
7	Bankhwar HPP	35	Markhor Energy	Swat	123.68	93.08	2031
8	Artistic-2 HPP	55	Artistic Milliners	Swat	211.745	113.5	2032
9	Daral Khwar-II HPP	9.5	Siddiqsons	Swat	43.82	23.66	2031
10	Balkani HPP	7.75	Shangla Power	Shangla	33.95	15	2031
11	Shalfalam HPP	60	Siddiqsons	Upper Dir	270.45	170.17	2033
12	Artistic-1 HPP	63	Artistic Milliners	Upper Dir	306.57	236.8	2032
13	Nila Da Katha HPP	31.24	Sino Pak Power	Manshera	136.8	58.4	2032
14	Chowkel Khwar HPP	60	MMP	Swat	241.78	120	2033
15	Bhimbal Katha HPP	26	Multiline Enterprises	Manshera	117.5	72.9	2032
Total		1,244.49			5,260.68	2,765.35	

KPK Generation Pipeline

Chitral corridor – evacuation restrained by transmission capacity

Potential projects listed hereunder were assessed by PEDO and were finalised for taking forward based on feasibility studies conducted by renowned consultants. Private sector can undertake below HPPs within IPP regime, supply to grid/BPCs under CTBCM, or to meet power requirements of public/private distribution companies (existing or upcoming).

#	HPP in Chitral Corridor with Feasibility Studies Completed	Capacity (MW)	Energy (GWh/Annum)	Estimated Cost of the Hydropower Project USD Million	Estimated Per MegaWatt Cost of the HPP (USD Million/MW)
1	Kari- Mushkur HPP	495	2,165	1228	2.48
2	Turen Mori Kari HPP	350	1,450	753	2.15
3	Jameshill more Lasht HPP	260	1,062	616	2.37
4	Laspur Miragram HPP	230	874	448	1.95
5	Shushgai Zindoli HPP	144	613	225	1.56
6	Shogo Sin HPP	132	583	269	2.04
7	Mujigram Shaghore HPP	64	278	182	2.84
	Total for HPP	**1,675**	**7,025**	**3,721**	

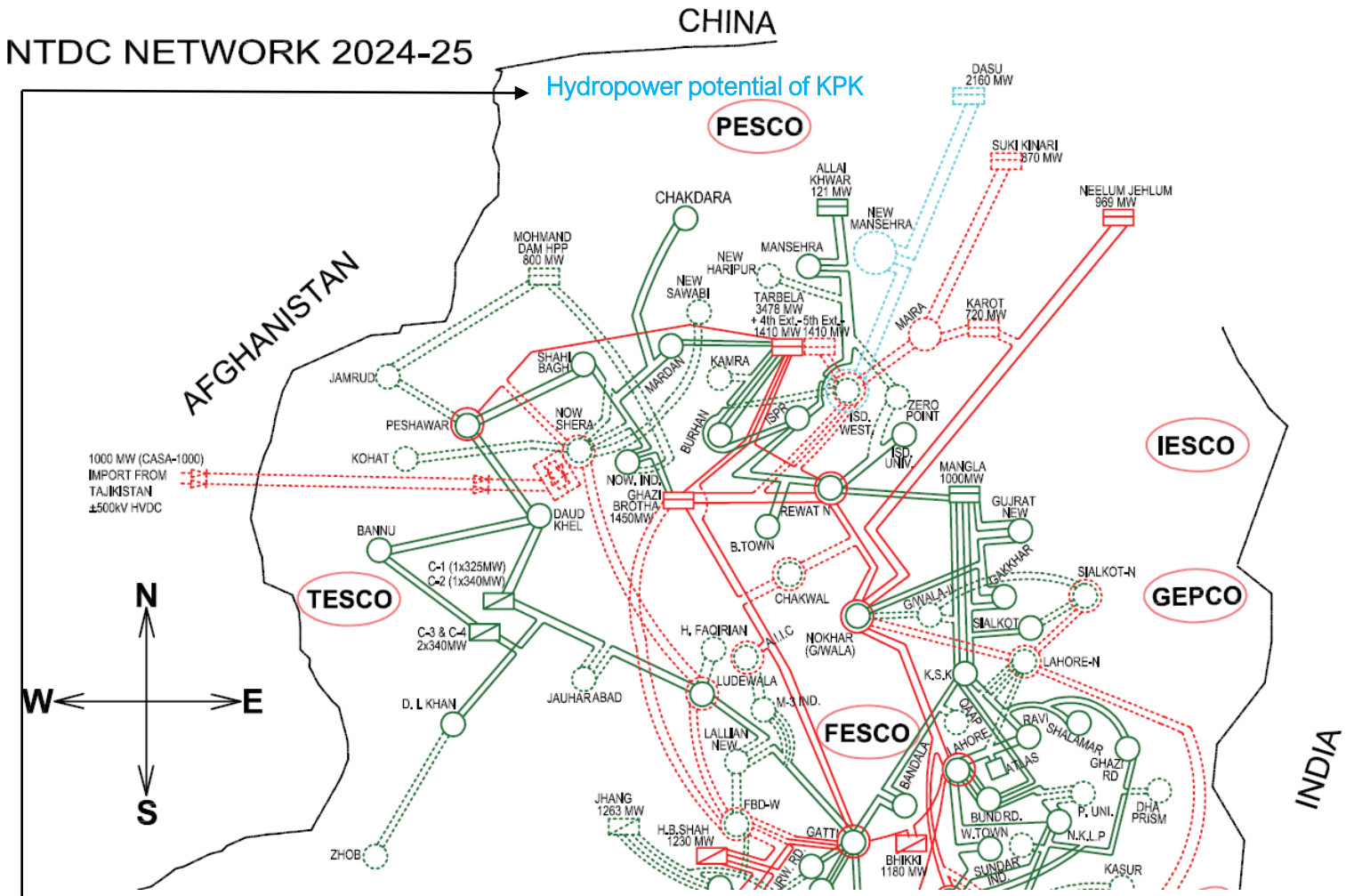
Risks Associated with PEDO Supply Potential as of June 2025

Sparse Transmission Network

The utilization of KPK's hydro potential is significantly constrained due to insufficient capacity in the transmission and distribution network to evacuate power from the envisaged hydro power projects.

National Transmission & Dispatch Company Limited (NTDC)'s network expansion plans till 2025 do not seem to account for a significant number of hydro projects being considered for development in KPK under the provincial regime.

Accordingly, **it provides an opportunity for the province to invest in the transmission lines in view of the upcoming hydro projects in the area.**



NTDC expansion plans currently do not envisage development of the transmission network in north of Chakdara where most of KPK's planned hydro projects are located.

Planned NTDC Grid map for 2024 - 25 showing major load and generation centers and transmission zones in the country's north.

Risks Associated with PEDO Supply Potential as of June 2025

Planned Supply Increase from 1B units to 5B units (including under development projects and PPP project)

The projects under development face risk of non-procurement by national grid. These mainly include Balakot, Gabral Kalam, Madyan, Lower Spatgah (PPP Project), Mujaheden and Chapri Charkhel. The non-procurement risk emanate from following facts:

- Supply to grid has become competitive – (a) there is no scarcity of base load at grid and (b) price of hydro power might not be able to compete with solar and wind energy.
- The possibility of carving PESCO's residential customers is very low. Even with the acquisition of PESCO, the DISCO will remain tied with legacy contracts.

Limited options for increase in supply are (a) increasing KPK industrial demand and (b) finding new markets for supply. For this, PEDO might require to focus on new solutions for supply to consumers within KPK and outside the province. To reduce cost of generation PEDO might also consider focusing on hybrid generation (Hydro-Solar Hybrid generation) or types of energy sold (selling hydrogen rather than electricity).

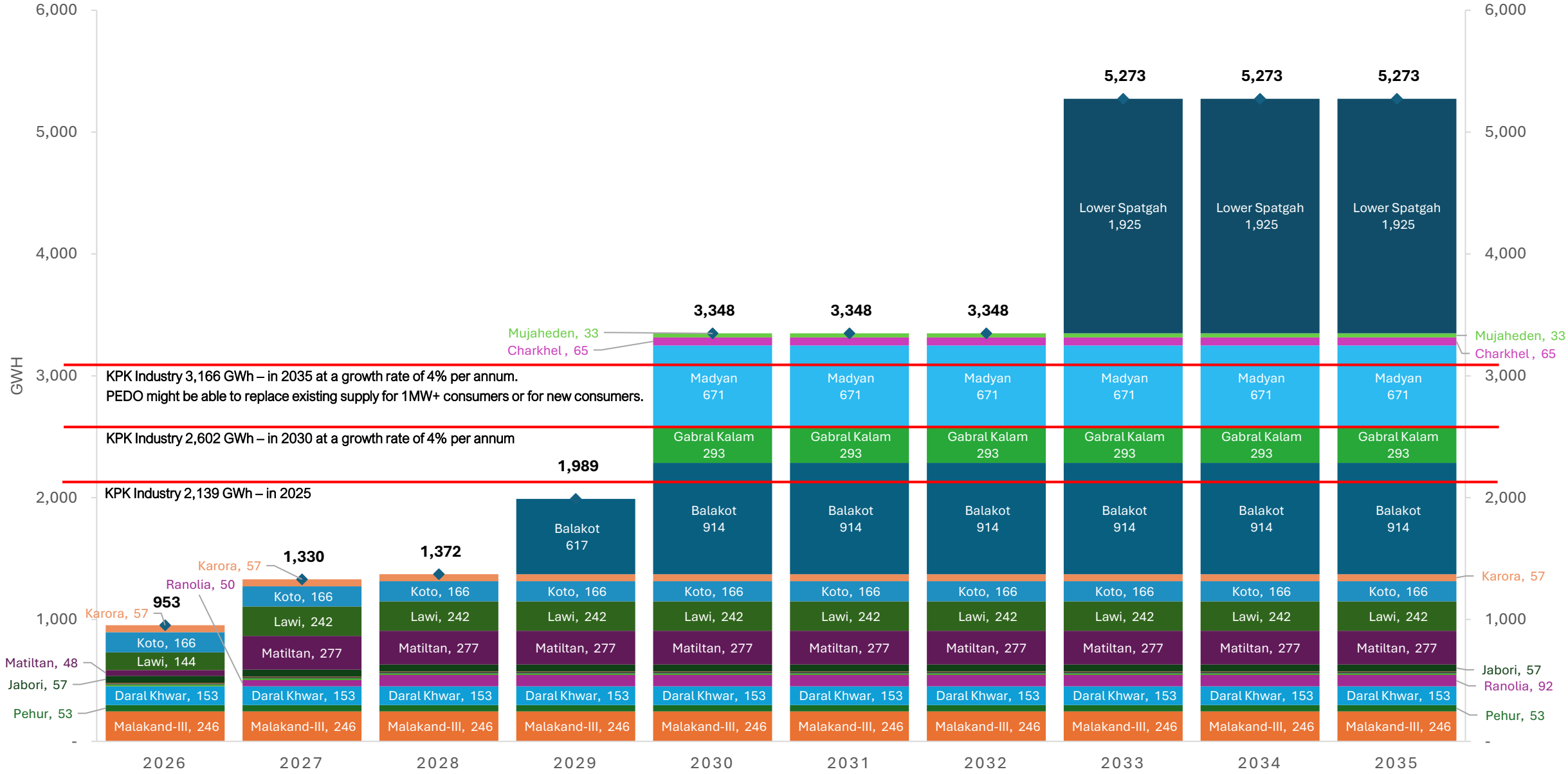
	MW	2026	2027	2028	2029	2030	2031	2031	2033
Malakand-III	81	246	246	246	246	246	246	246	246
Pehur	18	53	53	53	53	53	53	53	53
Daral Khwar	37	153	153	153	153	153	153	153	153
Ranolia	17	-	50	92	92	92	92	92	92
Reshun	4.2	15	15	15	15	15	15	15	15
Machai	2.6	7	7	7	7	7	7	7	7
Shishi	1.88	7	7	7	7	7	7	7	7
Jabori	10	57	57	57	57	57	57	57	57
Matiltan	84	48	277	277	277	277	277	277	277
Lawi	69	144	242	242	242	242	242	242	242
Koto	41	166	166	166	166	166	166	166	166
Karora	12	57	57	57	57	57	57	57	57
Balakot	300	-	-	-	617	914	914	914	914
Gabral Kalam	95	-	-			293	293	293	293
Madyan	215	-	-			671	671	671	671
Charkhel	14	-	-			65	65	65	65
Mujaheden	7	-	-			33	33	33	33
Lower Spatgah	470	-	-	-	-	-	-	-	1,925
Total		**953**	**1,330**	**1,372**	**1,989**	**3,348**	**3,348**	**3,348**	**5,273**

Note-1: In case of operational projects (in 2025), the generation estimates above have been developed based on actual average generation of last 2-3 years and in case of under construction/development projects the benchmark generation has been discounted by 20%, as per discussion with PEDO management.

Under-development projects are targeted to achieve COD in 2028, however keeping in view the level of risks associated with hydropower generation these projects are expected to complete in 2030.

Risks Associated with PEDO Supply Potential as of June 2025

Industrial consumption in KPK is expected to remain limited between 2 to 3 Billion units



Risks Associated with PEDO Supply Potential as of June 2025

IGCEP Iterations and CCI approved assumptions

The Integrated Generation Capacity Expansion Plan (IGCEP) provides a 10-year roadmap for national grid's power procurement and is supposed to be updated annually. The plan is developed by the National Transmission and Despatch Company (NTDC) under the obligations of the Grid Code and reviewed by the National Electric Power Regulatory Authority (NEPRA). The IGCEP focuses on optimizing power generation projects based on future demand forecasts and the "least cost" principle, integrating hydro, renewable, and thermal technologies.

IGCEP 2022-31, is the only iteration of IGCEP approved by NEPRA and is legally applicable as of date. All of the PEDO's existing development and construction phase projects (except Mujaheden, Chapri Charkhel and PPP based projects) of PEDO were included as committed projects on the basis of the assumption set approved by Counsel of Common Interest (CCI) for IGCEP 2022-31. The assumption set approved by the CCI has been duly acknowledged in section 5.9. of the IGCEP 2022-31, which provides the list of committed power projects based on the criteria stipulated by CCI for public sector that had two major conditions (i) PC-1 of the power project has been approved; and (ii) funding for the project has been secured.

However, in the subsequent iteration of IGCEP 2024-34, NTDC excluded majority of PEDO's larger upcoming projects from already approved committed PEDO projects. For this Section 5.2, sub-section 7(b) of the IGCEP 2024-34 was amended and a new clause was added that is "the public sector project must be under construction". This clause does not the have the requisite mandate or approval from CCI. More recently, a revised IGCEP 2025-35 is under finalization in which the proposed new criteria has been further revised as is expected to be now based on two elements applicable on public sector projects. These two elements are (b) construction progress above 10%, and (c) financial progress exceeding 10%. As a consequence of this change, Gabral Kalam and Madyan hydro power projects might stand excluded from the list of committed public sector projects under IGCEP 2025-35. However, this criteria is subject to approval by CCI where GoKPK can appose the change.

Conclusion: "The Problem Statement"

Challenges faced by PEDO from National Grid

- KPK's hydropower generation potential is 24.5 GW, while 4.79 GW of identified & viable generation potential under GoKPK mandate is as under:
    - 1,870 MW of PEDO's portfolio projects (estimated generation potential 8,000 GWh), out of which 172 MW (generation estimate of 630 GWh) is operational at end of FY 2025, while 506 MW (generation 1,950 GWh) is under construction. Out of 1,870, the development phase projects stand at 1,110 MW.
    - 1,245 MW of private sector advanced stage projects with completed feasibility studies (estimated generation potential 5,000 GWh)
    - 1,675 MW of feasibility study completed projects in Chitral corridor (estimated generation potential 7,000 GWh
- According to reported numbers and discussions with relevant federal entities even with growing GDP the surplus condition at grid will not resolve in next five years. On other hand net-metering and solar is reducing the future demand-supply gaps at national grid while contributing towards current surplus condition at national grid.
- Supply to grid has become competitive – (a) there is no scarcity of base load at grid, (b) price of hydro power might not be able to compete with solar and wind energy (c) Solar and other generation resources can be placed near base loads, while hydro power require expensive transmission networks.
- Possibility of carving PESCO's residential customers is very low, even with acquisition of PESCO the DISCO will remain tied with legacy contracts. On other hand the residential consumers within PESCO and TESCO have a high T&D loss and low recovery rates.
- From PEDO's perspective the 1,110 MW development phase-projects (both PPP and own projects) face threat of non-procurement from national grid. However, 310 MW (Gabral Kalam and Madyan) is subject to approval of change in IGCEP assumptions to be approved by CCI, that is to be resisted by GoKPK.
- Options for increase in supply, rests with (a) increasing KPK industrial demand (b) finding new markets for supply. For this PEDO might require to focus on new solutions for supply to consumers within KPK and outside the province. To reduce cost of generation PEDO might also consider focusing on hybrid generation (Hydro-Solar Hybrid generation) or type of energy sold (selling hydrogen rather than electricity).
- To supply electricity directly to consumers, the generation cost has to be substantially lower than national grid price (10.5 Cents/kWh in 2025 that is expected to decline to 9.5 Cents/kWh by 2035)

Section 03: Revised PEDO Vision based on Recent Developments in KPK

Background

Empowering KPK's Energy Future through KPEPRA

The Government of Khyber Pakhtunkhwa (GoKPK) has made significant strides over the years to enhance the province's energy generation portfolio and expand its industrial footprint.

GoKPK has consistently invested in multiple projects within the provincial power sector and is committed to continuing these investments. This includes areas such as power generation and transmission lines.

In the regard recent GoKPK initiatives to establish the framework for the power sector and expansion of industry include following:

- Established **Khyber Pakhtunkhwa Economic Zone Development & Management Company (KPEZDMC)** – an economic zones company
- Established **Khyber Pakhtunkhwa Transmission & Grid System Company (KPT&GSC)** – a transmission line & grid company
- Pilot project to **supply of Electricity under wheeling arrangement** from one of the PEDO's hydropower plant to selected industrial units within KPK
- Exploring possibility of inviting **industry to locate adjacent to PEDO hydropower plants** under direct supply arrangements.
- Establishment of **Khyber Pakhtunkhwa Electricity & Power Regulatory Authority (KPEPRA).**

Major Industrial Clusters

Khyber Pakhtunkhwa Economic Zone Development & Management Company (KPEZDMC)

Legal Structure

KPEZDMC has been established, as non-profit organization, within the meaning of section 42 of the of the Companies Act 2017 and is wholly owned by government of Khyber Pakhtunkhwa.

The company develop and manage industrial estates in the Khyber Pakhtunkhwa for rapid industrialization in the province.

Rehabilitation of the existing industrial estates is also part of the objectives of this company

There are three Special Economic Zones with tax incentives (two already established and one is upcoming), that can play main role in shaping industrial footprint in KPK.

KPEZDMC
Existing Economic Zones /Special Economic Zones

Gadoon Economic Zone
Covered Area: 1116 Acres
Location: Gadoon Amazai
District Swabi KP. 0938-270318

Hattar Economic Zone
Covered Area: 1443 Acres
Location: Hattar
District Haripur KP. 0995-617008

Bannu Economic Zone
Covered Area: 408 Acres
Location: Bannu
District Bannu KP. 0331-3001004

Peshawar Economic Zone
Covered Area: 866 Acres
Location: Jamrud Road, Hayatabad
District Peshawar KP. 091-9330015

Hattar SEZ
Covered Area: 424 Acres
Location: Hattar
District Haripur KP. 0995-5617078

D. I. Khan Economic Zone
Covered Area: 189 Acres
Location: Daraban Khurd, Indus Highway
District D. I. Khan KP. 0300-9056625

Nowshera Economic Zone
Covered Area: 86 Acres
Location: Risalpur
District Nowshehra KP. 0937-842697

Jalozai Economic Zone
Covered Area: 257 Acres
Location: Main Cherat Road, Jalozai-Pabbi
District Nowshehra KP.0937-842666

Rashakai SEZ
Covered Area: 1000 Acres
Location: M1 Motorway (Wali Interchange)
District Nowshera. 0309-9062376. 0333-9141219

Nowshera Extension
Covered Area: 76.25 Acres
Location: Risalpur
District Nowshera KP. 0937-842697

Export Processing Zone
Covered Area: 92 Acres
Location: Risalpur
District Nowshehra KP. 0937-842697

Mohmand Economic Zone
Covered Area: 350 Acres
Location: Tehsil Yakaghund, District Mohmand
05659251, 0346 8998050

Chitral Economic Zone
Covered Area: 40 Acres
Location: Chitral
District KP. 0313-6125356

Upcoming Economic Zones

Salt& Gypsum City Karak
Covered Area: 310 Acres
Location: District Karak

Katlang E.Z.
Covered Area: approx. 512 Acres
Location: District Mardan

Buner E.Z.
Covered Area: 126.4 Acres
Location: District Buner

Mansehra E.Z
Covered Area: 77.5 Acres
Location: District Mansehra

Daraban (Proposed SEZ)
Covered Area: 3000 Acres
Location: District D.I. Khan

For procuring and distributing electricity, the Economic Zone should have requisite licensing from regulator. As of date only Rashakai SEZ has applied for such License, that is at halt by NEPRA.

Transmission Infrastructure

Khyber Pakhtunkhwa Transmission & Grid System Company (KPT&GSC)

Legal Structure

- The NEPRA (Amendment) Act, 2018 allows Provincial Governments to establish a Provincial Grid Company (PGC). The PGCs are allowed to engage in the transmission of electric power within the territorial limits of such Province.
- KPT&GSCL (Khyber Pakhtunkhwa Transmission & Grid System Company) has been incorporated by GoKPK to develop a transmission corridor between Swat, Chitral, Dir and Manshera for evacuation of power from proposed HPPs in PEDO's portfolio.
- The company has been granted a PGC license by NEPRA.
- KPTG&SC has been established in March 2020, as a "private limited company", fully owned by GoKP.

At the time of License award from NEPRA, most of the Economic Zones under development by KPEZDMC were referred as "SEZ's", however subsequently under recent agreements with IMF the tax breaks and subsidies were limited to only three projects now referred as "SEZs'. Accordingly, the term "SEZ" used in KPT&GSC license agreement need to be corrected to include "Economic Zones" and "Industrial Parks".

As per the existing license KPT&GSC can construct following lines within KPK.

1. Construction of new Transmission Lines and grid stations of 500 KV, 220 KV and 132KV in the regions of Dir and Chitral for evacuation of power from different HPP(s) being developed in the said regions;
2. Construction of new Transmission Lines and grid stations of 220 KV and 132 KV in the region of Swat for evacuation of power from different HPP(s) being developed in the said region;
3. Construction of new Transmission Lines and grid stations of 220 KV and 132 KV in the region of Kohistan for evacuation of power from different HPP(s) being developed in the said region;
4. Construction of new Transmission Lines and grid stations of 220 1KV and 132 KV in the region of Manshera for evacuation of power from different HPP(s) being developed in the said region;
5. Construction of new Transmission Lines and grid stations of 220 KV and 132 KV for different SEZ(s) being set up in the province of KPK.

Transmission Infrastructure

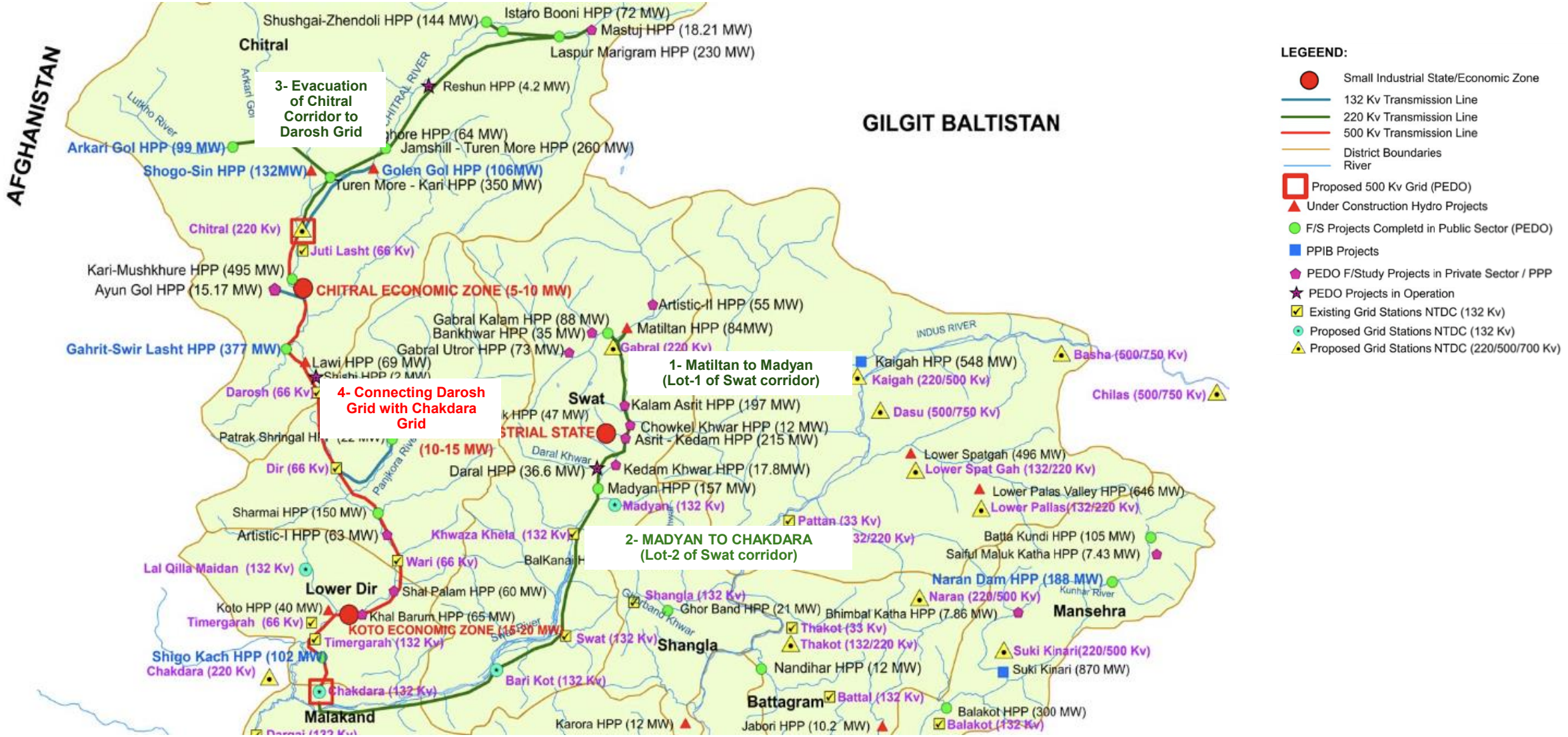
Khyber Pakhtunkhwa Transmission & Grid System Company (KPT&GSC)

- The KPT&GSC is constructing its Overhead Transmission Lines (OHTL) and Grid network to facilitate power evacuation from public and private hydropower plants in next 5-20 years under a phased manner from below listed KPK five (5) regions:
  - Chitral & Dir Region: 3,400 MW
  - Kohistan Region: 2,050 MW
  - Swat Region: 1,050 MW
  - Manshera Region: 728 MW
- Evacuation line for Swat region is at advanced stage, compared to other regions, as Swat region power evacuation requirements are between 2025-2030.
- Existing and upcoming major projects of KPT&GSC are listed in adjacent table

Project	Location	Project Nature	Investment Exposure (PKR Million)	Funding Req.(PKR Million)	Comments
Matiltan to Madyan (Lot-1 of Swat corridor)	Swat	40-kilometer 132/220 KV TL e & grid stations	8,000	-	GoKPK is fully funding the construction of this line & gridstations. Expected COD End 2026
MADYAN TO CHAKDARA (Lot-2 of Swat corridor)	Swat	80-kilometer 220 KV TL & grid stations	46,200	36,960	Estimated cost of line & gridstations is US$ 165m, debt amount to be arranged is US$ 132m. Exim Bank is reviewing the project for debt component. Expected COD End 2029
Evacuation of Chitral Corridor to Darosh Grid	Chitral	132 / 220 KV TL of 130KM length	32,480	32,480	Estimated cost of transmission line & gridstations is US$ 116m to be arranged from GoKPK and other financial institutions or capital market. Expected COD End 2030
Connecting Darosh Grid with Chakdara Grid	Chitral	500 KV Transmission line of 225 km	63,840	63,840	Estimated cost of transmission line & gridstations is US$ 228m to be arranged from GoKPK and other financial institutions or capital market. Expected COD End 2032
Total			223,320	206,080	

Transmission Infrastructure

Evacuation of Swat and Chitral Corridors



Transmission Infrastructure

Projects to be evacuated through Lot-I and Lot-II in Swat Corridor

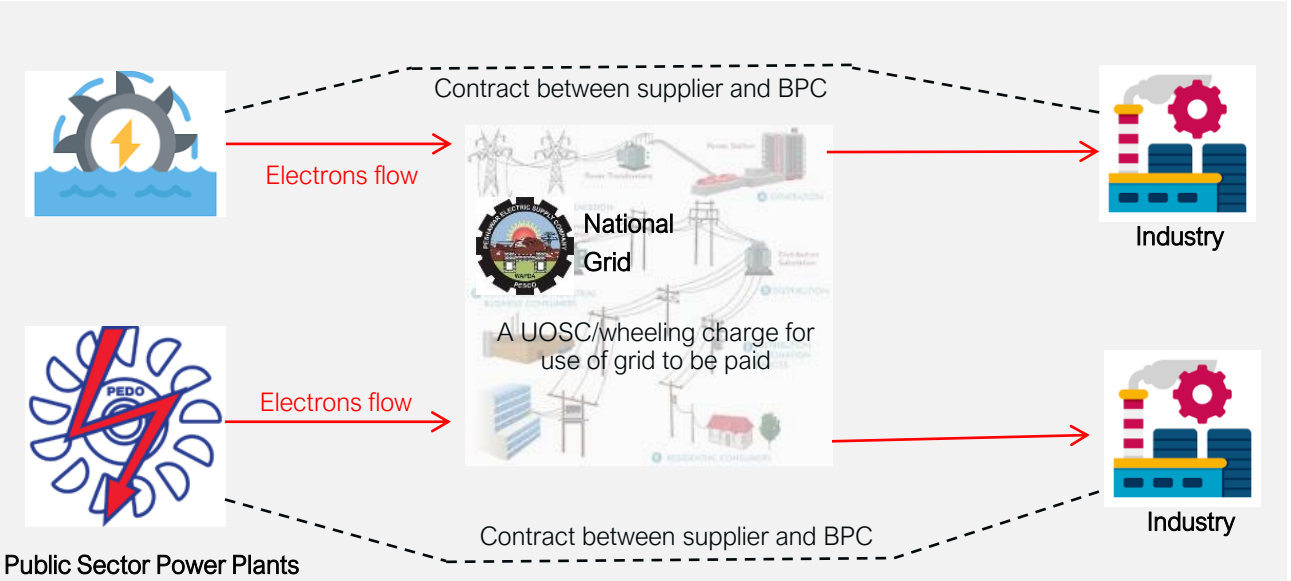
#	Hydropower plants	Capacity MW	Ownership	COD / Status
Transmission Line LOT – I				
1	Daral Khwar HPP Distt: Swat	36.6	PEDO – Public sector	Completed
2	Matiltan HPP Distt Swat	84	PEDO - Under Construction in public sector	2026
3	Gabral Kalam HPP Swat	95	Under Construction WB/PEDO funded KHRE	2030
4	Artistic II	55	Artistic Milliner (Private sector)	Feasibility approved. G/L and Tariff under process
5	Gabral Utror	89	Markhor Energy Milliner (Private sector)	Feasibility approved. G/L and Tariff under process
6	Bankhwar HPP	35	Markhor Energy Milliner (Private sector)	Feasibility approved. G/L and Tariff under process
Sub-total		395		
Transmission Line LOT – II				
7	Madyan HPP	215	Under Construction WB/PEDO funded KHRE	2030
8	Kalam Asrit HPP	238	IPP – KOEN (Korean Govt)	2032
9	Asrit Kedam HPP	229	IPP – KOEN (Korean Govt)	2034
10	Chowkel Khwar	60	Public sector project	Feasibility under process by Mott Macdonald Pakistan
Sub-total		742		
	Total	1130		

Wheeling of Electricity to Existing Industry

Sale of Electricity to BPCs (1 MW+ connection) using National Grid

- Wheeling of electricity is the process of transmitting electricity from a producer / generator to a user(s) within the same DISCO (balancing area) or from one area to another, using electrical network of the DISCO(s).
- In Pakistan, NEPRA's Wheeling of Electric Power Regulation 2016 (regulations), allowed generation companies to sell its electricity to Bulk Power Consumer (BPC) at any location in the country. The consumers were required to pay the cost of transporting of electricity (wheeling) for using NTDC/DISCO system(s), while the cost of generation was mutually agreed between the generator and BPC.
- For implantation of wheeling concept in Pakistan, the generation company enters in a long-term Energy Purchase Agreement (EPA) with a buyer and simultaneously enters in an Energy Wheeling Agreement (EWA) with the respective DISCO, under the applicable regulations.
- PEDO implemented a wheeling arrangement for Pehur 18 MW hydropower project wherein five industrial consumers (within KPK) were selected for supply of electricity from the said project using PESCO's network.

In the second phase, PEDO identified a larger portfolio for implementation of wheeling arrangement, however, the initiative is at halt because of delays in CTBCM (Competitive Trading Bilateral Contract Market) implementation and high wheeling cost proposed by the DISCOs. Same is discussed further in next sections.



Bulk Power Consumer (BPCs)	Location	Generation Allocated from Pehur HPP
Premier Chipboard Ind.	Peshawar	15%
AJ Textile Mills	Gadoon Amazai	30%
Gadoon Textile Mills	Gadoon Amazai	30%
Cherat Packaging	Gadoon Amazai	15%
Cherat Cement	Nowshera	10%

Direct Supply Model
Concept & Objective

Conceptual Understanding of Direct Supply Model

The Direct Supply arrangements envisage the supply/sale of electricity by the Projects to the industrial consumers at close proximity of each Project, that is without involving national grid/network or the distribution/transmission lines constructed by NTDC/PESCO.

Therefore, to have the Direct Supply arrangement, the electricity should be received by the industrial consumer directly from the outgoing bus bar of the Project without using in any way of any network licensee's system or its associated facilities.

PEDO is considering to provide electricity through a Direct Supply Model; under the said model business groups will be invited to establish industrial plants adjacent/close vicinity to HPP's of PEDO and benefit from the lower cost of hydel electricity.

To circumvent the challenges associated with wheeling, PEDO introduced the Direct Supply Model aimed at attracting new industries to KPK. This model involves establishing industrial units adjacent to or in the close vicinity of PEDO's hydropower plants. These units would benefit from the lower cost of hydel electricity, avoiding use of the national grid.

Given the current regulatory and cost-related hurdles, PEDO assessed certain projects for Direct Supply Model and also approached industry to understand possible interest in identified projects.

Based on initial interaction, industry showed interest in direct supply model, however, expects heavy discount on electricity price in comparison to national grid for establishing industry adjacent to power plants.

Option Types – Direct Supply Model

The projects were evaluated based on the availability of land, closeness to transmission line and the route to the HPP's. The following options were devised and were assigned to each project. This evaluation was completed in the supply assessment report. The details of the land are shown in the next slide.

Feature	Option A	Option B	Option C
Location	Adjacent to HPP	Along HPP's transmission line	Existing/new industrial zones near HPP clusters
Transmission Infrastructure	Minimal	Use/modification of existing lines	New/extended lines may be required
Coordination Required	CPPA, PESCO	CPPA, PESCO, PEDO	CPPA, PESCO, PEDO, KPEZDMC, KPK Transmission Co.
Tariff Type	Take-and-pay (preferred)	Take-and-pay (preferred)	Take-and-pay (preferred)
Seasonal Backup Needed	Yes	Yes	Yes
Scale	Single project focused	Project + route-focused	Cluster/zone-focused

GoKPK Initiative

Empowering KPK's energy future through KPEPRA

To ensure effective oversight of the power sector in Khyber Pakhtunkhwa, the Provincial Government is currently in process of setting up the Khyber Pakhtunkhwa Energy Regulatory Authority (KPEPRA). This initiative aligns with legislative competence conferred under Article 157(2) of the Constitution of the Islamic Republic of Pakistan and with section 7(4) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (NEPRA Act) .

KPEPRA is being formed to address the regulatory gaps in KPK's power sector. It will be responsible for overseeing electricity generation, transmission, and distribution, within its jurisdiction across the Province. The Regulator will also manage key functions such as tariff setting, licensing, compliance monitoring, and dispute resolution.

One of the key drivers for KPEPRA's establishment is to support the growing industrial and economic zones in KPK, especially where reliable and affordable electricity is critical. It aims to enable the wheeling of cheap hydropower to local industries by creating a more responsive and decentralized regulatory framework.

KPEPRA will also help develop competitive electricity markets in the Province, including the facilitation of bilateral power purchase agreements. This will improve transparency, efficiency, and investor confidence in KPK's energy sector.

Strategic Role of KPEPRA in KPK's Power Ecosystem

- Complements PEDO (generation) and KPTGSC (transmission)
- Supports KPEZMC by ensuring reliable, affordable power for industrial zones
- Unlocks full value of indigenous renewable resources (hydel, solar, wind)
- Builds investor confidence through a transparent regulatory regime.

GoKPK Initiative

Types of Licenses and Jurisdiction KPEPRA

The electricity supply chain encompasses three core functions: generation, transmission, and distribution. The jurisdiction of KPEPRA in respect of these functions is summarized below.

(a) Licensing, performance regulation, and tariff approval generation plants within territorial jurisdictions of KPK and whose output is consumed exclusively within the Province and does not feed into / utilize the National Grid;

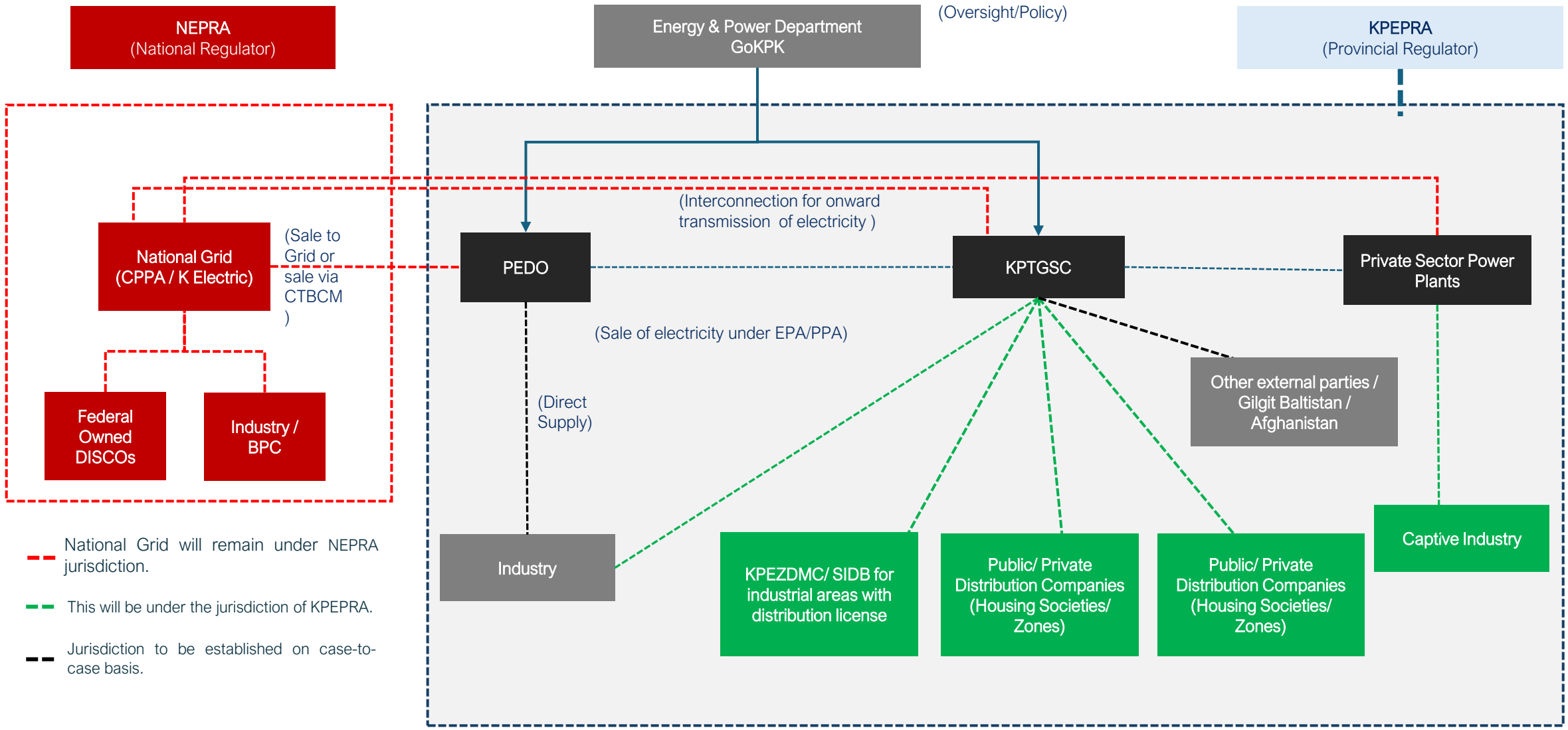
(b) Licensing and regulation of provincial transmission licensees dedicated intra-provincial transmission networks (for example, a 132 kV line interconnecting local renewable plants to a local distribution utility); and

(c) Licensing, supervision, and regulation of provincial distribution companies (excluding DISCOs owned by Federal Government) and micro-grids serving consumers within the Province;

TYPES OF LICENSES

Generation License	Transmission License	Distribution License	Integrated Utility License and Micro Utility License	Bulk Power Supply or Trading License
To authorize the construction, operation, and maintenance of a power generation facility to supply power within the Khyber Pakhtunkhwa without using national grid	To authorize the transmission of electricity within the Khyber Pakhtunkhwa without using national grid.	To authorize the local distribution and retail supply of electricity to consumers within the Khyber Pakhtunkhwa. This distribution not to overlap with the infrastructure of Federal owned DISCOs.	To authorize two or more of the three functions, i.e. generation, transmission and distribution for a specified geographic area	To authorize the purchase and resale of electricity to distribution licensees or large consumers.

Conceptual Diagram of the KPK's Power Sector Outlook



PEDO's Revised Vision Statement

Current Vision Statement

"Energizing Khyber Pakhtunkhwa with affordable and sustainable power. Pakhtunkhwa Energy Development Organization (PEDO) is a statutory body acting as one window facilitator on behalf of the Energy & Power Department, Government of Khyber Pakhtunkhwa to enhance energy security and to overcome the energy crisis in the country through induction of sustainable and affordable power generation in the national grid while harnessing the enormous renewable resources of the province. To provide an enabling environment, attract private sector investment, and promote energy efficiency and conservation."

Proposed Strategic Vision

"Leading the transformation of Khyber Pakhtunkhwa as a hub of innovative, sustainable, and affordable energy solutions, PEDO is committed to harnessing renewable resources to ensure energy security, economic prosperity, and environmental sustainability. For empowering communities and fostering economic growth, PEDO aims to be a driving force in sustainable energy development and creating a self-reliant future for the province. For this PEDO provides enabling environment for private sector, makes investments directly and in collaboration with selected parties. PEDO envisions Khyber Pakhtunkhwa as a leader in clean energy, contributing to provincial and national progress and global sustainability."

Rationale for Revisions

- Current Power Sector Dynamics: Existing vision is not aligned with current dynamics of electricity at national grid.
- Leadership & Innovation: Strengthens PEDO's role in pioneering advanced technologies and setting industry benchmarks.
- Community Empowerment: Emphasizes PEDO's commitment to social responsibility and direct local benefits.
- Economic Growth: Highlights the broader regional impact of energy initiatives.

This revised vision integrates technology, sustainability, and socio-economic progress.

Conclusion

Proposed Steps under KPK's New Power Sector Outlook

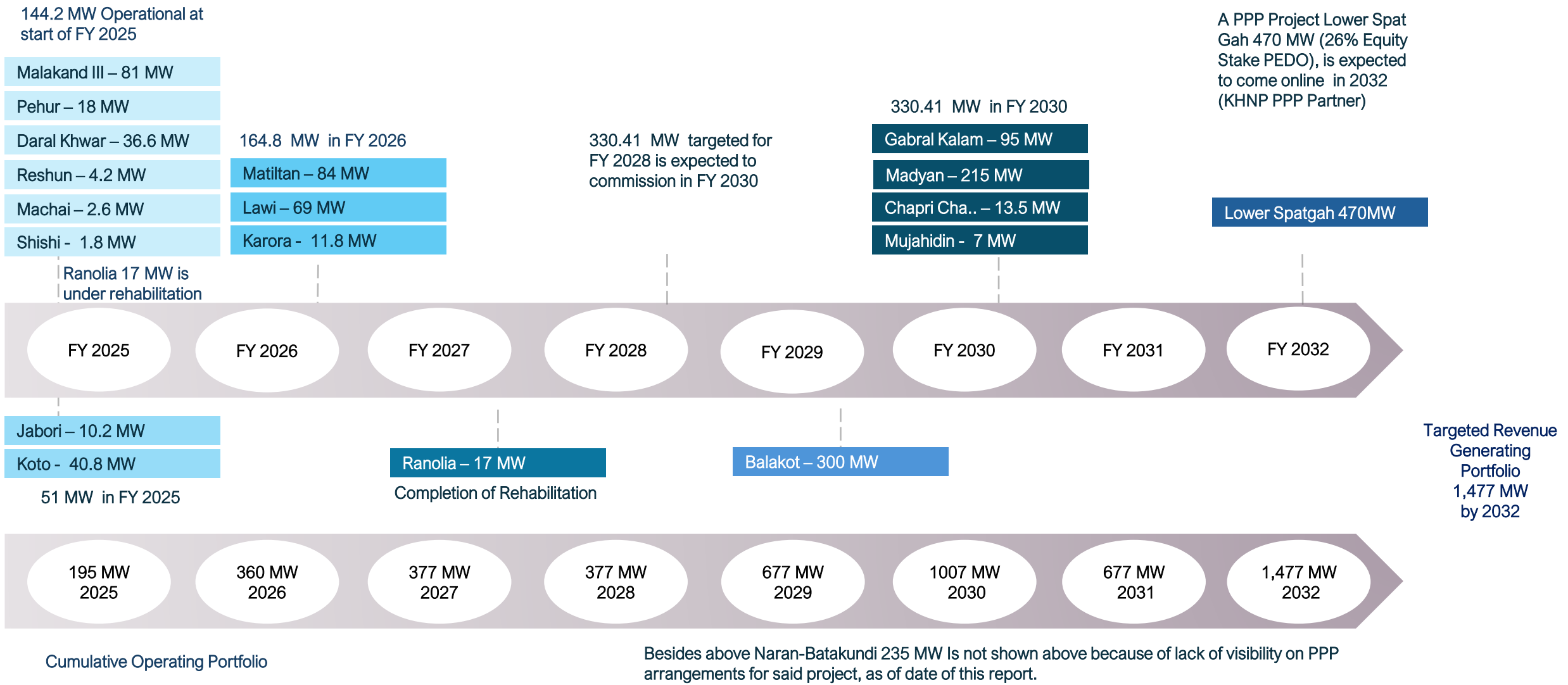
- KPK power sector has remained focused on (a) hydropower generation, and (b) sale of electricity to national grid.
- Both of above focused areas need to be realigned because of the changing realities, as discussed hereunder:
    - National grid has surplus capacity and limited hydropower projects can be absorbed by national grid in future, as discussed in last section.
    - New provincial electricity demand hubs need to be established, as existing KPK's demand will continue to be served by National Grid. For supply to existing domestic demand hubs CTBCM can be explored, while for new demand hubs both CTBCM and direct lines can be established. As of date CTBCM is expected to allow bilateral sale of electricity to 1MW+ consumers using national grid, subject to fulfillment of criteria discussed in coming sections and payment of UoSC to national grid (as established by NEPRA).
    - Going forward with establishment of KPEPRA, generation, transmission and distribution for electricity supply to new demand hubs within KPK will be possible, this will facilitate electrifying new demand hubs that may include industrial zones and new housing colonies.
    - Micro Distribution/Grid Licenses from KPEPRA will need to be acquired for industrial hubs established / operated by KPEZDMC and Small Industries Development Board (SIDB), or by related housing colonies/societies. For this either special purpose company to be established by GoKPK (responsible for electricity distribution within said industrial hubs) or existing public sector management entities will take micro distribution licenses from KPEPRA.
    - KPTG&SC will need to apply to NEPRA for broadening its scope of existing license (currently limited to SEZ and four hydropower corridors) and will also take license from KPEPRA for transmission lines within KPK (that does not involve interconnection with national grid). KPT&GSC will need to identify transmission lines where electrons will be transmitted both for national grid (falling under NEPRA jurisdiction) and for micro distributors/grids established within KPK (falling under KPEPRA jurisdiction). It is expected that separate tariffs will be required for said lines from two regulators, based on capacity allocations for such purpose.
    - Generation cost of new power plants (funded from foreign or local commercial loans) is expected to be at par or less than national grid price, accordingly generation arrangements and funding, need to be revisited. This may include hybrid generation (solar and hydro) or supply to domestic demand hubs from multiple sources including bulk purchase from grid or from new thermal power plants.

Conclusion

- Keeping in view the surplus capacity at national grid and GoKPK's preference for promoting industry within the province, PEDO with new vision need to reposition itself. It has now become crucial to coordinate with industry, SEZs (KPEZDMC), upcoming KPEPRA and distribution companies (provincial or ex-WAPDA) to align for each existing and upcoming project. This alignment has to be focused on major areas (a) supporting industrial development within KPK, and (b) ensuring financial viability of each project.
- It is understood that existing viable (legally and commercially) transmission lines, that were constructed by PEDO, will be transferred by PEDO to KPTGSC, which is the right step to separate the functions as per relevant mandate. This business plan does not assume any financial impact of such change, though there will be impact on balance sheets of both entities of said transfer.
- Similarly, KPTGSC is expected to provide technical solutions within its mandate for evacuation of the projects for transmission within KPK and for national grid. For this, separate licenses would be required from KPEPRA, besides its existing role as Provincial Grid Company that is focused to facilitate transmission of electrons to national grid.
- It is important to highlight that new transmission lines, established by KPTGSC, might be used for dual purposes that is (a) supply to national grid, and (b) supply to electricity distributors that are licensed by KPEPRA. For this it is crucial that underlying provincial transmission line projects are part of "Transmission System Expansion Plans (TSEP)" of NTDC and tariff structured from NEPRA are flexible to allow allocations of capacities (for both i.e. national grid and provincial consumption) within single transmission license. In this regard, both PEDO and KPTGSC need to initiate discussions with NEPRA for understanding implications of such tariff scenarios.
- The next sections of this business plan focus on PEDO portfolio and evaluates their potential for supplying to alternate customers within and outside the province. Business plan also focuses on possible mode of supply and cost of relevant mode to understand viability for the alternate customers.

Section 04: Revenue Generating Portfolio & Baseline Prices

PEDO's Targeted Timelines for Revenue Generating Portfolio



Malakand-III Hydropower Complex

Project Background

The Malakand-III Hydropower Project (81 MW) was developed by utilizing the auxiliary tunnel under the Swabi SCARP on the Upper Swat Canal System. Completed in 2008, it supplies power to NTDC under a 25-year PPA and is interconnected via the **132 kV Dargai Grid Station**. The Project tariff is on a Take or Pay Basis (Capacity payments).

Salient Features	
Capacity	81 MW
Design Discharge	51 m3/s
Net Head	181 m
Length of Power Tunnel	3.3 km
Benchmark Energy Sale	553.16 GWh
COD	1st November 2008
Project Cost (Original)	Rs. 5.9 Billion

Project Status	
Interconnection Status	Operational
Tariff Status	True-up tariff awarded
PPA/EPA/PAC Status	Executed

Tariff Status

The levelized true-up tariff of the Project is PKR 4.0294 on Take or Pay basis and is subject to US$ based ROE @17%. Debt Period is complete.

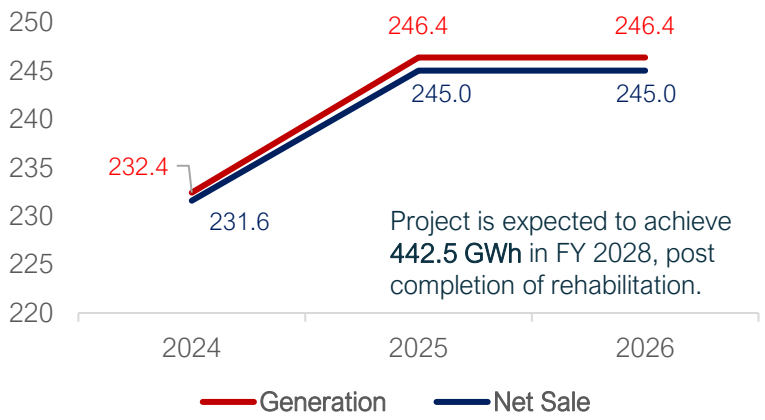
Indexed Tariff assumed for **FY 2026 is PKR 21.52/kWh,** based on units delivered in said year.

Indexed Tariff assumed for **FY 2028 is PKR 13.56/kWh,** based on units delivered in said year.

Immediate Action Required

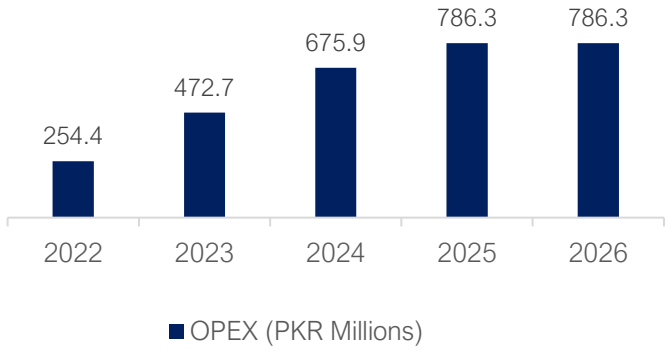
Malakand-III: NEPRA to be approached for recovering past insurance cost and to include insurance in future, in the tariff.

Energy Generation (GWh)



O&M Base Forecast

Base O&M adjusted for CPI – 2027 & onwards



Rehabilitation Status

- Rehabilitation Cost: – PKR 2,452.17 Million (Major cost components include Trash Rack Cleaning Machine (TRCM) estimated Cost Rs. 2 billion, MIVS Rs 41.82 M? and loop cooling water system PKR 37.65 M etc.)
- End of Rehabilitation Period: FY 2027
- Impact of Rehabilitation: Achievement of 80% of benchmark energy (for net sales) from existing 44.3% of benchmark energy.

Base Funding Source

- Hydel Development Fund (HDF) – PKR 2,452.17 Million

Major Risks and related Financial Model Assumptions:

- The rehabilitation cost has a US$ based cost component, because of which the cost and funding requirement might increase to Rs 2,453.13 million.
- Possible insurance cost recovery impact (as proposed in immediate actions), has not been assumed in the financial model.
- **There are ongoing discussions with the "Task Force on power sector", under which it is envisaged that (a) the rate of return is reduced to 13% (b) Delinking of US$ indexation for ROE, and (c) the project is converted to a take-and-pay basis. As there is no visibility on these discussions, same has not been incorporated in the Financial Model.**
- **Project's tariff control period is ending in 2034.**

Pehur Hydropower Complex

Project Background

Located in Swabi, Pehur HPC utilizes water from Gandaf Tunnel. Developed by SHYDO, the project was completed in 2009 with funding from HDF and ADP. It achieved COD on March 1, 2010, and is interconnected with the 132kV Gadoon Grid Station.

Salient Features	
Capacity	18 MW
Net Head (high head units)	68m
Net Head (low head unit)	44m
Length of Penstock	4.7 km
Benchmark Energy	57.7 GWh
Project Cost (Original)	Rs.911 Million
COD	1st March 2010

Project Status	
Interconnection Status	Operational
Tariff Status	True-up tariff awarded
PPA/EPA/PAC Status	Executed
Selling electricity to industry through wheeling	

Tariff Status

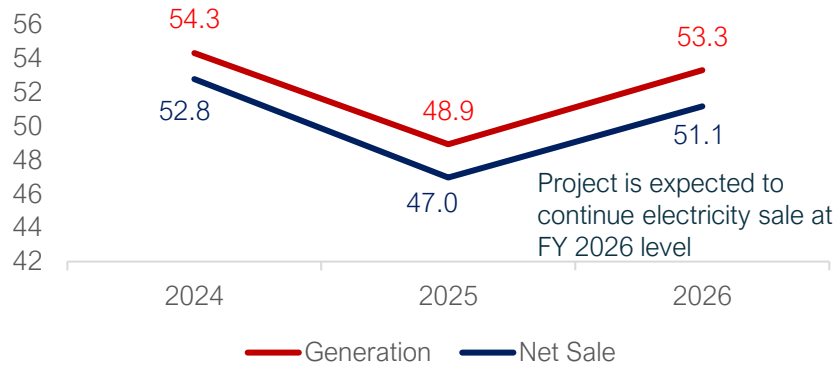
The project is selling 78%:22% to industry & PESCO. The levelized benchmark true-up tariff under NEPRA is PKR 3.767/kWh, while for industry benchmark was PKR 7.5514/kWh.

Indexed tariff **NEPRA Tariff is expected to be PKR 9.36/kWh in FY 2027 (once indexed),** while **for industry will be PKR 10.79/kWh in same year.**

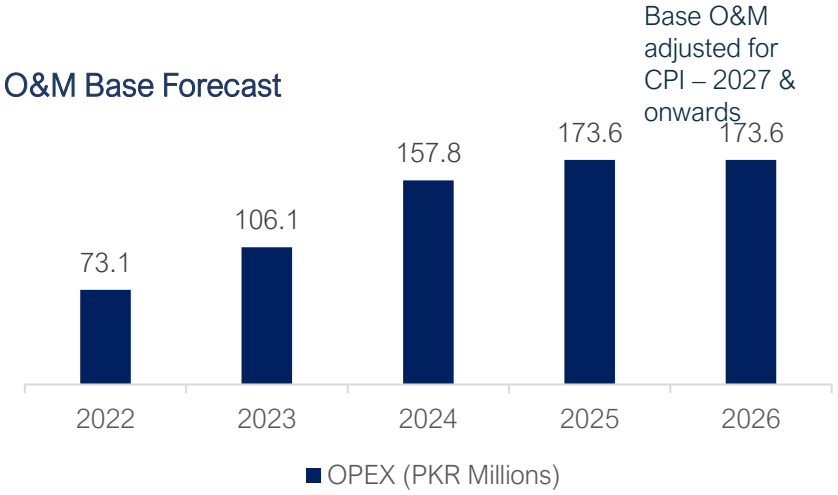
Immediate Action Required

Pehur: NEPRA to be approached for awarding indexed tariff from COD till date. Regular indexations to be applied going forward.

Energy Generation (GWh)



O&M Base Forecast



Project Status

- Project is operational with no major CAPEX expected in the near future.
- However, **it is recommended that an escape channel is constructed to increase electricity generation by passing main irrigation canal. Due to the unavailability of a confirmed CAPEX estimate for the escape channel, the same has not been assumed in the financial model.**

Major Risks and related Financial Model Assumptions:

- The impact of tariff indexations has been assumed to be effective from FY 2027 onwards. O&M cost is indexed with Pak CPI change.
- It is estimated that Rs 1.4 B might be recovered due to past indexation and insurance cost recovery. The impact has been assumed in FY 2026.
- **The project will transfer to CTBCM arrangement once applicable (assumed to transfer to CTBCM in 2027), under existing agreements with industry .**
- **Existing wheeling agreements with industry started in June 2020 and will end in June 2030. NEPRA tariff control period will end in 2035.**

Daral Khwar

Project Background

Developed on Daral Khwar Nullah, a tributary of River Swat, this run-of-the-river project was completed in 2019 and achieved COD on May 26, 2021. It supplies power through NTDC under a 30-year EPA and is interconnected via the 132 kV Madyan Grid Station.

Salient Features	
Capacity	36.6 MW
Design Discharge	15 m3/sec
Net Head	291 m
Length of Channel	3 Km
Benchmark Energy	154 GWh
COD	26th May 2021

Project Status	
Interconnection Status	Operational
Tariff Status	Benchmark tariff awarded
PPA/EPA/PAC Status	Executed
Existing EPA allows exit for sale to industry.	

Tariff Status

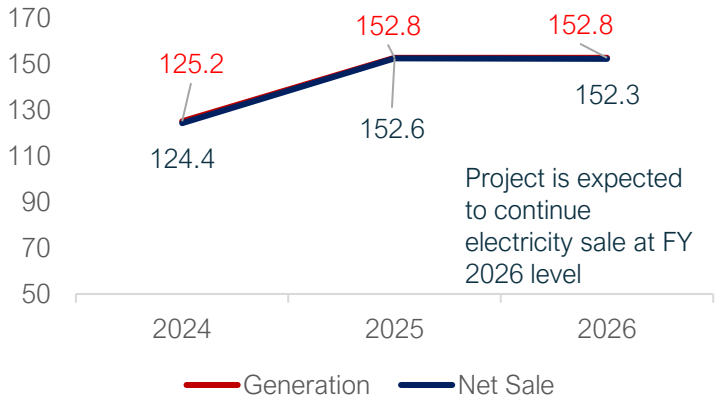
The levelized benchmark tariff of the Project under NEPRA is PKR 8.2683/kWh, on which it is currently selling electricity.

Expected Indexed tariff for 2026 is PKR 15.7/kWh in 2026 (Q-4)

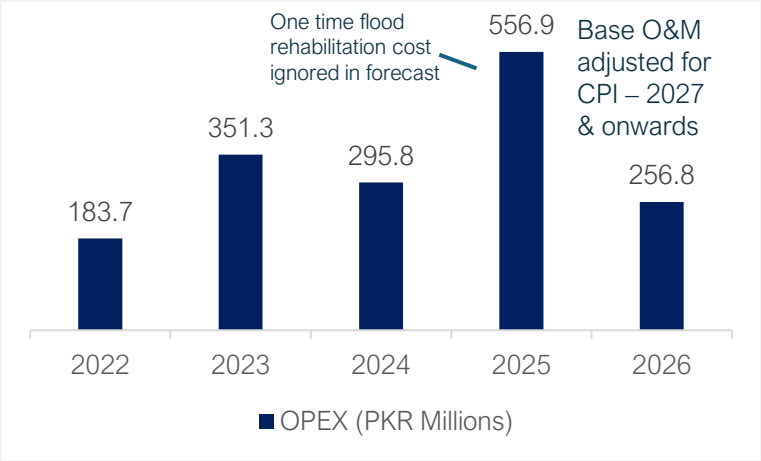
Immediate Action Required

Daral Khwar: NEPRA to be approached for awarding true-up tariff and indexations from COD till date. Regular indexations to be applied going forward.

Energy Generation (GWh)



O&M Base Forecast



CAPEX

- Project Cost in PEDO's Books: – PKR 9.6 Billion for construction of the HPP including transformer cost PKR 1.12 Billion to be incurred FY 2027 (no pass through by NEPRA)
- Estimated Project Cost for NEPRA True-up: PKR 9.1 B, including IDC on HDF and ADB REDSIP. Recent NEPRA decision on COD, will enhance capitalization. The tariff allows foreign debt servicing component.

Base Funding Source

- ADP – PKR 1.4 Billion, HDF – 8.2 Billion and ADB REDSIP 48.36 Million (US$ 0.52 M) - Interest During Construction (IDC) is not capitalized in PEDO Books (as not recognized as loan), however capitalized for for tariff purposes.

Project Status

- COD achieved, transformer cost of PKR 1.12 Billion to be incurred in 2027 to reduce back feed.

Major Risks and related Financial Model Assumptions:

- True-up adjustments have been assumed in Financial Model based on recent NEPRA decision (suo-moto proceedings) with regards to change in SCOD and extended construction period allowed to Project,
- Tariff Indexations impact has been assumed from FY 2026 (Q-4) and onwards. Rs 2.3 B might be recovered due to the tariff differential between true-up and COD.

Reshun Hydropower Station

Project Background

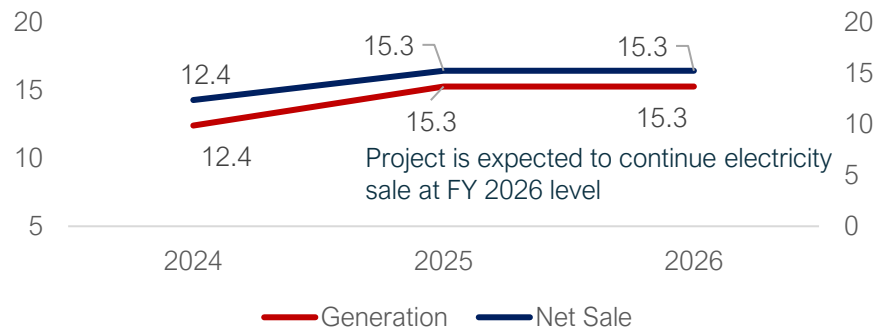
The Reshun Hydropower Project (2.8 MW), funded by GTZ (Pak-German Cooperation), was commissioned in 1999 as a social uplift project for Upper and Lower Chitral. Its capacity was enhanced to 4.2 MW in 2006, supplying 18,000+ consumers via a 33 kV transmission network. The project operated through three feeders covering 47 villages with transmission lines spanning 203 km.

Salient Features	
Installed Capacity	4.2 MW
Completion Year	1990
Cost of the Project	Rs. 802 Million
Cost of Rehabilitation	Rs. 1,054 Million
Maximum Capacity	4.8 MW
Benchmark Energy	25 GWh
Forecasted Tariff 2026	PKR 5.9/kWh
COD	1999

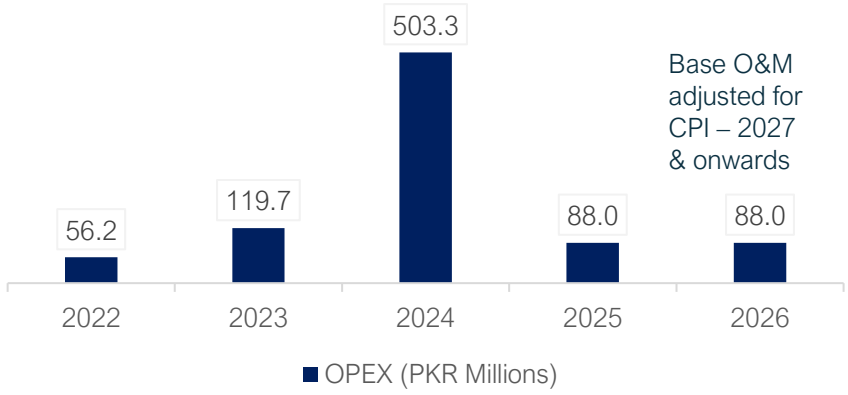
Project Status	
Interconnection Status	Operational
Tariff Status	Benchmark awarded
PPA/EPA/PAC Status	Direct Supply to Community

Tariff Status
NEPRA does not award the tariff. Based on discussions with PEDO's management, the project's tariff is structured on a no-profit, no-loss basis, i.e., O&M costs are passed on to consumers on a per-unit basis.

Energy Generation (GWh)



O&M Base Forecast



Machai Hydropower Station

Project Background

Located in Mardan on Machai Canal, this provincial hydel project supplies 2.6 MW to the national grid via an 11 kV transmission line interconnected through the Katlang grid.

Salient Features	
Capacity	2.6 MW
Design Discharge	40 m3/sec
Net Head	7.88 m
Length of Channel	1.5 Km
Benchmark Energy	15.7 GWh
COD	18th May 2020

Project Status	
Interconnection Status	Operational
Tariff Status	Benchmark/RPC stage tariff awarded
PPA/EPA/PAC Status	Executed
Existing EPA allows exit for sale to industry.	

Tariff Status

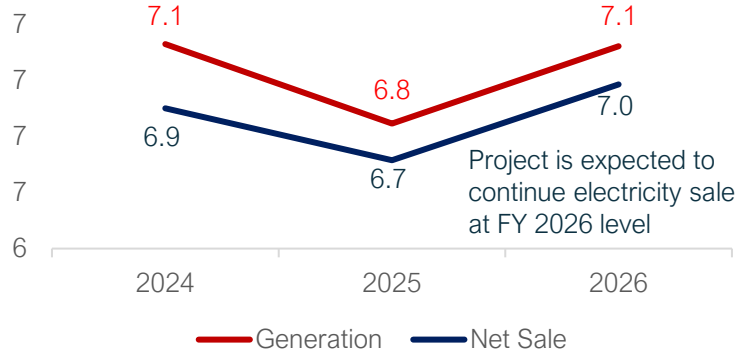
The levelized benchmark tariff of the Project under NEPRA is PKR 4.671/kWh, on which it is currently selling electricity.

Expected Indexed tariff is PKR 25.3/kWh in 2026 (Q-4)

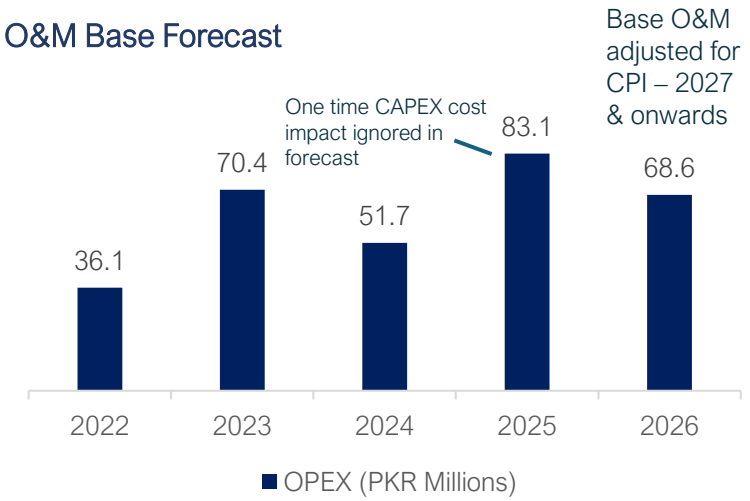
Immediate Action Required

Machai: NEPRA to be approached for awarding true-up tariff and indexations from COD till date. Regular indexations to be applied going forward.

Energy Generation (GWh)



O&M Base Forecast



CAPEX

- Project Cost in PEDO's Books: – PKR 1.5 billion for the construction of the HPP.
- Estimated Project Cost for NEPRA True-up: PKR 0.95 B, including IDC on ADB REDSIP and assumed debt by NEPRA. The indexed tariff of the project includes a foreign debt servicing component.

Base Funding Source

- ADP – PKR 612 Million, and ADB REDSIP PKR 889 Million (US$ 6.55 M) - Interest During Construction (IDC) not capitalized in PEDO's Books, however capitalized for tariff purposes. ADB REDSIP not recognized as loan in PEDO's Books.

Project Status / Data Gaps

- The annual project cost incurrence details were not available with the relevant PEDO team, which poses an issue in proceeding with the true-up petition with NEPRA.

Major Risks and related Financial Model Assumptions:

- True-up adjustments have been assumed in the Financial Model, assuming the project cost is incurred equally throughout the construction period.
- Tariff Indexations impact has been assumed from FY 2026 (Q-4) and onwards.
- It is estimated that more than PKR 261 Million might be recovered due to tariff differential between true-up and COD.

Shishi Hydropower Station

Project Background

The Shishi Hydropower Project (1.8 MW) in Tehsil Drosh, Chitral, is a run-of-river scheme utilizing the Shishi River. Originally a 300-kW mini plant (1985) by PEDO, it was later upgraded as a social project with enhanced infrastructure. The generated electricity is supplied to PESCO's 11kV Drosh grid.

Salient Features	
Capacity	1.875 MW
COD	18th December 2010
Rated Flow	3 Cumecs
Headrace Channel	3800 m
Benchmark Energy	14.6 GWh

Project Status	
Interconnection Status	Operational
Tariff Status	Benchmark/RPC stage tariff awarded
PPA/EPA/PAC Status	Draft submitted, that include exit clause

Tariff Status

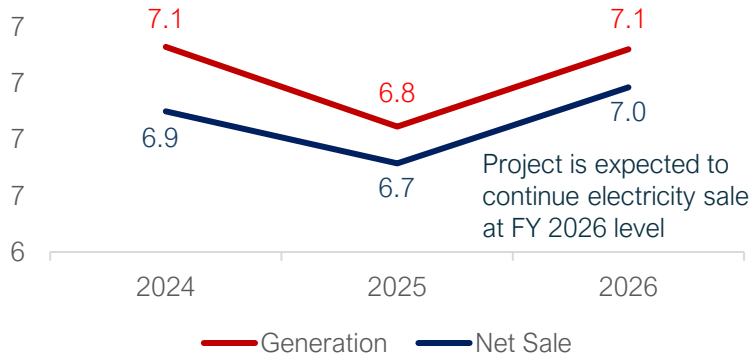
The levelized benchmark tariff of the Project, as per NEPRA, is PKR 2.671/kWh. The structure of the tariff is based on WACOG, depreciation, and O&M pass-through.

Expected tariff is PKR 2.56/kWh in 2026

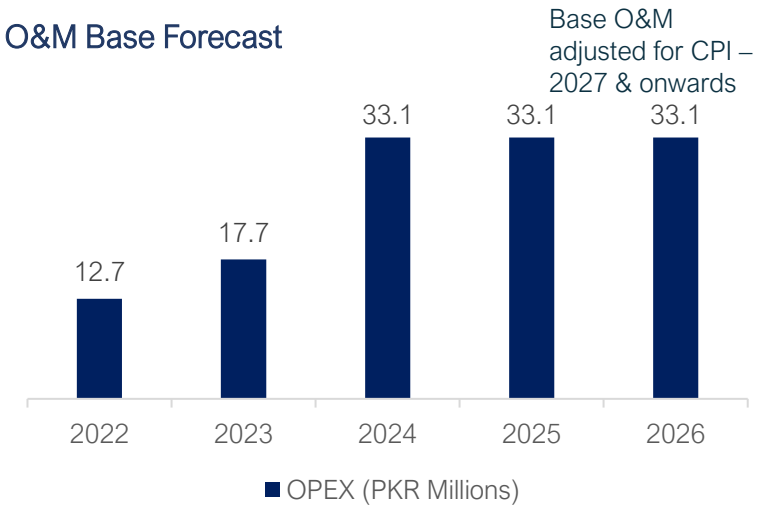
Immediate Action Required

Shishi: Based on available limited data, it seems that the tariff will decline if applied for true-up. Accordingly, no further action is recommended.

Energy Generation (GWh)



O&M Base Forecast



CAPEX

- Project Cost in PEDO's Books: – PKR 265 Million for construction of the HPP, as provided to Consultants
- Project Cost used by NEPRA for benchmark tariff determination: PKR 343 M, including IDC on assumed debt by NEPRA.

Base Funding Source

- ADP – PKR 265 Million

Project Status / Data Gaps

- The annual project cost incurrence details were not available with the relevant PEDO team, which poses an issue in proceeding with the true-up petition with NEPRA.
- The available project cost with PEDO is less than the NEPRA benchmark cost; accordingly, the analysis indicates that a true-up will result in a reduction of the tariff and is not recommended.

Major Risks and related Financial Model Assumptions:

- True-up adjustments have not been assumed in the Financial Model.

Jabori Hydropower Station

Project Background

The project is located on the Siran River, a left tributary of the Indus River. The weir site of the project is located approximately 1 km upstream of Jabori, near Village Sacha, while the powerhouse is situated near Granthali Village, about 3 km downstream of Jabori. Jabori HPP is connected through a 132 kV double-circuit transmission line, approximately 14.6 km in length, on Lynx conductor from Jabori Hydro Power Plant to the 132 kV Battal grid station.

Salient Features	
Capacity	10.2 MW
Design Discharge	8 m3/sec
Net Head	148m
Length of Power Tunnel	2,895m
Benchmark Energy	70.7 GWh
COD	FY 2025 (Q-3)

Project Status	
Interconnection Status	Operational
Tariff Status	Benchmark stage tariff awarded
PPA/EPA/PAC Status	Executed
Existing EPA allows exit for sale to industry.	

Tariff Status

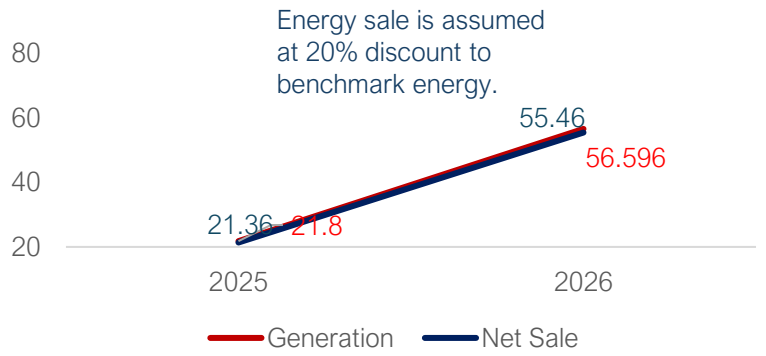
The levelized benchmark tariff of the Project under NEPRA is PKR 5.71/kWh (30-year debt).

Expected Indexed tariff is PKR 10.59/kWh, assumed FY 2026 (Q-4)

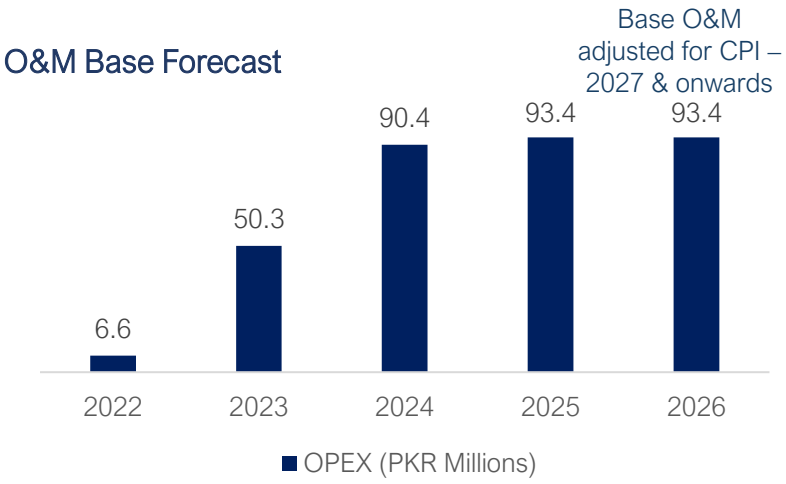
Immediate Action Required

Jabori: NEPRA to be approached for awarding true-up tariff and indexations from COD till date. Regular indexations to be applied going forward.

Energy Generation (GWh)



O&M Base Forecast



CAPEX

- Project cost expected to be capitalized in PEDO's Books: – **PKR 4.4 Billion** for construction of the HPP, as provided to Consultants. IDC is not expected to be capitalized in PEDO books.
- **Estimated Project Cost for NEPRA True-up: PKR 2.9 B, including IDC on assumed debt by NEPRA. The project cost was significantly reduced in benchmark tariff determination; further devaluation impact on delays might not be allowed to be passed through. Both factors affect the estimated true-up cost for Jabori.**

Base Funding Source

- ADP – PKR 438 Million and HDF- PKR 3.9 Billion. IDC is not capitalized in PEDO's Books; however, it is capitalized for tariff purposes.

Major Risks and Related Financial Model Assumptions:

- True-up adjustments have been assumed in the Financial Model.
- The impact of tariff indexations has been assumed from FY 2026 (Q4) onwards.
- It is estimated that PKR 413 M might be recovered due to the tariff differential between true-up and COD.

Koto Hydropower Project

Project Background

Identified by PEDO-GTZ in 1992, the project's feasibility was completed between 2008 and 2011, and it is located near Koto in Lower Dir, along the Panjkora River. The site is located 7 km from Timergara via N-45, with access from both riverbanks via the Timergara-Dir-Chitral and Munjai roads.

Salient Features	
Capacity	40.8 MW
Net Head	38.63 m
Design Discharge	126m3/sec
Length of Power Tunnel	1,883 m
Benchmark Energy	207.6 GWh
COD	FY 2025 (Q-4)

Project Status	
Interconnection Status	Not interconnected (transmission line complete)
Tariff Status	Benchmark stage tariff awarded
PPA/EPA/PAC Status	Draft under negotiation

Tariff Status

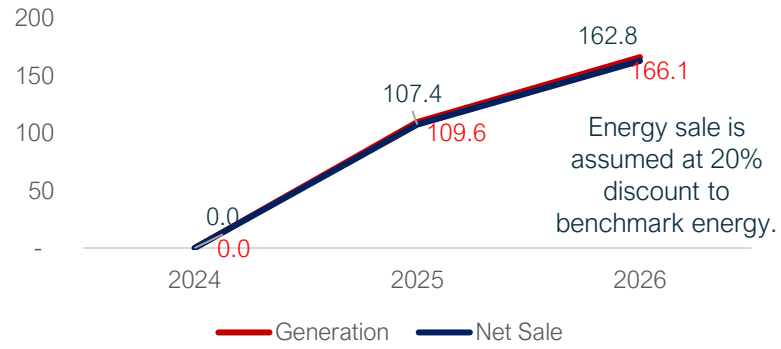
The levelized benchmark tariff of the Project under NEPRA is PKR 8.2481/kWh.

Expected Indexed tariff is PKR 16.67/kWh assumed in FY 2027 (Q-4)

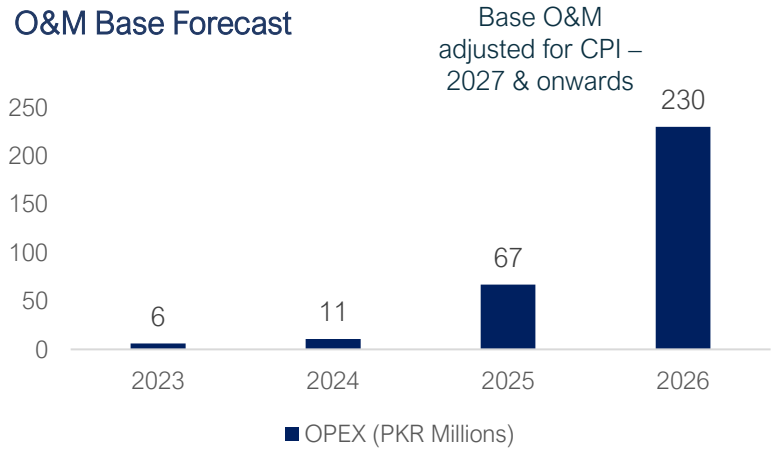
Immediate Action Required

Koto: EPA/PAC to be executed at the earliest.

Energy Generation (GWh)



O&M Base Forecast



Insurance cost of Rs 163 M/annum added in the related O&M Cost

CAPEX

- Base CAPEX: PKR 16.24 B, excluding impact of devaluation during projected period (PKR 278.4/US$ FY 2025 onwards), based on information provided to Consultants.
- Project cost expected to be capitalized in PEDO's Books: **PKR 16.5 Billion,** including impact of devaluation in future. IDC is not expected to be capitalized in PEDO's books.
- Estimated Project Cost for NEPRA True-up: PKR 16.2 B, including IDC on assumed debt by NEPRA.

Base Funding Source

- PEDO's Books ADP 10%, HDF 90%.
- NEPRA 20% Equity, 80% Debt.

Major Risks and related Financial Model Assumptions:

- True-up adjustments have been assumed in the Financial Model.
- Tariff Indexations impact has been assumed from FY 2027 (Q-4) and onwards.
- It is estimated PKR 3.7 B might be recovered (one-time on true-up) due to tariff differential between true-up date and COD.

Gorkin Matiltan Hydropower Project

Project Background

The Gorkin-Matiltan Hydropower Project (GMHPP) is a run-of-river project situated in Kalam, Tehsil Bahrain, District Swat. The Weir Site is located near Matiltan village, approximately 15 km from Kalam. The Powerhouse is situated near Gorkin village on the right bank of the Ushu River, about 8 km from Kalam. The project will be interconnected with Matiltan Grid to be constructed. This will be further connected to Madyan Grid through a 40 km transmission line (LOT-I). The Lot-I transmission line is under construction.

Salient Features	
Capacity	84 MW
Design Discharge	42 Cumecs
Net Head	238 m
Headrace Tunnel	6.67 Km
Benchmark Energy	346.8 GWh
COD	2026 (Q-4)
Project Status	
Interconnection Status	Plan agreed (under construction)
Tariff Status	Benchmark stage tariff awarded
PPA/EPA/PAC Status	draft submitted

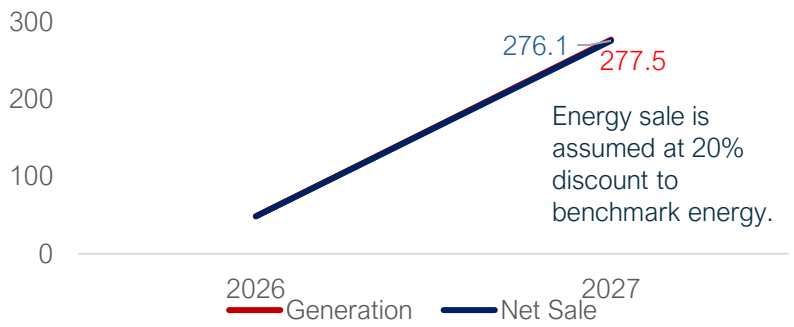
Tariff Status

The levelized benchmark tariff of the Project under NEPRA is PKR 6.265/kWh (step-down tariff). The expected indexed tariff is PKR 19.61/kWh, assumed for FY 2027 (Q-4), based

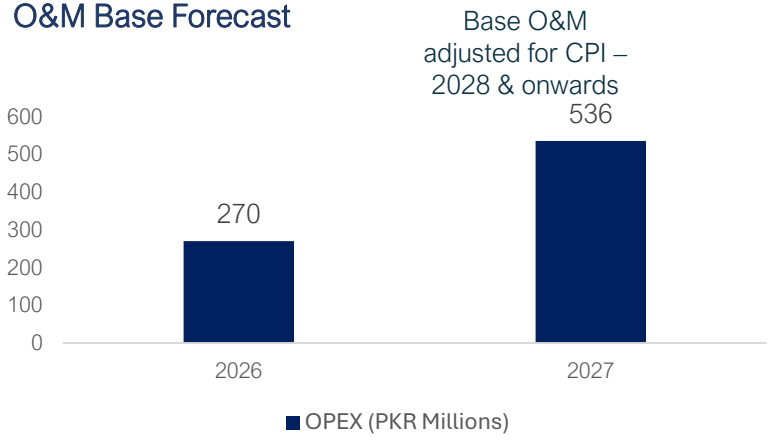
Immediate Action Required

Matiltan: EPA/PAC to be executed at the earliest. Existing step-down tariff structure will not allow exit from EPA for entering in bilateral sale arrangements for which tariff modification is required.

Energy Generation (GWh)



O&M Base Forecast



Insurance cost of Rs 266 M/annum added in the related O&M Cost

CAPEX

- Base CAPEX: PKR 32.3 billion, excluding the impact of devaluation during the projected period (PKR 278.4/US$ FY 2025 onwards), based on information provided to the Consultants.
- Project cost expected to be capitalized in PEDO's Books: **PKR 32.53 Billion,** including impact of devaluation in future. IDC is not expected to be capitalized in PEDO's books.
- Estimated Project Cost for NEPRA True-up: PKR 28.7 B, including IDC on assumed debt by NEPRA.

Base Funding Source

- PEDO Books ADP 20%, HDF 80%.
- NEPRA 20% Equity, 80% Debt.

Major Risks and related Financial Model Assumptions:

- **It is assumed that tariff modifications will be undertaken to exit the EPA, which will reduce the baseline indexed tariff. Expected modified true-up indexed tariff for FY 2027 (Q-4) is Rs 17.91/kWh with 30-year debt assumption**. Said modification/true-up adjustments have been assumed in the Financial Model from FY 2027 (Q-4) and onwards.
- It is estimated that PKR 3.8 billion might be recovered (one-time on true-up) due to the tariff differential between the true-up date and COD.

Lawi Hydropower Project

Project Background

The Lawi Hydropower Project is a run-of-river scheme on the Shishi River in Drosh Tehsil, Chitral, identified by WAPDA, with a feasibility study completed in 2007-08. The powerhouse is in Basnak village, 4 km from Drosh Town, while the weir is in Lao Nisar Village, 18 km upstream. The project is planned to be interconnected through a new 1.5 km line with a 132 KV transmission line from GolenGol HPP, under a loop-in loop-out arrangement.

Salient Features	
Capacity	69 MW
Design Discharge	20 m3/s
Net Head	398.5 m
Tunnel Length	12.1 km
Benchmark Energy	311.3 Gwh
COD	2026 (Q-2)

Project Status	
Interconnection Status	Plan agreed (under construction)
Tariff Status	Benchmark stage tariff awarded
PPA/EPA/PAC Status	Work not started

Tariff Status

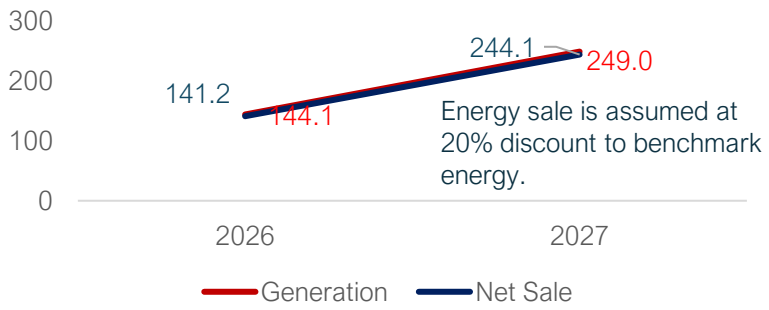
The levelized benchmark tariff of the Project, as determined by NEPRA, is PKR 4.9681/kWh.

Expected Indexed tariff is PKR 13.44/kWh, assumed in FY 2028 (Q-1)

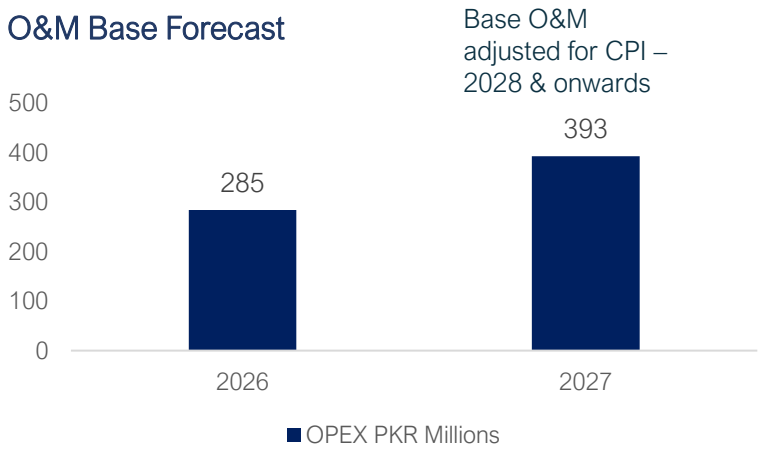
Immediate Action Required

Lawi: Drafting of EPA/PAC to be initiated for execution. It is proposed that the EPA include an "Exit Clause" to allow bilateral sale arrangements subsequently.

Energy Generation (GWh)



O&M Base Forecast



Insurance cost of Rs 217.3 M/annum added in related O&M Cost

CAPEX

- Base CAPEX: PKR 26.1 Billion, excluding impact of devaluation during projected period (PKR 278.4/US$ FY 2025 onwards), based on information provided to Consultants.
- Project cost expected to be capitalized in PEDO's Books: **PKR 26.9 Billion,** including impact of devaluation in future. IDC is not expected to be capitalized in PEDO's books.
- Estimated Project Cost for NEPRA True-up: PKR 19.4 B, including IDC on assumed debt by NEPRA.

Base Funding Source

- PEDO Books ADP 10%, HDF 90%.
- NEPRA 20% Equity, 80% Debt.

Major Risks and related Financial Model Assumptions:

- **It is assumed that EPA/PAC will be executed with exit clauses.**
- Tariff true-up adjustments has been assumed in Financial Model from FY 2028 (Q-1) and onwards.
- It is estimated PKR 2.8 Billion might be recovered (one-time on true-up) due to tariff differential between true-up date and COD.

Karora Hydropower Project

Project Background

The Karora Hydropower Project is a run-of-river scheme located in Shangla District, 15 km from Besham. The weir is on Khan Khwar near Kuzkana Village, and the powerhouse is in Marine Village, 5.2 km downstream. The power generation from the Project will be transmitted via a 132 kV double circuit line and interconnected with the existing NTDC's Khan Khwar/Dubair Khwae transmission line at Besham Qila.

Salient Features	
Capacity	11.8 MW
Net Head	142 m
Design Discharge	9.75 m3/s
Length of Power Tunnel	2.954 km
Benchmark Energy	71.029 GWh
COD	FY 2026 (Q-1)

Project Status	
Interconnection Status	Plan agreed
Tariff Status	Benchmark stage tariff awarded
PPA/EPA/PAC Status	draft under negotiation

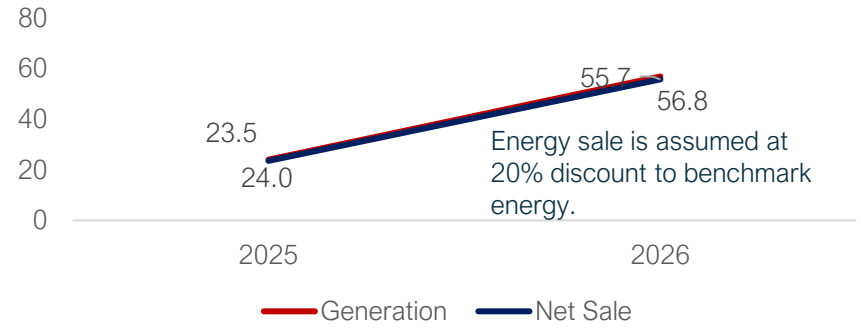
Tariff Status

The levelized benchmark tariff of the Project, as determined by NEPRA, is PKR 7.781/kWh, with a 30-year debt repayment period. Expected Indexed tariff is PKR 11.01/kWh, assumed in FY

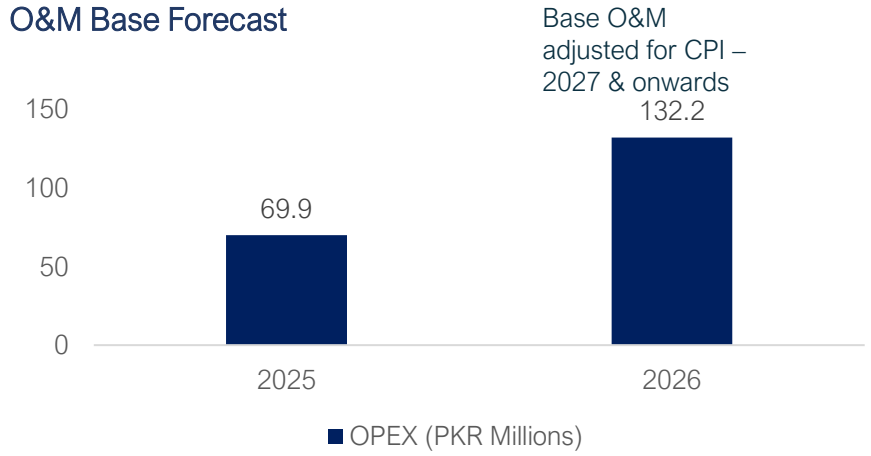
Immediate Action Required

Karora: EPA/PAC to be executed at the earliest, and work on the true-up petition is to be started at the earliest.

Energy Generation (GWh)



O&M Base Forecast



Insurance cost of Rs 62.23 M/annum added in related O&M Cost

CAPEX

- Base CAPEX: PKR 7.21Billion, excluding the impact of devaluation during the projected period (PKR 278.4/US$ FY 2025 onwards), based on information provided to the Consultants.
- Project cost expected to be capitalized in PEDO's Books: **PKR 7.23 billion, including the impact of devaluation in the** future. IDC is not expected to be capitalized in PEDO's books.
- Estimated Project Cost for NEPRA True-up: PKR 3.1 B, including IDC on assumed debt by NEPRA.

Base Funding Source

- PEDO Books ADP 10%, HDF 90%.
- NEPRA 20% Equity, 80% Debt.

Major Risks and related Financial Model Assumptions:

- **It is assumed that EPA/PAC will be executed with exit clauses.**
- Tariff true-up adjustments have been assumed in the Financial Model from FY 2028 (Q-1) and onwards.
- It is estimated that PKR 428 M might be recovered (one-time on true-up) due to the tariff differential between the true-up date and COD.

Ranolia Hydropower Complex

Project Background

The Ranolia Hydropower Project is a run-of-the-river type hydropower project with an installed capacity of 17 MW, located on Ranolia Khwar, a tributary of Dubair Khwar, in District Kohistan, Khyber Pakhtunkhwa Province. The project achieved COD on September 12, 2021; however, it was impacted by floods and is currently non-operational. Rehabilitation activities are presently in progress. The existing transmission line interconnecting the Project with Khan Khwar and Dubair Khwar substations was also damaged in the floods.

Salient Features	
Capacity	17 MW
Design Discharge	5.0 m3/s
Net Head	404 m
Benchmark Energy	99.5 GWh
Completion of Rehabilitation period	FY 2027(Q-2)

Project Status	
Interconnection Status	Already in place, under construction
Tariff Status	Benchmark stage tariff awarded
PPA/EPA/PAC Status	Executed with "Exit clause" Existing EPA allows exit for sale to industry.

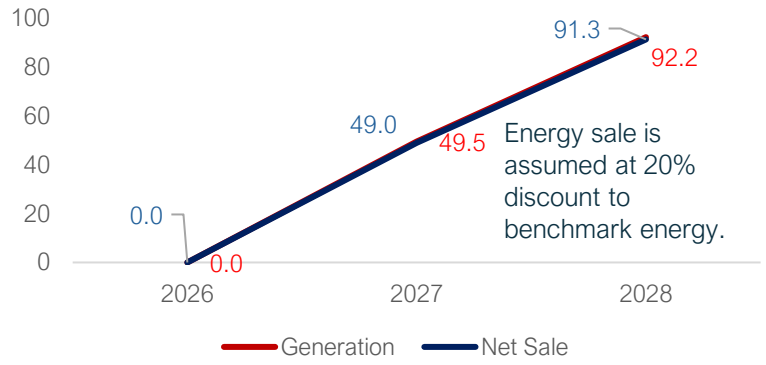
Tariff Status

The levelized benchmark tariff of the Project under NEPRA is PKR 4.1245/kWh (step-down tariff on a 'take or pay' basis), with an Effective levelized tariff of PKR 4.48/kWh. The expected effective indexed tariff is PKR 29.67/kWh for FY

Immediate Action Required

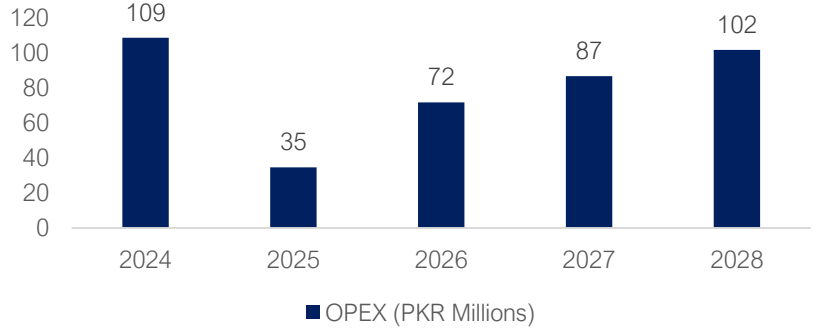
Ranolia: To realize payments under applicable EPA/PAC, revisions in tariff structure will be required, along with true-up.

Energy Generation (GWh)



O&M Base Forecast

Base O&M adjusted for CPI – 2029 & onwards



Historical data provided did not include insurance cost, accordingly an amount of PKR 30M/annum has been assumed from FY 2027

CAPEX

- Base CAPEX: PKR 12.219 billion, excluding the impact of devaluation during the projected period (PKR 278.4/US$ FY 2025 onwards), based on information provided to Consultants.
- Project cost expected to be capitalized in PEDO's Books: PKR 12.221 Billion, including the impact of devaluation in the future. IDC is not expected to be capitalized in PEDO's books, as ADB REDSIP is not recognized as a loan in PEDO's Books.
- Estimated Project Cost for NEPRA True-up: PKR 3.2 B, including IDC on assumed debt by NEPRA.

Base Funding Source

- GoKPK Books ADP 15%, HDF 30% and 50% from RED-SIP for construction. Separate ADB ACEIP loan US4 31.11 M for rehabilitation.
- PEDO Books: Foreign loans are not recognized as loans in PEDO and are recognized as HDF funding.
- NEPRA: 20% Equity, 80% Debt. The Debt allowed by NEPRA constitutes 100% of ADB RED-SIP, and same assumption has been used for true-up.

Major Risks and related Financial Model Assumptions:

- It is assumed that the tariff will be restructured on a & take-and-pay basis without a step-down structure, for implementing EPA.
- **Tariff true-up adjustments (after the above restructuring) have been assumed in the Financial Model from FY 2029 (Q-1) and onwards. Revised true-up tariff for 2029 is PKR 25.43/kWh.** It is estimated PKR 3.8 Billion might be recovered (one-time on true-up) due to tariff differential between true-up date and completion of rehabilitation (1.5 year).

Balakot Hydropower Project

Project Background

The 300 MW Balakot Hydropower Project is a run-of-river scheme on the Kunhar River. the Balakot HPP will be connected at two different voltage levels supplying power to NTDC at 500 KV as well as PESCO at 132 KV. The interconnection scheme would be 2 km 500 KV Double Circuit (DC) transmission line **by looping in-out Balakot HPP at 500/132 KV grid station at the 500 KV single circuit between Suki Kinari and Maira switch station.** The interconnection **at 132 KV level would be 10 km long for looping-out with 132 KV Balakot-Manshera-N circuit.**

Salient Features	
Capacity	300 MW
Design Discharge	154 m3/s
Design Net Head	217.6 m
Tunnel Length	9,137 m
Benchmark Energy	1,143 GWh
COD	FY 2029 (Q-3)

Project Status	
Interconnection Status	Under review by NTDC
Tariff Status	Generation license obtained, Petition drafted not submitted
PPA/EPA/PAC Status	Work not started

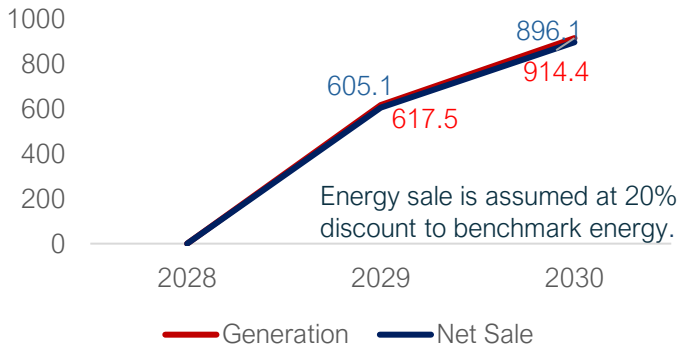
Expected Tariffs (PKR/kWh) & Structures		
Type	Take & Pay	Take or Pay
Reference Tariff (2029)	14.32/kWh	17.34/kWh
Trued-up Indexed (2031)	38.68/kWh	51.87/kWh

For "Take & Pay", debt repayment is assumed to be 30 Years, and PEDO assumes hydrological risk. The actual debt repayment period is 20 years. For Take or Pay, actual debt terms are taken into consideration.

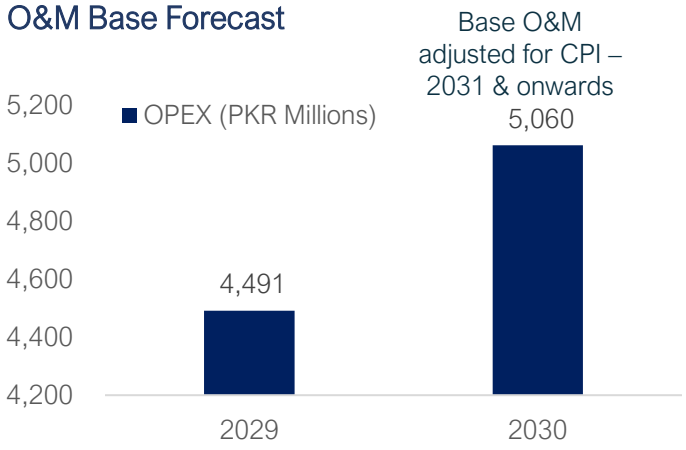
Immediate Action Required

Balakot: Assessment of demand for sale under bilateral arrangement is required and if Project is to be "exited" for bilateral sale, the tariff is to structured accordingly otherwise it can be on "Take or Pay" basis.

Energy Generation (GWh)



O&M Base Forecast



Insurance cost of Rs 1.1 B/annum added in related O&M Cost

CAPEX

- Base CAPEX: PKR 135.9 Billion, excluding impact of devaluation during projected period. (PKR 278.4/US$ FY 2025 onwards), based on information provided to Consultants.
- Project cost expected to be capitalized in PEDO Books: PKR 140 Billion including impact of devaluation in future. IDC is not expected to be capitalized in PEDO books.
- Estimated Project Cost for NEPRA True-up: PKR 174.8 B, including IDC on assumed debt by NEPRA (assuming timely completes at targeted COD).

Base Funding Source

- GoKPK Books ADP 8.3%, HDF 11.3% and 80.5% from foreign loans from ADB and AIIB.
- PEDO Book: ADP 8.3%, remaining from HDF.
- NEPRA 20% Equity, 80% Debt (100% foreign debt).

Major Risks and related Financial Model Assumptions:

- **Financial Model assumes (a mid way) sale undertake or Pay Structure while debt repayment assumption is 30 years. This will allow 'exit' of the project, say after 10 years (from now) and till that time hydrological risk remains parked with National Grid.**
- **Tariff true-up adjustments has been assumed in Financial Model on above basis. Accordingly, in FY 2031 indexed true-up tariff will be PKR 48.25/kWh (lower from PKR 51.87/kWh).**
- **It is estimated PKR 46.6 Billion might be recovered (one-time on true-up) due to tariff differential between true-up date and COD.**
- **The debt repayments of ADB and AAIB loans are starting before COD of Balakot project. For FM assumptions, it is assumed that these repayments will be made after COD, however it is proposed that repayment terms are renegotiated to start post COD of said project.**

Gabral-Kalam HPP

Project Background

The GoKPK is implementing the Gabral Kalam Hydropower Project through PEDO with financial assistance from the World Bank under the KHRE Program. The project is located in District Swat, KPK. A 3- to 4-km transmission line will be constructed to connect the Project with the upcoming 40 km transmission line (LOT-I) between Matiltan and Madyan. The Lot-I transmission line is under construction.

Salient Features	
Capacity	95 MW
Net Head	153 m
Design Discharge	65 m3/s
Length of Power Tunnel	4.7 Km
Benchmark Energy	366 GWh
COD (with delay of 2 years)	FY 2030 (Q-2)

Project Status	
Interconnection Status	Plan is under discussion with NTDC
Tariff Status	Generation License and tariff to be obtained
PPA/EPA/PAC Status	work not started

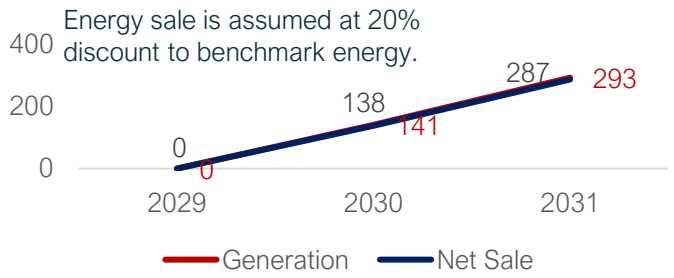
Expected Tariffs (PKR/kWh) & Structures		
Type	Take & Pay	Take or Pay
Reference Tariff (2030)	16.40/kWh	23.66/kWh
Trued-up Indexed (2032)	27.52/kWh	39.07/kWh

For "Take & Pay", debt repayment is assumed to be 30 Years while actual debt repayment period is 10-25 years, and PEDO assumes hydrological risk. For Take or Pay, actual debt terms are assumed.

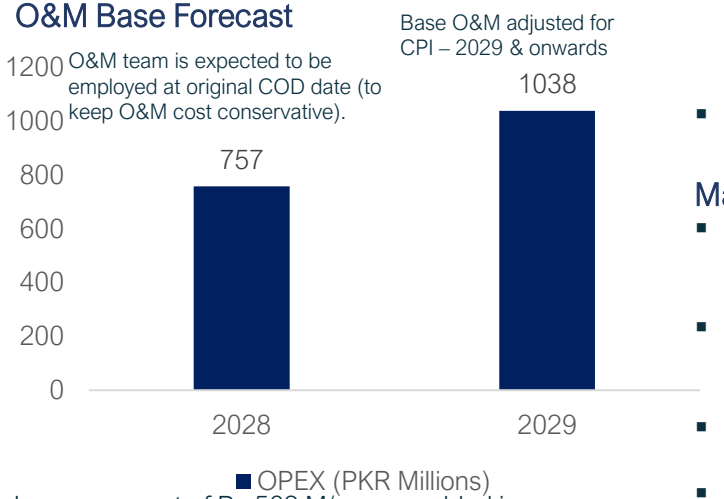
Immediate Action Required

Gabral Kalam: Assessment of demand for sale under bilateral arrangement is required, and if the Project is to be "exited" for bilateral sale, the tariff is to be structured accordingly; otherwise, it can be on a "Take or Pay" basis.

Energy Generation (GWh)



O&M Base Forecast



Insurance cost of Rs 562 M/annum added in related O&M Cost

CAPEX

- Base CAPEX: PKR 59.4 billion, excluding the impact of delays and devaluation during the projected period (PKR 278.4/US$ FY 2025 onwards), based on information provided to Consultants.
- Project cost expected to be capitalized in PEDO's Books: PKR 76.7 Billion, including the impact of IDC, delays, and devaluation in the future. IDC is expected to be capitalized in PEDO's books, as underlying loan agreements are transferred to PEDO.
- Estimated Project Cost for NEPRA True-up: PKR 64.2 B, including IDC on assumed debt by NEPRA.

Base Funding Source

- GoKPK & PEDO Book: HDF 20% and debt 80%. Sources of loan are (a) 67.8% of the total project cost is KHRE loan from IDA & IBRD, (b) 6.1% of the total project cost as new foreign commercial debt to be raised, and (c) 6.1% of the **total project cost as new local commercial debt to be raised.**
- NEPRA funding has been assumed on same basis, wherein HDF has been assumed as equity.

Major Risks and related Financial Model Assumptions:

- **Financial Model assumes (a midway) sale under the Take or Pay Structure, while the debt repayment assumption is 30 years. This will allow 'exit' of the project, till 'exit' the hydrological risk remains parked with National Grid.**
- **Tariff true-up adjustments have been assumed in the Financial Model on the above basis. Accordingly, in FY 2032 indexed true-up tariff will be PKR 34.36/kWh** (lower from PKR 39.07/kWh).
- **It is estimated that PKR 8 billion might be recovered (one-time on true-up) due to the tariff differential between the true-up date and COD.**
- **The debt repayments of KHRE's foreign loans (IDA & AIIB) are scheduled to start in FY 2025-2028. For FM assumptions, it is assumed that these repayments will be renegotiated and will start post-COD of said project.**

Madyan Hydropower Project

Project Background

The Madyan Hydropower Project is a run-of-river scheme proposed on the upper stretch of the Swat River is being implemented by the GoKPK through PEDO with financial assistance from the World Bank under the KHRE Program. The power generated will be evacuated through a 220 kV double-circuit transmission line of 2-3 km, which will be connected with a new 220 kV transmission line that will connect Chakdara with the Madyan grid stations (Lot-2). The Lot-2 transmission line is in the development phase with KPT&GSC.

Salient Features	
Capacity	215 MW
Gross Head	154m
Design Discharge	129 m3/s
Length of TL	2-3 km
Benchmark Energy	838.7 GWh
COD (with delay of 2 years)	FY 2030 (Q-2)

Project Status	
Interconnection Status	Plan to be agreed with NTDC
Tariff Status	Generation License and tariff to be obtained
PPA/EPA/PAC Status	work not started

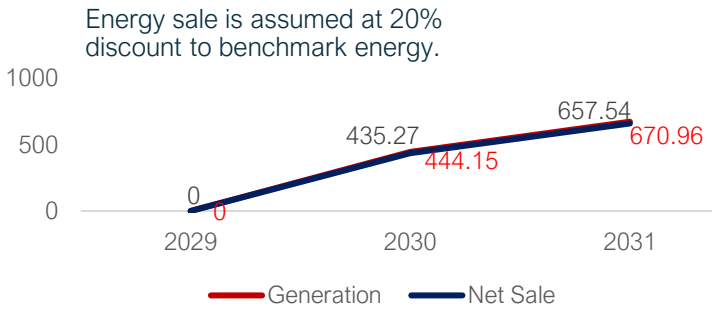
Expected Tariffs (PKR/kWh) & Structures		
Type	Take & Pay	Take or Pay
Reference Tariff (2030)	17.15/kWh	24.55/kWh
Trued-up Indexed (2032)	30.61/kWh	45.1/kWh

For "Take & Pay", debt repayment is assumed to be 30 Years and hydrological risk is assumed by PEDO. Actual debt repayment period is 10-25 years,. For Take or Pay, actual debt terms are assumed.

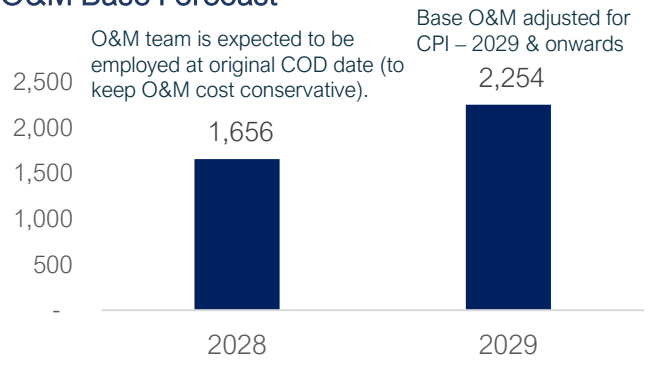
Immediate Action Required

Madyan: Assessment of demand for sale under bilateral arrangement is required and if Project is to be "exited" for bilateral sale, the tariff is to structured accordingly otherwise it can be on "Take or Pay" basis.

Energy Generation (GWh)



O&M Base Forecast



Insurance cost of Rs 1.2 B/annum added in related O&M Cost

CAPEX

- Base CAPEX: 124.1 Billion, excluding impact of delays and devaluation during projected period (PKR 278.4/US$ FY 2025 onwards), based on information provided to Consultants.
- Project cost expected to be capitalized in PEDO's Books: **PKR 154.9 Billion** including impact of IDC, delays and devaluation in future. IDC is expected to be capitalized in PEDO's books, as per underlying loan agreements.
- Estimated Project Cost for NEPRA True-up: PKR 146.4 B, including IDC on assumed debt by NEPRA.

Base Funding Source

- GoKPK & PEDO Book: HDF 20% and debt 80%. Sources of loan are (a) 55.4% of the total project cost is KHRE loan from IDA & IBRD, (b) 12.28% of the total project cost as new foreign commercial debt to be raised, and (c) 12.28% of the **total project cost as new local commercial debt to be raised.**
- NEPRA funding has been assumed on same basis, wherein HDF has been assumed as equity.

Major Risks and related Financial Model Assumptions:

- **Financial Model assumes (a midway) sale undertaking or Pay Structure, while the debt repayment assumption is 30 years. This will allow 'exit' of the project, till 'exit' the hydrological risk remains parked with National Grid.**
- **Tariff true-up adjustments have been assumed in the Financial Model on the above basis. Accordingly, in FY 2032 indexed true-up tariff will be PKR 38.22/kWh** (lower from PKR 45.1/kWh).
- **It is estimated PKR 22.3 Billion might be recovered (one-time on true-up) due to tariff differential between true-up date and COD.**
- **The debt repayments of KHRE's foreign loans (IDA & AIIB) are scheduled to start in FY 2025-2028. For FM assumptions, it is assumed that these repayments will be renegotiated and will start post COD of said project.**

Chapari Charkhel Hydropower Project

Project Background

The project feasibility study was conducted by the FATA Development Authority in 2015 and was later handed over to the Government of Khyber Pakhtunkhwa through PEDO in 2020. The Project is located about 16 km from Thal on the main Thal-Parachinar Road. According to the existing interconnection scheme, the Project will be connected through a 4 km long transmission line to the 132 kV Thal-Alazai Transmission Grid Station.

Salient Features	
Capacity	13.5 MW
Benchmark Energy	81.6 GWh
COD with delay	2030 (Q-2)

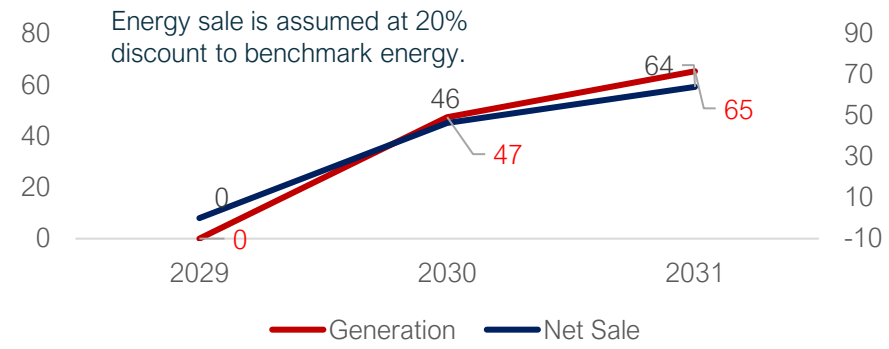
Project Status	
Interconnection Status	Plan agreed
Tariff Status	Generation License and tariff to be obtained
PPA/EPA/PAC Status	work not started
The Project was not in last approved iteration of IGCEP.	

Expected Tariffs (PKR/kWh) & Structures	
Type	Take & Pay
Reference Tariff (2030)	6.267/kWh
Trued-up Indexed (2032)	28.20/kWh
In line with tariff structure of existing small hydro power projects, it is assumed that tariff will be on "Take & Pay" with debt repayment to be on 30 Years for NEPRA tariff.	

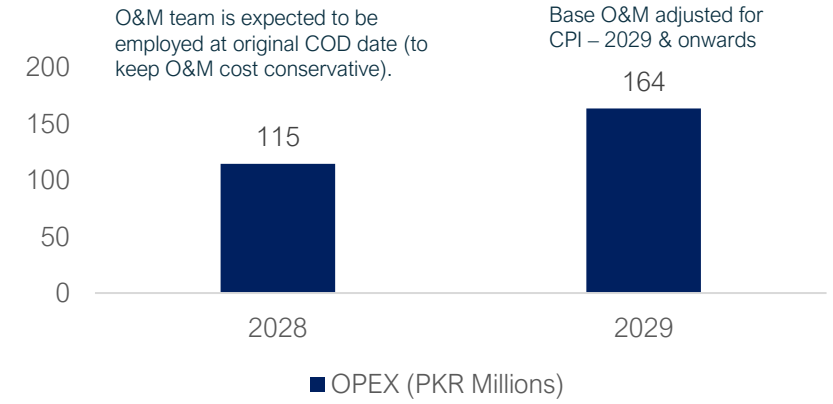
Immediate Action Required

Chapri Charkhel: Since the project was not in IGCEP, it is proposed that negotiations with NTDC team may be started. It is important to highlight expected tariff assumptions of the project, as on current assumptions, it becomes very competitive for inclusion in IGCEP.

Energy Generation (GWh)



O&M Base Forecast



Insurance cost of Rs 97.95 M/annum added in related O&M Cost

CAPEX

- Base CAPEX: PKR 10 Billion, excluding impact of devaluation during projected period (PKR 278.4/US$ FY 2025 onwards), based on information provided to Consultants.
- Project cost expected to be capitalized in PEDO's Books: **PKR 10.6 Billion** including impact of delays and devaluation in future. IDC is not expected to be capitalized in PEDO's books.
- Estimated Project Cost for NEPRA True-up: PKR 11.4 B, including IDC on assumed debt by NEPRA.

Base Funding Source

- PEDO Books: The project planned to be (100%) funded under Accelerated Implementation Program
- NEPRA: 20% Equity, 80% Debt.

Major Risks and related Financial Model Assumptions:

- **It is assumed that EPA/PAC will be executed with exit clauses.**
- Tariff true-up adjustments has been assumed in Financial Model from FY 2032 (Q-2) and onwards.
- It is estimated PKR 2.8 Billion might be recovered (one-time on true-up) due to tariff differential between true-up date and COD.

Mujahidin Hydropower Project

Project Background

The proposed Project is located on the Barandoo River, a right tributary of the Indus River, between the Mujahidin and Dadam villages of District Torghar. The Project area is located in the District of Torghar. The transmission line survey is in progress and there is no clarity with regard to the evacuation and interconnection plan of the project as of the date of development of this report.

Salient Features	
Capacity	7 MW
Annual Energy	41 GWh
Net Head	49.15 M
Design Discharge	16.38 Cumec
Length of Power Tunnel	900 m
COD with Delay	2030 (Q-2)

Project Status	
Interconnection Status	Survey in progress
Tariff Status	It will be a social uplift project
PPA/EPA/PAC Status	work not started

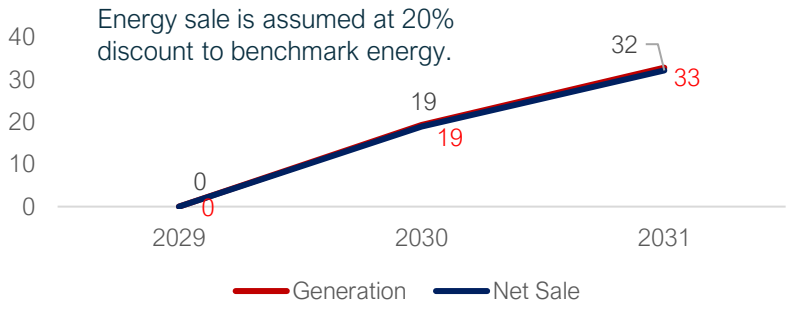
Expected Tariffs (PKR/kWh) & Structures	
Type	Take & Pay
Reference Tariff (2030)	6.036/kWh
Trued-up Indexed (2032)	24.72/kWh

In line with the tariff structure of existing small hydro power projects, it is assumed that the tariff will be on "Take & Pay" with debt repayment to be on 30 Years for the NEPRA tariff.

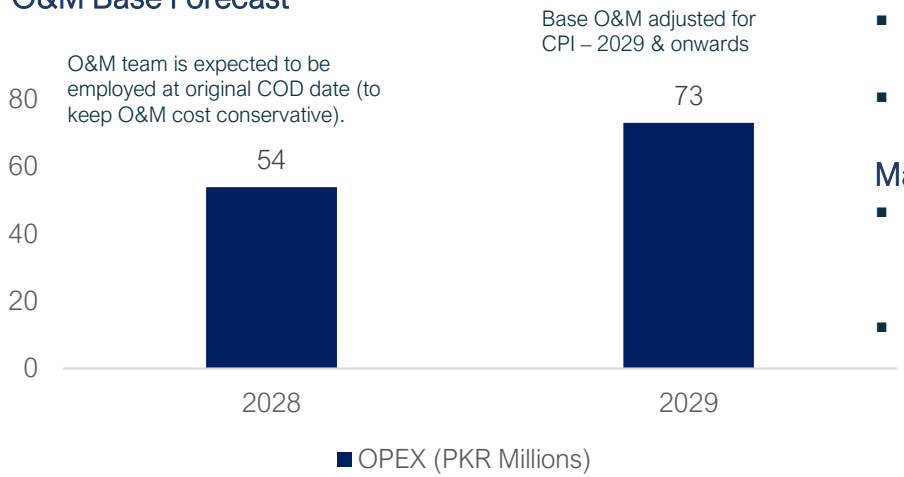
Immediate Action Required

Mujahadin: At the time of development of the business plan, the firm's EPC prices were not available; accordingly, the project cost needs to be updated and analyzed.

Energy Generation (GWh)



O&M Base Forecast



CAPEX

- Base CAPEX: PKR 4.8 Billion, excluding impact of devaluation during projected period (PKR 278.4/US$ FY 2025 onwards), based on information provided to Consultants.
- Project cost expected to be capitalized in PEDO's Books: **PKR 5.0 Billion,** including the impact of delays and devaluation in the future. IDC is not expected to be capitalized in PEDO's books.
- Estimated Project Cost for NEPRA True-up: PKR 5.0 B, including IDC on assumed debt by NEPRA.

Base Funding Source

- PEDO Books: The project is planned to be (100%) funded under Hydel Development Fund
- NEPRA: 20% Equity, 80% Debt.

Major Risks and related Financial Model Assumptions:

- Tariff true-up adjustments have been assumed in the Financial Model from FY 2032 (Q-2) and onwards, under the KPEPRA regime.
- It is estimated that PKR 1.2 billion might be recovered (one-time on true-up) due to the tariff differential between the true-up date and COD.

Summary of Recommendations

Common Concerns and Observations on NEPRA related Regulatory Aspects

Concern	Description
Areas to be strengthened at PEDO Level.	**Issues** • The financial control and reporting at project level is weak, resultantly provision of data for this business plan was slow and there were understanding issues with regard to foreign payments vs local payment requirements. • It seems commercial teams (with understanding of regulatory/tariff matters) are not involved in EPC and contracting of projects, which negatively impacts tariff achieved from regulator. Similarly, generation license, true-ups and tariff Indexations are given secondary importance, resultantly development of project without said items negatively impact the project in subsequent year.. • Most of the projects are underinsured as they are not claiming or unable to claim insurance amount under respective tariffs. **Recommendations:** These areas need to be strengthened at PEDO level.
EPC Price Adjustment Mechanism	**Issue:** NEPRA allows specific mechanism for EPC Price Adjustment, however in PEDO's EPC agreements allowed mechanism is not followed which results in either (a) PEDO's EPC price adjustment mechanism is different from NEPRA mechanism resultingly in limited adjustment cost get passed through during true-up process (b) in certain cases NEPRA did not allow any mechanism. **Recommendations:** • During tariff true-ups actual adjustment need to be defended properly for achieving better electricity prices. • For future, it is recommended that EPC agreements are structured in line allowed adjustment mechanisms. • Best practice is to first obtain benchmark tariff and structure EPC in line with determination. This will reduce risk of negative cost overruns.
Construction Period	**Issue:** Usually, CPPA agrees a Scheduled COD (SCOD) and NEPRA allows construction period, for relevant price adjustment up to SCOD under PPA/CPPA. Since (a) PEDO enters in PPA/EPA closer to COD, (b) EPA structure (followed by PEDO) is a very simplified version, which does not indicate construction period and/ or SCOD and procedures for delays and cure, (c) Construction period during true-up will be established by NEPRA based on respective determinations and construction delays might not be admitted/allowed. These issues are expected to limit price adjustments in foreign exchange component and changes in relevant indexes and resultantly allowed price of electricity to PEDO will reduce. **Recommendations:** PEDO should develop case with regard to reasons for COD delay (as part of true-up petitions) and establish revised COD to justify delays. In this regard suo-moto proceedings of NEPRA on Daral Khwar, sets a precedent. This will increase allowed adjustment cost limit and improve electricity price that can achieved for true-up
Financing	**Issue:** NEPRA allows actual Interest During Construction Period, at the time of tariff true-up. As per existing tariff determinations majority of debt funding is from HDF or from ADB REDSIP Facility. There in no interest cost of these loans been booked in PEDO financial statements. Resultantly getting this interest cost approved might become challenging. **Recommendations:** It is recommended that respective loan drawdowns along with interest cost is booked in financial statements of PEDO, and letters / confirmations from HDF and GoKPK on related interest cost been taken for proceeding for true-up of the projects. A summary of loans acknowledged in respective determinations is provided in the financial model.

Summary of Recommendations

Project-wise Risks and Steps to be taken with NEPRA and other Stakeholders

Project Name	Issues/ Risks	Recommendations
Operational HPPs		
Malakand-III HPP	• Project has not been allowed insurance cost recovery under the respective tariff, that is impacting its return. • There are on-going discussions with "Task Force on power sector", under which it is envisaged that (a) rate of return is reduced to 13% (b) Delinking of US$ indexation for ROE (c) project is converted to Take and Pay Basis. As there is no visibility on these discussions, they have not been incorporated in the Financial Model. • Under existing Power Purchase Agreement (PPA), project can not be exited for supply to industry. The PPA term ends in 2034.	• NEPRA to be approached for **recovering the past insurance cost** and to include insurance in the tariff, in future. However, the financial model does not account for the one-time impact of potential insurance cost recovery. • **Insurance to be taken up to the allowed limit** by NEPRA and respective cost to be recovered under tariff. • Financial Model assumes a **rehabilitation program of Rs 2.5 Billion;** To be completed by FY 2027, this will allow achievement of 80% of benchmark energy (for net sales) from existing 44.3% of benchmark energy. This is expected to reduce the resultant impact of Task Force recommendations and **enhance available units for sale** if project sells electricity under bilateral arrangements. • Engage with adjacent industrial zones for supply of electricity from Malakand-III in 2034.
Pehur HPP	• The project is supplying electricity under wheeling regulations, that will stand repealed once CTBCM regime becomes effective. The project will be treated under CTBCM arrangement once applicable, under existing agreements with industry. This switch over of regime will impact consumers' net price of electricity. Existing wheeling agreements with industry started in June 2020 and will end in June 2030. NEPRA tariff control period will end in 2035. • Under existing wheeling arrangements, the electricity not sold to consumers stands sold to PESCO. As of date, the applicable NEPRA tariff for electricity sold to PESCO, is not indexed.	• Clarifications to be taken from NEPRA/CPPA/market operator with regard to **treatment of Pehur under upcoming CTBCM auction.** • Pehur's **industrial consumers to be approached** to explain the implications of CTBCM. There are two **possible options for revising the agreements with industrial consumers** (a) consumers bear impact of energy and capacity balancing and existing sale price formula is continued (b) energy and capacity balancing requirements are taken over by PEDO, in which case consumers have to (i) abide by consumption levels agreed with PEDO (ii) price formula for 100% electricity consumed has to be reset/revised with PEDO. Under this Business Plan, option 'b' is adopted and related prices are discussed in coming section related to CTBCM. • **Indexation petition/application to be submitted** to NEPRA for price adjustments/increase from COD till date with regard to electricity sold to CPPA/PESCO. • Consider **construction of escape channel** to enhance generation capability.
Daral Khwar, Machai, and Jabori HPPs	• All of these projects have achieved COD; however, their true-up petitions have not been finalized and submitted to NEPRA. This is resulting in cash inflow delays and financial losses to PEDO . • The annual project cost incurrence details for Machai were not available with the relevant PEDO team; this may pose an issue in proceeding with the true-up petition with NEPRA.	• NEPRA to be approached for awarding **true-up tariff and indexations from COD** till date. **Regular indexations are** to be applied going forward. • Machai data to be made available to respective departments, for compilation of true-up petition.

Summary of Recommendations

Project-wise Risks and Steps to be taken with NEPRA and other Stakeholders

Project Name	Issues/ Risks	Recommendations
Reshun and Shishi HPPs	▪ The annual project cost incurrence details were not available with the relevant PEDO team; this poses a limitation in understanding the possible true-up impact on the existing tariff.	• Based on analysis of limited project cost data available, **true-up of these projects might reduce existing reference tariff**.
Under Construction & Rehabilitation HPPs		
Lawi, Koto and Karora HPPs	• These projects are under construction without relevant agreements (PPA/EPA/PAC) with national grid. It is important to highlight that the projects already approved under IGCEP need to have respective agreements in place for supply to national grid. These agreements can be executed with "exit" clauses (similar to Pehur, Daral Khawar and Jabori) to subsequently suspend the same and enter in bilateral arrangements with industry and avoid unnecessary risk on underlying PEDO's investment, as possibility of sale to industry is subject to various risks that might not be in control of PEDO.	• **Drafting of EPA/PAC to be initiated** for execution. It is proposed that respective PPAs/EPAs include **"Exit Clause"** to allow bilateral sale arrangements with 2nd tier buyers subsequently. In earlier agreements (Pehur, Daral Khawar and Jabori) , two major commercial changes (compared to Malakand-III) were made (i) debt repayment periods were extended to the tariff control period to avoid any loss to national grid consumers in case of 'exit' of the project, (ii) PEDO absorbed hydrological risks. It is recommended that in execution of these PPAs/EPAs, hydrological risk may be passed to national grid while debt period is kept in line with tariff control period. If CPPA/PESCO agrees, it will avoid resource risk at PEDO while retaining "exit clauses." The business plan assumes the federal government might not agree to take resource risk for small-scale projects while allowing "exit" from the project. • Post COD of these projects, need to be **taken for true-up, followed by regular indexations.**
Ranolia HPP	▪ The project (like other PEDO Projects) was 'under-insured' because of which, post flood damage in 2022, full insurance claims could not be realized. The rehabilitation cost of the Project is PKR 7.6 billion that is funded through ADB loan (ACEIP), while said loan is not parked at PEDO balance sheet. ▪ Rehabilitation costs are in addition to the PKR 4.6 billion construction CAPEX, mostly (50%) funded through ADB REDSIP (not recognized in PEDO books). NEPRA is expected to acknowledge construction/EPC costs, and rehabilitation costs may not be allowed. ▪ The EPA of the Project has already been executed with an "exit clause", while the project tariff is on a step-down basis (lower tariff after the debt period of the Project). This restricts the project's capability to raise invoices for the electricity sale to the national grid. Tariff True-up petition has not been submitted.	• Petition for **revision in the Tariff structure and true-up needs to be submitted**. The rehabilitation cost claim needs to be included in the true-up petition; however, it is expected that NEPRA may limit the inclusion of the rehabilitation claim in the true-up process. • NEPRA would require details of the actual interest paid during the construction period, for which evidence must be provided. The two debts for the projects may be reflected in the PEDO balance Sheet (although this transfer has not been assumed in the financial model projections). • **Insurance to be taken up to the allowed limit by NEPRA and respective cost to be recovered under the** tariff.

Summary of Recommendations

Project-wise Risks and Steps to be taken with NEPRA and other Stakeholders

Project Name	Issues/ Risks	Recommendations
Gorkin-Matiltan HPP	• The COD and Interconnection of this Project are dependent upon the construction of the Lot-I transmission line from Matiltan to Madyan. The construction of said transmission line is in progress with completion targeted at the end of 2026. The 'right of way' issues in transmission line projects are cumbersome and usually delay the transmission line project. • The project is under construction without relevant agreements (PPA/EPA/PAC) with the national grid, there is an expectation that with KPEPRA and other initiatives, Matiltan HPP will be selling electricity under a new provincial regime, and dependence upon the national grid is ending. In this regard, it is important to highlight that Matiltan is a relatively large-scale project (84 MW) compared to PEDO's existing operational portfolio with a benchmark electricity sale target of 346.8 GWh. For entering into any bilateral sale arrangement, the possible customer is expected to be an industrial cluster with requisite approvals for distribution and ready to consume electricity by COD of the said project. There is a low probability of matching the timing of plant availability and consumer readiness within 1.5 years. • The NEPRA tariff of the project is not on a straight-line basis but is on a step-down basis (which restricts the implementation of the exit clause); accordingly, to exercise the exit clause, the tariff structure is to be modified.	• Efforts to be made to **fast-track "ROW – right of way" for Lot-I transmission line to avoid possible penalties under the EPC agreements of both the Lot-I agreement and the** Matiltan EPC agreement. • An **EPA with "Exit Clauses" to be executed** with the national grid stakeholders to resolve the timing mismatch issue at the time of bilateral agreements. • It is recommended that in the execution of these PPAs/EPAs, hydrological risk is passed to the national grid. If CPPA/PESCO agrees, it will avoid resource risk at PEDO; however, the business plan assumes the federal government might not agree. During EPA negotiations and tariff modification and true-up, efforts should be made to shift hydrological risk to the national grid while retaining the project's exit clause. • Existing tariff structure of Project needs to be modified to make it capable of exercising the 'exit clause' and realize revenue. Tariff true-up petition to be submitted to NEPRA, post COD of the Project
Balakot HPP	• The project is under construction without relevant agreements (PPA/EPA/PAC) with the national grid. Notably, (a) Balakot is a large-scale project (300 MW) compared to PEDO's existing portfolio with a target of 1,146 GWh, (b) the Project will have dual interconnections with PESCO and NTDC. For bilateral sale, PEDO must either (a) lay direct lines from Kunhar river, Manshera, to the new industrial zone (parallel infrastructure), or (b) supply via CTBCM, incurring substantial extra grid use costs (UoSC). A possible customer is expected to be an industrial cluster with requisite approvals for distribution and ready to consume electricity by COD of the said project. There is a low probability of matching the timing of plant availability and consumer readiness within 3 years for a huge electricity supply. Accordingly, the EPA and National Grid need to be executed (possibly with an exit clause), and for bilateral arrangements, the project is further discussed in the coming sections. • There is no benchmark tariff available for the Project. • The ADB Loan for the project construction is not recorded in the PEDO books, and loan repayments are scheduled to commence before the COD of the Project.	• **Assessment of demand for sale under bilateral arrangement** is required, and if the Project is to be "exited" for bilateral sale, the tariff is to be structured accordingly; otherwise, it can be on a "Take or Pay" basis. Discussions with Gilgit Baltistan, Karachi Electric, and Rashakai Economic Zone can be initiated for bilateral arrangements. • The project has already obtained a generation license from NEPRA for supply to the grid; accordingly, the tariff petition of the Project will be submitted for the **benchmark tariff.** • It is proposed that repayments under the ADB Loan be renegotiated to commence after the COD of the **said project**. The loan for the project may be transferred to PEDO if deemed appropriate (this transfer is not assumed in the financial projections).

Summary of Recommendations

Project-wise Risks and Steps to be taken with NEPRA and other Stakeholders

Project Name	Issues/ Risks	Recommendations
Under Construction & Rehabilitation HPPs		
Gabral Kalam and Madyan HPPs	▪ Demand risk from industry is same as discussed above. ▪ Further the two projects are dependent upon new transmission lines (Lot-I and Lot-II) to connect them with Chakdara and further interconnect with major industrial zones, to enter in bilateral arrangements without CTBCM, depending upon the fact the federal government allows said project and executes EPAs/PPAs with exit clause. ▪ The financial model assumes debt repayment tenor equal to tariff control period to reduce the tariff and achieve "exit" clause under the EPA with national grid. This means that debt obligations on PEDO will be higher than respective debt component recovered under the tariff. ▪ As per KHRE financing agreement (parked at PEDO balance sheet), PEDO need to raise further debt fundings on commercial basis and no work has been started in this regard. ▪ The debt repayments of KHRE foreign loans (IDA & AIIB) are starting in FY 2025-2028, while projects have not achieved COD (2030). ▪ The two projects face risk of exclusion in the upcoming IGCEP iteration.	• **Assessment of demand for sale under bilateral arrangement for tariff structuring**. Discussions with Gilgit Baltistan, Karachi Electric and Rashakai Economic Zone can be initiated, for bilateral arrangements. • it is proposed that repayments under **KHRE Loan agreement is renegotiated to start post COD of said project. Surplus under said loan agreement may be renegotiated for use in other projects** • **Estimated amounts of new commercial debts for Gabral Kalam are (a) foreign Loan US$ 29.53 M and (b) local loan of PKR 8.2 Billion.** • **Estimated amounts of new commercial debts for Madyan are (a) foreign Loan US$ 84.4 M and (b) local loan of PKR 23.5 Billion, if project is to be taken towards construction.** • Revision in **IGCEP assumptions is under the mandate of CCI**, any such revision eliminating committed projects need to be resisted at all forums. Projects should **proceed for generation license and tariff** under approved IGCEP assumptions. • The relevant **transmission lines Lot-I and Lot-II is proposed to be taken-up for discussions with NTDC for inclusion in TSEP**. It is important to highlight that tariff of Lot-I and Lot-II transmission lines is an important matter affecting overall GoKPK initiative, though the issue is not part of this business plan however it recommended that matter may be taken with NEPRA and NTDC with the **proposal to structure the tariff based on capacity utilization / allocation levels** for respective supplies i.e. by (a) provincial government for domestic consumption under KPEPRA mandate and (b) national grid under NEPRA jurisdiction.
Chapri Charkhel and Mujaheden HPPs	▪ Project cost of Chapri Charkhel and tariff has been analyzed based on recent available engineering estimate. Earlier EPC bidding process was annulled. However final cost can be established, once final EPC cost is available. ▪ Mujaheden is a social uplift project (similar to Reshun), the cost recovery is expected to be limited to O&M Cost.	• Chapri Charkhel **EPC bid process may be reconducted** and based on finalized bid expected tariff may be revaluated. If the tariff is in current range, it is proposed that **negotiations with NTDC team may be started**. It is important to highlight expected tariff assumptions of the project, as on current assumptions it become very competitive for inclusion in IGCEP. • Under current assumptions Mujaheden indexed tariff will be lower than grid price for industry, however higher than residential grid tariff. It is proposed that **category-wise distribution tariff for direct supply to community may be designed under direction of KPEPRA that allows recovery of full generation tariff.**

Project-wise Tariff Analysis

Possible revenue enhancement from operational projects and revenue potential of upcoming projects

Project Name	Size (MW)	Benchmark Generation (GWh)	COD Date	Effective / Reference Tariff (PKR/KWh)	Conservative Sale (GWh)	Existing Revenue Potential PKR M	Tariff True-up Year	Indexed Effective Tariff	Forecasted Energy (GWh)	Possible Revenue PKR M/ Annum	Financial Impact PKR M/ Annum	Comments
Operational												
Malakand-III HPP	81	553	2008	23.0	246	5,660	2010	14.9	384	5,724	64	Impact of rehabilitation
Pehur HPP	18	58	2010	3.8	53	201	2026	9.2	53	492	292	Impact of Indexations
Daral Khwar HPP	37	154	2021	8.3	153	1,264	2026	15.7	153	2,404	1,141	Impact of True-up
Ranolia HPP	17	100	2027	3.7	92	341	2029	25.4	92	2,345	2,004	Impact of True-up
Reshun HPS	5	25	1999	5.9	15	89	1999	5.9	15	89	-	
Machai HPP	3	16	2020	4.7	7	33	2026	25.5	7	182	149	Impact of True-up
Shishi HPS	2	15	2010	2.6	7	18	2010	2.5	7	18	-	
Jabori HPP	10	71	2025	5.7	60	343	2026	10.6	60	637	293	Impact of True-up
Financial Impact (Existing Revenue Less Possible Revenue)						7,949				11,891	3,943	
Under Construction & Development												
Balakot HPP	300	1,143	2029	17.8	914	16,289	2031	48.2	914	44,119		Expected reveune post true-up
Gorkin-Matiltan HPP	84	347	2026	6.2	212	1,308	2027	17.9	212	3,788		Expected reveune post true-up
Lawi HPP	69	311	2026	7.9	249	1,968	2028	13.4	249	3,344		Expected reveune post true-up
Koto HPP	41	208	2025	8.2	166	1,370	2027	16.7	166	2,770		Expected reveune post true-up
Karora HPP	12	71	2026	7.8	57	442	2028	11.1	57	628		Expected reveune post true-up
Gabral Kalam HPP	95	366	2030	20.5	293	5,992	2032	34.4	293	10,060		Expected reveune post true-up
Madyan HPP	215	839	2030	21.4	671	14,363	2032	38.2	671	25,643		Expected reveune post true-up
Chapri Charkhel	14	82	2030	6.3	65	409	2032	28.2	65	1,841		Expected reveune post true-up
Mujaheden HPP	7	41	2030	6.0	33	198	2032	24.7	33	811		Expected reveune post true-up
Additional Revenue						42,339				93,004		Expected reveune post true-up
Lower Spatgah 26%	470	1,925	2032	25.5	1,925	49,011	2034	48.7	1,925	93,749		Expected reveune post true-up
Grand Total	1,478	6,325			5,219	99,300			5,356	198,644		

Project-wise Tariff Analysis

High Level Consumer Viability Analysis for Bilateral Arrangements

Projects with generation price/tariffs above grid prices have been highlighted in RED, these are **suitable to be continued with grid.**
projects with indexed prices below grid prices but more than switch over price are shown in YELLOW - **to be further analysed for bilateral arrangements.**
Projects that have generation cost/indexed tariff less than expected switch price level for industry (25% discounted price from grid) are shown in GREEN - **Expected to be viable for bilateral arrangements.**

Year1	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	Comments
Grid Prices- Industry	29.6	29.7	31.3	32.3	33.2	34.2	34.6	34.6	34.6	34.6	34.6	
Switchover Industry Price	23.7	23.73	25.	25.8	26.6	27.4	27.7	27.7	27.7	27.7	27.7	
Malakand-III HPP	21.2	21.5	17.2	13.6	14.4	15.3	15.6	15.6	15.6	13.3	0.0	2034 bilateral arrangement
Pehur HPP	9.1	9.3	10.5	10.8	11.1	11.4	11.6	11.6	11.6	11.6	11.6	Switch over from wheeling to CTBCM
Daral Khwar HPP	8.3	11.6	15.8	16.0	16.1	16.3	16.4	16.4	16.4	16.4	16.4	Expected to be viable for bilateral
Ranolia HPP	0.0	0.0	3.7	3.7	25.4	26.7	27.3	27.2	27.1	27.1	27.0	Expected to be viable for bilateral
Reshun HPS	5.8	5.7	6.0	6.2	6.6	6.9	7.0	7.0	7.0	7.0	7.0	Social welfare project
Machai HPP	4.7	12.7	26.0	27.2	28.5	29.9	30.5	30.6	30.8	30.9	31.0	To be further analyzed
Shishi HPS	2.6	2.6	2.5	2.4	2.3	2.2	2.1	2.1	2.0	1.9	1.8	Expected to be viable for bilateral
Jabori HPP	5.7	7.3	10.6	10.6	10.7	10.7	10.7	10.7	10.7	10.6	10.6	Expected to be viable for bilateral
Balakot HPP	0.0	0.0	0.0	0.0	13.8	17.8	48.2	48.3	48.3	48.3	48.3	Continue with National Grid
Gorkin-Matiltan HPP	0.0	6.2	11.0	17.8	17.7	17.6	17.5	17.5	17.4	17.4	17.4	Expected to be viable for bilateral
Lawi HPP	0.0	7.9	7.9	13.4	13.4	13.4	13.4	13.5	13.5	13.5	13.6	Expected to be viable for bilateral
Koto HPP	8.2	8.2	11.5	16.7	16.7	16.7	16.7	16.7	16.8	16.8	16.9	Expected to be viable for bilateral
Karora HPP	0.0	7.8	7.8	11.1	11.2	11.3	11.3	11.4	11.4	11.4	11.4	Expected to be viable for bilateral
Gabral Kalam HPP*	0.0	0.0	0.0	0.0	0.0	29.2	20.5	34.4	34.4	34.4	34.5	To be further analyzed
Madyan HPP *	0.0	0.0	0.0	0.0	0.0	29.4	21.4	38.2	38.2	38.3	38.3	Continue with National Grid
Chapri Charkhel	0.0	0.0	0.0	0.0	0.0	6.3	6.3	28.2	28.2	28.2	28.3	To be further analyzed
Mujaheden HPP	0.0	0.0	0.0	0.0	0.0	6.0	6.0	24.7	24.7	24.8	24.8	Social welfare project
Lower Spat Gah HPP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.5	48.7	48.7	Low probability of proceeding

*The Projects are assumed on Take or Pay basis while COD is achieved in 2nd Qtr 2031, because of which rates are high in 2030 and reduce to reference tariff level in 2032 when full year generation and sale is assumed.

Project-wise Tariff Analysis

List of Projects taken for further analysis for bilateral arrangements

Project Name	Size (MW)	Forecasted Energy(GWh)	Tariff True-up Year	Exit Year	Indexed Tariff PKR/KWh	Indexed Tariff US Cents /KWh	2025 US Cents/KWh	2026 US Cents/KWh	2027 US Cents/KWh	2028 US Cents/KWh	2029 US Cents/KWh	2030 US Cents/KWh	2031 US Cents/KWh	2032 US Cents/KWh	2033 US Cents/KWh	2034 US Cents/KWh	2035 US Cents/KWh
Malakand-III HPP	81	384	2010	2035	15.6	4.31	7.5	7.6	5.8	4.3	4.3	4.3	4.3	4.3	4.3	3.7	0.0
Pehur HPP	18	53	2026	2026	9.2	3.24	3.2	3.3	3.5	3.4	3.3	3.2	3.2	3.2	3.2	3.2	3.2
Daral Khwar HPP	37	153	2026	2026	15.7	5.53	2.9	4.1	5.3	5.1	4.8	4.6	4.5	4.5	4.5	4.5	4.5
Ranolia HPP	17	92	2029	2029	25.4	7.60	0.0	0.0	1.2	1.2	7.6	7.5	7.5	7.5	7.5	7.5	7.5
Reshun HPS			Social Uplift Project														
Machai HPP	3	7	2026	2026	25.5	8.98	1.7	4.5	8.7	8.6	8.5	8.4	8.4	8.5	8.5	8.5	8.6
Shishi HPS	2	7	2026	2026	2.5	0.88	0.9	0.9	0.8	0.8	0.7	0.6	0.6	0.6	0.5	0.5	0.5
Jabori HPP	10	60	2026	2026	10.6	3.73	2.0	2.6	3.6	3.4	3.2	3.0	3.0	3.0	2.9	2.9	2.9
Balakot HPP	300	914	Balakot is already in approved IGCEP, and is proposed to be continued for supply to national grid.														
Gorkin-Matiltan HPP	84	212	2027	2027	17.9	6.00	0.0	2.2	3.7	5.7	5.3	5.0	4.8	4.8	4.8	4.8	4.8
Lawi HPP	69	249	2028	2028	13.4	4.24	0.0	2.8	2.7	4.3	4.0	3.8	3.7	3.7	3.7	3.7	3.7
Koto HPP	41	166	2027	2027	16.7	5.60	2.9	2.9	3.9	5.3	5.0	4.7	4.6	4.6	4.6	4.6	4.7
Karora HPP	12	57	2028	2028	11.1	3.52	0.0	2.7	2.6	3.5	3.3	3.2	3.1	3.1	3.1	3.1	3.1
Gabral Kalam HPP	95	293	2032	2032	34.4	9.51	0.0	0.0	0.0	0.0	0.0	8.3	5.7	9.5	9.5	9.5	9.5
Madyan HPP	215	671	Madyan is facing issues for inclusion in recent IGCEP revision. If project proceeds, it may be dedicated for supply to Grid														
Chapri Charkhel	14	65	Project Cost to be re-eveluated BY PEDO, project not considered for bilateral arrangement based on available data														
Mujaheden HPP	7	33	Social Uplift Project														
Sub Total	1,005	3,416															
Lower Spat Gah (26%)	470	1,925	Currently project is not in IGCEP and because of its current status & high tariff might not be able to proceed in existing form														
Total	1,475	5,341															

05: Alternate Customers & Acceptable Price Levels

List of Alternate Customers (Other than National Grid)

Possible Categories of Alternate Customers that may be perused by PEDO

Customer Type	Comments
Distribution Companies/ Integrated Utilities for Housing Societies under KPEPRA	These will be new housing societies, that could be provided electricity through provincial generation resources and will fall under KPEPRA jurisdiction (once established). Effective sale tariff and a viable generation/procurement cost for residential segment is dependent upon their consumer mix (underserved and high end consumers). Pakistan's residential segment is generally cross subsidized from industry and commercial, that increase related tariff. Even if PEDO enters in such supply arrangement development and colonization of a housing society with take 8-10 year, accordingly, same has not been assumed for this Business Plan. In any case Malakand-III offers an opportunity to be considered for such an opportunity, for which business development activities and coordination with real estate developers to be initiated now.
General Industry	Industry choose location for manufacturing unit considering overall business proposition that include cost of electricity. General Industry can either be invited to (a) establish manufacturing units in industrial zones within KPK, (b) relocat / establish manufacturing near PEDO HPPs, or (c) supplied/wheeled electricity using national grid, for low cost of electricity. Businesses with high electricity cost implications and minimum physical mobility requirements (raw material and finished goods movement) may consider locating in KPK. Other industries will avoid increased freight cost and will prefer implementation of CTBCM to procure electricity from PEDO HPPs. Other industries that have targeted consumers and supply chains within or surrounding KPK may prefer option- 'a' and option 'b'. Comparable electricity price for this segment, for swtichting to PEDO HPP is electricity price of national grid under CTBCM, however for supply of electricity adjacent to PEDO HPP a higher discount of about 34%-35% can be assumed.
Export Industry	This mainly include textile industry, leather goods and sports goods that have manufacturing. These industries compete in global markets and compare their energy cost with competitors in other countries. Considering importance of energy prices for export segment a strategic intervention was made by Federal Government through introduction of 'Textiles and Apparel Policy, 2020-2025'. Under said policy energy (electricity and RLNG) was provided to the export-oriented sectors of the textiles and apparel industry at regionally competitive rates (RCET). GoP allowed electricity tariff for export units at US Cents 7.5/kWh in January 2019, which was subsequently increased to US Cents 9/kWh in Sept 2020, however RCET regime was abolished in Feb 2023. For the purposes of this study, it is assumed that attractive electricity sale price for export industry is below US Cents 9.5/kWh under CTBCM, while for direct lines it will be below US Cents 7.0/kWh because of increased freight cost, unless raw material supply chain for said industries is available with KPK and targeted consumers are within China or other central Asian countries, assuming secure route will be available to said states from KPK.

List of Alternate Customers (Other than National Grid)

Possible Categories of Alternate Customers that may be perused by PEDO

Customer Type	Comments
IT Industry	The global IT industry's composition includes a wide range of sectors like software development, IT services, hardware manufacturing, and telecommunications. The IT industry is also heavily involved in emerging technologies like Artificial Intelligence (AI), Machine Learning (ML), Blockchain, and Cloud Computing, which have less manpower requirement and more energy intensive. Crypto mining is similar to process blockchain networks, like Bitcoin and other cryptocurrencies. Fundamentally, Bitcoin mining operations and traditional data centres are similar in basic design and operational principles. Power must be brought into the building and distributed to the equipment, air distribution systems cool the equipment, and the building provides protection from outdoor conditions and security threats. One of the largest Bitcoin mining farms in the world is considered to be in Dalian, China. The electricity price for industrial usage (including cloud computing data centres) at 35 kV was 0.610 RMB/kWh (about US Cents 8.5 Cents/kWh) as of March 2025. **Attractive electricity price for said industry in KPK, Pakistan would be below US Cents 7.0/kWh adjacent to HPPs, however under CTBCM arrangement it can be assumed to be between US Cents 7.0/kWh to US Cents 8.0/kWh**
Distribution Companies/ Integrated Utility/ Micro License **for industrial zones** under KPEPRA	PEDO's existing generational portfolio is seasonal (less in winter and higher in summer), though more reliable compared to solar and wind. Industrial Zones, would require electricity 24x7 and to bridge the gap industrial zone will depend upon bulk supply from national grid and/or other resources like thermal power plants, solar generation etc. Electricity generation cost of solar power plants is expected to be in the range of US Cents 4-5/kWh, however will be available in day time. The bulk price supply from national grid is higher than industrial tariff at national grid. These industrial zones will require license from NEPRA/KPEPRA to distribute electricity within the zone and to put up thermal and solar power plants within their area. The viable price for electricity procurement from PEDO will depend upon the electricity supply achieved by industrial zone. Industrial zones with tax exemptions (SEZs) will be more be attractive from PEDO's perspective, compared to other industrial zones. Keeping in view these facts, **a viable electricity procurement price of PEDO electricity from the perspective of industrial zone will be maximum of 30% lower than national grid price for industrial consumers.**
External Utilities (K-Electrict)	K-Electric, under its approved Power Acquisition Program (PAP) 2024-2030, that K-Electric as "Supplier of Last Resort (SoLR)" in its jurisdiction intends to procure/wheel power from the 82 MW Turtonas-Uzghor Hydropower Project (TUHPP) and 330 MW Siddiqsons Energy Limited (SEL) through the NTDC network. With respect to TUHPP, the available transmission network capacity in Chitral is already fully allocated to 108 MW Golan Gol HPP, 68 MW Lawi HPP, and 40 MW Koto HPP (last two are PEDO HPPs). Overall procurement from thermal power plants (local coal based is 990 MW). In this regard, K-Electric is engaged with PEDO, and a working level joint development group is established, comprising of the representatives from both entities to consider power acquisition if the development of indigenous coal projects does not materialize (by 20230) or TUHPP is delayed beyond 2029. **The tariff of selected projects by K-Electric and wheeling charge for NTDC, will be established by NEPRA.**

List of Alternate Customers (Other than National Grid)

Possible Categories of Alternate Customers that may be perused by PEDO

Customer Type	Comments
Gilgit Baltistan	In 2024, Gilgit-Baltistan's summer demand reached 254MW against a production capacity of just 122MW (Source: Dawn Jan 14, 2025: Discussions in parliamentary committee). This gap underscores an urgent need for new energy projects. Major upcoming projects of Gilgit Baltistan are 54MW hydropower plant in Attabad and 34.5MW hydropower plant in Skardu, which are expected to significantly address the region's demand-supply gap and provide clean power to local communities. Foreign investors have showed reluctance in investing in Gilgit Baltistan (to bridge the widening gap in future) because of lack of sovereign guarantees for power projects and the resultant high tariffs, above affordability limits of GB's majority consumer base (As in May 2025, majority of residential consumer pay a tariff of PKR 5 for up to 500 units and PKR 7.5/kWh for consumption above 200 up to 500 units), which have deterred investment. **Possible supply to Gilgit Baltistan from PEDO HPP will involve construction of transmission line and Government of Baltistan agreeing to (a) PSDP allocation for construction and funding of transmission line and (b) tariff subsidy from Government of Gilgit Baltistan to bring supply cost within affordable limits of its consumers.**
Supply to Other countries	GoKPK may explore such possibility through federal government (legal opinion may taken in this regard). In this regard it is important to highlight few facts about CASA-1000 Project (Central Asia-South Asia Electricity Transmission and Trade Project). The project is focused on building infrastructure to facilitate electricity trade between Central and South Asian countries. In its current form project envisions export of surplus hydropower from Kyrgyzstan and Tajikistan to Afghanistan and Pakistan. CASA-1000 was conceived much earlier in the year 2010 when Pakistan was suffering from a power crisis and very little options were available. The electricity price under CASA-1000 is 5.13 US cents per kilowatt-hour (kWh), to which a transmission charge of 4.3 US cents (out of 4.3 Cents, about 1.2 Cents relate to Afghan Transit Charge) is added to an aggregate of 9.4 US cents, while as per available information Afghanistan is already importing electricity from Tajikistan at a price of 3 US cents (in summer seasons), which is the only indicator of market price in the region. **With these facts in view, to export electricity to say Afghanistan (a) CASA agreement to be revised to allow export from Pakistan to say Afghanistan using CASA-1000 infrastructure, and (b) ultimate electricity procurement price to Afghanistan is to be between 3-4 US Cents/kWh, for which cost of sizeable PEDO HPPs has to be around 3 Cents or below.** Further, both Kyrgyzstan and Tajikistan import electricity in winter when Pakistan is in surplus. The countries import electricity from neighbouring countries (mainly Russia and Uzbekistan). The Kyrgyzstan government is working on reforms to improve energy security, including privatizing the coal sector and increasing coal production, as well as regional integration projects like CASA-1000 to enhance electricity trade. Based on these facts export possibility to Kyrgyzstan and Tajikistan also exists and amending the CASA agreement might be of mutual benefit of all.

Mode and Timelines of Supply

Customer category wise acceptable price, mode and timeline

Customer Type	Applicable Price Rs/kWh	Applicable Price US Cents/kWh	CTBCM	Direct Supply	Timeline of customer availability (starting from now)
General Industry	29.62 (Industrial Tariff from Grid)	US 10.5 Cents/kWh	10% discount to grid – US 9.4 Cents/kWh	34% discount to grid – US 6.9/kWh	CTBCM supply can be immediate (2027), however will depend upon available slot.
Export Industry	29.62 (Industrial Tariff from Grid)	US 10.5 Cents/kWh	US 9.4 Cents	6.9 Cents/kWh	CTBCM supply can be immediate, however will depend upon available slot. For Direct Supply - 2-3 years customer selection and construction period
IT Industry	39.3 (Commercial Tariff)	US 14 Cents/kWh	US 7.5 Cents/kWh	6.9 Cents/kWh	CTBCM supply can be immediate, however will depend upon available slot. For Direct Supply - 2-3 years customer selection and construction period
Industrial zones under KPEPRA	39.5 (Bulk Supply Rate From Grid)	US 14.1 Cents/kWh	US 7.4 Cents/kWh	US 7.4 Cents/kWh	5-6 years, for colonization of industrial zone
Housing Societies (under KPEPRA)	39.5 (Bulk Supply Rate From Grid)	US 14.1 Cents/kWh	To keep price volatility risk minimum and operate fully with KPEPRA jurisdiction, CTBCM may not be opted for this. However once CTBCM matures same can be reconsidered.	US 5 Cents/kWh	7-8 Years
Supply to other countries	-	-	-	US 3-4 Cents/kWh	2027-2030 (Operationalization of CASA-1000 is expected to be in 2027)
External Utilities (K-Electric)	-	-	-	Subject to NEPRA Approvals (US 8-10 Cents/kWh)	2029-2030
Supply to Gilgit Baltistan				US 5 Cents/kWh	4-5 Years from now, subject Government of Balochistan agreeing to PSDP funding and subsidy.

Conclusion

Mode of Supply	Acceptable Range	Assumption	Timelines
CTBCM	US Cents 7.4 – 9.4/kWh for general industry, export industry, IT industry and industrial zones.	Expected targeted size 400 MW (hydropower capacity). Price range represent all inclusive cost (i.e. capacity balancing and marginal pricing)	Currently available time slot is 7 years. It is expected that CTBCM UoSC will reduce after 7 years (refer next chapter), If continues. For this business plan time slot of 2027-2031 has been assumed.
Direct Supply	US Cents 6.9 – 7.4/kWh for general industry, export industry, IT industry and industrial zones.	For supply to adjacent industry, Individual HPP size can be 10-15 MW, that can be made available to industries in sequence. For supply to industrial zones, supply can be in lots/multiples of 30-50 MW each with 2-3 years gap. Price range represent all available inclusive cost (i.e. cost of transmission line till gantory of consumer)	For supply directly to consumers, same will be subject to selection of parties and construction period of industries. Expected supply date is 2028 and onwards. For industrial zones (under KPEPRA), same will be subject obtaining of licenses and inviting industry to enjoy discounted electricity rates. Colonization is expected to be after 5-6 years (2031 onwards).
Direct Lines to Others Customers (Housing Societies, other countries)	US Cents 3 – 4/kWh from a sizeable generation resource for other countries. For Housing societies, aceeptable price is expected to be less than US Cents 5/kWh	For societies, size will depend on size of colony (rough estimate 40-50 MW in given time slot). Colonization of a hosung and full supply may take 8-10 years. For supply to other countries CASA-1000 may may be explored, a minimum size of 200 MW is expected for supply through CASA-1000. Price range for other countries represents delivery price at HPP gantory.	Supply to housing colonies will be subject to development, construction, colonization and obtaining of licenses by such colonies (7-8 year from now, 2032 onwards). Supply to other countries is subject to CASA-1000, 2028 onwards.
Direct Lines to K-Electrict	US Cents 8-10/kWh	Expected size 80MW to 450 MW. NTDC wheeling cost & energy losses will be added above supply cost. Price range represent, delivery price at HPPs gantory.	Supply to K-Electric is subject to Chitral corridor development and commissioning of coal power plants (2029-2030)
Direct Lines to Gilgit Baltistan	US Cents 5 /kWh	Expected size 40MW to 100 MW. Price range represent, acceptable supply cost at HPPs gantory.	Supply will be subject to PSDP allocations for transmission line and subsidy to consumers on supply cost (2030 onwards)

06: Competitive Trading Bilateral Contract Market (CTBCM)

Understanding CTBCM

Basic concept of CTBCM

CTBCM is an acronym for Competitive Trading Bilateral Contracts Market. It's a market reform model proposed for Pakistan's electricity sector, aiming to transition from the current single-buyer system to a more competitive wholesale market where electricity is traded through bilateral contracts.

In simpler terms:

Currently, Pakistan's electricity market operates under a single buyer model, meaning a single entity (CPPA) purchases electricity on behalf of multiple distributors (DISCOs). CTBCM proposes to change this by allowing larger consumers (1MW or more- referred a s"BPCs") to directly negotiate contracts with electricity generators.

Key features and objectives of CTBCM:

- **Transition to a competitive market:** Moving away from the single-buyer model to a more open and competitive wholesale market.
- **Bilateral contracts**: Allowing large consumers to directly contract with electricity suppliers.
- **Choice for consumers:** Empowering bulk consumers with the choice of their electricity supplier.
- **Improved governance:** Enhancing the oversight and management of the wholesale electricity market.
- **De-bundling of the power sector:** Breaking down the current structure of the power sector to promote competition.
- **Potential for lower prices and improved reliability:** By introducing competition, the goal is to achieve lower electricity costs and more reliable power supply.
- **Attracting private investment:** The competitive framework is expected to encourage private sector investment in the power sector, particularly in renewable energy.

Overall, CTBCM is a significant reform initiative aimed at improving the efficiency, reliability, and cost-effectiveness of Pakistan's electricity market by introducing competition and giving consumers more choice.

Understanding CTBCM

Different players under CTBCM

Market Operator: The Market Operator (CPPA-G) oversees setting up and running the CTBCM model and carries out several functions, as defined in Market Commercial code.

System Operator: The System Operator (National Power Control Centre) will carry out their responsibilities in line with the Grid & Commercial Codes and the applicable laws. The System Operator is required to provide operational transparency, post planning reports, real-time operational decisions, and dispatch results on its website.

SERVICE PROVIDERS

- **Transmission Service Providers (TSPs):** All Transmission Service Providers shall be enrolled with the Market Operator as Service Providers, for providing the transmission services to enable wholesale buying and selling of electric power (Energy and/or Capacity). TSPs shall include National Transmission Dispatch Company (the NTDC), the transmission activity of K-Electric (KE), Provincial Grid Companies (PGCs) and Special Purpose Transmission Licensees (SPTLs).
- **Distribution Network Service Providers:** They shall be enrolled with the Market Operator to develop and operate the Distribution Network so that Generators and/ or BPCs connected to such network can participate in the wholesale market.
- **Metering Service Providers:** They shall also be enrolled with the Market Operator as Service Providers to to provide services as per the metering conditions established in the Grid Code and Distribution Code and collect all metering information required under market Code for the the Market Operator

MARKET PARTICIPANT

- **Generation Companies:** A generation company (holding a valid generation license from NEPRA) that produces & sells electricity and has established a generation unit or a generation plant, shall be enrolled as market participant. Plants selling electricity to DISCOs are not required to enroll under CTBCM.
- **Electric Power Suppliers**: There are two categories (a) competitive suppliers; and (b) suppliers of last resort that are basically distribution companies. These suppliers are licensed entities, permitted to purchase power (Energy and Capacity) and sell it to end users or resell it to other Market Participants. Competitive Electric Power Supplier need to register underlying Contracts entered, with the Market Operator, except for load flow contracts with BPCs.
- **Electric Power Traders:** These are licensed entities who trade electric power in accordance with the respective Regulations, 2022.
- **Bulk Power Consumers (BPCs):** BPC is a consumer who buy electric power, Energy and/or Capacity, from the wholesale market or from an Electric Power Supplier of its choice.

Understanding CTBCM

Types of Bilateral Contracts under CTBCM

Underlying bilateral contracts will be registered with Market Operator, for which standardized contract structures are made available. Contracts will must be designed to ensure that Energy and Capacity balancing provisions are available and must clauses whereby both parties agree to use the defined quantities under the contract, for their bilateral settlement purposes.

Standardized Contracts	Nature of Contract	Possible Sellers	Possible Buyers	The risk of shortfall/excess in the balancing of energy or capacity
Generation Following Supply Contract	To sell a defined percentage (0%-100%) of the Capacity (of the Generation Plant) and Energy injected into the Grid. The Capacity bought and sold is Non-Guaranteed, i.e. risk is on buyer.	Generator or an Electric Power Trader.	Electric Power Supplier or an Electric Power Trader. A BPC can not enter in this kind of contract.	Risk of any shortfall will be on the buyer, under this contract. Ultimate risk exposure will depend on onwards sale contract with ultimate consumer (BPC).
Capacity and Associated Energy Supply Contract	This is relatively similar to the 'Generation Following Supply Contracts', but it may also be used by BPCs.	Generator or an Electric Power Trader.	Electric Power Supplier or an Electric Power Trader or a BPC.	Any of the buyer or seller can agree to take the associated risk.
Load Following Supply Contract	To sell all the Energy and Capacity, withdrawn by buyer at metering points.	Generator, Competitive Supplier or Electric Power Trader	Competitive Supplier, Electric Power Trader or a BPC.	Seller assume obligations of the buyer in the Energy and Capacity Balancing Mechanisms, as well as Capacity Obligations imposed on buyer.
Financial Supply Contract with Fixed Quantities	To sell defined quantities of Energy and/or Capacity at each Energy and/or Capacity Trading Period.	Generator, Competitive Supplier or Electric Power Trader	Competitive Supplier, Electric Power Trader or a BPC.	To the extent of fixed quantity seller shall be responsible, while the energy and capacity consumed above fixed quantity shall be the responsibility of buyer and will be respectively paid under balancing mechanism.

Note: As per NEPRA (Electric Power Trader) Regulations, 2022, a trader can not supply of electric power directly to a consumer.

Commercial Implications of CTBCM

Firm Capacity and Balancing Mechanisms

Energy and Capacity Balancing Mechanisms under CTBCM

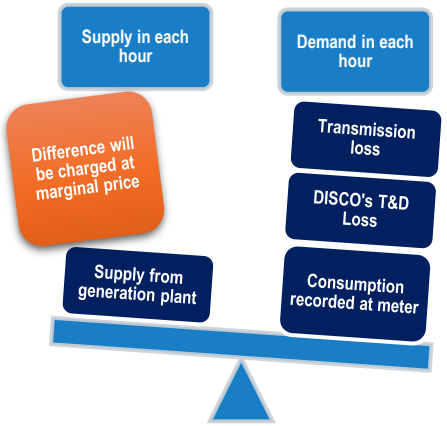
A core component of the CTBCM market design is the introduction of structured balancing mechanisms to manage discrepancies between contracted and actual power flows. These mechanisms ensure system reliability and financial fairness among market participants.

Energy Balancing adjusts hourly mismatches between contracted and actual power flows, settled at the daily marginal price. Capacity Balancing requires participants to meet demand during 50 annual critical hours, with a 10% reserve margin to ensure grid reliability.

Energy Balancing Mechanism

Energy imbalances are settled hourly based on:

- Difference between contracted vs. actual grid usage
- Adjustment for transmission and distribution (T&D) losses
- Compensation or penalties on imbalances at marginal market prices



Supplier's Firm Capacity

To participate, generation units must:

- Be licensed by NEPRA
- Obtain Firm Capacity Certificates, calculated using historical performance or availability factors (see table on right)

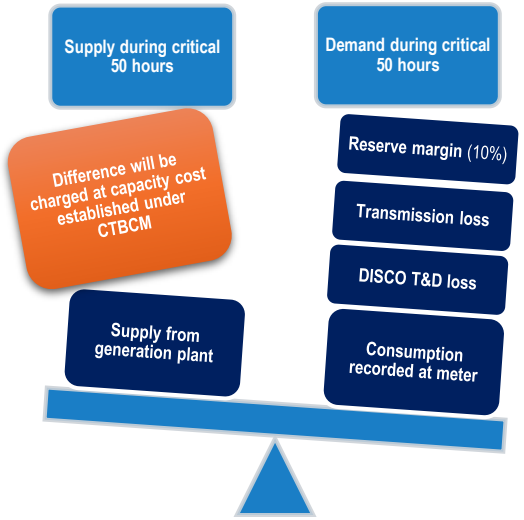
BPCs' participation is capped by their historical Maximum Demand Indicators (MDI) during critical hours.

Technology	Availability Factor
Dispatchable	
Hydro (reservoir) thermal (liquid fuels, gas or coal fired) and bagasse	92%
Thermal solar and nuclear	87%
Non-dispatchable	
Hydroelectric (run-of-river)	As per feasibility
Wind	30%
Solar PV	22%

Capacity Balancing Mechanism

Each year, the Market Operator identifies 50 Critical Hours (peak load periods) to measure:

- Available capacity vs. grossed-up BPC demand (+10% reserve margin)
- Imbalances settled using interim unit capacity price: PKR 10.5 million/MW/year



Commercial Implications of CTBCM

Use of System Charge and its Components

Market Cost Dynamics

The CTBCM framework introduces the Use of System Charge (UoSC) as a crucial mechanism to enable the efficient wheeling of electricity from suppliers to bulk power consumers. It's in fact the cost of use of national grid. The UoSC ensures that distribution and transmission companies (DISCOs) can recover the costs associated with using the existing electricity grid infrastructure, facilitating competition in the market while ensuring financial sustainability for network operators.

The UoSC incorporates various cost components that help in achieving cost recovery for grid usage. The UoSC includes key cost components for grid usage recovery: technical losses, stranded costs and cross-subsidies. These components are integral to maintaining the economic viability of the power sector but also raise concerns. Industry stakeholders, such as PEDO, Engro and manufacturers associations of textile and steel, have voiced their concerns about the fairness and transparency of the current UoSC allocation, especially regarding stranded cost allocations and regional disparities in how these charges are applied. Given the competitive market environment envisioned under the CTBCM framework, there was a growing call for reforming the UoSC to ensure that it is applied equitably across regions and consumer categories.

Currently, these charges are under review by the National Electric Power Regulatory Authority (NEPRA). DISCOs have submitted their petitions, and there has been extensive feedback from stakeholders. Based on discussions with relevant stakeholders, it is understood that a cabinet committee has been formed to develop a complete framework for proceeding on CTBCM that will also of establish fair UoSC for bilateral arrangements.

UoSC Breakdown

Key UoSC Components

- Transmission & Distribution charges: These include costs levied by the National Transmission and Dispatch Company (NTDC) and the Distribution Companies (DISCOs) for the usage of transmission lines and distribution networks.
- Technical and T&D losses: Losses incurred due to inefficiencies in the transmission and distribution process, both technical and operational.
- Stranded cost of IPPs: Charges arising from the capacity payments made to IPPs, even when their electricity is not needed due to lower demand or overcapacity.
- Cross-subsidy for subsidized consumers: A mechanism that redistributes the cost burden from residential and agricultural consumers to industrial and commercial users, keeping electricity affordable for vulnerable groups.

Regulatory Status

- Petitions submitted under NEPRA's 2022 Open Access Regulations: The distribution companies (DISCOs) have submitted petitions to NEPRA under these regulations to adjust and recover the UoSC.
- Operations of System Operator and Market Operator are merged and an separate entity has been established for this purpose. The operationalization of the Independent System & Market Operator (ISMO) is crucial for implementing the CTBCM.
- The Power Division is in final stages to introduce a framework under which commercial market operations of the Competitive Trading Bilateral Contract Market (CTBCM) will begin by the end of September 2025.

Attractiveness for Industry

KPK's Generation can be made available to BPCs in KPK and in other provinces

Opportunities for KPK

For Khyber Pakhtunkhwa , the CTBCM offers a transformative opportunity to revitalize its industrial sector by enabling direct procurement of electricity at more competitive rates. This is particularly advantageous for energy-intensive industries, such as manufacturing, cement, textiles, and chemicals, which can now access cheaper electricity through renewable energy (RE) contracts. By engaging with offsite RE plants, these industries can not only reduce operational costs but also enhance their environmental footprint, improving their corporate social responsibility (CSR) and environmental, social, and governance (ESG) credentials. The ability to procure clean, renewable energy helps KPK's industries meet global sustainability standards, thus gaining access to new markets and attracting global investors prioritizing sustainability.

Additionally, RE-based power purchase agreements (PPAs) under CTBCM offer more long-term stability compared to traditional captive power plants (CPPs), which rely on subsidized domestic gas or on fluctuation RLNG prices. These RE contracts provide a more sustainable and future-proof energy solution, insulated from the price volatility of domestic gas/RLNG. Unlike CPPs, which depend on government-backed subsidies, the CTBCM framework aligns with market-driven demand, mitigating risks associated with energy investments and encouraging industrial stakeholders to pursue energy solutions based on commercial viability, rather than sovereign guarantees. This shift strengthens KPK's energy sector by supporting the development of new, grid-connected generation projects that meet both industrial needs and environmental goals.

KPK Opportunity Areas

- **Lower Energy Cost:** Renewable energy offers a more affordable alternative to thermal energy produced by captive power plants (CPPs). Through CTBCM, KPK's industries can secure competitive electricity rates, achieve reduced production costs and increase profitability, particularly in energy-intensive sectors. Not only CPPs, new industry and upcoming industrial zones within KPK and outside KPK can benefit from hydropower generation through bilateral contracts with PEDO or other private sector produces.

- **Green Branding:** Transitioning to RE allows industries to strengthen their ESG profile, enhancing their brand image both locally and globally. This is an invaluable differentiator in today's market, where sustainability is a key decision-making factor for consumers and investors alike.

- **Hydropower Vs Solar/Wind:** Both Solar and Wind, have lower predictability features compared to hydropower. During summer (peak demand) Hydropower provide stable capacity compared to Solar and Wind.

- **Decentralized Procurement:** With CTBCM, KPK's industrial clusters can gain greater energy security and pricing control. Industries in Hattar, Rashakai SEZ, Gadoon, DI Khan, and Nowshera can capitalize on this model to reduce their dependence on the centralized grid, ensuring a stable, cost-effective, and reliable energy supply.

Upcoming Framework under CTBCM regime

Auction on Stranded Cost

Proposed framework, in process of finalization

Significant Reduction in Wheeling/UoSC Charges: This is a cornerstone of upcoming CTBCM's framework. The upcoming framework offers to achieve 'Stranded Cost component' through a price discovery mechanism. This change is projected to lower the total wheeling charge from a previous PKR 28.45 (Rs/kWh) to PKR 12.55 + Bid Price (Rs/kWh). This substantial decrease directly enhances cost efficiency for Bulk Power Consumers (BPCs), making direct power procurement significantly more attractive and fostering a competitive environment.

Structure of Upcoming Framework: The new framework is expected to remain applicable from September 2025 (Commercial operations date of CTBCM) for next five years its main features include:

- The framework will provide size allocations for bidding on stranded cost. The size will reflect firm capacity of supplier matching peak demand of respective customers.
- There will be defined eligibility conditions for participation in the bidding process.
- The bidding process will be administered through an online platform.
- The framework implementation and bidding process will be monitored by committee with participation from NEPRA, Power Division and Independent System and Market Operator.
- In bidding process participants can bid for following three years.
- There will be advantage to participants who bid for immediate years following the bidding process, however bid amount (stranded cost) will be same for each year. (weights will be applied on bid rates- higher weight for acquiring earlier slots increasing chance to win)
- Stranded cost of respective bidders will remain applicable for five years (starting from first bidding) after which there will be zero stranded cost.

Immediate Action Required

The bidding process may allow only "companies" registered with SECP with competitive supplier license (or for which application has been submitted). In this regard, PEDO may decide on legal structure for participation and acquire licenses, as may be required.

Other features of upcoming framework

- **Transparent Wheeling Auctions:** Robust Framework Guidelines establish clear rules, eligibility criteria, and procedures for annual wheeling auctions.
- **Managed Allocation of Wheeling Capacity:** 800 MW capacity capped over five years, allocated through annual auctions (e.g., first 200MW, subsequent 150MW), with limits on single participant quantum (max 50% of auction / 25% of 800MW).
- **1st Operational Slot:** Expected to be 2027 of 200 MW
- **Competitive Bidding & Financial Guarantees:** Auctions will involve competitive bidding, clear bid bonds (5% of annual base wheeling charge + DSS/FC Surcharge per MW), and performance guarantees (10%). Bids can span three fiscal years.
- **Clear Implementation Timelines:** Detailed timelines for the auction process will provide predictability for all stakeholders, from RFP issuance to regulatory approval of results.
- **Enhanced Market Efficiency:** The framework fosters increased competition, private sector investment (especially in renewables), improved consumer choice, and more predictable energy costs.

Upcoming Framework under CTBCM regime

Basic concept of Expected UoSC Under CTBCM

UoSC / Open Access Charge	2024	2025	Comments
Stranded Cost	15.9	0.25	This will be subject to competitive bidding and will be applicable for five years.
DSS (FC Surcharge)	3.23	3.23	Loan Markup on Power Holdings Limited, expected to continue in foreseeable future
Cross Subsidy	3.47	3.47	This depends upon level of loss sharing on electricity sale to underprivileged. Recently been reduced.
Distribution Margin	2.34	2.34	Cost paid to distribution companies for sale of electricity
UoSC	1.45	1.45	Transmission cost
System Losses	2.06		This was a duplication and is to be removed
	28.45	10.74	

Upcoming Framework under CTBCM regime

Maximum Achievable Firm Capacity by PEDO

The competitive bidding under CTBCM framework to be announced by the GoP will be subject to limits and restrictions as to how much a single bidder can take from 800 MW firm capacity to be offered for the auction. These limits has been analyzed hereunder indicating that 200 MW of firm capacity can be acquired by a single bidder.

Years	Allocations (firm capacity)	Limit on each aution for individual bidders (50% of each auction)	Limit on maximum achievable overall by one bidder (25% of 800 MW)	PEDO's firm capacity if declared successfull
2027	200	100	100	200 MW of firm capacity, can be injected by PEDO under upcoming CTBCM auction framework for next five years
2028	150	75	75	
2029	150	75	25	
2030	150	75		
2031	150	75		

Upcoming Framework under CTBCM regime

Projects that can be offered for supply under CTBCM and timelines

PEDO's Price (Index tariff plus other CTBCM related costs) has been compared with acceptable price levels under CTBCM of alternate customers (as established in last section) based on which it is expected that about 48.27 MW of firm capacity (111 MW Gross Capacity) can be offered under CTBCM.

Name	Gross Capacity MW	Firm Capacity MW	Year for entering in CTBCM	Indexed Tariff Cents/ kWh	PEDO's Price in CTBCM to cover indexed tariff, energy Losses & UoSC Cents/kWh*	Acceptable Price level for customers to swtich to PEDO Electricty* Cents/kWh**	Delta (Profit /Loss to Consumer)*** Cents/KWh	Proposed to be taken forward for auction under CTBCM	Firm Capacity that can be offered in CTBCM
Pehur HPP	18	6.08	2027	3.2	7.5	8.40	0.93	Yes	6.08
Daral Khwar HPP	37	17.45	2027	5.5	10.1	8.40	(1.69)	No	
Ranolia HPP	17	10.53	2028	7.6	12.3	8.40	(3.92)	No	-
Machai HPP	3	0.81	2028	9.0	13.9	8.40	(5.50)	No	-
Shishi HPS	2	0.81	2028	0.9	4.6	8.40	3.77	Yes	0.81
Jabori HPP	10	6.46	2028	3.7	7.9	8.40	0.50	Yes	6.46
Gorkin-Matiltan HPP	84	31.68	2028	6.0	10.5	8.40	(2.09)	No	
Lawi HPP	69	28.43	2029	4.2	8.3	8.40	0.05	Yes	28.43
Koto HPP	41	18.96	2027	5.6	10.2	8.40	(1.77)	No	
Karora HPP	12	6.49	2027	3.5	7.8	8.40	0.61	Yes	6.49
Gabral Kalam HPP	95	33.42	2031	9.5	14.1	8.40	(5.72)	No	
Total	388	161.12							48.27

*Note-1: For this Indexed Tariff has been grossed-up to cover distribution losses of 12.25% and 2.25% transmission losses (14.46% total), plus UoSC of relevant year.
**Note-2 Acceptable Price to customer has been established based on higher end of the range established in last section.
Note-3: For energy and capacity balancing it is assumed that customers will be restricted to operate 2 shifts/daily in all seasons. This restriction averages out impact of energy and capacity balances and allows PEDO to keep some profit on same.
*** Note-4: Delta / profit has not been assumed in the financial model, however energy and capacity balancing impact has been assumed in the financial model.

Conclusion

- In past, Wheeling/CTBCM has been pushed back by DISCOs on the premise that it will result in loss to National Grid, however based on recent discussions with various relevant stakeholders there seems to be a consensus on opening the wholesale electricity market by introducing a price discovery mechanism for establishing Stranded cost under UoSC (for CTBCM), which has been one of the main areas of controversy in past. For this 800 MW of firm capacity will be offered through issuance of 'framework guideline' under which 2-3 auctions will be held. Each auction will offer an allocation of 150 MW to 200 MW of firm capacity per year, for competition among interested parties. Each auction will allow right to bid for a slot in for any of the next five years (2027 to 2031), unutilized capacity will be offered in next bidding round. The framework guideline will remain applicable for next five years, after which market will be fully opened with zero stranded cost.
- For offering PEDO's portfolio under upcoming auctions an initial analysis has been done under this business plan, based on which it is estimated that about 48.27 MW of firm capacity (111 MW Gross Capacity) can be offered under CTBCM, however this has been reduced in next Section, considering viability of direct supply model for certain projects. This conclusion is subject to following prerequisites:
    - It is expected that auction process will allow eligible companies (registered with SECP) to participate in bidding process. PEDO has to make a decision as to (a) establish a separate company for this business stream (b) discuss with regulator/auction committee to change the criteria and allow PEDO (on its own) to participate in the upcoming auction.
    - Under the upcoming auction under CTBCM framework guideline (to be announced by GoP), interested bidders will be required to identify interested buyers (who will procure electricity) along with a high-level load flow analysis. Identification of electricity buyers is expected to be one of the major requirements for participating in said process. PEDO, being a public entity, will need to hold its own auction process to identify interested buyers, for which Request For Proposal can be issued either to already shortlisted parties (shortlisted about 2-3 years back) or a fresh process can be done for this purpose.
    - For selection of the interested parties and finalization of RFP, PEDO will be required to finalize the agreement structure for bilateral arrangement. There are three major contract types allowed under commercial code for said bilateral contract. These are (a) Capacity and Associated Energy Supply Contract (b) Load Following Supply Contract and (c) Financial Supply Contract with Fixed Quantities. Based on initial analysis it is proposed that a balanced risk profile for both parties can be achieved under 'Financial Supply Contract with Fixed Quantities' wherein there can be fixed price for given quantity supplied in defined timeframe, while any consumption beyond defined level will be buyer's risk. Pehur's existing agreements will need to be revised and renegotiated based on changed dynamics and risk profile under CTBCM.
    - Application for Competitive Supplier, is to be submitted for each project by PEDO or on behalf of the company that will participate in the upcoming auction under the CTBCM framework guideline.

07: Direct Supply Model

Direct Supply Model
Concept & Objective

Conceptual Understanding of Direct Supply Model

The Direct Supply arrangements envisage the supply/sale of electricity by the Projects to the industrial consumers at close proximity of each Project, that is without involving national grid/network.

Therefore, to have the Direct Supply arrangement, the electricity should be received by the industrial consumer directly from the outgoing bus bar of the Project without using in any way of any network licensee's system (of national grid) or its associated facilities.

PEDO is considering to provide electricity through a Direct Supply Model; under the said model, business groups are to be invited to establish industrial plants adjacent/close vicinity to HPP's of PEDO.

Work done till date

To circumvent the challenges associated with wheeling, PEDO introduced the Direct Supply Model aimed at attracting new industries to KPK. Given the current regulatory and cost-related hurdles, UK Aid's SEED program undertook to evaluate the viability of the proposed hydropower projects, while safeguarding the regulatory integrity of the project. For this following steps are complete

(a) evaluation of the identified projects (supply assessment) and
(b) pre-market sounding of interest (demand assessment) in acquiring electricity from such projects is complete.

PEDO currently is interreacting with industries department for arrangement of requisite facilitates (especially land) to invite industry adjacent to its HPPS.

Option Types – Direct Supply Model

The projects were evaluated based on the availability of land, closeness to transmission line and the route to the HPP's. The following options were envisaged undertaking the transactions.

Feature	Option A	Option B	Option C
Location	Adjacent to HPP	Along HPP's transmission line	Existing/new industrial zones near HPP clusters
Transmission Infrastructure	Minimal	Use/modification of existing lines	New/extended lines may be required
Coordination Required	CPPA, PESCO with regard to exit clause of EPA	CPPA, PESCO/ NTDC for changes in interconnection lines	CPPA, PESCO, PEDO, KPEZDMC, KP Transmission Co.
Tariff Type	Take-and-pay (preferred), if underlying risks are addressed	Take-or-pay (preferred), if underlying risks are addressed	Take-and-pay (preferred)
Seasonal Backup Needed	Yes	Yes	Yes
Scale	Single project focused	Project + route-focused	Cluster/zone-focused

PEDO HPP's - Direct Supply Model

Identified HPP and results of demand assessment

The table below summarizes demand analysis based on responses to PEDO's Request For Information (RFI).

- It highlights preferred hydropower projects alongside estimated land and investment requirements;Jabori Hydropower Project emerged as the top choice among investors while Machai was ranked as a second choice.
- Both Jabori and Machai were shortlisted for advancement to the next phase of implementation.

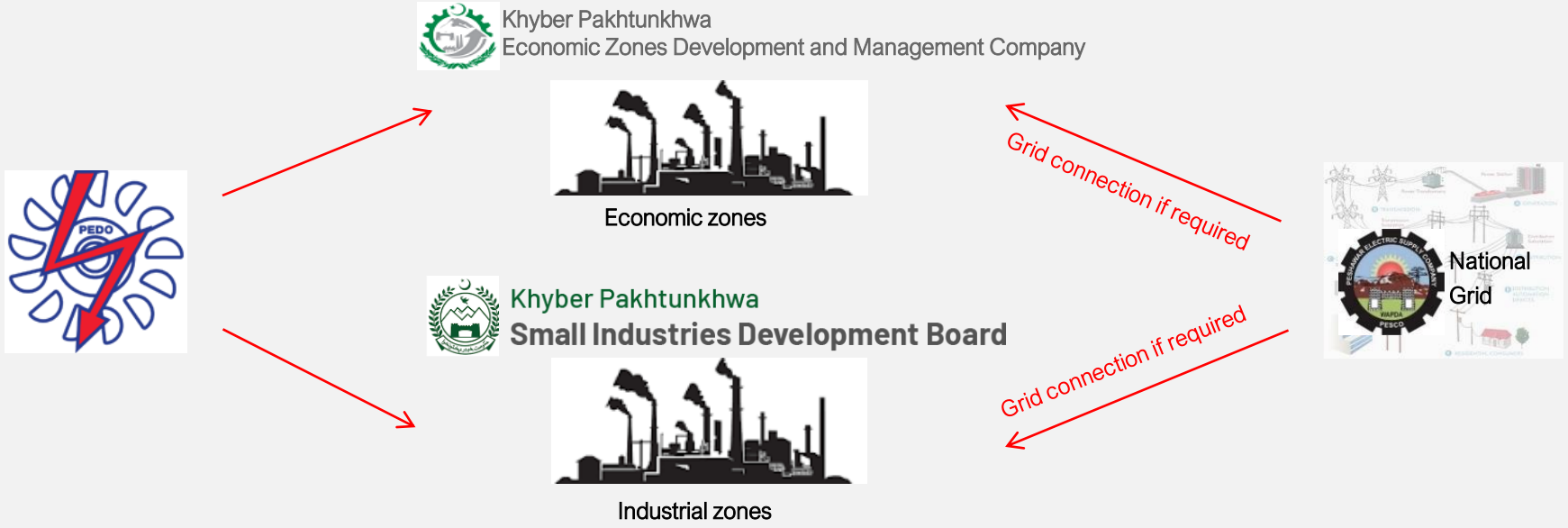
Name of PEDO Hydropower Plant	No. of Respondents that Preferred the HPP	Gross Amount of Investment Proposals Submitted under RFI (Rs in Billion)	Gross Land Requirement of Proposals Received under RFI (Acres)	Estimated Size of Investment that Can Be Entertained (Rs in Billion)	Estimated Size of Land to Accommodate the Possible Investment Levels (Acres)	Size of Land Available Adjacent to Power Plants (Acres)	Approximate Length of Interconnection Line (km) to Identified Land Parcels
Jabori 10.2 MW	14	11.6 to 13.8	126 to 175	1 to 5	50	Parcel-A: 6 Parcel-B: 30	Parcel-A: 1 km Parcel-B: 15 km
Machai 2.6 MW	9	2.1 to 3	31 to 44	Less than one billion	20	Sufficient land available at two identified locations	Parcel-A: 1 km Parcel-B: 17 km
Karora 11.8 MW	6	5.5 to 6	23 to 28	1 to 5	10 to 20 but can be higher	Parcel-A: 5 Parcel-B: 50	Parcel-A: 0.2 km Parcel-B: 12 km
Shishi 1.875 MW	3	Not indicated	KPEZDMC already has land	Cannot be estimated	Cannot be estimated	KPEZDMC has shown interest to connect with its SEZ (40 Acres)-Chitral Economic Zone	11 km (new line)

Supply to Economic Zones & Industrial Parks

Possible Supply to SEZ's from upcoming Swat Corridor

For transmission KPT&GSC is already mandated, to interconnect hydropower within economic zones, in this regard following activities are underway :

- KPEZDMZ is gearing to take distribution license from NEPRA for upcoming provincial economic zones.
- GoKPK has initiated the process of establishing provincial regulator that can issue distribution license and determine tariff for Consumers within Economic Zones.
- KPT&GSC is in process of developing of 120 km Matiltan-Chakdara 132/220KV Transmission Line. The project is planned to be implemented in two Lots (a) the first Lot of 40 km starts from Matiltan and ends at Madyan. Construction contracts for this Lot are in process of award and is fully funded by GoKPK. (b) the second Lot of 80 km starts from Madyan and ends at Chakdara. Studies and other development activities on second lot are in progress.
- Besides, Chitral Economic Zone (discussed above) to be connected with Shishi Power Plant, respective departments identified two economic zones operated by KPEZDMC and two industrial parks operated by SIDB for supply from upcoming transmission line to evacuate Swat Corridor. These economic zones are listed on next page:



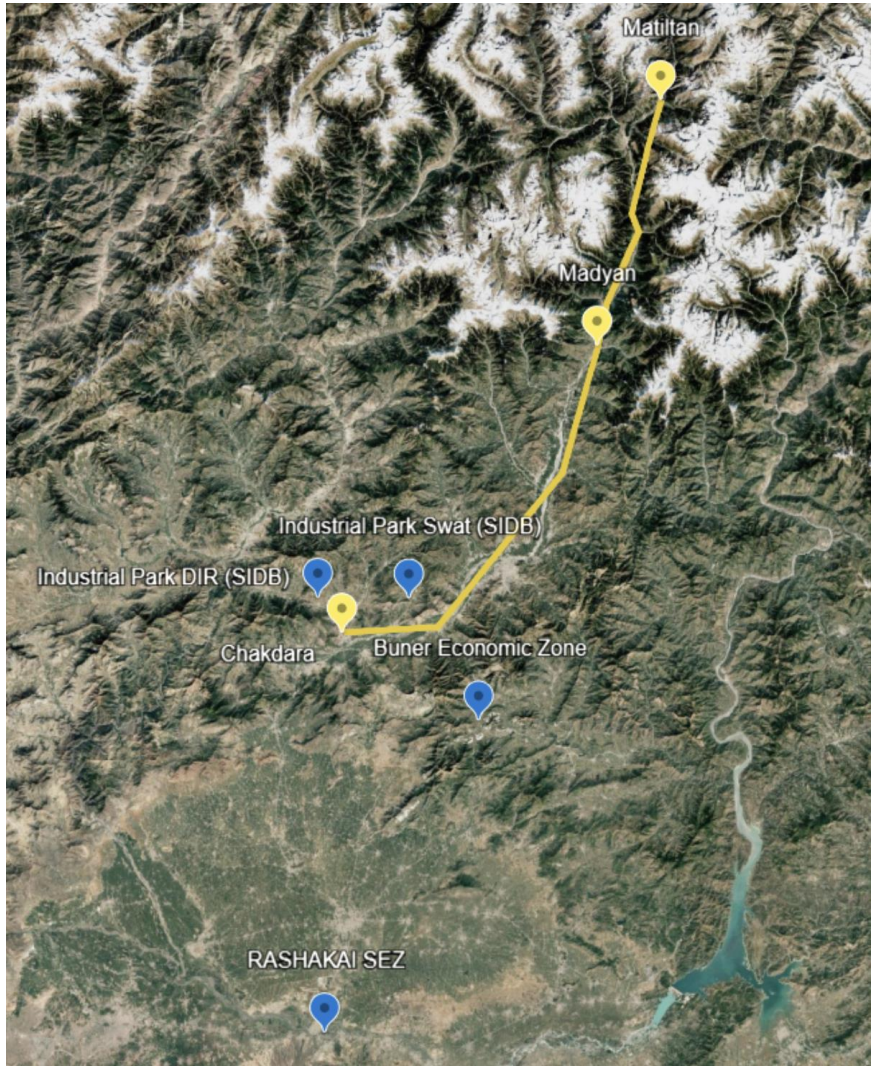
Supply to Economic Zones & Industrial Parks

Identified SEZ's for electricity supply from upcoming Swat Corridor

This Matiltan-Chakdara 132/220KV Transmission Line is marked on the adjacent map along with following Economic Zones and Industrial Parks that can be interconnected with PEDO HPPs for supply of low-cost electricity.

- **Rashakai SEZ** (already established): Distance from Rashakai SEZ to Chakdara grid station is 61 KM. Rashakai Special Economic Zone Development & Operation Company (RSEZDOC) has applied for supply and distribution licenses to NEPRA, that will allow the zone to distribute low-cost hydropower to industry. SEZ has 210 MW requirement on full colonization, for this 132 KV Grid Station-I with 40 MVA completed. Capacity can be extended to 160 MVA. 132 KV Grid Station II under construction. Electricity distribution network in phase I completed.
- **Buner Economic zone** (Land transfer from DC Buner to KPEZDMC in progress): 132 KV transmission line of 30 KM length (approx.) is required to connect the zone with proposed transmission corridor Lot-2. The Zone can either take distribution license from NEPRA or provincial distribution license from KPEPRA. SEZ has 20 MW requirement on full colonization
- **Industrial Park Swat** (Section-IV under Land Acquisition Act 1894 is in process by the District Administration Swat): 132 KV transmission line of 20 KM length (approx.) is required to connect the zone with proposed transmission line. SEZ has 5 MW requirement on full colonization
- **Industrial Park Dir** (PC-1 approval in progress): 132 KV transmission line of 16 KM length (approx.) is required to connect the zone with proposed transmission line.

Above industrial zones and SEZs have been identified during interactive sessions held with PEDO and representatives of KPEZDMC.



Viability of Possible Direct Supply Arrangements

Projects that can be offered for supply under CTBCM and timelines

PEDO's Price (Index tariff plus other direct line cost) has been compared with acceptable price levels for possible customers. Based on analysis provided hereunder, except for Machai, Ranolia and Gabral Kalam all projects are viable for direct supply.

Project Name	Size (MW)	Forecasted Energy(GWh)	Indexed Tariff PKR/KWh	Indexed Tariff Cents /KWh*	Cost of Energy Losses** Cents /KWh	Transmission Cost*** Cents /KWh	Price that can be offered under Direct Supply Cents /KWh	Possible Customers	Acceptable Price Level of Possible Customer****	Delta Cents /KWh	Exchange Rate
Malakand-III HPP	81	384	15.6	4.31	0.10	0.55	4.96	Housing Society	5.0	0.04	361.7
Pehur HPP	18	53	9.2	3.24	0.07	0.70	4.02	Industry	6.9	2.88	283.9
Daral Khwar HPP	37	153	15.7	5.53	0.12	0.70	6.36	Industry	6.9	0.54	283.9
Ranolia HPP	17	92	25.4	7.60	0.17	0.60	8.37	Industry	6.9	(1.47)	334.3
Machai HPP	3	7	25.5	8.98	0.20	0.70	9.89	Industry	6.9	(2.99)	283.9
Shishi HPP	2	7	2.5	0.88	0.02	0.70	1.60	Industry	6.9	5.30	283.9
Jabori HPP	10	60	10.6	3.73	0.08	0.70	4.52	Industry	6.9	2.38	283.9
Gorkin-Matiltan HPP	84	212	17.9	6.00	0.14	1.17	7.31	Industrial Zone/SEZ	7.4	0.09	298.1
Lawi HPP	69	249	13.4	4.24	0.10	1.11	5.44	Industrial Zone/SEZ	7.4	1.96	315.7
Koto HPP	41	166	16.7	5.60	0.13	1.17	6.90	Industrial Zone/SEZ	7.4	0.50	298.1
Karora HPP	12	57	11.1	3.52	0.08	0.63	4.23	Industry	6.9	2.67	315.7
Gabral Kalam HPP	95	293	34.4	9.51	0.21	0.97	10.69	Industrial Zone/SEZ	7.4	(3.29)	361.7

*Note-1: Indexed Tariff established in Section-4
**Note-2: Transmission losses of 2.25% has been assumed till gantry of the consumer.
***Note-3: For smaller projects up to 20 MW and for Malakand-III, transmission cost of Rs 2/KWh has been assumed, while for other larger projects transmission cost of Rs 3.5/KWh has been assumed. Higher transmission cost has been assumed to cover possible low utilization of the line in winter season or low industry demand.
**** Note-4: Acceptable price levels established for alternate customers in Section-5

Conclusion

- It is understood that cost of Direct Supply Model is less than cost of CTBCM supply, however from a strategic point of view supply market under CTBCM should continued to be perused by PEDO because (a) it has a much larger reach compared to Direct Supply, (b) price dynamics assumed in this plan can change (c) relocating existing industry to KPK will be less attractive to consumers.
- However, to catalyze development of domestic industry, it is recommended that in next few years Jabori and Karora may be offered under direct supply model by inviting industry establish their manufacturing units or other processing units (IT/data center etc.) adjacent to said power plants. For this selection process of credible parties may be initiated, followed by execution of agreements and construction process by related parties. The interconnection cost may be borne by related party while related O&M can be performed by KPT&GSC under license from KPEPRA.
- The energy supply variations and supply gaps from HPP, will be subject to industry's own arrangement through (a) national grid connection or (b) thermal power at site.
- For supply to industrial zones, it is recommended that negotiations may be started with KPEZDMC and Rashakai Special Economic Zone Development & Operation Company (RSEZDOC) for following projects:
    - Shishi HPP for supply to Chitral Economic Zone, followed by Lawi HPP once colonization takes pace. If KPEZDMC is of the view that Chitral Economic Zone will not take pace in couple of years, there are two options for Lawi HPP (a) separate line will be required to interconnect with Chakdara to further interconnect with other industrial zones (b) Supply under CTBCM to general industry within KPK. For this business plan it is assumed to supply under CTBCM.
    - Gokin Matiltan and Gabral Kalam can be interconnected with Rashakai SEZ, Buner SEZ and other upcoming industrial zones. The tariff of Gabral Kalam is higher than expected acceptable of SEZs. In case RSEZDOC does not agree to the acquire electricity from Gabral Kalam, it can be either (a) continued with National Grid or (b) Discussion may be held with K-Electric for supply of electricity from project, along with Madyan if considered appropriate. For this business plan it is assumed that it will continue with National Grid.
    - For Koto HPP, either (a) new industrial zone is considered within the vicinity for which it may continue with national grid till its colonization, or (b) Discussion may be held with K-Electric for supply of electricity from project.
    - The energy supply variations and supply gaps from HPP, will be subject to SEZ's Zone's own arrangement through (a) national grid connection or (b) thermal power at site.
- It is important to highlight, that for supply to industrial zones, KPEPRA has to be functional that will be required to provide respective licenses and will establish generation, transmission and distribution tariffs for the complete chain.

Recommendations

Proposed Targeted Timelines

Project Name	Size (MW)	Forecasted Energy (GWh)	COD Targets	Tariff True-up Targets	Indexed Tariff PKR/KWh	Proposed way forward	Assumed under CTBCM	Firm Capacity for Bid under CTBCM	Assumed under Direct Supply Model (adjacent industry)	Assumed for supply to SEZs/ Zones
Malakand-III HPP	81	384	Achieved	Achieved	14.9	Either new indsutrial zone or housing				Q1 FY 2035
Pehur HPP	18	53	Achieved	2026	9.2	Convert wheeling to CTBCM	Q1 FY 2027	6.08		
Daral Khwar HPP	37	153	Achieved	2026	15.7	To be evaluated for Direct Supply Model or Supply to Zone			Q3 FY 2029	
Ranolia HPP	17	92	2027	2029	25.4	High tariff- continue with National Grid				
Reshun HPS	5	15	Achieved	NA	5.9	Social uplift- off-grid sale				
Machai HPP	3	7	Achieved	2026	25.5	High tariff- continue with National Grid				
Shishi HPS	2	7	Achieved	Not Required	2.5	Supply to Chitral Economic Zone				Q1 FY 2028
Jabori HPP	10	60	Achieved	2026	10.6	Adjacent Industry by 2028. Bidding process complete at earliest.			Q3 FY 2028	
Balakot HPP	300	914	2029	2031	48.2	High tariff- continue with National Grid, or may be offered to K-Electric				
Gorkin-Matiltan HPP	84	212	2026	2027	17.9	Supply to Rashakai SEZ- RSEZDOC				Q3 FY 2029
Lawi HPP	69	249	2026	2028	13.4	If KPEZDM agrees then to Chitral Economic Zone, otherwise under Bid under CTBCM framework	Q1 FY 2029	28.43		
Koto HPP	41	166	2025	2027	16.7	Explore possibility of Economic zone (Koto economic zone) adjacent to HPP (continue will national grid till that time)				Q1 FY 2030
Karora HPP	12	57	2026	2028	11.1	Adjacent Industry by 2028. Bidding process complete at earliest.			Q1 FY 2029	
Gabral Kalam HPP	95	293	2030	2032	34.4	Offer RSEZDOC and K-Electric, or continue with national grid				
Madyan HPP	215	671	2030	2032	38.2	High tariff- continue with national Grid or discuss with K-Electric				
Chapri Charkhel	14	65	2030	2032	28.2	Final EPC cost and update project tariff. Assumed grid supply.				
Mujaheden HPP	7	33	2030	2032	24.7	If approved then will taken as social uplift- off-grid sale				
Sub Total	**1,008**	**3,431**						34.51		
Lower Spat Gah (26%)	470	1,925	2032	2034	48.7	Discuss possibility of lowering project cost and funding costs with KHNP. Not assumed in business plan at the moment.				
Grand Total	**1,478**	**5,356**						34.51		

08: Scenario Analysis & Financial Results

Financial Model Results

Summary results under two respective scenarios

At PEDO Level

From PEDO's perspective all funding requirements are met by GoKPK (directly or through Hydel Development Fund-HDF), with one exception that is of "Khyber Pakhtunkhwa Hydropower and Renewable Energy Development Program (KHRE program)" under which underlying obligations are allocated to PEDO by GoKPK.

KHRE program is designed to fund two major upcoming projects i.e. Gabral Kalam and Madyan. Under the said program, besides funding from IDA and IBRD (routed through EAD- federal government), additional funding sources to be explored and utilized that (a) GoKP/PEDO equity funding (b) domestic commercial loan and (c) foreign commercial loans. Accordingly, at PEDO level there is a requirement to raise following foreign and domestic commercial loans:

- Gabral Kalam (a) foreign commercial Loan US$ 29.53 M and (b) local commercial loan of PKR 8.2 Billion.
- Madyan are (a) foreign commercial Loan US$ 84.4 M and (b) local commercial loan of PKR 23.5 Billion.

Further it is understood that above two projects are facing resistance from National Grid. Accordingly, debt process may be initiated once there is more clarity from national grid in this regard. Based on assessment of two projects it is expected that resultant tariff of Madyan might be higher than Gabral Kalam, because of which it might face more resistance and delays for extended time.

Lastly, the debt repayments of KHRE's foreign loans (IDA & AIIB) are scheduled to start in FY 2025-2028. It is proposed that the KHRE loan agreement is renegotiated to ensure that (a) repayments start post COD of said projects that is now envisaged in 2030 and (b) excess funds. if any, are utilized to fund shortfalls of other projects emanating at GoKPK level.

At GoKPK Level

Net funding requirement at GoKPK level is analyzed under two scenarios that are:

a) **"AS IS"** All projects are perused and constructed as planned (excluding lower spat gah which has not been assumed as discussed in last section)

b) **"Eliminated Projects"** All assumptions are same as per "Scenario-a" above except that it further excludes (i) Madyan (ii) Chapri Charkhel and (iii) Mujaheden, as status of these three projects is not clear at the moment.

Under both of above scenarios funding gap is expected to arise only in 2026 which can be divided in two parts (I) loss emanating from PEDO funding needs, and (II) estimated repayments/ debt servicing of existing loan portfolio parked at GoKPK (currently adjusted under NFC), as tabulated hereunder:

Funding Shortfall at GoKPK level in FY 2026

Scenario	Scenario-a "AS-IS"	Scenario-b "Eliminated Projects"
If debt servicing of loans parked at GoKPK is recovered from PEDO		
PEDO related funding shortfall	PKR 11.40 B	PKR 4.02 B
Servicing of existing debts raised for PEDO	PKR 11.12 B	PKR 10.86 B
Funding Gap in FY 2026	**PKR 22.53 B**	**PKR 14.88 B**
If debt servicing of loans parked at GoKPK is continued by GoKPK own resources		
Funding Gap in FY 2026	**PKR 11.40 B**	**PKR 4.02 B**

Please note that above funding shortfall assessment is subject to (a) actual change in economic variables is in line with this document, (b) achievement of targets as set on last page and (c) project cost incurrence as per Section-4.

Scenario-a "AS-IS"

Projected cashflows of GoKPK for funding to PEDO Projects

All Amounts in PKR M

Year	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
PEDO Cashflow										
Operating Cashflow -PEDO	16,038	34,598	51,811	85,146	161,197	214,070	120,116	117,358	102,729	91,208
Less: Financing(Debt Repayments)	35,241	68,763	53,975	3,982	3,712	(9,089)	(11,862)	(11,943)	(11,716)	(9,766)
Less: Investing Activities	(112,552)	(121,983)	(91,582)	(805)	(150)	(150)	(150)	(150)	(150)	(150)
PEDO-Excess/Shortfall	**(61,273)**	**(18,622)**	**14,204**	**88,323**	**164,759**	**204,832**	**108,104**	**105,265**	**90,863**	**81,292**
GoKPK Cashflow										
Repayments on Loans Parked at GoKPK	-	-	(10,960)	(18,915)	(24,586)	(26,006)	(11,376)	(9,415)	(10,269)	(10,886)
Commitment Charges	(595)	(405)	(220)	(157)	(157)	(157)	(157)	(157)	(157)	(158)
Project IDC-GoKPK	(5,783)	(8,159)	(9,213)	-	-	-	-	-	-	-
Interest-GoKPK	(4,728)	(6,925)	(8,881)	(9,273)	(8,557)	(7,343)	(6,306)	(508)	(455)	(400)
GoKPK Level Funding requirement	**(72,379)**	**(34,112)**	**(15,070)**	**59,978**	**131,460**	**171,326**	**90,265**	**95,185**	**79,982**	**69,849**
Annual Development Plan (ADP)	8,214	5,261	3,479	-	-	-	-	-	-	-
Accelerated Implementation Program (AIP)	3,273	3,273	3,273	-	-	-	-	-	-	-
Debt drawdowns directly by GoKPK	38,365	29,158	33,388	-	-	-	-	-	-	-
GoKPK Excess/Shortfall	**(22,527)**	**3,580**	**25,070**	**59,978**	**131,460**	**171,326**	**90,265**	**95,185**	**79,982**	**69,849**

Scenario-a "AS-IS"

Projected Financial Statements of PEDO

All Amounts in PKR M

Extracts of Projected Income Statement

Year	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Revenue from sale of electricity	**18,535**	**31,873**	**43,039**	**60,653**	**135,756**	**198,027**	**105,732**	**105,728**	**93,662**	**87,522**
Operating Cost										
Operating and maintenance cost	(2,479)	(3,113)	(6,073)	(12,513)	(13,815)	(14,068)	(14,068)	(14,068)	(14,068)	(14,068)
Finance cost	(2,469)	(5,448)	(8,586)	(9,647)	(9,651)	(9,316)	(8,646)	(5,829)	(5,397)	(5,024)
Total Operating Cost	**(4,948)**	**(8,561)**	**(14,659)**	**(22,160)**	**(23,466)**	**(23,384)**	**(22,714)**	**(19,897)**	**(19,465)**	**(19,092)**
Profit for the year	**13,587**	**23,311**	**28,380**	**38,494**	**112,290**	**174,643**	**83,018**	**85,831**	**74,196**	**68,430**

Extracts of Projected Balance Sheet

Year	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Non-current Assets	284,956	396,366	461,134	413,111	361,880	318,372	281,423	250,044	223,397	200,768
Current Assets	10,681	9,967	13,350	15,526	17,999	22,230	22,231	22,232	20,496	20,498
Total Assets	**295,637**	**406,334**	**474,484**	**428,637**	**379,880**	**340,602**	**303,654**	**272,277**	**243,893**	**221,265**
Equity										
Government equity	244,709	311,509	367,568	368,198	368,198	368,198	368,198	368,198	368,198	368,198
Cumulative Repayments to GoKPK	(57,754)	(105,932)	(176,195)	(265,148)	(429,907)	(634,739)	(742,843)	(848,108)	(938,972)	(1,020,263)
Retained Earnings	35,567	58,878	87,258	125,752	238,041	412,684	495,703	581,534	655,730	724,160
Total Equity	**222,522**	**264,456**	**278,631**	**228,802**	**176,332**	**146,144**	**121,058**	**101,624**	**84,957**	**72,095**
Non-Current Liabilities	**72,493**	**141,255**	**195,230**	**199,213**	**202,924**	**193,836**	**181,973**	**170,030**	**158,314**	**148,548**
Current Liabilities	**623**	**623**	**623**	**623**	**623**	**623**	**623**	**623**	**623**	**623**
Total Liabilities	73,116	141,878	195,853	199,835	203,547	194,458	182,596	170,653	158,936	149,170
Total Equity and Liabilities	**295,637**	**406,334**	**474,484**	**428,637**	**379,880**	**340,602**	**303,654**	**272,277**	**243,893**	**221,265**

Extracts of Projected Cash Flow Statements

Year	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Cashflow From Operating Activities										
Profit for the year	13,587	23,311	28,380	38,494	112,290	174,643	83,018	85,831	74,196	68,430
Net Cash inflow from operating activities	16,038	34,598	51,811	85,145	161,197	214,070	120,116	117,358	102,729	91,207
Net Cash inflow from investing activities	(112,551)	(121,983)	(91,582)	(805)	(149)	(149)	(149)	(149)	(149)	(149)
Cashflow from Financing Activities	96,513	87,385	39,771	(84,341)	(161,048)	(213,921)	(119,966)	(117,208)	(102,579)	(91,058)
Net Change	-	-	-	-	-	-	-	-	-	-
Opening Cash & Bank	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
Closing Cash & Bank	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000

Scenario-b "Eliminated Projects"

Projected cashflows of GoKPK for funding to PEDO Projects

All Amounts in PKR M

Year	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
PEDO Cashflow										
Operating Cashflow -PEDO	17,808	38,650	40,091	60,326	84,914	182,458	90,175	87,073	73,741	63,312
Less: Financing(Debt Repayments)	11,520	22,415	17,900	1,688	1,656	(2,722)	(3,587)	(3,552)	(3,409)	(2,687)
Less: Investing Activities	(79,935)	(65,258)	(50,383)	(150)	(150)	(150)	(150)	(150)	(150)	(150)
PEDO-Excess/Shortfall	(50,607)	(4,193)	7,609	61,865	86,420	179,586	86,439	83,371	70,182	60,475
GoKPK Cashflow										
Repayments on Loans Parked at GoKPK	-	-	(10,960)	(18,915)	(24,586)	(26,006)	(11,376)	(9,415)	(10,269)	(10,886)
Commitment Charges	(673)	(573)	(475)	(441)	(441)	(441)	(441)	(441)	(441)	(443)
Project IDC-GoKPK	(5,454)	(7,444)	(8,032)	-	-	-	-	-	-	-
Interest-GoKPK	(4,728)	(6,925)	(8,881)	(9,273)	(8,557)	(7,343)	(6,306)	(508)	(455)	(400)
GoKPK Level Funding requirement	**(61,461)**	**(19,135)**	**(20,740)**	**33,235**	**52,837**	**145,796**	**68,317**	**73,008**	**59,017**	**48,747**
Annual Development Plan (ADP)	8,214	5,261	3,479	-	-	-	-	-	-	-
Accelerated Implementation Program (AIP)	-	-	-	-	-	-	-	-	-	-
Debt drawdowns directly by GoKPK	38,365	29,158	33,388	-	-	-	-	-	-	-
GoKPK Excess/Shortfall	**(14,882)**	**15,283**	**16,127**	**33,235**	**52,837**	**145,796**	**68,317**	**73,008**	**59,017**	**48,747**

Scenario-b "Eliminated Projects"

Projected Financial Statements of PEDO

Extracts of Projected Income Statement

All Amounts in PKR M

Year	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Revenue from sale of electricity	18,535	31,873	32,477	46,513	65,099	171,401	79,105	79,099	67,031	60,889
Operating Cost										
Operating and maintenance cost	(2,479)	(2,995)	(4,001)	(9,627)	(10,777)	(10,971)	(10,971)	(10,971)	(10,971)	(10,971)
Finance cost	(699)	(1,514)	(2,383)	(2,698)	(2,729)	(2,661)	(2,493)	(1,911)	(1,788)	(1,686)
Total Operating Cost	(3,178)	(4,509)	(6,384)	(12,326)	(13,507)	(13,632)	(13,464)	(12,883)	(12,760)	(12,657)
Profit for the year	15,357	27,363	26,093	34,188	51,592	157,769	65,641	66,217	54,271	48,232

Extracts of Projected Balance Sheet

Year	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Non-Current Assets	234,541	289,226	324,373	296,199	262,384	233,668	209,282	188,574	170,990	156,058
Current Assets	10,681	9,967	11,205	13,390	14,033	18,209	18,210	18,211	16,476	16,477
Total Assets	**245,222**	**299,193**	**335,578**	**309,589**	**276,417**	**251,877**	**227,493**	**206,786**	**187,465**	**172,535**
Equity										
Government equity	232,515	284,275	328,605	328,605	328,605	328,605	328,605	328,605	328,605	328,605
Cumulative Repayments to GoKPK	(58,809)	(106,376)	(158,315)	(220,180)	(306,600)	(486,187)	(572,626)	(655,997)	(726,179)	(786,654)
Retained Earnings	37,910	65,273	91,366	125,554	177,146	334,915	400,556	466,772	521,043	569,275
Total Equity	**211,616**	**243,172**	**261,657**	**233,979**	**199,151**	**177,333**	**156,535**	**139,380**	**123,469**	**111,226**
Non-Current Liabilities	32,983	55,399	73,299	74,987	76,644	73,921	70,335	66,783	63,373	60,686
Current Liabilities	623	623	623	623	623	623	623	623	623	623
Total Liabilities	**33,606**	**56,021**	**73,922**	**75,610**	**77,266**	**74,544**	**70,958**	**67,405**	**63,996**	**61,309**
Total Equity and Liabilities	**245,222**	**299,193**	**335,578**	**309,589**	**276,417**	**251,877**	**227,493**	**206,786**	**187,465**	**172,535**

Extracts of Projected Cash Flow Statements

Year	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Cashflow From Operating Activities										
Profit for the year	15,357	27,363	26,093	34,188	51,592	157,769	65,641	66,217	54,271	48,232
Net Cash inflow from operating activities	17,808	38,650	40,091	60,326	84,913	182,458	90,175	87,073	73,741	63,312
Net Cash inflow from investing activities	(79,935)	(65,258)	(50,383)	(149)	(149)	(149)	(149)	(149)	(149)	(149)
Cashflow from Financing Activities	62,127	26,608	10,292	(60,177)	(84,764)	(182,309)	(90,026)	(86,923)	(73,591)	(63,162)
Net Change	-	-	-	-	-	-	-	-	-	-
Opening Cash & Bank	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
Closing Cash & Bank	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000

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