Generation Tariff Petition

From FY 2024 onwards

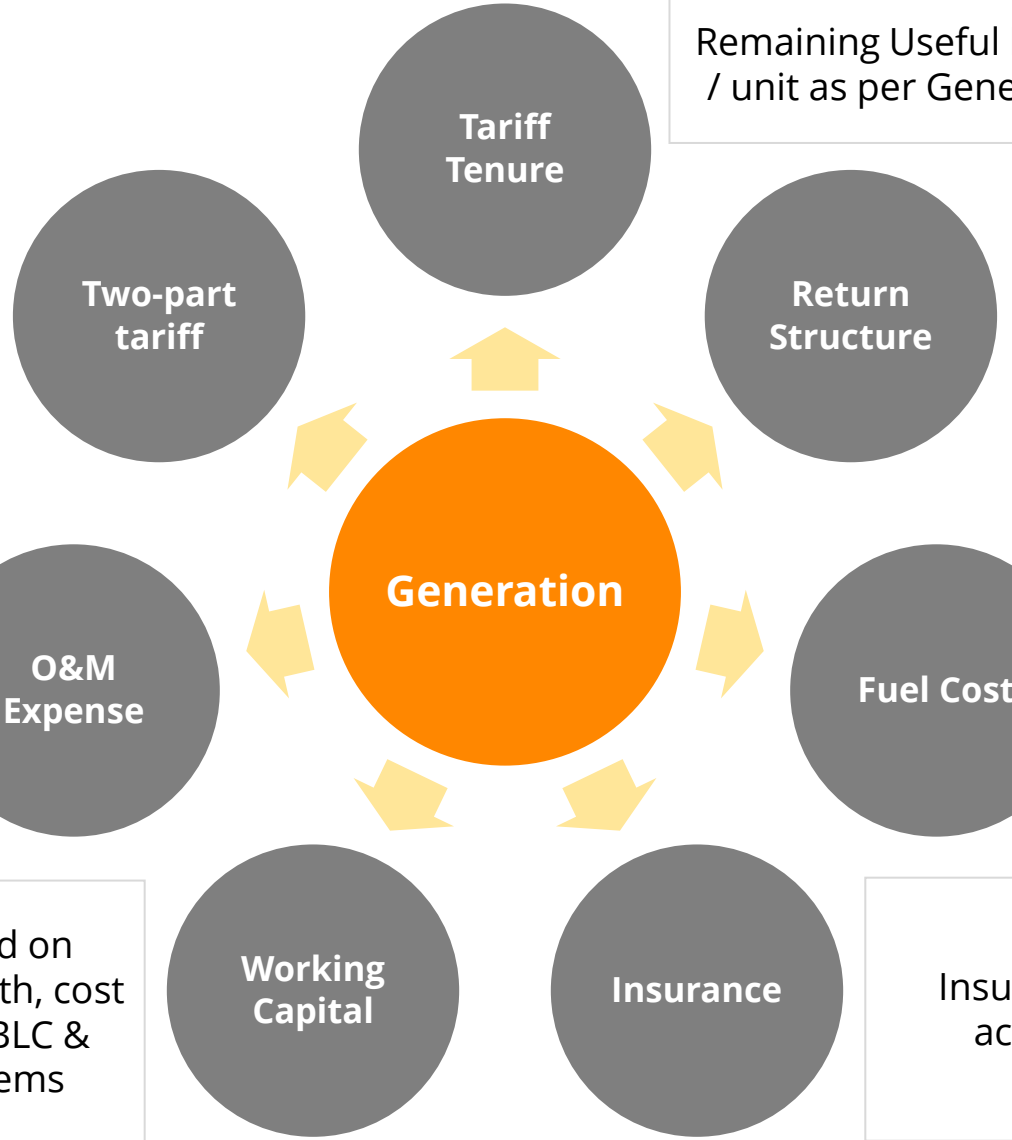
Introduction

- Keeping in view the learnings of Current MYT and upcoming market changes including separation of Distribution and Supply businesses, implementation of CTBCM model and proposed country wide central economic dispatch and for better transparency KE is pursuing separate Tariff Petitions for Generation, Transmission, Distribution & Supply Businesses
- Moreover, KE has requested for separate plant wise tariffs keeping in view central economic dispatch and for better visibility and transparency
- In view of above, KE has filed Generation Tariff Petition on December 01, 2022, and the same has been admitted by NEPRA on February 03, 2023
- The proposed tariff is primarily aligned with other IPPs. However, keeping in view the return structure of Current MYT, KE has proposed return structure based on Return on Regulatory Asset Base and Depreciation, rather than Debt servicing + RoE method included in IPPs which has debt repayment front loaded

Following slides highlight the key features of the Generation Tariff Petition submitted along with KE's response on the issues framed by the Authority:

Generation Tariff Petition
FY 24 onwards - Highlights

Generation Tariff Petition – Salient Features



Remaining Useful life of the plant / unit as per Generation License

Return Structure based on Return on Regulatory Asset Base (RAB) with 15% USD based ROE in line Current MYT (based on Notional debt to equity ratio) & depreciation

Based on already approved Heat rates (where available) along with degradation / part load adjustments, based on curves, as allowed to IPPs

Insurance at I% of EPC cost or actual, whichever is lower

Working capital cost based on Standard Receivable cycle with, cost of fuel inventory, cost of SBLC & cost of other inventory items

O&M expenses to cover both Fixed and variable expenses.
O&M savings to be shared between Consumer & KE in 60:40 ratio

Two part tariff with Energy Component based on Actual Despatch & Capacity Component based on Take or pay structure. Capacity payment to be based on available capacity considering annual outages including periodic overhauls

Issues Framed

Issue (i)

Whether the requested tariff on Take or Pay basis is justified?

Generation Tariff Petition - Issue (i)

- Tariff is based on **two-part tariff structure,** inline with the structure followed for other IPPs, including **Energy Purchase Price (EPP)** and **Capacity Purchase Price (CPP)** based on a Take-or-pay mechanism where **Capacity payment** shall be based on **the Available Capacity** and **Energy payments** shall be based on **Net Electrical Output**
- These plants have been installed keeping in view demand requirements of KE's service territory and are required to be maintained accordingly **till the end of the useful lives as per the Generation License** awarded by NEPRA
- These plants will be **dedicatedly available to serve demand of consumers within KE's service area.**
- Take or Pay Structure ensures recovery of the **fixed costs**, to **ensure availability** and **reliability** of the plant as well as to allow **reasonable returns.**
- Also, within Current MYT, Return, Depreciation and O&M is not linked with actual dispatch
- Hence, Keeping in view above, the tariff based on Take or Pay is justified consistent with IPPs and past precedent

Issue (ii)

Whether the requested tariff control period is justified?

Generation Tariff Petition - Issue (ii)

- **Tariff Control period** for all IPPs is based on its **licensed life**
- Since, KE is moving from an **integrated tariff to unbundled generation tariff** hence tariff control period for the remaining useful life of the plant as per the Generation License is justified

Plant Name	Life as per Generation License	Requested tariff control period till:
BQPS II	October 2042	FY 2043
BQPS III – Unit 1	30 years from COD	FY 2053*
BQPS III – Unit 2	30 years from COD	FY 2053*
KCCPP	August 2039	FY 2040
KTGEPS	August 2039	FY 2040
SGEPS	August 2039	FY 2040
BQPS I – Unit 1	September 2023	FY 2024
BQPS I – Unit 2	September 2023	FY 2024
BQPS I – Unit 5	September 2026	FY 2027
BQPS I – Unit 6	September 2032	FY 2033

*Requested Tariff Control period was based on expected COD of units in FY23. Subsequently, Unit 2 COD has been declared on 9th March 2023 whereas Unit 1 Test is planned on May 9, 2023.

In case of extension required for any of the plants above, then KE would separately request for the Authority's approval based on the least cost analysis of available options at that time.

Issue (iii)

Whether the request to allow all plants as must run for Economic Merit Order under Take or Pay Gas Supply Agreement is justified?

Generation Tariff Petition - Issue (iii)

- KE has not asked for all plants to be on must run at all times, rather, KE has asked in case where any agreement for supply of RLNG is entered with a condition of minimum off take, those plants shall be allowed as must run up to the extent of minimum off take
- Currently, KE has agreement with PLL for BQPS III (till December 2025) based on Take or Pay mechanism (75% of contract quantity is binding for Annual Delivery Plan with daily binding for the notified quantities)
- Further, long term supply agreements post expiry period of current BQPS-III Gas agreement is under consideration and similarly for other plants KE is also evaluating alternate Gas supply agreements
- RLNG agreements are based on **minimum offtake requirements, hence,** plants will have to be operated to meet the such requirements
- Important to understand that any such agreement will be done keeping in view the demand profile to ensure maximum optimization and will be submitted for regulatory approval
- Accordingly, in order to avoid any undue penalties or charges that will otherwise be applicable under Take or Pay obligations during the times where the plant is not required to be operated as per EMO principle. i.e. **Must run operating condition** will be required to be **considered for that time period only**.
- Considering that **Take or Pay is normal requirement** to arrange RLNG which is critical to ensure availability of generation plants, must run condition of plant to fullfill the minimum off take is justified

Issue (iv)

Whether the requested outage period is justified?

Generation Tariff Petition - Issue (iv)

- In order to maintain their operational performance including dispatch capabilities and ensure supply of uninterrupted power, all plants require regular maintenance and overhauls as per the OEM recommended approach
- Accordingly, KE has included the outages based on 90% annual availability (10% outages), along with periodic overhauls as per OEM recommendations. Further, BQPS I has been taken at 85% annual availability and major overhauls
- Accordingly, average annual availability factors for each plants are as follows

Plant Name	Average Availability Factor (%)*
BQPS II	88.41%
BQPS III – Unit 1	88.57%
BQPS III – Unit 2	88.57%
KCCPP	88.66%
KTGEPS	87.81%
SGEPS	87.64%
BQPS I	83.41%

*Represents average availability over the entire remaining plant life calculated based on yearly provision for Scheduled & Forced Outages and Overhauls based on operating Hours as per OEM recommendation.

- Furthermore, the outage plan have also been verified and vetted by an Independent Consultant and their report has been submitted to the Authority

Issue (v) and (vi)

Whether the requested heat rates and net capacity is justified?

Whether the requested adjustment on account of part load, degradation and ambient temperature is justified. Whether the requested Curves on such account are justified?

Generation Tariff Petition - Issue (v)

- For the purpose of **calculation of fuel cost component of tariff**, KE has **requested NEPRA approved heat rates** and **net capacity based on performance tests for all plants on base load,** along with part load and degradation adjustments based on curves, consistent with IPPs
- **For BQPS-III heat rate values are based on EPC guaranteed values** / calculated from guaranteed values which **shall be adjusted based on tests performed at the time of commissioning** of the plant for which KE would request adjustment of Heat rate and capacity based on test results
- Further, **for BQPS-II Heat rate and capacity on HSD which will be commissioned in future, KE has submitted estimated values which shall be adjusted based on test at the time of commissioning**
- Inline with IPPs, KE has proposed the reference tariff on base load Heat rates along with part load and degradation adjustments based on Hourly load and part load / degradation factors as per the curves

Generation Tariff Petition - Issue (vi) (2/2)

- KE has used the **Part Load & Degradation Curves prepared by experts which** were also engaged at the time of **Heat Rate Test** performed earlier that have been **used by the Authority in determining the Allowed Heat Rates.**
- For **BQPS-III**, **Part Load Curves provided by EPC Contractor** have been used whereas **Degradation Tables** have been requested **to be updated post commissioning of the plant**.
- In view of the above, the **adjustments for Part load, degradation and ambient temperature, inline with tariff structure of other IPPs, is justified**

Generation Tariff Petition - Issue (vi) (1/2)

- **Degradation:** refers to **decline in the generation Capacity** & **Heat Rate** of the plants as they **operate and age over their useful lives**. As a result, their operational efficiencies and capacities decline. Therefore, in order to account for the same, degradation adjustment is required **based on degradation curves**.
- **Part load adjustment: Plants operate at their maximum efficiency at Base Load levels (i.e. 100%)**. However, **due to varying demand levels** throughout any given period of time, plants have to be **operated at various technically accepted load levels based on the EMO principle**. This results in lower efficiency levels, **impact of which is requested to be allowed on an hourly basis in the Allowed Heat Rate** of the Plant based on Part load curve of the plant.
- **Ambient Temperature:** As the plants operate, their **capacities** originally established at **reference site conditions vary** due many variables including a **change in ambient temperature**. Therefore, **adjustment for ambient temperature is required** to account for the same and for calculation of part load adjustment and capacity payment.
- These adjustments are essential to allow prudent cost to KE and bring KE's tariff at comparable position with respect to other IPPs. **In Current MYT, the Authority has allowed part load adjustment on average basis for the control period**. However, KE has proposed to align the mechanism with IPPs for allowing part load on the basis of hourly data.

Issue (vii)

Whether the requested fuel cost components of each unit is justified?

Generation Tariff Petition - Issue (vii) (1/2)

- Fuel cost component represents the cost of fuel consumed for generation of Net Electrical Output at the allowed efficiency levels by the Authority.

Heat Rates

- KE has calculated fuel cost components based on heat rates as discussed in issue (v)
- KE has **also requested fuel cost component on heat rates for Simple Cycle Operations for all plants (except BQPS I)** when **steam turbine is on outage** and the plant is required to **operate to fulfill demand based on Economic Merit Order** on pricing of simple cycle operations **or during startups**
- KE has submitted heat rates on open cycle based on test reports

Fuel Prices

- Fuel cost component has been calculated using **Heat Rates (base load) as explained above** and **reference fuel prices as of November 2022** as follows:

Plant Name	Reference Rate (PKR / MMBtu)	Reference Rate (PKR / Litre)	Reference Rate (PKR / M. Ton)
	a	*b*	*c*
RLNG (SSGC)	3,301	N/A	N/A
RLNG (PLL)	2,930	N/A	N/A
HSD	6,067 (Note)	219.94	N/A
Furnace Oil (FO)	3,378 (Note)	N/A	137,701
Note: *Calculated values using calorific values and density.*			

Generation Tariff Petition - Issue (vii) (2/2)

Indexation Mechanism

- As **allowed under current MYT**, **Fuel Cost Component calculated at Reference Fuel Prices** is requested to be indexed as follows:
  - For **RLNG & Indigenous Natural gas** based on **revised HHV prices notified by the OGRA**.
  - While **HSD and HFO fuel prices** are requested to be indexed based on **revised HHV prices of HSD and HFO based on weighted average method** and **revised calorific value** determined based on lab test based on frequency mechanism proposed in the petition.
- Further, **fuel cost component** is proposed to be **adjusted to account for heat rate degradation and part load factor** as discussed in "**Issue vi" above.**

Issue (viii) & Issue (ix)

Whether the requested Variable O&M cost component is justified?

Whether the requested Fixed O&M cost component is justified?

Generation Tariff Petition - Issue (viii) (1/7)

- KE has proposed O&M structure **aligned with tariff of other IPPs**, where allowed **O&M cover both Capital and Revenue nature of expenses**. This will ensure consistency with Tariffs of IPPs
- The O&M costs have been further bifurcated into Variable O&M costs and Fixed O&M costs and foreign and local costs
- These costs have been forecasted keeping in view the maintenance requirements and overhaul cycles for the remaining life, and have also been analyzed with historic expenses and benchmarked with comparable IPPs
- Basis and calculation of these, including Overhauling requirements, reasonableness of expenses and costs have been **validated and benchmarked by an Independent Consultant** in detail, report of which has also been submitted to the Authority
- **Variable O&M** costs represents **maintenance costs** consisting of both parts and services procured **incurred based on plants' operating hours.**
- **Fixed O&M** costs represents the cost incurred to **ensure plant's availability irrespective of its operations**. This cost is critical to maintain performance, availability and continued operations of the plants.
- Standard indexation mechanism is proposed, inline with IPPs whereby **Foreign O&M expenses shall be indexed to PKR / USD exchange rates and US CPI** whereas **Local O&M expenses shall be indexed to Pak CPI**.
- **Plant wise benchmarking of O&M costs** and **comparison of historic O&M costs trend vs future requested O&M** is given the following slides.

O&M benchmarking & Historic O&M Trend (BQPS-III) (2/7)

Description	Unit 1	Unit 2	HBS*	Balloki*	Average of HBS & Balloki
	a	b	c	d	e = Average (c:d)
Total Variable O&M	0.2730	0.2726	0.2656	0.2963	0.2809
Total Fixed O&M	0.3565	0.3559	0.3344	0.3475	0.3410
Total O&M Cost	**0.6295**	**0.6285**	**0.6000**	**0.6438**	**0.6219**

Key findings

- BQPS III includes 2 single shaft units. Accordingly, any reference of similar technology with same configuration of single shaft (common generator for GT and ST) could not be found in Pakistan, however, the closest benchmark with respect to performance parameters were Balloki and HBS. BQPS III performance parameters are subject to change based on third party / NEPRA tests to be performed at COD.
- Overall BQPS III O&M cost tariff is slightly higher than HBS and lower than Balloki.

*Revised indexed tariff for April to June 2022 quarter adjusted for PKR to USD exchange rate of 206 and latest available CPI of June 2020 (i.e. 269.27 as per NEPRA (determinations), adjusted for CPI of 8.9% (FY21) and 9.0% (FY22) respectively. Further, fixed O&M components have been grossed up at 88.57% (representing average projected availability of BQPS III).

* Historic numbers have been indexed to the reference economic factors of petition from the respective year wise historic factors for comparison against **Levelized Number for FY24 onwards.**

O&M benchmarking & Historic O&M Trend (BQPS-II) (3/7)

Description	KE	UCH-II*	Nandipur*	Average of Nandipur & UCH-II
	a	b	c	d = Average (b:c)
Total Variable O&M	0.4321	0.4707	0.5053	0.4880
Total Fixed O&M	0.7459	0.7068	0.4682	0.5875
Total O&M Cost	**1.1779**	**1.1775**	**0.9734**	**1.0755**

Key findings

Fixed cost ratio in BQPS II (63.3%) is fairly aligned with UCH-II (60.0%) however it is at higher side as compared to Nandipur (36.2%). This is due to extensive maintenance needs related to sea water once through cooling system, 3 huge gas compressors and paint requirement due to sea side location, corrosive environment and usage of sea water for cooling / RO plant etc.

Variable O&M of KE is fairly aligned as compared to its benchmark plants.

Description	Bin Qasim Power Station II (Historic Trend)								
	Unit	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	6 Yr. Avg. (Indexed)*	FY24 onwards Levelized
Variable O&M	PKR / kWh	0.2865	0.1607	0.3340	0.2713	0.2750	0.3045	**0.4298**	**0.4321**
Total Fixed O&M	PKR Mn/ Yr	5,656	3,623	2,686	1,768	2,101	2,067	**3,300**	**2,857**

*Revised indexed tariff as per decision dtd. 11th April 23 for PKR to USD exchange rate of 206 and latest available CPI of June 2020 (i.e. 269.27 as per NEPRA (determinations), adjusted for CPI of 8.9% (FY21) and 9.0% (FY22) respectively. Further, fixed O&M components have been grossed up at 88.41% (representing average projected availability of BQPS II).

* Historic numbers have been indexed to the reference economic factors of petition from the respective year wise historic factors for comparison against **Levelized Number for FY24 onwards.**

O&M benchmarking & Historic O&M Trend (KCCPP) (4/7)

Description	KE	Habibullah Coastal Power Limited*
	a	b
Total Variable O&M	1.2088	0.9417
Total Fixed O&M	0.8347	1.5268
Total O&M Cost	**2.0435**	**2.4685**

Key findings

- From technical compatibility perspective, KCCPP average tariff has been benchmarked against estimated indexed tariff of HCPC plant for FY22. HCPC is considered as close benchmark of KCCPP as it is using the same technology. Since HCPC does not fall under NEPRA tariff determination regime, HCPC's tariff is not available in public domain. However, based on general market insights of IC/KE, power plant operating under 1994 power policy used to have energy and capacity charge with in their tariff. Escalable component of energy charge was meant to cover salaries and wages, administrative cost and repair and maintenance costs.
- Variable O&M of KCCPP is higher than HCPC because of site specific additional auxiliaries at KCCPP, such as sea water systems for cooling, extensive gas compressing systems due to low gas pressure supply and two steam turbines. However, total KCCPP O&M cost tariff is lower than HCPC despite KCCPP having higher auxiliary consumption (6.854%).

Description	Korangi Combined Cycle Power Plant (Historic Trend)								
	Unit	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	6 Yr. Avg. (Indexed)*	FY24 onwards Levelized
Variable O&M	PKR / kWh	1.5960	0.5505	1.0304	0.6806	0.5039	1.5711	**1.6253**	**1.2088**
Total Fixed O&M	PKR Mn/ Yr	849	727	960	771	2,928	1,485	**1,661**	**1,432**

*Revised indexed tariff for April to June 2022 quarter adjusted for PKR to USD exchange rate of 206 and latest available CPI of June 2020 (i.e. 269.27 as per NEPRA (determinations), adjusted for CPI of 8.9% (FY21) and 9.0% (FY22) respectively. Further, fixed O&M components have been grossed up at 88.66% (representing average projected availability of KCCPP).

* Historic numbers have been indexed to the reference economic factors of petition from the respective year wise historic factors for comparison against **Levelized Number for FY24 onwards.**

O&M benchmarking & Historic O&M Trend (KTGEPS) (5/7)

Description	KE	SNPCL*
	a	b
Total Variable O&M	1.4137	1.2651
Total Fixed O&M	0.4345	0.6190
Total O&M Cost	**1.8482**	**1.8841**

Key findings

- Any reference of similar technology with same configuration of combined cycle mode could not be found in Pakistan, however, the closest benchmark with respect to gas engines in combined cycle mode i.e., SNPCL was considered for tariff benchmarking.
- Overall KTGEPS O&M cost tariff is less as compared to the benchmark power plant, due to lower number of 60K major maintenance events (i.e. 53 activities during remaining life of plant until FY39).

Description	Korangi Town Gas Engine Power Station (Historic Trend)								
	Unit	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	6 Yr. Avg. (Indexed)*	FY24 onwards Levelized
Variable O&M	PKR / kWh	1.1261	1.2880	0.6487	1.6178	1.8775	1.3729	**2.1241**	**1.4137**
Total Fixed O&M	PKR Mn/ Yr	519	402	481	391	475	457	**589**	**308**

*Revised indexed tariff for April to June 2022 quarter adjusted for PKR to USD exchange rate of 206 and latest available CPI of June 2020 (i.e. 269.27 as per NEPRA (determinations), adjusted for CPI of 8.9% (FY21) and 9.0% (FY22) respectively. Further, fixed O&M components have been grossed up at 87.81% (representing average projected availability of KTGEPS).

* Historic numbers have been indexed to the reference economic factors of petition from the respective year wise historic factors for comparison against **Levelized Number for FY24 onwards.**

O&M benchmarking & Historic O&M Trend (SGEPS) (6/7)

Description	KE	SNPCL*
	a	b
Total Variable O&M	1.4813	1.2651
Total Fixed O&M	0.4305	0.6202
Total O&M Cost	**1.9118**	**1.8853**

Key findings

- Any reference of similar technology with same configuration of combined cycle mode could not be found in Pakistan, however, the closest benchmark with respect to gas engines in combined cycle mode i.e., SNPCL was considered for tariff benchmarking.
- Overall SGEPS O&M cost tariff is slightly higher as compared to the benchmark power plant, due to higher number of 60K major maintenance events (i.e. 64 activities during remaining life of plant until FY39).

Description	SITE Gas Engine Power Station (Historic Trend)								
	Unit	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	6 Yr. Avg. (Indexed)*	FY24 onwards Levelized
Variable O&M	PKR / kWh	1.0818	1.2153	1.7588	0.6687	0.3179	0.1823	**1.8972**	**1.4813**
Total Fixed O&M	PKR Mn/ Yr	543	444	489	455	497	373	**621**	**306**

*Revised indexed tariff for April to June 2022 quarter adjusted for PKR to USD exchange rate of 206 and latest available CPI of June 2020 (i.e. 269.27 as per NEPRA (determinations), adjusted for CPI of 8.9% (FY21) and 9.0% (FY22) respectively. Further, fixed O&M components have been grossed up at 87.64% (representing average projected availability of SGEPS).

* Historic numbers have been indexed to the reference economic factors of petition from the respective year wise historic factors for comparison against **Levelized Number for FY24 onwards.**

O&M benchmarking & Historic O&M Trend (BQPS-I) (7/7)

Description	BQPS-I Unit 6	TPS – Jamshoro*	TPS – Muzaffargarh	HUBCO	Average of Jamshoro, Muzaffargarh & HUBCO
	a	b	c	d	e = Average (c:d)
Total Variable O&M	0.2686	0.1098	0.1625	0.3131	0.1951
Total Fixed O&M	0.8103	3.1636	2.3613	0.5429	2.0226
Total O&M Cost	**1.0789**	**3.2734**	**2.5238**	**0.8560**	**2.2177**

Key findings

- Considering TPS – Jamshoro / Muzaffargarh are on "take and pay" basis, they are not considered as most appropriate benchmarks purposes. Accordingly, HUBCO being an IPP, is considered a close benchmark.
- Overall O&M tariff of BQPS I is substantially lower than TPS – Jamshoro / Muzaffargarh, however, it is higher than HUBCO mainly due to fixed O&M cost (~PKR 1.0b over the assumed tariff control period) linked to onetime activities at unit-6 such as water wall panels replacement, IP Turbine diaphragm replacement, Generator/Turbine rotor inspection/ balancing & LV switchgear busbar replacement etc.

Description	Bin Qasim Power Station I (Historic Trend)								
	Unit	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	6 Yr. Avg. (Indexed)*	FY24 onwards Levelized
Variable O&M – Unit 1	PKR / kWh	0.6094	0.3038	0.5529	0.2593	0.1165	0.0869	**0.5162**	**0.2313**
Variable O&M – Unit 2	PKR / kWh	0.1604	0.8314	0.3106	0.2251	0.0470	0.1778	**0.3665**	**0.2153**
Variable O&M – Unit 5	PKR / kWh	0.1130	0.4670	0.0682	0.1297	0.1626	0.0760	**0.2710**	**0.1688**
Variable O&M – Unit 6	PKR / kWh	0.0549	0.4255	1.1921	0.1587	0.3001	0.1953	**0.5384**	**0.2685**
Total Fixed O&M	PKR Mn/ Yr	2,309	2,819	2,117	2,618	2,285	3,108	**3,496**	**1,433**

*Revised indexed tariff for April to June 2022 quarter adjusted for PKR to USD exchange rate of 206 and latest available CPI of June 2020 (i.e. 269.27 as per NEPRA (determinations), adjusted for CPI of 8.9% (FY21) and 9.0% (FY22) respectively. Further, fixed O&M components have been grossed up at 83.41% (representing average projected availability of BQPS I).

* Historic numbers have been indexed to the reference economic factors of petition from the respective year wise historic factors for comparison against **Levelized Number for FY24 onwards.**

Issue (x)

Whether the requested insurance cost component is justified?

Generation Tariff Petition - Issue (x)

- Inline with IPPs KE has proposed insurance costs for each plant based on lower of 1% of their respective EPC value or actual premium paid.
- Insurance is required to cover the following risk:
  - Machinery Breakdown
  - Terrorism
  - Third Party Liability & Business Interruption.
- Summary of FY24 values is given as follows, whereas year wise components, calculated based on the same approach have been given in Tariff Table.

Plant Name	UoM	BQPS-II	BQPS-III (Unit 1)	BQPS-III (Unit 2)	KCCPP	KTGEPS	SGEPS	BQPS-I
EPC Cost	$ Mn	375	221	221	175.2	84.39	73.28	340.94
1% of EPC Cost	$ Mn	3.75	2.21	2.21	1.75	0.84	0.73	2.22*
Reference Exchange Rate	PKR/$	206	206	206	206	206	206	206
1% of EPC Cost	PKR Mn	772.5	455.26	455.26	360.90	173.84	150.95	456.57
Net Capacity Units on Gas **(Levelized)**	GwH	3,830.19	3,489.87	3,490.04	1,715.04	708.05	711.87	3,228.43*
Insurance Component	**PKR / kWh**	**0.2017**	**0.1305**	**0.1304**	**0.2104**	**0.2455**	**0.2120**	**0.1414**
* Values have been pro-rated to account for the partial year operations for Unit 1 & 2 (i.e. 92 days each).								

Issue (xi)

Whether the requested Regulatory Asset Base is justified?

Generation Tariff Petition - Issue (xi)

- **In line with Current MYT**, Regulatory Asset Base (RAB) shall **comprise of written down value of plant excluding surplus on revaluation** and **including Intangibles, and CWIP at start of control period.** This is proposed to be depreciated each year using straight line method based on remaining useful life of the plant.

- Under the **existing MYT**, **CAPEX expenditure has been allowed as part of RAB**. However, for the **proposed MYT**, in order to **align the tariff structure with IPPs**, KE has proposed the following:

  - **Closing RAB as of FY23 will be fixed**. Any **specific additions to RAB** relating to any specific capital expenditure (For e.g. HSD infrastructure at BQPS-II) during the period will only be **made subject to NEPRA's prior approval**. Consequently, a one-time adjustment in reference tariff will be filed accordingly

  - **Routine CAPEX & REVEX expenditures** for plant maintenance shall be **recovered through O&M expenses in tariff, inline with IPPs**

- Based on **Audited financials of FY22 and projected CAPEX for FY23**, KE has projected **Plant wise RAB as of FY23.** This has been **proposed to be actualized based on audited financial statements for FY23**. Accordingly, a one-time adjustment will be filed to account for the changes in RAB on account of actualization in the reference tariff.

Issue (xii)

Whether the requested Debt-Equity ratio of 70:30 is justified?

Issue (xiii)

Whether the requested Dollar based Return on Equity of 15% is justified?

Generation Tariff Petition - Issue (xii)

- Within the **Current MYT**, KE was **allowed a Return on Regulatory Asset Base based on a notional debt to equity ratio of 70:30**
- Considering the DE ratio allowed in the Current MYT, **KE has requested Return on Regulatory Asset Base based on a notional debt to equity ratio of 70:30.**

- Inline with the Current MYT, **KE has calculated the tariff on dollarized 15% return on equity**
- For the purpose of exchange rate indexation till FY 2023, KE has applied the **same exchange rate indexation mechanism as used by NEPRA in the current MYT**
- F**or FY24 onwards, exchange rate indexation** has been requested based on ratio of **Revised Exchange Rate to Reference Exchange Rate of 206 PKR/ USD, as also done for IPPs**

Issue (xiv)

Whether the requested Cost of Debt including Hedging Cost is justified?

Generation Tariff Petition - Issue (xiv) (1/2)

- KE has loans outstanding for BQPS III plant, for which below cost has been included in the tariff, based on cost of debt allowed to IPPs
    - **Cost of Debt for Local Component** based on **3-month KIBOR plus a spread of 2.5%.**
    - **Cost of Debt for Foreign Component** based on **3-month LIBOR plus a spread of 4.5%.**
    - **Hedging Cost based on difference of KIBOR and LIBOR plus a hedging cost spread of 2.5%** for the foreign portion
        - Considering the macro economic situation, hedging spreads have increased, further, KE also plans to hedge the Spread portion, along with principal
    - **Tax on Interest Payments to Foreign Lenders** have been separately requested **as pass through items**
    - Cost of debt ratio for **foreign and local has been assumed at 75:25, to be actualized on actual foreign local ratio**
- Since there are **no Outstanding Loans for Other Plants,** KE has requested **Cost of Debt for Local Component** based on **3-month KIBOR plus a spread of 2.5%.**
- Further, KE has claimed **ECA premium for BQPS-III plant** as pass through in **Current MYT** on actual**,** on which separate proceeding for approval is in progress
- **Indexation for change in KIBOR/ LIBOR is being requested on a quarterly basis in the proposed MYT**, based on the defined formula in the petition.

Generation Tariff Petition - Issue (xiv) (2/2)

Impact of SOFR Implementation:

- The **spreads on foreign loans** are **based on LIBOR** and accordingly, LIBOR has been used as a reference for calculating foreign cost of borrowing. However, once Secured Overnight Financing Rate **(SOFR) replaces LIBOR** as a new interest rate benchmark **post June 2023, LIBOR is requested to be replaced by SOFR.**
- Accordingly, **any consequent change in spreads** as a result of above transition **will also be submitted to the Authority** for their consideration **as a one-time adjustment in the reference tariff**.

Issue (xv)

Whether the requested Depreciation is justified?

Generation Tariff Petition - Issue (xv)

- **Depreciation represents the recovery of principal amount** invested over the remaining useful life of the plant.
- Depreciation is **proposed to be calculated using a straight line method** based on **written down value of RAB at the end of FY23 and remaining useful life** of the plant till the end of Control period.
- In **addition to actualization of FY23 RAB** based on updated financial statements, KE has requested that in the event of **change in RAB** due to addition of **any specific project approved by the Authority** (For e.g. HSD infrastructure at BQPS-II) **depreciation component shall be recalculated in the reference tariff**.
- Accordingly, **KE will file for an adjustment in reference tariff** of depreciation component as above for the Authority's consideration.

Issue (xvi)

Whether the requested Cost of working Capital is justified?

Generation Tariff Petition - Issue (xvi) (1/4)

- KE has requested a cost of working capital mechanism **similar to IPPs comprising of following components**:

Legends	Working capital components
A	Cost of Fuel Inventory
B	Cost of Fuel in Receivable cycle based on 30 days receipt period and 7 days payment period on RLNG fuel with 17% sales tax – based on units at plant factor, to be actualized every quarter.
C	Cost of SBLC (currently included based on SBLC given to SSGC allocated to BQPS II plant. However, will be updated in future in case of any new agreement)
D	Cost of Stores & spares inventory

- Each of above-mentioned components and the calculation methodology is explained in the following:

Generation Tariff Petition - Issue (xvi) (2/4)

A. Cost of Fuel Inventory

- **Cost of fuel inventory such as HSD** in case of KCCPP, BQPS-III & BQPS-II plants (to be commissioned) is **maintained for 7 days while 65,000 metric tons of HFO fuel** is maintained **(16,250 MT / unit)** in the case of BQPS-I plant **as allowed by the Authority in current MYT** to **ensure uninterrupted supply of power** in the event of **gas shortages / low gas pressure.**

B. Fuel Cost Receivable Cycle:

- Cost on Receivable cycle is **based on 30 days receipt period and 7 days payment** period on **RLNG fuel** resulting in **net receivable for 23 days**.
- Similarly, Cost on Receivable cycle is **based on 30 days receipt period and 18 days payment** period on **HFO fuel** resulting in **net receivable for 12 days**.
- Accordingly, **working capital for fuel cost for abovementioned days on proposed plant load factor** (proposed to be actualized on quarterly basis) for **RLNG & 60% load factor for HFO** is required based **on which cost of working capital is calculated**

Cost of Working Capital for the above two components is calculated based on the **amount as computed above and reference KIBOR (i.e. 15.16%) + Spread of 2%**

Generation Tariff Petition - Issue (xvi) (3/4)

C. Cost of SBLC

- **SBLC cost is being requested based on the lower of**:
  - **60 days worth of consumption of RLNG** in PKR terms at **Reference Fuel Prices**;
  - **Actual amount of SBLC given**.
- The **cost will be calculated on the above amount at the lower of**:
  - **Actual Cost paid**;
  - **SBLC Rate**. i.e. **0.6%** (in case of **BQPS-III**) & **0.5%** (in case of **Other Plants**)
- Furthermore, the above requested component in working capital is **currently based on the existing issued SBLC to SSGC & PLL (For BQPS-III RLNG Supply).**
- However, going forward SBLC rate is proposed to be adjusted in case of any new agreement with fuel suppliers subject to cap of 1.5% as allowed to IPPs.

Generation Tariff Petition - Issue (xvi) (4/4)

D. Cost of Store & Spares:

- In line **with Current MYT,** wherein in addition to the Return on RAB, **Stores & Spares were considered in Working Capital Component** as these **items were not part of the RAB** on which KE was allowed return.
- Accordingly, KE has included the **critical stores & spares required to maintain performance, availability and continued operations of the plants** in the absence of which risk of power outages can arise. These are maintained **as part of inventory (i.e. not included in RAB), to be utilized as per need basis**
- Cost of working capital on maintaining stores and spares is **calculated based on amount of inventory maintained and reference KIBOR (i.e. 15.16%) + Spread of 2%.**

Indexation Mechanism

- Cost of Working Capital shall be **indexed with variations in KIBOR** and **change in fuel prices on a quarterly basis**.
- Further, KE has requested to **update reference component** in case of any change in circumstances such as **addition of HSD inventory to BQPS-II** or **update in SBLC cost pursuant to any changes / addition in the agreement(s)**.

Issue (xvii)

Whether the requested Pass-Through Items are justified?

Generation Tariff Petition - Issue (xvii) (1/2)

Items	*Description*
Corporate tax and WPPF / WWF	➢ Corporate tax and WPPF / WWF is applicable on consolidated basis ➢ Accordingly, KE proposes the same to be **allowed as pass through in Supply business (petition to be submitted)** keeping in view, **KE's legal structure remains unchanged**. ➢ However, in case of **legal change in company's structure and Corporate tax & WPPF / WWF become applicable on KE's generation plants,** same is requested to be **allowed as pass through as done in the case of IPPs.**
Unrecovered Cost	➢ KE has proposed recovery of any **unrecovered cost determined by NEPRA pertaining to Current MYT pertaining to generation to be allowed in the next term as pass through.**
Take or pay arrangement charges	➢ In case of any **future/ existing RLNG fuel agreements with suppliers on Take or Pay basis** which require KE to ensure **regular payments for Fuel Charges regardless of plant operations**, same are proposed to be **allowed as pass through**
Costs pursuant to Unbundling in future	➢ **In future, if there is any legal unbundling**, KE will file for a **onetime adjustment for additional costs** pursuant to unbundling for determination by NEPRA which shall be pass through once approved by NEPRA.

Generation Tariff Petition - Issue (xvii) (2/2)

Items	*Description*
GIDC Charges	➢ Currently, **the matter of GIDC is sub-judice** and no amount is **passed onto the consumers and NEPRA has also stated that the adjustment will be allowed post determination by Court.** ➢ **Accordingly, if any GIDC is required to be paid** (pertaining to prior periods) **based on court verdict,** the same being of pass through nature, is proposed **to be allowed as pass through**
Costs related to Import of Power during Non-Operational Hours	➢ **In case plant is on stand-by but not in operation in accordance with the EMO,** costs pertaining to **import of Power is requested to be passed through in Tariff.** ➢ This ensures **efficient startups to meet customer demand** requirements based on **EMO principle.**
Start up Shutdown, and Black Charges	➢ **Considering Start up Shutdown, and Black Charges are genuine costs of generation operations**, same are requested to **be allowed as pass through.** ➢ For details, please refer issue (xviii).
Costs relating to Force Majeure Events	➢ **As allowed to IPPs, costs related to** a **Force Majeure Events** are requested to be **passed through** in Tariff ➢ **Details and modalities** of force majeure events will be included **under the SLA, in line with agreements of other IPPs.**

Issue (xviii)

Whether the requested Startup/Black Start/Shutdown Charges are justified?

Generation Tariff Petition - Issue (xviii) (1/3)

- In order to operate plant based on EMO principle, KE has requested recovery of **Startup and Shutdown Charges** in the upcoming control period.
- Furthermore, Black Start Facilities have also been developed at KCCPP and planned to be developed on BQPS II (HSD), and BQPS III Plants for which costs have also been requested.
- Details of Startup/Black Start/Shutdown Charges and calculation methodology is explained as follows:

A. ***Startup Charges:***

- Start up refers to any startup of **a plant / unit that is necessary for a station to comply with the Dispatch requirements / Instructions and that results in the synchronization with the grid system.**
- Start up charges are requested **based on reference start up charges indexed with relevant indices**, **including fuel prices and electricity tariff** as **defined in the petition**.
- **Charges claimed under Start up are requested based on net basis** considering KE has separately **requested recovery on units sent to grid based on simple cycle operations (excluding BQPS-III) as simple cycle operations have been requested separately**

Generation Tariff Petition - Issue (xviii) (2/3)

B. ***<u>Black start Charges:</u>***

- Black start refers to startup of a plant / Unit having black startup facility, **to restore power supply to the respective power plant necessary for a station to comply with the Dispatch requirements / Instructions, without relying on the external electric power transmission network to recover from a total or partial shutdown of the transmission network.**

- Black start charges is proposed to be allowed **based on reference start up charges indexed with relevant fuel prices** as **defined in the petition**.

Generation Tariff Petition - Issue (xviii) (3/3)

c. ***Shutdown Charges:***

- Similar to start up, shut down of **a plant / unit is necessary for a station to comply with the Dispatch requirements / Instructions that results in the de-synchronization with the grid system**.
- Shutdown charges are requested **based on reference shutdown charges indexed with relevant fuel prices and electricity tariff** as **defined in the petition**. These are mainly being claimed on account of the following reasons:
  - Owing to compliance of EMO, frequent start / stop is a common phenomenon to Plants.
  - During shutdown, machines follow a shutdown sequence for cool down and are not immediately brought to a standstill position to avoid thermal stresses.
  - The machine therefore consumes fuel from breaker opening till flame off.
  - Moreover, power is imported till the equipment (such as main & auxiliary cooling water pumps, boiler feed pump and essential auxiliaries) are gradually turned off to avoid thermal stresses on boiler and condenser.

- In view of the above, Start up, Shut down and Black start up charges are proposed to be allowed in the tariff considering **these are genuine cost of running the plant operations as these are incurred in accordance with EMO and hence, are beyond control of KE.**

Issue (xix)

What will be the mechanism to ensure availability of each plant?

Generation Tariff Petition - Issue (xix)

- In the Current MYT, KE maintains the record of the availability of its **plants on an hourly basis data of which is also submitted to the Authority** in the form of **Hourly EMO Report** submitted on a weekly basis**.**
- Furthermore, KE also has a **mechanism** in place for **recording and reporting of all data related to hourly availability of plants**.
- Further, to **align its practices with IPPs**, a mechanism for capacity declaration and its adjustment will be put in place in the SLAs covering the following points, generally covered under PPAs of IPPs:
  - **Declaration of Available Capacity.** Annual dependable capacity shall be based on ADC test to be carried out at the start of each year by plant team and results will be submitted to NEPRA.
  - **Revised Declared Available Capacity.**
  - **Adjusted Declared Available Capacity.**
  - **Adjustment mechanism for any Forced Outages in the above declared Available Capacities.**
- KE has submitted Head of Terms for SLAs within the petition

Issue (xx)

What will be the adjustment mechanism for over recovery due to settlement of imbalances under CTBCM?

Generation Tariff Petition - Issue (xx)

- KE's plants will be for KE's regulated consumers
- As per the CTBCM design and Market Commercial Code, energy imbalances are to be settled at the prevailing marginal price for each hour
- KE being the Supplier of Last Resort (SoLR), any imbalances which may arise due to Demand or Generation for the regulated market, shall be treated as pass-through
- KE has proposed the same in its plan for CTBCM Evaluation & Integration Plan and is also in line with consultative session held on December 28, 2022, wherein this was discussed and proposed that imbalances for regulated market (for DISCOs and KE) shall be treated as pass-through

Issue (xxi)

Whether a claw-back mechanism is required to be included in the tariff?

Generation Tariff Petition - Issue (xxi)

- Considering that O&M estimates may vary over the period of plant life**, claw back mechanism for sharing of O&M savings has been made part of tariff**
- As per the mechanism, in case **O&M expenses recovery is higher than the actual incurred O&M expense** at **completion of an overhaul cycle and at end of plant life**, **gain shall be shared between Consumer and KE in 60:40 ratio**
- However, in case of **under recovery of O&M expense** at the completion of an overhaul cycle, **the difference shall be carried over to the next overhaul cycle or the end of plant life as applicable.**
- **Overhaul cycle for a plant** is considered to have been **completed when all the major components of the plant,** for e.g. GTs & STs, **have undergone at least one Minor & one Major Overhaul/ Inspection.** Further detail regarding **calculation of overhaul cycle for each plant** has been defined in the Tariff petition.

Issue (xxii)

KE to provide status of investment allowed for generation in previous Multi Year Tariff along with benefits achieved.

Generation Tariff Petition - Issue (xxii) (1/2)

- Details of Investments carried out / planned in current MYT are given below:
- A comparative analysis of Investments allowed by NEPRA and actual investment incurred by KE in the Generation Segment is presented below:

Description	NEPRA Allowed (FY17-FY23)	Actual CAPEX (FY 17 - FY22)	Projected CAPEX FY 23	CAPEX (FY 17 - FY 23)	Excess / (Shortfall)
	A	B	C	D = B + C	E = D - A
BQPS-III (Plant) – excluding allied transmission project	72,240	73,238	22,761*	96,000	23,760
Other Generation CAPEX	25,594	36,991	3,206	40,197	14,603
Total CAPEX	**97,834**	**110,230**	**25,968**	**136,197**	**38,363**

*Cost to be actualized after completion of FY 2023 based on audited financial statements

Generation Tariff Petition - Issue (xxii) (2/2)

- Additional investment is **mainly on account of significant devaluation of Rupee against USD and higher inflation rates** compared to original estimates used by NEPRA. Additionally, certain **changes in scope necessary to ensure safe and reliable operations of the plants** also contributed to the excess spending.
- Due to the investments incurred, KE was able to ensure availability and reliability of plants**, avoid outages and ensured continued power supply** across its service territory. Consequently, the following benefits have been realized during the current MYT **(FY 2016 vs FY 2022)** :
  - Increase in **Fleet Reliability** from 96% to 99.5%.
  - Increase in **Fleet Availability** from 81% to 91%.
  - Increase in **Fleet Gross Efficiency - HHV** from 37% to 39%.
  - Increase in **Generation Capacity** from 1,875MW to 2,817MW[1] .
  - Reduction in **Fleet Energy Loss Rate** from 6% to 2%.
  - Reduction in **Fleet Forced Outage Numbers** from 347 to 104.

Furthermore, mentioned below are the major achievements in current MYT :

- Addition of highly efficient **900 MW RLNG BQPS III** plant to KE's generation fleet.
- **Efficiency improvements** which have already been passed on to the consumers in the form of lower heat rates, as mentioned earlier in case of BQPS-I.
- **Black Start Facility** at KCCP and BQPS-II have been established which has enabled KE to become independent from IPPs and NTDC, with lesser restoration time, thus enhancing KE's technical readiness to export power to the network in case of black outs.

1. Installed Capacity including BQPS-3