Energy That Moves Life

Mr. Syed Safeer Hussain,
Registrar,
National Electric Power Regulatory Authority (NEPRA),
NEPRA Tower,
Attaturk Avenue (East), G-5/1,
Islamabad.

Ref No. KE/BPR/NEPRA/2020/286
March 11, 2020

Subject: **Mechanism of Mid Term Review within the MYT Determination FY 2017 – 2023**

Dear Sir,

This is with reference to the mechanism of Mid-Term Review provided in the Multi-Year Tariff Determination (MYT Determination) for the control period FY 2017 to FY 2023, dated July 5, 2018 and notified vide SRO no. 576(I)/2019 dated May 22, 2019.

In this regard, the Petition for Mid-Term Review, duly approved by the Board of Directors (copy of Board resolution enclosed) is being submitted for consideration and approval by the Authority.

Please let us know if any further information is required and we would request that an opportunity of hearing be provided in this regard to discuss the same in person.

Sincerely,

Muhammad Aamir Ghaziani
Chief Financial Officer

Encl:

- Mid Term Review Petition & Annexures
- BoD Resolution with respect to Mid-Term Review

REGISTRAR
Dy. No: 4368
Dated: 13-03-20

Certified True Copy (CTC) of Resolutions
passed by KE Board of Directors at its Meeting No. 1214
held on Friday, 28 February 2020 at 1000 hours in KE's Board Room,
3RD Floor, KE House, 39-B, Sunset Boulevard, Phase-II, DHA, Karachi

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Filing of Mid-Term Multi Year Tariff (MYT) Review Application with NEPRA

IT IS HEREBY RESOLVED THAT filing of K-Electric Mid-Term Review Application under MYT along with revised investment plan of PKR 443 billion, as presented to the Board, be and is hereby approved.

RESOLVED FURTHER THAT CEO and CFO K-Electric be and are hereby jointly authorized to sign and file the said Review Application with NEPRA for and on behalf of the Company. CEO and CFO be and hereby further authorised to take all necessary actions and sign such other deeds, documents, instruments etc. incidental and related to the application and appear before the aforesaid Authority and admit execution thereof for and on behalf of the Company. CEO and CFO, be and are hereby further authorized to delegate their powers to any KE officer, as they deem fit, to sign such other deeds, documents, instruments etc. incidental and related to Review Application and appear before any authority including NEPRA and admit execution thereof for and on behalf of the Company.

Muhammad Rizwan Dalia
Chief People Officer & Company Secretary

100 Rupees

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...EL ALVI STAMP VENDOR
...3 High Court Of Sindh
Karachi.

13 DEC 2019

(RUPEES ONE HUNDRED ONLY)

M. SHAHID QURESHI
Ledger # ...

Filing of Mid Term Review Application As Per Multi-Year Tariff (MYT) Determination 2017-2023 Before National Electric Power Regulatory Authority (NEPRA)

AFFIDAVIT

I, Syed Moonis Abdullah Alvi s/o Syed Riazuddin Alvi, having CNIC # 42201-6886191-3, Muslim, Adult, resident of Plot No.11, Park Lane 1, 17th Street Off. Khayaban-e-Seher, Phase VI, D.H.A, Karachi, Chief Executive Officer– KE, do hereby solemnly affirm and declare as under:

1. That I am the applicant in the subject matter and well conversant with the facts of the case.

2. That the accompanying application has been filed under my instructions, the facts mentioned therein are true and correct and the contents of the application whereof may kindly be read and treated as part of the Affidavit, for the sake of brevity.

3. That, I am authorized to sign and file this mid-term review application with NEPRA such other deeds, documents, instruments, etc. and take all necessary actions incidental and related to this mid-term review application and appear before the Authority for and behalf of the Company

4. That it would be in the larger interest of justice that KE's requests made through the accompanying application are granted.

5. That whatever stated above is true and correct to the best of my knowledge and belief.

Q917087

100 Rupees

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IHAMMAD ADEEL ALVI STAMP VENDOR
...ence No. 143 High Court Of Sindh
Karachi.
...o. ... Date 13 DEC 2019
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M. SHAHID QURESHI
Advocate
...SBC
Ledger # 1...

(RUPEES ... HUNDRED ONLY)

Filing of Mid Term Review Application As Per Multi-Year Tariff (MYT) Determination 2017-2023 Before National Electric Power Regulatory Authority (NEPRA)

AFFIDAVIT

I, Muhammad Aamir Ghaziani s/o Muhammad Anwer, having CNIC # 42301-1189331-3, Muslim, Adult, resident of House No. 74L-I, Block 2 PECHS, Karachi, Chief Financial Officer – KE, do hereby solemnly affirm and declare as under:

1. That I am the applicant in the subject matter and well conversant with the facts of the case.

2. That the accompanying application has been filed under my instructions, the facts mentioned therein are true and correct and the contents of the application whereof may kindly be read and treated as part of the Affidavit, for the sake of brevity.

3. That, I am authorized to sign and file this mid-term review application with NEPRA such other deeds, documents, instruments, etc. and take all necessary actions incidental and related to this mid-term review application and appear before the Authority for and behalf of the Company

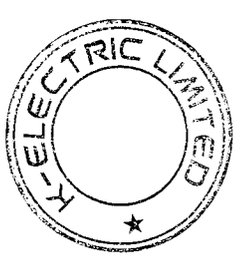
4. That it would be in the larger interest of justice that KE's requests made through the accompanying application are granted.

5. That whatever stated above is true and correct to the best of my knowledge and belief.

Dated: March 11, 2020

Mid-Term Review under Multi Year Tariff 2017-2023

March 11, 2020



1. Introduction

National Electric Power Regulatory Authority ("NEPRA") issued its final decision, dated July 5, 2018, in the matter of K-Electric Limited's ("KE" or "the Company") Multi Year Tariff (MYT) for the control period July 2016 to June 2023, subsequently notified by the Ministry of Energy (Power Division) through SRO 576(I)/2019 dated May 22, 2019 (referred as "MYT Decision").

KE's MYT, includes a mid-term review mechanism, to be carried out after completion of 3.5 years of the tariff control period (December 2019), wherein NEPRA would review / reassess certain assumptions made in the tariff, as also explained in detail in paras 26.20, 29.6, and 34.1 (xxiii) of the MYT Decision.

Accordingly, as part of the mid-term review, KE has carried out its assessment, with respect to the following factors, along with their related impacts on KE's tariff, and the same is being submitted for NEPRA's consideration through this Petition.

i. Impact of exchange rate on the allowed Return on Equity (RoE) component;

ii. Assessment of allowed investments vs actual investments;

iii. Impact of working capital requirements beyond KE's control (related to Government entities); and

iv. Other factors beyond KE's control including change in KIBOR and LIBOR rates, actual sent-out growth being lower than the growth assumed within tariff projections and cost of normal working capital

KE's assessment of the above factors and their related impacts on tariff have been discussed in detail in Grounds for Petition. Please note that the below submissions are without prejudice to KE's right and arguments on issues within the MYT Decision, raised in its appeal filed with the Appellate Tribunal on July 13, 2018 and its outcome.

The next section summarizes investments made across the value chain since the beginning of the tariff control period (July 2016 to December 2019) and related benefits to consumers.

2. Continued Investments across the Value Chain

Despite significant economic slowdown and its impact on macroeconomic factors including high borrowing rates and significant rupee devaluation, along with the severe cashflow constraints faced by KE due to continued delays / non-payment of dues by government entities, the Company remained resolute in its commitment to invest across the power value chain and improve its service levels. As a result, during the period July 2016 to December 2019, the Company invested over **PKR 140 billion** in the power value chain.

These investments have helped:

- Increase capacity by over 420 MW, through own and external sources, for which investment in necessary infrastructure was made, including interconnection works
- Increase transmission capacity by over 1,200 MVAs, through addition of 5 new grid stations, 29 power transformers and 38 km of line
- Increase distribution capacity by over 1,500 MVAs, through addition of over 750 km of HT lines, over 300 feeders and around 5,400 PMTs
- Reduce transformer trips by 56% (FY 16 v December 2019)
- Reduce Transmission & Distribution (T&D) losses by 3.1% points while maintaining generation fleet efficiency (FY 16 to FY 19)
- Improve recovery ratio by 4.1% points (FY 16 to FY 19)[1]
- Add 677,735 new consumers resulting in addition of 996 MW

[1] Recovery ratio on due basis

K-ELECTRIC LIMITED

- Convert around 8,000 PMTs on to Aerial Bundled Cable (ABC) and community engagement initiatives to curb power theft and improve recovery levels under Project Ujala – as a result, very high loss areas such as Gharo have been exempted from load-shed
- Increase load-shed exemption to more than 70% of service territory including all industrial zones
- Reduce unserved energy as a percentage of demand by 24% (FY 16: 11.3% to FY 19: 8.6%), driven by load-shed reduction and capacity enhancement
- Launch 'KE Live App' accessible to consumers 24/7 – enabling consumers to access power status, billing history, consumption comparisons and raise complaints etc.
- Make technological advancements including installation of Automated Meter Readers (AMRs) at PMT level and implementation of Meter Data Management System (MDMS) Project, providing greater visibility into network performance

2.1 Generation

KE continued its stride towards efficiency improvements and increase in despatch capacity through enhancements in its generation infrastructure. In this regard, 20 MW of steam turbines (10 MW each at Korangi Gas Turbine Power Station and SITE Gas Turbine Power Station) came online in January 2017, enabling combined cycle operations of these plants. Further, focusing on reliability, availability and fleet efficiency, KE continued to invest in maintenance and rehabilitation of its existing generation plants, and in this regard, during the period July 2016 to December 2019, investments of **PKR 24,324 million** have been made.

In addition, over 400 MW have been added from July 2016 to date in IPP mode which has helped reduce the demand-supply deficit. Further, to manage the growing power demand along with improvement in efficiency levels and fuel diversification, KE is pursuing its 900 MW project on fast track basis. The 900 MW RLNG project would also enable KE to decommission its less reliable Units 3 & 4 of BQPS – I plant, which primarily run on furnace oil, thus resulting in annual fuel cost savings of around **PKR 60 billion**. Fuel cost comparison of 900 MW plant running on RLNG with higher efficiency as compared to Units 3 & 4 of BQPS – I running on Furnace Oil is given below:

Exhibit 1: Comparison of Fuel Cost

Fuel Type	Fuel Cost (PKR/kWh)
RLNG	9.11[2]
Furnace Oil	18.18[3]

Further, with regard to 900 MW RLNG project, contracts have been signed with Siemens AG and Harbin Electric International and 'Notice To Proceed' (NTP) of the Project has also been issued. Construction works for 900 MW RLNG project have started, with expected completion of Unit 1 in summer of 2021 and project completion by the end of 2021. With regard to the 900 MW project, till December 2019, KE has incurred Capex of c. **PKR 11,926 million.**

2.2 Transmission

Since the start of the tariff control period, KE has invested **PKR 54,343 million** in the Transmission business, focusing on capacity enhancement and improved network reliability. In this regard, significant progress has been made on TP – 1000 Project, enabling KE to reduce transmission constraints and serve the incremental power demand.

Further, during the period July 2016 to December 2019, 5 new grid stations have been added, along with addition of 29 power transformers and 4 auto transformers resulting in capacity addition of over 1,200 MVAs in power transformation capacity and 1,000 MVAs in auto transformers. In addition, over 38 km of new EHT lines have been added along with rehabilitation of 189 km of lines. Going forward, KE plans to continue and further accelerate investments in Transmission infrastructure upgrade through capacity enhancement as well

[2] Based on planned net efficiency of 900 MW BQPS III RLNG plant and average of 2019 RLNG prices in USD (SSGC – Transmission) at current exchange rate (RLNG Price: PKR 1,438/MMBTU)

[3] Based on average net efficiency (FY 19) of Unit 3 & 4 of BQPS I plant and Furnace Oil price of PKR 59,616/MTon

as to set up new interconnection points with the National Grid for increased reliability and off-take of additional power from the National Grid.

2.3 Distribution

Pursuing its aim to bring operational efficiency and improve power supply, during the period July 2016 to December 2019, KE invested **PKR 50,323 million**[4] in the Distribution segment.

As a result of these investments, distribution capacity has been enhanced along with improved network reliability, through addition of over 300 feeders, around 5,400 PMTs and over 750 km of HT lines. These initiatives have resulted in an increase in distribution capacity by over 1,500 MVAs, and have enabled KE to exempt over 70% of the service territory from load-shed with complete exemption to industries.

Further, to bring about efficiency and convenience, initiatives such as ABC and 'Aasaan Meter' have been carried out swiftly with high momentum to aid the downward trajectory of T&D losses and increase customer satisfaction. As part loss reduction initiatives, KE has converted around 8,000 PMTs onto ABC which has significantly contributed towards reduction in T&D losses.

Furthermore, as part of technological advancements, KE has started roll out of AMRs at PMT level and is progressing on MDMS projects which would provide greater visibility into network performance. In addition, with a focus on customer-centricity, KE launched the 'KE Live App', providing consumers with 24/7 access to their billing history, consumption pattern and power status etc.

Moreover, in view of the learnings from Monsoon 2019, safety procedures and practices for earthing / grounding have been revisited to make them less prone to theft. In addition, the Company is also undertaking revalidation of earthing / grounding of the network. Moreover, to further improve network safety, KE has planned various initiatives which include installation / replacement of Vacuum Circuit Breakers (VCBs), Ring Main Unit (RMUs) and Load Breaker Switches (LBSs).

Further, in line with its commitment to provide safe and reliable supply of power along with upliftment of communities that it serves, KE has recently launched 'Project Sarbulandi' which aims at improving network health to provide a safe electricity environment, network upgradation through complete installation of ABCs, further reduction in load-shed through improved Aggregate Technical & Commercial Losses (AT&C) and upliftment of areas through community engagement activities.

3. Grounds for Petition

3.1 Impact of Exchange Rate on Allowed Return on Equity (RoE) Component

Within the MYT, NEPRA has allowed exchange rate indexation on Return on Equity (RoE) to KE. For allowing the indexation on RoE, NEPRA has used the movement of exchange rates from June 2009 to June 2016 as benchmark and allowed grossing up of 17.05% on the RoE to account for indexation.

> *Accordingly, to evaluate the future exchange rate fluctuations, historical trend of last seven years US$ vs PKR parity, from June 2009 to June 2016, has been analyzed. The analysis indicates that the overall average exchange rate variation during the aforesaid period remained at about 17.05%....*
>
> *MYT Determination dated March 20, 2017 – para 25.17.3*

Accordingly, indexed RoE allowed to KE for Generation, Transmission and Distribution businesses is as follows:

Exhibit 2: Allowed RoE under MYT

Description	Unit	Generation	Transmission	Distribution	KE
Return on Equity (RoE) – Dollarized	a	**15.00%**	**15.00%**	**16.67%**	**15.21%**
USD Indexation factor	b	17.05%	17.05%	17.05%	17.05%
Indexation to be included in RoE	c = a x b	2.56%	2.56%	2.84%	2.59%
Indexed RoE	d = a + c	**17.56%**	**17.56%**	**19.51%**	**17.80%**

[4] Includes Support Capex of PKR 1,212 million

Further, as the indexation was based on projected exchange rates, on the basis of historical trend, the MYT Decision includes below paragraph with respect to review of projected exchange rates vs actual exchange rates used for indexation purposes.

> *The Authority further considers that at the time of midterm review,* ***if the actual PKR to US$ exchange rate variation turns out to be more or less than 5% of projected exchange rate accounted for in the current MYT, the Authority may review its accumulated impact on the allowed RoE component of KE.*** *For the purpose of calculating aforementioned exchange rate variation,* ***the Authority shall take simple average of actual exchange rates as on the last day of each quarter from July 2016 to December 2019, (midterm review) vis a vis simple average of the exchange rates projected by the Authority in its assessment for the same period.*** *If the variation works out to be more or less than 5%, the Authority may review its accumulated impact on the allowed RoE component of KE.*
>
> *MYT Decision dated July 5, 2018 – para 29.6*

Here, it is also important to highlight that within the MYT Decision, NEPRA has allowed KE Return on Asset Base of 14.10%, based on notional debt to equity ratio of 70:30, whereas KE's actual debt to equity ratio based on debt and invested equity was 24:76 (FY 16). KE was required to invest equity to fund losses in past and no such condition for debt to equity ratio was specified in the Previous MYT. As a result, NEPRA has allowed a lower return to KE. The issue of applying notional 70:30 debt to equity ratio for the purpose of determining KE's Return on Asset Base has also been taken up in the appeal filed with the Appellate Tribunal, however, KE would like to request NEPRA to correct this factual anomaly in the mid-term review so as to allow actual variation in the exchange rate based on actual gearing ratio, in accordance with the provisions of Section 31 (3) (a), (b) and (c) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 ("NEPRA Act, 1997 (as amended)").

> ***Section 31(3)(a) – NEPRA Act, 1997 (as amended)***
>
> *31(3) Without prejudice to the generality of the sub-section (2), the following general guidelines shall be applicable to the Authority in the determination, modification or revision of rates, charges and terms and conditions for provision of electric power services*
>
> *(a) tariffs should allow licensees the recovery of any and all cost prudently incurred to meet the demonstrated needs of their customers:*
>
> *Provided that assessments of licensees' prudence may not be required where tariffs are set on other than cost of service basis, such as formula-based tariffs that are designed to be in place for more than one year;*

> ***Section 31(3)(b) – NEPRA Act, 1997 (as amended)***
>
> *31(3) Without prejudice to the generality of the sub-section (2), the following general guidelines shall be applicable to the Authority in the determination, modification or revision of rates, charges and terms and conditions for provision of electric power services*
>
> *(b) tariffs should generally be calculated by including a depreciation charge and a rate of return on the capital investment of each licensee commensurate to that earned by other investments of comparable risk;*

> ***Section 31(3)(c) – NEPRA Act, 1997 (as amended)***
>
> *31(3) Without prejudice to the generality of the sub-section (2), the following general guidelines shall be applicable to the Authority in the determination, modification or revision of rates, charges and terms and conditions for provision of electric power services*
>
> *(c) tariffs should allow licensees a rate of return which promotes continued reasonable investment in equipment and facilities for improved and efficient service;*

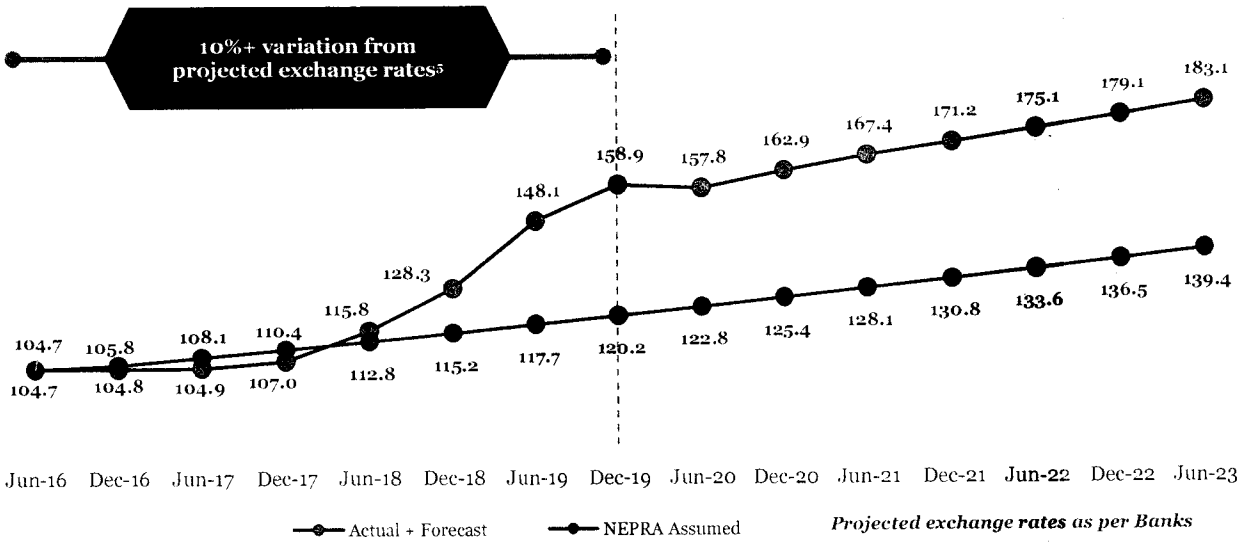
3.1.1 Comparison of Exchange Rates

Since the time of tariff finalization, there has been significant depreciation in PKR against the USD, which is beyond KE's control. Accordingly, to assess the impact of rupee devaluation on the allowed RoE component, KE has carried out comparison of (i) simple average of actual exchange rates as on the last date of each quarter

from July 2016 to December 2019 against (ii) simple average of exchange rates used by NEPRA in its projections for the same period[5].

Further, as stated in Section 3.1, NEPRA has used the exchange rate movement from June 2009 to June 2016, which implies an annualized increase of 4.33% and a quarterly increase of 1.07%. However, due to significant rupee depreciation, the actual exchange rates[6] were significantly higher as compared to the rates assumed within the projections, as shown in the chart below.

Exhibit 3: Average of Quarter-end Exchange Rates (PKR/USD)[7]



Evident from the above, the variation in average of quarterly projected exchange rates used by NEPRA vs average of quarterly actual exchange rates is higher than 5% (criteria for review of RoE component as given by NEPRA in the MYT Decision), and accordingly, the indexation impact allowed on RoE needs to be adjusted in tariff.

3.1.2 Revised Indexation for RoE

Based on the actual exchange rates for the period July 2016 to December 2019, and revised forecast till June 2023[8] (as shown above), and using the same methodology for indexation as used by NEPRA, the indexation factor works out to 41.94%, resulting in below updated RoEs for Generation, Transmission and Distribution.

Exhibit 4: Revised Indexation for RoE

Description	Unit	Generation	Transmission	Distribution	KE
Return on Equity (RoE) – Dollarized	a	**15.00%**	**15.00%**	**16.67%**	**15.21%**
USD Indexation factor – updated	b	41.94%	41.94%	**41.94%**	41.94%
Indexation to be included in RoE	c = a x b	6.29%	6.29%	**6.99%**	6.38%
Indexed RoE – updated	d = a + c	**21.29%**	**21.29%**	**23.66%**	**21.59%**

3.1.3 KE's request

Accordingly, considering the above indexed RoEs, KE requests NEPRA to increase the base tariff by **PKR 0.17 / kWh**.

[5] For comparison of exchange rates, please refer Annexure A
[6] Source: Business Recorder
[7] For actual & forecasted quarter-end exchange rates, please refer Annexure A
[8] Forecast as per Banks

3.2 Investment Plan

In the MYT Decision, NEPRA has allowed a year wise investment plan of **PKR 298,915 million** for the 7-year tariff control period (FY 2017 – FY 2023) and has considered the same while calculating the **base rate adjustment component of PKR 1.07 / kWh** in the base tariff. Further, as part of the mid-term review, assessment of actual against allowed investments is to be carried out by NEPRA in order to review the impact on the base tariff, with certain conditions and exceptions. These conditions are explained in detail in para 34.1 (xxiii) of the MYT Decision.

During the period July 2016 to December 2019, though the actual investments have been lower than the allowed investments of **PKR 203,258 million**, the variation is mainly due to delays in tariff finalization which resulted in consequential delays in execution of projects (900MW and TP – 1000 & TP – 2). However, following the tariff notification, planned projects, including 900 MW are being pursued in an accelerated manner, to ensure that these are completed during the tariff control period.

3.2.1 KE's Updated Investment Plan

In the MYT Decision, NEPRA has stated that additional investments would be allowed in generation segment only to the extent of new generation plant. Further, no additional investment on Transmission & Distribution segment would be allowed, and it will be a commercial decision of KE to invest.

> *In case KE wants to bring more investment to outperform the regulatory targets in Transmission & Distribution (T&D) segments then KE shall be allowed to retain the gains over and above the approved T&D loss target. Hence there shall be no revision in the T&D losses benchmarks and base rate adjustment component, implying that no cost of funds/WACC shall be allowed for that additional investment.* ***Accordingly, it would be KE's own commercial decision for these additional investments.***
>
> *MYT Decision dated July 5, 2018 – Para 34.1 (xxiii)(ii)*

Accordingly, in the updated investment plan being submitted to NEPRA as part of this Petition, KE has not requested for any additional investment for reduction in T&D losses or sent-out growth as these are linked with financial KPIs of the T&D segment.

However, in view of the business requirements and KE's commitment to provide safe and reliable supply of power to its consumers, as per the latest estimates, KE's approved investment plan for tariff for the period FY 2017 – 2023 needs to be revised to **PKR 442,783 million**.

The revision in approved investment plan is necessary due to:

(i) Changing operational dynamics, service requirements and revision in estimated scope

Keeping in view surplus capacity in the National Grid and shortfall within KE's service territory, KE is being asked by the Ministry of Energy (Power Division) to pursue its 900 MW RLNG and 700 MW coal projects on fast track basis and for the remaining shortfall of around 1,400 MW (projected by FY 2023) pursue additional power from the National Grid, instead of its other planned power projects. In this regard, discussions and related technical studies are in process. However, in the MYT estimates submitted in March 2016, it was assumed that supply from the National Grid would cease from 2021. Since, this is a significant change in circumstances, therefore, the investment plan needs to be revised accordingly.

Further, KE would like to submit that Capex plan approved at the time of MYT was based on certain assumptions and forecasted business requirements which are subject to change. Moreover, keeping in view the learnings from Monsoon 2019 (extreme weather event – unprecedented rainfall breaking 40 years record), the investment plan needs significant revisions to enhance safety and reliability of the network to cater for such extreme events. Moreover, based on greater visibility into network performance through technological upgrades, including installation of AMRs, the investment plan warrants revision to enhance the overall network performance and resilience.

Furthermore, increased investment in maintenance and overhaul of existing generation facilities was also necessary to ensure continuity of supply. These have no impact on the financial KPIs and hence make no commercial proposition for KE to invest, however, these are necessary for KE to meet its regulated obligations and is in the interest of consumers. Therefore, the same needs to be considered in the revised investment plan for tariff, as all prudent costs of the licensee is to be compensated for within the tariff, in line with Section 31(2)(b), Section 31(2)(c) and Section 31(3)(a) of the NEPRA Act, 1997 (as amended).

Section 31(2)(b) – NEPRA Act, 1997 (as amended)

31(2) The Authority, in the determination, modification or revision of rates, charges and terms and conditions for the provision of electric power services shall keep in view—

b) the research, development and capital investment programme costs of licensees;

Section 31(2)(c) – NEPRA Act, 1997 (as amended)

31(2) The Authority, in the determination, modification or revision of rates, charges and terms and conditions for the provision of electric power services shall keep in view—

c) the encouragement of efficiency in licensees, operations and quality of service;

(ii) Significant devaluation of PKR against USD in actual as well as higher inflation rates, as against assumed within the projections

As discussed in Section 3.1.1, the exchange rate has deviated significantly from the assumptions taken in MYT which has resulted in considerable increase in planned Capex and the same should be adjusted in the revised investment plan for the tariff. Here, it is also important to note that within the revised plan, around 70% of the investment is linked with USD and given the significant rupee depreciation, the capital cost must also be revised to account for the impact of rupee devaluation.

Moreover, the impact of exchange devaluation is allowed by NEPRA to other entities as well and hence the same should also be allowed to KE. This will be in line with requirements of Section 31(3)(a) of the NEPRA Act, 1997 (as amended) which requires that all prudent cost shall be allowed to KE.

Further, KE will update NEPRA and if material changes in investment plan are required in line with service obligation requirements and due to external factors beyond KE's control (e.g. Supply from National Grid, exchange rate, inflation etc.), KE would like to request NEPRA to allow such adjustments in tariff accordingly.

Detailed explanation of investments in each business segment and reasons for revisions are given below:

3.2.2 900 MW Project

To manage the growing power demand within KE's service area, KE's planned generation projects include 900 MW RLNG based power plant, duly approved by NEPRA within the MYT. The addition of 900 MW RLNG plant and allied transmission projects form an integral part of KE's business plan, aimed at bridging power shortfall and providing smooth and reliable supply of power to the consumers.

Here, it is important to note that delays in tariff finalization has resulted in consequential delays in planned projects, including, 900 MW project. However, following the tariff notification in May 2019, 900 MW project is being pursued on fast track basis, and in this regard, project contracts have been signed with Siemens AG and Harbin Electric International. Further, Notice to Proceed (NTP) for commencement of work has also been issued and construction work is in progress.

KE plans to construct the 900 MW BQPS III power plant in the most expeditious manner along with consequent decommissioning of less efficient and less reliable Units 3 & 4 of BQPS – I plant. It is expected that the first unit of 900 MW plant will come online in summer of 2021, with full completion of the project expected by the end of 2021. Further, to ensure reliable evacuation of power from 900 MW BQPS III power plant, the system load flow has also been reviewed and for this, simultaneous investments will be made in transmission projects based on geography of the load demand requirement.

For the purpose of tariff, within the MYT, the project cost for 900 MW has been benchmarked with Haveli Bahadur Shah IPP and a total cost of USD 730.5 Million (including allied transmission projects) has been allowed in the tariff. Further, the allowed cost was translated into PKR using forecasted exchange rates at the time of tariff determination, which translated into an average exchange rate of PKR 115/USD for the project.

However, since the tariff determination, there has been significant rupee devaluation which is beyond KE's control and therefore the actual exchange rate variation on the project cost should be adjusted in the tariff, in accordance with the Power Generation Policy 2015. This is also in line with the process followed for Independent Power Producers (IPPs) where the risk of exchange rate variation on project cost is compensated by actualizing the same at the time of Commercial Operations (COD). Accordingly, the impact of exchange

rate variation, on project cost of USD 730.5 Million allowed under the MYT, works out to be **PKR 35,159 million** (including allied transmission projects) and the same should be included in the allowed investments within the tariff, to ensure that all prudent costs are allowed, in accordance with Section 31(3)(a) of the NEPRA Act, 1997 (as amended).

Here, it is also important to note that project timelines assumed by NEPRA were on the basis of initial forecasts / estimates and the same were locked by NEPRA in determining the allowed project cost. As per the timelines assumed in tariff, the first unit of the project was due to come online in July, 2018 whereas the MYT Decision was issued on July 5, 2018 itself. Accordingly, the assumption of commercial operations of first unit in July 2018 (as per the initial estimates) within the MYT is incapable of rational justification and therefore, requires revision in project timelines.

Further, it is important to understand that financial close of the project is only possible after notification of tariff. In this regard, as per the Private Power & Infrastructure Board (PPIB) 'Procedures for Development of Private Projects under Upfront Tariff Regime', financial close is to be achieved within 9 months from issuance of 'Letter of Support'. Further, the construction period allowed in the tariff in case of RLNG IPPs is usually 27 months from the financial close (36 months in total). With regard to KE's 900 MW project, NEPRA should adopt the same principle and give due consideration that KE's MYT was notified in May 2019, and with the expected online date of unit 1 in summer of 2021, the planned 900 MW project is well within the timelines allowed to other IPPs.

Moreover, within the MYT Decision, NEPRA has stated that the base rate component will not be adjusted in case KE manages to build the 900MW BQPS III power plant at a cost less than allowed by the Authority.

> *In case, **KE manages to build the BQPS-III power plant at a cost less than the cost allowed by the Authority then KE shall be allowed to retain the savings by not adjusting the base rate component.***
>
> *MYT Decision dated July 5, 2018 – Para 34.1 (xxiii)(viii)*

In this regard, post conclusion of the bidding process, the revised cost of 900 MW RLNG Project is estimated to be USD 658 million[9] (including allied transmission projects). However, in view of the above referred paragraph, no adjustment in the allowed cost of USD 730.5 million is to be made and accordingly KE has calculated the impact of exchange rate variation based on allowed cost of USD 730.5 million.

3.2.3 Generation (Existing Plants)

Generation plants require maintenance expenditure to maintain their performance level. This expenditure, based upon running hours, is required for:

- Maintaining and enhancing despatch capacity of each generating unit – with prolonged operation of units, their despatch ability decreases because of fouling, choking, increased clearance, leakages. Accordingly, maintenance activities are critical to regain the lost capacities
- Maintaining efficiency of generation units – efficiency will gradually decrease if these overhauling activities at turbine, boilers and balance of plants are not carried out timely in accordance with prudent practices

Considering the above, to improve the overall fleet performance and ensure reliable supply of power, during the period July 2016 to December 2019, KE has invested **PKR 24,324 million** on generation plants, and under the revised plan, the total planned investment for maintenance of existing generation plants is **PKR 45,646 million** for the tariff control period.

The variation of **PKR 20,581 million** from the approved investment plan for existing generation plants is mainly due to:

- Impact of exchange rate and inflation: **PKR 1,844 million**
- Generation Long-term Improvement Plan (GLTIP) for BQPS – I: **PKR 2,721 million**

[9] Includes estimated ancillary costs, interest during construction and financing costs which are subject to change

- Other revision in estimates and necessary additional investments to ensure availability and reliability: **PKR 16,016 million**

It is important to consider that these investments / initiatives are prudent and critical to ensure quality of service, and therefore must be allowed in tariff in accordance with Section 31(2)(c) and Section 31(3)(a) of the NEPRA Act, 1997 (as amended).

3.2.3.1 Generation Long-term Improvement Plan (GLTIP)

The Generation Long-term Improvement Plan (GLTIP) for BQPS – I help remove the permanent deration in capacity and degradation in terms of efficiency of units of BQPS – I. These units are old, and several equipment required replacement or repairs. During the period July 2016 to December 2019, under the GLTIP, **PKR 2,046 million** has already been incurred by KE, contributing towards improved reliability and enabling recoupment of derated capacity of BQPS – I units. Important to note that had these investments not been made, this would have resultantly impacted KE's ability to serve the growing power demand, thus further widening the demand-supply situation. Further, most of the investments have been incurred prior to the conduct of heat rate tests of BQPS-I units, and therefore, the benefits have already been passed on to consumers. Accordingly, the investments already made and proposed investments under the GLTIP totaling **PKR 2,721 million** for the tariff control period should be allowed in the revised investment plan.

3.2.3.2 Other Revision in Estimates and Necessary Additional Investments to Ensure Availability and Reliability

As stated in Section 3.2.1, initial estimates as part of the investment plan were submitted in March 2016 and the same need revision in line with change in operational requirements and circumstances to ensure reliability and availability of the generation fleet. In this regard, additional investments of **PKR 16,016 million** will be required and some of the activities requiring this revision in investment plan are as follows:

- Generator stator rewinding at Unit 2 of BQPS I Plant which has made the unit available for >180MW capacity with high reliability and availability
- Additional expenditure on 60K maintenance at SITE Gas Turbine Power Station (SGTPS) and Korangi Gas Turbine Power Station (KGTPS) plants based on OEM recommendation to ensure its reliable operations and to avoid deration in capacity and efficiency
- Two major overhauls of GTs at Korangi Combined Cycle (KCCP) plant
- Control system upgradation at BQPS – II and KCCP
- RAH Elements/drive/seals/accessories for BQPS-I Units 1, 2, 5 & 6. These are essential for maintaining boiler efficiency and removing restriction on steam generation
- Inlet chiller at GTs of KCCP helps to maintain the capacity of GTs @ 15-degree celsius when ambient temperature increases above 15-degrees. The overhauling of chillers is required for reliable operations
- Units 1, 2, 5 & 6 (BQPS – I) boilers due to ageing require replacement of some critical boiler pressure parts for reliable operations. These mainly include Water Wall, Superheater, Reheater, Economizers tubes and bends

3.2.4 KE's Request

In view of the above, KE requests NEPRA to allow additional Capex in Generation segment as follows:

Exhibit 5: Revised Capex for Generation **PKR Million**

Particulars	Allowed Capex	Impact of Exchange Rate & Inflation	Necessary Revision in Scope	Revised Capex Requested
900 MW Project (incl. allied transmission projects)	84,410	35,159	-	119,569
Generation (Existing Plants)	25,065	1,844	18,737	45,646
Total	**109,475**	**37,003**	**18,737**	**165,215**

3.2.5 Transmission

Considering the significant investment required in KE's Transmission Network, KE in the MYT Petition had stated that a total of **PKR 115,773 million** will be invested in the Transmission infrastructure by FY 2023. The planned investments included **PKR 95,307 million** on account of a series of Transmission Packages for growth and enhancement of Transmission Network and the remaining **PKR 20,466 million** in overhauling / rehabilitation of the existing Transmission Network.

However, in view of the business and system requirements, such as setting up of 500 kV grid stations for off-take of power from the National Grid and rehabilitation works on transmission lines and infrastructure in Balochistan region including upgradation of 66kV line to 132kV level, along with revision in scope of planned projects and Other Transmission Capex, KE plans to invest **PKR 150,400 million** (excluding allied transmission projects of 900 MW) in the transmission segment across the tariff control period. This would enable KE to off-take additional supply of capacity from the National Grid, and improve its ability to evacuate power around the city with reliability and convenience to consumers.

The variation of **PKR 34,628 million** from the approved investment plan in Transmission is mainly due to:

- Impact of exchange rate and inflation: **PKR 11,799 million**
- Revision in estimates and necessary additional investments: **PKR 22,829 million**

The revision in estimates and necessary additional investments are mainly on account of inclusion of 500kV grid stations to off-take additional power from the National Grid **(PKR 24,055 million)** envisaged as part of TP-2 project under the revised scope, rehabilitation works in Balochistan region including upgradation of 66kV line to 132kV level **(PKR 7,325 million)** and revision in scope of planned projects (TP-1000 & TP-2) and Other Transmission Capex (reduction of **PKR 8,552 million**)

These revisions in investment plan are prudent costs to be incurred by KE which would enable KE to better serve the customer needs and improve the overall service levels, and therefore the same must be allowed in tariff, in accordance with Section 31(2)(c) and Section 31(3)(a) of the NEPRA Act, 1997 (as amended).

Here, KE would also like to submit that incase of delay/denial of additional supply from the National Grid, which is beyond KE's control, KE will be required to re-consider the original scope of TP-2 Project, and the same will be filed with NEPRA separately for consideration, as also discussed in Section 3.2.1.

3.2.5.1 Transmission Package 1000:

TP - 1000 project is distributed into fifteen separate Functional Work Packages (FWPs) planned to achieve target enhancement of 1,020 MVAs resulting in increased reliability, stability and grid capacity. In this regard, till December 2019, KE has invested **PKR 41,419 million** and significant progress has been made, with around 90% of the project completed, resulting in capacity enhancement and improved reliability of KE's transmission network. Further, due to challenges related to Right of Way (RoW), works on 2 FWPs are in progress and it is expected that the same will be completed on expeditious basis, upon receipt of required RoW approvals.

Under the TP-1000 project, around 900 MVAs (net) of capacity enhancement has been achieved till December 2019. Major accomplishments under the TP – 1000 project are detailed below:

- Five (5) new grid stations which consist of 2x 220kV and 3x 132kV grids have been added
- Twenty-Five (25) new Power Transformers have been added in the system out of which six (6) have been energized at new grids, whereas the remaining nineteen (19) have been installed at existing grids which includes replacement of four (4) transformers
- One (1) Auto Transformer energized at new grid whereas three (3) have been installed at existing grid
- Addition of 28x 220kV bays and 47x 132kV bays
- 6.04km net addition in length of 220/132kV transmission circuits and rehabilitation of around 39 km of 220/132 kV lines
- 432 MV new switchgears have been added

- Replacement of old GIS at SGTPS with new (13) thirteen GIS bays
- State of the art "Disaster Recovery Centre (DRC)" facility is commissioned which will serve as backup for KE Load Dispatch Centre (LDC)

In addition, as part of the TP-1000 project, following will be achieved by December 2020:

- Energization of 2 new grid stations, extension of existing grids and addition of 3 power transformers (120 MVAs of capacity)
- Addition of around 195 km of Transmission lines

However, considering the revision in project scope, which include change in short circuit level of new 220kV grids and transmission lines, conversion of 132kV new grid station into GIS from AIS, and addition of power transformers and GIS bay at 132kV grid stations to accommodate the additional consumer load, the total planned investment under TP-1000 project has been revised to **PKR 52,756 million.**

3.2.5.2 Transmission Package 2:

Under the TP – 2 project, till December 2019, KE has invested **PKR 4,823 million,** and the total investment planned is **PKR 62,935 million** across the tariff control period, which includes 500kV grid stations for off-take of additional power from the National Grid.

Under the TP-2 project, following have been achieved and/ or planned to be achieved:

Achieved to Date:

- Five (5) power transformers have been added in existing grid stations resulting in increase in capacity by 200 MVAs
- Addition of over 31km of transmission line and another 11km will be added by June 2020
- Circuit rehabilitation works resulting in enhanced capacity of around 38 km length

Major Plans till FY 2023:

3.2.5.2.1 Addition of New 500 kV Grid Station(s)

Within the revised investment plan, a new 500 kV grid station has been added for the import of 500 MW from K2/K3 Projects. Further, to off-take additional power from the National Grid, over and above the existing 650 MW (NKI + Jamshoro) and new proposed 500 MW from K2/K3 (KKI), KE is also conducting a detailed network study to evaluate the technical possibility of adding another 600~700 MW in the system from South East 500 kV network of NTDC, for which another 500 kV Interconnection Grid will be required.

The planned amount under the project is **PKR 24,055 million,** to be incurred during FY 2021 to 2023. Following grid stations have been planned under this project:

- 1x 500kV KKI (3x 500MVA Auto Transformers)
- 1x 500kV KSEI (3x 500MVA Auto Transformers)

As detailed in Section 3.2.1, considering the surplus capacity in the National Grid and based on discussions with the Government of Pakistan ("GoP") and NEPRA, to bridge the projected shortfall within KE's service area, in addition to 900 MW RLNG plant and 700 MW Coal IPP, KE is considering off-take of additional power from the National Grid in place of other generation projects, previously envisaged.

The off-take of additional power from the National Grid would not only allow KE to bridge the demand-supply gap but would also lower the burden of capacity payments at national level, which is a key contributing factor towards the circular debt. Further, within the MYT Decision, NEPRA has included a provision for additional generation projects and as the additional supply of power from the National Grid would be in lieu of new generation projects, hence the investment in setting up of 500 kV grid stations should be allowed.

3.2.5.2.2 Other TP-2 Initiatives:

- 1x 220kV Dhabeji (1x 250 MVA Auto Transformer & 1x 40 MVA Power Transformer) and 1x 132kV Mehmoodabad (2x 40 MVA Power Transformers) grids
- Addition of 38km transmission line length for new underground double circuit to Mehmoodabad grid and interconnection of renewable power plant at Vinder-Uthal-Bela
- Addition of 1x 220kV and 2x132kV grids along with 30 km of Transmission lines to cater additional load demand
- Rehabilitation of 7x 220kV and 6x 132kV existing transmission circuits – 176 km of Transmission lines
- Replacement of OFC of 132kV Jacob/ Baloch circuit with New 132kV XLPE single circuit UG cable 8.1 km
- Addition of 5 Transmission Lines bays

3.2.5.3 Hub, Uthal, Vinder and Bela (HUBV) Transmission Lines

- To further strengthen the network, KE has planned phase wise rehabilitation of existing transmission lines from Hub-Chowki to Bela grid and enhancement of grids in Vinder, Uthal & Bela which includes upgradation of 66 kV to 132 kV level with a total cost of **PKR 7,325 million.**
- In addition to the above, rehabilitation of existing 66 kV transmission line is also under execution, for which Phase 1 has already been started and expected to complete in FY 2021. Whereas, in parallel phase 2 would also be initiated from August 2020.

3.2.5.4 Transmission Capex on existing network

To further strengthen the existing network and improve its reliability, KE has invested **PKR 8,101 million** till December 2019, and plans to invest a total of **PKR 27,385 million** under the revised plan. This includes:

- Grid rehabilitation/ enhancement to ensure improved system performance with minimized downtime
- EHT line rehabilitation and periodic maintenance for smooth network operations and reliability assurance
- Enhancement/ rehabilitation of OPGW for reducing the downtime and enhancing the reliability of Telecom/ SCADA services
- Upgradation of under rated transmission equipment to support load growth in both urban / rural areas

Details of major Capex are as under:

- Sixteen (16) power transformers have been added / replaced in the existing grid stations including five (5) new power transformers
- Four Hundred and Seventy-Six (476) 11kV switches have been added/replaced
- Three-year overhauling project of Eighty-Four (84) GIS Bays out of which seventy-seven (77) bays have been completely retrofitted, which is an important step towards increasing network reliability
- Replacement of 194 current / potential transformers, 55 circuit breakers of 132 kV along with replacement of 517 old relays and revision of settings to improve Line and Grid protection system
- Application of RTV coating on insulator strings – 2x 220kV transmission lines have been completed and work is in progress on other 220kV circuits
- Inception of two 11kV Mobile grids to cater the load in case of any emergencies.
- 111.33km circuit length rehabilitated by replacement of insulators / conductors

3.2.6 KE's Request

In view of the above, KE's request to NEPRA to allow additional Capex in Transmission segment is as follows:

Exhibit 6: Revised Capex for Transmission **PKR Million**

Business Area	Allowed Capex	Impact of Exchange Rate & Inflation	Necessary Revision in Scope	Revised Capex Requested
Transmission (excl. 900 MW allied transmission projects)	115,773	11,799	22,829	**150,400**

3.2.7 Distribution

Similar to Generation & Transmission business, KE has continued to bring operational improvements in the distribution segment, with a focus on customer centricity. Despite delays in tariff finalization, the Company remained committed to invest and since the beginning of the tariff control period till December 2019, KE has invested **PKR 50,323 million** in the distribution segment[10].

However, given the operational challenges and in view of the learnings, there is a need to further increase investments in the distribution segment, which would enable KE to provide safe and reliable supply of power to its consumers. As a result, KE plans to invest **PKR 127,168 million** in the distribution segment[11] across the tariff control period.

The variation of **PKR 53,501 million** from the approved investment plan in Distribution is mainly due to:

- Impact of exchange rate and inflation: **PKR 7,754 million**
- Revision in estimates and necessary additional investments: **PKR 45,747 million**

The revision in estimates and necessary additional investments under the revised plan have been made in view of the learnings from 2019 Monsoon, where Karachi experienced unprecedented rainfall, breaking the 40 years record, along with requirements to improve network reliability and resilience. Accordingly, to enhance the overall safety and reliability of its network, revisions for necessary additional investments under Safety & Protection and Maintenance have been made amounting to **PKR 19,155 million** and **PKR 26,829 million** respectively. Further, minor revisions have been made to scope of Support Capex, resulting in reduction of **PKR 236 million** from the initial estimates.

It is important to consider that above investments / initiatives in the Distribution segment are prudent and critical to ensure quality of service, and therefore must be allowed in tariff in accordance with Section 31(2)(c) and Section 31(3)(a) of the NEPRA Act, 1997 (as amended).

Furthermore, as part of revalidation of the network, an independent network study is also being conducted, which may require further revisions to the planned investments and the same will be filed with NEPRA separately.

Details of revision in estimates and necessary additional investments are given below:

3.2.7.1 Additional Capex due to Necessary Revisions in Scope of Safety & Protection Projects

Workplace and public safety under the jurisdiction of KE network is of paramount importance and in order to reinforce safety standards, under the revised Capex plan, KE has enhanced the scope of its Safety and Protection projects to ensure safe and reliable supply of electricity to its consumers.

Here, it is important to highlight that in addition to necessary revisions and additional investments in Safety & Protection projects, in view of the ground realities and learnings from 2019 Monsoon, for external factors beyond KE's control, including encroachment / illegal use of KE's network, KE is in continuous engagement

[10] Includes Support Capex of PKR 1,212 million
[11] Includes Support Capex

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with relevant stakeholders and is also pursuing the matter of encroachment / illegal use of KE's network in the Honorable courts of Pakistan.

- **Earthing and Grounding**

As part of its Safety and Protection projects, KE has revisited the scope of "Earthing and Grounding", and under the revised plan, revalidation of grounding of overall distribution network is envisaged. The planned initiatives would enable KE to ensure safe and reliable supply of electricity to consumers.

The potential benefits of the project can be listed as below:

- To protect against unfortunate incidents;
- To avoid risk of fire due to leakage current through unwanted path; and
- To avoid electric shock to persons who may be in contact with the network poles

Under the revised scope of earthing and grounding project which includes initiatives to revalidate complete earthing and grounding of the distribution network of KE, an additional Capex of **PKR 3,563 million** would be incurred. This includes revalidation of earthing and grounding of the existing poles and the investment in future years to upkeep and maintain the same, including replacement of earthing and grounding material, which are susceptible to theft.

- **Replacement of bare conductor**

To further improve the overall safety, KE has started installation of **HT covered conductors** in place of bare conductor(s) in HT network. Covered conductors are also used to improve safety against accidental contact with live conductors. Further, covering is provided on conductor to minimize the impact of arid/humid climate, tree branches and birding, thus significantly enhancing the overall safety of the network. Covered conductors use the covering material as protection against accidental contact with other conductors or with grounded parts such as tree branches. This covering is sufficient for temporarily withstanding the phase-to-earth voltage. The installation of the aforementioned covered conductors on the distribution HT network, would be carried out in conjunction with the HT preventive maintenance plan to cover around 900 feeders by the end of the control period, requiring an additional expenditure of **PKR 4,820 million.**

- **Electrification of hazardous areas**

Karachi is unique in its demography, development trends and socio-economic outlook than the rest of the country. It is estimated that nearly 62% of Karachi's residents live in informal settlements on only 23% of the city's residential land that mainly make up the high loss areas. Densities in these settlements range up to 4,500 persons per hectare and continue to increase. Meanwhile, less than 40% of the population live in "planned" settlements on 77% of the city's residential land[12]. Despite its small share of the total occupied land, informal sector meets over 50% of the city's housing needs. The informal settlements, of which only a few are officially documented, are known as Katchi Abadis[13]. The World Bank in its report[14] has also listed various specific issues that are clearly distinct to Karachi compared to other cities in the country.

Owing to the mushroom growth in the outskirts, these settlements are in areas that lack basic utilities including but not limited to energy infrastructure. It is pertinent to note that, the population that resides in such areas obtains access to electricity through illegal means (carrying nonstandard electrical wires from nearest PMTs) which makes the unwarranted system prone to accidents and safety hazards.

In such a case, it is of paramount importance to lay down the infrastructure that eliminates the chances of any accident through the illegal abstraction of electricity and to provide safe and reliable power to consumers. Further, the use of substandard material by locals due to no mains also results in deterioration to the existing KE system. In this regard, KE is continuously working on electrifying no mains areas through various schemes

[12] A. Hasan, "Emerging Urbanization Trends: The case of Karachi", May 2016
[13] Urbanization and Emerging Population Issues Working Paper 10, "Land ownership, control and contestation in Karachi and implications for low-income housing", International Institute for Environment and Development United Nations Population Fund, 2013
[14] "Pakistan Development Update" also highlighted major issue with respect to Livability, Sustainably and Growth, Nov 2016

which are designed for consumers in far flung areas where power is being used through illegal infrastructure. In this process, LT mains and network infrastructure is being laid out to regularize such connections.

To further accelerate the installation of necessary distribution infrastructure in such potentially hazardous areas, under the revised Capex plan, an additional investment of **PKR 8,086 million** has been envisaged.

- **Installation / Replacement of Protection Equipment**

In addition to revalidation of earthing and grounding of the distribution network, to further strengthen the safety of its network along with improving reliability of power supply, additional investments for installation / replacement of protection equipment have been planned under the revised Capex plan. Protective equipment in a distribution system consists of relays, cutout switches, circuit breakers and fuses and often function individually or simultaneously in case a disruptive event occurs. Further, circuit breakers function to deenergize the entire feeder which can disrupt power to all customers served through that particular feeder. Hence, the installation of Ring Main Units (RMU) and Vacuum Circuit Breaker (VCB) add layers of redundancy in the system. Through this flexibility, power can be shut off in portions of the system only, thereby isolating the fault. This becomes important also as most of the protective equipment installed at this point is oil type and relay response of such breakers is much less than desirable.

In this regard, KE plans installation / replacement of protection equipment including Vacuum Circuit Breakers (VCBs), Ring Main Unit (RMUs) and Load Breaker Switches (LBSs), which require dividing feeders into loops. The protection is activated at the first terminating point of each feeder by replacing existing switches with new VCBs and RMUs, having relays with enhanced facility of broken conductor feature to ensure public safety. Under the revised plan, KE targets installation / replacement of **1,700 VCBs** and **330 RMUs**. With the induction of protection at the incoming of feeder, downstream faults in distribution network can be isolated without affecting the gird. In future, protection is also planned at all outgoing switches, enabling HT network to operate by isolating faults and limiting the outage to loop instead of affecting all consumers of the feeder. In addition, EFIs on overhead lines are being installed to further improve operational flexibility of the system.

Further, as part of safety initiatives, off-load switches at overhead are being replaced with LBS to operate without any interruption to enhance the reliability index of the system. Installation of LBS enhances operational flexibility and increases safety, which shows KE's commitment towards safe and reliable supply of power to consumers. Under the revised plan, installation / replacement of around **6,300 LBSs** across the network has been envisaged.

For installation / replacement of the aforementioned protection equipment (VCBs, RMUs and LBS) on the distribution network, KE has planned additional Capex of **PKR 1,396 million**.

- **Installation of guard wires under Public Accidents Prevention Plan**

To enhance overall public safety, guard wires are being installed across the overhead HT lines, under "Public Accidents Prevention Plan" project. This is an extensive exercise considering the wide spread of KE network. The installation of guard wires on overhead HT lines would enable KE to achieve maximum protection against safety incidents, improve and enhance distribution network lifespan, and reduce outages. The guard wire in the 11kV network is a grounded conductor placed beneath an overhead line in order to ground the line and in case of breakage, protect it from reaching the ground which might result in an adverse event.

Accordingly, the revised Capex plan for distribution includes additional investment of **PKR 1,290 million** for installation of guard wires under the Public Accidents Prevention Plan.

3.2.7.2 Additional Capex due to Necessary Revisions in Scope of Maintenance Projects

While KE is committed to improve reliability of its network through rigorous maintenance activities round the year, challenges such as the proliferation rate of Karachi in an un-planned manner, densely populated areas and unpredictable climate change pose significant challenges.

To overcome capacity constraints and improve reliability of the network, since the start of the tariff control period, KE has added around 5,400 PMTs and increased its distribution capacity by over 1,500 MVAs. In addition, over 300 feeders have been added and a further 400 feeders will be added by FY 23. Further, during

the period July 2016 to December 2019, KE has added over 750 km of HT lines along with simultaneous optimization of LT network. Addition of feeders, PMT and HT lines along with execution of around 1,000 System Improvement Programs ("SIPs") have resulted in capacity addition, reduction in overloading and improved network reliability. To further optimize the system, instead of laying feeders in many places, feeder links are being used to balance an overloaded feeder with an underloaded one.

- **Corrective & Preventive Maintenance**

To further the reliability of its distribution network, on the maintenance side, KE has revised the scope of maintenance activities and going forward, a more robust periodic maintenance is planned, which is subject to extensive maintenance schedule covering 300 feeders annually. Moreover, the scope of work has been redefined, including enhanced quality & reliability standards. In addition, dry-type transformers, mobile trolleys and PMUs have been introduced along with rehabilitation of old HT infrastructure and long feeders, which would result in improved availability index of the network, including SAIFI and SAIDI.

Further, installation of AMRs at PMT level has resulted in greater visibility on outages, which warrants greater investments to improve network reliability and resilience. In addition, the installation of AMRs at the PMT level and moving towards having a robust AMI infrastructure, would also result in improvements in reporting of reliability indices and with the planned initiatives, KE expects to reduce SAIFI and SAIDI by around 45% by the end of the control period.

To carry out maintenance projects (both preventive and corrective), an additional investment of **PKR 11,909 million** has been envisaged under the revised plan.

- **System Improvement Programs**

In addition to maintenance programs and with regard to the growth of distribution network, additional investments in System Improvement Programs (SIPs) are also planned whereby, considering the current loads at the PMT level and the future load growth, enhancement and rehabilitation of the common distribution network at LT level is being carried out to avoid any overloading of the network. These activities benefit in improving the reliability indices on a preemptive basis. In this regard, considering the additional expenditure already incurred by KE and the revised scope of maintenance activities which includes SIP on around 1,000 PMTs (per year) in subsequent years from FY 2021 – FY 2023 (2,500 – 3,000 PMTs in total), KE plans an additional investment of **PKR 9,688 million** for SIPs.

- **Rehabilitation of ABC Projects**

Considering the climatic conditions of Karachi which damage the insulation installed on ABC and tampering of the equipment by area residents in certain high loss areas, rehabilitation on existing ABC is planned to be carried out. Here, it is pertinent to mention that in case of bare conductors, any tampering or damage to the equipment can be corrected / rectified through minimal expenditure, however in case of ABC, entire spans have to be replaced, thereby increasing the overall investment requirement. Accordingly, to carry out ABC rehabilitation work on around 2,500 PMTs having ABC, an additional investment of **PKR 5,232 million** would be required.

3.2.8 KE's Request

In view of the above, KE requests NEPRA to allow additional Capex in Distribution segment as follows:

Exhibit 7: Revised Capex for Distribution **PKR Million**

Business Area	Allowed Capex	Impact of Exchange Rate & Inflation	Necessary Revision in Scope	Revised Capex Requested
Distribution[15]	73,667	7,754	45,747	**127,168**

[15] Includes Support Capex

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3.2.9 KE's Request

In view of the changing operational dynamics, service requirements and revision in estimated scope along with significant rupee devaluation, KE would request NEPRA to approve total Capex of **PKR 442,783 million** for the 7-year tariff control period.

Exhibit 8: Revised Capex — PKR Million

Business Area	Allowed Capex	Impact of Exchange Rate & Inflation	Necessary Revision in Scope	Revised Capex Requested
Generation[16]	109,475	37,003	18,737	**165,215**
Transmission	115,773	11,799	22,829	**150,400**
Distribution[17]	73,667	7,754	45,747	**127,168**
Total	**298,915**	**56,555**	**87,313**	**442,783**

Further, in view of the revised investment plan which will also have an impact on existing claw-back thresholds, KE requests NEPRA to revise claw-back thresholds for the tariff control period, including FY 2017 and FY 2018.

3.3 Impact of Working Capital Requirements

In its submission to NEPRA during the MYT renewal process, KE explained the issue and dynamics of recovery loss and the importance of a cost-reflective tariff based on AT&C losses. Further, KE also explained the significant implications on cash flow and working capital requirements, due to non-consideration of recovery loss in the tariff and the issue of recovery loss has also been taken up in the appeal filed / pending with the Appellate Tribunal. Moreover, with regard to recovery loss, KE in its comments filed on the GoP's Reconsideration request on MYT, requested to account for recovery loss, with an improvement trajectory for recovery from Non-Public Sector Consumers.

Further, with respect to the issue of long outstanding dues and irregular payments by Public Sector Consumers, KE requested to provide a working capital allowance in the base tariff, on the basis of a mechanism to be determined by NEPRA, in order to compensate KE for the unavoidable costs of providing additional working capital due to delays / non-payment by the Government (Federal, Provincial or Local) entities / Public Sector Consumers.

Accordingly, to compensate KE for the increase in working capital requirements, NEPRA included the following para within the MYT Decision

> *However, during the midterm review, the Authority may review the working capital needs of KE if there are significant changes in working capital needs which cannot be foreseen at this stage but could impair KE's ability as a going concern entity in this MYT's control period. During that review,* ***if there is an increase in working capital requirement due to factors beyond KE's control, the Authority may consider the extent to which working capital requirement needs to be revisited***
>
> *MYT Decision dated July 5, 2018 -para 26.20*

3.3.1 Assessment of working capital cost with respect to Government related entities

Circular debt has constrained KE's liquidity and as at December 31, 2019, net receivable from Government entities (after off-setting payable to Government entities) increased from **PKR 24,727 million** (June 2016) to **PKR 108,943 million** (on principal basis).

Due to accumulated receivables from government entities, including stuck-up Tariff Differential Subsidy (TDS) receivables, KE has to incur significant working capital cost as the related cost of supplying energy, which includes payments to fuel suppliers / IPPs, has to be made timely. As a result, KE has incurred additional costs

[16] With 900 MW project (including allied transmission projects)
[17] Includes Support Capex

in holding working capital to cover late payments by government entities and stuck up TDS receivables from the GoP, while ensuring timely payments to fuel suppliers / IPPs. This is an uncontrollable and unavoidable cost, and accordingly should be compensated within the tariff.

While KE puts rigorous efforts to recover the outstanding amounts from all parties, the amount pertaining to Government related entities is completely beyond KE's control. Accordingly, a separate assessment has been carried out relating to working capital requirements and the associated cost which KE has to incur due to accumulation in receivables from Government and Public Sector Consumers.

With regard to receivables from the Government and related entities, one of the major components is the TDS claims which have reached an alarming level of around **PKR 188,562 million** as at December 31, 2019 and is further accumulating due to delays / non-release by the GoP, despite KE's continuous pursuance of the matter.

Moreover, the Power Purchase Agreement with NTDC, which continues to hold the field in line with the stay order dated February 06, 2014, granted by the Honorable Sindh High Court, provides a set-off mechanism through which KE's TDS receivable from the GoP are to be netted off with KE's payables to NTDC/CPPA-G.

Further, recovery of energy dues from Government entities and departments has remained a key challenge for KE and as at December 31, 2019, receivables from various government entities and departments in respect of energy dues have reached a level of **PKR 49,700 million**. Further, any payments received from government entities and departments are received with significant delays, and as a result, substantial amount always remains outstanding against these entities, significantly impacting KE's liquidity position and translates into additional borrowing cost for the Company. Further, since the principal amount stays unrecovered, the Late Payment Surcharge ("LPS") is also not recovered and therefore has no impact on working capital requirements related to Government entities.

Within these Public Sector Consumers, there are consumers which are of strategic nature, including Karachi Water & Sewerage Board ("KWSB"), and these installations are not disconnected, in line with orders issued by the Honorable Courts and in the public interest. Accordingly, KE ensures continued power supply to these consumers, despite regular and continuous defaults from these entities / departments. This adds to KE's cost of supply due to additional cost borne by KE as a result of increased borrowings. Here, it is also important to highlight that despite delays / non-payment of energy dues by government entities, including KWSB, KE has ensured payment of current monthly bills to SSGC and PSO (majorly owned and controlled by the GoP).

Moreover, it must also be considered that KE, at various forums, including the Honorable Courts of Pakistan has raised the issue of non-payment of energy dues by Government and related entities and is also in continuous engagement with relevant departments in this regard. In addition to continuous engagement with GoP and Government of Sindh (GoS) on release of outstanding dues, KE has also recently started a public campaign, requesting the GoS to clear its outstanding dues towards KE. However, despite these efforts, there have been continued defaults from various Government departments and entities, which have seriously constrained the working capital position of Company, and KE should be compensated for the same accordingly.

It is also critical to note that despite these stuck-up claims along with significant rupee devaluation since the start of the tariff control period, both of which are beyond KE's control, the Company has ensured payments for fuel and power purchases, however, this has been managed through increased borrowings. Had these not been made, this would have compromised KE's ability to ensure continued power supply, which would have been against the consumer interest.

In view of the above, working capital allowance (related to Government entities) is requested to compensate KE for this cost, in accordance with Section 31(2)(c) and Section 31(3)(a) of the NEPRA Act 2018, based on which all prudent costs incurred by the licensee to ensure quality of service is to be allowed in tariff.

3.3.2 Assumptions for Cost of Working Capital

Within the forecast, considering past trend, no release on account of TDS has been assumed and recovery from Public Sector Consumers has been assumed in line with earlier forecast submitted to NEPRA. Moreover, KE would request NEPRA to actualize the assumptions relating to working capital balances including release of

TDS and recovery ratio of Public Sector Consumers at the end of the tariff control period and accordingly make the necessary adjustments in tariff.

Cost of working capital has been calculated as 6 months KIBOR + 2.5% spread as allowed by NEPRA within the MYT. For this purpose, actual data for KIBOR has been used till December 2019, while forecast[18] has been used for the period January 2020 till June 2023.

3.3.3 Cost of Working Capital

Considering the working capital stuck due to receivables from Government entities and the inputs for cost of working capital explained above, KE has incurred working capital cost of around **PKR 17,789 million** till December 2019, which would increase to **PKR 67,859 million** by 2023.

Exhibit 9: Cost of Working Capital — **PKR Million**

Period	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	Total
Net Working Capital	15,524	25,880	76,356	108,484	109,356	107,358	94,300	
Cost of working Capital	1,741	1,831	6,504	14,643	15,521	14,764	12,856	67,859

3.3.4 KE's Request

Accordingly, KE would request NEPRA to consider the above submissions and increase the base tariff by **PKR 0.65/kWh.**

3.4 Other Factors beyond KE's Control

KE would request NEPRA's consideration on the below factors, which are beyond Company's control, however, the same have an impact on KE's tariff, and accordingly necessary adjustments should be made in the tariff.

3.4.1 Revision in Cost of Debt

Within the MYT, NEPRA has allowed weighted average cost of debt of 12.51% based on certain KIBOR and LIBOR assumptions and stated that no adjustment on account of future variation in rates will be allowed. However, based on actualized numbers and revised forecast, there is a significant deviation from the rates assumed in tariff.

Based on revised estimates, the weighted average cost of debt works out to be 13.46% (assuming no change in spreads / loan portfolio assumed by NEPRA in the MYT).

Exhibit 10: Cost of Debt

Period	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	Applicable for the Control Period
Assumed in Tariff								
KIBOR	6.2%	7.0%	8.0%	9.2%	9.9%	10.2%	12.2%	**8.6%**
LIBOR	1.1%	1.7%	1.9%	2.2%	2.4%	2.6%	2.7%	**2.0%**
Actual + Forecast								
KIBOR	6.2%	6.3%	10.2%	13.3%	11.8%	11.1%	10.3%	**9.5%**
LIBOR	1.1%	1.8%	2.5%	1.9%	1.8%	1.9%	2.0%	**1.8%**

The above revision in cost of debt is beyond KE's control and is a prudent cost incurred to fund planned projects and normal business operations, therefore, non-inclusion of the same would result in prudent costs being disallowed, which is against Section 31(3)(a) of the NEPRA Act, 1997 (as amended). Further, in case of IPPs, the risk of interest rate variation is covered through indexation mechanism allowed in the tariff, and accordingly, the same principle should be applied to KE.

[18] As per Banks

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Accordingly, KE would request NEPRA to consider the impact of change in KIBOR & LIBOR, which is a prudent cost and is beyond Company's control, and allow adjustment of **PKR 0.10/kWh** in the base tariff.

3.4.2 Revision in Sent-out Growth

Demand growth in KE's service area was projected to increase by 2,000MW by FY 26, through inclusion of 800,000 new customers into the system and based on a projected GDP growth of c. 5%. It was projected that by FY 19, KE would add around 270,000 new customers, against which around 600,000 customers have been added, resulting in addition of over 800 MW. Further, to overcome capacity constraints, KE added around 300 feeders to its distribution network, as against planned 222 feeders. Further, load-shed as a percentage of demand has been reduced by 22%, against the target of 18% (FY 16 to FY 19). In addition to the consumer base, reduction in load-shed and addressing the issue of system constraints, there has been an increase in peak demand by 335 MW (3,530 MW in FY 19).

However, despite overachieving the set targets for controllable factors, which include consumer addition, capacity enhancement and reduction in load-shed, due to the prevailing economic conditions (which are beyond KE's control) and change in consumption pattern, a comparable increase in energy consumed has not been witnessed. As a result, for the period FY 16 to FY 19, on Compound Annual Growth Rate (CAGR) basis, growth in sent-out of 2.3% has been achieved as compared with the 4.6% projected growth. This lower than projected growth in sent-out is mainly due to factors beyond KE's control such as economic slowdown, change in consumption pattern etc.

Here, it is also important to consider that in its decision dated December 31, 2019 in the matter of quarterly tariff adjustment for the period July 2016 to March 2019, NEPRA has actualized the growth in load charged (fixed charges), thus passing on the benefit of higher actual growth in load charged as compared to NEPRA projected growth to consumers. Therefore, on the same premise, NEPRA should also actualize the growth in sent-out units.

Accordingly, NEPRA is requested to revise sent-out growth projections to 2.3% instead of the currently assumed target of 4.4% for the tariff control period, and allowed adjustment of **PKR 0.29/kWh** in the base tariff, as non-revision of projected growth in sent-out would result in disallowance of prudent costs, which would be against Section 31 (3)(a) of the NEPRA Act, 1997 (as amended).

Exhibit 11: Revision in Sentout Growth

Sent-out (GWh)	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	CAGR FY 16 to FY 19	CAGR FY 19 to FY 23	CAGR FY 16 to FY 23
Actual + Forecast	16,580	17,419	17,697	18,098	18,509	18,928	19,358	2.3%	2.3%	2.3%
NEPRA	17,458	18,189	18,952	19,761	20,613	21,505	22,435	4.6%	4.3%	4.4%

3.4.3 Normal Cost of Working Capital

KE has carried out assessment of total cost of working capital incurred to fund the working capital gap taking into account current assets (excluding cash and securities) and current liabilities (excluding short-term borrowings and current maturity of long-term borrowings).

One of the major components included in current receivables is accumulated dues from consumers. Certain portion of amount billed to consumers remains unrecovered and this recovery loss is a genuine cost of distribution business which has material implications on Company's cashflow position and working capital requirements. Within the MYT, NEPRA has stated that KE has been allowed to retain the LPS, which should be sufficient to cover the working capital requirements of the Company. However, as per the assessment, the LPS income is not sufficient to cover the cost of working capital.

Considering the above, within the MYT proceedings, KE had requested NEPRA to calculate the Regulatory Asset Base ("RAB") based on 'Invested Equity + Borrowings', which would have accounted for the working capital requirements as well, however, the same was not allowed by NEPRA. As a result, KE has not been adequately compensated for the cost of working capital, which is beyond KE's control and an unavoidable cost. Here, KE would like to reiterate that the issue of calculation of RAB based on written down value of fixed assets has already been taken up in the appeal filed / pending with the Appellate Tribunal against the MYT Decision.

As per the assessment, the net working capital and related cost, net of LPS, is shown below.

Exhibit 12: Normal Cost of Working Capital — PKR Million

Period	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	Total
Net Working Capital	66,865	76,821	72,257	82,066	84,518	87,281	87,269	
Cost of working Capital	5,193	6,354	9,484	12,225	11,869	11,704	11,128	67,957
Less: LPS	(2,479)	(2,318)	(2,327)	(2,281)	(2,235)	(2,190)	(2,146)	(15,976)
Net Working Capital Cost	**2,714**	**4,036**	**7,157**	**9,945**	**9,634**	**9,514**	**8,981**	**51,981**

Accordingly, KE would request NEPRA to consider the above cost of working capital of **PKR 0.50/kWh** (over and above the requested working capital cost for Government related entities) and allow its recovery in the tariff as all prudent costs of the licensee is to be compensated for within the tariff, in line with Section 31(3)(a) of the NEPRA Act, 1997 (as amended).

4. KE's Request

In view of the foregoing, NEPRA is requested to consider the above factors along with justifications as contained herein and accordingly allow the related adjustments within KE's tariff.

Exhibit 13: Summary of Impacts

Particulars	Annexure	Adjustment in Tariff required at July 01,2016 (PKR / kWh)
Impact of exchange rate on allowed RoE	A	0.17
Impact of Investment Plan[19]	B	(0.07)
Impact of working capital requirement (Government related entities)	C	0.65
Other Factors		
Revision in Cost of Debt	D	0.10
Revision in Sent-out Growth	E	0.29
Normal Cost of Working Capital	F	0.50
Total Impact		**1.64**

Accordingly, NEPRA is requested to allow the accumulated impact of increase in base tariff from July 2016 to December 2019 in the quarterly tariff adjustment for the quarter October to December 2019 and increase the base tariff from January 2020.

Here, KE would like to reiterate that given the fast pace changes in the operating environment and service requirements requiring revision in planned investments, technological developments and other factors (beyond KE's control) including policy/guidelines issued by GoP, KE would request NEPRA to take the same into consideration and provide greater flexibility by allowing KE to submit any revisions requiring necessary adjustments within the tariff, to ensure that all prudent costs incurred by KE are adequately compensated. This would enable KE to better serve customer needs and accordingly would be in the best interest of consumers as well as KE, in line with the principles enshrined in Section 31 of the NEPRA Act, 1997 (as amended).

[19] Includes impact of disposal of assets having written down value of PKR 3,921 million (excluding revaluation surplus) and consumer inflows (actualized + forecast) amounting to PKR 32,313 million

Further, it is requested that KE be permitted to submit additional grounds and/or representations in writing in future and also be allowed to avail the right of personal hearing in the matter before the Authority. Without prejudice to the above, nothing herein contained is deemed to be an admission of liability whether express or implied by KE, its officers or representatives and as already indicated above, this mid-term review does not in any way affect whether expressly or impliedly any of the grounds placed in the appeal pending before the Appellate Tribunal with regard to KE's MYT for the tariff control period FY 2017-2023. In addition, KE would request NEPRA to look at KE's MYT in this mid-term review in a holistic manner so that the MYT remains a dynamic document which caters to the needs of KE's consumers, its relevant stakeholders including both private and otherwise, as well as the significant improvements that KE has made in its overall investment plan, deliverables and the provision of safe and reliable power to consumers within KE's service territory at least possible cost.

Syed Moonis Abdullah Alvi
Chief Executive Officer

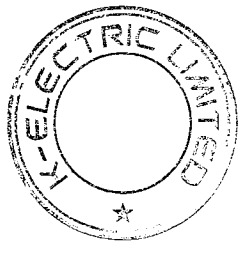
Muhammad Aamir Ghaziani
Chief Financial Officer

Disclaimer

The projections and forecasts contained in this petition for Mid-term Review ("Mid-term Review") are only intended for National Electric Power Regulatory Authority ("NEPRA") for the purposes of Mid-term review of K-Electric Limited's Multi-Year Tariff for the period FY 2017 to FY 2023. The business plan contained in Mid-term Review is based on expectations, estimates and projections that involve various economic and business risks and uncertainties which could cause actual results or events to differ materially from those presently anticipated.

Further, figures for FY 2019 and Half year ended December 2019 included in this mid-term review are provisional and unaudited and are being shared with NEPRA solely for the purpose of this Mid Term Review.

The information contained in this Mid-term Review is not intended as a solicitation or recommendation of investment. Under no circumstances should this information be relied on or treated as legal or other professional advice. Although K-Electric Limited has taken the greatest possible care in compiling this information, it assumes no responsibilities for any reliance for investment decisions placed thereon.



Annexure A

Exchange rate Impact on allowed Return on Equity (RoE)

Impact on Base Tariff at July 1, 2016:

Impact	Unit	Tariff components		Increase / (Decrease)	Reference for Updated Components
		Updated components	Originally allowed by NEPRA		
		A	B	C = A - B	
Return on Asset Base (RoAB)	PKR / kWh	1.56	1.45	**0.12**	Annexure A1
Base Rate Adjustment component	PKR / kWh	1.12	1.07	**0.05**	Annexure A2
Total (RoAB + Base Rate Adjusted Component)	**PKR / kWh**	**2.69**	**2.52**	0.17	

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Annexure A1

Calculation of updated Return on Asset Base (RoAB) per unit- with updated Exchange rate Indexation on allowed Return on Equity (RoE):

Description	Unit	Legend	Amount
RoAB updated- (please refer **Annexure A1.1**)	PKR mn	A	20,442
Units billed - FY 2016	GWh	B	12,865
RoAB per unit - June 2016	PKR / kWh	C = A / B	1.59
Allowed T&D loss - FY 2016	%	D	22.10%
Allowed T&D loss - FY 2017	%	E	20.90%
RoAB per unit - June 2017	**PKR / kWh**	**F = C x (1-D)/(1-E)**	**1.56**
Originally allowed by NEPRA	PKR / kWh	G	1.45
Increase in RoAB	**PKR / kWh**	**H = F -G**	**0.12**

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Annexure A1.1

Calculation of updated Return on Asset Base (RoAB) amount- with updated Exchange rate Indexation on allowed Return on Equity (RoE):

Description	Unit	Legend	Generation	Transmission	Distribution	Total
Regulatory Asset Base - June 2016	**PKR mn**	**A**	**88,721**	**28,601**	**16,869**	**134,190**
Debt	%	B	70%	70%	70%	70%
Equity	%	C	30%	30%	30%	30%
Break up of Regulatory Asset Base						
Debt	PKR mn	D = A x B	62,104	20,020	11,808	93,933
Equity	PKR mn	E = A x C	26,616	8,580	5,061	40,257
Total		**F**	**88,721**	**28,601**	**16,869**	**134,190**
Cost of Debt	**%**	**G**	**12.51%**	**12.51%**	**12.51%**	
Return on Equity (RoE)						
RoE - Dollarized	%	H	15.00%	15.00%	16.67%	
Indexation factor - updated (Please refer **Annexure A1.2**)	%	I	41.94%	41.94%	41.94%	
Indexation to be included in RoE	%	J = H x I	6.29%	6.29%	6.99%	
Indexed RoE - Updated	**%**	**K = H + J**	**21.29%**	**21.29%**	**23.66%**	
Cost of debt - amount	PKR mn	L = D x G	7,769	2,505	1,477	11,751
RoE - amount	PKR mn	M = E x K	5,667	1,827	1,197	8,691
Total Return on Asset Base		**N = L + M**	**13,436**	**4,331**	**2,675**	**20,442**
Effective Return						
Cost of Debt	%	O = L / D				12.51%
RoE	%	P = M / E				21.59%
Return on Asset Base	**%**	**Q = N / F**				**15.23%**

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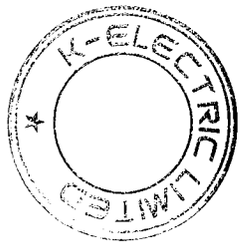
Annexure A1.2

Calculation of updated Exchange rate indexation factor for Return on Equity (RoE)

Quarter end	Updated exchange rates for the control period (Actual till December 2019 and forecast till June 2023)[1]	Increase in exchange rates with June 2016 as base
	PKR / USD	
30-Jun-16	104.70	
30-Sep-16	104.75	0%
31-Dec-16	104.80	0%
31-Mar-17	104.85	0%
30-Jun-17	105.00	0%
30-Sep-17	105.45	1%
31-Dec-17	110.50	6%
31-Mar-18	115.40	10%
30-Jun-18	121.60	16%
30-Sep-18	124.30	19%
31-Dec-18	139.10	33%
31-Mar-19	140.70	34%
30-Jun-19	164.50	57%
30-Sep-19	156.70	50%
31-Dec-19	155.35	48%
31-Mar-20	157.83	51%
30-Jun-20	160.34	53%
30-Sep-20	162.90	56%
31-Dec-20	165.50	58%
31-Mar-21	167.37	60%
30-Jun-21	169.26	62%
30-Sep-21	171.18	63%
31-Dec-21	173.11	65%
31-Mar-22	175.07	67%
30-Jun-22	177.05	69%
30-Sep-22	179.05	71%
31-Dec-22	181.08	73%
31-Mar-23	183.13	75%
30-Jun-23	185.20	77%

Average increase % **41.94%**

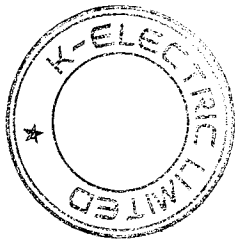
1. Actual exchange rates taken from Business recorder and forecast as per Banks



Annexure A1.3

Comparison of Average exchange rates July 2016 to December 2019 - Actual vs Forecasted by NEPRA

Quarter End	Forecasted exchange rates - Originally taken by NERPA	Actual exchange rates
	PKR / USD	
30-Jun-16	104.70	104.70
30-Sep-16	105.82	104.75
31-Dec-16	106.94	104.80
31-Mar-17	108.08	104.85
30-Jun-17	109.24	105.00
30-Sep-17	110.40	105.45
31-Dec-17	111.58	110.50
31-Mar-18	112.77	115.40
30-Jun-18	113.97	121.60
30-Sep-18	115.19	124.30
31-Dec-18	116.41	139.10
31-Mar-19	117.65	140.70
30-Jun-19	118.91	164.50
30-Sep-19	120.18	156.70
31-Dec-19	121.46	155.35
Average of Quarterly exchange rates - July 2016 to December 2019	**113.47**	**125.21**
Variation in Average exchange rates		**10.35%**



Annexure A2

Calculation of updated Base Rate Adjustment component - with updated exchange rate indexation on Return on Equity (RoE)

Description	Unit	Legend	2017	2018	2019	2020	2021	2022	2023	Total
Sent-out - NEPRA's projections	GWh	A	17,458	18,189	18,952	19,761	20,613	21,505	22,435	
T&D Losses (%) - NERPA allowed		B	20.90%	19.80%	18.75%	17.76%	16.80%	15.95%	15.36%	
Units Billed - NEPRA's projections	GWh	C = A x (1-B)	13,809	14,588	15,399	16,251	17,150	18,075	18,989	
Investments Allowed	PKR mn	D	37,941	66,231	73,342	50,405	30,196	20,316	20,484	298,915
Projected Average Regulatory Asset Base (RAB)	PKR mn	E	148,419	190,631	248,127	294,643	317,527	323,480	323,975	
Return on Asset Base (RoAB) allowed at updated RoAB @ 15.23% - (Please refer **Annexure A1.1** for updated RoAB %)	PKR mn	F = E x 15.23%	22,610	29,040	37,799	44,885	48,371	49,278	49,353	281,335
Present Value (PV) of RoAB discounted at 15.23%	**PKR mn**	**G = F - discounted at 15.23%**								**154,792**
Projected EBIT with updated RoE [excluding Base Rate Adjustment component]	PKR mn	H	21,460	22,317	18,378	17,995	19,747	19,764	20,852	140,513
PV of Projected EBIT discounted at 15.23%	**PKR mn**	**I = H - discounted at 15.23%**								**83,534**
Shortfall in Returns (based on PV)	**PKR mn**	**J = I - G**								**(71,259)**
Shortfall covered through Base Rate Adjustment component:										
Revised Base Rate Adjustment Component	PKR / kWh	K	**1.12**	1.11	1.10	1.08	1.07	1.06	1.05	
Revenue - Base Rate Adjustment Component	PKR mn	L = K x C	15,534	16,184	16,864	17,583	18,342	19,135	19,962	123,603
PV of Base Rate Adjustment Component discounted at 15.23%	**PKR mn**	**M = L - discounted at 15.23%**								**71,259**

Impact on Base Rate Adjustment Component - July 1, 2016:		
Updated Base Rate Adjustment Component	**N = K**	1.12
Originally allowed Base Rate Adjustment Component	O	1.07
Increase in Base Rate Component	P = N - O	**0.05**

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Annexure B
Calculation of updated Base Rate Adjustment component - with Updated Investment Plan

Description	Unit	Legend	2017	2018	2019	2020	2021	2022	2023	Total
Sent-out - NEPRA's projections	GWh	A	17,458	18,189	18,952	19,761	20,613	21,505	22,435	
T&D Losses (%) - NERPA allowed		B	20.90%	19.80%	18.75%	17.76%	16.80%	15.95%	15.36%	
Units Billed - NEPRA's projections	GWh	C = A x (1-B)	13,809	14,588	15,399	16,251	17,150	18,075	18,989	
Investments Updated	PKR mn	D	27,700	44,615	39,983	68,938	139,943	77,987	43,617	442,783
Projected Average Regulatory Asset Base (RAB)- updated	PKR mn	E	141,554	166,308	197,694	239,115	326,997	415,117	453,065	
Return on Asset Base (RARB) allowed at updated RoAB @ 15.23% - (Please refer **Annexure A1.1** for updated RoAB)	PKR mn	F = E x 15.23%	21,564	25,335	30,116	36,426	49,813	63,237	69,018	295,510
Present Value (PV) of RoAB discounted at 15.23%	**PKR mn**	**G = F - discounted at 15.23%**								**155,237**
Projected EBIT with updated RoE and Investments [excluding Base Rate Adjustment component]	PKR mn	H	21,133	22,013	22,967	23,801	21,721	18,571	17,713	147,921
PV of Projected EBIT discounted at 15.23%	**PKR mn**	**I = H - discounted at 15.23%**								**88,612**
Shortfall in Returns (based on PV)	**PKR mn**	**J = I - G**								**(66,625)**
Shortfall covered through base rate adjustment component:										
Revised Base Rate Adjustment Component	PKR / kWh	K	**1.05**	1.04	1.02	1.01	1.00	0.99	0.98	
Revenue - Base Rate Adjustment Component	PKR mn	L = K x C	14,524	15,132	15,767	16,440	17,149	17,890	18,664	115,565
PV of Base Rate Adjustment Component discounted at 15.23%	**PKR mn**	**M = L - discounted at 15.23%**								**66,625**

Impact on Base Rate Adjustment Component - July 1, 2016:

Base Rate Adjustment Component - with Updated Investment plan and RoE	N = K	1.05
Base Rate Adjustment Component - with Updated RoE (please refer **Annexure A**)	O	1.12
Decrease in Base Rate Component	P = N - O	**(0.07)**

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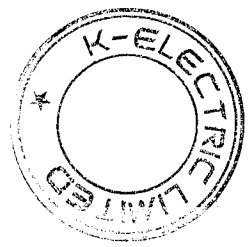
Annexure C

Calculation of Impact on Tariff due to working capital requirement (Government related entities)

Description	Unit	Legend	2016	2017	2018	2019	2020	2021	2022	2023	Total
Working Capital balance-											
Government related entities:											
Receivables	PKR mn	A	77,528	76,534	102,353	194,748	283,224	346,577	408,971	462,265	
Payables	PKR mn	B	(52,801)	(61,011)	(76,473)	(118,392)	(174,740)	(237,221)	(301,614)	(367,965)	
Net balance	PKR mn	C = A +B	**24,727**	**15,524**	**25,880**	**76,356**	**108,484**	**109,356**	**107,358**	**94,300**	
Average net balance	PKR mn	**D**		**20,125**	**20,702**	**51,118**	**92,420**	**108,920**	**108,357**	**100,829**	
Average 6-month KIBOR		E		6.15%	6.34%	10.22%	13.34%	11.75%	11.13%	10.25%	
Short term borrowing spreads		F		2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	
Cost of working capital	**PKR mn**	**G = D x (E + F)**		**1,741**	**1,831**	**6,504**	**14,643**	**15,521**	**14,764**	**12,856**	**67,859**
Units billed at NEPRA allowed T&D losses - FY 17 to 23 (Please refer **Annexure E)**	GWh	H		13,115	13,970	14,379	14,884	15,399	15,910	16,384	**104,041**
Impact on Tariff	**PKR / kWh**	**I = G / H**									**0.65**

Assumptions for calculation of cost of working capital:

- Receivables include amounts receivables on account of Tariff Differential Subsidy (TDS), Pending Fuel Charge Adjustment and energy dues from Government related entities / Public Sector Consumers
- Payables include amounts payable to CPPA-G / NTDC and SSGC
- Balances till December 2019 are based on financial statements and going forward amounts have been forecasted
- Within the forecast, considering past trend, no release on account of TDS has been assumed and recovery from Public Sector Consumers has been assumed in line with earlier forecast submitted to NEPRA - KE would request NEPRA to actualize the assumptions relating to working capital balances including release of TDS and recovery ratio of Public Sector Consumers at the end of the tariff control period and accordingly make the necessary adjustments in tariff
- Cost of working capital has been calculated as 6 months KIBOR + 2.5% spread as allowed by NEPRA within the MYT.
- For this purpose, actual data for KIBOR has been used till December 2019, while forecast has been used for the period January 2020 till June 2023



Annexure D
Impact on Tariff due to Revision in Cost of Debt

Impact on Base Tariff at July 1, 2016:

Impact	Unit	Tariff components		Increase / (Decrease)	Reference for "Updated components including Updated Cost of Debt"	Reference for "Components with Updated RoE and Investments"
		Updated components including Updated Cost of Debt	Components with Updated RoE and Investments			
		A	B	C = A - B		
Return on Asset Base (RoAB)	PKR / kWh	1.63	1.56	**0.07**	Annexure D1	Annexure A
Base Rate Adjustment component	PKR / kWh	1.08	1.05	**0.03**	Annexure D2	Annexure B
Total (RoAB + Base Rate Adjusted Component)	**PKR / kWh**	**2.72**	**2.62**	**0.10**		

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Annexure D1

Calculation of updated Return on Asset Base (RoAB) per unit- with Updated Cost of Debt

Description	Unit	Legend	Amount
RoAB updated- (Please refer **Annexure D1.1**)	PKR mn	A	21,337
Units billed - FY 2016	GWh	B	12,865
RoAB per unit - June 2016	PKR / kWh	C = A / B	1.66
Allowed T&D loss - FY 2016	%	D	22.10%
Allowed T&D loss - FY 2017	%	E	20.90%
RoAB per unit - June 2017	**PKR / kWh**	**F = C x (1-D)/(1-E)**	**1.63**
Base Rate Adjustment Component - with Updated RoE (**please refer Annexure A**)	PKR / kWh	G	1.56
Increase in RoAB	**PKR / kWh**	**H = F -G**	**0.07**

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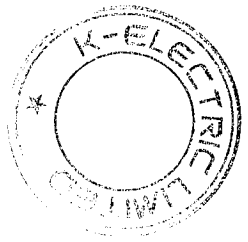
Annexure D1.1

Calculation of updated Return on Asset Base (RoAB) amount- with updated Cost of Debt

Description	Unit	Legend	Generation	Transmission	Distribution	Total
Regulatory Asset Base - June 2016	**PKR mn**	**A**	**88,721**	**28,601**	**16,869**	**134,190**
Debt	%	B	70%	70%	70%	70%
Equity	%	C	30%	30%	30%	30%
Regulatory Asset Base- RAB						
Debt	PKR mn	D = A x B	62,104	20,020	11,808	93,933
Equity	PKR mn	E = A x C	26,616	8,580	5,061	40,257
Total		**F**	**88,721**	**28,601**	**16,869**	**134,190**
Cost of Debt- (please refer Annexure D1.2)	**%**	**G**	**13.46%**	**13.46%**	**13.46%**	
Return on Equity						
RoE - Dollarized	%	H	15.00%	15.00%	16.67%	
Indexation factor Updated (Please refer **Annexure A1.2**)	%	I	41.94%	41.94%	41.94%	
Indexation to be included in RoE	%	J = H x I	6.29%	6.29%	6.99%	
Indexed RoE - Updated	**%**	**K = H + J**	**21.29%**	**21.29%**	**23.66%**	
Cost of debt	PKR mn	L = D x G	8,361	2,695	1,590	12,646
RoE - amount	PKR mn	M = E x K	5,667	1,827	1,197	8,691
Total Return on Asset Base		**N = L + M**	**14,028**	**4,522**	**2,787**	**21,337**
Effective Return						
Cost of Debt	%	O = L / D				13.46%
RoE	%	P = M / E				21.59%
Return on Asset Base	**%**	**Q = N / F**				**15.90%**



Annexure D1.2

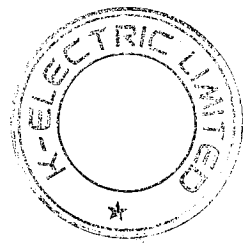
Calculation of updated Cost of Debt

Description	Legend	Dec-16	Jun-17	Dec-17	Jun-18	Dec-18	Jun-19	Dec-19	Jun-20	Dec-20	Jun-21	Dec-21	Jun-22	Dec-22	Jun-23	Applicable Rate for the Control period
3-month US$ LIBOR	A	1.00%	1.30%	1.38%	2.13%	2.48%	2.60%	2.0657%	1.76%	1.75%	1.78%	1.84%	2.00%	2.02%	2.02%	**1.83%**
6-month KIBOR	B	6.15%	6.15%	6.15%	6.53%	9.01%	11.44%	13.69%	13.00%	12.00%	11.50%	11.50%	10.75%	10.75%	9.75%	**9.53%**
Hedging Cost	**C = B -A**															**7.70%**

Description	Spreads allowed by NEPRA
Spread over LIBOR	4.50%
Spread over KIBOR	2.50%

Cost of Debt - Updated:

Description	KIBOR / LIBOR rates	Spread Allowed	Hedging Cost	Total cost of debt	Weightage	Updated Cost Of Debt
	D	E	F = C	G = D +E + F		
Foreign Loan	1.83%	4.50%	7.70%	14.03%	71%	**10.03%**
Local Loan	9.53%	2.50%	0.00%	12.03%	29%	**3.44%**
						13.46%

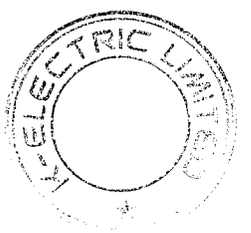


Annexure D2
Calculation Of Updated Base Rate Adjustment Component-With Updated Cost Of Debt

Description	Unit	Legend	2017	2018	2019	2020	2021	2022	2023	Total
Sent-out - NEPRA's projections	GWh	A	17,458	18,189	18,952	19,761	20,613	21,505	22,435	138,913
T&D Losses (%) - NERPA allowed		B	20.90%	19.80%	18.75%	17.76%	16.80%	15.95%	15.36%	
Units Billed - NEPRA's projections	GWh	C = A x (1-B)	13,809	14,588	15,399	16,251	17,150	18,075	18,989	
Investments Updated	PKR mn	D	27,700	44,615	39,983	68,938	139,943	77,987	43,617	442,783
Projected Average Regulatory Asset Base (RAB)- updated	PKR mn	E	141,554	166,308	197,694	239,115	326,997	415,117	453,065	
Return on Regulatory Asset Base (RoAB) allowed at updated RoAB @ 15.90% - (Please refer **Annexure D1.1** for updated RoAB %)	PKR mn	F = E x 15.90%	22,508	26,444	31,435	38,021	51,995	66,007	72,041	308,452
Present Value (PV) of RoAB discounted at 15.90%	**PKR mn**	**G = F - discounted at 15.90%**								**158,104**
Projected EBIT with updated RoE [excluding Base Rate Adjustment]	PKR mn	H	22,057	22,976	23,971	24,847	22,813	19,710	18,901	155,275
PV of Projected EBIT discounted at 15.90%	**PKR mn**	**I = H - discounted at 15.90%**								**91,069**
Shortfall in Returns (based on PV)	**PKR mn**	**J = I - G**								**(67,035)**
Shortfall covered through base rate adjustment component:										
Revised Base Rate Adjustment Component	PKR / kWh	K	**1.08**	1.07	1.06	1.04	1.03	1.02	1.01	
Revenue - Base Rate Adjustment Component	PKR mn	L = K x C	14,979	15,607	16,262	16,955	17,687	18,452	19,249	119,191
PV of Base Rate Adjustment Component discounted at 15.90%	**PKR mn**	**M = L - discounted at 15.90%**								**67,305**

Impact on Base Rate Adjustment Component - July 1, 2016:

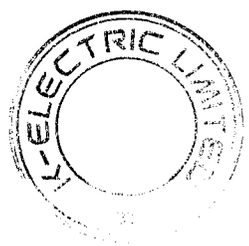
Base Rate Adjustment Component - with Updated Cost of Debt	N = K	1.08
Base Rate Adjustment Component with updated RoE and Investment Plan (please refer **Annexure B**)	O	1.05
Increase in Base Rate Adjustment Component	P = N - O	**0.03**



Annexure E
Calculation of updated Base Rate Adjustment component- Updated Sent-out Projections

Description	Unit	Legend	2017	2018	2019	2020	2021	2022	2023	Total
Sent-out - updated projections	GWh	A	16,580	17,419	17,697	18,098	18,509	18,929	19,358	126,589
T&D Losses (%) - NERPA allowed		B	20.90%	19.80%	18.75%	17.76%	16.80%	15.95%	15.36%	
Units Billed - NEPRA's projections	GWh	C = A x (1-B)	13,115	13,970	14,379	14,884	15,399	15,910	16,384	
Investments Updated	PKR mn	D	27,700	44,615	39,983	68,938	139,943	77,987	43,617	442,783
Projected Average Regulatory Asset Base (RAB)- updated	PKR mn	E	141,554	166,309	197,696	239,748	326,028	413,816	453,345	
Return on Regulatory Asset Base (RoAB) allowed at updated RoAB @ 15.23% - (Please refer **Annexure A1.1** for updated RoAB)	PKR mn	F = E x 15.23%	21,564	25,335	30,116	36,522	49,666	63,039	69,061	295,303
Present Value (PV) of RoAB discounted at 15.23%	**PKR mn**	**G = F - discounted at 15.23%**								**155,150**
Projected EBIT with updated RoE [excluding Base Rate Adjustment component]	PKR mn	H	19,540	20,553	20,728	20,881	17,783	14,260	12,066	125,812
PV of Projected EBIT discounted at 15.23%	**PKR mn**	**I = H - discounted at 15.23%**								**77,139**
Shortfall in Returns (based on PV)	**PKR mn**	**J = I - G**								**(78,012)**
Shortfall covered through base rate Adjustment component:										
Revised Base Rate Adjustment Component	PKR / kWh	K	**1.34**	1.32	1.30	1.29	1.27	1.26	1.25	
Revenue - Base Rate Adjustment Component	PKR mn	L = K x C	17,549	18,437	18,731	19,156	19,591	20,036	20,489	133,989
PV of Base Rate Adjustment Component discounted at 15.23%	**PKR mn**	**M = L - discounted at 15.23%**								**78,012**

Impact on Base Rate Adjustment Component - July 1, 2016:		
Base Rate Adjustment Component - with Updated Sent-out Projections	**N = K**	1.34
Base Rate Adjustment Component with updated RoE Investment Plan (please refer Annexure B)	O	1.05
Increase in Base Rate Adjustment Component	P = N - O	**0.29**



Annexure F

Calculation of Impact on Tariff due to Normal Working Capital Requirement

Description	Unit	Legend	2016	2017	2018	2019	2020	2021	2022	2023	Total
Working Capital balance:											
Current Assets - Note 1	PKR mn	A	120,109	137,547	158,400	169,948	171,885	174,337	177,100	177,089	
Current Liabilities - Note 2	PKR mn	B	(66,898)	(70,682)	(81,579)	(97,691)	(89,819)	(89,819)	(89,819)	(89,819)	
Net Working Capital	**PKR mn**	**C = A - B**	**53,211**	**66,865**	**76,821**	**72,257**	**82,066**	**84,518**	**87,281**	**87,269**	
Average net balance	PKR mn	D		60,038	71,843	74,539	77,162	83,292	85,899	87,275	
Average 6-month KIBOR	%	E		6.15%	6.34%	10.22%	13.34%	11.75%	11.13%	10.25%	
Short term borrowing spreads	%	F		2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	
Cost of working capital	**PKR mn**	**G = D x (E +F)**		**5,193**	**6,354**	**9,484**	**12,225**	**11,869**	**11,704**	**11,128**	**67,957**
Less : Late Payment Surcharge	PKR mn	H		(2,479)	(2,318)	(2,327)	(2,281)	(2,235)	(2,190)	(2,146)	**(15,976)**
Net cost of normal working capital	**PKR mn**	**J = G -H -I**		**2,714**	**4,036**	**7,157**	**9,945**	**9,634**	**9,514**	**8,981**	**51,981**
Units billed at NEPRA allowed T&D losses - FY 17 to 23 (Please refer **Annexure E**)	GWh	K		13,115	13,970	14,379	14,884	15,399	15,910	16,384	104,041
Impact per unit	**PKR / kWh**	**L= J / K**									**0.50**

Assumptions for calculation of cost of working capital:

- Note 1: Current assets including Gross receivables, excluding cash & bank and short term investments and receivables from Government related entities and pending FCA (already taken in assessment of cost working capital related to Government related entities)
- Note 2: Current liabilities excluding short term borrowing, current maturity of long term borrowing and payables to CPPA-G / NTDC and SSGC (already taken in assessment of cost working capital related to Government related entities)
- Balances till December 2019 are based on financial statements and going forward amounts have been forecasted
- Within the forecast, considering past trend, no release on account of TDS has been assumed and recovery from Public Sector Consumers has been assumed in line with earlier forecast submitted to NEPRA - KE would request NEPRA to actualize the assumptions relating to working capital balances including release of TDS and recovery ratio of Public Sector Consumers at the end of the tariff control period and accordingly make the necessary adjustments in tariff
- Cost of working capital has been calculated as 6 months KIBOR + 2.5% spread as allowed by NEPRA within the MYT.
- For this purpose, actual data for KIBOR has been used till December 2019, while forecast has been used for the period January 2020 till June 2023