

K Electric Limited

SUMMARY OF REQUIRED ADJUSTMENT ON ACCOUNT OF VARIATION IN COST OF FUEL AND POWER PURCHASES

DESCRIPTION		Key	Unit	Jun-21	Sep-21
				Reference	Current
A) Cost of fuel:					
Cost of fuel - KE	a	Mill Rs.	14,543.335	18,805.663	
Cost of fuel - Power Purchases	b	Mill Rs.	8,422.159	8,768.235	
Adjustment - Note 1	c	Mill Rs.	(184.000)	-	
Total	d = a + b + c	Mill Rs.	22,781.494	27,573.898	
B) Units Sent Out					
Units Sent Out - KE	e	GWh	960.489	903.393	
Units - Power purchases	f	GWh	1,131.056	1,018.610	
Total	g = e + f	GWh	2,091.545	1,922.003	
C) Cost per unit on respective sent out					
Cost of fuel - KE	h = a / e	Rs./kWh	15.142	20.817	
Cost of fuel - Power Purchases	i = b / f	Rs./kWh	7.446	8.608	
Adjustment - Note 1	j = c / e	Rs./kWh	(0.192)	-	
Weighted Average Cost / Total cost per unit	k = d / g	Rs./kWh	10.892	14.346	
D) Cost per unit on total sent out - Note 2					
Cost of fuel - KE	l = a / g	Rs./kWh	6.953	9.784	
Cost of fuel - Power Purchases	m = b / g	Rs./kWh	4.027	4.562	
Adjustment - Note 1	n = c / g	Rs./kWh	(0.088)	-	
Weighted Average Cost / Total cost per unit	o = l + m + n	Rs./kWh	10.892	14.346	
E) Variation per unit - Note 3					
Cost of fuel - KE	p	Rs./kWh		2.831	
Cost of fuel - Power Purchases	q	Rs./kWh		0.535	
Adjustment - Note 1	r	Rs./kWh		0.088	
Total Fuel Cost Adjustment	s = p + q + r	Rs./kWh		3.454	
F) Total Fuel Cost Adjustment		Ps/kWh		345.43	
G) Variation amount					
Cost of fuel - KE	t = p x g	Mill Rs.		5,441.223	
Cost of fuel - Power Purchases	u = q x g	Mill Rs.		1,028.784	
Adjustment - Note 1	v = r x g	Mill Rs.		169.085	
Total Fuel Cost Adjustment	w = t + u + v	Mill Rs.		6,639.092	

Note 1 : As per mechanism given in MYT, weighted average cost for KE's fuel cost and power purchase is calculated by dividing fuel cost with Total units sent out (KE+power purchase) in GWh as per Annexure II & III of MYT Decision

Note 2 : This represents adjustment made by NEPRA on account of EMO in fuel cost for the month of June 2021 vide its decision dated August 6, 2021. Subsequently, KE had submitted the required data to NEPRA and requested to allow the same in FCA of July 2021 or August 2021.

Note 3 : Calculated as difference of current and reference month of cost per unit for the month.

MECHANISM FOR ADJUSTMENT IN TARIFF DUE TO VARIATION IN FUEL PRICE

1. The fuel cost component of tariff of KE's own generation power plants shall be adjusted due to change in fuel prices, generation mix and volume. KE shall be allowed adjustment in this tariff component on monthly and quarterly basis.

Adjustments on Monthly Basis

2. The change in KE own generation's fuel cost component due to variation in fuel prices, generation mix and volume shall be passed on to the consumers of KE directly in their monthly bills in the form of Fuel Charges Adjustment ("FCA"). Following steps shall be followed to calculate these variations;
 - i. The monthly fuel cost of each power plant/unit (on each fuel in case of dual fuel power stations) in KE's own generation system will be calculated based on actual units generated based on the target of heat rates and auxiliary consumption, approved by the Authority, as per the following formula;

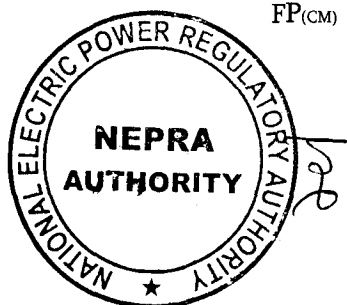
$$\text{CoF} = (\text{GBB} \times \text{HR} \times \text{FP}_{(\text{CM})})$$

CoF = Cost of Fuel of each power station/unit in Million Rupees

GBB = Generation at Bus Bar of power station after its approved auxiliary consumption expressed in GWh

HR = The approved heat rate for each power station/unit in BTUs/kWh at Bus Bar.

Price of fuels for the current month converted into Rs./BTUs. The price of gas as notified by the relevant Authority shall be used. In case of deregulated fuels, the prices shall be verified from the documentary evidences to be submitted by KE. The conversion in BTUs shall be made based on calorific value approved by the Authority. For the determined fuel component in this tariff determination, the furnace oil and gas prices of Rs, 27,744/Metric ton and Rs. 613/MMBTu respectively have been used as reference. Calorific value of 40,351 BTUs/kg for furnace oil has been used.



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Note: For dual fuel power plants/units, total fuel cost shall be calculated totaling the cost of energy generated on each fuel.

- ii. The fuel cost of each power station shall be totaled to arrive at monthly fuel cost of KE's whole generation fleet.

$$TCoF_{(WG)} = CoF1 + CoF2 + CoF3 \dots\dots CoFN$$

- TCoF_(WG) = Total Cost of Fuel in Million Rupees of whole generation fleet of KE
 COF1 = Cost of Fuel in Million Rupees of 1st power plant/unit
 COF2 = Cost of Fuel in Million Rupees of 2nd power plant/unit
 COF3 = Cost of Fuel in Million Rupees of 3rd power plant/unit
 CoFN = Cost of Fuel in Million Rupees of Nth power plant/unit

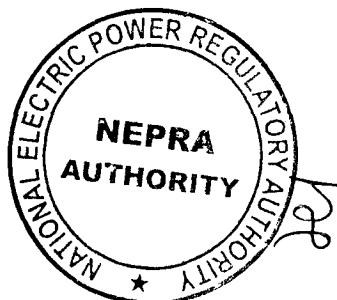
- iii. The weighted average fuel cost shall be worked out by dividing the total fuel cost of whole generation fleet of KE with the total units sent out (both own generation and power purchases) by KE in that month.

$$WAFC_{(WG)} = TCoF_{(WG)} / TUSO$$

- WAFC_(WG) = Weighted Average Fuel cost of KE's whole generation fleet in Rs./kWh
 TCoF_(WG) = Total Cost of Fuel in Million Rupees of whole generation fleet of KE
 TUSO = Total Units Sent Out based on targeted auxiliaries (KE's own generation + Power Purchases) in GWh

- iv. The computed monthly weighted average cost shall be compared with the reference weighted average cost to compute monthly FCA portion of change in KE own generation's fuel component. The formula is produced below;

$$FCA(OG) = \{WAFC_{(WG)(CM)} - WAFC_{(WG)(RM)}\}$$



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FCA(OG) = The required Increase/ (Decrease) in Rs./kWh in fuel cost component of KE's own generation for the current month over the last month of the previous quarter to be reflected in the monthly bills of consumers as part of Fuel Charges Adjustment.

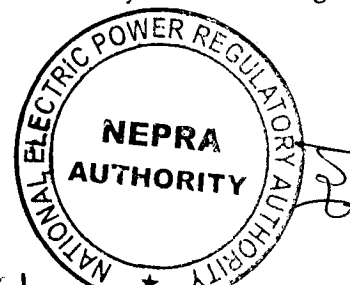
WAFC_(WG)
(CM) = Weighted Average Fuel cost of KE's whole generation fleet of the Current Month in Rs./kWh

WAFC_(WG)
(RM) = Weighted Average Fuel cost of KE's whole generation fleet of the Reference Month in Rs./kWh

- v. For the purpose of above adjustment the Current Month would mean the month for which adjustment is required and the Reference Month would mean the last month of the preceding quarter.
- vi. For the purpose of adjustment for the months from July 01, 2016 to September, 2016, the determined fuel cost component of Rs.2.9265/kWh, calculated on total units sent out basis, shall be used as reference.
- vii. The generation at Bus bar for each power station/unit shall be worked out after subtracting the auxiliary consumption, set by the Authority, from the gross generation for each generating unit/power station.
- viii. The price of furnace oil shall be worked out on the basis of monthly weighted average method taking into account the opening stock, monthly purchases and closing stock. The price of gas as notified by the relevant Authority shall be used to calculate the cost and corresponding variations. In case of other fuels, the costs and variations shall be computed using prices that are either notified by the relevant Authority or based on the documentary evidences submitted by KE.
- ix. In case it is not possible to calculate energy on each fuel for the dual fuel power stations then the energy generated shall be worked out based on proportionate BTUs consumed (based on Authority's benchmark calorific value) of each fuel.
- x. The calorific value of furnace oil has been set as 40,351 BTUs/Kg. No variations in the calorific value shall be allowed on actual basis during the tariff control period. The calorific value of other fuels shall be approved by the Authority before allowing variation thereon.

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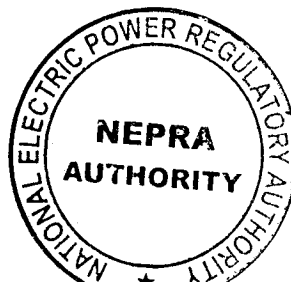


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- xi. K-Electric shall submit its monthly adjustment request within seven days following the current month. The request shall be submitted on a prescribed format as provided in this Mechanism. KE shall submit the following information/data for verification.
- Complete monthly data showing plant/unit wise gross generation, actual auxiliary consumption, fuel consumption, installed capacity, de-rated capacity, plant availability, power dispatched and system demand data.
 - Fuel stock position (opening and closing), Furnace Oil/Gas/Other Fuels purchased during a month along with duly verified copies of purchase orders.
 - KE shall be obligated to provide any additional information, if required, during the processing of the relevant adjustment request.
- xii. The approved monthly FCA shall be notified by the Authority and shall be charged in the month intimated by the Authority in the respective monthly FCA decision. The determined FCA shall be charged on the basis of units consumed by each consumer in the month for which it is calculated.
- xiii. K-Electric in its FCA request shall certify that data provided is accurate and plants have been operated following economic despatch.

Adjustment on quarterly basis.

- xiv. The impact of monthly variations in Million Rupees in KE own generation's fuel cost component to the extent of targeted T&D losses, not taken into account in the monthly FCAs, shall be adjusted on quarterly basis, i.e. approved respective monthly FCA times the total units sent out multiplied by the allowed level of T&D losses. The impact of these variations shall be worked out based on targeted units to be sold in the next quarter and shall be adjusted in the Schedule of Tariff of KE. Upon recovery of the allowed variations, this impact shall be reversed in the next quarterly adjustment.
- xv. Furthermore, in order to bring KE's tariff on current level of fuel prices, the KE own generation's fuel cost component shall be adjusted at the price level of last month of each quarter. The weighted average fuel cost of last month of quarter under consideration shall be

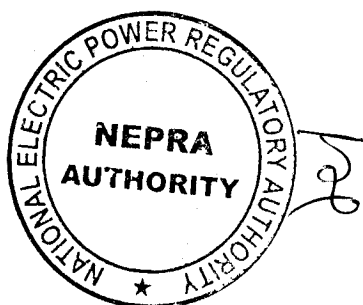


compared with the weighted average fuel cost of reference month of last quarter to work out this impact. The resultant variations in terms of Rs./kWh shall be adjusted in the SOT of KE. For the purpose of adjustment for the quarter July 01, 2016 to September, 2016, the fuel cost component of Rs.3.6998/kWh, calculated on units sold basis, shall be used as reference.

- xvi. The determined fuel cost component shall also be adjusted with the target of yearly T&D losses while making the adjustment for the quarter April-June every year.
- xvii. The aforesaid quarterly adjustments shall be made in the consumer end tariff using following yearly target of T&D losses;

FY	2016	2017	2018	2019	2020	2021	2022	2023
Loss Reduction (%)	22.10	20.90	19.80	18.75	17.76	16.80	15.95	15.36

- xviii. K-Electric shall submit the quarterly adjustment request within fifteen days (15), following the last month of each quarter.



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MECHANISM FOR ADJUSTMENT OF FUEL PRICE VARIATIONS

Generation on Gas, F.O and Others at Bus Bar	Unit	Reference month	Current Month
Bin Qasim Power Station Unit-I Bin Qasim Power Station Unit-II Bin Qasim Power Station Unit-III Bin Qasim Power Station Unit-IV Bin Qasim Power Station Unit-V Bin Qasim Power Station Unit-VI Korangi Gas Turbine Power Station SITE Gas Turbine Power Station Bin Qasim Power Station-II CCPP Korangi Combined Cycle Power Station New Power Station(s)	GWh		
Total			
Price of Fuel			
Gas	(Rs/MMBTu)		
Furnace	(Rs/M.Ton)		
Others			
Approved Heat Rates at Bus Bar-Gas, F.O, Others			
Bin Qasim Power Station-I Bin Qasim Power Station Unit-II Bin Qasim Power Station Unit-III Bin Qasim Power Station Unit-IV Bin Qasim Power Station Unit-V Bin Qasim Power Station Unit-VI Korangi Gas Turbine Power Station SITE Gas Turbine Power Station Bin Qasim Power Station-II CCPP Korangi Combined Cycle Power Station New Power Station(s)	BTU/kWh		
Cost of Fuels (Gas, F.O, Total , Others)			
Bin Qasim Power Station-I Bin Qasim Power Station Unit-II Bin Qasim Power Station Unit-III Bin Qasim Power Station Unit-IV Bin Qasim Power Station Unit-V Bin Qasim Power Station Unit-VI Korangi Gas Turbine Power Station SITE Gas Turbine Power Station Bin Qasim Power Station-II CCPP Korangi Combined Cycle Power Station New Power Station(s)	Mln Rs.		
Total Cost of Fuel	Mln Rs.		
Weighted Average Cost- Current Month	Rs./kWh		
Less Weighted Average Cost- Reference Month	Rs./kWh		
Required Increase/Decrease- KE's Own Generation	Rs./kWh		



**MECHANISM FOR ADJUSTMENT IN TARIFF
DUE TO VARIATION IN POWER PURCHASE PRICE ("PPP")**

1. This mechanism shall be applicable to make adjustments in the PPP component of KE's tariff due to variation in fuel prices, energy mix, inflation, exchange rate etc. on monthly and quarterly basis.

Adjustment on Monthly Basis

2. The change in the fuel component of PPP due to variation in fuel prices and energy mix shall be passed on to the consumers of KE directly in their monthly bills in the form of FCA. Following steps shall be followed to calculate these variations;
 - i. The actual fuel cost of each power station/source, determined/approved by the Authority, shall be totaled to arrive at monthly total fuel cost of all the power stations.

$$TCoF_{(WPPP)} = CoF1 + CoF2 + \dots + CFN$$

TCoF_(WPPP) = Total Cost of Fuel in Million Rupees of all external generation sources

COF1 = Cost of Fuel in Million Rupees of 1st power plant/unit

COF2 = Cost of Fuel in Million Rupees of 2nd power plant/unit

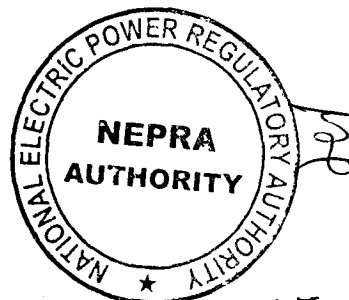
COFN = Cost of Fuel in Million Rupees of Nth power plant/unit

- ii. The weighted average fuel cost of the PPP shall be worked out by dividing the total fuel cost with the total units sent out (both own generation and power purchases) by KE in that month.

$$WAFC(WG) = TCoF(WG) / TUSO$$

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WAFC = **Weighted Average Fuel cost of all external generation sources in**
(WPPP) = **Rs./kWh**

TCoF = **Total Cost of Fuel in Million Rupees of all external generation**
(WPPP) = **sources**

TUSO = **Total targeted Units Sent Out (KE's own generation+ Power**
Purchases) in GWh

- iii. The computed monthly weighted average fuel cost shall be compared with the reference weighted average fuel cost to compute the PPP fuel component part of FCA. The formula is produced below;

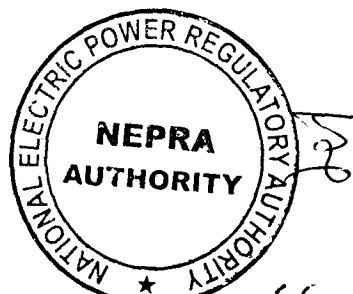
$$FCA-PPP = \{WAFC_{(WPPP)(CM)} - WAFC_{(WPPP)(RM)}\}$$

FCA-PPP = The required Increase/ (Decrease) in PPP's fuel cost component for the current month over the reference month to be reflected in the monthly bills of consumers as part of Fuel Charges Adjustment.

WAFC = **Weighted Average Fuel cost component of PPP of the Current**
(CM) = **Month**

WAFC = **Weighted Average Fuel cost component of PPP of the Reference**
(RM) = **Month**

- iv. For the purpose of above adjustment, the Current Month would mean the month for which adjustment is required and the Reference Month would mean the last month of the preceding quarter. For the purpose of adjustment for the months from July 01, 2016 to September, 2016, the fuel cost component of PPP of Rs. 2.2622/kWh, calculated on units sent out basis, shall be used as reference.
- v. The monthly adjustment shall be restricted to the fuel component of PPP and shall be passed on to the consumers as part of FCA in accordance with the above formula.
- vi. K-Electric shall, within seven days following the Current Month, request for FCA to compensate for variations in fuel component of PPP. The request shall be submitted on a prescribed format as provided in this Mechanism.

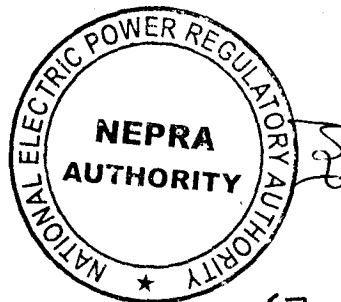


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- vii. KE shall submit the following information/data for verification.
- Complete monthly data showing power purchased in GWh, installed capacity, de-rated capacity, plant availability, power dispatched and system demand data.
 - Duly verified copies of invoices raised by each external source of power along with duly verified copies of their purchase orders/bill stickers.
 - K-Electric shall also provide separate workings/indexations for all the tariff components along with the applicable currency exchange rate, US CPI etc. in accordance with approved determination/power purchase agreement.
 - KE shall be directed for the provision of any additional information, if required, during the processing of relevant adjustment request
- viii. The approved monthly FCA shall be notified by the Authority and shall be charged in the month intimated by the Authority in the respective monthly decision. The determined FCA shall be charged on the basis of units consumed by each consumer in the month for which FCA is calculated.

Adjustment on quarterly basis.

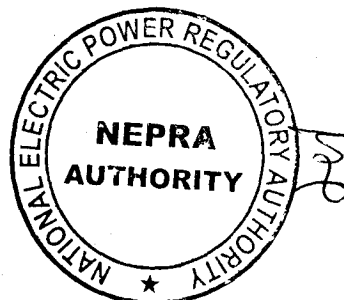
- ix. The impact of monthly variations in Million Rupees in fuel cost component of PPP to the extent of targeted T&D losses, not taken into account in the monthly FCAs, shall be adjusted on quarterly basis. The impact of these variations shall be worked out based on targeted units to be sold in the next quarter and shall be adjusted in the SoT of KE. Upon recovery of the allowed variations, this impact shall be reversed.
- x. In addition, the monthly variations in Million Rupees in the variable O&M and fixed costs, as allowed by the Authority, shall be adjusted on quarterly basis using weighted average method on targeted units sold basis. The impact of these variations shall be worked out based on targeted units to be sold in the next quarter and shall be adjusted in the SoT of KE. Upon recovery of the allowed variations, this impact shall be reversed. For the purpose of these adjustments for the quarter July 01, 2016 to September, 2016, the O&M and capacity charges components of Rs. 1.5219/kWh, calculated on units sold basis, shall be used as reference.



- xi. Furthermore, in order to bring KE's tariff on current level of prices, each cost component of PPP shall be adjusted at the price level of last month of each quarter. The total weighted average PPP of last month of quarter under consideration shall be compared with the total weighted average PPP of reference month of the last quarter to work out this impact. For the purpose of these adjustments for the quarter July 01, 2016 to September, 2016, the PPP of Rs. 4.3819/kWh, calculated on units sold basis, shall be used as reference.
- xii. The determined PPP component shall also be adjusted with the target of yearly T&D losses while making the adjustments for the quarter April-June every year.
- xiii. The net quarterly variation in the power purchase cost (Fuel + Fixed part) shall be adjusted in the consumer end tariff based on the following yearly target of T&D losses.

FY	2016	2017	2018	2019	2020	2021	2022	2023
Loss Reduction (%)	22.10	20.90	19.80	18.75	17.76	16.80	15.95	15.36

- xiv. K-Electric shall submit the quarterly adjustment request within fifteen days (15), following the last month of each quarter. K-Electric shall be entitled to monthly/quarterly adjustment of PPP only from such sources whose tariffs are determined/approved by the Authority. The approved tariff of wind/solar power projects shall only be allowed variations on quarterly basis.
- xv. The actual payments in respect of WWF and WPPF to the IPPs shall be considered as pass through and shall be adjusted on yearly basis upon production of verifiable documentary evidences. Upon recovery of the same, the impact of these items shall be reversed.
- xvi. For the purpose of above adjustment the Current Quarter would mean the quarter for which adjustment is required and the Reference Quarter would mean the quarter preceding the Current Quarter.



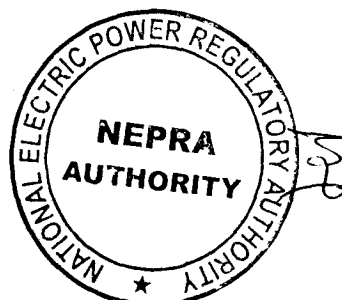
- xvii. The approved quarterly adjustment in tariff along with the revised schedule of tariff shall be sent to GoP for notification.

MECHANISM FOR CALCULATIONS OF POWER PURCHASE COST VARIATIONS

Generation at Bus Bar	Unit	Reference month	Current Month
Tapal	GWh		
Gul Ahmed			
NTDC			
KANUPP			
PASMIC			
Others			
Total			
Rate of Power Purchase			
Rate of Power Purchase	Unit	Last month	Current Month
Tapal	Rs./ kWh		
Gul Ahmed			
NTDC			
KANUPP			
PASMIC			
Others			
Total			
Total Cost of Power Purchase			
Tapal	Mln. Rs.		
Gul Ahmed			
NTDC			
KANUPP			
PASMIC			
Others			
Total			
Weighted Average Cost- Current Month	Rs./kWh		
Weighted Average Cost- Reference Month	Rs./kWh		
Required Increase/Decrease in the consumer end tariff	Rs./kWh		

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