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National Electric Power Regulatory Authority Islamic Republic of Pakistan

NEPRA Tower, Attaturk Avenue (East), G-5/1, Islamabad.
Ph: +92-51-9206500, Fax: +92-51-2600026
Web: www.nepra.org.pk, E-mail: registrar@nepra.org.pk

No. NEPRA/PAR-168/14837-14839

August 29, 2017

Subject: **Decision of the Authority in the matter of Power Acquisition Request (PAR) of K-Electric Ltd. for Purchase of 11-14 MW Power from Lotte Chemicals Pakistan Limited [Case # NEPRA/PAR-168]**

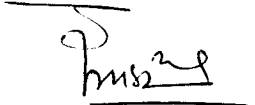
Dear Sir,

Please find enclosed herewith the subject Decision of the Authority (10 pages) in Case No. NEPRA/PAR-168.

2. The Decision is being intimated to the Federal Government for the purpose of notification in the official gazette in accordance with the provisions of Section 31(4) of the Regulation of Generation, Transmission and Distribution of Electric Power Act (XL of 1997).

3. The Order of the Authority is to be notified in the official Gazette.

Enclosure: As above


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(Syed Safer Hussain)

Secretary
Ministry of Water & Power
'A' Block, Pak Secretariat
Islamabad

CC:

1. Secretary, Cabinet Division, Cabinet Secretariat, Islamabad.
2. Secretary, Ministry of Finance, 'Q' Block, Pak Secretariat, Islamabad.



DECISION OF THE AUTHORITY IN THE MATTER OF POWER ACQUISITION REQUEST (PAR) OF K-ELECTRIC FOR PURCHASE OF 11 – 14 MW POWER FROM LOTTE CHEMICALS PAKISTAN LIMITED

1. INTRODUCTION

- 1.1. Lotte Chemicals Pakistan Limited (LCPL) has set up a Co-generation power plant at its premises in Port Qasim, Karachi having generation capacity of 48.1 MW (gross capacity at ISO). The plant achieved commercial production on July 17, 2012.
- 1.2. LCPL was granted a Generation License bearing No. SGC/93/2013 dated November 26, 2013. Through Licensee's proposed modification in the generation license dated 13th June 2017, LCPL was authorized to sell surplus power to K-Electric in accordance with the terms and conditions of such license. According to the Power Sale Proposal, the gross capacity is 41.319 MW and net capacity is 39.119 MW. The auxiliary consumption is 2.2 MW including compressor load of 2 MW. Sui Southern Gas Company Limited vide its letter No. Sales/NOC/PG-1421 dated 15th November 2016 issued NOC/ permission to sell surplus power to K-Electric from approved gas quota of 9 MMCFD. LCPL proposed to sell surplus power of 11-14 MW from this captive power generation plant to K-Electric through a power acquisition contract.

2. FILING OF PAR

- 2.1. K-Electric vide letter No. SBD/AR/NEPRA-0141/2017-0123, dated 23rd January 2017, submitted a Power Acquisition Request (PAR) in respect of purchase of 11-14 MW power from LCPL under the Interim Power Procurement (Procedure & Standards) Regulation, 2005 (IPPR).

3. SALIENT FEATURES OF THE PAR

- 3.1. The proposed take and pay tariff is as under:

| Description | Tariff | Indexation |
|-------------------------|--------|----------------------------------|
| Energy Price (Rs./kWh): | | |
| Fuel cost component | 6.10 | Gas price as notified by OGRA |
| O&M Foreign | 0.85 | Exchange Rate & US CPI quarterly |
| Total | 6.95 | |





| | | |
|----------------------------------------|--------------|----------------------------|
| Fixed Price (Rs./kW/h): | | |
| O&M (Local) | 0.17 | Pakistan WPI quarterly |
| Working Capital | 0.04 | KIBOR variations quarterly |
| Insurance | 0.02 | Exchange Rate |
| WACC Return | 0.94 | KIBOR variations quarterly |
| Depreciation | 0.36 | |
| Total | 1.53 | |
| Fixed Price at 92% (Rs./kWh) | 1.67 | |
| Total Tariff at 92% (Rs./kWh) | 8.62 | |
| GID Cess (Rs./kWh) | 2.03 | |
| Total Tariff with GIDC(Rs./kWh) | 10.65 | |

3.2. Key assumptions for the above tariff are as under:

- The proposed debt equity ratio is 75:25.
- Cost of debt has been taken as 3-month KIBOR 6.10% + 3%.
- Assumed return on equity is 15%.
- Exchange Rate of Rs. 106/USD has been assumed.
- Proposed LHV heat rates are 9,174.5 BTU/kWh (HHV 10,163.5 BTU/kWh)
- Proposed LHV efficiency of 37.2% (HHV efficiency of 33.58%)
- Total net Capacity of generation facility is 39.12 MW (gross 41.32 MW)
- The proposed annual plant availability is 92%.
- Cost of working capital has been worked out on one month cycle @ KIBOR + 2%.
- The proposed Insurance component has been worked out on the basis of annual insurance expense of Rs. 8 million.
- The petitioner has worked out depreciation component on annual depreciation expense of Rs. 122.48 million on the basis of straight line method and assuming plant useful life of 25 years.
- The proposed term of the contract is 5 Years.
- Reference Natural Gas price is Rs. 600/MMBTU and Gas Infrastructure Development Cess (GIDC) of Rs. 200/MMBTU.
- The Proposed FCC on RLNG is Rs. 9.30/kWh on the basis of RLNG price of Rs. 915/MMBTU (US\$ 8.63/MMBTU)





4. ADMISSION OF THE PAR

4.1. The Authority admitted the subject PAR and decided to hold a hearing in the matter. The hearing was scheduled for 16th June 2017 in Marriot Hotel, Karachi.

5. FRAMING OF ISSUES

5.1. Based on the contents of the PAR, following issues were framed for the hearing:

- i. Whether the proposed heat rates are justified?
- ii. Whether the proposed O&M is reasonable and justified?
- iii. Whether the fixed cost components are reasonable and justified
- iv. Whether the proposed Tariff control period of 5 years is justified?
- v. Whether the proposed tariff indexation / adjustment mechanism is justified?
- vi. Whether there is any negative impact of this power purchase on the existing tariff of K-Electric?

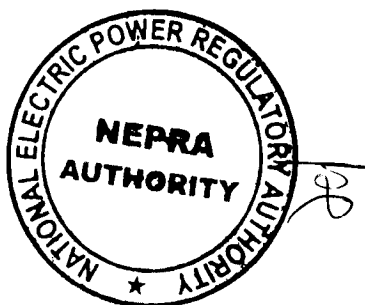
6. NOTICE OF ADMISSION/HEARING

6.1. Notice of admission/hearing was made public in leading national newspapers on June 3, 2017, inviting stakeholders to become party to the proceedings by filing intervention request or comments within 7 days. Stakeholders were also invited to participate in hearing. Individual notices were also sent to key stakeholders.

7. COMMENTS FILED BY WHISTLEBLOWER PAKISTAN

7.1. In response to the notice of admission, Whistleblower Pakistan (WBP) filed comments vide letter dated June 22, 2017. Majority of the issues raised by WBP related to the generation license of LCPL. Comments pertaining to issues other than generation license are summarized below:

- i) The generation license has been issued for 48.1 MW (Gross), 41.319 MW (de-rated at mean site conditions), 0.3 MW (Auxiliary Consumption) and 41.019 MW (Net) whereas the gross and net capacity of the power plant mentioned in the PAR and which appeared in the advertisement is 41.32 MW (Gross) and 39.12 MW (Net)
- ii) The efficiency of the power plant which was considered reasonable by the Authority, as stated in its generation license determination was around 40 – 42% whereas the



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LHV and HHV heat rates (and efficiency) of the power plant mentioned in the PAR and which appeared in the advertisement is 9,174.5 BTU/kWh (37.19%) and 10,163.5 BTU/kWh (33.58%), respectively.

- iii) The power plant has obtained the gas allocation from SSGC as captive power plant and such CPPs are supposed to generate electricity for their own use and not for sale. Issuance of NOC by gas distribution companies to CPPs to sell surplus electricity is against the spirit of the provisions of Gas Policy wherein CPPs are supposed to generate and consume electricity for their own industrial load.

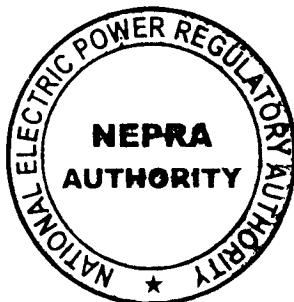
8. HEARING

- 8.1. The hearing was held as per schedule and was participated by K-Electric, Mr. Arif Balwani, Lotte Chemical and Karachi Chamber of Commerce.

CONSIDERATION OF THE VIEWS OF THE STAKEHOLDERS, ANALYSIS AND FINDINGS ON IMPORTANT ISSUES

9. Whether the proposed heat rates are justified?

- 9.1. KE requested fuel cost component of Rs. 6.10/kWh (excluding GIDC) on natural gas which was based on net LHV thermal efficiency of 37.2%. The requested thermal efficiency is based on guaranteed performance data. The plant utilizes GE LM 6000 PD Sprint gas turbine technology. KE also submitted that once SSGC begins to commence RLNG to Lotte Chemicals, the fuel cost component shall be changed to RLNG from natural gas due to difference in fuel prices of gas and RLNG. Therefore, KE also requested the Authority to allow a fuel cost component based on RLNG.
- 9.2. In order to assess thermal efficiency of the subject power plant, figures mentioned in OEM brochure, guaranteed performance data at reference site conditions, auxiliary consumption, degradation, partial loading and consumption of steam in the industrial process have been examined in detail. Based on technical analysis of the installed gas turbine, flat net thermal efficiency of 38% at reference site conditions is considered realistic for the subject power plant and the same is being approved. Since the steam generated by applying HRSG is not being used for power generation, the same is not considered in the calculation of efficiency. Similarly the capital cost associated with installation of HRSG and allied equipment shall not be considered while allowing return on equity. Based on the efficiency level of 38%, Ex-GST gas price of Rs. 600/MMBTU excluding GIDC, the fuel cost component works out to be Rs. 5.9674/kWh and the same is being approved.





- 9.3. The Authority noted the issue raised by WBP regarding the inconsistency of thermal efficiency between the generation license and the PAR. It is being clarified that the efficiency number for open cycle based gas turbine (i.e., 41%) as indicated in the generation license of LCPL is based on OEM data at ISO conditions whereas the efficiency number mentioned in the PAR is based on EPC guaranteed data adjusted for reference site conditions and auxiliary consumption. Therefore, there is no inconsistency in both the numbers. WBP also raised the issue of difference between the gross and net capacities determined in the generation license and PAR. It is being clarified that while granting generation license, the details regarding auxiliary consumption of gas turbine was only provided. However, subsequent to filing of PAR, details regarding the load of 2 MW for gas booster were also provided which is installed and operational at site. Therefore, the same has been included in the auxiliary consumption.
- 9.4. The reference fuel cost component shall be subject to adjustment for variation in gas price in accordance with the prescribed mechanism. In case GIDC is applicable, the same shall also be included in the gas price on submission of verifiable documentary evidence and fuel cost component shall be adjusted accordingly in accordance with the prescribed mechanism. The mechanism for adjustment of fuel cost component for variation in gas price shall be as under:

$$GCC(\text{Rev}) = GCC(\text{Ref}) \times GP(\text{Rev}) / GP(\text{Ref})$$

Where:

GCC(Rev) = Revised Gas cost component applicable for the billing cycle

GP(Rev) = Revised gas price, excluding General Sales Tax applicable for the billing cycle as notified by OGRA for new captive power

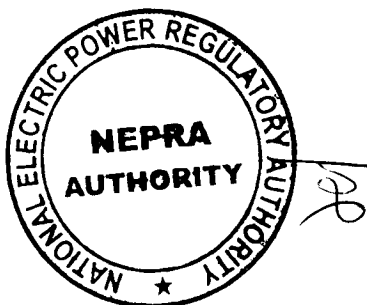
GP(Ref) = Reference Ex-GST HHV gas price of Rs. 600 /MMBTU

GCC(Ref) = Reference Fuel Cost Component on gas of Rs. 5.9674 /kWh

- 9.5. Since the subject PAR was based on committed gas quota from the gas supplier, the use of RLNG for power generation for sale of surplus power to KE shall not be allowed.

10. Whether the proposed O&M is reasonable and justified?

- 10.1. KE requested O&M of Rs. 1.0193/kWh, comprising of Rs. 0.1687/kWh for local O&M and Rs. 0.8506/kWh for foreign O&M. According to KE, local O&M includes cost of consumables including demin water, cooling water and manpower for co-generation





plant. Foreign O&M includes plant maintenance based on 50,000 hours (6 years) cycle as recommended by the OEM.

10.2. The Authority considered the request of KE with regards to O&M and found it on the higher side. The Authority in a similar case has allowed O&M of Rs. 0.6190/kWh including fixed and variable O&M and the same is being approved in the instant case. The O&M cost shall be subject to indexation every two years in the month of November with CPI (General) as published by Pakistan Bureau of Statistics as per the following mechanism:

$$\text{O\&M (Rev)} = \text{O\&M (Ref)} \times \text{CPI (Rev)} / \text{CPI (Ref)}$$

Where:

$$\text{O\&M (Rev)} = \text{Revised O\&M component}$$

$$\text{O\&M (Ref)} = \text{Reference O\&M component of Rs. 0.6190/kWh}$$

$$\text{CPI (Rev)} = \text{Revised CPI (General) published by Pakistan Bureau of Statistics}$$

$$\text{CPI (Ref)} = \text{Reference CPI (General) of 212.01 for November 2016}$$

11. Whether the fixed cost components are reasonable and justified?

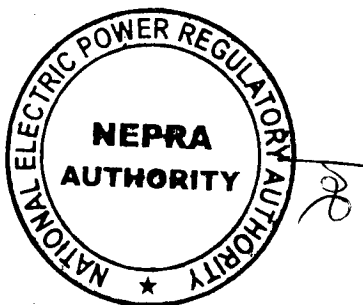
Working Capital Charge

11.1. KE requested Rs. 0.0362/kW/h (Rs. 0.0393/kWh at 92%) for Working Capital Charge. The working capital charge was calculated for EPP of 30 days and for fuel payment of 15 days per month, one month cycle at KIBOR + 2% interest.

11.2. The Authority in the case of gas based power plants has not allowed cost of working capital due to the fact that payment to gas supplier is made in the month following the month in which the gas is actually consumed. The power seller and power purchaser may reflect the same billing cycle in the power acquisition contract, therefore, there shall be no need for cost of working capital, hence not allowed by the Authority.

WACC Return

11.3. KE requested Rs. 0.9449/kW/h (Rs. 1.0271/kWh at 92%) for WACC return. According to the PAR, the project cost for the Co-Generation project was Rs. 4,153 million as per the financial statements. According to KE, after excluding costs related to co-gen process (HRSG and some other non related costs), the cost associated with power generation



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works out to be Rs. 3,062 million. KE calculated WACC return based on debt equity ratio of 75:25, cost of debt of KIBOR + 3% and cost of equity of 15%.

11.4. The Authority in cases of captive power plants has not allowed WACC based return rather it has allowed return on equity investment only. The Authority in cases of captive power plants allowed IRR of 15% on equity investment. In line with the decisions in many similar cases, the Authority has decided to allow 15% IRR on equity investment of 25% of the capital cost of Rs. 3,062 million. Accordingly, the ROE component works out as Rs. 0.4128/kWh on 92% plant factor and the same is approved by the Authority.

Depreciation

11.5. KE requested the Authority to allow Rs. 0.3574/kW/h (Rs. 0.3885/kWh at 92%) as depreciation component based on straight line method for a period of 25 years.

11.6. Depreciation is the recovery of capital cost of the project. Captive power plants are set up for self-consumption and consumers cannot be burdened for such costs. In similar cases, the Authority has not allowed the recovery of capital cost. Therefore, in-line with the decisions in similar cases, the Authority has decided to maintain its decision in the instant case.

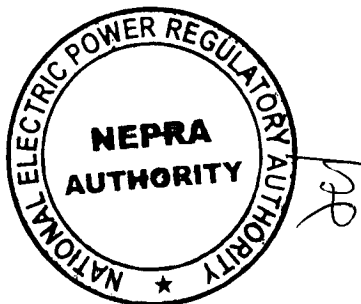
Insurance

11.7. KE requested insurance cost component of Rs. 0.0233/kW/h (Rs. 0.0253/kWh at 92%) based on annual insurance cost of Rs. 8 million. The requested insurance cost is within the benchmark of 1% of the EPC cost and, therefore, allowed as per the request of the Petitioner.

12. Whether the proposed Tariff control period is justified?

12.1. According to the PAR submitted by KE, the sale and purchase of surplus power shall be made on "take and pay" basis through bilateral agreement between power producer and KE for the term of 5 years. KE intends to purchase power from Lotte Chemicals because of the prevalent power demand-supply gap which is expected to be filled by installation of new power projects of approximately 2,100 MW in the next 5 years.

12.2. Keeping in view the demand supply gap, the Authority considers that the term of the proposed agreement is justified. Since the tariff is on "Take and Pay" basis, in case KE's



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electricity demand is fulfilled earlier or its projects come online earlier than expected, KE shall have discretion to discontinue purchase of electricity from Lotte without incurring any additional liabilities.

13. Whether the proposed indexation / adjustment mechanism is justified?

13.1. KE requested the following indexations on the tariff components:

| Tariff Cost Component | Requested Tariff Indexation & Adjustment |
|-------------------------|----------------------------------------------|
| Fuel Cost Component | Prevalent Gas/RLNG price as notified by ORGA |
| Variable O&M (Local) | Pakistan CPI |
| Fixed O&M (Foreign) | US\$ to PKR variation & US CPI |
| Insurance | US\$ to PKR variation |
| Cost of Working Capital | Adjustments for relevant KIBOR variation |
| WACC Return | Adjustments for relevant KIBOR variation |

13.2. The Authority in the cases of captive power plants has allowed indexation to the extent of fuel price and O&M. Therefore, in-line with the decisions in similar cases, the Authority has decided to allow adjustments in fuel cost component for variation in gas price and O&M component for inflation in accordance with the prescribed mechanisms.

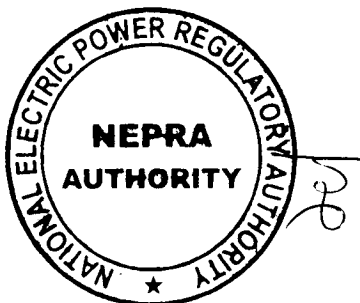
14. Whether there is any negative impact of this power purchase on the existing tariff of K-Electric?

14.1. The efficiency of the whole existing fleet of KE is around 38% and majority of the power purchase from external sources is RFO based which is costlier fuel. The purchase of power from LCPL shall be beneficial for the consumers and shall not have any negative impact on the existing tariff of KE.

15. Summary of Tariff

15.1. Summary of the approved tariff is provided hereunder:

| Description | Rs./kWh |
|---------------------|---------|
| Fuel Cost Component | 5.9674 |
| O&M | 0.6190 |
| Insurance | 0.0253 |
| ROE | 0.4128 |
| Total | 7.0245 |



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16. ORDER

16.1. The Authority hereby determines and approves the following tariff for Lotte Chemical Pakistan Limited for sale of surplus power to K-Electric on take and pay basis:

Reference Tariff

| Description | Rs./kWh |
|---------------------|---------------|
| Fuel Cost Component | 5.9674 |
| O&M | 0.6190 |
| Insurance | 0.0253 |
| ROE | 0.4128 |
| Total | 7.0245 |

16.2. Gas Infrastructure Development Cess (GIDC) has not been assumed in the reference gas price of Rs. 600/MMBTU. In case GIDC is applicable, the same shall also be included in the gas price on submission of verifiable documentary evidence and fuel cost component shall be adjusted accordingly in accordance with the prescribed mechanism. The mechanism for adjustment of fuel cost component for variation in gas price shall be as under:

$$GCC(\text{Rev}) = GCC(\text{Ref}) \times GP(\text{Rev}) / GP(\text{Ref})$$

Where:

- GCC(Rev) = Revised Gas cost component applicable for the billing cycle
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GP(Ref) = Reference Ex-GST HHV gas price of Rs. 600 /MMBTU
GCC(Ref) = Reference Fuel Cost Component on gas of Rs. 5.9674 /kWh

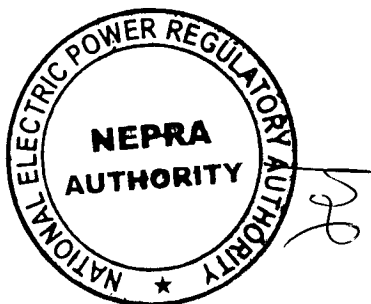
16.3. The total O&M cost will be subject to indexation every two years in the month of November with CPI (General) as published by Pakistan Bureau of Statistics as per the following mechanism:

$$O\&M(\text{Rev}) = O\&M(\text{Ref}) \times CPI(\text{Rev}) / CPI(\text{Ref})$$

Where:

- O&M (Rev) = Revised O&M component
O&M (Ref) = Reference O&M component of Rs. 0.6190/kWh
CPI (Rev) = Revised CPI (General) published by Pakistan Bureau of Statistics
CPI (Ref) = Reference CPI (General) of 212.01 for November 2016

16.4. The term of the contract shall be 5 years.

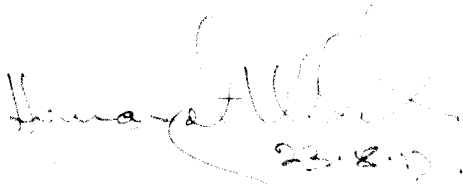


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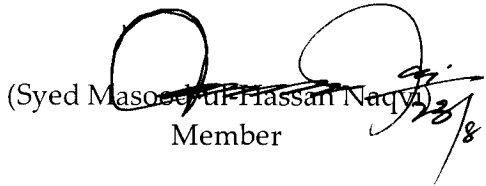
- 16.5. The Authority has decided to grant permission for procurement of power as per the above approved generation tariff. KE is directed to incorporate the same in the Power Acquisition Contract and submit the same in line with the Regulation 5(1) of the IPPR-2005.
17. The above Order is to be notified in the official gazette in accordance with the provisions of Section 31(4) of the Regulation of Generation, Transmission and Distribution of Electric Power Act 1997.

AUTHORITY

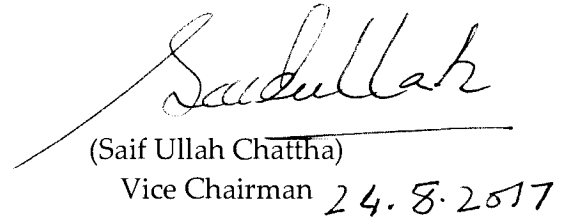

23.8.17

(Himayat Ullah Khan)
Member

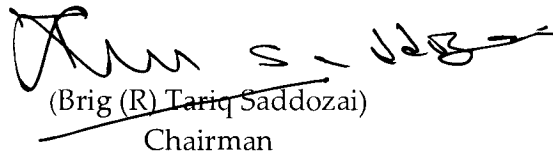
(Maj (R) Haroon Rashid)
Member


23/8

(Syed Masood ul Hassan Naqvi)
Member

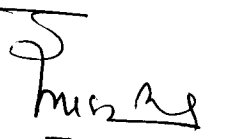

24.8.2017

(Saif Ullah Chattha)
Vice Chairman


29/8/17

(Brig (R) Tariq Saddozai)
Chairman




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