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National Electric Power Regulatory Authority Islamic Republic of Pakistan

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No. NEPRA/PAR-152/KE(EPCL)-2016/ 82


January 3, 2017

Chief Executive Officer
K-Electric Limited (KEL)
KE House, Punjab Chowrangi,
39 – B, Sunset Boulevard, Phase-II
Defence Housing Authority
Karachi.

Subject: Decision of the Authority in the matter of granting Permission to K-Electric for Negotiating the Power Acquisition Request (PAR) with Engro Polymer & Chemicals Limited (EPCL) for Purchase of 4.5 MW Power [Case # NEPRA/PAR-152/KE(EPCL)-2016]

Please find enclosed herewith the subject Decision of the Authority (08 pages) in the matter of granting Permission to K-Electric for Negotiating the Power Acquisition Request (PAR) with Engro Polymer & Chemicals Limited (EPCL) for Purchase of 4.5 MW Power for information and further necessary action.

Enclosure: As above


03.01.17

(Syed Safer Hussain)



National Electric Power Regulatory Authority
(NEPRA)

DECISION OF THE AUTHORITY
IN THE MATTER OF
GRANTING PERMISSION TO K-ELECTRIC
FOR NEGOTIATING THE
POWER ACQUISITION REQUEST (PAR)
WITH
ENGRO POLYMER & CHEMICALS LIMITED (EPCL)
FOR
PURCHASE OF 4.5 MW POWER

(NO: NEPR/PAR-152/KE (EPCL)-2016)

Islamabad

The Authority in exercise of the powers conferred on it under Section 7(3) (a) read with Section 31 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997, Interim Power Procurement (Standards & Procedure) Regulations – 2005, and all other powers enabling it in this behalf, and after taking into considering all the submissions made by the parties, issues raised, evidence / record produced during hearing, and all other relevant material, hereby issues this decision.



Decision of the Authority with respect to Power Acquisition Request (PAR) of K-Electric for Purchase of 4.5 MW Natural Gas Based Power from Engro Polymer and Chemicals Limited (EPCL)

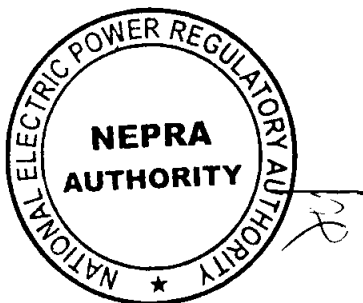
K-Electric vide letter dated 3rd November 2015 submitted the Power Acquisition Request (PAR) for procurement of 4.5 MW power from natural gas based power plant Engro Polymer & Chemicals Limited (EPCL) under the Interim Power Procurement (Procedure & Standards) Regulation, 2005. KE was directed to submit the Board of Directors (BOD) resolution in favour of signatory and acquisition of power from EPCL. Accordingly KE on 29.2.2016 submitted resolution passed by KE BOD meeting dated 23.2.2016. EPCL was awarded generation license for its 79.02 MW (ISO gross) captive nature gas fired electric power plant in 2004 & 2011.

2. Information submitted by K-Electric

2.1 The information provided by K-Electric as per IPPR-2005 are as under:

Regulation	Particular	Information provided by KE
Regulation 3(3)(a)	Firm Capacity expected	4.5 MW (Net) at mean site
Regulation 3(3)(b)	Technology, indicating primary fuel, primary fuel and backup fuel	Gas fired electric power generation plant (Alstom Tornado Gas Turbine)
Regulation 3(3)(c)	The expected time of commercial operation of the generation facility	KEL has mentioned year of commissioning as 1999
Regulation 3(3)(d)	The expected rate of power to be acquired and the basis thereof including but not limited to the feasibility study report, contracts and agreement	KEL has submitted as below: Rs. 8.32 per kWh at 100% load factor Rs. 8.5056 per kWh at 91.3% load factor
Regulation 3(3)(e)	Distribution Company's demand which is going to be met through the proposed procurement	4.5 MW
Regulation 3(3)(f)	The adequacy of the transmission system or distribution company's sub-transmission system and the cost of transmission / interconnection to the Grid System involved in the procurement.	11 kV transmission line from KEL
(Regulation 3(4))	The information on prescribed forms of Schedule-I	The filled in forms are submitted by KEL

2.2 K-Electric submitted that it continuously received a large number of new connection applications on a daily basis in addition to base of 2.3 million connections across residential, commercial, industrial and agricultural sectors. K-Electric submitted that for bridging the demand supply gap of peak demand of 3,056 MW during June, the KE is pursuing to purchase power from





captive power producers who have surplus capacity. EPCL approached KE to sell 4.5 MW (net). The unit is already installed and will be available for supply of power upon approval by the Authority. The supply will assist in making available power to the rising demand within the Port Qasim industrial area.

2.3 According to KE, the Power Acquisition Contract (hereinafter "PAC") with EPCL was signed on 14.3.2009 for electricity capacity upto 18 MW for a period of four years. However, EPCL discontinued the supply in 2011 to KE citing grid frequency issues. EPCL has requested KE for a resumption of supply of power from its generation facility through an extension of term of the original PAC. Following this, KE vide letter dated 3.3.2015 enclosed the first addendum to the PAC with a request to the Authority to approve the extension. However, NEPRA through its letter dated 2.4.2015 directed KE to follow the IPPR-2005 and seek power acquisition permission from the Authority for negotiating PAC. Accordingly PAR has been filed.

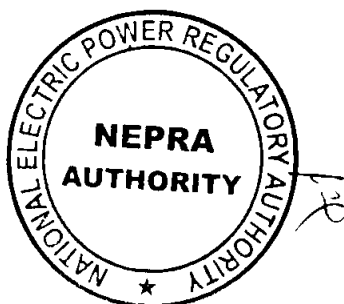
2.4 According to K-Electric, the total installed capacity of EPCL gas fired electric power plant is 79.8 MW (Gross ISO G-T(i) 6.5 MW, G-T(ii) 29.06 MW, GT(iii) 29.06 MW & S-T 14 MW). EPCL plans to sell 4.5 MW (net) from G-T(i) to KE. According to KE, natural gas is the primary fuel for the power plant for which gas allocation and other approvals are available from SSGC. KE referred the Clause # 2 of the GSA which states that *"The Company shall supply gas for power generation against unconditional UNDERTAKING by the consumer that power so generated will be used only at the abovementioned premises of the consumer will be for his own industrial activity or to sell surplus power to buyers at mutually agreed rates under the directives of NEPRA."*

2.5 According to KE, the gas turbine (unit no. 1) which will provide 4.5 MW electricity to KE was commissioned in the year 1999 with an original acquisition value of PKR 398.22 million. KE submitted that EPCL have requested for return based on the Weighted Average Cost of Capital plus depreciation. After careful review and discussion with EPCL on the power sale proposal, KE has agreed in principal for purchase of power from EPCL subject to the regulatory approvals. The supply of KE is expected to be through 11 kV line.

2.6 KE submitted that KE is already procuring power from Tapal Energy, Gul Ahmed and Bin Qasim Power Station-I. EPCL is offering an option of making the power available within shortest possible time. The generation unit is already in operational mode and no significant cost is required to evacuate the power.

3. Agreed Tariff

3.1 The summary of the sale proposal submitted by K-Electric with EPCL is as under:





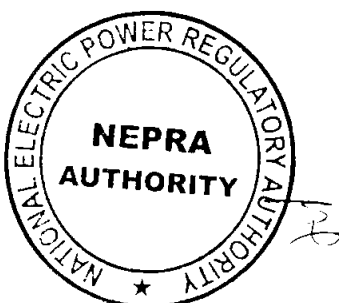
Company	Engro Polymers and Chemicals Limited		
Contract Capacity	4.5 MW net at mean site conditions		
Interconnectivity	11 kV transmission line from KE		
Project Location	Port Qasim, Karachi		
Plant Technology	Gas fired electric power generation plant (Alstom Tornado Gas Turbine)		
Project Term	5 Years		
Power Purchaser	KE Limited		
Fuel	Gas		
Plant Factor	91.3%		
Energy Production	39.42 GWh at 100 Load factor and 36.266 at 91.3% load factor.		
Capital Structure	Project Financing	%age	PKR
	Equity	30%	119,466,697
	Debt	70%	278,755,628
	Total Financing	100%	398,222,326
Financing Terms	Interest Rate: KIBOR + 3.0 % p.a. KIBOR: 7%		
Levelized Tariff	PKR 8.3233/kWh at 100 % load factor PKR 8.5056 kWh at 91.3% load factor		
Relevant Agreements	PAC & GSA		

3.2 According to KE, EPCL has provided a cost plus tariff on "Take & Pay" mechanism, which is broken down into variable component (i.e. Energy Purchase Price) and fixed cost component (i.e. Capacity Purchase Price). The variable tariff components includes fuel cost and variable O&M. The fixed cost components includes fixed operation and maintenance, insurance, WACC and depreciation charges. The tariff breakup is as under:

Year	Gas Charges	VO&M	GIDC	EPP	Fixed O&M	Insurance	WACC	Depreciation	CPP @ 91.3%	Total Tariff
1	6.0131	0.3923	2.0988	8.5042	0.2267	0.0245	1.1617	0.5051	2.1003	10.6044
2	6.0131	0.3923	2.0988	8.5042	0.2267	0.0245	1.1617	0.5051	2.1003	10.6044
3	6.0131	0.3923	2.0988	8.5042	0.2267	0.0245	1.1617	0.5051	2.1003	10.6044
4	6.0131	0.3923	2.0988	8.5042	0.2267	0.0245	1.1617	0.5051	2.1003	10.6044
5	6.0131	0.3923	2.0988	8.5042	0.2267	0.0245	1.1617	0.5051	2.1003	10.6044

4. Proceedings

4.1 The Authority admitted the subject case for consideration. In accordance with the





provisions of Regulation 4(1) of the IPPR-2005 "Upon admission of a request for power acquisition, the Authority shall satisfy itself in respect of the prudence of the procurement and grant the power acquisition permission to a distribution company for negotiating a power acquisition contract to meet its load growth or reduction in power purchase cost or a transmission company to initiate power acquisition contract negotiations for procurement on behalf of a distribution company or a group of such companies." The Authority therefore decided to process the case in line with earlier cases.

5. Hearing

5.1 In order to arrive at fair and informed decision, the Authority decided to hold the hearing. Advertisement in this regard was published in Daily "Dunya" and Daily "News" was published on 20.08.2016. Individual notices were issued however, no comments or intervention request was filed.

5.2 The hearing was conducted on 20th September which was attended by the representatives of KE, Engro and other stakeholders.

5.3 Issue-wise discussion on the requested tariff is as under:

6. Fuel Cost Component

6.1 KE submitted that the working of the Fuel Cost Component ("FCC") is based on the guaranteed efficiency parameters of 32.52 % HHV provided by EPCL. According to KE, the Reference gas price is taken as per the OGRA notified price for captive power producers, dated 1st January 2013 i.e. 573 Rs/MMBTU on HHV basis. Separate provision for GIDC has been made in the tariff. KE requested the Authority to allow pass through of Fuel Cost Component as adjusted to the prevailing gas price. KE further submitted that the GIDC for captive power producers is currently at 200 PKR/MMBTU. KE requested that the same should also be allowed as a pass through. According to KE, the SSGC will supply gas, which has already allocated 7.5 MMCFD of gas for EPCL on 14th April 2008 for a period of 25 years under a Gas Sale Agreement. KE requested to determine whether the proposed heat rate and indexation mechanism for FCC as stated in the Power Sales Proposal is appropriate.

6.2 The Petitioner claimed 36.14% net LHV thermal efficiency (flat) without compensation of degradation and part load adjustments at reference site conditions (RSC) for its power plant on take and pay basis. NEPRA in its determinations for small size gas based Jenbacher engine (including Mekotex, Galaxy textile and FIMCOTEX) having capacity of 3.3 MW allowed 37.5% net LHV thermal efficiency on open cycle mode at reference site conditions (on take and pay basis) and 43% net LHV thermal efficiency for combined cycle mode at reference site conditions

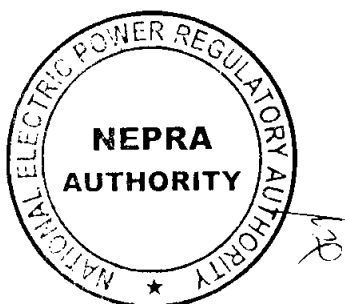




(on take and pay basis) taking into account the designed efficiency of said engines. In addition, NEPRA in its determination for medium sized Wartsila gas engine (including SNPCL) having capacity of 9.7390 MW allowed 48.75% net LHV thermal efficiency at reference site conditions (on take and pay basis) on combined cycle mode with compensation of degradation and part load adjustments taking into account the designed efficiency of the said engines. The subject power plant is gas turbine (GT) based power plant having capacity of 5.2 MW at RSC which is commissioned in year 1999 and EPCL proposed a cost plus tariff on take and pay mechanism. The designed efficiency of the said GT as per OEM (Alstom Tornado) brochure is 29% gross LHV at RSC. EPCL intends to give 10% allowance in efficiency owing to usage of flue gases for its process requirements. This scenario resembles with waste heat recovery concept. The factor of degradation for this 17 year old plant also requires consideration as the permanent degradation in efficiency for gas turbine based power plant in a 30 year terms period is generally 1.5% (refer to PPA of Orient Power). For computation of thermal efficiency in respect to EPCL power plant, the Authority considered the (i). OEM broucher (ii.) Contractual QA / QC documents (iii) Performance test reports (iv). Correction factors (v) Power plant simulation data (vi) Degradation factor & (vii) comparison with other small size gas based power plants. Keeping in view, the Authority considers that if the Company had installed a steam turbine unit for utilizing the flue gases of the gas turbine then 39.29% net LHV thermal efficiency flat at reference site conditions could have been achieved but in the instant case as the EPCL did not claim for the extra capital cost in respect of steam turbine unit while providing incentive of 10% in efficiency, therefore the proposal is considered reasonable. Based on the OEM data / information and after allowing a degradation of 0.85% (as gas turbine was installed / commissioned in 1999) the 38.15% net LHV thermal efficiency on proposed combined cycle mode at reference site conditions (on take and pay basis) without compensation of degradation and part load adjustment has been considered reasonable and the same is allowed in the instant case. Accordingly based on the net LHV efficiency of 38.15%, gas price of Rs. 634.96/MMBTU the fuel cost component has been calculated as Rs. 5.6795/kWh and the same is allowed. GIDC on the aforesaid efficiency has been calculated separately which works out as Rs. 1.9814/kWh. However, the power producer shall provide the documentary evidence in support of GIDC payment to the power purchaser.

7. Variable & Fixed O&M cost Component

7.1 KE submitted that the variable O&M cost components includes the cost of consumables such as, Chemicals, turbine oil, lube oil and other supplies, and preventive and overhaul parts. KE requested the Authority to determine whether the proposed Variable O&M tariff is appropriate and provide an indexation mechanism as requested in the power sale proposal. KE requested to approve the variable O&M component of Rs. 0.3923/kWh. KE further submitted that Rs.





0.2267/kWh be allowed to Engro on account of fixed O&M.

7.2 The Authority considered the variable and fixed O&M cost requested by the KE. The variable and fixed O&M cost when compared with the other gas based projects seems reasonable, therefore the same is allowed as such.

8. Insurance

8.1 KE submitted that the annual cost of insurance proposed by EPCL is based on the insurance documents. The Insurance Component shall cover breakdown and business interruption. KE requested the Authority to determine whether the proposed Insurance tariff is appropriate and also determine a suitable indexation mechanism as requested in the power sale proposal.

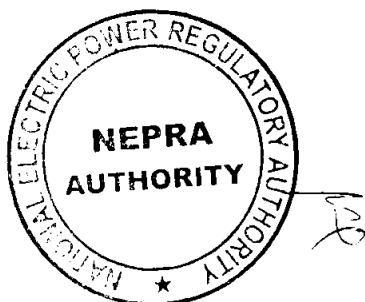
8.2 Insurance cost is calculated as per 1% of the EPC cost. In the instant case the requested insurance component of Rs. 0.0245/kWh is much lower as compared to other power projects. In view thereof considering the reasonability of insurance cost, the Authority decided to allow the same as such.

9. WACC plus Depreciation Based Return

9.1 KE submitted that the total cost of Gas Turbine is PKR 398 million. The plant was set up in 1999. Therefore, for the purpose of filing for this tariff, EPCL is adopting the Weighted Average Cost of Capital (WACC) plus Depreciation Expense approach. The deemed capital structure for this tariff filing is 70:30 debt to equity. For the purpose of calculating WACC, the cost of debt has been assumed as KIBOR+3.0% spread while the return on equity has been assumed as 15%. The applicable formula for indexation of WACC shall be NEPRA guideline.

9.2 The KE intends to procure power from the Captive Power Plant which will provide surplus energy of 4.5 MW. The Authority in the captive power plants i.e. Mekotex, Fateh Textile, Salim Yarn, Roomi Fabrics, Al-Abass Sugar Mills only allowed return on the equity. The Authority in the case of gas based power project allow 15% IRR. As a matter of equity and justice and principle of similar treatment for similar kind of projects and providing level playing field, the Authority decided to allow ROE and same IRR to EPCL instead of WACC. Accordingly based on the 25% equity (Rs. 99.5 million) and 15% IRR, the ROE has been works out as Rs. 0.4702/kWh and the same is allowed to EPCL.

10. Summary of the Requested and approved generation tariff on take & pay basis is as under:



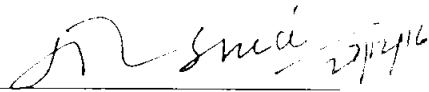


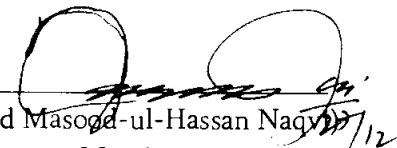
Tariff Components	Requested Generation Tariff Rs./kWh	Approved Generation Tariff Rs./kWh
Fuel Cost Component	6.0131	5.6795
Variable O&M	0.3923	0.3923
GIDC	2.0988	1.9814
Total EPP	8.5042	8.0532
Fixed O&M	0.2267	0.2267
Insurance	0.0245	0.0245
WACC / ROE	1.1617	0.4702
Depreciation	0.5051	-
Total Generation Tariff	10.6044	8.7746

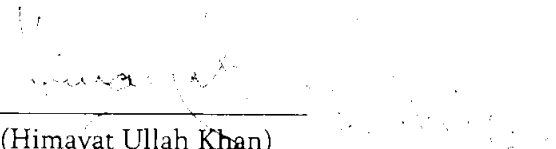
11. The Authority further decided to allow indexation to the extent of fixed & variable O&M and fuel price in line with the other Captive Power Plants.

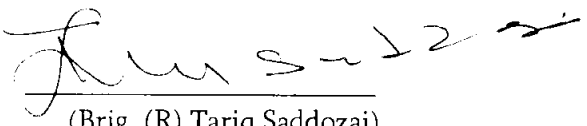
12. Keeping in view the above, the Authority has decided to grant permission for procurement of power as per the above approve generation tariff. KE is directed to incorporate the same in the Power Acquisition Contract and submit the request in line with the Regulation 5(1) of the IPPR-2005.

AUTHORITY

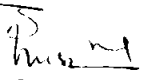

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03.01.17