

January 23<sup>rd</sup>, 2017  
SBD/AR/NEPRA-0141/2017-0123

The Registrar  
NEPRA Tower, Ataturk Avenue (East)  
Sector G- 5/1  
Islamabad

**Subject: Power Acquisition Request ("PAR") of K-Electric for Purchase of 11 - 14 MW (Net) Power from Lotte Chemical Pakistan Limited ("LCPL")**

Dear Sir,

K-Electric Limited ("KE") submitted a PAR to the Authority for the purchase of 11 MW net power from LCPL vide letter SBD/AR/NEPRA-071/2015-0929, dated October 6<sup>th</sup> 2015 under the Interim Power Procurement [Procedure & Standards Regulation], 2005 ("IPPR"). The Authority had dismissed the submitted PAR on the grounds that LCPL did not have a No Objection Certificate ("NOC") from Sui Southern Gas Company (SSGC) for usage of sanctioned gas for sale of surplus power to K-Electric. LCPL has now obtained the requisite NOC from SSG which has been attached as annexure to the Power Sale Proposal.

KE hereby re-submits for the approval of the Authority, the PAR for the purchase of 11 – 14 MW net power from LCPL under the IPPR. In addition to the PAR, we have also attached LCPL Power Sale Proposal, a Certified True Copy of Resolutions passed by KE Board of Directors, thereby providing General Power of Attorney to Chief Executive Officer of KE to make and sign applications and petitions with NEPRA.

We look forward to expeditious processing of the subject PAR within the timeframe stipulated in the IPPR for grant of Power Acquisition Permission by the Authority.

Sincerely,



**Adnan Rizwi**  
Director Strategy and Business Development

For information & my a P.  
— DRO/DReg-I  
Cope to:  
— SA (Tech)  
— SAT-I  
— Div (LIC)  
— LAC (IP)  
— M/F

24.01.17  
cc: Chairman  
VC/MCT  
M(LIC)  
M(CA)

Enclosed:

1. Power Acquisition Request
2. Power Sale Proposal
3. Certified True Copy of Resolutions

Registrar
Dy. No. 774
Dated: 24-01-17

**Certified True Copy (CTC) of Resolutions dated 17 January 2017  
Passed by K-Electric Board of Directors**

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**Resolution by Circular - 01 of 2017 – Purchase of Power from Lotte Chemical Corporation Limited (LCPL)'s Captive Power Plant**

**Resolved That** K-Electric be and is hereby authorized to enter into a Power Acquisition Contract (PAC) with Lotte Chemicals Pakistan limited (LCPL) to procure 11MW to 14 MW power from LCPL's 48.1 MW (gross capacity) Co-generation Captive Power Generation Unit at Port Qasim, Karachi, subject to mutually agreed terms & conditions and NEPRA's approvals and after completing all statutory requirements, legal review and obtaining all necessary approvals.

**Resolved Further That the** Chief Executive Officer (CEO), jointly with any one of the Chief Generation & Transmission Officer (CGTO) and Chief Financial Officer (CFO), be and are hereby authorized to finalize and sign the PAC with LCPL and Power Acquisition Request (PAR) for filing with NEPRA, for and on behalf of the Company. The CEO, jointly with any one of the CGTO and CFO, be and are hereby further authorized to take all necessary actions and sign such other deeds, documents, instruments etc. incidental and related to the execution and implementation of the PAC for and behalf of the Company and in relation to KE's Power Acquisition Request (PAR) with NEPRA. CEO, jointly with any one of CGTO 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 PAC execution and PAR and appear before any authority including NEPRA and admit execution thereof for and on behalf of the Company.

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MUHAMMAD RIZWAN DALIA  
Company Secretary  
K-ELECTRIC LIMITED



# Power Acquisition Request

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In relation to:

Lotte Chemical Pakistan Limited

Submitted before:

National Electric Power Regulatory Authority

Submitted by:

K-Electric Limited

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January, 2017

## Contents

Chapter 01: Grounds Forming Power Acquisition Request .....	2
1.1 Overview .....	2
1.2 K-Electric Limited.....	2
1.3 Lotte Chemical Pakistan Limited.....	3
1.4 Submission of PAR to Authority .....	4
Chapter 02: Overview of the Power Sale Proposal.....	6
2.1 Summary of Sale Proposal.....	6
2.2 Tariff Components .....	6
2.2.1 Fuel Cost Component.....	7
2.2.2 O&M Local.....	8
2.2.3 O&M Foreign .....	8
2.2.4 Working Capital Charge .....	8
2.2.5 WACC Return .....	8
2.2.6 Insurance .....	8
2.2.7 Depreciation.....	9
2.3 Reference Tariff Parameters and Assumptions.....	9
2.4 Tariff Indexations.....	10
2.5 Tariff Summary .....	11
Annexure I: Information Required under IPPR 2005.....	12
Annexure II: LCPL Power Sale Proposal.....	15

## **Chapter 01: Grounds Forming Power Acquisition Request**

### **1.1 Overview**

Pakistan today is faced with power shortage that has crippled the domestic industry and put the common man in Pakistan under great duress. The power shortage has resulted in a low GDP over the past five years. While the real demand for power grows at a persistent rate of 5 – 6 % annually, the growth in generation capacity is much slower leading to a widening demand and supply gap that has hampered the economy. Furthermore, the combination of higher usage of furnace oil in the generation fuel mix and unchecked T&D losses across the country has led to higher consumer power tariff and lower recoveries. The non-availability of fiscal space to pay the rising subsidy has also led to a soaring in circular debt. Given the dire nature of Pakistan's energy crisis, it is important to utilize all avenues to increase power generation in the country.

Karachi is the financial and trading hub of Pakistan. The availability of port facilities has attracted energy related investments over several decades thus positioning Karachi as the entry point of energy corridor of Pakistan. Although K-Electric has a customer base of 2.3 million connections across residential, commercial, industrial and agricultural sectors, the actual consumers of power are estimated to be well over 20 million people living in and around Karachi. K-Electric continues to receive a large number of new connection applications on a daily basis. At any particular instant, the volume of these applications usually adds up to several hundred megawatts. K-Electric recorded a peak demand of 3,195 MW in during 2015-16. Hence the demand of electricity is growing at a good pace and calls for not only investment in generation capacities but also tapping surplus power available from captive units. K-Electric is, therefore, pursuing purchase of power from independent power producers and captive plants. Lotte Chemical Pakistan Limited (LCPL) has approached K-Electric for a sale purchase agreement for 11 – 14 MW (net) power to be generated from their captive power generation unit using existing allotted quota of Gas from SSGC under a Gas Supply Agreement and eventually RLNG (on as and when available basis) once SSGC commences its supply to LCPL..

### **1.2 K-Electric Limited**

K - Electric Limited ("K-Electric") is the only vertically integrated and privatized utility in Pakistan engaged in Generation, Transmission and Distribution of electricity. K-Electric was incorporated on 13 September 1913, under the now repealed Indian Companies Act (now Companies Ordinance 1984) (. It was subsequently nationalized in 1952 and brought in under the Federal Government umbrella within the Ministry of Water and Power. It is a public limited company with its shares listed on the Pakistan Stock Exchange. The K-Electric was privatized on November 29, 2005, and majority share ownership was transferred to a consortium of Al-Jomaih Group (Saudi Arabia) and National Industrial Group (Kuwait). Abraaj Capital (Dubai) took control of K-Electric management in September 2008 and since has raised an investment of over US\$ 1.0 billion including their own equity injection of US\$ 361 million to embark upon an aggressive turnaround.

K-Electric has an installed capacity of circa 2,247 MW gross. The actual availability is less because of site conditions, reduced capacity of older units in BQPS-I and non-availability of gas to run the available capacity at higher loads. Additionally, it purchases electricity from Independent Power Producers, Captive Power Producers and National Transmission and Despatch Company (“NTDC”). K-Electrics serves all segments of the society including industrial, commercial, agricultural and residential consumers within Karachi and adjacent areas of Sindh and Baluchistan. The company has a rapidly increasing consumer base which currently stands at 2.3 million. More importantly, within its franchise area, K-Electric is faced with the challenge of serving more than 20 million people which constitute over 10% of population in Pakistan. K-Electric’s vast transmission network area spans over 6, 500 square kilometres.

The Company is principally engaged in generation, transmission and distribution of electrical energy to industrial, commercial, agricultural and residential consumers of Karachi under the Electricity Act, 1910 as amended to date and NEPRA Act 1997, to its licensed areas.

### **1.3 Lotte Chemical Pakistan Limited**

The LOTTE group is ranked amongst the top 5 Conglomerates in South Korea, with a turnover that exceeds US\$ 75 billion. With over three decades of experience, the LOTTE group has gained competitiveness in world markets with success across major industries such as food, retail, tourism, petrochemical, construction, manufacturing and finance. The LOTTE group is engaged in over 20 businesses in 19 Countries worldwide.

Lotte Chemical Corporation is a subsidiary of the South Korean Conglomerate LOTTE, which acquired majority shareholding in Lotte Chemical Pakistan Limited (LCPL) from Akzo Nobel, NV, Netherlands in 2009. LCPL was originally established as a business unit of ICI Pakistan, however, LCPL demerged as an independent entity in the year 2000.

LCPL is a world-class supplier and manufacturer of Purified Terephthalic Acid (PTA), an essential raw material for the manufacture of polyester staple fibre, filament yarn and PET packaging industry. LCPL operates a 500,000 tonnes per annum PTA plant at Port Qasim.

LCPL created a separate legal entity named Lotte Powergen (Private) Limited to set up a 48.1 MW Co-generation power project. The 48.1 MW (gross capacity at ISO) Co-generation Power Project of LCPL started its commercial production on 17 July, 2012 and is located within the premises of LCPL in Port Qasim, Karachi (the “Generation Facility”). Later, Lotte Powergen (Private) Limited was amalgamated into LCPL through a scheme sanctioned by Sindh High Court. LCPL has now proposed to sell the surplus power of 11 MW, up to 14 MWs from this captive power generation plant to K-Electric through a power acquisition contract.

## 1.4 Submission of PAR to Authority

LCPL owns a co-generation power plant with installed capacity of 48.1 MW based on full supply of gas (10.5 MMCFD at ISO conditions). The power plant is currently dedicated for supply of power to the LCPL's Purified Terephthalic Acid (PTA) manufacturing facility. Based on 9 MMCFD from SSGC, the unit can generate up to 38 MW Gross at site conditions. According to LCPL, they currently have a surplus power of 11 MW, which can increase to 14 MW once SSGC begins providing RLNG to LCPL, available after taking into account the requirements of PTA manufacturing, which it intends to sell to K-Electric. In view of the power demand-supply gap in Karachi, it is in the interest of consumers that K-Electric purchases such surplus power from LCPL.

K-Electric has received a Power Sale Proposal from LCPL, which is attached as Annexure-II. The power sale proposal is based on the Plant specifications and provides details forming the basis of their tariff proposal.

On November 26, 2013, Lotte Powergen (Pvt.) Ltd., a wholly owned subsidiary of LCPL, was given a generation license with validity up to November 25, 2037 (Please see Annexure – II of the LCPL Power Sale Proposal). Later on January 29, 2015, the Sindh High Court sanctioned the scheme of amalgamation of Lotte Powergen (Pvt.) Ltd. with LPCL. Consequently, pursuant to NEPRA Licensing (Application & Modification Procedure) Regulations, 1999, LCPL submitted an application for the Licensee Proposed Modification (LPM) to NEPRA on January 2<sup>nd</sup>, 2017 (Please see Annexure 1 of the LCPL Power Sale Proposal). NEPRA's decision in this regard is awaited.

LCPL signed a Gas Supply Agreement (GSA) with SSGC on January 30, 2015 wherein 9MMCFD of natural gas would be supplied to LCPL for its power generation facility on "as and when available" basis from March to November every year, in accordance with the terms and conditions mentioned in the GSA.

LCPL has been pursuing SSGC for issuance of No Objection Certificate (NOC) in relation to sale of surplus power to K-Electric and has already obtained such NOC from SSGC. A copy of the NOC has been shared with K-Electric and is attached with this PAR (Please see Annexure III of the LCPL Power Sale Proposal). SSGC has issued this NOC allowing LCPL to sell surplus power from its current approved gas load subject to the conditions set forth therein. It is important to note here that SSGC has put a condition that once RLNG becomes available in SSGC system, the gas consumed for power supply to KE shall be billed to LCPL at the RLNG rate and the local gas rate shall no more apply. Thus, the fuel costs component of the tariff will change to RLNG from natural gas.

As noted above, the current allocation of 9 MMCFD shall also be used for power supply to KE. However, once the RLNG becomes available, the SSGC shall allocate an additional 3.5 MMCFD of RLNG for the purpose of power supply to KE. Once such 3.5 MMCFD of RLNG becomes available, the existing arrangement of using part of 9 MMCFD gas for power supply to KE shall

cease permanently. This will result in increase in future the supply to KE from 11 MW on natural gas to 14 MW based on 3.5 MMSCFD of RLNG on as and when available basis pursuant to the gas supply agreement, to be execute between the gas supplier and LCPL.

Having received the Power Sale Proposal from LCPL, and having received the NOC from SSGC for sale of surplus power to KE, K-Electric intends to enter into a formal arrangement with LCPL for acquisition of power on the basis of this proposal subject to receipt of an approval from NEPRA. To pursue this objective, K-Electric hereby submits its Power Acquisition Request ("PAR") to NEPRA in accordance with Interim Power Procurement Regulations (IPPR) 2005.

K-Electric hereby requests the following from the Authority:

- Approve the proposed power acquisition by K-Electric from LCPL under IPPR 2005;
- Review the proposed Tariff as provided in the Power Sale Proposal and its assessment provided in the Power Acquisition Request and approve Reference Tariff;
- Review the Indexation, Escalation and Adjustment methodology as described in the Power Sale Proposal keeping in perspective the assessment of Power Purchaser as provided in the Power Acquisition Request and approve accordingly;
- Consider any other matters stated in the Power Acquisition Request.

## Chapter 02: Overview of the Power Sale Proposal

### 2.1 Summary of Sale Proposal

<b>Project Company</b>	Lotte Chemical Pakistan Limited (LCPL)
<b>Project Capacity</b>	48.1 MW (Gross ISO) with full gas supply of 10.5 MMCFD
<b>Auxiliary Load</b>	2.2 MW
<b>Supply to K-Electric</b>	11– 14 MW (Net)
<b>Interconnectivity</b>	220 kV
<b>Project Location</b>	Port Qasim, Sindh, Pakistan
<b>Plant Type</b>	Co-generation
<b>Contract Term</b>	5 Years
<b>Power Purchaser</b>	K-Electric Limited
<b>Fuel Type</b>	Gas/RLNG
<b>Plant Factor</b>	92%
<b>Levelized Tariff</b>	PKR 8.48/kWh (PKR 10.51/kWh with GIDC) at 100% load factor PKR 8.62/kWh (PKR 10.65/kWh with GIDC) at 92% load factor
<b>Concession Documents</b>	Power Acquisition Contract
<b>Contract Nature</b>	Take and Pay
<b>Generation License Applicable Framework</b>	Available and valid up to 25 <sup>th</sup> November, 2037 Interim Power Procurement Regulations 2005

### 2.2 Tariff Components

LCPL has provided a cost plus single part tariff on ‘Take and Pay’ basis:

- A. The proposed tariff attempts to recover fuel cost, operations & maintenance (parts, lubricants, chemicals, payroll, administration etc), working capital, insurance, and investment (WACC + depreciation).
- B. Besides fuel, the plant maintenance costs related to consumption of spare parts etc (foreign O&M costs) have been kept as variable.

The fixed tariff component includes Local Operations and Maintenance Cost, Insurance, Working Capital Charge, WACC Return, and Depreciation. Additionally, the tariff proposal also separately identifies the Gas Infrastructure Development Cess (GIDC). The GIDC is an additional cost of fuel procurement and will become pass-through if charged and collected by the gas marketing companies upon directive from the Government of Pakistan, and upon presentation of relevant documents and invoices to KE. The amount of GIDC has been calculated based on per kWh of energy and will be paid according to the number of units received by K-Electric.

At 100% plant load factor, the levelized tariff works out to be PKR 8.48/kWh and at 92% plant load factor, it is PKR 8.62/kWh both exclusive of GIDC.

### 2.2.1 Fuel Cost Component

The working of the Fuel Cost Component (“FCC”) is based on efficiency of 33.58% (HHV) and gas price of PKR 600 per MMBTU (HHV basis) plus PKR 200 per MMBTU of Gas Infrastructure Development Cess (GIDC), making total Gas price equal to PKR800 per MMBTU.

Once SSGC begins to commence RLNG to LCPL, the FCC will change to RLNG from natural gas as elaborated in Section 1.4 above. For RLNG (as and when available) the FCC is assumed to be based on a price of PKR 915/MMBTU (HHV) based on PSO’s circular with effective date 01/12/2016-31/12/2016. Other specifications for calculating the FCC are as follows:

Plant Parameters	Quantity (MW)
Plant Capacity (Gross)	41.319
Auxiliary Load & Other Losses	2.2
Plant Capacity (Net) <sup>1</sup>	39.119
Net Saleable Energy to KE	11 MW-14 MW

<sup>1</sup>The tariff workings have been done on Net Plant Capacity at site conditions on the basis of full gas availability.

Fuel Calculations	Natural Gas	RLNG (reference)
BTU/kWh – LHV	9,174.5	9,174
BTU/kWh at actual efficiency HHV	10,163.5	10,164
Rs./MMBTU – Cost of NG	600	915
Rs./kWh – Cost of Fuel excluding Cess	6.1	9.30
Rs./MMBTU – GID Cess	200.00	-
Rs./MMBTU – Total Cost of NG	800	-
Rs./kWh – Cost of Fuel including cess	8.13	9.30

The Authority is requested to approve the adjustment of Fuel Cost Component with gas price (including GIDC) and RLNG after the same becomes applicable to LCPL.

The basis for gas price and RLNG price shall be provided by SSGC in its billing to LCPL and the same shall be provided as evidence to NEPRA in KE’s monthly return for filing.

### **2.2.2 O&M Local**

The O&M Local Cost Component includes the cost of consumables and include: (i) demin water, (ii) cooling water and (iii) manpower for the co-generation plant. Based on the total of these three costs, the O&M Local Cost Component works out to be PKR 0.1687 per kWh.

### **2.2.3 O&M Foreign**

The O&M Foreign Cost Component includes the plant maintenance cost based on 50,000 hours (6 years) cycle as recommended by OEM and is US\$ 2.75 million per annum translating to PKR 0.8506 per kWh.

### **2.2.4 Working Capital Charge**

The Working Capital Component has been calculated for EPP of 30 days and for Fuel payment of 15 days per month, one month cycle - interest charged @ KIBOR + 2%. The Working Capital Component including interest on outstanding receivables works out to be PKR0.0362 per kWh.

### **2.2.5 WACC Return**

The total Project Cost of the Co-Generation project was PKR 4,153.0 million as per the financial statements of Lotte Power Gen shared with K-Electric for review. After careful evaluation and negotiation, K-Electric indicated that non relevant costs that are related to co-gen only (process plant) will not be part of the power generation tariff. Therefore cost allocated for this tariff has excluded the HRSG, and some other non related costs. Final cost that is based on the total relevant project cost comes out to be PKR 3.062 billion. The Weighted Average Cost of Capital (WACC) return with a Debt: Equity ratio of 75:25 has been calculated on this allocated cost.

For the WACC calculation, cost of debt has been taken as KIBOR (6.10) + 3% spread and cost of equity has been taken as 15%. The WACC works out to be 10.575% to apply on the project investment cost. The WACC Return Component, as a result is calculated to be PKR0.9449 per kWh.

The Authority is requested to allow this component as the return component of the tariff.

### **2.2.6 Insurance**

The annual cost of insurance proposed by LCPL is PKR8 million, based on which the Insurance Cost Component works out to be PKR 0.0233 per kWh.

### 2.2.7 Depreciation

The Authority is requested to allow a depreciation component as part of the project tariff, which component has been calculated on the basis of straight-line method for the plant life (25 years). Consequently, based on the project cost, the per annum depreciation amount works out to be PKR 122.48 million. The Depreciation Component is therefore PKR 0.3574 per kWh.

## 2.3 Reference Tariff Parameters and Assumptions

The following assumptions have been made while calculating the Reference Generation Tariff. Changes in any of these assumptions will result in changes in the Reference Generation Tariff.

- **Main Economic assumptions include:**

PKR – USD Exchange Rate	<b>106 PKR/USD – Reference Base Rate as of December 2016</b>
Gas Price HHV Basis	<p>Base fuel price is PKR 600/MMBTU on HHV basis and Gas Infrastructure Development Cess (GIDC) PKR 200/MMBTU</p> <p>As mentioned in SSGC NOC attached as (Annexure III of LCPL Power Sale Proposal), once RLNG shall be available to LCPL, the fuel costs component will change to RLNG which is currently being assumed at US\$ 8.63/MMBTU without GST at distribution network based on PSO's circular with effective date 01/12/2016-31/12/2016. RLNG price PKR 915/MMBTU on HHV basis is assumed Actual price of RLNG will be based and indexed to the RLNG prices (including Import costs, margin, terminal charges, retainage, distribution &amp; transmission losses, cost of supply etc) to be determined by OGRA/GOP at the time RLNG supplies commence to LCPL</p>
3 Month KIBOR	<b>6.10% (3 Month KIBOR OFFER Rate - As published by State Bank of Pakistan) – Reference Base Rate as of December 2016</b>

- Total cost of the Cogeneration project is Rs 4,153.0million according to the Financial Statements of Lotte Powergen Private Limited. Cost allocated for this tariff excluding HRSG and other non-related costs is Rs 3,062 million.
- Plant Capacity of 39.119 MW (net) at mean site conditions
- Plant availability factor of 92% (approximately 335 days per annum) has been assumed
- Weighted Average Cost of Capital is assumed to be 10.5750%
  - Debt: Equity ratio 75: 25
  - Return on Equity: 15%
  - Debt servicing per annum: 9.12% (3 month KIBOR @ 6.10% + 3%)
- Plant efficiency is 33.58% on HHV basis
- US CPI-U Base Reference Rate (Seasonally adjusted US city average, as published by Department of Labour – Bureau of Labor Statistics: November 2016 = 241.353
- Pakistan WPI General Base Reference Rate: December 2016 = 213.76

## 2.4 Tariff Indexations

The Authority is requested to allow the following indexations on the Tariff Cost Components:

Tariff Cost Component	Tariff Indexation & Adjustment
Fuel Cost Component	Prevalent Gas price as notified by OGRA  (Once LCPL switches to RLNG, notified RLNG RLNG Price as published by relevant Authority/Ministry, with applicable levies/charges)
Variable O&M (Local)	Pakistan WPI
Fixed O&M (Foreign)	US\$ to PKR variation & US CPI
Insurance	US\$ to PKR variation
Cost of Working Capital	Adjustments for relevant KIBOR variations
WACC Return	Adjustments for relevant KIBOR variations

## 2.5 Tariff Summary

The proposed Take and Pay tariff is summarized below:

(Unit: Rs. /kWh)

	Year 1	Year 2	Year 3	Year 4	Year 5
Fuel Cost	6.10	6.10	6.10	6.10	6.10
<i>Fuel Cost (RLNG reference)</i>	<i>9.30</i>	<i>9.30</i>	<i>9.30</i>	<i>9.30</i>	<i>9.30</i>
O&M Foreign	0.85	0.85	0.85	0.85	0.85
<b>Energy Price (Natural Gas)</b>	<b>6.95</b>	<b>6.95</b>	<b>6.95</b>	<b>6.95</b>	<b>6.95</b>
<b>O&amp;M Local</b>	<b>0.17</b>	<b>0.17</b>	<b>0.17</b>	<b>0.17</b>	<b>0.17</b>
<b>Working Capital</b>	<b>0.04</b>	<b>0.04</b>	<b>0.04</b>	<b>0.04</b>	<b>0.04</b>
<b>Insurance</b>	<b>0.02</b>	<b>0.02</b>	<b>0.02</b>	<b>0.02</b>	<b>0.02</b>
<b>WACC Return</b>	<b>0.94</b>	<b>0.94</b>	<b>0.94</b>	<b>0.94</b>	<b>0.94</b>
<b>Depreciation</b>	<b>0.36</b>	<b>0.36</b>	<b>0.36</b>	<b>0.36</b>	<b>0.36</b>
<b>Fixed Price at 100%</b>	<b>1.53</b>	<b>1.53</b>	<b>1.53</b>	<b>1.53</b>	<b>1.53</b>
<b>Total Tariff at 100% (Natural gas)</b>	<b>8.48</b>	<b>8.48</b>	<b>8.48</b>	<b>8.48</b>	<b>8.48</b>
<b>Fixed Price at 92%</b>	<b>1.67</b>	<b>1.67</b>	<b>1.67</b>	<b>1.67</b>	<b>1.67</b>
<b>Total Tariff at 92% (Natural gas)</b>	<b>8.62</b>	<b>8.62</b>	<b>8.62</b>	<b>8.62</b>	<b>8.62</b>
<b>GID Cess</b>	<b>2.03</b>	<b>2.03</b>	<b>2.03</b>	<b>2.03</b>	<b>2.03</b>
<b>Total Tariff with GIDC at 92% (Natural gas)</b>	<b>10.65</b>	<b>10.65</b>	<b>10.65</b>	<b>10.65</b>	<b>10.65</b>

Submitted:



Tayyab Tareen  
Chief Executive Officer (CEO)  
K-Electric Limited



Dale Sinkler  
Chief Generation and Transmission Officer  
K-Electric Limited

Annexure I: Information Required under IPPR 2005

<b>Information about Generation Capacity Under Proposed Procurement Request</b>	
Net Supply	11MW-14 MW
Technology	Gas Turbine; GE Aero derivative
Fuel	Natural Gas/RLNG (as and when available and provided by SSGC to LCPL)
Whether Forms part of least cost plan	Lower than FO based generation
Availability of Power/Energy	92%
Year of Commissioning	2012
Expected rate of power to be acquired	PKR 8.62 @ 92% without GIDC
KE Demand in FY16 (Peak)	<b>3,195 MW</b>
Location	Port Qasim, Karachi
Proposed Grid for interconnection	220 kV
Approximate Distance	1 KM Already connected
Augmentation Required in Grid	None
Augmentation Required in transmission network	None
Estimated costs if augmentation required	None
Steps taken or required for transmission augmentation	None
Any other information	None

**Peak Demand at Interconnection Points of KE Transmission and Distribution Network**

<b>Interconnection Point # 1</b>	
<b>Grid Identification:</b>	BALDIA / NKI
<b>Location</b>	Baldia
<b>Voltage</b>	220kV
<b>Capacity in MVA</b>	950MVA
<b>Peak Demand at # 1</b>	445 MW
<b>Interconnection Point # 2</b>	
<b>Grid Identification:</b>	KDA / NKI
<b>Location</b>	Scheme 33
<b>Voltage</b>	220kV
<b>Capacity in MVA</b>	950MVA
<b>Peak Demand at # 2</b>	130 MW
<b>Interconnection Point # 3</b>	
<b>Grid Identification:</b>	KDA / JAMSHORO
<b>Location</b>	Scheme 33
<b>Voltage</b>	220kV
<b>Capacity in MVA</b>	750MVA
<b>Peak Demand at # 3</b>	70 MW

KE (Distribution) Peak Demand		
2007-08	Peak Demand (MW)	2,443
	Actual Load shed in the evening peak demand	387 MW (10-06-2008)
2008-09	Peak Demand (MW)	2,462
	Actual Load shed in the evening peak demand	45 MW (27-05-2009)
2009-10	Peak Demand (MW)	2,562
	Actual Load shed in the evening peak demand	480 MW (29-06-2010)
2010-11	Peak Demand (MW)	2,591
	Actual Load shed in system peak demand	582 MW (08-06-2011)
2011-12	Peak Demand (MW)	2,596
	Actual Load shed in system peak demand	433 MW (22-05-2012)
2012-13	Peak Demand (MW)	2,778
	Actual Load shed in system peak demand	532 MW (19-06-2013)
2013-14	Peak Demand (MW)	2,929
	Actual Load shed in system peak demand	621 MW (18-06-2014)
2014-15	Peak Demand (MW)	3,056
	Actual Load shed in system peak demand	679 MW (18-06-2015)
2015-16	Peak Demand (MW)	3,195
	Actual Load shed in system peak demand	622 MW (19-05-2016)

## **Annexure II: LCPL Power Sale Proposal**

## Annexure II: LCPL Power Sale Proposal

10 January 2017

Mr. Adnan Rizwi  
Director Business Development  
K Electric Limited  
3rd Floor, KE House, 39-B, Sunset Boulevard,  
DHA II, Karachi

Dear Sir,

Further to your email dated 09 January 2017 with regard to review of the Power Sale Proposal, please find enclosed the final Power Sale Proposal duly signed along with following Annexures for onward submission to NEPRA.

- a) Annexure 1 (NEPRA License Proposal Modification Application Receiving.)
- b) Annexure 2 (Copies of Generation License and Contract for The Supply of Gas For Power Generation.)
- c) Annexure 3 (Copy of NOC from SSGC)
- d) Annexure 4(Copy of Letter from MPNR for allocation of 3.5 MMCFD RLNG.)
- e) Annexure 5(Fuel Gas Specifications)
- f) Annexure 6 (Operations Team Organogram- Cogen Plant)

Thanking You,

Best Regards,



Ashiq Ali  
Chief Financial Officer

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# Power Sale Proposal

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**December 2016**

**Submitted to:**



## Table of Contents

Chapter 01	Project Background	3
Chapter 02	Technical Overview	5
Chapter 03	Operational Overview	8
Chapter 04	Tariff Structure and Components	12
Chapter 05	Tariff Indexation	16

# Chapter 01      Project Background

## 1.1 Background of Project Company Sponsors

The LOTTE group is ranked amongst the top 5 Conglomerates in South Korea, with a turnover that exceeds US\$ 75 billion. With over three decades of experience, the LOTTE group has gained industry leading competitiveness in world markets that include major industries such as food, retail, tourism, petrochemical, construction, manufacturing and finance. The LOTTE group is engaged in over 20 businesses in 19 Countries worldwide.

Lotte Chemical Corporation is a subsidiary of the South Korean Conglomerate LOTTE, which acquired majority shareholding in Lotte Chemical Pakistan Limited (LCPL) from Akzo Nobel, NV, Netherlands in 2009. LCPL was originally established as a business unit of ICI Pakistan, however, LCPL demerged as an independent entity in the year 2000.

LCPL is a world-class supplier and manufacturer of Purified Terephthalic Acid (PTA), an essential raw material for the manufacture of polyester staple fibre, filament yarn and PET packaging industry. LCPL operates a 500,000 tonnes per annum PTA plant at Port Qasim.

## 1.2 Project Location

In order to ensure reliable supply to its manufacturing facility, LCPL has invested in a 48.1 MW Co-generation power project. The 48.1 MW (gross capacity) Co-generation Power Project of LCPL started its commercial production on 17 July, 2012 and is located within the premises of LCPL Chemical Pakistan limited in Port Qasim, Karachi (the “**Generation Facility**”).

## 1.3 Economic Rationale of the Project

The Generation Facility has the capacity to produce 48.1MW Gross at ISO conditions based on full supply of gas (10.5 MMSCFD) and currently can generate up to 38 MW Gross at Mean Site Conditions with its sanctioned gas supply of 9 MMSCFD. The net power requirement of LCPL is only 22 to 25 MW based on the operating rate of the PTA Plant.

With excess power available for sale to third party, LPCL has approached K- Electric to sell its excess power upto 14 MW. Considering the shortage of Power in the country, KE has expressed its willingness to procure

power from LCPL, inter alia, to reduce the electricity demand-supply gap and to better address its customers' needs.

Subject to the satisfaction of the applicable regulatory and legal requirements, LCPL intends to sell power to KE, whereby the latter is required to obtain the approval of NEPRA under a Power Acquisition Contract as may be mutually agreed and negotiated between the parties in the future.

#### 1.4 Generation License

LCPL warrants that it has a valid Generation License issued by NEPRA bearing no. SGC/93/2013 dated November 26, 2013 with a validity up till November 25, 2037, permitting LCPL to sell the generation output of the power generation facility in accordance with the terms and conditions of such license. LCPL has filed on 03 January 2017 a petition before NEPRA for License proposed modification to grant permission to sell power to K Electric Limited. The Receiving copy from NEPRA of the LPM application is attached as **Annexure -1**

#### 1.5 Gas Supply Agreement

LCPL signed a Gas Supply Agreement (GSA) with SSGC on January 30, 2015 wherein 9MMCFD of natural gas would be supplied to LCPL for its power generation facility on "as and when available" basis from March to November every year, in accordance with the terms and conditions mentioned in the GSA. A copy of the GSA is attached as **Annexure 2**. Furthermore, SSGC has issued a NOC allowing LCPL to sell surplus power from approved gas load subject to the conditions set forth in **Annexure 3**. It is important to note here that SSGC has put a condition that once RLNG becomes available in SSGC system, the gas consumed for power supply to KE shall be billed to LCPL at the RLNG rate and the local gas rate shall no more apply. Thus, the fuel costs component of the tariff will change to RLNG from natural gas.

As noted above, the current allocation of 9 MMCFD shall also be used for power supply to KE. However, once the RLNG becomes available, the SSGC shall allocate an additional 3.5 MMCFD of RLNG for the purpose of power supply to KE. Once such 3.5 MMCFD of RLNG becomes available, the existing arrangement of using part of 9 MMCFD gas for power supply to KE shall cease permanently. This will result in increase in future the supply to KE from 11 MW on natural gas to 14 MW based on 3.5 MMSCFD of RLNG (already allocated by Ministry of Petroleum and Natural Resources) as provided in **Annexure 4** on as and when available basis pursuant to the gas supply agreement, to be execute between the gas supplier and LCPL.

## Chapter 02      Technical Overview

### 2.1 Technical Overview of the Generating Facility

The plant comprises of the following key equipment:

- 1- GE LM6000 PD Sprint gas turbine-generator package, aero derivative type, along with its auxiliaries.
- 2- Two Natural Gas Booster Compressor packages from Ariel, model JGC-4 reciprocating type, packaged and supplied by AG Equipment USA, capable of producing discharge pressure of 50 barg from site gas supply as required for the gas turbine.
- 3- Instrument Air Compressor package from Atlas Copco, model GA30 air cooled oil injected rotary screw type, capable of supplying instrument air of 7 bars.
- 4- Two Instrument Air Dryer Packages from Atlas Copco, model CD80+ adsorption type.
- 5- Heat recovery steam generator from Dakeung Machinery Limited is of horizontal design having Main and Bypass stack, Diverter Dampener, and other associated auxiliary systems, capable of producing steam at 52 tons/hr at ISO conditions.
- 6- Two submersible pump packages from Gould's, Model 3171 Vertical type, Centrifugal pump.
- 7- Potable water pump package, from KSB, Model M7N, ISO 5199 Standard, horizontal type, Centrifugal pump.
- 8- Balance of Plant system includes Piping, valves, RVs, Flame arrestors, steel structure, DCS, ESCADA, ESD, Fire & Gas System, CCTV System, PA system, MCC, Relays, Transformer, and Motors.

HVAC System from Mitsubishi & Ascon units, variable refrigerant flow system, type Cassette, decorative, standalone units for Cogen Control, DCS room, PLC room.



Further technical details of the Generation Facility are as under:

a) GE LM6000 PD Sprint Gas Turbine

<b>Make</b>	General Electric
<b>Turbine Type</b>	Aero derivative
<b>Technology</b>	Land and Marine Turbine
<b>Model</b>	LM 6000 PD Sprint
<b>Total Installed Capacity (Gross ISO)</b>	48.10 MW
<b>Auxiliary Consumption</b>	2.2 MW (GTG Parasitic load: 0.2 MW, Gas Compressor load: 2.0 MW)

b) Heat Recovery Steam Generator (HRSG)

<b>Make</b>	Daekyung Machinery & Engineering Ltd (DKME - South Korea)
<b>Steam Output</b>	52 te/hr (Saturated Steam)
<b>Pressure</b>	103 bara
<b>Temperature</b>	313 °C
<b>Noise</b>	85 dB (1 meter from surface of HRSG)
<b>Utilization</b>	To provide steam to the Chemical process PTA plant

c) Natural Gas Booster Compressors

<b>Make</b>	Ariel Corporation (USA)
<b>Type</b>	Double Acting Piston Compressors
<b>Model</b>	JGC/4
<b>Units</b>	2 units (one running and one stand by)
<b>Design Flow</b>	12 MMCFD (+/- 3%)
<b>Power Req.</b>	2.0 MW

d) Electric Efficiency of Gas Turbine @ 30 deg C

Description	Amount	Unit
Total Power	41.319	MW
Net Power	39.119	MW
Heat Rate @ Total Power	8,686	BTU/kWh
Heat Rate @ Net Power (LHV)	9,174	BTU/kWh
Heat Rate @ Net Power (HHV)	10,164	BTU/kWh
LHV Efficiency of GTG at Net Power	37.2	%
HHV Efficiency of GTG at Net Power	33.58	%

## 2.2 Primary Fuel

The gas specifications mentioned in **Annexure 5** are used to calculate the Reference Gas Price per MMBTU.

Currently Natural Gas is the primary fuel for the power plant for which gas allocation from SSGC is available along with the necessary NOC from SSGC to sell its surplus power. In future the primary fuel may change to RLNG as LCPL also has sanction of 3.5MMSCFD of RLNG on as and when available by Ministry of Petroleum and Natural Resources based on which the respective gas supplier and LCPL will execute a gas supply agreement for the provision of the gas to the company in accordance with the gas allocation.

## 2.3 Expected Plant Performance Parameters

### 2.3.1 Annual Plant Availability

The guaranteed annual plant availability is 335 days or 92% per annum for dispatch of electrical energy to KE after accounting for the outages comprising of scheduled outage, forced outage and partial forced outage.

Operating Parameters	QTY	Unit
Days per annum	365.00	Days
<b>Plant availability</b>	92%	%
Operating Days	335	Days/year
<b>Operating Hours</b>	8059	Hours/year

Following are the expected performance parameters in terms of net output to be supplied to KE.

Plant Capacity	QTY	Unit
Plant Capacity (Gross)	41.319	MW
<b>Auxiliary Load &amp; Other Losses</b>	2.2	MW
Plant Capacity (Net)	39.119	MW
<b>Power for PTA Plant (Net)</b>	22-25	MW
<b>Proposed Supply to KE</b>	11-14	MW

### 2.3.2 Interconnection

Power Supply at 220 kV, connections to be done at the downstream of TR01 SWBD01, Sub 03 energy meters will be installed in respective sub Stations or at a mutually agreed location.

## Chapter 03      Operational Overview

### 3.1 Human Resource

Details regarding engagement of full team along with members and designations is provided as **Annexure 6**.

### 3.2 Scope of Operation and Maintenance of the Plant

The Generation Facility is operated 24 hours with four shifts. Shift team is responsible for smooth running of the plant. Shifts team also monitors and trouble shoots any problem during plant operation safely and efficiently to avoid personnel, equipment and production loss.

While the Plant Manager in general shift is responsible for overall operational activities of the plant, planning and maintenance of monthly water wash activities and shut down with other support departments, optimization of operational parameters, cost and efficiencies evaluation of whole Co-Generation plant is done with the co-ordination of Production Manager.

Maintenance team is responsible to provide support to the Cogeneration plant operation i.e. routine, planned and unplanned maintenance.

### 3.3 Scope for Maintenance of the Plant over its lifetime

#### Gas turbine Generator Package Maintenance

To attain maximum plant availability and equipment reliability and to reduce forced outages, Maintenance Master Plan Agreement (MMP) has been agreed effective August 2014 between GE & LCPL, covering all planned & unplanned maintenance. Contract validity is 4 years.

#### **Maintenance Scope – GE MMP Agreement with GE/LCPL**

- Boroscopic inspection at every 4000 hrs.
- Semi Annual / Annual inspection of the turbine including Gear box at every 4000 hrs.
- Alternator Inspection at every 8000 hrs.
- Mapping Checks at every 8000 hrs.
- Online Monitoring & Diagnostic of the system.
- VSV Bushing Replacement at every 12,500 hrs.



- HPC Stg1 Blade Replacement & HPC Stg2, 3, 4 Blades Inspection at every 16,000 hrs. Subject to sprint operation.
- Sprint Nozzles Cleaning at every 25,000 hrs. Subject to sprint operation.
- Premixers Inspection at 25000 hrs of Sprint operation.
- Hot Section Exchange at 25000 hrs Subject to its condition and GE's recommendation
- Fuel Premixture replacement / cleaning subject to condition.
- Air Filter replacement (Semi/annual) subject to condition.
- Major GTG Overhaul at 50,000 hrs. Subject to its condition and GE's recommendation. This is not a part of existing MMP Contract but it will be covered in next maintenance contract.
- Natural Gas Booster Compressor Package Maintenance

**The scope of the Natural Gas Booster Compressor maintenance is as follows:**

- Daily process and vibration parameters monitoring & oil make up activity.
- At every 4000 hrs: inspection of frame, replacement of filters and oil, package alignment checks and suction / discharge valve inspection/maintenance.
- At every 8000 hrs: complete scope of 4000 hrs maintenance plus checking bearing, crosshead, connecting rod, piston rod and piston clearance, checking rod run out, replacement of piston rod packing /wiper packing and suction/discharge valve refurbishment.
- At every 16000 hrs: complete scope of 8000 hrs maintenance plus checking of auxiliary end chain & chain drive for sprocket teeth undercutting along with rebuilding oil wiper cases.
- At every 32000 hrs: complete scope of 16000 hrs maintenance plus checking clearance of crosshead pin and connecting rod bushing, checking for wear in the auxiliary end drive chain and piston grooves.
- At every 48,000 hrs: complete scope of 32000 hrs maintenance plus replacement of lubricator distribution blocks & cross head bushing.

Instrument Air Compressor Maintenance

- Daily parameter checks and oil drainage.
- Every 3 months, check coolers, air filters and electronic water drain. Clean/replace if necessary.
- Every 4000 hrs, check parameters and leakages, replace oil, air and electric cabinet air filters, clean coolers and automatic drain filters, test temperature shutdown function and check proper functioning of LED display.
- Every 8000 hrs, test safety valves and replace oil separator element.

Adsorption Air Dryer Maintenance

- Daily display panel check for errors.
- Every 4000 hrs, check for damaged/loose wiring & air leaks, and replace silencers and inlet/outlet filter cartridges.
- Every 8000 hrs, exchange dew point sensor, and implement service plan A.

- Every 40000 hrs, replace desiccant and shuttle valves, and implement service plan B.

#### Submersible Pump Maintenance

- Routine reliability checks including monitoring of temperature, discharge pressure, seal condition and vibrations. Checks are also carried out for unusual noise, piping leaks, greasing levels, and proper float controls.
- Every 2000 hrs, check anchor bolts for tightness and carbon steel shaft for rusting and alignment (Replace if necessary). Also completely change bearing grease.
- Every 16000 hrs, analyze pump performance and if necessary carry out complete overhaul.

#### Submersible Pump Maintenance

- Routine reliability checks and monitoring of bearing temperature. Checks are also carried out for unusual noises, shaft and static seal leakages, oil levels as well as correct functioning of auxiliary connections.
- Weekly, start stand-by submersible pump to ensure readiness for operation.
- Every 4000 hours, change oil subject to condition.
- Every 16000 hrs, take pump out of service and thoroughly clean the cooling system.

#### Balance of Plant System Maintenance

As per inspection regime, all equipment is monitored. Maintenance operations are carried out when necessary.

#### DCS/ESCADA/ESD Maintenance

Performance of backup and system health checks along with major and minor modifications.

#### Fire & Gas System

Preventive maintenance of complete fire and gas system for integrity checks and system availability on quarterly basis.

#### MCCs

A general cleaning and inspection of all the MCCs is carried out every two years, coupled with plant Overhaul.

#### Relays

Relay testing is carried out during plant overhaul, by vendor engineers, using the method of secondary injection. Trip settings of the protection relays are verified and logged accordingly.

#### Transformers

Testing of transformers is carried out by Siemens/Schnieder Pakistan, which includes transformer turns ration test, winding resistance and insulation resistance test. These tests are performed once every two years.

Motors

Preventive maintenance of motors is carried out quarterly, semi-annually and annually. Vibrations and temperatures of the motors are monitored every quarter, greasing is carried out as per OEM recommendation, and insulation resistance test and other detailed checks are carried out annually.

HVAC System Maintenance

- Daily monitoring of discharge temperatures against set-point.
- Weekly and monthly servicing of indoor and outdoor units as well as refrigerant pressure checks.
- Refrigerant charging and further servicing is carried out when required.



## Chapter 04 Tariff Structure and Components

### 4.1 Nature of Power Acquisition Contract

The sale and purchase of captive power of capacity 11-14 MW will be made on “take and pay” basis through bi-lateral agreement between power producer and KE for the term of 5 years subject to approval of NEPRA. Due to the “take and pay” nature of the contract, the tariff will not be a two part tariff but a single tariff.

### 4.2 Reference Tariff Assumptions

The following key parameters and cost components are being assumed while calculating the Reference Generation Tariff and changes in any of these assumptions will result in changes in the Reference Generation Tariff.

▪ **Main Economic assumptions include:**

PKR – USD Exchange Rate	106 PKR/USD (Dec 2016)
Gas/RLNG Price	<p>Base fuel price is PKR 600/MMBtu on HHV basis plus Gas Infrastructure Development Cess (GIDC) PKR 200/MMBtu making total base fuel price of PKR 800/MMBtu</p> <p>As mentioned in SSGC NOC attached as Annexure 3, once RLNG shall be available to LCPL, the fuel costs component will change to RLNG which is currently being assumed at US\$ 8.63/MMBTU without GST at distribution network based on PSO’s circular with effective date 01/12/2016-31/12/2016. RLNG price PKR 915/MMBtu on HHV basis is assumed Actual price of RLNG will be based and indexed to the RLNG prices (including Import costs, margin, terminal charges, retainage, distribution &amp; transmission losses, cost of supply etc) to be determined by OGRA/GOP at the time RLNG supplies commence to LCPL.</p>
3 Month KIBOR	<p>6.10% (Dec 2016)</p> <p>3 Month offer side KIBOR notified by Reuters and published by State Bank of Pakistan or as amended from time to time</p>

- Total cost of the Cogeneration project is Rs 4,153.1 million
- Cost allocated for this tariff excluding HRSG and other non-related costs amounts to Rs 3,062 million.
- Estimated committed capacity for KE is 11MW-14 (MW) (net) at mean site conditions.
- Plant availability factor of 92% (approximately 335 days per annum) has been assumed.
- Weighted Average Cost of Capital is assumed to be 10.58%
  - Debt to equity ratio 75:25
  - Return on Equity: 15%
  - Debt servicing per annum: 9.10% (3 month KIBOR @ 6.10% + 3%)
- Plant efficiency is 33.58% HHV
- Any other assumptions that are not expressly stated herein but are based on the PAC draft negotiated by the Project Company with KE. Consequently any change in any such assumptions may lead to change in the Reference Generation Tariff

#### 4.3 Tariff Components and Indexations

Tariff has been calculated using 39 MW (Net Capacity) as the basis, which cost has been spread on 11 MW.

##### Fuel Cost Component (“FCC”)

The cost of fuel is a pass through item and is variable with dispatch. The Fuel Cost Component (“FCC”) is calculated using the following specifications:

##### Gas Price per MMBtu:

Rs. 600 per MMBtu on HHV basis plus Rs 200 per MMBtu of Gas Infrastructure Development Cess (GIDC) making total Gas price of Rs 800 per MMBtu.

##### RLNG price per MMBtu:

RLNG price PKR 915/MMBtu on HHV basis is assumed at US\$ 8.63 per MMBtu as described in section 4.2 above. Actual price of RLNG will be based and indexed to the RLNG prices (including Import costs, margin, terminal charges, retainage, distribution & transmission losses, cost of supply etc) to be determined by OGRA/GOP.

FUEL CALCULATIONS	QTY Natural Gas	QTY RLNG
BTU/ KWh - LHV	9,174	9,174
BTU/KWh at actual efficiency HHV	10,164	10,164
Rs/MMBTU - Cost of NG	600	915
Rs/kWh- Cost of Fuel excluding Cess	6.10	9.30
Rs/MMBTU - GID Cess	200	-
Rs/MMBTU - Total Cost of NG	800	-
Rs/KWh - Cost of Fuel including cess	8.13	9.30

**Local (Variable) O&M Component**

Cost of Demin and Cooling Water for Cogeneration plant per year is as follows:

- a) Demin water = 150Rs/te  
 Total consumption = 53,959 te per year  
 Total Cost = Rs 8.1 million per year
- b) Cooling Water = 3.5Rs/te of re circulating CW  
 Total Consumption per year = 3,405,600 tpy

Total Cost = Rs 11.9 million per year

- c) Expected total manpower cost per annum = Rs 37.8 million

*[Cost per unit of Demin + Cooling water + manpower = Rs 0.17 per KWh]*

**Foreign (Fixed) O&M Component**

The fixed O&M component consists of fixed maintenance cost. Details of which are as follows;

*[Total foreign maintenance cost per annum = US\$ 2.75 million (Rs 0.85 per KWh)]*

The maintenance cost is based on 50,000 hours (6 years) cycle as recommended by the OEM.

**Insurance Component**

*[Expected total Insurance cost per annum = Rs 8 million (Rs 0.02 per KWh)]*

**Working Capital Component**

This component is to be kept separate from the O&M Costs.

Working capital charge is calculated for EPP 30 days and for Fuel payment 15 days per month, one month cycle - interest charged @ KIBOR + 2%.

*[Working Capital Charge including interest on outstanding receivables = Rs 0.04 per KWh]*

**Return and Rationale for charging it:**

The total Project cost allocated for this tariff is Rs 3.062 billion as mentioned in Section 4.2.

Weighted Average Cost of Capital (WACC) return with a Debt to Equity ratio of 75:25 has been calculated on this allocated cost.

The cost of debt has been taken as 3 Month KIBOR (6.10) + 3% spread.

The cost of equity has been taken as 15%.

The WACC works out to be 10.58% to apply on the project investment cost.

*[WACC Component works out to be Rs. 0.94 /kWh]*

**Depreciation**

The depreciation component has been calculated on the basis of straight-line method for the plant life period of 25 years. Consequently, the per annum depreciation amount is Rs. 122.48 million.

*[The Depreciation component works out to be Rs. 0.36/kWh]*

**4.4 Tariff Sheet (Rs./kWh)****Natural Gas**

	1	2	3	4	5
Fuel Cost (Natural Gas)	6.100	6.100	6.100	6.100	6.100
Fuel Cost (RLNG reference)	9.30	9.30	9.30	9.30	9.30
O&M Foreign	0.850	0.850	0.850	0.850	0.850
Energy Price (Natural Gas)	6.950	6.950	6.950	6.950	6.950
O&M Local	0.17	0.17	0.17	0.17	0.17
Working Capital	0.04	0.04	0.04	0.04	0.04
Insurance	0.02	0.02	0.02	0.02	0.02
WACC Return	0.94	0.94	0.94	0.94	0.94
Depreciation	0.36	0.36	0.36	0.36	0.36
Fixed Price at 100%	1.53	1.53	1.53	1.53	1.53
Total Tariff at 100% (Natural gas)	8.48	8.48	8.48	8.48	8.48
Fixed Price at 92%	1.67	1.67	1.67	1.67	1.67
Total Tariff at 92% (Natural gas)	8.62	8.62	8.62	8.62	8.62
GID Cess	2.03	2.03	2.03	2.03	2.03
Total Tariff with GIDC at 92% (Natural gas)	10.65	10.65	10.65	10.65	10.65

## Chapter 05      Tariff Indexation

Through the power acquisition contract, to be filed by KE before the regulator, NEPRA will be requested to allow following indexations for different tariff components.

### **Fuel Cost:**

The Fuel Cost Component shall be adjusted on account of Fuel Price variation of fuel consumed during operational period and other applicable levies / fee / charges as notified by the Government.

### **Local Operations and Maintenance Cost:**

The local O&M component shall be indexed to the WPI in Pakistan, as notified by the Pakistan Bureau of Statistics. The indexation shall be done quarterly based on the NEPRA Guidelines.

### **Foreign Operations and Maintenance Cost:**

The foreign O&M component shall be indexed with foreign exchange variation and US CPI. The indexation shall be indexed quarterly based on the NEPRA guidelines

### **Insurance**

The Reference Insurance Cost Component shall be indexed to actual premium and PKR/USD exchange rate, based on the revised TT & OD selling rate of USD notified by the National Bank of Pakistan.

The Insurance cost component shall be indexed annually based on NEPRA Guidelines

### **Cost of Working Capital**

The cost of working capital facility shall be indexed to quarterly changes in the 3- month KIBOR and fuel price variations,

### **WACC Return**

The WACC Component of the Reference Generation Tariff shall be indexed to quarterly changes in the 3-month KIBOR.



02 January 2017

Registrar  
National Electric Power Regulatory Authority ("NEPRA")  
NEPRA Tower, Attaturk Avenue (East)  
Sector G-5/1, Islamabad

**Subject: License Proposed Modification Application- on behalf of Lotte Chemicals Pakistan Limited (the "Company")**

Dear Sir,

I, Ashiq Ali, Chief Financial Officer of Lotte Chemicals Pakistan Limited is the duly authorized representative on behalf of the Company by virtue of a Board Resolution, appended herewith, hereby apply to the National Electric Power Regulatory Authority ("NEPRA or Authority") for the modification of our Generation License No SGC/93/2013 dated 26 November 2013 pursuant to Regulation 10(2) of the National Electric Power Regulatory Authority (Application and Modification Procedure) Regulations, 1999 (the "AMPR")

I certify that the documents-in-support attached with this application are prepared and submitted in conformity with the provisions of the NEPRA (Application and Modification Procedure) Regulations, 1999 (the "Regulations"). I further undertake and confirm that the information provided in the attached documents-in-support is true and correct to the best of my knowledge and belief.

A bank draft No. 10538301 dated 29 December 2016, in the sum of Pakistan Rs 294,384/-being the non-refundable license application fee calculated in accordance with Schedule II to the Regulations for the modification of the license, is also attached herewith.

Yours Sincerely

  
Ashiq Ali  
Chief Financial Officer



By the order of :  
LOTTE CHEMICAL PAKISTAN LIMITED  
EZ/1-P4 EASTERN INDUSTRIAL ZONE  
PORT QASIM KARACHI

29 DEC 2016  
Customer Reference:  
SCB Reference:  
Delivery Method:  
Payment Summary:

Page 1 of 1  
314257  
PK00031Q0030173  
Pickup by Customer

National Electric Power Regulatory Authority (NEPRA)  
A/C LOTTE CHEMICAL PAKISTAN LIMITED

Gross Amount		294,384.00
Remitting Bank	less	0.00
Withholding Tax	less	0.00
Discount	less	0.00
Net Amount		294,384.00

Dear Sir/Madam,

Standard Chartered Bank (Pakistan) Limited has attached a cheque 10538301 in the amount of PKR \*\*294,384.00 payable to National Electric Power Regulatory Authority (NEPRA) as instructed by LOTTE CHEMICAL PAKISTAN LIMITED Please do not hesitate to contact us if we can be of any further service at :  
Payment Description: 29-DEC-2016

REFERENCE	DATE	DESCRIPTION	AMOUNT (PKR)
-----------	------	-------------	--------------



**TOTAL PKR:** 294,384.00

Account Payee Only

Standard Chartered  
Standard Chartered Bank (Pakistan) Limited  
Straight Through Service-Cash Management, 071, Karachi

P.O.NO : 10538301  
Stationery/Ref No: 5003401

2 9 1 2 1 6

Pay to \*\*National Electric Power Regulatory Authority (NEPRA)\*\* Or Order  
\*\*A/C LOTTE CHEMICAL PAKISTAN LIMITED\*\*

Rupees \*\*Two hundred ninety four thousand three hundred\*\*

PKR \*\*294,384.00

\*\* eighty four and 00/100 Only\*\*

PAYABLE AT ANY BRANCH OF SCB IN PAKISTAN

To: STS PAYS LIP ACCOUNT

A/C # 00-09-9017690-71

Standard Chartered Bank(Pakistan) Limited

Please do not write below this line.

[Signatures and Stamp]

Signatory PA/Attorney No Signatory PA/Attorney No

10538301038007100000099017690710101

National Electric Power Regulatory Authority  
(NEPRA)  
Islamabad – Pakistan

**GENERATION LICENCE**

**No. SGC/93/2013**

In exercise of the Powers conferred upon the National Electric Power Regulatory Authority (NEPRA) under Section 15 of the Regulation of Generation, Transmission and Distribution of Electric Power Act 1997, the Authority hereby grants a Generation Licence to:

**LOTTE POWERGEN (PVT.) LIMITED**

Incorporated under the Companies Ordinance, 1984  
Under Corporate Universal Identification  
No. 0078755, dated February 29, 2012

for its Natural Gas Based Generation Facility Located at EZ/1-P-4, Eastern Industrial Zone, Port Qasim Karachi, in the Province of Sindh  
(Installed Capacity: 48.10 MW Gross ISO)

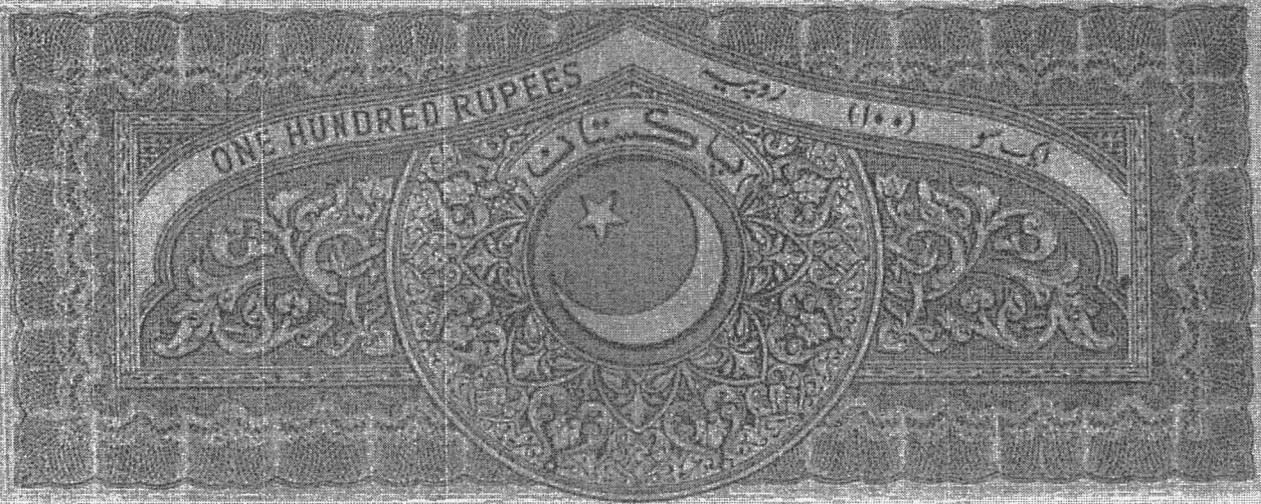
to engage in generation business subject to and in accordance with the Articles of this Licence.

Given under my hand this 26<sup>th</sup> day of November Two Thousand & Thirteen and expires on day of 25<sup>th</sup> November Two Thousand & Thirty Seven.

  
Registrar



Handwritten mark or signature at the bottom left corner.



M. ILIAS STAMP VENDOR  
1. 3665  
ISSUED TO M. ILIAS STAMP VENDOR  
THROUGH WITH SUI SOUTHERN GAS COMPANY LIMITED  
NO. 100  
VALUE RS. 100  
STAMP VENDOR'S SIGNATURE

01 APR 2009

**SUI SOUTHERN GAS COMPANY LIMITED  
CONTRACT FOR THE SUPPLY OF GAS FOR POWER GENERATION**

BY THIS CONTRACT made between Sui Southern Gas Company Limited (hereinafter referred to as "Company") and M/S PAKISTAN PTA LTD, (EZ/1/P-4, Eastern Industrial Zone, Port Qasim, Karachi.) (hereinafter called the "Consumer"). The Consumer agrees to purchase from the Company and the Company agrees to supply to the Consumer 9MMCFD of natural Gas at 35 psig for Power Generation for his own use on the said plots on terms & conditions hereafter set forth:



**TERMS AND CONDITIONS**

- 1 Gas supply will be provided by the Company on "as and when available" basis only during the period March to November each year. The Consumer will make dual firing arrangements to avoid loss of production as and when Gas is not available during March to November and also during December to February when the Company will keep the Consumer's Gas supply disconnected at his cost, each year.
- 2 The Company shall supply Gas for power generation against unconditional UNDERTAKING by the Consumer that power so generated will be used only at the above mentioned premises of the Consumer will be for his own industrial activity and will not be to any other party. In the event of violation of this condition Gas supply will be disconnected without notice and entirely at the risk and cost of the Consumer.
- 3.01 Immediately before execution of this agreement by the Consumer the Consumer shall pay to the Company the sum of Rs. 319,000,000/- (Rupees Three Hundred Nineteen Millions -) as Gas supply deposit or shall furnish a schedule Bank's continuing guarantee in lieu thereof be drawn in accordance with the draft to be provided by the Company for due performance of his obligations hereunder.
- 3.02 If subsequent to the execution of this agreement by the consumer and the company.

SE [Signature] [Signature] [Signature] [Stamp: PAKISTAN PTA LTD Karachi]

- 3.02.01 The consumption of Gas and / or connected load increases for any reason whatsoever beyond the limit of the above Gas supply deposit or Gas consumption otherwise increased beyond the normal consumption of the existing equipment.
- 3.02.02 Or the price of Gas or rent for meter shall be increased in accordance with the terms of this agreement.
- 3.02.03 Or any new tax or charges shall be levied on Gas by any Government or local or other authority or any such tax or charge already levied on Gas shall be increased then in addition to the sum mentioned in sub-clauses 3.01 above, the Company shall have a right to demand from the Consumer and the Consumer shall on such demand pay to the Company such amount in cash or furnish additional continuing bank guarantee in lieu thereof according to the draft to be provided by the Company within one month of Company's demand.

Provided the total amount of Gas supply deposit or bank guarantee in lieu thereof required to be provided by the Consumer under sub-clauses 3.01 and 3.02 of this agreement shall not exceed the amount which, according to the estimate that the Company may from time to time make the Consumer may have to pay to the Company on account of estimated consumption of Gas in three months together with taxes and charges payable thereon and three months rent for the meter.

- 3.02.04 The Company may utilize such Gas supply deposit received from the Consumer for the propose of the business of the Company, subject to condition that such Gas supply deposit shall be reimbursed to the Consumer upon disconnection of Gas supply under the terms and conditions of the Gas supply Contract.
- 4.01 Subject to the provisions hereinafter made the Consumer shall pay to the Company price for Gas supplied to the Consumer at the rate fixed by the Ministry of Petroleum and Natural Resources. Government of Pakistan in due course, pending which Power Tariff as notified by the Government from time to time will be applicable on ad-hoc basis subject to retrospective adjustment after final decision.
- 4.02 The Consumer shall also pay to the Company rent of the meter at the rate prescribed by the Company from time to time from the date on which the meter is fixed up to the date when the same shall be removed provided that if the quantity of Gas consumption necessitates replacement of meter by a meter of different size. The Consumer shall pay rent of the new meter at the rate prescribed by the Company for such meter.
- 4.03 In addition to the price of Gas the consumer shall also pay to the company all taxes or charges levied on natural Gas by the government or local or other authority.
- 4.04 The register of the meter shall be prima facie evidence of the quantity of Gas consumed by the Consumer but should the accuracy of the meter be disputed and the meter be officially tested by the Company and be found to register erroneously, the register of the meter shall be rectified according to the degree of inaccuracy deducted on such testing for the period meter has registered inaccurately. If such period is know or ascertainable and if such period not known or ascertainable then the period of adjustment in the register of the meter and or Gas bills shall be from the date when the meter reading was last obtained.



- 4.05 In case the meter shall for any cause whatsoever, cease or omit to register regularly the quantity of Gas used, the Consumer shall pay to the Company for the Gas supplied to him during the period the meter so remained out of order on the basis of average monthly consumption of Gas by the Consumer during the two months immediately preceding or following the month in which the meter so remained out of order whichever is more.
- 4.06 In case meter cannot be read due to any reason the Company shall submit provisional bill based on the average of past two months consumption or any other reasonable basis as the Company may deem fit and the Consumer shall make payment against that bill within due date. The Company shall adjust the estimated consumption against actual reading obtained subsequently and bill the Consumer for the difference. Consumer shall make payment against such bill within due date.
- 5.01 Where the metering pressure exceeds 8 inches water column above atmosphere pressure, the unit of volumetric measurement shall be one on cubic foot of Gas at an absolute pressure of 14.65 pounds per square inch and a temperature of 60 degrees Fahrenheit without application of adjustment for water vapor content and correction factors such as for pressure, temperature, specific gravity deviation from Boyle's Law expansion and Reynolds number. The value of atmospheric pressure for calculating the pressure factor shall be 14.65 pounds per square inch and value to acceleration due to gravity shall be 32.17 feet per second. The gas delivered hereunder shall be measured in accordance with methods in use in the industry generally and recommended by the Gas Measurement Committee of the Natural Gas Department of the America Gas Association applied in practical manner subject to the approval of the Government of Pakistan.
- 5.02 Where the metering pressure does not exceed 8 inches water column above atmospheric pressure the unit of volumetric measurement shall be 1 cubic foot of Gas at metering pressure and temperature without adjustment for water vapor content.

#### BILLING

- 6.01 The bill will be sent periodically. This period may be one month to three month depending on the current policy of the Company in this respect. Any change in this policy will be at the sole discretion of the company but the Consumer will be duly notified at least 15 days in advance. Dispatch of bills by the Company by ordinary post at the address given hereinabove shall be considered sufficient evidence of delivery of the bills to the Consumer by the Company intimating the Consumer's liability to payment for the Gas consumed.

After the bills have been sent and / or paid if the Company at any time discovers any errors, omission or discrepancy in any such bill owing to any reason whatsoever, the Company shall be entitled to bring such discrepancy to the notice of the Consumer and send correct bills which the Consumer undertake to pay within 15 days of the date of issue shown on the bills.

- 6.02 Any mistake in or dispute about the bill or meter reading shall not entitle Consumer to withhold payment of the bills in time, provided, however, if the Company finds any mistakes in the bill sent to the Consumer then irrespective of the fact whether payment has been made or not, the Company shall, upon having discovered the mistake at any time be entitled to send a correct bill and Consumer shall be liable to pay the same.



**PAYMENT**

- 7.01 All bills pertaining to gas consumption and or other charges are payable within 15 days of the date of issue hereinafter referred to as "due date" as shown on the bills. The bills are to be paid at the authorized banks within the due date. The Consumer will not be entitled to extension in due date irrespective of the date of receipt of the bills by the Consumer.
- 7.02 The responsibility for making payment is that of the Consumer. If the first bill is not received by the consumer within 45 days of commissioning of Gas supply and thereafter if any bill is not received by the Consumer within 25 days after the due date of the previous bill the Consumer shall communicate with the Company and arrange for settlement of the dues. If the Consumer fails to pay any of the bills by the due date given hereon late payment surcharge at the rate prescribed by the Company for the time being shall become payable and shall continue to accrue at monthly rests until payment by the Consumer in full. The rate presently is 2% per month or part thereof. In addition to this surcharge, the Company shall also be entitled to terminate this Contract and to disconnect the supply of Gas and to remove its Gas meter and other equipments without any notice.
- 8 Payment shall be made within the due date either by Cash or through a Bank Draft in favor of Sui Southern Gas Co Ltd at the authorized banks. Payment by cheque will not be considered payment unless it is realized. Failure of any Cheque to be realized within 3 days from the date of deposit in the bank by the Company shall render the supply of Gas liable to disconnection without any notice.
- 9 Payment must be made on or before the due date failing which the supply of Gas is liable to be terminated without notice at the risk of the Consumer. Notwithstanding such disconnection / termination of Gas supply the Consumer shall pay the company the full amount of Gas bills up to and including the date of disconnection together with all charges, taxes and or incidental expenses accrued to or incurred by the Company.

**GENERAL:**

- 10 All pipes and fittings from the Gas main to the inlet of the meter station shall be land and fixed by the Company.

The meter station shall be located closes to the Boundary wall within the Consumer's premises described hereinbefore and at a place nearest to the Company services connection. All pipes and fittings on and beyond the outlet of the meter station shall be installed by the Company at the expenses of the Consumer. The Company shall not be responsible for leakage of Gas from nor for repairs to such pipes of fittings under any circumstances.

The Gas meter regulator service valve and the inlet pipe of meter forming parts of the meter station shall be installed and kept in repair by the Company.

The Consumer shall be responsible for the safety and protection of the meter station and the said property of the Company and shall be liable for any damage caused thereto by fire or other accidents or due to carelessness of any one whomsoever not in the Company's employment. For this purpose if a meter room is constructed the Consumer shall be responsible for keeping it in good condition.



- 11 The Company shall retain the title to and ownership of all regulators, meters, pipes, devices and other property installed by it upon the said premises and may remove or replace the same at any time before or after the termination of the Contract without prior intimation to the Consumer.
- 12 The Company shall have the right to provide further connection to other parties or premises from the outlet of the regulator installed for the purpose of supplying Gas to the Consumer's premises described above. In that case the cost of any alteration in or addition to the pipes and fittings, incidental thereto shall be borne by the Company.
- 13 No meter shall be connected to or disconnected from the Gas pipes except by the authorized personnel of the Company. The meter shall be inspected periodically, but the Company's personnel shall have free access at all reasonable times to Gas installation at the said premises of the Consumer.
- 14 Alterations in or additions to Gas installations will be made only by the Company but the Company may in exceptional cases exercise its discretion to permit the Consumer to undertake alterations in or additions to the Gas installations. Such permission must be obtained in writing from the Company in advance.
- 15 The Consumer shall not make maintain any connection with the fuel / Gas pipe of any other person or corporation during the subsistence of this Contract without the written consent of the Company.
- 16 As the production of Gas from wells and the conveyance of it are subject to accidents, interruptions and failures, and the lines and equipment to malfunctioning, breaking, freezing failures and closing, which cannot be foreseen or prevented by any reasonable care or expenditure and as the supply of Gas and transportation facilities are limited Company does not, by the Contract undertake to furnish to the Consumer a full and uninterrupted supply of Gas but only to furnish such supply and for such length of time as it reasonably can, and it is expressly agreed to by the Consumer that the Company shall not be liable for any loss, or damages, or injury, that may result either directly or indirectly from shortages or interruptions in the supply of Gas or from discontinuances thereof due to the said reasons or as result of labor strike, lockouts, riots, civil commotions, hostilities, wars, epidemics, calamities, natural disasters or causes beyond the ordinary reasonable control of the Company.
- 17 The Company shall have right to close or interrupt Gas supply to Consumer's premises for short period after giving at least 24 hours notice in advance for carrying out necessary extension repair and / or alternation work in the Company's pipe lines, equipment and devices.
- 18 The Company shall have the right to curtail and / or to discontinue deliveries of Gas to the Consumer consuming Gas in excess of 3000 cu.ft. per hour whenever and to the extent necessary in its sale judgment for operational reasons.
- 19 The Consumer knowing its inflammable character shall take all precautions in the use of Gas and maintenance of Gas installation on his premises and shall be solely responsible for any loss, damages, injury or accident resulting directly or indirectly and for any reason whatsoever from Gas installation. The Consumer shall indemnify the Company against all demands and claims for any such loss, damages, injury or accident.

- 20 The contract shall not be binding or in force until approved and signed by proper office of the Company duly authorized in this behalf and no promise or agreement or representation made by any agent or employee in soliciting the same or otherwise, shall bind the Company except to the extent here-in provided.
- 21 Without prejudice to any other right that the Company may have and in addition to such right. The Company shall be entitled to rescind the Contract at any time for following reasons.
- 21.01 Neglected or default of the Consumer to pay the bills rendered by the Company for any months supply of Gas or other dues payable by the Consumer within the period specified in clause 7.01 hereof and / or to meet the Company's demand for additional Gas supply deposit made under clause 3.02.03.
- 21.02 Any action by the Municipal Authorities, Improvement Trust, Local bodies, or any Government authorities or any legal proceeding against the company by any party interfering with the company's right to supply gas or collect dues payable to the company here under.
- 21.03 Any action by the consumer to secure Gas through the meter for purpose other than that mentioned here in above or for another party with out written consent of the company.
- 21.04 Any action by the consumer tending to secure more Gas than the meter registers or to secure Gas through the said meter at a higher pressure than that at which the regulators are set by the company or any interference by the consumer with the meters or regulators tending to prevent the same from properly operating and correctly registering;
- 21.05 Any action of the consumer to break the seals or to tamper with the Gas instillation in any way whatsoever in order to secure unauthorized supply of Gas and or to indulge in unsafe usage of Gas;
- 21.06 Any alternation, addition or extension to the existing Gas instillation carried out by the consumer with out obtaining prior approval of the company in writing;
- 21.07 Violation of or default in compliance with any the terms and conditions of this contract.
- 22 Either of the parties here to may, at his/her/ their absolute will terminate this contract by one month notice of his / her / their intention to do so be given in writing to the other party and this Contract shall remain in force until so terminated. In the case of termination of this Contract under this clause no party shall be entitled to any damages or compensation for any loss or injury arising from such termination of this Contract.
- 23 In case the premises of consumer mentioned above or the property thereon shall be attached or threatened with attachment in execution or in case of assignment, bankruptcy or any act of insolvency on the part of the Consumer the Contract shall at the option of the Company become null and void and the Company shall have the right to remove any or all of its property from the premises of the Consumer.



24. In case of cancellation or termination of the Contract for any cause whatsoever, all claim for gas supplied and or services rendered by the Company up to the date of disconnection of Gas supply shall become forthwith due and payable without notice from the Company and Consumer shall pay the same on demand. In case of default late payment surcharge shall be payable by the Consumer as provided in clause 7.02 above.
25. The price of Gas and or charges payable by the Consumer under this Contract shall also be subject to such charges as may be notified by the Government from time to time and the rates so notified by the Government shall take effect from the date fixed by the Government irrespective of the whether the same have been intimated or not, to the Consumer by the Company.
26. In the event of disconnection at the request of the Consumer or due to any default on his / her / their part a sum of Rs. 1,000/- subject to increase / decrease by the Government in this behalf as reconnection fee shall have to be paid by Consumer before the Gas supply is restored by the Company. Restoration of Gas supply shall in any case be subject to the availability of meter and to other necessary equipment.
27. All the above mentioned terms and conditions contained in this Contract have been read and understood by the consumer and a copy of terms and conditions has been received by the Consumer undertakes and agrees to abide by all such terms and conditions in token whereof the Consumer has affixed his / her / their signature and seal hereunder.

Signed for and on behalf of  
SUI SOUTHERN GAS COMPANY LTD

*Zeeha Alvi*  
FOR MANAGING DIRECTOR



*Asif Saad*

Asif Saad  
Chief Operating Officer

Dated: 16-04-2009



*Ali Aamir*

Ali Aamir  
Chief Financial Officer

Dated: 16-04-2009





Sales/NOC/PG-1421  
15-11-2016

Mr. Adnan Samdani  
(Director Finance & Company Secretary  
M/s. Lotte Chemical Pakistan Limited  
Plot No. EZ/1/P-4 Eastern Industrial Zone  
Bin Qasim  
Karachi.)

**Subject: NOC/Permission to Sell Surplus Power to K-Electric  
From approved Gas load of 09 MMCFD (38 MW) for Captive  
Generation Customer No. 5371775743 at Plot No. EZ/1/P-4  
Eastern Industrial Zone Bin Qasim Karachi.**

This is with reference to your letter dated August 26 2015.  
We are pleased to inform that your request to sell surplus power to K-Electric  
from approved gas based Captive Power Generation has been approved by SSGC  
subject to following conditions:

1. You will undertake to take RLNG (on as and when available basis) for the portion of surplus power failing which gas supply for volume utilized for selling of Power will be disconnected and NOC will also be cancelled.
2. The NOC is subject to availability of mechanism / infrastructure for supply of surplus power to K-Electric.
3. Gas supplies would be on as and when available basis.
4. NOC will be subject to cancellation in case of any directives from Government of Pakistan.
5. No outstanding gas bills/invoice to-date would be allowed.
6. No direct litigation against SSGC will be carried out by you.
7. Gas supply deposit will be updated by you for full volume of gas.
8. The NOC is subject to use of gas in high efficiency system for Captive power generation.

Yours sincerely,

**Dr. Ejaz Ahmed**  
A/SGM (CS)

For: Managing Director

No. NG (II) -16(4)/16 RLNG-IPP-Pt-5  
Government of Pakistan  
Ministry of Petroleum & Natural Resources (Policy Wing)  
Directorate General of Gas  
First Floor, Petroleum House, G-5/2  
\*\*\*\*\*

MOP

Annexure 4

Islamabad, the 16<sup>th</sup> March, 2016

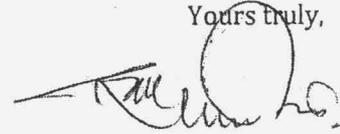
**The Managing Director**  
Sui Southern Gas ~~Company~~ Ltd.,  
Karachi *Company*

**Subject: ALLOCATION OF RLNG TO BULK CONSUMERS ON TRANSMISSION AND HIGH PRESSURE DISTRIBUTION NETWORK**

Dear Sir,

I am directed to refer to this Ministry's letter No. NG (II)-16(I)/15-Misc-LNG-Pt dated 23.12.2015 (copy enclosed) and to say that in pursuance of ECC's decision No. ECC-126/15/2015 dated 03.09.2015 this Ministry hereby allocates 3.5 MMCFD of RLNG on 'as and when available basis' to M/s LOTTE CHEMICAL PAKISTAN LTD as per their requested load.

Yours truly,



**(Abdul Rasheed Jokhio)**  
Director (Tech)

CC:

- (i) CEO, M/s LOTTE CHEMICAL Ltd.
- (ii) Chairman, OGRA, Islamabad
- (iii) Managing Director, PSO, Karachi
- (iv) Director Minister for Petroleum & NR, Govt. of Pakistan
- (v) SPS to Secretary Petroleum & NR, Govt. of Pakistan
- (vi) PA to DG (Gas) Petroleum & Natural Resources, Govt. of Pakistan



Annexure - 5

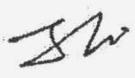


# PERAC RESEARCH & DEVELOPMENT FOUNDATION

## TEST REPORT Page 1 of 1

Customer's Name	M/s. Lotte Chemicals.	Test Report No	1015/ 2016-2017
Customer's Ref	Email	Reporting Date	25-11-2016
Date	23-11-2016	Sample Code	3133
Sample Description	Gas Sample	Receiving date	24-11-2016

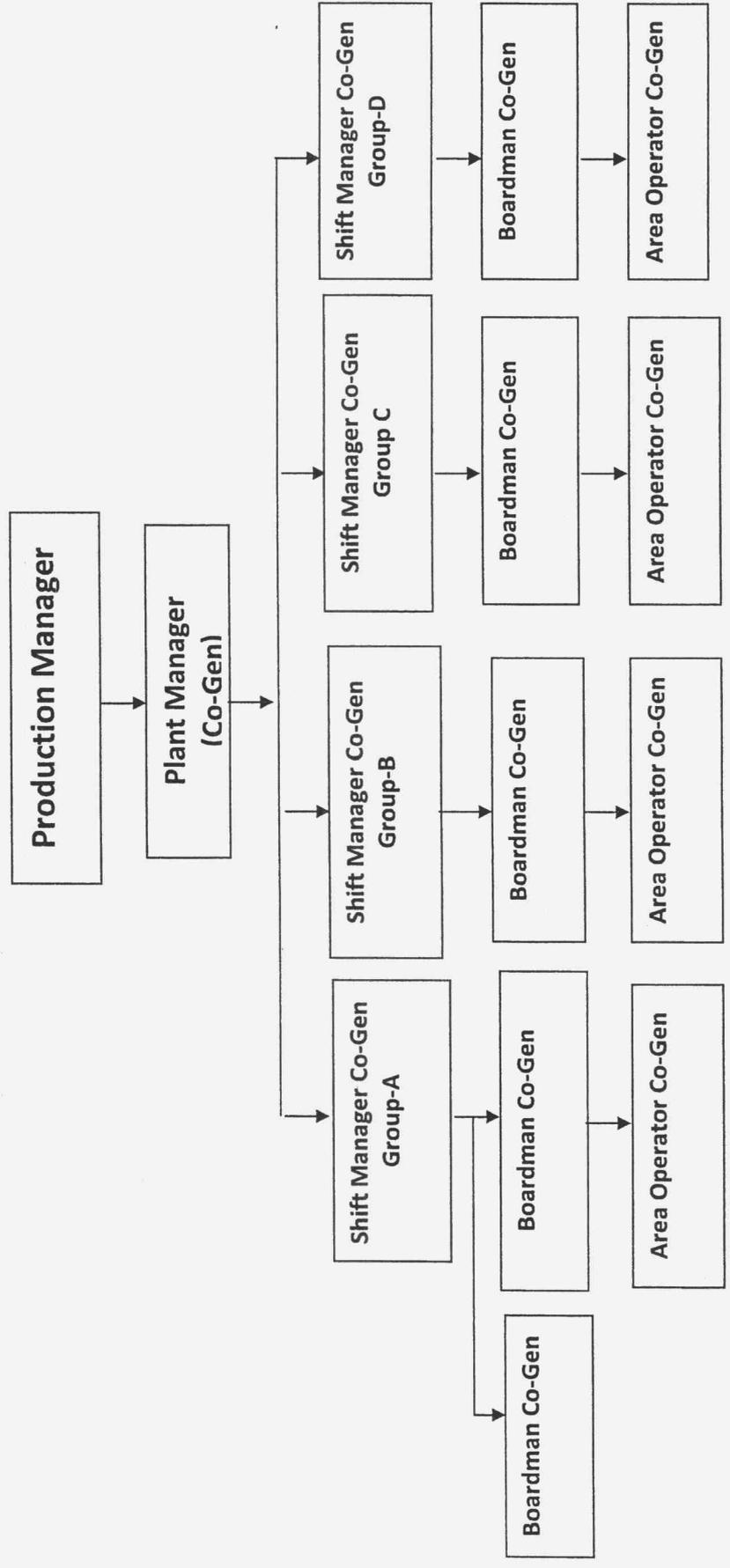
TEST METHOD ASTM	DESCRIPTION	TEST RESULTS
	<b>COMPONENTS</b>	
By Analyzer	CARBON MONO OXIDE, Mole %	Nil
D-1945	CARBON DIOXIDE, Mole %	2.845
"	NITROGEN, Mole %	2.436
"	METHANE, Mole %	88.736
"	ETHANE, Mole %	5.113
"	PROPANE, Mole %	0.379
"	ISO-BUTANE, Mole %	0.210
"	N-BUTANE, Mole %	0.245
"	ISO-PENTANE, Mole %	0.019
"	N-PENTANE, Mole %	0.017
"	HEXANE, Mole %	Traces
"	HEPTANE PLUS, Mole %	Traces
	TOTAL	100
D-3588	Calculated Gas gravity (Air 1.00)	0.6272
"	Calculated <b>GROSS</b> heating value BTU per cubic feet of dry gas @ 14.65 PSI and 60 °F.	1012.53
"	Calculated <b>NET</b> heating value BTU per cubic feet of dry gas @ 14.65-PSI and 60 °F.	913.17

 Prepared by	 Section Incharge (E)	 Head R & ASD
----------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------

The analysis based on Sample(s) provided to us by the Client. The interpretation or opinions expressed represent the best judgment (E & O.E.). We have no responsibility and warranty or representation in connection with which such report is used.

Rev. No. 0	Dated: 21-01-2000	F-10-05
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### a) Operations Team Organogram - Cogen Plant



**b) Maintenance Team Organogram – Cogen Plant on share basis with Process Chemical plant**

