Annex A

BEFORE THE NATIONAL ELECTRIC POWER REGULATORY AUTHORITY

Case No. _____

Central Power Generation Company Limited (GENCO-II)

(Petitioner)

TARIFF MODIFICATION PETITION UNDER RULE 3(1) OF THE NATIONAL ELECTRIC POWER REGULATORY AUTHORITY (TARIFF STANDARDS AND PROCEDURE) RULES, 1998

Rule 3	**Introduction**	Tariff Petition under Section 31 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997, read with Rule 3 of the NEPRA (Tariff Standards and Procedure) Rules, 1997 for modification of the Generation Tariff in respect of the 747MW Combined Cycle Power Plant located at Thermal Power Station Guddu, District Kashmore, Sindh.
Rule 3(2)(d)	**Petitioner's name and address**	Central Power Generation Company Limited Thermal Power Station Guddu, District Kashmore Phone: 0722-691088 Fax: 0722-691085 Email: genco2_guddu@yahoo.com, ceo@cpgcl.com.pk
	Petitioner's Authorised Person	Engr. Junaid Ahmed Baig Chief Executive Officer
	Petitioner's Generation License	License No. GL/02/2002 dated 1st July 2002 Modification-I dated 26th April 2013 Modification-II dated 10th July 2019
Rule 3(2)(c)	**Relief Sought**	The relief sought is stated in **para-53** of the Petition.
Rule 3(2)(d), (e)		Details set out in the main body of the Petition.
Rule 3(2)(f)	**Summary of Evidence**	The following are documents are annexed with the Petition: (i) Affidavit under Rule 3(8); (ii) Resolution of Petitioner's Board of Directors; (iii) Bank Draft of Requisite Fee; (iv) Annexures as per the Index.

List of Abbreviations

CCPP	Combined Cycle Power Plant
CDL	Cash Development Loan
CPP	Capacity Purchase Price
CPPA	Central Power Purchasing Agency (Guarantee) Limited
CPGCL	Central Power Generation Company Limited (GENCO-II)
COD	Commercial Operation Date
EPC	Engineering, Procurement and Construction
FCC	Fuel Cost Component
GL	Generation License
GoP	Government of Pakistan
GT	Gas Turbine
HSD	High Speed Diesel
IRR	Internal Rate of Return
MMSCFD	Million Standard Cubic Feet per Day
MW	Megawatt
NESPAK	National Engineering Services (Private) Limited
NPCC	National Power Control Centre
O&M	Operation and Maintenance
PPA	Power Purchase Agreement
RoE	Return on Equity
ST	Steam Turbine
TPS	Thermal Power Station
USD	United States Dollar
WAPDA	Water & Power Development Authority

List of Tables

I. BACKGROUND

(a) The Petitioner

1. Central Power Generation Company Limited ("**CPGCL**" or "**GENCO-II**" or the "**petitioner**") is a public-sector power generation company in which, shareholding is fully-owned by the Government of Pakistan ("**GoP**").

2. CPGCL was incorporated on 26th October 1998 as a result of the unbundling of the Power Wing of the Water and Power Development Authority ("**WAPDA**"), for the purpose of taking over the properties, rights, assets, obligations, and liabilities of WAPDA's thermal power stations located at Guddu, Sukkur, and Quetta.

3. This petition is being filed through CPGCL's Chief Executive Officer, who has been duly authorized by the CPGCL's Board of Directors in this regard, and is fully conversant with the facts relevant to this petition.

4. The total installed capacity at CPGCL's thermal power station located at Guddu ("**TPS Guddu**" or" **Complex**") is 2,402MW, however, the net dependable capacity of TPS Guddu is now 1,641MW (after de-licensing of Units 1 – 4 of TPS Guddu by the Authority in July 2019).

5. On 1st July 2002, CPGCL obtained generation license No. GL/02/2002 from the Authority to operate the power plants inherited from WAPDA. The generation license was subsequently modified on CPGCL's motion on 26th April 2013 to include the 747MW Combined-Cycle Power Plant Guddu ("**747MW CCPP**" or the "**Plant**") as 'Block-V' of TPS Guddu, and again on 10th July 2019 to exclude/delicense Units 1 – 4 of TPS Guddu, and to extend the expiry date of the generation license to 30th June 2042.

(b) The 747MW CCPP

6. The specifications of the 747MW CCPP, as per CPGCL's generation license, are as follows:

Table 1: Plant Data of 747 MW CCPP

Plant Size (installed capacity)	776.70 MW (gross at ISO reference site conditions)	
Type of Technology	Combine Cycle Power Plant	
No. of Units & Size (MW)	Gas Turbines	2 x 255.6 MW (ISO)
	Steam Turbine	1 x 265.50 MW (ISO)
Make and Model of Units	Gas Turbines	GE, PG9351 (MS9001 FA), USA
	Steam Turbine	Harbin Turbine Company, China
Commercial Operations Date	17th December 2014	
Expected Life of Facility	30 years (appx.) from Commercial Operations Date	

Note: The two gas turbines of the 747 MW CCPP as denoted as **GT-14** and **GT-15** whereas the steam turbine is denoted as **ST-16** of TPS Guddu.

7. The construction of the 747 MW CCPP was financed through a mix of local and international loans. The local debt is in the form of three (03) CDLs from the GoP, with a combined value of Rs. 7,874million. These loans were obtained between August 2010 and May 2012, and their repayment period commenced after a five (05) year

grace period, with the loan servicing being on an annual basis.

8. The international loan for the Plant is in the amount of USD 464.1 million, and has been provided by a consortium of banks comprising of: (i) Export-Import Bank of China; (ii) Hongkong and Shanghai Bank Corporation Limited; and (iii) HSBC Bank Middle East Limited. This loan was secured under a '*Facility Agreement relating to an Export Credit Facility in connection with the Supply, Installation, and Commissioning of a 747 MW Gas Turbine Combined Cycle Power Plant at Guddu Supported by Sinosure*', dated 23rd December 2011 (**"Facility Agreement"**). *Crucially*, this loan has been secured by the GoP through a sovereign guarantee issued on 7th March 2012. Salient features of the Facility Agreement are as follows:

- Loan Amount: USD 464,084,737.00
- Amount Drawn by CPGCL: USD 463,826,843.00
- 1st drawdown date: 30th October 2012
- Interest Rate: LIBOR + 2.4%
- Grace Period: 3 years
- Repayment Period: 9 years
- Total Tenure: 12 years
- Installment: Semi-Annual

9. The EPC Contract for the 747MW CCPP was executed on 19th September 2009 between CPGCL and M/s Harbin Power Engineering Company Ltd., and the commercial operations date (**"COD"**) of the Plant was achieved on 14thDecember 2014.

10. The main fuel for the 747MW CCPP is indigenous gas and the backup fuel is high speed diesel.

11. On 23rd October 2017, CPGCL entered into a gas supply agreement (**"GSA"**) with M/s Pakistan Petroleum Limited under which, 200 MMSCFD gas is supplied to the Plant through a dedicated gas pipeline from the Kandhkot Gas Field located in Sindh. The term of this GSA is for the lease life of the Kandhkot Gas Field.

12. On 20th September 2015, CPGCL signed a Power Purchase Agreement (**"PPA"**) with the Central Power Purchasing Agency (Guarantee) Limited (**"CPPA"**) for a period of twenty-five (25) years. It is pertinent to mention that CPGCL's current PPA does not include the 747MW CCPP as part of CPGCL's power generation complex, as defined in the PPA, however, since the Plant's COD, CPGCL has been selling power to CPPA from the Plant, on the basis of its approved tariff, **on the same terms and conditions** contained in the current PPA. Furthermore, CPGCL and CPPA have agreed, and initialed an 'Amendment No.2' to the current PPA for inclusion of 747 MW CCPP. This initialed amendment was submitted to the Authority for its approval on 2nd June 2023, and as soon as the Authority's approval is received, CPGCL and CPPA intend to execute this amendment.

(c) Tariff for the 747MW CCPP

13. After the Plant's COD, CPGCL filed a tariff petition before the Authority to obtain a generation tariff. The initial tariff of the Plant was approved by the Authority 26th April 2016, however, being dissatisfied with certain aspects of this tariff, CPGCL asked the Authority to review it by seeking, *inter alia*, a higher value of variable O&M cost, additional sums for startup costs, and a tariff for partial loading of the Plant as per the

terms of the PPA.

14. The Authority gave its determination on CPGCL's review motion on 7th April 2017[1] ("**2017 Tariff**"), whereby the Authority allowed CPGCL recovery of 'return on equity' ("**RoE**") at the rate of 15%, as well as partial loading;*"...in accordance with standard practice and shall be dealt with in PPA".* It may be noted that being a government-operated plant, the 747MW CCPP has been frequently operated by the National Power Control Center ("**NPCC**" or "**System Operator**") in partial-loading mode in order to support system stability

15. Between 2014 to July 2020, despite the fact that the Plant was licensed only as a combined-cycle plant, and only had tariff for combined-cycle operations, CPGCL was made to operate the Plant in open-cycle configuration by the System Operator on multiple occasions. This happened at times even before the Plant's COD, i.e., when the Plant was in testing/commissioning phase, as well as during power shortages in the country from time-to-time. During such instances, NPCC required CPGCL to operate its gas turbines in open-cycle mode, even though ST-16 was either undergoing scheduled maintenance, or was unavailable for technical reasons. Despite having purchased electricity in such instances with full knowledge of the additional generation cost borne by CPGCL due to open-cycle operations, CPPA did not pay CPGCL the additional /extra fuel cost for open-cycle generation, for the reason that the 2017 Tariff did not cater for open-cycle operations, which meant that whenever CPGCL operated the Plant in open-cycle mode, it did so at a significant loss.

16. In view of this situation, CPGCL filed a tariff modification petition on 30th July 2020 seeking the Authority's permission to undertake open-cycle operations of 747MW CCPP, as and when demanded by NPCC, and further sought payment of the fuel cost component ("**FCC**") at approximately 1.5 times of the FCC allowed for combined-cycle operation, whenever NPCC required the Plant to be operated in open-cycle mode.

17. During the pendency of this tariff modification petition, CPGCL filed a motion to amend it, to also seek a reduction of its RoE component of the capacity payments from 15% to 10%, as per the directions of GoP. This was done in pursuance of a decision in this regard of the Cabinet Committee on Energy, taken in August 2020.

18. The Authority, vide determination dated 28th December 2020[2] allowed CPGCL to operate the 747MW CCPP in open-cycle mode as and when required by NPCC with additional fuel cost being allowed in the tariff, however, *without* retrospective effect as prayed for by CPGCL, thereby disallowing the recovery of losses that CPGCL had already suffered due to open-cycle operations between 2014 to 2020. *Crucially*, the Authority did not allow any payment of capacity charges to CPGCL while the Plant was being operated in open-cycle mode. Furthermore, although the Authority *did* allow the reduction in CPGCL's RoE for the Plant from 15% to 10%, however the same was allowed without considering the RoE during the Plant's construction period, and without any indexation of the foreign currency component of the EPC cost of the Plant.

19. Being dissatisfied with the aforementioned determination, CPGCL approached the Authority for review on 18th January 2021. In its review motion, CPGCL sought *inter*

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[1] Authority's tariff determination for 747MW CCPP dated 7th April 2017 is attached as **Annex-A**

[2] Authority's tariff determination dated 28th December 2023 is attached as **Annex-B**.

alia payment of the open-cycle fuel cost component for operating the Plant in open-cycle mode since March 2014, as well as payment of capacity charges whenever CPGCL was compelled by NPCC to operate the Plant in open-cycle mode. CPGCL further sought USD indexation of the RoE for the Plant and also prayed for the Authority to allow CPGCL to recover RoE during the Plant's construction period.

20. The Authority gave its determination on this review motion on 28th July 2021, whereby it upheld its earlier decisions of not allowing payment of the capacity purchase price during open-cycle operations, or retrospective payment of the open-cycle FCC, however, the Authority did allow USD indexation of the RoE component of the tariff[3].

(d) Damage to ST-16

21. On the night of 10th July 2022, there were exceptionally heavy rains in Guddu. Due to the rain, there was flooding in parts of the Plant and the resulting rain water ingress caused a short-circuit in the steam turbine area of the 747MW CCPP, leading to a fire (the "**Fire Incident**"). Although the fire was contained as quickly as was possible, extensive damage was caused to ST-16, including to its steam turbine generator, which was damaged beyond repair. Since then, ST-16 has been on forced outage and therefore, the 747MW CCPP has been unavailable as a combined-cycle plant.

22. After the Fire Incident, CPGCL commissioned an independent inquiry into the cause of the incident, and an international consultant, M/s VA Consultancy was engaged for this purpose on the directions of the Power Division. M/s VA Consultancy submitted their report on 4th October 2022[4], and identified the cause of the Fire Incident as short circuiting due to high moisture content in the steam turbine's leads, PT panel, and pipes of busbar. The report by M/s VA Consultancy further conclude that: "*From the damage it can be observed that the fire has been stopped in minimum time period*".

23. Thereafter, CPGCL engaged M/s NESPAK to provide consultancy services for the repair of ST-16 and also engaged the OEM of ST-16, M/s Harbin Electric International ("**HEI**") to carry out damage assessment and to give an estimate of the repair cost of ST-16. HEI carried out a detailed assessment of ST-16 and submitted its report to CPGCL in April 2023[5], in which, it recommended the replacement of major components of ST-16, including the steam turbine generator. HEI also submitted a commercial proposal for complete repair of ST-16[6] in which, the total cost of repair was estimated to be approximately **USD 41.2 million**. Furthermore, the repair time is estimated at **24 – 28 months** from date of issuance of work order for repair works

(e) Capacity Payments for 747MW CCPP

24. Since the Plant's existing tariff only allows payment of its capacity purchase price when the Plant is operated in combined-cycle mode, CPPA has not paid the Plant's capacity purchase price since December 2022 (*after accounting for certain utilized permitted outage periods for the Plant*). It is however pertinent that since the Plant's gas turbines are reasonably high on the economic merit order, even on open-cycle mode, and

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[3] Authority's determination-in-review dated 28th July 2021 is attached as **Annex-C**.

[4] The report by M/s VA Consultancy dated 4th October 2022 is attached as **Annex-D**.

[5] HEI's damage assessment report for ST-16 dated April 2023 is attached as **Annex-E**

[6] HEI's commercial proposal for repair of ST-16 is attached as **Annex-F**.

furthermore, since the Plant is at strategic location for load balancing, NPCC has been regularly issuing despatch instructions for GT-14 and GT-15 (*when they have been available, either together or individually*). As a result, CPGCL has been operating the 747MW CCPP in open-cycle mode without receiving the capacity purchase price for the Plant, at a significant loss.

25. Due to the aforementioned situation, CPGCL is no longer in a position to pay for the fixed and variable O&M costs of the Plant. It may be noted that gas turbines major maintenance costs (combustion inspection, hot gas path and major inspections with the replacement of standard parts) occur on the basis of running hours, which accrue irrespective of the Plant's mode of operation. CPGCL is also under an obligation to carry out debt servicing for the Plant. The latter issue is of critical importance since the next installment of the foreign debt is payable in **July 2024**[7]. If CPGCL is unable to fulfill its repayment obligations, the lenders have the option to call on the sovereign guarantee issued by the GoP to the foreign lenders under the Facility Agreement. CPGCL has paid the previously three (03) instalments of the foreign debt, between January 2023 and January 2024 with considerable difficulty from its own resources, in order to avoid such a scenario, however, CPGCL is no longer in a position to continue these payments in the absence of payment of capacity purchase price.

26. As a result of the aforementioned developments, CPGCL seeks a modification to its 2017 Tariff (*as subsequently modified on 28th July 2021*) in the manner set out in Part-II below.

II. PROPOSED TARIFF MODIFICATION

27. CPGCL requires a modification to its tariff to be able to meet its actual cost of generation from GT-14 and GT-15 in open-cycle mode, and to be able to operate and maintain these units in a safe, efficient, and reliable manner.

28. A summary of the tariff sought by CPGCL through this petition is as follows:

(i) **Capacity Charges**: Presently, CPGCL is only receiving the open-cycle FCC approved by the Authority for open-cycle operation of the Plant. This does not cover the actual cost of operating and maintaining the Plant, including the cost of maintaining the GTs through CPGCL's Long-Term Service Agreement ("**LTSA**") with the OEM of the GTs, M/s GE. In all likelihood, NPCC will require CPGCL to operate the Plant in open-cycle mode until the restoration of ST-16, however, if CPGCL continues to do so under its current tariff, it will suffer considerable losses, and will not even be able to cover the operation and maintenance costs of the Plant. Accordingly, CPGCL would seek a modification to its tariff whereby instead of receiving no capacity payment for open-cycle operations of the Plant, CPGCL should receive the capacity purchase price, *albeit*, on a '**take-and-pay**' basis whenever the Plant is operated in open-cycle mode, so that the actual cost of generation, as well as operation and maintenance of the Plant can be recovered. Alongside this change, CPGCL seeks a continuation of the already-approved FCC for open-cycle operations of the Plant, as per the Authority's determination dated 28th July 2021;

[7] The previous instalment, which was due in January 2024 was paid by CPGCL out of its own resources despite the lack of capacity payments by CPPA.

(ii) **Return on Equity / IRR**: For reasons that are elaborated herein below CPGCL seeks a restoration of the RoE / IRR component of its tariff to the original IRR permitted under the 2017 Tariff, prior to its reduction vide Authority's determination dated 28th July 2021;

(iii) Adjustment for Partial Loading and Correction Factors: CPGCL seeks an adjustment of its heat rate for partial loading as well as degradations and other correction factors due to the ambient condition i.e., temperature, humidity, pressure etc., as per the relevant method/curves and allied data provided by the OEM of the 747MW CCPP.

(iv) Startup Costs: CPGCL seeks recovery of the actual startup costs for the units of the 747MW CCPP.

29. Save for the changes sought in this tariff petition, CPGCL seeks a continuation of its tariff approved in 2017, as modified in 2021, or from time-to-time for periodic reasons such as adjustments for fuel price variation or indexation. Detailed reasoning for the proposed modifications is as follows:

(a) Capacity Purchase Price

30. As aforementioned, CPGCL's shareholding is fully owned by the GoP, however, in the current economic scenario, it is unlikely that the GoP will be able to finance the cost of rehabilitation of ST-16. Furthermore, CPGCL's receivables from CPPA-G currently stand at Rs. 43.930 billion[8]. This situation leaves CPGCL with only two viable sources of funds, i.e., the RoE from its capacity payments or external financing. As a result of the stoppage of capacity payments for the 747MW CCP in December 2022, CPGCL is currently not receiving any RoE.

31. CPGCL's debt servicing is also done through the capacity payments that it receives from CPPA. Although CPGCL managed to pay the instalments of the foreign debt between January 2023 and January 2024 with great difficulty, with the next instalment being due in July 2024, CPGCL will be unable to pay it due to lack of any financial reserves. This would, in turn, expose the GoP to the risk of its sovereign guarantee being called on

32. Under CPGCL's current tariff regime, it receives no capacity payments while operating the 747MW CCPP in open-cycle mode. However, after the damage to ST-16 due to the Fire Incident, the Plant can only operate in open-cycle mode until rehabilitation of ST-16 is complete. The open-cycle FCC alone does not cover the fixed O&M cost, payments to M/s GE under the LTSA for maintenance of the GTs, or other capital expenditure for operating and maintaining the Plant.

33. It is pertinent to mention that in the current scenario (*i.e., where CPGCL receives no capacity payment for open-cycle operation*), it would be in CPGCL's interest to shut down the Plant all-together until restoration of ST-16 is complete, as operating the Plant in this scenario causes a significant loss to CPGCL. However, CPGCL is compelled to operate the Plant in open-cycle mode by NPCC, with regular despatch instructions, due to a host of factors, which include; (i) the Plant's position on the economic merit order, even in open-cycle mode; (ii) utilization of indigenous gas; and

[8] As on 31st January 2024.

(iii) balancing of load and voltage stability due to the strategic location of TPS Guddu. NPCC has already written a number of letters to CPGCL[9], instructing that the capacity of the GTs should be made available to the System Operator, since the 747MW CCPP has strategic importance for north-south connectivity of the national grid, and for maintaining system stability. Thus, shutting down GT-14 and GT-15 till the restoration of ST-16 (*which CPGCL will be forced to do in the absence of any capacity payments during open-cycle operation of these units*) will not only deprive the System Operator of cheap electricity, but will also have an impact on the stability and connectivity of the national grid.

34. Given the above, in order to allow CPGCL to operate the Plant safely and efficiently, and to allow CPGCL to recover the actual cost of generation, operation, and maintenance of the Plant, CPGCL would request the following:

(i) CPGCL should receive the capacity purchase price for the Plant on a '**take-and-pay**' basis, whenever the Plant is operated on open-cycle mode.

(ii) CPGCL should continue to receive the already-approved open-cycle FCC component whenever the Plant is operated in open-cycle mode.

(iii) CPGCL should receive the full capacity purchase price for the available capacity of the Plant even if NPCC only requires partial-loading of the Plant, since the capital and fixed O&M cost of operating the Plant is the same irrespective of operations on full load, or partial load.

35. A summary of CPGCL's current tariff in combined-cycle, and open-cycle modes is as follows:

Table 2: Summary of Current Tariff of the 747MW CCPP *(Fig: Rs./kWh)*

Operation Mode	Energy Purchase Price	Capacity Purchase Price	Total
Combined Cycle	8.3877	4.6517	12.9435
Open Cycle	11.9745	*nil*	11.9745

36. CPGCL seeks a "**take-and-pay**" tariff from the Authority to recover all components of its tariff. The proposed take-and-pay tariff is based on the following assumptions:

(i) Given that on a take-and-pay tariff, the Plant will not receive guaranteed despatch, the availability factor should be reduced from the current take-or-pay tariff, to **50%**, to allow a slightly higher capacity purchase price. This will compensate CPGCL for the loss of revenue from the current model of guaranteed capacity payments, and will also allow CPGCL to undertake rehabilitation of ST-16 from its own resources.

(ii) The take-and-pay tariff will be based on the presently available capacity of the Plant, which is **483MW** (the combined capacity of GT-14 and GT-15).

(iii) On the basis of the costs allowed in the current tariff, by applying a 50% availability factor, the annual operating cost of the 747MW CCPP comes to Rs. 36,247 million (*inclusive of indexation since 2017*). This cost-estimate may be verified by the Authority with reference to the current tariff.

[9] NPCC's letters are attached as **ANNEX-G**

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37. On the basis of the above assumptions, the proposed capacity purchase price on a take-an-pay basis shall be as follows:

Table 3: Breakdown of Proposed Take-and-Pay Tariff

#	Description of Expense	Cost (Rs. Million)	Capacity Purchase Price (Rs/kW/h)
1	Fixed O&M (local)	1,287	0.3304
2	Fixed O&M (foreign)	3,944	1.0124
3	Insurance[10]	747	0.1918
4	RoE[11]	8,543	2.1928
5	Debt Servicing (local)	1,397	0.3586
6	Debt Servicing (foreign)	20,328	5.2174
	Total	**36,247**	**9.3034**

38. In view of the above, a summary of the proposed "take-and-pay" tariff sought by CPGCL for operation of the Plant in open-cycle mode is as follows:

Table 4: Summary of Proposed Tariff (*Fig: Rs. / kWh*)

Operation Mode	Energy Purchase Price	Capacity Purchase Price	Total
Open Cycle	11.9745	9.3034	21.2779[12]

Return on Equity / IRR

39. As aforementioned, in 2020, CPGCL, on the directions of the Power Division, sought a reduction to the RoE component of its tariff, which was allowed, however without indexation of the RoE component, which was subsequently allowed through by the Authority in its determination on CPGCL's review motion, dated 28th July 2021.

40. In the present economic scenario and the GoP's financial constraints, CPGCL will be heavily dependent on the IRR component of its tariff to finance the cost of rehabilitation of ST-16. The component that is presently admissible to CPGCL as a part of its tariff is insufficient for this purpose, and is far below the industry-standard.

41. In the 2017 Tariff, the Authority, after comprehensively examining the costs associated with construction of the 747MW CCPP, allowed CPGCL an IRR of 15%, against 16% claimed by CPGCL. CPGCL would accordingly request that the **IRR of 15%** (*not RoE of 15%*), which was allowed by the Authority in the 2017 Tariff, may kindly be restored.

42. In this regard, CPGCL would like to apprise the Authority that it is in the process of seeking the Federal Government's concurrence to this, since the request for reduction in IRR which was made by CPGCL to the Authority in 2020, was based on the directions contained in the Power Division's letter dated 6th October 2020, which in turn referred to a decision of the Cabinet Committee on Energy dated 27th August 2020. Thus,

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[10] Since CPGCL is in the process of acquiring insurance for the 747MW CCPP, the rates being used here are 'reference rates' based on the 2017 Tariff. CPGCL prays that these rates should be replaced with actual cost of insurance, once insurance coverage is duly obtained.

[11] The RoE calculation in this table is also based on the presently allowed RoE as per the determination dated 28th July 2021. In this petition, CPGCL is also seeking a reversion to the originally allowed IRR of 15%.

[12] CPGCL requests that this figure may be adjusted on the basis of adjustments (if any) to other tariff components as prayed for in this petition.

CPGCL prayer in this regard is contingent on the Power Division's concurrence to CPGCL's request.

(b) Adjustment for Partial Load and Degradation

43. In its initial tariff petition for the 747MW CCPP, which was filed on 4th June 2015, CPGCL sought an adjustment of the heat rate of the Plant due to partial loading, in accordance with the calculation method/curve of the OEM of GT-14 and GT-15, i.e., M/s GE. At the time, these were contained in the document GEK 116403 (*updated version*). In the initial tariff determination for the Plant in 2016, the Authority decided that: "*Partial loading shall be dealt in accordance with standard practice and shall be addresses in PPA*", and the same principle was reiterated in the 2017 Tariff.

44. As aforementioned, the PPA between CPGCL and CPPA had already been executed at this point (*in September 2015*). Although the draft Amendment No. 2 to the PPA has already been initialed by the Parties, and submitted to the Authority for its approval, even after its eventual execution by the parties, CPPA's stance in respect of any payment under the PPA is that such payment must be expressly covered under the tariff for the plant in question.

45. CPGCL accordingly prays for the Authority to allow; (i) adjustments to the heat rate of the 747MW CCPP in accordance with the correction curves and other relevant data[13] supplied by the OEM of GT-14 and GT-15; (ii) heat rate adjustment for partial loading; and (iii) heat rate adjustment for degradation as per the data supplied by the OEM.

(c) Start-up Cost

46. In the 2017 Tariff, the Authority allowed CPGCL Rs. 552.58 million as start-up costs during testing and commissioning phase of the Plant, however, since then, CPGCL has been bearing start-up costs of the Plant on its own, without any recovery in its tariff.

47. CPGCL would accordingly request that the start-up costs of the units of the 747 MW CCPP may be included in the O&M costs of these units. In this regard, it may be noted that the CPGCL's PPA with CPPA (*which is being applied, for now, to the 747MW CCPP*) includes provision for start-up cost, however, the computation of these costs is a matter for the tariff, and as per CPPA, the payment of these costs would require the inclusion of start-up costs in CPGCL's tariff.

48. In this regard, it is pertinent that the two other GENCOs, namely Jamshoro Power Company Limited (GENCO-I) and Northern Power Generation Company Limited (GENCO-III) have already been allowed start-up costs of their units vide the Authority's determinations dated 21st September 2022. For this purpose, the Authority directed CPPA to review the costs submitted by these GENCOs and to carry out its due diligence, and allowed the costs determined by CPPA to these GENCOs.

49. CPGCL's calculation of the start-up costs of the units of the 747MW CCPP is as follows:

[13] The correction curves and relevant data is attached as **Annex-H**.

Table 5: Start-Up Costs for Gas Turbines, GT-14 & GT-15 (*Fig: Pak Rs.*)

Mode of Start-up	Fuel Consumption				Cost of Steam Source (Rs.)	Auxiliary Used in Start-Up (KWh)	Cost of Auxiliary Used (Rs.)	Total Start-up Cost (Rs.)
	Natural Gas Consumption	CV	Heat Input	Cost of Natural Gas (Rs.)				
Open Cycle (60 mins)	1 MMCFT	820 BTU/CFT	820 MMBTU	861,000	Nil	1,500	17,962	878,962
Cost of Natural Gas:	Rs. 1,050/MMBTU							
Cost of Auxiliary Power	Rs. 11.9745/KWh							

Note: Auxiliary Consumption is to be taken from the auxiliary energy meters of both Gas Turbines.

Table 6: Start-Up Costs for Steam Turbine, ST-16 (*Fig: Pak Rs.*)

Mode of Start-up	Cost of Steam Source (Rs.)	Auxiliary Used in Start-Up (KWh)	Cost of Auxiliary Used (Rs.)	Total Start-up Cost (Rs.)
Hot (100 mins)	77,000	39,425	472,095	549,095
Warm (360 mins)	77,000	141,930	1,699,541	1,776,541
Cold (660 mins)	77,000	260,205	3,115,825	3,192,825
Cost of Demineralized Water	Rs. 50/M. Ton			
Cost of Auxiliary Power	Rs. 11.9745/KWh			

III. CONCLUSION

50. The present scenario, in which the Petitioner is being asked by NPCC to operate the 747MW CCPP in open-cycle mode with no capacity payments, is unsustainable and forces CPGCL to operate the Plant at a huge loss. Eventually, CPGCL will have no option but to shut down the remaining units of the Plant until ST-16 is rehabilitated and the Plant is restored as a combined-cycle unit. This scenario, as aforementioned, will deprive the system of cheap electricity produced from indigenous gas and will have an impact on the stability and the north-south connectivity of the national grid. The Authority is requested to keep these considerations in view when deciding this petition.

51. It may be noted however that even at the aforementioned rates proposed by CPGCL, the total per-unit price from the 747MW CCPP shall be highly competitive when compared to other plants on the economic merit order. If the proposed take-and-pay tariff is not allowed and CPGCL is forced to shut down the Plant till the rehabilitation of ST-16, NPCC will be required to issue despatch to the RLNG or imported coal-based plants falling immediately below 747MW CCPP (open-cycle) on the economic merit order, which, as on 1st February 2024, have per unit prices ranging between 22.36189 (*for NPPMC, Haveli Bahadur Shah plant*) and Rs. 30.53500 (*for Rousch Power plant*). Thus, the proposed tariff is in the best interest of the consumers as well.

52. The Authority has in the past already allowed the Petitioner an open-cycle operations tariff, clearly indicating the Petitioner's intention to provide electricity to the grid with maximum flexibility, including in those times when combined-cycle operations were unavailable due to routine technical reasons.

F/A-5

V. PRAYER

53. In view of the foregoing, it is humbly prayed that the Authority may kindly grant the following:

(i) Allow the Petitioner an open-cycle tariff with effect from July 2022 on a **'take-and-pay'** basis, with payment of the capacity purchase price and the energy purchase price at the rates proposed in **para-38** of the petition. This tariff should be applicable whenever the System Operator requires CPGCL to operate the Plant in open-cycle mode. Furthermore, the capacity purchase price in such circumstances should be paid for the full available capacity of the Plant irrespective of the System Operator's despatch instruction being for partial or full load of the Plant.

(ii) The proposed tariff should be allowed with effect from **July 2022**, i.e., from the date when ST-16 became unavailable, since CPGCL has been operating the Plant in open-cycle mode since then, at NPCC's instructions.

(iii) The IRR of 15% for the 747MMW CCPP, which was allowed in the 2017 Tariff may kindly be restored, subject to concurrence of the Power Division;

(iv) CPGCL may be allowed adjustment of the heat rate of the 747MMW CCPP for partial loading, degradation, and other correction factors as per the curves and data provided by the OEM of GT-14 and GT-15;

(v) CPGCL may be allowed actual start-up costs for the 747MMW CCPP at the rates proposed in **para-49** of the petition, or at such other rates as may be fairly determined by CPPA; and

(vi) Any other better relief, which the Authority may consider appropriate in the circumstances may kindly be granted.

Islamabad, 26th February 2024

Petitioner
Central Power Generation Company Limited
through

Junaid Ahmed Baig

Engr. Junaid Ahmed Baig
Chief Executive Officer / Authorized Representative

F/B

GHC

CENTRAL POWER GENERATION CO. LTD.

(GENCO-II)

0722 – 679088
0722 – 679085
genco_guddu@yahoo.com

OFFICE OF THE
CHIEF EXECUTIVE OFFICER

No. CPGCL/CEO/24/2384-88

TPS Guddu, the 15th March 2024

For information
- DRO-I
Copy to
- ADG(CT)
M.F

cc. Chairman
- M(Tech)
- M(Fin)
- M(Trf)
- M(Law)

Masroor Khan,
Director (NEPRA),
National Electric Power Regulatory Authority,
NEPRA Tower, Ataturk Avenue (East),
Sector G-5/1, Islamabad.

Div(Tech)

Subject: **TARIFF MODIFICATION PETITION FILED BY CENTRAL POWER GENERATION COMPANY LIMITED**

With reference to your office letter No. NEPRA/R/TRF-100/CPGCL/3208 dated 04.03.2024, enclosed please find herewith the requisite information on specified Forms 01 to 15, as desired. Thank you for your attention to this matter. Hopefully the information provided meets your requirements. Looking forward to any feedback or additional information you may need.

DA / As Above

Chief Executive Officer

Copy to:

- Chief Engineer / T.D, CPGCL GENCO-II, TPS Guddu.
- Chief Financial Officer, CPGCL GENCO-II, TPS Guddu.
- Manager (MIS), CPGCL GENCO-II, TPS Guddu.
- Plant Manager-V, CPGCL GENCO-II, TPS Guddu.

REGISTRAR OFFICE
Dated 18.3.24
3021

Form 1 - General Information of the Power Project

General Information of the Power Plant

Name of the Generation Company	
Name of the Power Station	747MW, Combined Cycle Power Plant, Guddu
Installed Capacity ISO	776.70MW
Installed under Policy	2002
Project Type	Public
Executing Agency	Central Power Generation Company Limited (CPGCL)
LOI Details	Issued by CPGCL
Basis	BOO
Location (Region, District, Province):	Guddu District Kashmore, Sindh
Type of Tariff	Tariff Modification Petition
NEPRA's Applicable Rules / Regulations	Tariff Standard Rules
Type of Technology•.	Thermal
Characteristic of Plant:	Combined Cycle
Other Characteristic of Plant: (Boiler Type)	Subcritical boiler
Other Characteristic of Plant: (Turbine ype)	Condensing
Fuel Type	Gas / HSD
Site Specific Features:	Near to Load centre
Special Technological Features:	General Electric Model:PG9351FA (For GT) and LN260-11.45/2.55/0.47/560/560/305 (For ST)
Environmental related Features:	National Envirenmental Quality Standard (NEQS)
Contract Type	Take or Pay
Power Purchaser	CPPAG
Period of the Contract	30 years
Construction Mode	EPC
Water Anangement	Raw water / Canal Water / Open Cycle & Close Cycle
Generation License	Issued
IA status	Not Applicable
Sovereign Guarantee	Applicable
PPA / EPA status	under process
Fuel Supply Agreement	Gas Supply Agreement attached
Coal Jetty	Not Required
Requested Levelized Tariff Rs/kWh or US Cents/kWh) for a contract period	Rs. 6.1379/kWh (Ref tariff)

Form 2 - Breakup of Project Costs

Description	PKR Million
EPC cost:	**58,636.152**
Offshore EPC Cost	52,868.327
Onshore EPC cost	5,767.826
Non EPC Cost:	**3,186.421**
Gas Booster Compressor Station	1,465.271
Consultancy	284.401
Startup Expenses	552.582
Training & Development (Foreign Currency Payment)	307.362
Administrative, Salaries & Wages	48.480
Land Cost	-
Other Miscellaneous	125.185
Construction of Additional Culvert	403.140
Custom duties and Cess	**2,420.360**
CAPEX	**11,175.572**
Financing Fees & Charges	1,141.276
Interest During Construction	6,161.775
Sinosure Fees	3,872.521
DSRA**	-
Total Project Cost	**75,418.505**
Total Project cost MUSD / MW	**1.0066**
* Export Credit Agency	M/s Export-Import Bank of China M/s Hongkong Shanghai Banking Corporation Limited M/s HSBC Bank Middle East Limited
** Debt Servicing Reserve Account	

Form 3 — Breakup of Capital Costs for Coal, RFO, Gas, Bagasse, Biomass, Solid Waste and Nuclear Fuel based Projects

Brief Description	Book Value Rs. Million
Building & Civil Works on Freehold Land.	**6,160.901**
Buildings and Civil Works on Freehold Land Office (01-02-01)	**3,523.755**
Machine hall body	332.285
foundation treatment	29.906
foundation work	43.197
superstructure	103.008
Operation floor	39.874
ground and undergroud facility	29.906
roof structure	19.937
cladding and architechtural work	26.583
water supply and drainage	9.969
ventilation and air conditioning	16.614
lighting	13.291
GTG foundation	110.762
foundation base treatment	12.184
excavation	8.861
foundation structure	79.748
backfilling	9.969
Transformer foundation	110.762
foundation base treatment	11.076
excavation	8.861
foundation structure	80.856
backfilling	9.969
foundation base treatment	35.311
excavation	19.617
foundation and foundation beam	27.464
backfilling	15.694
superstructure	145.166
roof structure	31.387
cladding and architechtural work	58.851
door and window	7.847
flooring	27.464
roop top and suspended ceiling	23.540
water supply and drainage	41.850
ventilation and air conditioning	62.774
lighting	26.156
foundation base treatment	14.051
excavation	19.319
foundation structure	114.160
backfilling	21.076
anti-corrosion of foundation	7.025
foundation base treatment	1.287
excavation	0.966
foundation structure	3.540
backfilling	1.127
superstructure	4.184
roof structure	0.644
flooring	0.805
cladding and architechtural work	1.127
door and window	0.322
equipment foundation	2.092
excavation	37.083
foundation and foundation beam	58.273
backfilling	42.380
superstructure	121.843
roof structure	26.488
cladding and architechtural work	68.868
ground and undergroud facility	58.273

Brief Description	Book Value Rs. Million
door and window	10.595
flooring	31.785
roof top and suspended ceiling	21.190
equipment foundation	52.975
Plant storm water piping	56.735
excavation	12.482
pipe installation	21.559
inspection well	8.510
backfilling	14.184
Plant sewage water piping	56.735
excavation	12.482
pipe installation	21.559
inspection well	8.510
backfilling	14.184
Machine hall building water supply and drainage, ventilation and AC	53.443
Central control building water supply and drainage, ventilation and AC	12.758
GTG gas house HVAC	2.552
Pressurizing station HVAC	1.701
DG building HVAC	1.609
Workshop HVAC	2.039
Store HVAC	1.363
Admin HVAC	5.195
Switchyard HVAC	2.552
laboratory HVAC	1.841
Fabrication yard	60.576
Site laboratory	24.230
Contruction power supply	6.058
Construction water supply	6.058
Living camp water supply	6.058
Temporary road access and maintenance	12.115
Drainage	6.058
Steam turbine body	95.492
Foundation base treatment	4.775
excavation	4.775
individual foundation and foundation beam	6.684
backfilling	5.730
machine hall steel structure	18.143
roofing	3.820
operation floor	10.504
ground and underground facility	14.324
flooring	8.594
cladding and architechtural works	7.639
door and window	5.730
water supply and drainage, ventilation , air conditioning and lighting	4.775
steam turbine pedestal	51.039
foundation treatment	5.104
excavation	4.083
substructure	13.780
backfilling	4.083
Superstructure	22.967
gouting of equipment foundation	1.021
Transformer foundation	18.111
Foundation base treatment	1.630
excavation	1.811
foundation structure	12.677
backfilling	1.992
Foundation base treatment	8.395
Earthwork	16.790
Foundation works	15.857
Superstructure	32.646
roofing	3.731

Brief Description	Book Value Rs. Million
cladding and architechtural works	7.462
door and window	1.866
water supply and drainage, ventilation , air conditioning and lighting	6.529
Foundation base treatment	0.813
Earthwork	0.697
treatment building structure	6.387
outdoor sediment pond	1.393
filtration pond	1.393
water tank foundation	0.581
trench	0.348
CW make up water pipe	3.037
Foundation base treatment	0.942
excavation	0.456
pipe installation	1.093
backfilling	0.547
Sewage water treatment station	4.252
Foundation base treatment	0.553
Earthwork	0.723
sediment pond	1.148
treatment building structure	1.191
trench	0.468
boundary wall and gate	0.170
CW pump house	4.860
Foundation base treatment	0.437
excavation	0.535
foundation and water pond	1.604
Superstructure	1.021
roofing	0.389
cladding and architechtural works	0.292
door and window	0.243
gound floor works	0.292
trench	0.049
Foundation base treatment	21.325
excavation	14.217
boiler foundation	130.322
boiler auxiliary equipment foundation	28.434
backfilling	16.586
operation floor	11.847
lighting	14.217
chemical water building	8.597
foundation base treatment	1.118
Earthwork	1.375
lab foundation	1.032
lab structure	1.547
chemical house	0.602
trench	0.430
water pond	1.891
water supply and drainage, ventilation , air conditioning and lighting	0.602
Start up boiler house	6.448
excavation	0.387
individual foundation and foundation beam	0.516
backfilling	0.451
Superstructure	1.354
roofing	0.258
gound and underground facility	0.258
cladding and architechtural works	0.580
door and window	0.258
water supply and drainage, ventilation , air conditioning and lighting	0.451
boiler foundation	1.741
other auxiliary equipment foundation, pedestal and trench	0.193
hot water house	1.290

Brief Description	Book Value Rs. Million
Earthwork	0.245
Foundation works	0.219
Superstructure	0.709
ground floor works	0.116
Compressor house	2.149
Earthwork	0.473
Foundation works	0.451
Superstructure	0.795
roofing	0.279
ground floor works	0.150
storm water pump house	3.009
Foundation base treatment	0.421
Earthwork	0.572
foundation and rain water drain trap	1.354
Superstructure	0.602
lighting	0.060
	-
Buildings and Civil Works on Freehold Land Store House (01-02-02)	**224.786**
maintenance house	16.859
foundation base treatment	1.349
excavation	1.180
foundation structure	2.192
backfilling	1.517
superstructure	4.889
roof structure	1.012
flooring	1.349
cladding and architechtural work	1.517
door and window	0.337
water supply and drainage, ventilation, air conditioning and lighting	1.012
equipment foundation	0.506
warehouse	11.239
excavation	0.899
foundation structure	2.135
backfilling	1.124
superstructure	3.934
roof structure	0.787
flooring	0.674
cladding and architechtural work	1.236
door and window	0.450
hydrogen generation station	22.479
excavation	2.473
backfilling	2.922
tank foundation	4.945
pipe rack	2.473
trench	2.023
auxiliary structure	6.294
boundary wall and gate	1.349
firefighting (plant firefighting pipe and hydrant)	11.239
earthwork	2.360
plant firefighting water pipe	5.170
hydrant	2.473
inspection well	1.236
administration building	33.718
foundation base treatment	2.360
excavation	1.349
foundation and foundation beam	3.709
backfilling	1.686
superstructure	13.824
roof structure	1.012
cladding and architechtural work	2.023
door and window	0.674

Brief Description	Book Value Rs. Million
flooring	3.035
roof top and suspended ceiling	1.012
water supply and drainage, ventilation, air conditioning and lighting	3.035
guard structure(boundary wall, guard room and watch tower, etc.)	5.620
guard room	1.686
plant boundary wall	2.529
gate	1.124
watch tower	0.281
sewage water treatment station	5.620
earthwork	1.180
sediment pond	1.236
treatment room	1.686
trench	0.787
boundary wall and gate	0.731
garage	5.620
leveling and grading	0.674
ground hardening	1.967
vehicle shelter	2.978
	-
Buildings and Civil Works on Freehold Land Other Building (Operating) (01-02-03)	**2,412.360**
Survey works	30.861
Soil investigation	97.728
Site clearance/demolishing	38.577
leveling and grading	74.582
landscaping	15.431
Living camp	168.783
Temporay site office	127.866
Lighting and fencing boundary wall at construction site and living camp	40.917
Parking area	20.459
Temporary communication facility	15.344
Material warehouse	112.522
DG building	15.344
Removal of temporary facilities	10.229
foundation base treatment	5.367
excavation	4.025
foundation structure	19.454
backfilling	4.696
superstructure	30.187
water supply and drainage, ventilation, air conditioning and lighting	3.354
foundation of booster station equipment	28.750
foundation base treatment	24.597
excavation of oil tank foundation	29.069
oil tank foundation	91.679
backfilling	31.305
auxiliary structure at oil tank area	8.944
fuel oil pump house	20.125
fuel oil unloading pump house	17.889
oil pipe rack	11.520
construction of intake air filter house supporting steel structure	139.411
Roads	109.802
crash barriers	27.451
foundation base treatment	70.275
excavation	83.052
concrete structure	383.316
backfilling	89.440
connection with existing culvert	12.777
removal of existing culvert	19.759
Water intake	59.125
water intake room	11.262
suphonic well	28.155

Brief Description	Book Value Rs. Million
Foundation base treatment	5.068
excavation	0.845
concrete structure	15.485
Foundation base treatment	11.825
excavation	13.514
backfilling	15.203
cooling tower shell	67.571
cooling tower column and foundation	13.514
water spay and distribution device	11.825
auxiliary structures	14.077
electric distribution room	5.631
road	4.927
boundary wall and gate	3.519
Roads, pavedareas, crash barriers etc, as specified in Vol-iii	95.931
	-
Power Generation Plant Assets	**71,102.064**
Boiler Plant Equipment (01-04-01)	**17,058.890**
A2: HRSGs AND STEAM TURBINE GENERATOR	**17,058.890**
Embedded Parts of HRSGs	22.858
HRSG pressure parts (drums, economizers, evaporators, superheaters, reheaters etc.)	5,109.337
Steam and feedwater piping system	974.717
Exhaust system (ducts, expansion joints, silencer, chimney etc.)	806.737
Steel structures	1,210.106
Piping system / valves and accessories	806.737
Painting and corrosion materials, insulation materials, welding materials, firefighting materials, etc.	806.737
Errection & Commission	2,025.744
Piping system	652.113
Equipments of condensate water system	79.507
Equipment of vacuum system	40.337
Equipments of feedwater system	121.011
Errection & Commission	1,044.634
Cooling towers and accessories	521.622
Auxiliariy cooling water system including pumps, valves	80.674
Closed cycle water system including pumps	26.891
Errection & Commission	296.663
Open cycle cooling water system including pumps and valves	401.557
Errection & Commission	276.023
Raw water treatment system	388.953
Errection & Commission	135.749
Water treatment plant equipments	499.919
Instrumentation and control along with ACS network	80.674
Errection & Commission	390.801
Chemical dosing system	104.807
Errection & Commission	46.231
Boiler feed water pumps crane and other lifting equipments	87.199
Errection & Commission	20.553
	-
Turbogenerator Units (01-04-03)	**34,013.634**
A1: GAS TURBINE GENERATORS	**25,637.511**
Two gas turbine units with accessories and auxiliaries	14,683.813
Air inlet systems incl. filter house, evaporative cooling system, silencer, ducting, compressed air supply etc.	376.965
Exhaust system including duct, gas flow di-verter, blind plate, stack etc.	269.261
Gas turbine house including steel structures, steel sheets, etc.	269.261
Errection & Commission	1,539.467
HSD storage tanks and auxiliaries	471.206
Fuel oil pumps and pipe system	51.833
Oilwater seperation system	9.424
EOT crane	3.325

Brief Description	Book Value Rs. Million
Errection & Commission	469.577
Fuel oil forwarding system	150.021
Errection & Commission	275.921
Inert gas system	115.913
Gas fuel treatment and pressure regulating system	289.782
Vent/flare system	79.031
Gas fuel heating system	201.946
Valves / piping and accessories	42.150
Errection & Commission	328.750
Hydrogen generation and storage system	403.891
GT 1# generator and auxiliaries (including CO2/H2 supplying manifold)	2,023.786
GT 2# generator and auxiliaries (including CO2/H2 supplying manifold)	2,023.786
Errection & Commission	311.845
Cooling system for GT 1# generator	99.316
Cooling system for GT 2# generator	99.315
Errection & Commission	14.809
Neutral point equipment	36.853
Busbar systems including air pressure maintenance system	471.206
Two generator circuit breakers	471.206
Errection & Commission	53.852
	-
A2: HRSGs AND STEAM TURBINE GENERATOR	**8,376.123**
Steam Turbine and auxiliaries including lub oil system	3,126.961
Condenser and auxiliaries	510.934
Bypass steam reducing stations	294.459
Steam turbine house including steel structures, steel sheets, etc.	955.984
Valves & piping	194.962
Errection & Commission	553.575
Steam turbine hall over head crane	59.161
One generator for steam turbine	1,850.137
Auxiliaries of generator	2.689
Errection & Commission	163.529
One lot of cooling system for Generator	99.038
Errection & Commission	7.477
Neutral point equipment	5.490
Bus bar system	255.467
Generator circuit breaker	268.912
Errection & Commission	27.347
	-
Accesory Electric Equipment (01-04-04)	**17,379.880**
A1: GAS TURBINE GENERATORS	**11,465.879**
Electrical equipment for fuel oil system	214.062
Cables	565.448
Cable trays	80.778
Cable accessories	1.020
Errection & Commission	134.077
Instrumentation and control equipments	224.259
Control cables	126.553
Control cable trays	25.580
Errection & Commission	32.621
Potable water system	1.547
CB/DS	571.775
CT/CVT/SA/Line trap	156.777
Disel Engine Generator	73.777
Conductor/insulator	92.222
Steel structures	403.891
Protection system	5.651
DC supply system	53.852
UPS	40.389
Control equipments and auxiliaries	249.066
Substation auxiliary supply system	27.667

Brief Description	Book Value Rs. Million
Errection & Commission	272.157
Gen. step-up transformer and auxiliaries for generator 1#	1,001.650
Gen. step-up transformer and auxiliaries for generator 2#	1,001.650
Neutral point equipment	10.164
Errection & Commission	98.341
Main auxiliary transformer Unit 1#	146.236
Main auxiliary transformer Unit 2#	146.236
Errection & Commission	8.086
One lot of unit auxiliary transformers	78.086
Miscellaneous of unit auxiliary transformers	0.601
Errection & Commission	2.227
One lot of common auxiliary transformers	39.043
Miscellaneous of common auxiliary transformers	0.602
Errection & Commission	2.227
M.V. power distribution system	750.720
Errection & Commission	12.652
L.V. power panels	673.152
Terminal boxes and subsidiary distributions	8.848
Errection & Commission	23.151
Rectifiers	57.064
Batteries	32.608
Inverters	65.216
220 V DC switchgear	3.098
230 Safe AC switchgear	3.261
Miscellaneous of rectifiers, batteries and inverters	1.793
Errection & Commission	52.613
M.V. cables	463.263
L.V. cables	772.105
Control and instrumentation cables	308.842
Cable trays	209.056
Cable termination and accessories	6.732
Errection & Commission	1,192.392
Electrical protection and control equipments for 500kv substation	349.437
Electrical protection and control equipments for generator stepup transformer	135.010
Protection and control system for unit auxiliary transformer	87.359
Protection and control system for cubicle etc.	222.369
Errection & Commission	17.289
Emergency diesel generator set with accessories	97.203
Power and control panel of EDG	1.656
Distribution system for EDG	1.346
Errection & Commission	29.325
	-
A2: HRSGs AND STEAM TURBINE GENERATOR	**5,914.001**
500 kV switchyard connection equipments	108.425
Errection & Commission	85.735
One Gen. step up transformer	969.430
Auxiliaries of transformer	2.448
Errection & Commission	30.980
M.V. power distribution system	146.872
Errection & Commission	7.971
L.V. power system	47.042
Terminal boxes and subsidiary distributions	26.891
Errection & Commission	31.230
Rectifiers, batteries and inverters	18.261
DC & AC distribution system	2.017
Errection & Commission	16.574
M.V. cables and 6.6 kV busbar interconnections	223.870
L.V. cables	373.116
Control and instrumentation cables	149.246
Cable trays	107.565
Accessories of cable system	39.367

Brief Description	Book Value Rs. Million
Errection & Commission	924.828
Electrical protection and control equipments for 500kv substation	137.113
Electrical protection and control equipments for generator stepup transformer	52.976
Protection and control system for unit auxiliary transformer	34.278
Protection and control system cubicle etc.	87.254
Errection & Commission	10.893
Instrumentation and control equipment	739.811
Errection & Commission	1,539.808
	-
Misc.Power Plant Equipment (01-04-05)	**2,649.659**
A1: GAS TURBINE GENERATORS	**1,860.749**
Fire fighting including fire detection and alarm systems	477.938
Laboratory	80.778
Cranes, hoists & lifting equipment including gas turbine overhead traveling crane, mobile crane, emergency diesel generator room crane etc. & Vehicles including electric and diesel engine driven fork lift trucks	188.483
Vehicles including first aid ambulance vehicle, fire fighting vehicles	40.389
Workshop and store equipment	121.167
Waste water treatment system	107.704
Errection & Commission	253.303
Lighting distributions	68.409
Lighting fixtures	54.727
Miscellaneous of lighting system	13.682
Errection & Commission	4.908
Earthing system equipments and auxiliaries	73.691
Lightning protection equipments and auxiliaries	49.127
Errection & Commission	56.107
Consumables	23.291
Balance of deliveries and services	0.673
Heat and ventilation equipments	60.584
Air conditioning equipments	185.790
	-
A2: HRSGs AND STEAM TURBINE GENERATOR	**788.910**
Compressors and accessories	129.706
Dryers	23.583
Air receivers	23.583
Pipes and valves	58.957
Errection & Commission	21.663
Lighting distributions	30.752
Lighting fixtures	24.602
Miscellaneous of lighting system	6.150
Errection & Commission	99.974
Earthing system equipments and auxiliaries	111.576
Lightning protection equipments and auxiliaries	74.384
Errection & Commission	141.399
Consumables	41.910
Balance of deliveries and services	0.672
	-
General Plant & Assest.	**922.334**
Laboratory Equipment (01-07-06)	**350.267**
A2: HRSGs AND STEAM TURBINE GENERATOR	**350.267**
NaOCl sodium hypocloride system for the c/w system and the freshwater system	154.467
Errection & Commission	53.246
Sampling system	101.984
Errection & Commission	40.570
	-
Communication Equipment (01-07-08)	**572.067**
A1: GAS TURBINE GENERATORS	**394.481**
Telecommunication system	176.673
Instrumentation and control equipments	134.630
Errection & Commission	83.177

Brief Description	Book Value Rs. Million
A2: HRSGs AND STEAM TURBINE GENERATOR	**177.586**
Telecommunication and clock system	157.481
Errection & Commission	20.105
Total: -	**78,185.298**

Form 4 - Breakup of Capital Costs for Coal, RFO, Gas, Bagasse, Biomass, Solid Waste and Nuclear Fuel based Projects

Items	PKR Million
Gas Booster Compressor Station	1,465.271
Consultancy	284.401
Startup Expenses	552.582
Training & Development (Foreign Currency Payment)	307.362
Administrative, Salaries & Wages	48.480
Land Cost	-
Other Miscellaneous	125.185
Construction of Additional Culvert	403.140

Form 5 - Selection of EPC Contractor / Selection of O&M Contractor

Applicable Framework (please underline or circle)	NEPRA (Selection of Engineering, Procurement and Construction Contractor by Independent Power Producers) Guidelines, 2017 (As amended from time to time) NEPRA Competitive Bidding Tariff (Approval Procedure) Regulations, 2017 (As amended from time to time)
Name / No of Construction / Supply / Service Package	**EPC Contract Detail**
Scope of works	Design, Supply, Errection/Installation, Testing and Commissioning of 747MW (Gross), Gas Turbine Combined Cycle Power Plant at Guddu
awarded through ICB or not?	Yes
No. Of bids received	2
Date of award	01-07-2009
Date of start of work	27-08-2010
Date of completion of work	31-12-2014
Value of award	Rs. 59,775.41 Million

Form 6 — Financial Assumptions

Total Project Cost	**Million PKR**
Capital Structure	
Debt	53,731.614
Equity	21,686.891
Debt % of Total Project Cost	71%
equity % of Total Project Cost	29%
Debt (Foreign Component)	45,858.217
Debt (Local Component)	7,873.397
equity (Foreign component)	-
equity (Local Component)	21,686.891
loans etc.	Foreign Loan USD 463.827 Million Local Loan PKR 7,873 Million
construction Period	36 months
grace Period — Years	5 year for Local Loans 3 year for Foreign Loan
Loan Repayment Period - Years	20 year for Local loans 9 years for Foreign Loan
loan Repayment Terms and Details	
return on Equity	15%
insurance cost (As % of Total EPC)	1% of EPC Cost
Exchange Rate for US $ or other relevent currencies	100.3 reference rate
KIBOR	7%
Spread over KIBOR	2%
LIBOR	0.3399%
Spread over LIBOR	2.4%
Discount Rate	-
Land Required for Power Plant	55 Acres
Indexation on Tariff Component	Attached
Expected Financial Close	17-12-2014
RCOD	-
COD	17-12-2014
Sinosure Fees (Rs. Million)	3,872.521

Detail of Indexation Allowed by NEPRA

Tariff Components	Adjustment/Indexation
Capacity Charges (Rs./kW/h):	
Fixed O&M (Local)	CPI (General)
Fixed O&M (Foreign)	US CPI & Rs./US$
Insurance	Actual with subject to maximum limit
Cost of Working Capital	KIBOR & Fuel Price
ROE	Rs. /US$
Local Debt Servicing	
Foreign Debt Servicing (Average)*	LIBOR & Rs./US$
Total	
Energy Charge Gas (Rs./kWh):	
Fuel cost Component	Gas Price notified by the relevant Authority
Variable O&M (Foreign)	US CPI & Rs./US$
Total	
Energy Charge HSD (Rs./kWh):	
Fuel Cost Component	HSD Price notified by the relevant Authority

Form 7 - Technical Assumptions

Capacity Calculations	
Gross Capacity (ISO)	776.7MW
Gross Capacity (RSC)	747MW
Auxiliary Load (RSC)	26.21MW
Auxiliary Load (RSC)	3.51%
Net Capacity (RSC)	720.79MW
Annual Net Generation at 100% Plant Factor (GWh)	6,314
Efficiency Calculations: At ISO / MCR (As per OEM) at Full Load	
Thermal Efficiency Gross LHV ISO/MCR	56.7%
Heat Rate Gross LHV ISO/MCR	6018 BTU/kWh
Thermal Efficiency Net LHV ISO/MCR	55.18%
Heat Rate Net LHV ISO/MCR	6183 BTU/kWh
Efficiency Calculations: At RSC (Guaranteed by EPC Contractor) at full load (With and Without Correction Factors)	
Thermal Efficiency Gross LHV RSC	56.46%
Heat Rate Gross LHV RSC	6043 BTU/kWh
Thermal Efficiency Net LHV RSC	54.48%
Heat Rate Net LHV RSC	6263 BTU/kWh
Partial Load Curves v/s Heat Rate (Correction factors)	Attached
Degradation due to aging v/s Heat Rate (correction factors)	Attached
Efficiency Sharing Mechanism	No
Misc. Information	
Plant Availability	92%
Schedule Outage	**For GTs:** 1. Off Compressor washing: 20 days/year 2. Air inlet filter replacement: 5 days/year 3. HGPI: 30 days after 32000 FFH 4. MI: 35 days after 64000 FFH **For ST:** 1. MI: 60 days after 50000 EOH 2. Condenser and cooling tower cooling: 29 days/year
Forced Outage	29 days/year
Maintainance Cycle	32000 FFH for Monor Inspection and 64000 FFH for Major Inspection
Start/Stops	NA
Plant Factor	92%
Project Useful Life	30 years
Generation Voltage	GT : 15KV and ST : 20KV
Interconnection Voltage Level	500KV
Grid for Interconnection	500KV TPS Guddu
Original Equipment Manufacturer (OEM) (Name of OEM Manufacturer)	GT : General Electric, USA ST: Harbin Electric International (HEI), China
Owners Engineer	M/s NESPAK
EPC Contractor	M/s HEI, China
Plant Machinery	New
Status of Studies	Approved

Fuel Detail	
Calorific Value of Fuel (RFO / Coal / Gas / Bagasse / Biomass / Solid Waste / Nuclear Fuel) LHV/HHV	830 BTU/CFT (Gas)
Conversion Factor CFT / KG	42 CFT/KG
HHV-LHV Factor	1.1076
Fuel Price HHV (Gas)	Rs.588.23/MMBTU
Fuel Price LHV (Gas)	NA
Specific fuel Consumption (Gross / Net)	306 / 317 KG/KWH
Inland Tranportation of fuel	Through Gas pipeline
Adjustment in CV for RFO based projects only	NA
Interconnectivity	
Interconnection Arrangement	500KV Switchyard

Form 8 — Plant Characteristics for Coal, RFO, GAS, Bagasse, Biomass, Solid Waste and Nuclear Fuel based project

Name Of the Company	**Central Power Generation Company Ltd.**
Name of the Power Station	**747 MW TPS Guddu**
Unit(s) Block(s) Parameters	**Combined Cycle Steam Turbine - 16**
Name of Boiler / HRSG Manufacturer	Nooter / Eriksen, Hanzhou Boiler Group, China
Name of Turbine Generator Manufacturer	Harbin Electric Co., China
Main Steam Pressure at Turbine Inlet (Bar) abs 1	114.5 Bar
Main Steam Temperature at Turbine Inlet (deg C) 1	560.6 Deg C
Main Steam flow at Turbine inlet under MCR condition (tons/hr)2	278.992 T/hr
Main Steam flow at Turbine inlet under VWO condition (tons/hr)2	278.992 T/hr
Reheat Steam Pressure at Turbine Inlet (Bar) abs 1	25.4 Bar
Reheat Steam Temperatue at Turbine Inlet (degC) 1	560 Deg C
Units gross electrical output under MCR / rated condition (MW)2	261 MW
Units gross electrical output under turbine VWO condition (MW)2	261 MW
Design Condenser Back Pressure ((kPa)(a))	6.4/12 kPa
Design Cooling Water Temperature (deg C)	30 DegC
Guaranteed Design Gross Turbine Cycle Heat Rate (Btu/kWh)3	6263 Btu/kWh
Guaranteed Design Gross Turbine Cycle Efficiency (%)	54.48%
Steam Flow at Super heater outlet under MCR condition (tons/hr)	278.992 T/Hr
Steam Pressure at Super heater outlet under MCR condition (Bar) abs	119.2 Bar
Steam Temperature at Super heater outlet under MCR condition (deg C)	563.6 Deg C
Steam Temperature at Reheater outlet under MCR condition (deg C)	563 Deg C
Type of Cooling Tower	Induced Draft Cooling
Type of Cooling System4	Closed Circuit Cooling & Once through cooling
Type of Boiler Feed pump5	Multi Stage HP Centrifugal Motor Driven Pump
Special Features/Site Specific Features6	Vicinity to River / Canal
Special Technological Features7	9FA Class GT with Advance Gas Path feature
Environmental Regulation related Features8	National Environment Quality Standard
Any Other Special Features	-
Cooling Method: Dry Cooling / Wet Cooling etc (whichever is applicable)	Wet cooling
Condensate cooling mechanism: Once through / closed loop etc	Closed Loop

1. At Turbine MCR Condition.
2. With 0% (Nil) make up and Design Cooling Water Temperature.
3. At MCR output based on gross generation, 0% (Nil) Makeup and Design Cooling Water Temperature
4. Closed Circuit Cooling, Once through cooling, sea cooling, natural cooling, natural drift cooling, induced draft cooling.
5. Motor driven, Steam turbine driven etc.
6. Any site specific feature such as Vicinity to sea, Intake/Makeup water systems etc. Scrubbers etc, Specify all such
7. Any Special Technological feature like Advanced class FA Technology in Gas Turbines etc.
8. Environmental regulation related features like FGD, ESP etc.

Note I: Heat Balance Diagrams has to be submitted alongwith above information in case of new stations.

Form 9 - Breakup or Annual O&M Charges

NEPRA allowed following Reference Rate on the basis of Quaid-e-Azam Thermal Power Plant (QTPL).

Description	Rate (Rs./kW/h)
Fixed O&M (Local)	0.0627
Fixed O&M (Foreign)	0.1375
Variable O&M (Foreign)	0.2998

Form 10— Calculation or IDC

Calculation or IDC

Debt Amount — USS Million or any Other Currency
KIBOR
Spread over KIBOR
LIBOR / Other
Spread over LIBOR
Total Interest Rate

	Construction Period			Debt			
Year	**1st Year**	**2nd Year**	**3rd Year**	**Principal**	**IDC**	**Fin. Fees**	**DSM**
Local				7,873.397	4,130.054		
Foreign				45,858.217	2,010.844	1,141.276	
Total				**53,731.614**	**6,140.898**	**1,141.276**	
Interest							
Closing Balance							
Opening Balance							
2nd Quarter							
Principal Amount							
Interest							
Closing Balance							
Opening Balance							
3rd Quarter							
Principal Amount							
Interest							
Closing Balance							
Opening Balance							
4th Quarter							
Principal Amount							
Interest							
Closing Balance							
Total Debt Incl. IDC				**53,731.614**	**6,140.898**	**1,141.276**	

Form 10 - Calculation of IDC (Local)

Loan	Principal	IDC	Finance Fees	Total
CDL-1	1,673	1,919		3,593
CDL-2	2,600	1,052		3,652
CDL-3	3,600	1,159		4,759
Total	**7,873**	**4,130**	**-**	**12,003**

Cash Development Loan (CDL) 1				
Loan	PKR 1,673			full
Interest Rate per Annum	13.61%	Interest Rate per Day	0.038%	idc
Grace Period	5	Interest Rate Basis	360	ops
Repayment Period	20	Debt Servicing Period	1	
Loan Tenure	25	Debt Servicing	36 Months	

Start Date	End Date	Days	Opening	Interest
4-Aug-10	30-Jun-11	**327.00**	4,681	**579**
1-Jul-11	30-Apr-12	**300.00**	4,681	**531**
1-May-12	30-Jun-12	**60.00**	5,100	**116**
1-Jul-12	**30-Jun-13**	**360.00**	5,100	**694**
01-Jul-13	03-Aug-13	**33.00**	0	**0**
			IDC	**1,919**

Cash Development Loan (CDL) 2				
Loan	PKR 2,600			full
Interest Rate per Annum	13.61%	Interest Rate per Month	0.038%	idc
Grace Period	5	Interest Rate Basis	360	ops
Repayment Period	20	Debt Servicing Period	1	
Loan Tenure	25	Debt Servicing	36 Months	

Start Date	End Date	Days	Opening	Interest
12-Apr-11	30-Jun-11	79.00	2,531	76
1-Jul-11	30-Apr-12	300.00	2,531	287
1-May-12	30-Jun-12	60.00	2,600	59
01-Jul-12	30-Jun-13	360.00	2,600	354
1-Jul-13	11-Apr-14	281.00	2,600	276
			IDC	**1,052**

Cash Development Loan (CDL) 3				
Loan	PKR 3,600			full
Interest Rate per Annum	12.64%	Interest Rate per Month	0.035%	idc
Grace Period	5	Interest Rate Basis	360	ops
Repayment Period	20	Debt Servicing Period	1	
Loan Tenure	25	Debt Servicing	36 Months	

Start Date	End Date	Days	Opening	Interest
17-May-12	30-Jun-12	30.00	3,600	**38**
1-Jul-12	30-Jun-13	360.00	3,600	**455**
1-Jul-13	30-Jun-14	360.00	3,600	**455**
1-Jul-14	17-Dec-14	167.00	**3,600**	**211**
			IDC	**1,159**

Form 10 - Calculation of IDC (Foreign)

	Drawndown (USD Million)	Drawdown Date as per HSBC LIBOR Documents	Interest Payment Date	Days Outstanding	Applicable LIBOR	Spread/ Margin	Interest Rate	IDC	IDC Payment (USD)	Actual IDC Payment Date	Exchange rate claimed as per UBL Bank statement	IDC Payment in (PKR)
	464.08	23-Dec-11	20-Jun-12	181.00								
1st	183.53	30-Oct-12	**17-Jan-13**	80.00	0.313%	2.40%	2.713250%	1.107				
	38.21	23-Nov-12	**17-Jan-13**	56.00	0.257%	2.40%	2.657000%	0.158	1.264	15-Jan-13	97.54	123.339
2nd	221.74	18-Jan-13	**19-Jul-13**	182.00	0.488%	2.40%	2.887500%	3.237				
	31.99	30-Jan-13	**19-Jul-13**	170.00	0.476%	2.40%	2.875750%	0.434				
	30.00	19-Mar-13	**19-Jul-13**	122.00	0.332%	2.40%	2.732100%	0.278				
	16.90	3-Jun-13	**19-Jul-13**	46.00	0.231%	2.40%	2.630500%	0.057				
	11.91	26-Jun-13	**19-Jul-13**	23.00	0.195%	2.40%	2.595350%	0.020	4.026	15-Jul-13	100.7	405.381
3rd	312.53	19-Jul-13	**21-Jan-14**	186.00	0.400%	2.40%	2.800000%	4.521				
	31.80	21-Aug-13	**21-Jan-14**	153.00	0.350%	2.40%	2.750220%	0.372				
	10.94	5-Sep-13	**21-Jan-14**	138.00	0.329%	2.40%	2.729480%	0.114				
	12.34	5-Dec-13	**21-Jan-14**	47.00	0.210%	2.40%	2.609750%	0.042	5.050	16-Jul-14	105.59	533.182
4th	367.62	22-Jan-14	**21-Jul-14**	181.00	0.335%	2.40%	2.734600%	5.054				
	4.31	12-Feb-14	**21-Jul-14**	159.00	0.306%	2.40%	2.706320%	0.052				
	8.32	12-Jun-14	**21-Jul-14**	39.00	0.192%	2.40%	2.591750%	0.023	5.129	18-Jul-14	99.15	508.564
5th	380.25	21-Jul-14	**17-Dec-14**	150.00	0.3271%	2.40%	2.727100%	4.321				
	12.33	29-Oct-14	**17-Dec-14**	50.00	0.2326%	2.40%	2.632600%	0.045	4.366	20-Jan-15	100.87	440.377
								Total IDC (Foreign)				**2,010.844**

Principal	45,858.217
Finance Fees	1,141.276
Total Debt incl. IDC	**49,010.337**

11 - Calculation of ROE

IRR of 15%				
Year	Equity (USD in Millions)	ROE (USD in Millions)	ROEDC (USD in Millions)	ROE (Rs./kWh)
1	216.220	32.433	6.353	0.6161
2	216.220	32.433	6.353	0.6161
3	216.220	32.433	6.353	0.6161
4	216.220	32.433	6.353	0.6161
5	216.220	32.433	6.353	0.6161
6	216.220	32.433	6.353	0.6161
7	216.220	32.433	6.353	0.6161
8	216.220	32.433	6.353	0.6161
9	216.220	32.433	6.353	0.6161
10	216.220	32.433	6.353	0.6161
11	216.220	32.433	6.353	0.6161
12	216.220	32.433	6.353	0.6161
13	216.220	32.433	6.353	0.6161
14	216.220	32.433	6.353	0.6161
15	216.220	32.433	6.353	0.6161
16	216.220	32.433	6.353	0.6161
17	216.220	32.433	6.353	0.6161
18	216.220	32.433	6.353	0.6161
19	216.220	32.433	6.353	0.6161
20	216.220	32.433	6.353	0.6161
21	216.220	32.433	6.353	0.6161
22	216.220	32.433	6.353	0.6161
23	216.220	32.433	6.353	0.6161
24	216.220	32.433	6.353	0.6161
25	216.220	32.433	6.353	0.6161
26	216.220	32.433	6.353	0.6161
27	216.220	32.433	6.353	0.6161
28	216.220	32.433	6.353	0.6161
29	216.220	32.433	6.353	0.6161
30	216.220	32.433	6.353	0.6161

Note: Eenrgy shall be taken from technical assumptions

Form - 12 Comparison with Similar Technologv National and International Plants

No Power Plant of similar technology i.e. GE Frame 9FA exist in Pakistan.

Comparison with Similar Technology National and International Plants			
Preject Cost Breakup (Million USD) or any other currcacy			
EPC cont			
Offshore EPC Cost			
Onshore EPC Cost			
EPC cost / MW			
Non EPC			
Project Developement & Advisors cost			
Project Management			
O&M Mobilization and Training			
Land Cost			
Security Surveillance			
Insurance during Construction			
Testing and Commissioning			
Custom duties and Cess			
Capital Spres			
One Month Escrow Account (If required)			
Capex			
Financing Fees and Charges			
Interest during construction			
* ECA Premium			
Total Project Cost			
Project Cost / MW			
Fixed O&M			
Variable O&M			
Export Credit Agency etc.			

Form 13 - Working Capital

Working Capital Requirement		
Total Net Capacity	694.25	MW
Hours per Day	24	Hours
Days in a Year	365	Days
Net Annual Generation	6,082	GWh
Net Generation in 7 days	116.63	GWh
Net Generation in 7 days at 60%	69.98	GWh
Heat rate mentioned in EPC Contract	7,482	KJ/ kWh
Conversion Factor KJ/Btu to Btu/kWh	0.9478	KJ to Btu
Heat Rate (LHV)	7,092	Btu/kWh
HSD Price (HHV) Including GST	76.769	Rs./ Liter
CV HSD (LHV)	34,304	BTU/Liter
Fuel Cost Component	**15.8703**	**Rs. / kWh**
Fuel Cost for 7 Day(s)	1,111	Rs.
Base Rate	7%	%
Spread over KIBOR	2%	%
Cost of Working Capital	9%	%
Total cost of Working Capital	99.95	Rs. Millions
Working Capital Component	**0.0158**	**Rs./kW/h**

Form 14 - Debt Servicing (Foreign)

Debt Servicing Schedule (Foreign Loan)

Gross Capacity	747.006	MW	US$/ Rs. Parity	100.3	
Net Capacity	720.791	MW	Debt	463.827	US$ Million
LIBOR	0.34%		Debt in Pak Rupees	46,521.832	Rs. Million
Spread over LIBOR	2.40%				
Total Interest Rate	2.7399%				

Period	Principal Million US$	Principal Repayment Million US$	Interest Million US$	Drawdowns Million US$	Balance Million US$	Debt Service Million US$	Principal Repayment Rs./ kW/h	Interest Rs. kW/h	Debt Servicing Rs./ kW/h
1	392.5779		6.4239	71.2490	463.8268				
1st Year			**6.4239**			-	-	**0.1020**	-
2	463.8268	25.7682	6.2582		438.0587	32.0264			
3	438.0587	25.7682	6.0679		412.2905	31.8360			
2nd Year		**51.5363**	**12.3261**			**63.8624**	**0.8187**	**0.1958**	**1.0145**
4	412.2905	25.7682	5.8364		386.5224	31.6046			
5	386.5224	25.7682	5.3540		360.7542	31.1222			
3rd Year		**51.5363**	**11.1904**			**62.7268**	**0.8187**	**0.1778**	**0.9964**
6	360.7542	25.7682	4.9971		334.9861	30.7652			
7	334.9861	25.7682	4.6401		309.2179	30.4083			
4th Year		**51.5363**	**9.6372**			**61.1735**	**0.8187**	**0.1531**	**0.9717**
8	309.2179	25.7682	4.3067		283.4497	30.0749			
9	283.4497	25.7682	3.9047		257.6816	29.6729			
5th Year		**51.5363**	**8.2114**			**59.7477**	**0.8187**	**0.1304**	**0.9491**
10	257.6816	25.7682	3.5889		231.9134	29.3571			
11	231.9134	25.7682	3.2124		206.1453	28.9806			
6th Year		**51.5363**	**6.8013**			**58.3377**	**0.8187**	**0.1080**	**0.9267**
12	206.1453	25.7682	2.8868		180.3771	28.6550			
13	180.3771	25.7682	2.4848		154.6089	28.2530			
7th Year		**51.5363**	**5.3716**			**56.9080**	**0.8187**	**0.0853**	**0.9040**
14	154.6089	25.7682	2.2004		128.8408	27.9686			
15	128.8408	25.7682	1.7454		103.0726	27.5136			
8th Year		**51.5363**	**3.9459**			**55.4822**	**0.8187**	**0.0627**	**0.8813**
16	103.0726	25.7682	1.4591		77.3045	27.2273			
17	77.3045	25.7682	1.0708		51.5363	26.8390			
9th Year		**51.5363**	**2.5299**			**54.0662**	**0.8187**	**0.0402**	**0.8588**
18	51.5363	25.7682	0.7139		25.7682	26.4820			
19	25.7682	25.7682	0.3569		0.0000	26.1251			
10th Year		**51.5363**	**1.0708**			**52.6071**	**0.8187**	**0.0170**	**0.8357**

747 MW Central Power Generation Company Limited
Debt Servicing Schedule
Cash Development Loan 1

Gross Cap	747.006 MW	Interest Rate	13.61%
Net Capac	720.791 MW	Debt in Pak Rupees	1,673 Rs. Million

Period	Principal Million Rs.	Principal Repayment Million Rs.	Balance Million Rs.	Debt Service Million Rs.	Principal Repayment Rs./ kW/h	Interest Rs. kW/h	Debt Servicing Rs./ kW/h
1	1,673.397		1,673.397			0.0344	
2	1,673.397		1,673.397			0.0344	-
3	1,673.397	19.247	1,654.150	246.996	0.0030	0.0361	0.0391
4	1,654.150	21.866	1,632.284	246.996	0.0035	0.0357	0.0391
5	1,632.284	24.842	1,607.442	246.996	0.0039	0.0352	0.0391
6	1,607.442	28.223	1,579.218	246.996	0.0045	0.0346	0.0391
7	1,579.218	32.065	1,547.154	246.996	0.0051	0.0340	0.0391
8	1,547.154	36.429	1,510.725	246.996	0.0058	0.0333	0.0391
9	1,510.725	41.386	1,469.339	246.996	0.0066	0.0326	0.0391
10	1,469.339	47.019	1,422.320	246.996	0.0074	0.0317	0.0391
11	1,422.320	53.418	1,368.901	246.996	0.0085	0.0307	0.0391
12	1,368.901	60.689	1,308.212	246.996	0.0096	0.0295	0.0391
13	1,308.212	68.948	1,239.264	246.996	0.0109	0.0282	0.0391
14	1,239.264	78.332	1,160.932	246.996	0.0124	0.0267	0.0391
15	1,160.932	88.993	1,071.938	246.996	0.0141	0.0250	0.0391
16	1,071.938	101.105	970.833	246.996	0.0160	0.0231	0.0391
17	970.833	114.866	855.967	246.996	0.0182	0.0209	0.0391
18	855.967	130.499	725.468	246.996	0.0207	0.0185	0.0391
19	725.468	148.260	577.208	246.996	0.0235	0.0156	0.0391
20	577.208	168.438	408.770	246.996	0.0267	0.0124	0.0391
21	408.770	191.363	217.407	246.996	0.0303	0.0088	0.0391
22	217.407	217.407	(0.000)	246.996	0.0344	0.0047	0.0391

747 MW Central Power Generation Company Limited
Debt Servicing Schedule
Cash Development Loan 2

Gross Cap 747.006 MW
Net Capac 720.791 MW

Interest Rate 13.61%
Debt in Pak Ruı 2,600 Rs. Million

Period	Principal Million Rs.	Principal Repayment Million Rs.	Interest Million Rs.	Balance Million Rs.	Debt Servic Million Rs.	Principal Repayment Rs./ kW/h	Interest Rs. kW/h	Debt Servicing Rs./ kW/h
1	2,600.000		215.756	2,600.000			0.0342	
2	2,600.000		215.756	2,600.000			0.0342	
3	2,600.000	29.904	353.860	2,570.096	383.764	0.0047	0.0560	0.0608
4	2,570.096	33.974	349.790	2,536.121	383.764	0.0054	0.0554	0.0608
5	2,536.121	38.598	345.166	2,497.523	383.764	0.0061	0.0547	0.0608
6	2,497.523	43.851	339.913	2,453.672	383.764	0.0069	0.0538	0.0608
7	2,453.672	49.820	333.945	2,403.852	383.764	0.0079	0.0529	0.0608
8	2,403.852	56.600	327.164	2,347.252	383.764	0.0090	0.0518	0.0608
9	2,347.252	64.303	319.461	2,282.949	383.764	0.0102	0.0506	0.0608
10	2,282.949	73.055	310.709	2,209.894	383.764	0.0116	0.0492	0.0608
11	2,209.894	82.998	300.767	2,126.897	383.764	0.0131	0.0476	0.0608
12	2,126.897	94.294	289.471	2,032.603	383.764	0.0149	0.0458	0.0608
13	2,032.603	107.127	276.637	1,925.476	383.764	0.0170	0.0438	0.0608
14	1,925.476	121.707	262.057	1,803.769	383.764	0.0193	0.0415	0.0608
15	1,803.769	138.271	245.493	1,665.498	383.764	0.0219	0.0389	0.0608
16	1,665.498	157.090	226.674	1,508.408	383.764	0.0249	0.0359	0.0608
17	1,508.408	178.470	205.294	1,329.938	383.764	0.0283	0.0325	0.0608
18	1,329.938	202.760	181.005	1,127.178	383.764	0.0321	0.0287	0.0608
19	1,127.178	230.355	153.409	896.823	383.764	0.0365	0.0243	0.0608
20	896.823	261.707	122.058	635.116	383.764	0.0414	0.0193	0.0608
21	635.116	297.325	86.439	337.791	383.764	0.0471	0.0137	0.0608
22	337.791	337.791	45.973	(0.000)	383.764	0.0535	0.0073	0.0608

747 MW Central Power Generation Company Limited
Debt Servicing Schedule
Cash Development Loan 3

Gross Cap	747.006 MW	Interest Rate	12.64%
Net Capac	720.791 MW	Debt in Pak Ru	3,600 Rs. Million

Period	Principal Million Rs.	Principal Repayment Million Rs.	Interest Million Rs.	Balance Million Rs.	Debt Servic Million Rs.	Principal Repayment Rs./ kW/h	Interest Rs. kW/h	Debt Servicing Rs./ kW/h
1	3,600.000		349.496	3,600.000			0.0554	
2	3,600.000		349.496	3,600.000			0.0554	
3	3,600.000	46.382	455.040	3,553.618	501.422	0.0073	0.0721	0.0794
4	3,553.618	52.245	449.177	3,501.373	501.422	0.0083	0.0711	0.0794
5	3,501.373	58.849	442.574	3,442.524	501.422	0.0093	0.0701	0.0794
6	3,442.524	66.287	435.135	3,376.237	501.422	0.0105	0.0689	0.0794
7	3,376.237	74.666	426.756	3,301.572	501.422	0.0118	0.0676	0.0794
8	3,301.572	84.103	417.319	3,217.468	501.422	0.0133	0.0661	0.0794
9	3,217.468	94.734	406.688	3,122.734	501.422	0.0150	0.0644	0.0794
10	3,122.734	106.709	394.714	3,016.026	501.422	0.0169	0.0625	0.0794
11	3,016.026	120.196	381.226	2,895.829	501.422	0.0190	0.0604	0.0794
12	2,895.829	135.389	366.033	2,760.440	501.422	0.0214	0.0580	0.0794
13	2,760.440	152.503	348.920	2,607.937	501.422	0.0242	0.0553	0.0794
14	2,607.937	171.779	329.643	2,436.158	501.422	0.0272	0.0522	0.0794
15	2,436.158	193.492	307.930	2,242.667	501.422	0.0306	0.0488	0.0794
16	2,242.667	217.949	283.473	2,024.718	501.422	0.0345	0.0449	0.0794
17	2,024.718	245.498	255.924	1,779.220	501.422	0.0389	0.0405	0.0794
18	1,779.220	276.529	224.893	1,502.691	501.422	0.0438	0.0356	0.0794
19	1,502.691	311.482	189.940	1,191.209	501.422	0.0493	0.0301	0.0794
20	1,191.209	350.853	150.569	840.356	501.422	0.0556	0.0238	0.0794
21	840.356	395.201	106.221	445.155	501.422	0.0626	0.0168	0.0794
22	445.155	445.155	56.268	0.000	501.422	0.0705	0.0089	0.0794

Principal Repayment Rs./ kW/h	Interest Rs. kW/h	Debt Servicing Rs./ kW/h
-	0.1239	-
-	0.1239	-
0.0151	0.1642	0.1793
0.0171	0.1622	0.1793
0.0194	0.1599	0.1793
0.0219	0.1574	0.1793
0.0248	0.1545	0.1793
0.0281	0.1513	0.1793
0.0317	0.1476	0.1793
0.0359	0.1434	0.1793
0.0406	0.1387	0.1793
0.0460	0.1333	0.1793
0.0520	0.1273	0.1793
0.0589	0.1204	0.1793
0.0666	0.1127	0.1793
0.0754	0.1039	0.1793
0.0853	0.0940	0.1793
0.0966	0.0827	0.1793
0.1093	0.0700	0.1793
0.1237	0.0556	0.1793
0.1400	0.0393	0.1793
0.1584	0.0209	0.1793

Form 15 - Reference Tariff Gas

Year	Energy Purchase Price (Rs./kWh)			Capacity Purchase Price (Rs. /kW/Hour)											Total Tariff	
	Fuel	Var. O&M	Total EPP	Fixed O&M Foreign	Fixed O&M Local	Cost of W/C	Insurance	ROE	Foreign Debt Repayment	Foreign Interest Charges	Local Debt Repayment	Local Interest Charges	Total CPP	Capacity Charge@ 92%	Rs. /kWh	Cents/kWh
1	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	-	0.1020	-	0.1239	1.1548	1.2543	5.6347	5.6178
2	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	0.8187	0.1958	-	0.1239	2.0664	2.2461	6.6265	6.6067
3	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	0.8187	0.1778	0.0151	0.1642	2.1037	2.2867	6.6671	6.6471
4	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	0.8187	0.1531	0.0171	0.1622	2.0791	2.2598	6.6402	6.6204
5	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	0.8187	0.1304	0.0194	0.1599	2.0564	2.2352	6.6156	6.5958
6	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	0.8187	0.1080	0.0219	0.1574	2.0340	2.2109	6.5913	6.5716
7	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	0.8187	0.0853	0.0248	0.1545	2.0113	2.1862	6.5666	6.5470
8	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	0.8187	0.0627	0.0281	0.1513	1.9886	2.1616	6.5420	6.5224
9	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	0.8187	0.0402	0.0317	0.1476	1.9662	2.1371	6.5175	6.4980
10	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	0.8187	0.0170	0.0359	0.1434	1.9430	2.1119	6.4923	6.4729
11	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	-	-	0.0406	0.1387	1.1073	1.2036	5.5840	5.5673
12	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	-	-	0.0460	0.1333	1.1073	1.2036	5.5840	5.5673
13	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	-	-	0.0520	0.1273	1.1073	1.2036	5.5840	5.5673
14	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	-	-	0.0589	0.1204	1.1073	1.2036	5.5840	5.5673
15	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	-	-	0.0666	0.1127	1.1073	1.2036	5.5840	5.5673
16	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	-	-	0.0754	0.1039	1.1073	1.2036	5.5840	5.5673
17	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	-	-	0.0853	0.0940	1.1073	1.2036	5.5840	5.5673
18	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	-	-	0.0966	0.0827	1.1073	1.2036	5.5840	5.5673
19	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	-	-	0.1093	0.0700	1.1073	1.2036	5.5840	5.5673
20	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	-	-	0.1237	0.0556	1.1073	1.2036	5.5840	5.5673
21	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	-	-	0.1400	0.0393	1.1073	1.2036	5.5840	5.5673
22	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	-	-	0.1584	0.0209	1.1073	1.2036	5.5840	5.5673
23	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	-	-	-	-	0.9280	1.0087	5.3891	5.3730
24	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	-	-	-	-	0.9280	1.0087	5.3891	5.3730
25	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	-	-	-	-	0.9280	1.0087	5.3891	5.3730
26	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	-	-	-	-	0.9280	1.0087	5.3891	5.3730
27	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	-	-	-	-	0.9280	1.0087	5.3891	5.3730
28	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	-	-	-	-	0.9280	1.0087	5.3891	5.3730
29	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	-	-	-	-	0.9280	1.0087	5.3891	5.3730
30	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	-	-	-	-	0.9280	1.0087	5.3891	5.3730
Average																
1-10	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	0.7368	0.1072	0.0194	0.1488	1.9403	2.1090	6.4894	6.4700
11-22	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	0.0000	0.0000	0.0877	0.0916	1.1073	1.2036	5.5840	5.5673
23-30	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	0.0000	0.0000	0.0000	0.0000	0.9280	1.0477	5.4281	5.4119
1-30	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	0.2456	0.0357	0.0416	0.0862	1.3371	1.4534	5.8338	5.8164
Levelized																
1-30	4.0806	0.2998	4.3804	0.1375	0.0627	0.0158	0.0959	0.6161	0.4547	0.0776	0.0320	0.1247	1.6169	1.7575	6.1379	6.1195

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
ISLAMIC REPUBLIC OF PAKISTAN
NEPRA Tower, Ataturk Avenue (East) G-5/1, Islamabad
Phone: 9206500, Fax: 2600026
Website: www.nepra.org.pk, Email: info@nepra.org.pk

OFFICE OF THE REGISTRAR

No. NEPRA/R/TRF-100/CPGCL/3208

March 4, 2024

Engr. Junaid Ahmed Baig
Chief Executive Officer
Central Power Generation Company Limited
Thermal Power Station Guddu, District Kashmore

Subject: **TARIFF MODIFICATION PETITION FILED BY CENTRAL POWER GENERATION COMPANY LIMITED**

This is with reference to the subject petition submitted by Central Power Generation Company Limited (CPGCL) vide letter No. CPGCL/CEO/1424-5 dated 26.02.2024 (received on 27.02.2024) for modification of Tariff in respect of 747 MW Combined Cycle Power Plant located at Thermal Power Station Guddu in open cycle mode.

2. The petition has been examined and noted that information on Forms (Form 1-15) specified by the Authority for steam based power plants operating, on coal, residual furnace oil, gas, biomass, bagasse, solid waste or nuclear fuel, to be submitted with petition as required under Rule 3 NEPRA Tariff Rules has not been submitted. The Forms are available on NEPRA's website www.nepra.org.pk. For convenience, a copy of the same is enclosed.

3. It is, therefore, advised to submit the information on the specific Forms immediately for processing of the subject petition.

4. Please note that the subject petition is under scrutiny to check compliance with the documentary requirement for admission of the same. In case any further observation / query arises during the process, the same will be communicated accordingly for your response. For any information / clarification in the matter, you may contact this office from Monday to Friday during office hours.

Encl: **As above**

(Masroor Khan)
Director