National Electric Power Regulatory Authority
Islamic Republic of Pakistan

Registrar

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

No. NEPRA/TRF-271/NPGCL-2014/1214-1216
January 27, 2016

Subject: **Decision of the Authority in the matter of Motion for Leave for Review against the Decision of the Authority dated 14.04.2015 regarding Tariff Petition filed by Northern Power Generation Company Ltd. (NPGCL)** [Case # NEPRA/TRF-271/NPGCL-2014]

Dear Sir,

This is in continuation of this office letter No. NEPRA/TRF-271/NPGCL-2014/5617-5619 dated 14th April 2015 whereby Determination of the Authority in the matter of Tariff Petition filed by Northern Power Generation Company Ltd. (NPGCL) for the Determination of its Generation Tariff was sent to the Federal Government for notification in the official Gazette.

2. Please find enclosed herewith the subject decision of the Authority along with Annex-I, II, III & IV (24 pages) in the matter of Motion for Leave for Review filed by Northern Power Generation Company Ltd. against Determination of the Authority dated 14.04.2015.

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

Enclosure: As above

27.01.16
(Syed Safeer Hussain)

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

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

DECISION OF THE AUTHORITY IN THE MATTER OF MOTION FOR LEAVE FOR REVIEW AGAINST THE DECISION OF THE AUTHORITY DATED 14.04.2015 REGARDING TARIFF PETION FILED BY NORTHERN POWER GENERATION COMPANY LIMITED (NPGCL)

1. Northern Power Generation Company Limited (NPGCL) (hereinafter referred to as "the Petitioner") vide its letter dated April 24, 2015, filed a motion for leave for review (hereinafter referred to as "Review motion"), seeking review of determination of National Electric Power Regulatory Authority (hereinafter referred to as "the Authority") dated April 14, 2015 in the matter of the Petitioner's Nandipur power project (hereinafter referred to as "Impugned determination"). The review motion was filed in terms of rule 16 (6) of the National Electric Power Regulatory Authority Tariff (Standards and Procedure) Rules, 1998 (hereinafter referred to as "tariff rules").

2. The Review Motion was considered and admitted on May 21, 2015 for further proceedings It was also decided to provide an opportunity of hearing to the parties to the proceedings; accordingly, the hearing in this regard was held on August 12, 2015, for which letters of invitation for participation and submission of comments were sent to the major stakeholders, including the interveners of the proceedings of the impugned determination. Copy of the petition was also sent to Anwar Kamal Law Associates (AKLA) as he was the only commentator in the original determination. The hearing was attended by the Petitioner and representative of NESPAK. On a day of hearing, AKLA letter was received requesting the Authority to postpone the hearing as he is busy in other engagement. The Authority decided that this hearing can't be postponed at this belated stage as the petitioner has already arrived at NEPRA HQ to present its case.
3. **Ground for Review Motion:** The petitioner requested for the review of following parameters in its subject review motion;

EPC Cost

4. The petitioner submitted that incurred and verified EPC cost amounting to USD382.52 Million, be accepted and allowed as EPC Cost. In support, the petitioner submitted that Northern Power Generation Company Limited (NPGCL) – 'the **Petitioner**', executed amendment no-2 to the original contract with EPC contractor amounting to USD 67 Million in the light of decision of Honourable Supreme Court of Pakistan. According to the petitioner, this cost was and is part and parcel of original cost of the project through which original investment and project was saved by the management in this crucial time when there is huge shortage of generation capacity in the country. Although it changed the project economics by some extent but still EPC Cost of the project remained far below than other comparable projects installed in the country in almost same period. To illustrate, the petitioner compared it project cost with UCH-II power project which uses the same GE Turbines having less capacity. Following is the comparison table of EPC costs of Nandipur Project with UCH-II Power project provided by the Petitioner.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA AUTHORITY

	UCH-II (386.2 MW)	Nandipur (425 MW)
EPC Cost	$ 370.253 Million	$ 382.52 Million
Per Mw EPC Cost	$ .9868 Million	$ .929 Million

5. According to the petitioner, it is evident from the table above that even by allowing these costs NEPRA will not cross the benchmark set itself by the Learned Authority.

6. The Petitioner is of the view that NEPRA Rule 17(3) (i) of NEPRA Tariff (Standards & Procedures) Rules 1998, quoted below, allows the recovery of prudently incurred costs.

"Tariffs shall be determined, modified or revised on the basis of and in accordance with the following standards, namely, tariffs should allow licensees the recovery of any and all costs prudently incurred to meet the demonstrated needs of their customers, provided that, assessments of licensees, prudence may not be required where tariffs are set on other than 'cost of service' basis, such as formula based tariffs that are designed to be in place for more than one years."

7. The Petitioner would thus like to submit that all these costs are incurred for the continuity of the project and from saving it from total collapse and loss of investment. The Petitioner requests the Authority to reconsider and grant approval of the said amounts, as they are verified by the learned Authority.

Interest During Construction

8. According to the petitioner the Authority, should realise the fact that project was forced to delay by certain circumstances as determined by the Supreme Court of Pakistan's commission. It's neither the fault of project management nor the project itself. It was and is a cheap project envisaged by the Government and still even after allowance of all the costs, will provide cheap electricity than the basket rate of CPPA. With the costs and tariff determined by the learned Authority the project will not be able to even pay the lenders' payments and project will collapse like other GENCOs within days. It is humbly requested, that taking into view the realities of the project, all the Interest during construction costs be allowed as it will give more benefit to consumers than their payments in the form of regular provision of electricity.

9. The Petitioner also submitted, that RCOD and COD are the subject matters of the PPA and are to be decided mutually by the Power Purchaser and the power producer. According to the standard PPAs, proper penalty is imposed for any delinquency on part of the power producer. Therefore, deductions made by the Authority, in the opinion of the Petitioner, results in dual penalization for the power producer.

Financing and Advisory Fee

10. The petitioner submitted that the Authority, in its determination dated April 14, 2015, has assessed Rs 610.37 Million ($7.34 m) as financing fees as total fee allowed. However, in general practice 3% of financing is allowed in all the cases already decided by the learned Authority. According to the petitioner, they are being discriminated against in this case too and request the Authority to allow 3% of financing as determined in all the other cases.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA AUTHORITY

11. The petitioner further informed that the learned Authority disallowed the cost of offshore financing fee paid by the company. The petitioner again reiterated that there is no negligence of project management in this regard and for these circumstances created by outside forces, project should not be punished.

NON-EPC Cost

12. According to the petitioner, the Authority in its tariff determination dated April 14, 2015 para 38 admitted that there are some legitimate costs which are not allowed due to lack of documentation to the satisfaction of the Authority.

13. With regards to construction activities (clubbed under "Land and Building" in the Determination) the petitioner submitted that the construction activities are still going on and are not completed yet. The Authority, according to the petitioner, should allow the requested costs (which Authority admits, are legitimate) in full (USD 4.84 M) as these will be certainly subject to adjustment at COD on provision of documentation. The Petitioner further submitted that disallowing (some of) these type of costs like access roads etc. will finish the claim and chance of the petitioner to claim these costs.

14. With regards to Owner Engineers cost which in the instant case is NESPAK, the petitioner stressed that cost related to NESPAK consultancy services should be allowed in full as it is based on a proper agreement.

15. On the disallowance of incurred demurrage and detention charges, the petitioner stressed this cost should be allowed due to peculiar circumstances faced by it. According to the petitioner, it can never be assigned as negligence or inefficiency on part of project, hence project should not be punished in this regard. These expenses should be allowed in full looking into the special circumstances faced by the project.

16. At the end of its submission, the petitioner basically requested the Authority to allow full costs of Non EPC, which according to the Petitioner has prudently been incurred and have been duly verified.

Return on Equity During Construction (ROEDC)

17. The Petitioner is of the view that the calculations of Return on Equity During Construction (ROEDC) by the Authority seems not to have been carried out fairly. The Authority has adopted the basis of 'Weighted Average', which is detrimental to the interest of The Petitioner. The Petitioner is of the view that the calculation should have been made on the basis of 'First In First Out' (FIFO).

18. The Authority may kindly note that the basis of 'Weighted Average' cannot be applied on calculating the ROEDC. This method conceives that disallowed costs are prevalent evenly throughout the construction period, which is not correct. If there is any cost overrun of the Project, it takes place at the end of the construction period, immediately before COD. Therefore, it would have been fair and prudent if the Authority had applied the basis of FIFO in calculating the ROEDC. In light of this, the Petitioner earnestly requests the Authority to reconsider its decision and calculate the ROEDC on a FIFO basis. The learned Authority has already followed this practice in case of Halmore Power COD Adjustment.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA AUTHORITY

Indexation of ROE

19. The ROE of the project is calculated on conversion are of Rs. 90 per USD whether its indexation basis is given as Rs. 103 per USD. There is a GAP of indexation of 13 Rupees which is unjust and should be corrected.

O&M Costs

20. The learned Authority has taken the O&M Cost (Variable) as reference for four GAS based IPP's. It is to be mentioned that the referred plants i.e. Saif, Sapphire, Orient and Halmore are not similar plants to the Nandipur project due to following reasons, with the only exception that they all are CCPP. The average HSD tariff of these four IPP'S is allowed to Nandipur Project of NPGCL. The petitioner would like to make a market based adjustment (which is certainly an inadvertent mistake) that FFH factor which is used for conversion of GAS O&M into HSD O&M is a multiplication factor of 1.5, whereas this factor is 3.5 for change of fuel to HSFO (GE reference papers are attached). Petitioner requests to translates this rate for HSFO by the simple calculation i.e. HSD Rate/1.5=GAS Rate*3.5 for operations on HSFO, as this project is HFSO based and tariff is also determined for HSFO Fuel. The O&M costs allowed by Authority did not match with the operation of the project and hence cannot be compensated by any other means. It will be impossible for the Project management to operate the project on given allowed costs. It is worth mentioning here that if comparison of Nandipur is made with other HSFO plants as documented and listed in the latest Industry Report the plant ranks amongst the few most efficient plants in operation. This would mean that if a viable tariff is given to the plant it will be operational most of the time and feed the energy needs of the region. Major part of the variable costs includes the GE supplied spare parts, consumables and inspection costs. The calculations for maintenance activities for 10 years through a prudent system are attached for reference that clearly shows that variable costs on Gas/HSFO and HSFO alone has significant difference. The Authority has also ignored the fact that those costs were requested at an exchange rate of Rs. 67.6 per US$.

21. It may be pointed out that in addition to cost for mentioned items/consumables attributable to variable cost, the cost of works power (Cost of auxiliary consumption) is also part of variable O&M. It may be mentioned that for the CCPP plant which can be operated on tri-fuel i.e. RFO/ HSD/gas fuel has significant additional variable O&M cost i.e. cost for RFO treatment (Dedicated Fuel oil treatment plant for RFO treatment), cost of RFO heating (separate auxiliary steam boilers for RFO tank heating and for RFO heating being fed to GT) and cost of inhibitor dosing (KI200 chemical) to RFO to gas turbine, the added auxiliary consumption cost for RFO treatment/heating, maintenance cost of fuel oil treatment plant, auxiliary steam boilers (three nos.) and inhibitor dosing skids attributes to significant additional Variable cost.

22. The Authority has also allowed Petitioner, the Fixed O&M Costs as requested but ignored the fact that those costs were requested at exchange rate of Rs 67.7 per US$. Authority is requested to make this exchange rate adjustment to our request. Here are some examples of Fixed O&M rate as allowed by the authority for similar projects and like to mention that gas based projects cannot be compared with HSFO based projects in any case, due to difference of requirements.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY NEPRA AUTHORITY

23. It may be mentioned that the CCPP with Gas/HSD fuel only operation are not equipped with fuel oil treatment plant auxiliary steam boilers and inhibitor dozing skids, hence their associated VOM cost is considerably less.

Project Efficiency

24. Refer serial no. 72 page 22 of above referred documents. The authority's claim Quote "The authority noted that the efficiency of frame 9E gas turbine as specified by GE for dual fuel operation (i.e. RFO and Natural gas) is in the range of 52% to 52.7% and this efficiency is independent of type of fuel used for generation" Unquote. The referred efficiencies seem to be design/theoretical efficiencies at ISO conditions which are never achieved practically and are independent of fuel (Being design parameters).

25. In reality the heat rate/thermal efficiency/ capacity of the gas turbines are established taking in to consideration site reference conditions i.e. altitude (Atmospheric pressure), ambient temperature and humidity and base fuel.

26. It may be mentioned that the operation of the gas turbine on RFO, considerably increase the heat rate(Reduced thermal efficiency) of gas turbine due to detrimental effect of RFO on hot gas components of gas turbine. The firing temperature of the gas turbine is considerably decreased by OEM which results in lower capacity and higher heat rate (lower thermal efficiency), and this firing temperature is kept even if the gas turbine is operated on gas/RFO intermittently. However for 'gas only' operation, the firing temperature of the gas turbine is increased to an optimum level which results in higher efficiency (lower heat rate) and capacity.

27. It may be mentioned that the allowed efficiency of CCPP for the tariff determination is even higher than the guaranteed (contractual) net efficiency 44.47% (8095 KJ/KWH).

28. The Authority vide Para-79 accepted the reasons of less efficiency of Nandipur Power Plant and allowed 7.7% reduction in efficiency. But this reduction is allowed from the operation of plant on gas Fuel whereas it should be from Furnace oil efficiency of 44%.

29. The Representative of CPPA vide para-16 explained that the available efficiency in the market of such plants is 45%. Considering above the efficiency of 44% as quoted by the Petitioner is justifiable and be allowed.

30. Despite of our request, for allowing lower efficiency than contractual due to long detention of parts in aggressive atmosphere, the efficiency even higher than guaranteed efficiency has been allowed which is not justified and perhaps not achievable. Honourable Authority is therefore requested to revisit its decision and revise the allowed thermal efficiency as requested. It may be pointed out that for performance parameters comparison only KAPCO units 5→8 (Frame 9E gas turbine with tri fuel Gas/ RFO/HSD operation) in combined cycle mode are comparable with Nandipur plant. Due to difference of fuel (fuel being LSFO for KAPCO and HSFO for Nandipur), O&M factor will still be higher than that of KAPCO. It needs to be reiterated that Nandipur will remain one of most efficient plant even if the efficiency filed by the petitioner is granted. Furthermore, it remains beyond comprehension that if UCH-II was allowed efficiency degradation then why the efficiency of Nandipur has been increased by this much.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY NEPRA AUTHORITY

Time Period for Filing of Documents after COD

31. The decision binds the management of the company to file all the relevant documents for COD adjustment, within 30 days after COD. It's not possible as this exercise requires a lot of activities and collection of documents. Authority has never done it before for any project also. This condition needs to be withdrawn being discriminatory and non-practical.

Indexation Mechanism of Working Capital Costs/Tariff

32. Determination did not provide any mechanism for adjustment of working capital cost/tariff. It needs to be clarified in tariff determination for future reference.

Open Cycle Tariff

33. The Authority did not deliberate the Tariff of the power plant on open cycle after the COD. The operation of plant on open cycle is not a requirement of the petitioner, whereas keeping in view the Power crisis/demand in the country, if it is the requirement of open cycle operation for one reason or the other by the NTDC then how the National demand will be met. As such Authority should deliberate the tariff on open cycle as submitted in the petitioner.

Gas Connection Costs

34. GAS connection and conversion costs and tariff should also be allowed as project has received confirm GAS allocation letter.

35. Based on the above, the Petitioner requests the Authority under Rule 16 of the NEPRA Tariff (Standards & Procedures) Rules 1998 to reconsider its decision for tariff Determination, enabling the Petitioner to recover all the prudently incurred and verified costs, as allowed under the NEPRA Tariff (Standards & Procedures) Rules 1998 and Power Policy 2002.

Summary of Costs

Particulars	Cost RFO/HSD Fuel		Cost with RFO/HSD/GAS Fuel	
	Rupees	USD	Rupees	USD
EPC	27,943.61	317.72	27,943.61	317.72
Escalation	6,725.57	64.80	6,725.57	64.80
Gas Connection	-	-	3,970.36	38.55
Gas Conversion	-	-	2,575.00	25.00
IDC	14,323.85	146.16	14,323.85	146.16
Financing Fee	1,104.66	13.02	1,104.66	13.02
Non-EPC(cost of telecommunication and dispatch eqpt missing)	4,589.30,+90.00 (SCADA system)	46.07	4,589.30,+90.00 (SCADA system)	46.07
Duties and Taxes	2,009.91	22.24	2,009.91	22.24
O&M Mobilization	515.00	5.00	515.00	5.00
Spare Parts	1,592.34	15.00	1,592.34	15.00
Total	**58,804.24**	**630.02**	**65,349.60**	**693.57**

Relief sought by the Petitioner:

36. On the basis of the above, the Petitioner requested the Authority to approve, and revise the tariff based on, the following factors identified:

EPC Cost

a Incurred and verified EPC cost amounting to USD382.52 Million, be accepted and allowed as EPC Cost.

IDC

b Interest during Construction be allowed at actual for total construction period.

Non EPC Costs

c Non EPC Costs amounting to USD 46.07 Million be accepted and allowed as Non EPC Cost.

Financing fee and Charges

d Financing Fees / Financial Advisory should be calculated and allowed at 3% of financing as per precedence.

Spare part cost

e Spare parts be allowed amounting to USD 15 Million.

Gas Connection costs

f Gas Connection costs should also be allowed.

O&M cost

g O&M tariff should be allowed on realistic basis for HSFO Fuel with multiple of 3.5 to Gas O&M and Fix O&M tariff should be determined as requested along with due indexation.

Return Indexation/adjustment

h Indexation base of conversion rats for ROE and ROEDC should be of Rs. 90

i ROEDC to be calculated on FIFO Basis instead of Weighted Average.

Project Efficiency

j Project thermal efficiency to be accepted as 44% for HSFO Fuel.

Working Capital Cost

k Adjustment mechanism for working capital tariff be provided.

Time period Clause for COD adjustment

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA AUTHORITY

l Time period clause to be omitted from determination.

Open Cycle Efficiency

m Open cycle tariff should be allowed against demand of NPCC.

37. Argument heard and record perused.

38. As per regulation 3(2) of the National Electric Power Regulatory Authority (Review Procedure) Regulations, 2009, "any party who is aggrieved from any order of the Authority and who, from the discovery of new and important matter of evidence or on account of some mistake or error apparent on the face of record or from any other sufficient reasons, may file a motion seeking review of such order".

39. In the instance case, it is observed that some of the submissions made in the Review Motion were already deliberated upon in the impugned determination. The Authority is of the view that only the following grounds merit consideration and certain clarifications:-

- EPC Cost
- Spare part cost
- Gas Conversion & Connection costs
- Return adjustment
- O&M cost
- Working Capital Cost
- Time period Clause for COD adjustment
- Open Cycle Efficiency

EPC Cost

40. The portion of EURO part of EPC contract to the extent of Euros 42.91 million couldn't be verified in the impugned determination because of lack of backup documents. However, in the Impugned determination at para 24 reproduced below, the project is entitled to get adjustment if relevant documents are provided.

> "*24. The petitioner claimed to have work done worth Euros 69.81 million. According to the petitioner, Euro 7.8 million were paid as a 10% advance on the total contract price of Euro 78 million leaving Euro 0.391 million as payables. In support, the petitioner submitted the copies of the EPC invoice but didn't substantiate it with the bank statements and debit advices. The Petitioner however, provided a debit advice totaling Euros 35.09 million. During discussion, the petitioner informed that initially the lenders directly paid the EPC contractor without first disbursing the loan to Nandipur project account, therefore, to authenticate the transaction through the project account bank statements at this stage is not possible. The petitioner, however, submitted that they are in contact with National Bank of Pakistan (the Euro L/C bank) and the petitioner will*

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY NEPRA AUTHORITY

forward the required information as soon as it receives from NBP. Since Euro portion of EPC contract lacked key information to authenticate the claimed transaction cost therefore, the Authority has decided to consider Euros 42.91 million (78-35.09) as payable and converted at current PKR to Euro exchange rate of 115 which will be subject to adjustment only to the extent of variation in exchange rate upon submission of bank statements and debit advices etc."

41. This time, the petitioner has provided the requisite information which has been reviewed. As a result, now total verified EPC cost amounts to US$ of 109.22million against US$ 99.81 million previously allowed. The payable amount of Euros 0.391 million or equivalent US$ 0.49 million is still payable that shall be adjusted based on actual relevant currency exchange rate at the time of COD adjustments.

Spare part cost

42. Under this head, an amount of $ 10.99 million was allowed in the Impugned determination against the claimed amount of $ 15 million. The petitioner in its review motion, has requested to consider the disallowed cost of $ 4.01 million. These disallowed costs comprise of $ 0.09 million for defective parts of Fuel Oil Treatment Plant (FOTP) and $ 3.92 million for "other items". In support of other items, purchase order was provided in the review motion worth US$ 3.93 million, which related to 2nd set of GTG spare part. Therefore, for 2nd set of GTG, an amount of $3.93 million is allowed to the petitioner.

43. Furthermore, an amount of $ 6.27 million for Balance of Plant (BOP) payable on the basis of submitted bid price of the contract was allowed in the impugned determination. After submission of relevant documents in the review motion it was observed, that an amount of $ 6.27 million provisionally allowed on account of BOP payable now stands as $ 5.3 million. The excess amount of $ 0.96 million previously allowed is being adjusted on account of spare part cost. In total, the Petitioner is allowed US$ 13.95 million under the head of spare part. This amount shall be subject to adjustment on account of relevant currency fluctuation at the time of COD. For this purpose, the petitioner shall provide all the documentary evidence substantiating that these payments have been made according to the spare part contract agreements.

Gas Conversion and Infrastructure costs

44. In the impugned determination, the petitioner was not allowed separate tariff for gas based operation due to the lack of clarity related to supply of RLNG. The petitioner has submitted certain communications, draft PC-1 for conversion, and other related documents that related to the plant conversion on gas and RLNG supply. Ministry of Petroleum and Natural Resource (Ministry of P&NR) was also approached regarding the supply of RLNG to the project. The Ministry of P&NR subsequently informed that

1. *"MP& NR would make the required gas volume i.e. 100 MMCFD available for imported RLNG effective December 2015 and onwards. In addition to this availability of volume, Ministry of Water and Power was requested to provide firm RLNG requirements of the Nandipur Power Project year wise along with other relevant information of firm payment schedule etc. But to date no such information was provided by MW&P and resultantly no such allocation of RLNG volume for the said project could be made.*

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY NEPRA AUTHORITY

2. *It is important to note that pursuant to decision of ECC of the Cabinet vide Cas No. ECC-126/15/2015 dated 03.09.2015 that this Ministry has been allowed to allocate RLNG volumes based availability of RLNG and keeping in consideration the transportation infrastructure and allied matters*
3. *In view the latest ECC decision, allocation of 100MMFCFD RLNG to Nandipur power project can be considered subject to provision of requested information keeping in view the availability of RLNG volumes and infrastructure etc."*

45. After reviewing the document and communication as discussed above, it is established that the government is committed to provide the RLNG to the project, although the petitioner has not demonstrated that a firm commitment of RLNG is available. The key issue for consideration is, whether to allow gas tariff for the project at this stage or when the required supply of fuel, which in the instant case is RLNG, is ensured? This needs to be understood that under 2002 power policy, supply/risk of fuel is to be borne by the project developer which in the instant case is NPGCL. In the past, while giving tariff determination on gas and RFO based power plants, the Petitioner was not required to submit signed fuel supply agreements. The tariff becomes effective only when the plant operates when on a particular fuel. The Authority therefore, considers that in the instant case, the burden of ensuring committed gas supply should be left with the petitioner. The Authority further considers that to ensure more reliability in operation, option for operating on alternate fuel cannot be ignored. The Authority feels that this will not only provide flexibility in plant operation but will increase capacity and efficiency of the plant; thus resulting in reduction in tariff, which is in the consumer's interest. The tariff on RLNG shall only be applicable when the plant will operate on RLNG and the conversion cost is not included in the tariff of RFO based plant operation. In view of the above, it is decided to allow a separate tariff to the petitioner that shall only be applicable once the plant is ready for operation on gas and firm gas commitment is available to the project.

46. With regards to the inclusion of gas conversion, it noted that the gas conversion cost of Rs 2090 million or equivalent US$ 20.29 million is based on the proposal submitted by GE and Dongfang Electric Corporation Limited (DECL). It is important to note that in the impugned determination, the petitioner assumed this cost to be Rs 2,575 million. For the gas infrastructure, the petitioner submitted the revised SNGPL estimate worth Rs 4750 million. Previously the petitioner requested Rs 3,790 million under this account. The following breakup of gas infrastructure /connection cost of Rs 4,750 million has been submitted for consideration:

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA AUTHORITY

Sr. No.	Description	Rs. In Million
A	Pipeline Construction Works	
1.	Survey/design	13.000
2.	Pipeline/Metering station construction activities	1063.000
3.	Freehold Land	425.000
4	Civil Works	42.000
	Total	1543.000
B	Equipment/Material	3207.000
	Grand Total (A+B)	4750.000

47. The Authority noted that, SNGPL while quoting the above rates for pipeline construction stated, that the minimum construction time of EPC activities shall be around 30 to 36 months after allocation of gas to the above plants and receipt of 100% cost.

48. The petitioner's request for inclusion of Gas connection infrastructure cost was reviewed and the Authority observed that inclusion of the pipeline and ancillary cost in the power plant tariff will not be fair to the consumers. There is separate regulatory body, i.e. OGRA which is mandated to review and approve such capex of gas utilities. The Authority has therefore, decided not to allow the cost of gas infrastructure amounting to Rs 4750 million being out of its purview and mandate.

49. The gas conversion cost of $20.29 million, which is based on estimate offered by GE worth $ 15.42 million and $4.87 million offered by DECL is, considered legitimate cost. The Authority has therefore decided to allow the same as maximum ceiling subject to adjustment at the time COD on the provision of documentary evidence.

50. The gas operation will lead to better efficiency, capacity and O&M cost. These benchmarks were not set in the impugned determination as no separate tariff for operation on gas was allowed to the Petitioner. Therefore, there is a need to establish these benchmarks which are discussed hereunder:

a. **Thermal Efficiency gas:** The petitioner requested a thermal efficiency of 48% on operation on gas. The Authority noted that the thermal efficiency proposed by the Petitioner is on the lower side compared to power plant having similar make and model. Keeping in view the efficiency allowed to similar projects, the Authority has decided to set minimum thermal efficiency of 49% net LHV with compensation of degradation and partial loading adjustments. This will be subject to adjustment at the time of COD if the tested efficiency is more than 49% net LHV.

b. **Plant Availability on gas:** The Authority has already allowed plant availability factor of 90% to similar power plants having similar make and model. The same availability is being approved in the instant case.

c. ***Net Capacity and Auxiliary Energy Consumption (AEC) on Gas:*** For calculating capacities on the combined cycle mode of operation, while allowing 3% auxiliary consumption on combined cycle mode, following capacities at site conditions on both intermittent Gas/RFO is worked out and the same is therefore, being, being allowed:

Fuel	Gross Capacity Combined Cycle (MW)	Net Capacity Combined Cycle (MW)
Gas/HSFO Intermittent Operation	**464.41**	**450.47**
Gas Only	**521.868**	**506.212"**

Return on Equity during Construction (ROEDC)

51. The Authority in case of Halmore COD adjustment—which also faced delays, allowed First In First Out (FIFO) method of calculating RoEDC. Following is the relevant portion of the decision dated November 06, 2014:

"ROEDC Calculation:

5.1 The petitioner claimed that the Authority has adopted the basis of weighted average, which is detrimental to the interest of the petitioner. The petitioner is of the view that the calculation should have been made on the basis of first in first out. The petitioner also submitted that; if there is any cost overrun of the project, it takes place

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY NEPRA AUTHORITY

at the end of the construction period, immediately before COD. Therefore, it would have been fair and prudent, if the Authority had applied the basis of FIFO in calculating the ROEDC.

5.2 In the light of petitioner's submissions and arguments, the Authority decided to reconsider its decision and have decided to revise the ROEDC calculation on the basis of petitioner's claim."

52. The petitioner argument for application of FIFO method for calculating RoEDC merit reconsideration as such calculation of RoEDC has already been allowed to Halmore, Therefore, the RoEDC of the project is therefore being re-determined on the basis of FIFO

O&M Costs

53. The petitioner is not disputing the allowed fixed O&M charges as the Authority allowed same fixed O&M charges of Rs 0.2172/kW/h as requested. The petitioner point of contention is with regard to the Variable O&M cost. In the impugned determination, the Petitioner was allowed variable O&M cost that was an average of variable O&M cost on HSD operation of Orient, Saif, and Sapphire and Halmore power plants. The petitioner has disputed that comparison and stated that its power plant is different than those four, as Nandipur power plant is CCGT that is designed to be run on RFO instead of gas. In para 11.6 of the petition, the petitioner stated that the Nandipur power plant is comparable to KAPCO units and not with CCGT as assumed in the impugned determination. The Authority while agreeing to with the petitioners point of view, decided to revise the variable O&M cost for RFO based operation while taking benchmark of June 2015 variable O&M values of KAPCO. Similarly, it was also decided to assume KAPCO's variable O&M number on operation on gas. The petitioner's request for Fixed O&M on operation on both fuels are reasonable and within the benchmark allowed to similar IPPs therefore, it is allowed as such. The O&M cost will be subject to adjustment at actual at the time of COD in case the revised actual number is less than the allowed. In view of the above, the following O&M cost is allowed to the petitioner for different fuel while taking June 2015 indices:

Fuel Type	Variable O&M			Fixed O&M		
	Revised	Requested	Previous Allowed	Revised	Requested	Previous Allowed
	Rs/kWh	Rs/kWh	Rs/kWh	Rs/kW/h	Rs/kW/h	Rs/kW/h
Gas	0.343	0.6500	N/A	N/A	0.1995	N/A
F.O	0.480	0.7074	0.4550	N/A	0.217	0.217

Working Capital Cost

54. The petitioner was allowed a working capital component of Rs 0.1213/kW/h which is required to be adjusted at the time of first fill of inventory and subsequently with KIBOR variation. However, no such adjustment formula was prescribed for working capital component adjustment. Therefore, it has been decided to clarify the adjustment

related to the cost of working capital component. Based upon the assessed working capital requirement of Rs 4,149.69 million on RFO operation, while taking base KIBOR of 8.53% + 200 points spread and RFO price of Rs 38,265/ ton, the cost of working capital component has been assessed at Rs 436.96 million or Rs. 0.1213 per kW per hour. This cost shall be adjusted according to the actual prices prevailing at the time of first fill along with the actual KIBOR rate at the time COD. This component shall be quarterly or biannually adjusted as the case may be, with 3 months or 6 month KIBOR post COD.

55. Similarly, based upon the assessed requirement of Rs 1,517.23 million on operation on RLNG, while taking base KIBOR of KIBOR 8.53% + 200 points spread, the cost of working capital component has been assessed as Rs 159.76 million or Rs. 0.0405 per kW per hour on the basis of RLNG rate of $9.57/MMbtu (LHV) or equivalent Rs 956.97/MMbtu. This cost shall be adjusted according to the actual prices gas/RLNG price at the time of COD along with the actual KIBOR. This component shall be quarterly or biannually adjusted as the case may be, with 3 months or 6 month KIBOR post COD.

Time Period for Filing of Documents after COD

56. According to the document/information submitted, more than 85% of the required project work payment have already been made and Authority's decisions in this regard are given in this document as well as in the Impugned determination. Which means more than 85% of the work that was supposed to be done at the time of COD have already been accomplished and NEPRA's decision in this regard already given. The petitioner now only has to provide information to the extent of the remaining portion that is assumed in the tariff. Further, the plant has achieved COD w.e.f July 23, 2015. The petitioner should have approached NEPRA by now for COD adjustment. In view of the above, since the Petitioner has already achieved COD therefore, the Petitioner is directed to provide all the necessary information within 30 days of this decision, only to the extent of cost assumed which is required to be adjusted at actual.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA AUTHORITY

Open Cycle operation

57. Open cycle operation of CCGT drop the efficiency value by about 12% to 13% in absolute terms. Which means that consumers will get the same units of electricity with 1.5 times the cost. This type of inefficient operation post COD has never been allowed to any IPP on similar technology post COD and this project should not be an exception. Therefore, the petitioner's request in this regard is rejected.

58. In view of the foregoing discussion, the review motion filed by the Petitioner is hereby disposed and the impugned determination is hereby modified and the order is revised as indicated below.

ORDER

59. Pursuant to Section 31 (4) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 read with Rule 16 (11) of NEPRA Tariff Standards and Procedure Rules, 1998, the National Electric Power Regulatory Authority

(hereinafter "the Authority") has hereby determined the following reference tariff NPGCL's Nandipur Power Project (hereinafter 'The Petitioner"):

Reference Tariff On RFO

Tariff Components	Year 1 to 15	Year 16-30	Indexation
Capacity Charge PKR/kW/Hour)			
Fixed O&M Foreign	0.1273	0.1237	US$ /PKR & US CPI
Fixed O&M Local	0.0898	0.0898	Local CPI (General)
Cost of Working Capital	0.1213	0.1213	KIBOR
Insurance	0.1219	0.1219	US$ /PKR (If any)
Debt Service	1.1090	-	KIBOR
Return on Equity	0.8237	0.8237	US$ /PKR
Total Capacity Charge	**2.3930**	**1.2840**	
Energy Charge on Operation on RFO Rs./kWh			
Fuel Cost Component	7.5247	7.5247	Fuel Price
Variable O&M	0.4800	0.4800	US$/PKR & US CPI

Reference Tariff On Gas/RLNG

Tariff Components	Year 1 to 15	Year 16-30	Indexation
Capacity Charge PKR/kW/Hour)			
Fixed O&M Foreign	0.1170	0.1170	US$ /PKR & US CPI
Fixed O&M Local	0.0826	0.0826	Local CPI (General)
Cost of Working Capital	0.0405	0.0405	KIBOR
Insurance	0.1113	0.1113	US$ /PKR (If any)
Debt Service	1.0632	-	KIBOR
Return on Equity	0.7760	0.7760	US$ /PKR
Total Capacity Charge	**2.1905**	**1.1273**	
Energy Charge on Operation on RFO Rs./kWh			
Fuel Cost Component	6.6636	6.6636	Fuel Price
Variable O&M	0.3435	0.3435	US$/PKR & US CPI

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA AUTHORITY

Note: i) Component wise proposed tariff for operation on RFO is indicated at **Annex-I** and tariff on operation on Gas is attached as **Annex-II.**
ii) Debt Servicing Schedule for RFO operation is is attached as **Annex-III** and on operation on Gas is attached as **Annex-IV.**

60. The following adjustments /indexations shall be applicable to reference tariff;

<u>One Time Adjustment</u>

Adjustment in EPC Cost

61. The Authority has assessed total EPC cost of 315.94 million at equivalent US dollar. That include the following payables:

EPC Cost Payables	Amount in million
US$ portion	13.40
Euro Portion	0.39
PKR portion	772.77

62. Since the exact timing of the above mentioned payables to EPC contractor is not known at this point in time therefore, adjustment for relevant foreign currency fluctuation for the portion of payment in the relevant foreign currency will be made at COD. In this regard, the sponsor will be required to provide all the necessary relevant details along with documentary evidence. At this stage $ portion of EPC is converted to equivalent Rs at assumed PKR to US$ exchange rate of 103 and Euro portion at assumed PKR to Euro exchange rate of 129 80

63. The adjustment shall be only for currency fluctuation against the reference parity values according to the following mechanism;

EPC payables ($ portion) $_{(Adj.)}$ = PKR 1,379.93 million / 103× $E_{(PR)}$

EPC payables (Euro Portion) $_{(Adj.)}$ = PKR 50.77 million / 129.80 × $E_{(PR)}$

Where:

$E_{(PR)}$ = Respective Weighted Average PKR/EURO and PKR/US$ parity based upon timing of the payment

64. The tariff components i.e. Insurance, ROE, Principal Repayment and Interest Charges etc. shall be adjusted based on EPC currency fluctuation at COD and based on other project cost items that are allowed to be adjusted as prescribed in the determination

Adjustment due to Variation in Net Capacity

65. The reference tariff on RFO has been determined on the basis of minimum net capacity of 411.351 MW at delivery point at mean site conditions. All the tariff components except fuel cost component shall be adjusted at the time of COD based upon the Initial Dependable Capacity (IDC) tests to be carried out for determination of contracted capacity. Adjustment shall not be made if IDC is established less than 411.351 MW net capacity at reference site conditions. The adjustments shall be made according to the following formula:

$CC_{(Adj.)}$ = $CC_{(Ref)}$ x 411.351 / $NC_{(IDC)}$

$CC_{(Adj.)}$ = Adjusted relevant Capacity Charge components of tariff

$CC_{(Ref)}$ = Reference relevant Capacity Charge components of tariff

$NC_{(IDC)}$ = Net Capacity at reference site conditions established at the time of IDC test

Note:- Reference capacity charge components of Tariff i.e. Revised O&M Foreign, Revised O&M Local, Insurance, Debt Servicing., Return on Equity etc. to be adjusted as per IDC test.

66. The reference tariff on Gas/RLNG has been determined on the basis of minimum net capacity of 450.4777 MW at delivery point at mean site conditions. All the tariff components except fuel cost component shall be adjusted at the time of COD based upon the Initial Dependable Capacity (IDC) tests to be carried out for determination of

contracted capacity. Adjustment shall not be made if IDC is established less than 450.4777 MW net capacity at reference site conditions. The adjustments shall be made according to the following formula:

$CC_{(Adj.)} = CC_{(Ref)} \times 450.4777 / NC_{(IDC)}$

$CC_{(Adj)}$ = Adjusted relevant Capacity Charge components of tariff

$CC_{(Ref)}$ = Reference relevant Capacity Charge components of tariff

$NC_{(IDC)}$ = Net Capacity at reference site conditions established at the time of IDC test

Note:- Reference capacity charge components of Tariff i.e. Revised O&M Foreign, Revised O&M Local, Insurance, Debt Servicing., Return on Equity etc. to be adjusted as per IDC test.

Adjustment in Insurance as per actual

67. The actual insurance cost for the minimum cover required under contractual obligations with the Power Purchaser not exceeding 1.35% of the EPC cost will be treated as pass-through. Insurance component of reference tariff shall be adjusted as per actual on yearly basis upon production of authentic documentary evidence by NPGCL.

Adjustment in Return on Equity (ROE)

68. Return on Equity (on both fuel) will be quarterly adjusted on account of variation in PKR/US$ parity according to the following formula:

$ROE_{(Rev)} = ROE_{(Ref)} \times ER_{(Rev)} / 103$

Where;

$ROE_{(Rev)}$ = Revised ROE

$ROE_{(Ref)}$ = Reference ROE

$ER_{(Rev)}$ = The revised TT & OD selling rate of US dollar as notified by the National Bank of Pakistan

Indexations:

69. The following indexation shall be applicable to the reference tariff as follows;

a) **Indexation applicable to O&M**

The Fixed O&M local component of Capacity Charge will be adjusted on account of Inflation (CPI) and Fixed O&M foreign component on account of variation in US CPI and dollar/Rupee exchange rate. Quarterly adjustment for local inflation, foreign inflation and exchange rate variation will be made on 1" July, 1" October, in January and 1" April based on the latest available information with respect to CPI notified by the Federal Bureau of Statistics (FBS), US CPI issued by US Bureau of Labor Statistics and revised TT & OD selling rate of US Dollar notified by the National Bank of Pakistan. The mode of indexation will be as under:

Fixed O&M (RFO)

$F\ O\&M_{(LREV)}$ = Rs. 0.0898/kW/Hour × $CPI_{(REV)}$ / 195.13

$F\ O\&M_{(FREV)}$ = Rs. 0.1273/kW/Hour × US $CPI_{(REV)}$/234.722× $ER_{(REV)}$/101.7

Where:

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY NEPRA AUTHORITY

F O&M (LREV)	=	The revised applicable Fixed O&M Local Component of the Capacity Charge indexed with Local CPI
F O&M (FREV)	=	The revised applicable Fixed O&M Foreign Component of the Capacity Charge indexed with US CPI (All Urban) and Exchange Rate variation
CPI (REV)	=	The revised Local CPI (General)
US CPI (REV)	=	The revised US CPI (All Urban)
ER (REV)	=	the Revised TT & OD selling rate of US dollar as notified by the National Bank of Pakistan

ii) **Fixed O&M (Gas/RLNG)**

F O&M (LREV) = Rs. 0.0826/kW/Hour × CPI (REV) / 195.13

F O&M (FREV) = Rs. 0.1170/kW/Hour × US CPI (REV)/234.722× ER (REV)/101.7

Where:

F O&M (LREV)	=	The revised applicable Fixed O&M Local Component of the Capacity Charge indexed with Local CPI
F O&M (FREV)	=	The revised applicable Fixed O&M Foreign Component of the Capacity Charge indexed with US CPI (All Urban) and Exchange Rate variation
CPI (REV)	=	The revised Local CPI (General)
US CPI (REV)	=	The revised US CPI (All Urban)
ER (REV)	=	the Revised TT & OD selling rate of US dollar as notified by the National Bank of Pakistan

iii) **Variable O&M (RFO)**

The formula for indexation of variable O&M component will be as under:

V O&M (FREV) = Rs. 0.4800/kWh × US CPI (REV)/234.722 × ER (REV)/101.7

Where:

V O&M (FREV)	=	The revised applicable Variable O&M Foreign Component of the Capacity Charge indexed with US CPI and Exchange Rate variation
US CPI (REV)	=	The revised US CPI
ER (REV)	=	the Revised TT & OD selling rate of US dollar as notified by the National Bank of Pakistan

Note: The reference Variable O&M indicated above shall be replaced with the revised number at COD after incorporating the required adjustment based upon the IDC test

iv) **Variable O&M (Gas/RLNG)**

The formula for indexation of variable O&M component will be as under:

$V\ O\&M_{(FREV)}$ = Rs. 0.3435/kWh × $US\ CPI_{(REV)}$/234.722 × $ER_{(REV)}$/101.7

Where:

$V\ O\&M_{(FREV)}$ = The revised applicable Variable O&M Foreign Component of the Capacity Charge indexed with US CPI and Exchange Rate variation

$US\ CPI_{(REV)}$ = The revised US CPI

$ER_{(REV)}$ = the Revised TT & OD selling rate of US dollar as notified by the National Bank of Pakistan

Note: The reference Variable O&M indicated above shall be replaced with the revised number at COD after incorporating the required adjustment based upon the IDC test

v) **Adjustment for KIBOR variation**

The interest part of fixed charge component will remain unchanged throughout the term except for the adjustment due to variations in interest rate as a result of variation in 6 months KIBOR according to the following formula;

$\Delta I_{(L)}$ = $P_{(LREV)}$ × ($KIBOR_{(REV)}$ – 10.822%)/2

Where:

$\Delta I_{(L)}$ = the variation in interest charges corresponding to variation in biannual KIBOR. Δ I can be positive or negative depending upon whether $KIBOR_{(REV)}$ > or <10.822%. The interest payment obligation will be enhanced or reduced to the extent of Δ I for each half of an year under adjustment applicable on biannual basis

$P_{(LREV)}$ = is the outstanding principal (as indicated in the attached debt service schedule to this order) on 6 month basis on the relevant biannual calculations date. Period 1 shall commence on the date on which the first instalment is due after availing the grace period.

vi) **Fuel Price Variation (RFO)**

The Variable Charge Part of the tariff on RFO relating to fuel cost shall be adjusted on account of the fuel price variations according to the mechanism given below:

$FC_{(Rev)}$ = $FC_{(Ref)}$ × $FP_{(Rev)}$ / $FP_{(Ref)}$

Where:

$FC_{(Rev)}$ = Revised fuel cost component on RFO.

$FP_{(Rev)}$ = The new price of RFO per Metric Ton as per original OMC invoice

$FP_{(Ref)}$ = Reference RFO price of Rs 38,265 per ton (inclusive of transportation cost)

vii) **Fuel Price Variation (RFO)**

The Variable Charge Part of the tariff on Gas/RLNG relating to fuel cost shall be adjusted on account of the fuel price variations according to the mechanism given below:

$$FC_{(Rev)} = FC_{(Ref)} \times FP_{(Rev)} / FP_{(Ref)}$$

Where:

$FC_{(Rev)}$ = Revised fuel cost component on Gas/RLNG.

$FP_{(Rev)}$ = The new price of Gas/RLNG to be notified by the competent Authority/OGRA

$FP_{(Ref)}$ = Reference Gas/RLNG price of Rs 956.97/MMbtu

70. For one-time adjustment of relevant tariff components at COD according to the mechanism laid down in this order, NPGCL shall submit the relevant documents to NEPRA within 30 days of COD for adjustment.

Adjustment on account of Calorific value

71. The Adjustment on account of variation in calorific value will be allowed as per the following mechanism:
    a. The reference CV will be 18,364 Btu/lb. There will however be no adjustment below the minimum limit of 18,200 Btu/lb
    b. NPGCL shall maintain and submit, annually a detailed record of consignment wise CV of the oil received and consumed for power generation for the adjustment on account of variation against the reference CV duly supported with the copies of test reports certified by the fuel supplier

72. **Terms and Conditions of Tariff:**
    a. Capacity Charge Rs./kW/hour applicable to dependable capacity at the delivery point.
    b. The tariff is applicable for a period of 30 years commencing from the date of the Commercial Operation.
    c. All new equipment will be installed and the plant will be of standard configuration.
    d. Dispatch criterion will be based on the Energy Charge.
    e. Scheduled Outage periods per annum shall be in accordance with the 2006 standardized PPA.
    f. NTDC will be responsible for constructing the interconnection to the grid.
    g. All invoicing and payment terms are assumed to be in accordance with the 2006 standardized PPA.
    h. Tolerance in Dispatch shall be in accordance with 2006 standardized PPA.
    i. If there is any change in any assumption that may lead to change in the tariff shall be referred to NEPRA for approval.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY NEPRA AUTHORITY

j. 100% of debt has been assumed to be local provided however that in the event NPGCL uses a mix of foreign and local loan, the future benefits of the lower interest rates shall be passed on to the Power Purchaser.

k. No corporate income tax and no minimum turnover tax have been assumed.

l. Working capital has been financed by a separate Working Capital facility, and is not included in the project cost.

73. The above tariff and terms and conditions be incorporated in the Power Purchase Agreement between NPGCL (Nandipur power project) and CPPA-G. In the absence of PPA, the Petitioner will receive the capacity payment on units delivered basis

74. The above determination is intimated to the Federal Government for notification in the official gazette under section 31(4) of the Regulations of Generation, Transmission, and Distribution of Electric Power Act, 1997.

AUTHORITY

(Khawaja Muhammad Naeem)
Member

(Maj. (R) Haroon Rashid)
Member

(Himayat Ullah Khan)
Member

(Syed Masood ul Hassan Naqvi)
Member

(Brig (R) Tariq Saddozai)
Chairman

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA AUTHORITY

27.01.16

NPGCL's 411 MW Nandipur Combined Cycle Power Plant Operation on RFO

Month	Energy Purchase Price (Rs/kWh)			Capacity Purchase Price (Rs/kW/Month)									
		O&M Foreign	O&M Local			Cost of Fuel W/C							
1	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.2344	0.8746	2.3930	3.9884	11.9931	11.6438
2	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.2604	0.8486	2.3930	3.9884	11.9931	11.6438
3	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.2894	0.8196	2.3930	3.9884	11.9931	11.6438
4	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.3215	0.7875	2.3930	3.9884	11.9931	11.6438
5	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1218	0.8237	0.3573	0.7517	2.3930	3.9884	11.9931	11.6438
6	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1218	0.8237	0.3970	0.7120	2.3930	3.9884	11.9931	11.6438
7	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.4411	0.6679	2.3930	3.9884	11.9931	11.6438
8	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.4902	0.6188	2.3930	3.9884	11.9931	11.6438
9	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.5446	0.5644	2.3930	3.9884	11.9931	11.6438
10	7.5247	0.4800	8.0047	0.0898	0.1273	0.12	0.1219	0.8237	0.6052	0.5038	2.3930	3.9884	11.9931	11.6438
11	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.6724	0.4366	2.3930	3.9884	11.9931	11.6438
12	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.7472	0.3618	2.3930	3.9884	11.9931	11.6438
13	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.8302	0.2788	2.3930	3.9884	11.9931	11.6438
14	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.9225	0.1865	2.3930	3.9884	11.9931	11.6438
15	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	1.0251	0.0839	2.3930	3.9884	11.9931	11.6438
16	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.0000	0.0000	1.2840	2.1400	10.1447	9.8493
17	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.0000	0.0000	1.2840	2.1400	10.1447	9.8493
18	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.0000	0.0000	1.2840	2.1400	10.1447	9.8493
19	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.0000	0.0000	1.2840	2.1400	10.1447	9.8493
20	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.0000	0.0000	1.2840	2.1400	10.1447	9.8493
21	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.0000	0.0000	1.2840	2.1400	10.1447	9.8493
22	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1218	0.8237	0.0000	0.0000	1.2840	2.1400	10.1447	9.8493
23	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.0000	0.0000	1.2840	2.1400	10.1447	9.8493
24	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.0000	0.0000	1.2840	2.1400	10.1447	9.8493
25	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.0000	0.0000	1.2840	2.1400	10.1447	9.8493
26	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.0000	0.0000	1.2840	2.1400	10.1447	9.8493
27	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.0000	0.0000	1.2840	2.1400	10.1447	9.8493
28	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.0000	0.0000	1.2840	2.1400	10.1447	9.8493
29	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.0000	0.0000	1.2840	2.1400	10.1447	9.8493
30	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.0000	0.0000	1.2840	2.1400	10.1447	9.8493
Average														
1-15	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.5426	0.5684	2.3930	3.9884	11.9931	11.6438
16-30	7.5247	0.4800	8.0047	0.0896	0.1273	0.1213	0.1219	0.8237	0.0000	0.0000	1.2840	2.1400	10.1447	9.8493
1-30	7.5247	0.4800	8.0047	0.0896	0.1273	0.1213	0.1219	0.8237	0.2713	0.2832	1.8385	3.0642	11.0689	10.7465
Levelized														
1-30	7.5247	0.4800	8.0047	0.0898	0.1273	0.1213	0.1219	0.8237	0.3642	0.5306	2.1788	3.6314	11.6361	11.2971

Net Capacity (MW)	411.3510
Reference US CPI	234.722
Reference Local CPI	195.13
Net Thermal Efficiency	45.00%
Levelized Tariff (@ 60% plant Factor) Rs /kWh	11.6361

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA AUTHORITY

NPGCL's 450 MW Nandipur Combined Cycle Power Plant Operation on Gas

1	6 6636	0 3435	7.0071	0 0826	0.1170	0.0405	0.1113	0.7760	0.2247	0.8385	2.1905	3 6509	10 6580	10.3475
2	6 6636	0 3435	7.0071	0 0826	0.1170	0.0405	0.1113	0.7760	0.2497	0.8135	2.1905	3 6509	10 6580	10.3475
3	6 6636	0 3435	7.0071	0 0826	0.1170	0.0405	0.1113	0.7760	0.2774	0.7858	2.1905	3 6509	10 6580	10.3475
4	6 6636	0 3435	7.0071	0 0826	0.1170	0.0405	0.1113	0.7760	0.3083	0.7549	2.1905	3 6509	10 6580	10.3475
5	6 6636	0 3435	7.0071	0 0826	0.1170	0 0405	0.1113	0.7760	0 3425	0 7207	2.1905	3.6509	10.6580	10.3475
6	6 6636	0 3435	7.0071	0 0826	0.1170	0 0405	0.1113	0.7760	0 3806	0 6826	2.1905	3.6509	10.6580	10.3475
7	6 6636	0 3435	7.0071	0 0826	0.1170	0 0405	0.1113	0.7760	0 4229	0 6403	2.1905	3.6509	10.6580	10.3475
8	6 6636	0.3435	7.0071	0.0826	0.1170	0.0405	0.1113	0.7760	0 4699	0 5933	2.1905	3.6509	10.6580	10.3475
8	6 6636	0.3435	7.0071	0.0826	0.1170	0.0405	0.1113	0.7760	0 5221	0 5410	2 1905	3.6509	10 6580	10.3475
10	6 6636	0.3435	7.0071	0.0826	0.1170	0.04	0.1113	0.7760	0 5802	0 4830	2 1905	3.6509	10 6580	10.3475
11	6 6636	0.3435	7.0071	0.0826	0.1170	0.0405	0.1113	0.7760	0 6447	0 4185	2 1905	3.6509	10 6580	10.3475
12	6 6636	0.3435	7.0071	0 0826	0.1170	0.0405	0.1113	0.7760	0.7163	0.3469	2.1905	3.6509	10.6580	10.3475
13	6 6636	0.3435	7.0071	0 0826	0.1170	0.0405	0.1113	0.7760	0.7959	0.2672	2.1905	3.6509	10.6580	10.3475
14	6 6636	0.3435	7.0071	0 0826	0.1170	0.0405	0.1113	0.7760	0.8844	0.1788	2.1905	3.6509	10.6580	10.3475
15	6 6636	0.3435	7.0071	0 0826	0.1170	0.0405	0.1113	0.7760	0.9827	0.0805	2.1905	3.6509	10.6580	10.3475
16	6 6636	0.3435	7.0071	0 0826	0.1170	0.0405	0.1113	0.7760	0.0000	0.0000	1.1273	1.8789	8.8860	8.6272
17	6 6636	0.3435	7.0071	0 0826	0.1170	0.0405	0.1113	0.7760	0.0000	0.0000	1.1273	1 6789	8.8860	8.6272
18	6 6636	0.3435	7.0071	0 0826	0.1170	0.0405	0.1113	0.7760	0.0000	0.0000	1.1273	1 6789	8.8860	8.6272
18	6 6636	0 3435	7.0071	0.0826	0.1170	0.0405	0.1113	0.7760	0.0000	0.0000	1.1273	1 8789	8.8860	8.6272
20	6 6636	0 3435	7.0071	0.0826	0.1170	0.0405	0.1113	0 7760	0 0000	0 0000	1.1273	1 6789	8.8860	6 6272
21	6 6636	0 3435	7.0071	0.0826	0.1170	0.0405	0.1113	0 7760	0 0000	0 0000	1.1273	1.6789	8.8860	6 6272
22	6 6636	0 3435	7.0071	0.0826	8.1170	0.0405	0.1113	0 7760	0 0000	0 0000	1.1273	1.8789	6.8860	6 6272
26	6 6636	0.3435	7.0071	0 0826	0.1170	0.0405	0.1113	0 7760	0 0000	0 0000	1.1273	1.8789	6.8860	8 6272
24	6 6636	0.3435	7.0071	0 0826	0.1170	0 0405	0.1113	0 7760	0 0000	0 0000	1.1273	1 8789	8 8860	8 6272
25	6 6636	0.3435	7.0071	0 0826	0.1170	0 0405	0.1113	0 7760	0 0000	0 0000	1.1273	1 6789	6 8860	8 6272
26	6 6636	0.3435	7.0071	0 0826	0.1170	0 0405	0.1113	0 7760	0 0000	0 0000	1.1273	1 8789	6 8860	8 6272
27	6.6636	0.3435	7.0071	0 0826	0.1170	0.0405	0.1113	0 7760	0 0000	0.0000	1.1273	1.8789	8.8860	8.6272
28	6 6636	0.3435	7.0071	0 0826	0.1170	0.0405	0.1113	0 7760	0 0000	0.0000	1.1273	1.8789	6.8860	8.6272
29	6 6636	0.3435	7.0071	0 0826	0.1170	0.0405	0.1113	0 7760	0 0000	0.0000	1.1273	1.8789	8.8860	8.6272
30	6 6636	0.3435	7.0071	0 0826	0.1170	0.0405	0.1113	0 7760	0 0000	0.0000	1.1273	1.8789	8.8860	8.6272
Average														
1-15	8 6636	0 3435	7.0071	0 0826	0.1170	0.0405	0.1113	0.7760	0.5202	0.5430	2 1905	3.6509	10.6580	10 3475
16-30	6 6636	0 3435	7.0071	0 0826	0.1170	0.0405	0.1113	0.7760	0.0000	0.0000	1 1273	1.8789	8.8580	8 6272
1-30	6 6636	0 3435	7.0071	0 0826	0.1170	0.0405	0.1113	0.7760	0.2601	0.2715	1 6589	2.7649	9.7720	9 4673
Levelized														
1-30	6 6636	0.3435	7.0071	0.0826	0.1170	8.0405	0.1113	0.7760	0.3491	0.5087	1.9852	3.3086	10.32	10.0152

Net Capacity (MW)	450.4777
Reference US CPI	234.722
Reference Local CPI	195.13
Net Thermal Efficiency	49.00%
Levelized Tariff (@ 60% plant Factor) Rs /kWh	10.3157

Debt Servicing Schedule (RFO)

Net Capacity	411.35
No of hours in a year	8,760
Generation	3,603
Loan Amount	29,327
Loan Repayment Years	15
Instalments per annum	2
No of Instalments	30
KIBOR 6 Months	8.53%
Spread	2.29%
Effective Interest Rate	**10.822%**

Year	Quarter	Principal Amount Million Rs.	Repayment Million Rs.	Mark Up Million Rs.	Debt Service Million Rs.	Principal Amount Million Rs.	Annual Principal Repayment Rs/Kw/hr	Annual Interest Rs/kW/hr	Annual Debt Serving Rs/kW/hr
1	1	29,327	411	1,587	1,998	28,916			
	2	28,916	433	1,565	1,998	28,482	0 2344	0.8746	1.1090
2	3	28,482	457	1,541	1,998	28,026			
	4	28,026	482	1,517	1,998	27,544	0 2604	0.8486	1.1090
3	5	27,544	508	1,490	1,998	27,036			
	6	27,036	535	1,463	1,998	26,501	0.2894	0.8196	1.1090
4	7	26,501	564	1,434	1,998	25,937			
	8	25,937	595	1,404	1,998	25,343	0.3215	0.7875	1.1090
5	9	25,343	627	1,371	1,998	24,716			
	10	24,716	661	1,337	1,998	24,055	0.3573	0.7517	1.1090
6	11	24,055	696	1,302	1,998	23,359			
	12	23,359	734	1,264	1,998	22,625	0.3970	0.7120	1.1090
7	13	22,625	774	1,224	1,998	21,851			
	14	21,851	816	1,182	1,998	21,035	0.4411	0.6679	1.1090
8	15	21,035	860	1,138	1,998	20,175			
	16	20,175	906	1,092	1,998	19,269	0.4902	0.6188	1.1090
9	17	19,269	955	1,043	1,998	18,313			
	18	18,313	1,007	991	1,998	17,306	0.5446	0.5644	1.1090
10	19	17,306	1,062	936	1,998	16,244			
	20	16,244	1,119	879	1,998	15,125	0.6052	0.5038	1.1090
11	21	15,125	1,180	818	1,998	13,946			
	22	13,946	1,243	755	1,998	12,702	0.6724	0.4366	1.1090
12	23	12,702	1,311	687	1,998	11,391			
	24	11,391	1,382	616	1,998	10,010	0.7472	0.3618	1.1090
13	25	10,010	1,456	542	1,998	8,553			
	26	8,553	1,535	463	1,998	7,018	0.8302	0.2788	1.1090
14	27	7,018	1,618	380	1,998	5,400			
	28	5,400	1,706	292	1,998	3,694	0.9225	0.1865	1.1090
15	29	3,694	1,798	200	1,998	1,896			
	30	1,896	1,896	103	1,998	(0)	1.0251	0.0839	1.1090

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

Debt Servicing Schedule (Gas/RLNG)

Net Capacity	450.48
No of hours in a year	8,760
Generation	3,946
Loan Amount	30,790
Loan Repayment Years	15
Instalments per annum	2
No of Instalments	30
KIBOR 6 Months	8.53%
Spread	2.29%
Effective Interest Rate	**10.822%**

Year	Quarter	Principal Amount Million Rs.	Repayment Million Rs.	Mark Up Million Rs.	Debt Service Million Rs.	Principal Amount Million Rs.	Annual Principal Repayment Rs/Kw/hr	Annual Interest Rs/kW/hr	Annual Debt Serving Rs/kW/hr
1	1	30,790	432	1,666	2,098	30,358			
	2	30,358	455	1,643	2,098	29,903	0.2247	0.8385	1.0632
2	3	29,903	480	1,618	2,098	29,423			
	4	29,423	506	1,592	2,098	28,918	0.2497	0.8135	1.0632
3	5	28,918	533	1,565	2,098	28,385			
	6	28,385	562	1,536	2,098	27,823	0.2774	0.7858	1.0632
4	7	27,823	592	1,506	2,098	27,231			
	8	27,231	624	1,474	2,098	26,607	0.3083	0.7549	1.0632
5	9	26,607	658	1,440	2,098	25,949			
	10	25,949	694	1,404	2,098	25,255	0.3425	0.7207	1.0632
6	11	25,255	731	1,367	2,098	24,524			
	12	24,524	771	1,327	2,098	23,753	0.3806	0.6826	1.0632
7	13	23,753	812	1,285	2,098	22,941			
	14	22,941	856	1,241	2,098	22,084	0.4229	0.6403	1.0632
8	15	22,084	903	1,195	2,098	21,181			
	16	21,181	952	1,146	2,098	20,230	0.4699	0.5933	1.0632
9	17	20,230	1,003	1,095	2,098	19,227			
	18	19,227	1,057	1,040	2,098	18,169	0.5221	0.5410	1.0632
10	19	18,169	1,115	983	2,098	17,055			
	20	17,055	1,175	923	2,098	15,880	0.5802	0.4830	1.0632
11	21	15,880	1,238	859	2,098	14,641			
	22	14,641	1,306	792	2,098	13,336	0.6447	0.4185	1.0632
12	23	13,336	1,376	722	2,098	11,960			
	24	11,960	1,451	647	2,098	10,509	0.7163	0.3469	1.0632
13	25	10,509	1,529	569	2,098	8,980			
	26	8,980	1,612	486	2,098	7,368	0.7959	0.2672	1.0632
14	27	7,368	1,699	399	2,098	5,669			
	28	5,669	1,791	307	2,098	3,878	0.8844	0.1788	1.0632
15	29	3,878	1,888	210	2,098	1,990			
	30	1,990	1,990	108	2,098	0	0.9827	0.0805	1.0632

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA AUTHORITY