



National Electric Power Regulatory Authority
Islamic Republic of Pakistan

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No. NEPRA/TRF-TCUT-2017/13031-13033
July 27, 2017

Subject: **Determination of the Authority in the Matter of Upfront Generation Tariff for the Projects on Thar Coal**

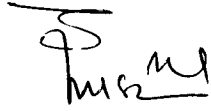
Dear Sir,

Please find enclosed herewith the subject Determination of the Authority along with Annex-1, 1A, 2, 2A, 3, 3A, 4, 4A, 5, 5A, 6, 6A, 7, 7A, 8 & 8A (52 pages).

2. The Determination 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 (XL of 1997).

3. The Order of the Authority along with 16 Annexures (Annex-1, 1A, 2, 2A, 3, 3A, 4, 4A, 5, 5A, 6, 6A, 7, 7A, 8 & 8A) of the Determination needs to be notified in the official Gazette.

Enclosure: As above


27.07.17
(Syed Safer Hussain)

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

CC:

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

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
(NEPRA)

DETERMINATION

IN THE MATTER OF UPFRONT GENERATION TARIFF FOR THE
PROJECTS ON THAR COAL

July ~~27~~ 2017

Intervener:

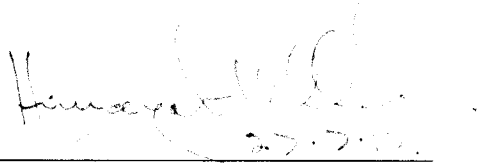
1. Anwar Kamal Law Associates

Commentators:

1. Qureshi Law Associates
2. Fatima Electric Company Limited
3. Sind Engro Coal Mining Company
4. Ministry of Water and Power
5. Government of Sindh
6. Sindh Board of Investment
7. Lucky Electric Power Company
8. Shanghai Electric
9. Syed Akhtar Ali

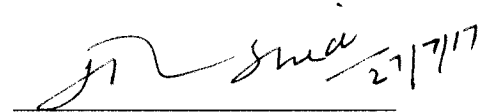
This determination is being given in accordance with the Regulation 3 of the Upfront Tariff (Approval & Procedure) Regulations, 2011. An applicant can opt for the Upfront Generation Tariff on Thar coal once notified in the Official gazette pursuant to section 31(4) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (XL of 1997).

Authority



(Himayat Ullah Khan)

Member



(Maj (R) Haroon Rashid)

Member



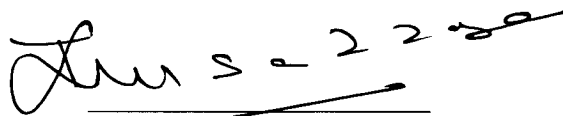
(Syed Masood Ali Hassan Naqvi)

Member



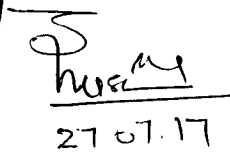
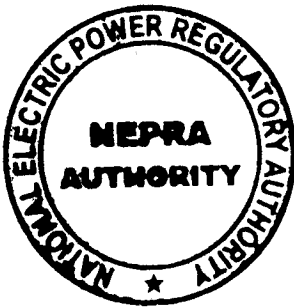
(Saif Ullah Chattha)

Vice Chairman 27-7-2017



Brig (R) Tariq Saddozai

Chairman



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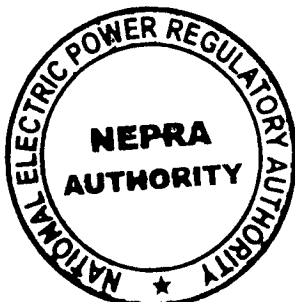
1. BACKGROUND

- 1.1. The previous upfront tariff for Thar coal based power plants was determined on July 09, 2014 which was notified by Ministry of Water & Power on January 20, 2015. The validity of the upfront tariff was two years from the date of its notification. The tariff expired on 19th January 2017.
- 1.2. Following projects were approved under the previous upfront tariff:

Project Name	Block	Units	Gross Capacity
Engro PowerGen Thar (Pvt) Limited	II	2x330MW	660 MW
ThalNova Power Thar (Pvt) Limited	II	1x330MW	330 MW
Thar Energy Limited	II	1x330MW	330 MW
Thar Coal Block-I Power Generation Co. (Pvt) Limited	I	2x660MW	1,320 MW
Total			2,640 MW

2. INITIATION OF PROCEEDINGS FOR NEW TARIFF

- 2.1. The Authority decided to initiate proceedings for determination of new tariff for future Thar coal power projects. Accordingly, following issues were framed to seek input from the stakeholders:
- Whether the Authority should determine another upfront tariff with revised benchmarks keeping in view the improvements in latest technology and reduced risks as first movers have already borne the first movers' risks?
 - Whether the Authority should determine benchmark tariff for competitive bidding under Competitive Bidding Tariff (Approval Procedure) Regulations, 2014 for new power projects on Thar coal?
 - If new tariff is determined under either upfront or competitive regime, whether the cost-plus regime shall remain available?
 - Whether only such coal power plants may be allowed which have low cooling water requirement for future power generation at Thar?
- 2.2. The above issues were made public through an advertisement in the leading newspapers on January 13, 2017 inviting stakeholders to become party to the proceedings by filing intervention request in the matter within 15 days. The stakeholders were also invited to file comments for assistance of the Authority within 15 days. Individual Notices were also sent to all concerned on January 19, 2017.





2.3. The Authority vide letter dated January 13, 2017 also solicited Ministry of Water & Power's point of view as to how many more MWs from Thar Coal are being envisaged along with time frame. A reminder in the matter was also sent on March 15, 2017. The Ministry vide letter No. Tariff/I.L Coal-2013 dated March 24, 2017 provided its comments in the matter.

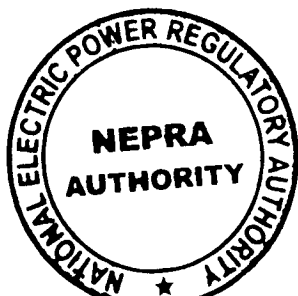
3. **COMMENTS FROM STAKEHOLDERS**

3.1. In response to the public notice, following stakeholders filed comments in the matter:

- i. Qureshi Law Associates
- ii. Fatima Electric Company Limited
- iii. Sindh Engro Coal Mining Company (SECMC)

3.2. The summary of the comments are as under:

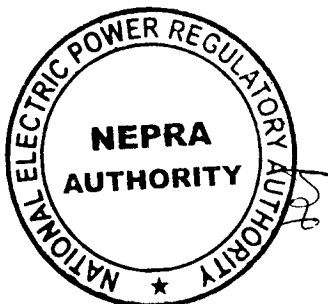
Issues	Qureshi Law Associates	Fatima Electric Company Limited	Sindh Engro Coal Mining Company
1. Whether the Authority should determine another upfront tariff with revised benchmarks keeping in view the improvements in the latest technology and reduced risk as first movers have already borne the first movers' risk?	Lower world-wide demand for coal and higher production efficiencies lead to lower EPC costs, however, this may be counterbalanced with expensive land/rent in Thar, higher labor/ O&M costs and higher interest rates.	The same upfront tariff may please be extended for at least next two years or first 10,000 MW.	No comments
2. Whether the Authority should determine benchmark tariff for competitive bidding under	ICB is a cumbersome procedure and an upfront tariff on take it or leave it basis remains the more viable option.	It would be more prudent strategy to openly invite interest of sponsors through extension of upfront tariff to	No comments





Competitive Bidding Tariff (Approval Procedure) Regulation, 2014 for new power projects on Thar coal?		get maximum projects so that first target of 10,000 MW is achieved.	
3. If new tariff is determined under either upfront or competitive regime, whether the cost-plus regime shall remain available?	There needs to be a fall back procedure for investors who are unsatisfied with either the upfront coal tariff or perhaps due to some technology specific reason.	Provision of cost plus may please be continued in parallel with upfront tariff.	No comments
4. Whether only such coal power plants may be allowed which have low cooling water requirement for future generation at Thar?	Second this proposition for low cooling water requirements in the parched Thar area being made compulsory.	There should be a check on certain amount of water for power generation so that judicious use of water is ensured.	Water is a scarce resource in Thar Desert and as an option IPP developers can opt for air cooled or hybrid cooled solutions for their power plants. Therefore, the tariff should include the use of efficient water consumption technologies.

3.3. SECMC also submitted that in the event of the prevalent suspension imposed on imported fuels, a surge in interest from potential IPP developers to develop power plants based on Thar coal has been witnessed. SECMC further submitted that since mining is a scale business, Thar coal will become cheaper than the imported coal as

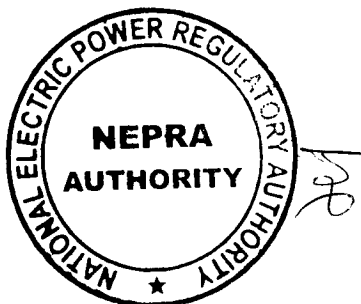


the mine expands, therefore, it is essential that mining projects are expanded as much early as possible.

- 3.4. Energy Department, Government of Sindh vide its letter No. SO (Tech)/ ED/ (Coal)/ 1 – 40/2017, dated January 19, 2017 stated that the Government of Sindh has been approached by a number of such project developers, whose projects are already list under the CPEC Priority Projects, for an extension in upfront tariff for two months. We hereby support and forward this request to NEPRA on behalf of projects that are already listed in CPEC list of projects for favorable consideration by NEPRA.

4. FRAMING OF ISSUES FOR THE HEARING

- 4.1. The Authority considered the views of the stakeholders and decided to hold a hearing in the matter. Accordingly, the following issues were framed and approved for the hearing:
- i. Whether the Authority should determine another upfront tariff with revised benchmarks keeping in view the improvements in technology and reduced risks as investors have already borne the first movers risks?
 - ii. Whether the Authority should determine benchmark tariff for competitive bidding under Competitive Bidding Tariff (Approval Procedure) Regulations, 2014 for new power projects on Thar coal?
 - iii. If new tariff is determined under either upfront or competitive regime, whether the cost-plus regime option should be available?
 - iv. Whether only such coal power plants may be allowed which have low cooling water requirement for future power generation at Thar?
 - v. What shall be the reasonable IRR on equity for future Thar coal power projects keeping in view the reduced risks?
 - vi. What shall be the appropriate thermal efficiency levels for future Thar coal power projects?
 - vii. What shall be the appropriate capital cost for future Thar coal power projects?
 - viii. Whether the construction period of 40 months and 48 months for 330MW and 660MW/1,099MW projects respectively is reasonable?
 - ix. Whether other operating costs as given in the previous upfront Thar tariff should be reduced?





- x. Any other issue with the approval of the Authority.

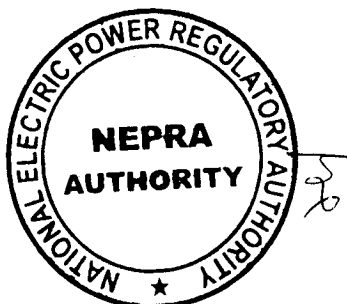
5. NOTICE OF HEARING

- 5.1. The Authority decided to hold a hearing in the matter on March 28, 2017. Notice of hearing along with issues framed for the hearing was made public in leading national newspapers on March 12, 2017 inviting stakeholders to participate in the hearing. The stakeholders were also invited to file comments in the matter within 14 days. Individual notices were also sent to important stakeholders on March 17, 2017.

6. INTERVENTION REQUEST

- 6.1. Anwar Kamal Law Associates (AKLA) vide letter No. R/NEPRA/203/17 dated 25th March 2017 filed an intervention request which is summarized below:

- AKLA has requested the Authority to consider its earlier letters on issues of surplus capacity & underutilization of power plants and the induction of new power plants on 'Take or Pay' basis.
- The available generation capacity of several base load plants has not been utilized to its full.
- Due to non-utilization of the available generation capacity and the nature of long-term PPA/EPA, the consumers are paying for the capacity which power is not being provided.
- The cost per unit of power purchase from several power plants in many months may be in the range of above Rs. 100/kWh.
- Upfront Regulation may be a prudent instrument for a competitive Power Sector but it is not effective for a strictly Regulated Power Sector. The technical, financial and economic feasibility of Power Projects cannot be the same at different locations, how will an Upfront Tariff be best suited for the Investors and the Consumers?
- Another drawback of upfront tariff is that in the approval of an Upfront Tariff there is no provision for stakeholder participation especially the electricity consumers.
- The commercial viability of Thar Coal is still a question, the development of Upfront Tariff to induct more and more Power Plants with long term PPAs and that too on 'Take or Pay' basis may not be prudent and appropriate.

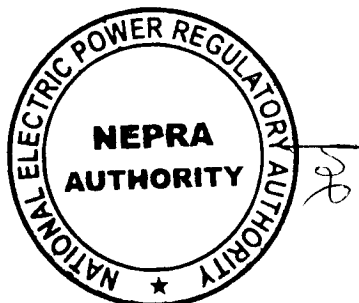


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- Decisions with regards to coal power plants may be made after the outcome of the study under the Paris Agreement of the United Nations Framework Convention on Climate Change.
- In case any investor wants to put its plant on 'Take and Pay' basis, there will be no harm in facilitating the same through Upfront Tariff.
- Financial and Economic viability of the induction of Power Plants be analyzed in detail.
- It is pertinent to mention that the electricity Tariff in Pakistan is already higher in the Region and even the benefit of the crash in the international prices of oil has not been passed on in full to the consumers in Pakistan.
- In addition to paying for idle Capacity, CPPA is also paying 'Partial Load Adjustment Charges' (PLAC) to many Power Plants for the reason that on the instructions of the National Power Control Centre (NPCC), the System Operator, these Power Plants were not utilized to their full Capacity.
- Efforts should be made to utilize the available power generation capacity to its full and then to go for setting up new power plants. Efforts should also be made to encourage investors to setup their power plants to be operated under 'Take and Pay' regimes in a competitive power market.
- Many Industrial Estates in Punjab and Khyber Pakhtunkhwa have published 'Expression of Interest' for purchase of power from IPPs. It will mean that the demand growth of CPPA system may go down. In this case, how will CPPA be able to pay the power producers with which it has executed long term PPAs on 'Take or Pay' basis, and that too for a period of 25 to 30 years?
- AKLA requested the Authority not to determine any upfront Tariff for 'Take or Pay' or 'Must Run' power plants.

7. COMMENTS FROM STAKEHOLDERS

- 7.1. In response to the notice of hearing, following stakeholders filed comments in the matter:
- i. Ministry Water & Power
 - ii. Government of Sindh
 - iii. Sindh Board of Investment
 - iv. Lucky Electric Power Company





- v. Shanghai Electric
- vi. Syed Akhtar Ali

Ministry of Water & Power

7.2. Ministry of Water & Power provided following comments in the matter:

- a. The upfront tariff for Thar coal projects was incentivized due to lack of investors' interest, uncertainty regarding infrastructure connectivity with Thar coal field and high rate of interest prevailing in Pakistan.
- b. It is necessary to review the tariff assumptions after the success achieved in bringing in investors' interest especially after CPEC investment. Since it is the only indigenous thermal source available, it is important to keep investment in Thar coalfield an attractive proposition.
- c. Three blocks of Thar coal are included in CPEC and in order to provide economies of scale, each block must achieve a capacity of more than 15 – 20 million tons per annum, which means generation of around 7,500 – 9,000 MW cumulatively. At present, tariff on Thar coal is available to projects of around 3,600 MWs.
- d. Given the above, the following improvements in tariff are proposed:
 - i. **EPC Cost:** The cost of machinery is 10-15% lower than those estimated in the previous Upfront Tariff.
 - ii. **Project Completion Time:** It has been observed during the construction being carried out on coal plants in the country these days that an efficient management can complete the project in 30 months after Financial Close. It is proposed that the COD time allowed after FC should be reduced to 30 months to provide for efficient project management.
 - iii. **Cost of Water Pipeline:** The cost of water pipeline from Vajihar to the project site is estimated to be at least 50% higher than the actual.
 - iv. **Loan Tenure:** The period of 10 years for loan repayment also increases load on the initial 10 years of tariff. The same may be increased from 10 years to 13 or 15 years.
 - v. **IRR:** The policy interest rate has now come down to 5.75% from 9.50% in 2014. This requires a matching rationalization in the IRR especially when the uncertainties in investment on Thar Coal based power plant have reduced considerably.



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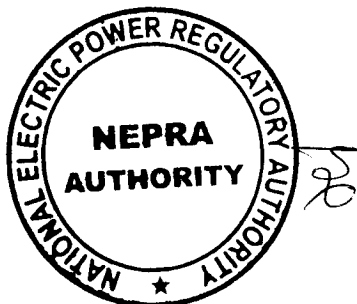


- vi. **Price of coal:** There has been the practice of giving extension to the high IRR for coal mining sponsors, which due to the above reasons is no longer justified. It would be appropriate that the coal tariff for the purpose of power generation is capped appropriately at the rates commensurate with the economy of scale at 20 million tons per annum.
 - vii. **Type of Tariff:** Although the best option for any competitive tariff is through reverse bidding, its applicability for Thar Coal based power is limited because there are only three available sites with three sponsors who are licensees for the mines or their nominees.
 - viii. **Cooling System:** The previous tariffs have been on the basis of water cooling system which would limit the mine mouth capacity to 3000-5000 MWs. It is therefore suggested that the new tariff incentivize projects with air-cooling system (which save around 80% on the water requirement).
 - ix. **Environmental concerns:** It is suggested that the new tariff should accommodate projects only on Super Critical or better technology and there should be no tariff for plants of lower specifications than Super Critical.
- e. The Ministry is of the view that the above improvements in tariff will bring down the levelized tariff by around 15-20% from the existing upfront tariff. It will also help in conservation/optimum utilization of the scarce water resources while containing environmental challenges.

Sindh Board of Investment (SBOI) & Government of Sindh (GoS)

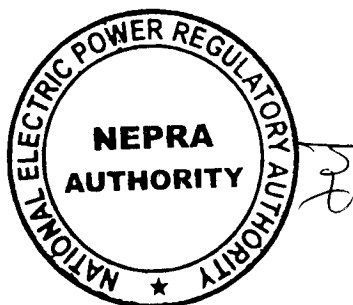
7.3. SBOI vide letter No. PS/Chairperson/SBI/Misc/2017, dated April 4, 2017 and GoS vide letter No. SO(Tech)/ED/(Coal)1-40/2017, dated April 6, 2017 filed following comments in the matter:

- To continue and re-notify the lapsed tariff which shall assure investors of an IRR of 20% and to maintain a consistent incentive policy to safeguard and encourage domestic and international investment in Thar mining and power generation.
- The current tariff was allowed to lapse without according due notice to investors as required and stated in the regulators rules.
- Allowing a 'no existing tariff' regime to exist has sent a signal of uncertainty and mistrust to investors and markets.





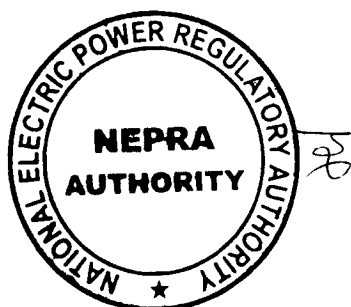
- Pakistan is an energy deficient market with 3500 MW of load shedding on daily basis. The cost to economy of an unsupplied kWh translates into more than USD 30 billion/annum.
- Thar coal is in its nascent stage of development and any reduction in tariff will render irreparable damage to the momentum towards energy achieving autarky.
- Even if there is a possibility of reducing tariff, it will be unwise at this stage when Thar coal lease holders have spent tens of millions of dollars towards the mine development and are on the threshold of launching an integrated investment plan of billions of dollars for Thar coal development.
- SBOI endorses reduction in the cost of producing electricity but firmly believe that such a reduction is only sustainable in the long run by promoting economies of scale in coal mining rather than upsetting investor returns through policy reversals.
- It is estimated that a one percent decrease in return through a tariff reduction of a few cents will result in a cost saving of 3 million USD. However, this is a onetime saving, as with every decrease in ROI, there is a multiplying reduction in investments interests. However, the cost saving accounted for at full utilization of GoS' Thar mining plan of 20 million tons per year will be 11 million USD per year. Economies of scale will result in the decrease of coal price from 60 USD per ton to 28 USD per ton at full capacity of mine.
- Cost of fuel contributes more than 50% of tariff, therefore, the decrease in coal price will translate into a significant decrease in tariff over the life of mining in Thar.
- Mine developers cannot firm-up Coal Supply Agreements for downstream power plants if policies and tariff regimes are subject to quick changes.
- In 2002, a Chinese company Shenhua made a competitive proposal to establish an integrated mining and power project, however, the proposal fell through on account of unreasonable negotiations over 0.5 Cents/kWh and the chance at achieving energy security and bringing prosperity to many of our people lost out for over a decade.
- Fiscal incentives alone may not be the triggering point for investments. The convergences of regional strategic interests are the catalyst that drives such development.



- The CPEC program has generated global investor interest in Thar. In case of inconsistent policies on tariff, Investors will not remain engaged in Thar and will divert attention to other resource reservoirs and business opportunities across the globe.
- Regarding EPC cost, the baseline costs of steel, copper and other commodities have registered a rise from the time the last Feed-in-Tariff (FIT) was determined. EPC costs are directly correlated with oil prices which have arisen by an astounding 79% last year.
- The proposal to extend the tenor of debt beyond ten years by MW&P is completely divorced from reality. No local or foreign bank is willing to extend the tenor for debt beyond 10 years.
- Similarly, the proposal to introduce reverse bidding is nothing but a rouse which is non-practical and out of tune with ground realities. Competitive bidding of tariffs is only possible if market dynamics reflect efficiencies. Current market size does not warrant competitive bidding and may most likely be counterproductive. Competitive bidding should not be reviewed in isolation of the market and industry environment and status of investment in the energy sector.
- In conclusion, any move to revise the tariff downward will serve to primarily destabilize development of a valuable national resource and discourage investment of billions of dollars in the economy.
- GoS also requested to extend the previous FIT for another two years.

7.4. Lucky Electric Power Company vide letter LEP/PD/135, dated March 14, 2017, filed following comments:

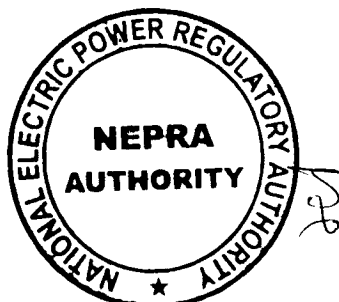
- The coal deposits are sufficient to ensure fuel supply for generation of electricity in huge quantum while available cooling water reserves are scarce and limit the exploitation of maximum capacity of power generation.
- Thar coal, being available in abundance provides an alternate/ substitute to imported coal, in line with GoP policy to reduce reliance on imported fuels and save foreign exchange besides providing energy security to the Country.
- To exploit Thar coal potential in full, The coal in the long run will have to be transported away from Thar to other parts of the country to feed the power generation plants.



- Given the above, the Authority should also consider regarding applicability of new tariff for power generation based on Thar coal to upcoming power generation plants based outside Thar region utilizing Thar coal.

7.5. Shanghai Electric vide letter dated March 24, 2017, filed comments which are summarized below:

- The detailed and prospective planning of power projects investment and construction will be the key to a stable supply electricity in the country while an investment friendly policy will be the basis of the solid economic growth.
- One of the most critical advantages of upfront tariff mechanism is that it reduces the unpredictability of project financing and brings more confidence to banks and ECAs.
- Thar blocks start their development after the announcement of upfront tariff which is the foundation and the real reason for blooming Thar projects today.
- A continuous tariff policy will benefit the development of power sector in long-term period.
- Changing to the competitive bidding tariff mechanism may create many uncertainty for Thar coal fired power project sponsors, make them spend more time to negotiate for financing.
- Some other disturbance may also occur, for example, there are only two mine developers in Thar block at this moment and the price of Thar Coal will only be decided by TCEB instead of the market competition, so the sponsors of power project may face the problems of fuel from mine developers when they try to make their investment decision.
- Suggested following four methods to decrease the electric tariff:
 - There shall be more Thar coal based power projects to replace those power plants burning furnace oil with very low efficiency but much higher cost than coal fired power plant. Also, a stable local energy resource may bring more advantage to the national security and reserve of foreign exchange.
 - Air cooling technology shall be adopted to the upcoming power plant projects in Thar area, since it is a technology not only for saving water, but also lowering tariff. Based on our calculation, although air cooling system may lead to a little higher investment in project cost and some losses of efficiency, the overall cost will be reduced because there will be almost no need for water charge in the entire 30 years' operation and maintenance



period. Fund to build water facility can also be saved accordingly and finally the power tariff will be lower than water cooling power projects.

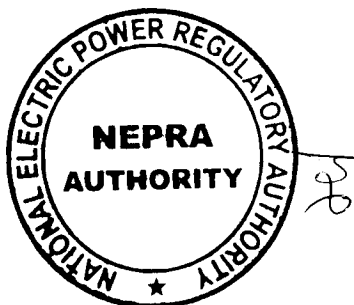
- Unit with larger capacity and higher parameters shall be encouraged to use in Thar area to make up the decline of efficiency because of air cooling system and it may also contribute a further lower electric tariff. At the same time, larger capacity units with higher parameter are usually more environmental friendly, means less coal consumption and emission.
- We don't think the policy regarding additional cost to those projects who use European boiler to burn Thar coal, describing as "the incremental cost of European boiler @ US\$0.1 million per MW assumed in the over project cost on account of capital cost, financing fees & IDC", shall keep available in any new tariff system for coal fired power projects, since we already proved that Chinese boiler manufactures are more than capable to provide suitable solution for Thar coal. This policy virtually increased the capital cost and enhanced the electric tariff a lot, but did not contribute the unit reliability and efficiency. However, using a Chinese boiler for Thar coal should have a higher cost compare with a one for imported coal with same capacity and parameters, which may not be a very significant number.

7.6. Comments from Syed Akhtar Ali (former Member Energy, Planning Commission) are summarized below:

- A major issue in case of Thar coal tariff is the allowed IRR of 20% on equity which is translated to 35.4% ROE in operational years. Nowhere in the world such a high return has ever been allowed.
- IRR approach is more versatile, understandable, comparable and perhaps even more transparent as compared to ROE.
- People used to yearn for local coal utilization expecting that it would be cheaper to do that and would save foreign exchange.

8. HEARING

8.1. The hearing in the matter was held on 28th March 2017 in NEPRA Tower. The hearing was participated by PPIB, CPPA, PPDB, Sindh Board of Investment, Government of Sindh, Thar Coal Energy Board, JPCL,SECMC, Shanghai Electric, Oracle Thar Coal Mines, Port Qasim Electric Power Company, Hubco, Sapphire,



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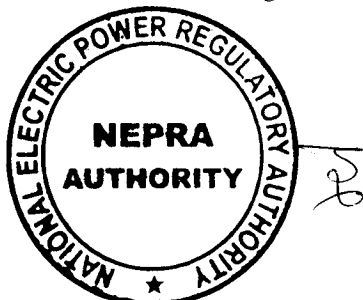
Lucky Electric Power Company Limited, Siddiqsons Energy and Syed Akhtar Ali, Ex-Member Energy Planning Commission.

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

9. **Whether the Authority should determine another upfront tariff with revised benchmarks keeping in view the improvements in technology and reduced risks as investors have already borne the first movers risks?**

Whether the Authority should determine benchmark tariff for competitive bidding under Competitive Bidding Tariff (Approval Procedure) Regulations, 2014 for new power projects on Thar coal?

- 9.1. All the stakeholders including MW&P, GoS, SBOI and project developers supported the upfront tariff regime as compared to the competitive bidding regime for development of power projects in Thar. According to MW&P, although the best option is reverse bidding but its applicability for in Thar is limited because there are only three available sites with three sponsors who are licensees for the mines. According to GoS and SBOI, competitive bidding of tariffs is only possible if market dynamics reflect efficiencies and the current market size does not warrant competitive bidding and may most likely be counterproductive. Both GoS and SBOI requested for re-notification of the lapsed tariff with two years extension. The project developers also showed reservations on competitive bidding regime and requested for another upfront tariff for future power project development. AKLA submitted that in case investors want to put there plant on 'Take and Pay' basis, there will be no harm in facilitating the same through Upfront Tariff, however, upfront tariffs should not be determined for projects on 'Take or Pay' basis or 'Must Run' plants .
- 9.2. Having gone through the comments of the stakeholders and considering the stage of Thar coal mines development, the authority feels that some of the comments of the stakeholders carry weight and needs to be considered. The Authority noted that the previous upfront tariff paved the way for development of Thar coal mines. However, the objective is to achieve the optimal mine size of 20 million tons in shortest possible time which is utmost important as the fuel cost component which accounts for approximately 50% of the total tariff will substantially come down as soon as the optimal mine size is achieved; thus resulting in overall tariff reduction. The Authority further considers that the delay in expansion of mine shall not be in the interest of the consumers rather shall be detrimental. Keeping in view comments of the stakeholders, stage of the mine development and the stated reasons, the



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Authority has decided to announce upfront tariff for this phase with revised benchmarks for future power projects on Thar coal. The new upfront tariff shall be for a capacity of upto 5,000 MW or two years whichever is earlier.

10. If new tariff is determined under either upfront or competitive regime, whether the cost-plus regime option should be available?

10.1. None of the stakeholders commented on this issue except Qurashi Law Associates and Fatima Electric Company Limited who submitted that the cost plus option should remain available. According to Fatima Electric some of the bottlenecks in the Thar region are soil issues, evacuation or water shortage and cost plus regime gives opportunity to take care of these difficulties.

10.2. The Authority considers that the option to file tariff petition for determination is provided in NEPRA Tariff (Standards & Procedures) Rules 1998 and unless the Rules are modified, the window of filing of tariff petition under Tariff (Standards & Procedures) Rules 1998 shall remain available.

11. Whether only such coal power plants may be allowed which have low cooling water requirement for future power generation at Thar?

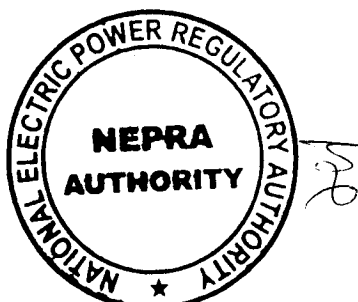
11.1. Water is a serious issue in Thar and the major bottleneck in the development of power projects in Thar. One of the solutions to the problem is air cooling technology instead of wet cooling technology. Stakeholders including MW&P supported the idea of air cooling technology.

11.2. M/s Shanghai Electric (SE) in its comments submitted that in order to reduce tariff air cooling technology should be adopted. The commentator further submitted that although air cooling system may lead to a little higher investment in project cost and some losses of efficiency, the overall cost will be reduced because there will be almost no need for water charge in the entire 30 years' operation and maintenance period and fund to build water facility can also be saved accordingly and finally the power tariff will be lower than water cooling power projects.

11.3. SECMC in its presentation during the hearing submitted that the current LBOD scheme is sufficient for 4x330MW and for the development of further 4x330MW power projects, following options are available:

A. Expansion of LBOD Scheme

B. Use of Air Cooling (or Hybrid) technology instead of Wet Cooling technology



C. Use of Groundwater and recycling of drain water

- 11.4. According to SECMC LBOD scheme can be expanded to make water available for future IPPs following resource estimation at source. This expansion will have to be financed by GoS/IPPs/others and will have to be compensated in the tariff. The approximate cost may be ~0.78 cents/kWh versus existing case of 0.52 cents/kWh. In case of air cooling technology or with little water (hybrid technology), this would require increase in CAPEX, increase in auxiliary load, decrease in thermal efficiency and decrease in net output. The approximate cost may be ~1.27 cents/kWh versus base case of 0.52 cents/kWh. Under the third option, SECMC submitted that enough ground water and drain water can be generated from 8 IPPs which can be treated through advanced High Efficiency Reverse Osmosis (HERO) to run 2-3 IPPs. In this case the required cost shall be slightly above base case of 0.52 cents/kWh.
- 11.5. SECMC submitted following details of calculation of 1.27 Cents/kWh:
- Loss in efficiency of 5% from 37% to 32%
 - Increase in capital cost by USD 20 million and customs duties and financial cost by US\$ 4 million for 1x330MW.
 - Decrease in net capacity and increase in auxiliary consumption by 1.5%.
 - Plant factor of 79% as against 85%.
 - Elimination of only 50% water cost provided in the previous tariff.
- 11.6. The comments submitted by Shanghai Electric and SECMC are contradictory. According to Shanghai Electric, the overall tariff shall reduce by introduction of air cooling technology while according to SECMC the overall levelized tariff shall be higher by 0.63 Cents/kWh. This needs further scrutiny. Accordingly Shanghai Electric was requested to provide the following details:
- How much capital cost will be required per MW and in total (and the size of the plant for which such cost is being recommended)?
 - What shall be the Impact of air cooling technology on auxiliary consumption, net output and efficiency?
- 11.7. Shanghai Electric in its reply submitted that the additional capital cost for air cooling technology shall be US\$ 40,000-45,000/MW, the drop in efficiency shall be 2% and there shall be no change in auxiliary consumption and net output.

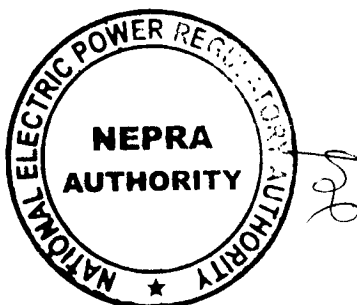


11.8. The Authority has considered the submissions made by the various stakeholders for using air cooling technology. The use of air cooling technology has also been discussed with the representatives of the OEM and follow up discussions have also been made with SECMC and Shanghai Electric. Having considered the views of commentators, the Authority feels that every effort should be made to exploit the Thar resources for which selection of appropriate technology is of utmost importance. The Authority considers that such technology should be preferred that helps in induction of maximum capacity. In view thereof, the Authority has decided to announce separate tariffs for air cooling and wet cooling technologies. On the basis of feedback from OEM and other stakeholders, the Authority has decided to incorporate additional capital cost of US\$ 40,000/MW for air cooling technology along with 2% lesser efficiency as compared to wet cooling technology and elimination of entire water cost provided in wet cooling technology.

12. What shall be the reasonable IRR on equity for future Thar coal power projects keeping in view the reduced risks?

12.1. In the previous upfront Thar coal tariff, IRR on equity of 20% was allowed to incentivize the development and utilization of Thar coal reserves. The higher IRR as compared to imported and local coal and other technologies was offered to first movers to offset higher risks involved in the Thar region. MW&P submitted that the interest rate has now come down to 5.75% from 9.50% in 2014 which requires a matching rationalization in the IRR especially when the uncertainties in investment on Thar Coal based power plants have reduced considerably.

12.2. GoS and SBOI in their comments, however, insisted to maintain 20% IRR on equity for power projects in Thar and submitted that any reduction in tariff at this stage shall be discouraging for the investors and shall render irreparable damage to the momentum towards energy achieving autarky. GoS and SBOI further submitted that the tariff for Thar power plants shall automatically reduce with the expansion of the size of the mine. Therefore, there is a need to keep investment in Thar attractive and bring more and more investors for development of power plants in Thar which will result in expansion of the size of the mine to optimal level of 20 million tons/annum. This shall enable the coal price to reduce from US\$ 60/ton to US\$ 28/ton and the resultant tariff will decrease substantially. SECMC in its presentation submitted that if the Authority seeks marginal reductions in tariff, there is a possibility that it may turn IPP potential investors away from Thar. However, by facilitating further mine expansion, the Authority can bring the tariff substantially down for benefit of all stakeholders.

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12.3. While determining the previous upfront Thar coal tariff, the higher IRR on equity of 20% was offered to first movers to offset higher risks involved in the Thar region. SECMC submitted in its presentation that the construction of 3.8 Million Tons Per Annum (MTPA) mine (sufficient for 2x330MW) is already in progress and the COD is expected by June 2019. The power plant of 2x330MW is also in the construction phase and is expected to achieve COD simultaneously with the mine. SECMC plans to achieve COD of 7.6 MTPA (sufficient for 4x330MW) by June 2020 and 11.2 MTPA by December 2020 which shall be sufficient for 6x330MW. The tariffs of 6x330MW power plants have already been approved. SECMC plans to expand its capacity to 19.6 MTPA tentatively by 2022.

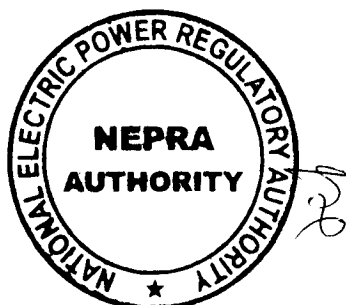
12.4. The Authority considers that return is not the only factor for attracting investors. Since mine development along with construction of a coal plant is in progress, the confidence of the investors has developed and has also eliminated certain risks and uncertainties. The Authority considers that it will be unjust to treat at par all those coming now with those who have taken all the risks. It is an international regulatory practice that the returns are adjusted according to the prevailing conditions which in the instant case demand for downward revision of return. It is also to be noted that country risk has decreased as compared to 2014. Further, the prevailing interest rates are lowest in the country. Accordingly, the Authority has decided to revise IRR on equity for the future power projects in Thar to 18%. The offered IRR of 18% on equity is still higher among all the technologies.

13. What shall be the appropriate thermal efficiency levels for future Thar coal power projects?

13.1. The fuel cost component of the previous upfront Thar coal tariff was based on the following minimum thermal efficiency levels:

Description	330MW	660MW	1099MW
Net LHV Thermal Efficiency at bus bar	37.0%	39.0%	40.0%

13.2. The minimum net thermal efficiency levels were subject to adjustment as per heat rate test at the time of COD. In case the actual efficiency establishes higher than the minimum as a result of heat rate test, the following sharing mechanism shall be applicable:




Gross Capacity	Efficiency net (LHV) achieved at COD	Sharing Ratio Power Purchaser : Sponsor
330 MW	37% (min)	100% : 0%
660 MW	39% (min)	100% : 0%
1099 MW	40% (min)	100% : 0%
330 MW	37.01% - 37.50%	70% : 30%
660 MW	39.01% - 39.50%	70% : 30%
1099 MW	40.01% - 40.50%	70% : 30%
330 MW	37.51% - 38.00%	50% : 50%
660 MW	39.51% - 40.00%	50% : 50%
1099 MW	40.51% - 41.00%	50% : 50%
330 MW	38.01% - 38.50%	30% : 70%
660 MW	40.01% - 40.50%	30% : 70%
1099 MW	41.01% - 41.50%	30% : 70%
330 MW	>38.5%	0% : 100%
660 MW	>40.5%	0% : 100%
1099 MW	>41.5%	0% : 100%

- 13.3. MW&P in its comments suggested that the new tariff should accommodate projects only on Super Critical or better technology and there should be no tariff for plants of lower specifications than super critical.
- 13.4. Shanghai Electric in its comments submitted that unit with larger capacity and higher parameters should be encouraged to use in Thar area to make up the decline of efficiency because of air cooling system and it may also contribute a further lower electric tariff. At the same time, larger capacity units with higher parameter are usually more environmental friendly, means less coal consumption and emission.
- 13.5. Keeping in view the comments of MW&P and Shanghai Electric, low efficiency of subcritical technology and resultantly adverse environmental impacts of subcritical technology, the Authority has decided to allow only those projects which use super critical technology or above and the use of subcritical technology shall not be allowed. The Authority has decided to approve minimum efficiency level of 39% for wet cooling technology and 37% for air cooling technology. In case the actual efficiency establishes higher than the minimum as a result of heat rate test, the following sharing mechanism shall be applicable:





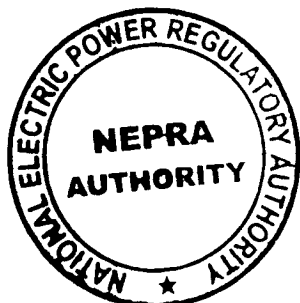
Type	Efficiency net (LHV) achieved at COD	Sharing Ratio Power Purchaser : Sponsor
Wet Cooling	39% (min)	100% : 0%
Air Cooling	37% (min)	100% : 0%
Wet Cooling	39.01% - 39.50%	70% : 30%
Air Cooling	37.01% - 37.50%	70% : 30%
Wet Cooling	39.51% - 40.00%	50% : 50%
Air Cooling	37.51% - 38.00%	50% : 50%
Wet Cooling	40.01% - 40.50%	30% : 70%
Air Cooling	38.01% - 38.50%	30% : 70%
Wet Cooling	>40.5%	0% : 100%
Air Cooling	>38.5%	0% : 100%

13.6. The tariffs have been worked out on the basis of power complex comprising single unit and two units each for wet cooling technology and air cooling technology. The sponsors shall be allowed to choose appropriate size of the power complex in accordance with the feasibility of the project, benchmark efficiency levels, benchmark capital cost levels, availability of coal, consent of the power purchaser and availability of interconnection arrangements by NTDC.

14. What shall be the appropriate capital cost for future Thar coal power projects?

14.1. The capital cost in the previous upfront Thar coal tariff was determined on the basis of European boiler. Incremental cost of US\$ 0.1 million/MW was assumed in the overall project cost for European boiler. For non-European boiler, appropriate provision was provided for downward adjustment of the incremental cost at the time of COD. The capital cost indexation mechanism provides that 11% of the CAPEX cost shall remain unadjusted, 51% shall be adjusted with US PPI Steel Index and 38% shall be adjusted with US PPI Electrical Machinery Index. In the light of capital cost adjustment mechanism, 11% of the capital cost is non-EPC and 89% is EPC. Accordingly, the details of capital cost excluding customs duties & taxes were as under:

Description	330 MW	660 MW	1099 MW
	Million USD		
EPC Cost	363.34	683.40	1,060.59
Non-EPC Cost	44.91	84.47	131.08
CAPEX	408.24	767.87	1,191.67





14.2. In order to rebase the capital cost, information was sought from the project developers of the actual EPC cost. The information was analyzed vis a vis indexed capital cost on the basis of US PPI Steel and Electric Machinery Indices for June 2014 and revised indices for March 2017. The Authority has decided to revise the EPC cost on the basis of following:

- Specific cost associated with European boilers is being withdrawn. Sponsors shall be free to select boilers of any origin.
- The cost allowed to 660MW shall be used as benchmark.
- EPC cost has been rebased on the basis of Steel and Electrical Machinery Index for March 2017 for wet cooling technology and with additional cost of US\$ 40,000/MW for air cooling technology for power complex comprising single unit.
- For power complex comprising two units, 95% of the EPC cost allowed to single unit of wet cooling technology has been considered keeping in view the scale benefits with additional cost of US\$ 40,000/MW for air cooling technology.
- The relevant portions of the EPC cost shall be subject to indexation on the basis of US PPI Steel and Electric Machinery Indices.

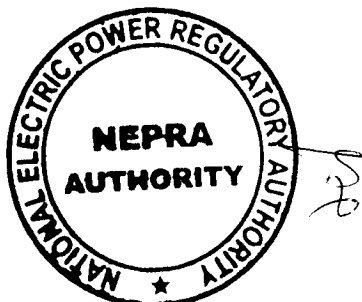
14.3. Similarly, the Authority has also decided to revise the non EPC cost as under:

- For power complex of single unit, non EPC cost shall be 10% of the EPC cost.
- For power complex of two units, non EPC cost shall be 9% of the EPC cost.

14.4. In the light of above analysis, following capital cost has been assessed:

Description	Single Unit		Two Units	
	Wet Cooling	Air Cooling	Wet Cooling	Air Cooling
	Million USD/MW			
EPC Cost	0.924	0.964	0.877	0.915
Non-EPC Cost	0.092	0.092	0.079	0.079
CAPEX	1.016	1.056	0.956	0.994

14.5. The EPC cost shall be subject to adjustment at the time of COD for variation in US PPI Steel and US PPI Electrical Machinery Indices against the reference indices of 213.70 and 113.60 PPI Steel and US PPI Electrical Machinery respectively. The applicable revised index shall be for the month falling the date of approval of upfront



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tariff in favour of the project company. The relevant portions of the EPC cost are as under:

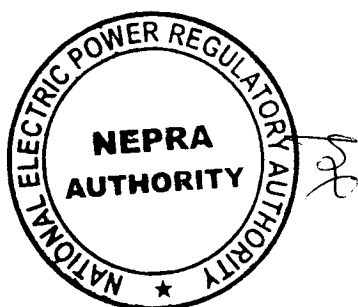
Description	Single Unit		Double Unit	
	Wet Cooling	Air Cooling	Wet Cooling	Air Cooling
	Million USD/MW			
Steel Index	0.510	0.530	0.484	0.505
Electric Machinery Index	0.414	0.434	0.393	0.410
Total EPC Cost	0.924	0.964	0.877	0.915

15. Whether the construction period of 40 months and 48 months for 330MW and 660MW/1,099MW projects respectively is reasonable?

15.1. The previous upfront Thar coal tariff was based on 40 months construction period for 330MW and 48 months for 660MW/1,099MW projects. None of the stakeholders submitted comments on the appropriate construction period except MW&P. The Ministry proposed that an efficient management can complete the project in 30 months after financial close.

15.2. According to the EPC contract of 2x330MW coal project in Thar, the agreed construction period is 42 months. The sponsor is of the view that 1 unit shall be operational 6 months before the combined COD of the complex. In all such cases, the PPA provides separate pre-COD tariff in accordance with the clarification issued by the Authority.

15.3. The Authority considers that the 30 months construction period proposed by MW&P is very aggressive. Construction of coal power project is complex and generally requires more time as compared to combined cycle power projects. In case of achieving COD within 30 months, more labour, machinery and equipment and other resources shall be required and chances of project delay shall be higher. In case of normal construction period, the sponsor shall have the incentive to complete the project in lesser time and save cost on account of interest during construction, earn extra equity returns for the allowed construction period and offset the cost associated with extra resources employed for completion of the project. Accordingly, the Authority has decided to allow 36 months construction period for power complex comprising single unit and 42 months for power complex comprising two units.



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16. Whether other operating costs as given in the previous upfront Thar tariff should be reduced?

16.1. Other operating cost include variable and fixed O&M, ash handling, lime stone, insurance and cost of working capital.

O&M Cost

16.2. The Authority has decided to maintain the existing level of O&M cost subject to incorporation of appropriate indexations as provided hereunder:

- 60% of variable O&M and 50% of fixed O&M were subject to indexation on the basis of US CPI and Exchange Rate against Reference US CPI of June 2014 of 238.343 and Reference exchange rate of Rs. 97.1/USD.
- On the basis of US CPI for March 2017 of 243.801 and revised exchange rate of Rs. 105/USD, the foreign components of fixed and variable O&M have been revised.
- 40% of variable O&M and 50% of fixed O&M were subject to indexation on the basis of reference local CPI (General) against Reference CPI of June 2014 of 194.74.
- On the basis of local CPI (General) for March 2017 of 213.32, the local components of fixed and variable O&M have been revised.

Ash Handling & Lime Stone

16.3. The Authority has decided to maintain the existing level of Ash Handling and lime stone cost provided hereunder:

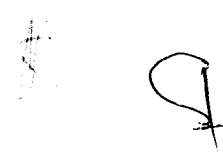
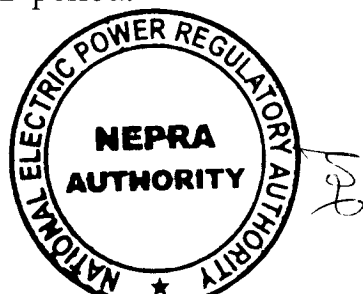
Cost of Lime

Cost of Lime Stone including Transportation	Rs.1250.00/M.Ton
Consumption	Kg.0.07/kWh
Cost of Lime Stone	Rs.0.09/kWh

Cost of Ash Disposal

Ash produced	Kg.0.22/kWh
Ash Transportation cost	Rs.1000.00/M.Ton
Ash Disposal Cost	Rs.0.22/kWh

16.4. The cost of ash handling and lime stone shall be subject to adjustment as per actual at the time of COD and if require, appropriate adjustment mechanism shall be provided for post COD period.





Water Charges

16.5. Cost of water charges under wet cooling has been worked out on the basis of following:

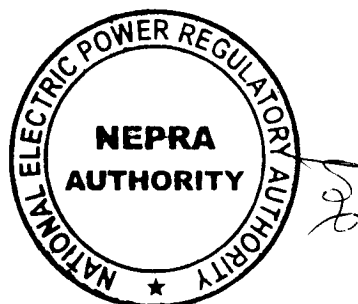
- Government of Sindh water charge of Rs. 0.2897/kWh has been worked out on the basis of water charge of Rs. 0.32/gallon.
- Capital expenditure of US\$ 0.057 million/MW for single unit and US\$ 0.047 million/MW for two units for setting up of pumping station at Vajihar and Pipeline from Vajihar to power plant for transmission of LBOD water.
- Levelized tariff component for capital expenditure shall be Rs. 0.0994/kWh for single unit and Rs. 0.0819/kWh for two units.
- O&M of US\$ 2,805/MW for single unit comprising US\$ 1,289/MW for electricity cost @ Rs. 8/kWh from power plant as auxiliary beyond the allowed limit of 8% and maintenance cost of US\$ 1,515/MW.
- O&M of US\$ 2,653/MW for single unit comprising US\$ 1,289/MW for electricity cost @ Rs. 8/kWh from power plant as auxiliary beyond the allowed limit of 8% and maintenance cost of US\$ 1,364/MW.
- The O&M component works out Rs. 0.0430/kWh for single unit and Rs. 0.0407/kWh for two units.
- The total levelized component of water is Rs. 0.4321/kWh for single unit and Rs. 0.4123/kWh for two units.

Insurance During Operation

16.6. In line with the Authority's decision in various technologies, the Authority has decided to allow 1% of EPC cost as annual insurance cost. The insurance cost component shall be adjusted annually on actual subject to maximum of 1% of the EPC cost and prevailing exchange rate on the first day of the insurance coverage period.

Cost of Working Capital

16.7. In line with the previous upfront tariff, Cost of Working Capital has been allowed on the basis of 30 days inventory and 30 days receivable @ KIBOR of 6.36%+2% premium.



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Coal Price

16.8. The basis of coal price are as under:

- Thar Coal Energy Board (TCEB) vide its decision dated 2nd October 2015 in the matter of review motion determined levelized coal price of US\$ 46.24/ton comprising variable and fixed coal price components for mine size of 3.8 MTPA leading to 6.5 MTPA.
- TCEB calculations are made on the basis of mine size of 3.8 MTPA for 1.5 years and 6.5 MTPA for 28.5 years.
- The same coal price has been used for calculation of fuel cost component.
- The FCC component shall be adjusted on the basis of revised coal price by TCEB.

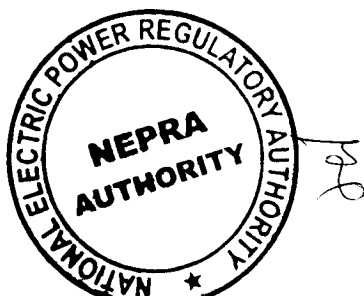
17. FINANCIAL ASSUMPTIONS

17.1. The tariff has been worked out on the basis of following financial assumptions:

- Debt Equity ratio is 75:25.
- LIBOR of 1.8% with a premium of 4%.
- One time Sinasure/credit insurance fee @7% of the debt servicing amount.
- In case of project financing without Sinasure/credit insurance fee, the applicable premium over LIBOR shall be 4.5%.
- In case of local financing KIBOR 6.36% with a premium of 2.5%
- Financing fees and charges have been calculated on the basis of 3% of the 75% of CAPEX financing.
- IDC has been calculated on the basis of approved construction period and average debt drawdown on quarterly basis.
- ROEDC has been calculated on the basis of approved construction period and average equity drawdown.
- Exchange rate of Rs. 105/US\$.

18. SUMMARY OF PROJECT COST AND TARIFF

18.1. Summary of project cost is provided hereunder:

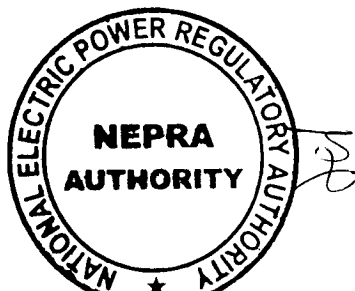




Description	Single Unit				Two Units			
	Wet Cooling		Air Cooling		Wet Cooling		Air Cooling	
	F. Fin.	L. Fin.	F. Fin.	L. Fin.	F. Fin.	L. Fin.	F. Fin.	L. Fin.
	Million US\$/MW							
EPC Cost	0.924	0.924	0.964	0.964	0.877	0.877	0.915	0.915
Non-EPC Cost	0.092	0.092	0.092	0.092	0.079	0.079	0.079	0.079
CAPEX	1.016	1.016	1.056	1.056	0.956	0.956	0.994	0.994
Customs Duties	0.044	0.044	0.046	0.046	0.042	0.042	0.044	0.044
Total CAPEX	1.060	1.060	1.102	1.102	0.998	0.998	1.038	1.038
Fin. Fees & Charges	0.024	0.024	0.025	0.025	0.022	0.022	0.023	0.023
Sinosure Fee	0.086	-	0.090	-	0.082	-	0.086	-
IDC	0.073	0.114	0.076	0.119	0.081	0.128	0.084	0.133
Project Cost	1.243	1.198	1.292	1.246	1.184	1.148	1.231	1.194

18.2. Summary of levelized tariff is provided hereunder:

Description	Single Unit				Two Units			
	Wet Cooling		Air Cooling		Wet Cooling		Air Cooling	
	F. Fin.	L. Fin.	F. Fin.	L. Fin.	F. Fin.	L. Fin.	F. Fin.	L. Fin.
	Rs./kWh							
Energy Charge Variable:								
Fuel Cost	1.1480	1.1480	1.2100	1.2100	1.1480	1.1480	1.2100	1.2100
Water Charges	0.4321	0.4321	-	-	0.4123	0.4123	-	-
Ash Disposal	0.2200	0.2200	0.2200	0.2200	0.2200	0.2200	0.2200	0.2200
Limestone	0.0900	0.0900	0.0900	0.0900	0.0900	0.0900	0.0900	0.0900
Variable O&M	0.1256	0.1256	0.1256	0.1256	0.1256	0.1256	0.1256	0.1256
Total	2.0157	2.0157	1.6457	1.6457	1.9960	1.9960	1.6457	1.6457
Energy Charge Fixed:								
Fuel Cost	2.7121	2.7121	2.8587	2.8587	2.7121	2.7121	2.8587	2.8587
Capacity Charge:								
Fixed O&M	0.3717	0.3717	0.3717	0.3717	0.3445	0.3445	0.3445	0.3445
Cost of Working Capital	0.1124	0.1124	0.1185	0.1185	0.1124	0.1124	0.1185	0.1185
Insurance	0.1416	0.1416	0.1477	0.1477	0.1345	0.1345	0.1403	0.1403
ROE	1.1147	1.0744	1.1588	1.1169	1.1141	1.0807	1.1586	1.1237
Debt Servicing	1.2341	1.3628	1.2829	1.4166	1.1752	1.3060	1.2221	1.3580
Total	2.9745	3.0629	3.0796	3.1714	2.8808	2.9780	2.9840	3.0851
Levelized Tariff	7.7023	7.7907	7.5839	7.6758	7.5889	7.6861	7.4884	7.5895
Levelized Tariff US\$/kWh	7.3356	7.4197	7.2228	7.3103	7.2275	7.3201	7.1318	7.2281



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19. ORDER

I. The Authority hereby determines and approves the following upfront tariff and adjustments/indexations for Thar coal power generation projects for delivery of electricity to the power purchaser:

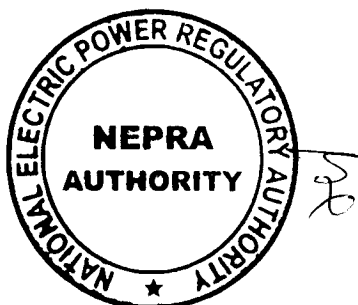
Description	Single Unit				Two Units			
	Wet Cooling		Air Cooling		Wet Cooling		Air Cooling	
	F. Fin.	L. Fin.	F. Fin.	L. Fin.	F. Fin.	L. Fin.	F. Fin.	L. Fin.
	Rs./kW/Hour							
Capacity Charge:								
1-10 Years	3.0887	3.2222	3.2001	3.3389	2.9823	3.1243	3.0913	3.2390
11-30 Years	1.4793	1.4451	1.5272	1.4915	1.4497	1.4212	1.4976	1.4680

Description	Single Unit Local/Foreign Financing				Two Units Local/Foreign Financing			
	Wet Cooling		Air Cooling		Wet Cooling		Air Cooling	
	Variable	Fixed	Variable	Fixed	Variable	Fixed	Variable	Fixed
	Rs./kWh	Rs./kW/H	Rs./kWh	Rs./kW/H	Rs./kWh	Rs./kW/H	Rs./kWh	Rs./kW/H
Energy Charge:								
1st Year	2.1294	4.0040	1.7337	4.2204	2.1043	4.0040	1.7337	4.2204
2nd Year	2.2659	3.0837	1.8775	3.2503	2.2408	3.0837	1.8775	3.2503
3rd Year	2.1535	2.5646	1.7591	2.7032	2.1284	2.5646	1.7591	2.7032
4th Year	2.1101	2.5365	1.7133	2.6736	2.0850	2.5365	1.7133	2.6736
5th Year	2.0672	2.5136	1.6680	2.6494	2.0421	2.5136	1.6680	2.6494
6-8 Year	2.0538	2.4564	1.6539	2.5891	2.0287	2.4564	1.6539	2.5891
9-10 Year	2.0327	2.4560	1.6317	2.5888	2.0076	2.4560	1.6317	2.5888
11th Year	1.8536	1.4094	1.5344	1.4855	1.8438	1.4094	1.5344	1.4855
12th Year	1.8523	1.3943	1.5330	1.4697	1.8424	1.3943	1.5330	1.4697
13-15 Year	1.8509	1.3792	1.5316	1.4538	1.8411	1.3792	1.5316	1.4538
16-22 Year	1.8992	1.3799	1.5824	1.4545	1.8893	1.3799	1.5824	1.4545
23-30 Years	1.6994	1.3771	1.3718	1.4516	1.6895	1.3771	1.3718	1.4516

II. Basis of Determination

The above tariff is worked out on the following basis:

- i. Net capacity has been worked out after allowing auxiliary consumption of 8%.

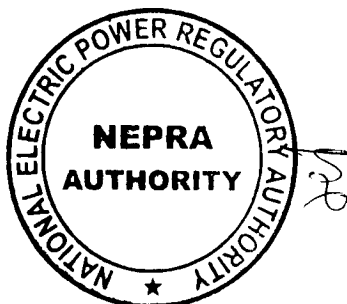




- ii. The Reference LHV calorific value of 11,005 Btus/Kilogram of Thar coal has been assumed for the calculation of fuel cost component which shall be subject to adjustment on the basis of actual calorific value.
- iii. The tariffs have been worked out on the basis of power complex comprising single unit and two units each for wet cooling technology and air cooling technology. The sponsors shall be allowed to choose appropriate size of the power complex in accordance with the feasibility of the project, benchmark efficiency levels, benchmark capital cost levels, availability of coal, consent of the power purchaser and availability of interconnection arrangements by NTDC.
- iv. Reference exchange rate of Rs. 105/US\$ has been used in calculating the reference tariff and the same shall be used for indexations/adjustments where applicable.
- v. Construction period shall be 36 months for power complex comprising single unit and 42 months for power complex comprising two units.
- vi. The upfront tariff has been determined on the basis of debt equity ratio of 75:25.
- vii. Reference LIBOR is 1.8% with a premium of 4%.
- viii. One time Sinasure fee/credit insurance fee @7% of the debt servicing amount.
- ix. In case of project financing without Sinasure fee/credit insurance fee, the applicable premium over LIBOR shall be 4.5%.
- x. In case of local financing, the reference KIBOR is 6.36% with a premium of 2.5%.
- xi. Loan tenure of 10 years plus grace period equivalent to construction period has been considered.

III. One Time Adjustments at COD

- i) The EPC cost shall be subject to adjustment at the time of COD for variation in US PPI Steel and US PPI Electrical Machinery Indices against the reference indices of March 2017 of 213.70 and 113.60 US PPI Steel and US PPI Electrical Machinery respectively. The applicable revised index shall be for the month falling the date of approval of upfront tariff in favour of the project company. The relevant portions of the EPC cost are as under:





Description	Single Unit		Double Unit	
	Wet Cooling	Air Cooling	Wet Cooling	Air Cooling
	Million USD/MW			
Steel Index	0.510	0.530	0.484	0.505
Electric Machinery Index	0.414	0.434	0.393	0.410
Total EPC Cost	0.924	0.964	0.877	0.915

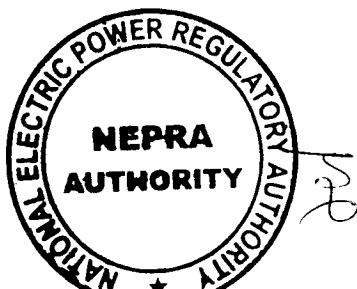
- ii) The customs duties and cess in the project cost shall be adjusted as per actual.
- iii) IDC shall be reestablished on the basis of weighted average quarterly LIBOR/KIBOR during the construction period, indexed capital cost, actual custom duties & cess, actual premium over LIBOR/KIBOR subject to maximum and the impact of Sinasure fee/credit insurance fee, if any.
- iv) Upfront Sinasure fee/credit insurance fee @7% on the total debt servicing (including principal and mark-up for the entire loan tenor) has been included in the project cost. Project cost shall be adjusted at the time of COD on the basis of actual Sinasure fee/credit insurance fee subject to maximum of 7%. In case the sponsor managed better alternative Sinasure fee/credit insurance fee arrangement, the same shall be considered at the time of COD.

IV. Adjustment due to Variation in Net Capacity

The actual net capacity of the complex shall be determined on the basis of Initial Dependable Capacity (IDC) Test at the time of COD and the relevant tariff components shall be adjusted downward. Upward adjustment in tariff shall not be allowed if the IDC established lower than the benchmark net capacity. The minimum net capacity shall be gross capacity minus maximum allowed auxiliary consumption.

V. Adjustment as per Heat Rate Test

The fuel cost component shall be subject to downward revision on the basis of actual heat rates established as a result of heat rate test conducted at the time of COD in accordance with the established benchmarks in the presence of the representatives of the power purchaser. For acceptance of the test, approval of the power purchaser shall be mandatory. Upward revision in the fuel cost component shall not be allowed in case the net LHV efficiency is established lower than the minimum thermal efficiency and the financial impact, if any, of lower thermal efficiency over the term of the Agreement shall be borne by the power producer. The efficiency gains shall be shared in accordance with the following mechanism:



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Type	Efficiency net (LHV) achieved at COD	Sharing Ratio Power Purchaser : Sponsor
Wet Cooling	39% (min)	100% : 0%
Air Cooling	37% (min)	100% : 0%
Wet Cooling	39.01% - 39.50%	70% : 30%
Air Cooling	37.01% - 37.50%	70% : 30%
Wet Cooling	39.51% - 40.00%	50% : 50%
Air Cooling	37.51% - 38.00%	50% : 50%
Wet Cooling	40.01% - 40.50%	30% : 70%
Air Cooling	38.01% - 38.50%	30% : 70%
Wet Cooling	>40.5%	0% : 100%
Air Cooling	>38.5%	0% : 100%

VI. Adjustment in Insurance as per actual

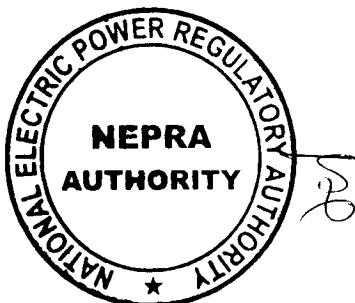
During the term of the Agreement, insurance component of tariff shall be adjusted on the basis of actual insurance cost with maximum of 1% of EPC Cost converted into Pak Rupees on the basis of Rs.-US\$ parity prevailing on the 1st day of the start of each Agreement Year. The reference insurance component has been worked out on the basis of 1% of EPC cost and exchange rate of Rs. 105/US\$.

VII. Cost of Working Capital

- a. The Working Capital requirement has been worked out in accordance with the following:
 - i. 30 days coal inventory at 100% plant load.
 - ii. Receivables equivalent to one month of fuel charges at 100% plant load.
- b. Interest on Working Capital has been calculated on the basis of quarterly-KIBOR of 6.36% plus 200 basis point, which shall be adjusted for variation in quarterly-KIBOR and weighted average cost of coal inventory.

VII. Operation and Maintenance (O&M) Cost

- i. Foreign O&M component shall be indexed with US CPI and Exchange Rate.
- ii. Local O&M component shall be indexed with local CPI (General).



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- iii. The reference US CPI (All Urban Consumers) and local CPI (General) shall be of March 2017.
- iv. The following costs with respect to lime stone and ash handling have been determined, which are shown separately in the reference tariff table;

Cost of Lime

Cost of Lime Stone including Transportation	Rs.1250.00/M.Ton
Consumption	Kg.0.07/kWh
Cost of Lime Stone	Rs.0.09/kWh

Cost of Ash Disposal

Ash produced	Kg.0.22/kWh
Ash Transportation cost	Rs.1000.00/M.Ton
Ash Disposal Cost	Rs.0.22/kWh

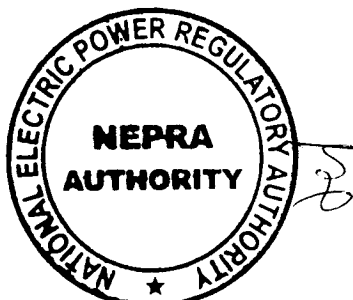
- v. The cost of ash handling and lime stone shall be subject to adjustment as per actual at the time of COD and if require, appropriate adjustment mechanism shall be provided for post COD period.

VIII. Adjustment for LIBOR/KIBOR

The interest calculated in the reference debt service schedule shall be subject to adjustment for variation in quarterly-KIBOR in the case of local loan and quarterly-LIBOR in the case of foreign loan on quarterly basis. The adjustment shall be made on 1st July, 1st October, 1st January and 1st April based on latest available TT&OD selling rate and KIBOR notified by the National Bank of Pakistan and Reuters for the purpose of LIBOR.

IX. Water Charges under Wet Cooling

- a. Component of Government of Sindh water charge shall be adjusted for the revised water charge as announced by GoS.
- b. Capital cost of US\$ 0.057 million/MW for single unit and US\$ 0.047 million/MW has been assumed for water pumping station/pipelines from Vajihar to the project site. At the time of COD, this cost shall be verified and shall be indexed in whole or in parts for the exchange rate variation for the portion of cost that has been occurred in foreign currency. Pumping station and pipelines cost from Vajihar to different Thar blocks shall vary, therefore, reasonable cost will be allowed for mine mouth power plant for Thar Blocks other than Block-II.





- c. The O&M cost of Rs0.0430/kWh for single unit and Rs 0.0407/kWh for two units for pumping station at Vajihar.

X. Fuel Price Adjustment

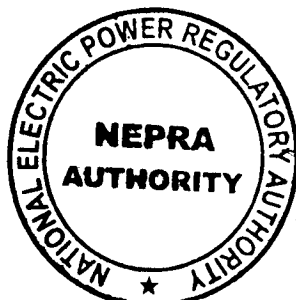
- i. The following two part reference coal price has been used for determining the upfront tariff for Thar Coal Projects:

Description	Variable	Fixed	Total
	US\$/Ton	US\$/Ton	US\$/Ton
1st Year	14.75	56.43	71.18
2nd Year	16.39	43.46	59.85
3rd Year	15.04	36.14	51.19
4th Year	14.52	35.75	50.27
5th Year	14.01	35.43	49.43
6-8 Years	13.85	34.62	48.47
9-10 Years	13.59	34.61	48.21
11th Year	12.49	19.86	32.35
12th Year	12.47	19.65	32.12
13-15 Years	12.46	19.44	31.89
16-22 Years	13.03	19.45	32.48
23-30 Years	10.64	19.41	30.05

- ii. The above coal price is determined by TCEB for Bloc-II for mine size of 6.5 MTPA. Revised coal price of each block of Thar Coal shall be determined by TCEB/Competent Authority and the reference fuel cost components shall be adjusted accordingly.
- iii. The basis of coal price shall be provided in the Power Purchase Agreement.
- iv. If the plant has to operate on imported fuel due to unavailability of Thar Coal, the prescribed pricing mechanism for imported coal shall be applied to calculate fuel cost component.

XI. Monitoring Mechanism for the use of coal fuel

The Power Producer shall furnish a monthly coal usage and coal procurement statement duly verified and certified by the Central Power Purchasing Agency



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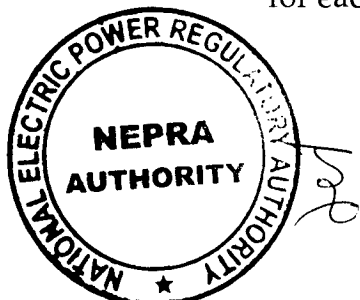


(CPPA) for each month, along with the monthly energy bill. The statement shall cover details such as -

- i. Quantity of fuel (tons) consumed and procured along with heating value during the month for power generation purposes,
- ii. Cumulative quantity (tons) of coal consumed and procured till the end of that month during the year,
- iii. Actual (gross and net) energy generation (denominated in units) during the month,
- iv. Cumulative actual (gross and net) energy generation (denominated in units) until the end of that month during the year,
- v. Opening fuel stock quantity (tons),
- vi. Receipt of fuel quantity (tons) at the power plant site and
- vii. Closing fuel stock quantity (tons) for available at the power plant site.

XII. General Conditions

- i. The guaranteed availability of the plants shall be 85%.
- ii. The upfront tariff shall be available for those projects only which use super critical technology or above and the use of subcritical technology shall not be allowed.
- iii. The upfront tariff shall be available for the brand new machinery only.
- iv. This tariff shall be applicable only for the mine mouth projects in Thar area.
- v. Sponsors shall be free to select boilers of any origin.
- vi. The sponsor of the project can arrange foreign financing in American Dollar (\$), British Pound Sterling (£), Euro (€) and Japanese Yen (¥) or in any other currency as the Government of Pakistan may allow.
- vii. In case the actual premium over LIBOR/KIBOR is less than the maximum limit, the saving shall be shared in the ratio of 60:40 between power purchaser and the power producer respectively.
- viii. The debt part of the project can also be financed through mix of local and foreign financing and the IDC and debt servicing component shall be adjusted accordingly.
- ix. In case of more than one financing plans, separate IDC shall be calculated for each plan on reference parameters.

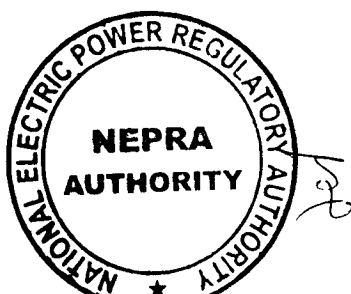


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- x. Average debt and equity drawdown have been assumed for calculation of interest during construction and return on equity during construction period and there shall be no adjustment for actual drawdowns.
- xi. In case there is a time lag between the construction of power complex and coal mine and the power complex becomes available earlier than the mine, the responsibility to provide coal shall be of the sponsor and the ROE component of tariff shall be adjusted accordingly depending on ROE allowed on imported/local coal usage.
- xii. The upfront tariff shall be applicable for 5,000 MW or two years from the date of notification whichever shall be earlier.
- xiii. The tariff control period from the date of COD shall be 30 years.
- xiv. Discount factor of 10% has been used for calculation of levelized tariff.
- xv. The sole criterion for dispatch of all the coal based power plants shall be the "merit order dispatch" and the variable cost shall be the basis of dispatch.
- xvi. At the time of COD, 90% of the EPC cost shall be converted into Pak Rupees using the Average of the Exchange Rates prevailing on 1st day of each month during construction period.
- xvii. In case the project approved under this upfront tariff is obligated to pay any tax on its income from generation of electricity, or any duties and/or taxes, not being of refundable nature, are imposed on the company during the operation period, the exact amount paid by the company on these accounts shall be reimbursed on production of original receipts. This payment shall be considered as a pass-through payment spread over a period of twelve months. However, withholding tax on dividend shall not be passed through.
- xviii. During the life of the project operations, Quarterly adjustments/indexations for local inflation, foreign inflation, exchange rate variations and interest rate variations will be made on 1st July, 1st October, 1st January and 1st April each year based on latest available date with respect to CPI notified by the Federal Board of Statistics (FBS), USCPI issued by US Bureau of Labor Statistics and revised TT&OD selling rate of foreign currencies (US Dollar, British Pound Sterling, Euro and Japanese Yen or any other currency as the Government of Pakistan may allow) notified by the



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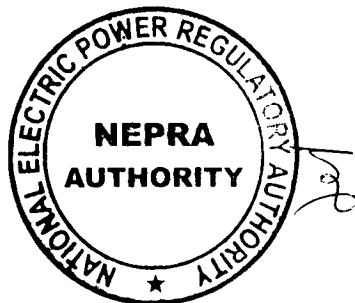


National Bank of Pakistan. The method of indexation will be as follows:

Tariff Components	Tariff Indexation & Adjustment
Fuel Cost component	Delivered Coal Price (inclusive of transportation) at the Power Plant
Variable O&M (Foreign)	US\$ to Pak Rupees & US CPI
Variable O&M (Local)	Local CPI (General)
Fixed O&M (Foreign)	US\$ to Pak Rupees & US CPI
Fixed O&M (Local)	Local CPI (General)
Cost of Working Capital	Adjustments for relevant KIBOR variations and average inventory cost
Return on Equity	US\$ to Pak Rupees
Principal Repayment (Foreign Currency Loan)	US\$/Euro/Yen/Pound to Pak Rupees (based on borrowing by the Company)
Interest//Mark-up Payments* (Foreign Currency Loan)	<ul style="list-style-type: none">• Adjustments for relevant LIBOR or other applicable Interest Rate benchmark• Adjustment for variation in Rs./Foreign Currency (US\$/Euro/Yen/Pound) rates as applicable
Interest/Mark-up Payments* (Local Currency Loan)	Adjustments for relevant KIBOR variations

20. NOTIFICATION

The above Order of the Authority along with 16 Annexes shall be notified in the Official Gazette in accordance with Section 31(4) of the NEPRA Act.



Upfront Tariff on Wet Cooling for Thar Coal based Power Projects for Single Unit on Foreign Financing

Annex - 1

Year	Energy Purchase Price (Rs./kWh)							Fixed FCC			Capacity Purchase Price (PKR/kWh/Hour)							Capacity Charge@ 85%	Total Tariff Rs. /kWh	Total Tariff Cents/kWh
	Var. FCC	Water Charges	Ash Disposal	Lime Stone	Var. O&M		Total EPP	Rs./kWh/hr.	at 85% PF (Rs./kWh)	Fixed O&M		Cost of W/C	Insurance	ROE	Debt Repayment	Interest Charges	Total CPP			
					Foreign	Local				Local	Foreign									
1	1.2315	0.4623	0.2200	0.0900	0.0757	0.0500	2.1294	4.0040	4.7106	0.1572	0.1587	0.0956	0.1203	0.9475	0.9247	0.6847	3.0887	3.6338	10.4737	9.9750
2	1.3680	0.4623	0.2200	0.0900	0.0757	0.0500	2.2659	3.0837	3.6278	0.1572	0.1587	0.0956	0.1203	0.9475	0.9795	0.6298	3.0887	3.6338	9.5275	9.0738
3	1.2556	0.4623	0.2200	0.0900	0.0757	0.0500	2.1535	2.5646	3.0172	0.1572	0.1587	0.0956	0.1203	0.9475	1.0376	0.5718	3.0887	3.6338	8.8045	8.3852
4	1.2122	0.4623	0.2200	0.0900	0.0757	0.0500	2.1101	2.5365	2.9841	0.1572	0.1587	0.0956	0.1203	0.9475	1.0991	0.5103	3.0887	3.6338	8.7280	8.3124
5	1.1692	0.4623	0.2200	0.0900	0.0757	0.0500	2.0672	2.5136	2.9571	0.1572	0.1587	0.0956	0.1203	0.9475	1.1642	0.4451	3.0887	3.6338	8.6581	8.2458
6	1.1558	0.4623	0.2200	0.0900	0.0757	0.0500	2.0538	2.4564	2.8898	0.1572	0.1587	0.0956	0.1203	0.9475	1.2332	0.3761	3.0887	3.6338	8.5774	8.1689
7	1.1558	0.4623	0.2200	0.0900	0.0757	0.0500	2.0538	2.4564	2.8898	0.1572	0.1587	0.0956	0.1203	0.9475	1.3063	0.3030	3.0887	3.6338	8.5774	8.1689
8	1.1558	0.4623	0.2200	0.0900	0.0757	0.0500	2.0538	2.4564	2.8898	0.1572	0.1587	0.0956	0.1203	0.9475	1.3838	0.2256	3.0887	3.6338	8.5774	8.1689
9	1.1348	0.4623	0.2200	0.0900	0.0757	0.0500	2.0327	2.4560	2.8894	0.1572	0.1587	0.0956	0.1203	0.9475	1.4658	0.1436	3.0887	3.6338	8.5559	8.1485
10	1.1348	0.4623	0.2200	0.0900	0.0757	0.0500	2.0327	2.4560	2.8894	0.1572	0.1587	0.0956	0.1203	0.9475	1.5527	0.0567	3.0887	3.6338	8.5559	8.1485
11	1.0424	0.3756	0.2200	0.0900	0.0757	0.0500	1.8536	1.4094	1.6581	0.1572	0.1587	0.0956	0.1203	0.9475	-	-	1.4793	1.7404	5.2521	5.0020
12	1.0411	0.3756	0.2200	0.0900	0.0757	0.0500	1.8523	1.3943	1.6404	0.1572	0.1587	0.0956	0.1203	0.9475	-	-	1.4793	1.7404	5.2330	4.9838
13	1.0398	0.3756	0.2200	0.0900	0.0757	0.0500	1.8509	1.3792	1.6226	0.1572	0.1587	0.0956	0.1203	0.9475	-	-	1.4793	1.7404	5.2140	4.9657
14	1.0398	0.3756	0.2200	0.0900	0.0757	0.0500	1.8509	1.3792	1.6226	0.1572	0.1587	0.0956	0.1203	0.9475	-	-	1.4793	1.7404	5.2140	4.9657
15	1.0398	0.3756	0.2200	0.0900	0.0757	0.0500	1.8509	1.3792	1.6226	0.1572	0.1587	0.0956	0.1203	0.9475	-	-	1.4793	1.7404	5.2140	4.9657
16	1.0880	0.3756	0.2200	0.0900	0.0757	0.0500	1.8992	1.3799	1.6234	0.1572	0.1587	0.0956	0.1203	0.9475	-	-	1.4793	1.7404	5.2630	5.0124
17	1.0880	0.3756	0.2200	0.0900	0.0757	0.0500	1.8992	1.3799	1.6234	0.1572	0.1587	0.0956	0.1203	0.9475	-	-	1.4793	1.7404	5.2630	5.0124
18	1.0880	0.3756	0.2200	0.0900	0.0757	0.0500	1.8992	1.3799	1.6234	0.1572	0.1587	0.0956	0.1203	0.9475	-	-	1.4793	1.7404	5.2630	5.0124
19	1.0880	0.3756	0.2200	0.0900	0.0757	0.0500	1.8992	1.3799	1.6234	0.1572	0.1587	0.0956	0.1203	0.9475	-	-	1.4793	1.7404	5.2630	5.0124
20	1.0880	0.3756	0.2200	0.0900	0.0757	0.0500	1.8992	1.3799	1.6234	0.1572	0.1587	0.0956	0.1203	0.9475	-	-	1.4793	1.7404	5.2630	5.0124
21	1.0880	0.3756	0.2200	0.0900	0.0757	0.0500	1.8992	1.3799	1.6234	0.1572	0.1587	0.0956	0.1203	0.9475	-	-	1.4793	1.7404	5.2630	5.0124
22	1.0880	0.3756	0.2200	0.0900	0.0757	0.0500	1.8992	1.3799	1.6234	0.1572	0.1587	0.0956	0.1203	0.9475	-	-	1.4793	1.7404	5.2630	5.0124
23	0.8882	0.3756	0.2200	0.0900	0.0757	0.0500	1.6994	1.3771	1.6201	0.1572	0.1587	0.0956	0.1203	0.9475	-	-	1.4793	1.7404	5.0599	4.8190
24	0.8882	0.3756	0.2200	0.0900	0.0757	0.0500	1.6994	1.3771	1.6201	0.1572	0.1587	0.0956	0.1203	0.9475	-	-	1.4793	1.7404	5.0599	4.8190
25	0.8882	0.3756	0.2200	0.0900	0.0757	0.0500	1.6994	1.3771	1.6201	0.1572	0.1587	0.0956	0.1203	0.9475	-	-	1.4793	1.7404	5.0599	4.8190
26	0.8882	0.3756	0.2200	0.0900	0.0757	0.0500	1.6994	1.3771	1.6201	0.1572	0.1587	0.0956	0.1203	0.9475	-	-	1.4793	1.7404	5.0599	4.8190
27	0.8882	0.3756	0.2200	0.0900	0.0757	0.0500	1.6994	1.3771	1.6201	0.1572	0.1587	0.0956	0.1203	0.9475	-	-	1.4793	1.7404	5.0599	4.8190
28	0.8882	0.3756	0.2200	0.0900	0.0757	0.0500	1.6994	1.3771	1.6201	0.1572	0.1587	0.0956	0.1203	0.9475	-	-	1.4793	1.7404	5.0599	4.8190
29	0.8882	0.3756	0.2200	0.0900	0.0757	0.0500	1.6994	1.3771	1.6201	0.1572	0.1587	0.0956	0.1203	0.9475	-	-	1.4793	1.7404	5.0599	4.8190
30	0.8882	0.3756	0.2200	0.0900	0.0757	0.0500	1.6994	1.3771	1.6201	0.1572	0.1587	0.0956	0.1203	0.9475	-	-	1.4793	1.7404	5.0599	4.8190
Average																				
1-10	1.1974	0.4623	0.2200	0.0900	0.0757	0.0500	2.0953	2.6983	3.1745	0.1572	0.1587	0.0956	0.1203	0.9475	1.2147	0.3947	3.0887	3.6338	8.9036	8.4796
11-30	0.9962	0.3756	0.2200	0.0900	0.0757	0.0500	1.8074	1.3809	1.6246	0.1572	0.1587	0.0956	0.1203	0.9475	0.0000	0.0000	1.4793	1.7404	5.1724	4.9261
1-30	1.0633	0.4045	0.2200	0.0900	0.0757	0.0500	1.9034	1.8200	2.1412	0.1572	0.1587	0.0956	0.1203	0.9475	0.4049	0.1316	2.0158	2.3715	6.4161	6.1106
Levelized																				
1-30	1.1480	0.4321	0.2200	0.0900	0.0757	0.0500	2.0157	2.3053	2.7121	0.1572	0.1587	0.0956	0.1203	0.9475	0.7569	0.2921	2.5283	2.9745	7.7023	7.3356

Levelized Tariff =

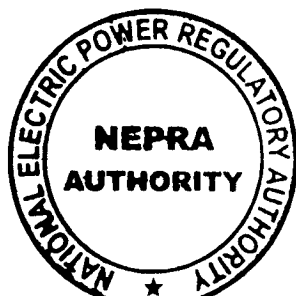
7.7023 Rs./kWh

7.3356 Cents/kWh



Upfront Tariff - Debt Servicing on Foreign Financing
Single Unit on Wet Cooling Technology

Period	Principal Million \$/MW	Principal Repayment Million \$/MW	Interest Million \$/MW	Balaaance Million \$/MW	Debt Service Million \$/MW	Principal Repayment Rs./kW/hour	Interest Rs./kW/ Hour	Debt Servicing Rs./kW/h
1	0.93	0.02	0.01	0.91	0.03			
2	0.91	0.02	0.01	0.90	0.03			
3	0.90	0.02	0.01	0.88	0.03			
4	0.88	0.02	0.01	0.86	0.03	0.9247	0.6847	1.6094
1st Year		0.07	0.05		0.12			
5	0.86	0.02	0.01	0.84	0.03			
6	0.84	0.02	0.01	0.82	0.03			
7	0.82	0.02	0.01	0.81	0.03			
8	0.81	0.02	0.01	0.79	0.03	0.9795	0.6298	1.6094
2nd Year		0.08	0.05		0.12			
9	0.79	0.02	0.01	0.77	0.03			
10	0.77	0.02	0.01	0.75	0.03			
11	0.75	0.02	0.01	0.73	0.03			
12	0.73	0.02	0.01	0.71	0.03	1.0376	0.5718	1.6094
3rd Year		0.08	0.04		0.12			
13	0.71	0.02	0.01	0.69	0.03			
14	0.69	0.02	0.01	0.66	0.03			
15	0.66	0.02	0.01	0.64	0.03			
16	0.64	0.02	0.01	0.62	0.03	1.0991	0.5103	1.6094
4th Year		0.08	0.04		0.12			
17	0.62	0.02	0.01	0.60	0.03			
18	0.60	0.02	0.01	0.58	0.03			
19	0.58	0.02	0.01	0.56	0.03			
20	0.56	0.02	0.01	0.53	0.03	1.1642	0.4451	1.6094
5th Year		0.09	0.03		0.12			
21	0.53	0.02	0.01	0.51	0.03			
22	0.51	0.02	0.01	0.49	0.03			
23	0.49	0.02	0.01	0.46	0.03			
24	0.46	0.02	0.01	0.44	0.03	1.2332	0.3761	1.6094
6th Year		0.09	0.03		0.12			
25	0.44	0.02	0.01	0.41	0.03			
26	0.41	0.02	0.01	0.39	0.03			
27	0.39	0.03	0.01	0.36	0.03			
28	0.36	0.03	0.01	0.34	0.03	1.3063	0.3030	1.6094
7th Year		0.10	0.02		0.12			
29	0.34	0.03	0.00	0.31	0.03			
30	0.31	0.03	0.00	0.29	0.03			
31	0.29	0.03	0.00	0.26	0.03			
32	0.26	0.03	0.00	0.23	0.03	1.3838	0.2256	1.6094
8th Year		0.11	0.02		0.12			
33	0.23	0.03	0.00	0.20	0.03			
34	0.20	0.03	0.00	0.18	0.03			
35	0.18	0.03	0.00	0.15	0.03			
36	0.15	0.03	0.00	0.12	0.03	1.4658	0.1436	1.6094
9th Year		0.11	0.01		0.12			
37	0.12	0.03	0.00	0.09	0.03			
38	0.09	0.03	0.00	0.06	0.03			
39	0.06	0.03	0.00	0.03	0.03			
40	0.03	0.03	0.00	0.00	0.03	1.5527	0.0567	1.6094
10th Year		0.12	0.00		0.12			



Upfront Tariff on Wet Cooling for Thar Coal based Power Projects for Single Unit on Local Financing

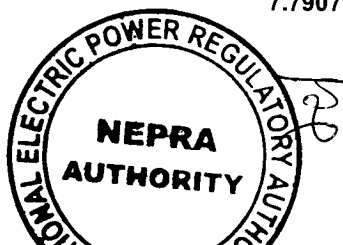
Annex - 2

Year	Energy Purchase Price (Rs./kWh)							Fixed FCC			Capacity Purchase Price (PKR/kWh/Hour)							Capacity Charge@ 85%	Total Tariff Rs. /kWh	Total Tariff Cents/kWh
	Var. FCC	Water Charges	Ash Disposal	Lime Stone	Var. O&M		Total EPP	Rs./kWh/hr.	at 85% PF (Rs./kWh)	Fixed O&M		Cost of W/C	Insurance	ROE	Debt Repayment	Interest Charges	Total CPP			
					Foreign	Local				Local	Foreign									
1	1.2315	0.4623	0.2200	0.0900	0.0757	0.0500	2.1294	4.0040	4.7106	0.1572	0.1587	0.0956	0.1203	0.9132	0.7648	1.0124	3.2222	3.7908	10.6308	10.1246
2	1.3680	0.4623	0.2200	0.0900	0.0757	0.0500	2.2659	3.0837	3.6278	0.1572	0.1587	0.0956	0.1203	0.9132	0.8348	0.9423	3.2222	3.7908	9.6846	9.2234
3	1.2556	0.4623	0.2200	0.0900	0.0757	0.0500	2.1535	2.5646	3.0172	0.1572	0.1587	0.0956	0.1203	0.9132	0.9113	0.8659	3.2222	3.7908	8.9615	8.5348
4	1.2122	0.4623	0.2200	0.0900	0.0757	0.0500	2.1101	2.5365	2.9841	0.1572	0.1587	0.0956	0.1203	0.9132	0.9947	0.7824	3.2222	3.7908	8.8851	8.4620
5	1.1692	0.4623	0.2200	0.0900	0.0757	0.0500	2.0672	2.5136	2.9571	0.1572	0.1587	0.0956	0.1203	0.9132	1.0859	0.6913	3.2222	3.7908	8.8151	8.3954
6	1.1558	0.4623	0.2200	0.0900	0.0757	0.0500	2.0538	2.4564	2.8898	0.1572	0.1587	0.0956	0.1203	0.9132	1.1853	0.5918	3.2222	3.7908	8.7345	8.3185
7	1.1558	0.4623	0.2200	0.0900	0.0757	0.0500	2.0538	2.4564	2.8898	0.1572	0.1587	0.0956	0.1203	0.9132	1.2939	0.4833	3.2222	3.7908	8.7345	8.3185
8	1.1558	0.4623	0.2200	0.0900	0.0757	0.0500	2.0538	2.4564	2.8898	0.1572	0.1587	0.0956	0.1203	0.9132	1.4124	0.3648	3.2222	3.7908	8.7345	8.3185
9	1.1348	0.4623	0.2200	0.0900	0.0757	0.0500	2.0327	2.4560	2.8894	0.1572	0.1587	0.0956	0.1203	0.9132	1.5417	0.2354	3.2222	3.7908	8.7130	8.2981
10	1.1348	0.4623	0.2200	0.0900	0.0757	0.0500	2.0327	2.4560	2.8894	0.1572	0.1587	0.0956	0.1203	0.9132	1.6829	0.0942	3.2222	3.7908	8.7130	8.2981
11	1.0424	0.3756	0.2200	0.0900	0.0757	0.0500	1.8536	1.4094	1.6581	0.1572	0.1587	0.0956	0.1203	0.9132	-	-	1.4451	1.7001	5.2117	4.9636
12	1.0411	0.3756	0.2200	0.0900	0.0757	0.0500	1.8523	1.3943	1.6404	0.1572	0.1587	0.0956	0.1203	0.9132	-	-	1.4451	1.7001	5.1927	4.9454
13	1.0398	0.3756	0.2200	0.0900	0.0757	0.0500	1.8509	1.3792	1.6226	0.1572	0.1587	0.0956	0.1203	0.9132	-	-	1.4451	1.7001	5.1737	4.9273
14	1.0398	0.3756	0.2200	0.0900	0.0757	0.0500	1.8509	1.3792	1.6226	0.1572	0.1587	0.0956	0.1203	0.9132	-	-	1.4451	1.7001	5.1737	4.9273
15	1.0398	0.3756	0.2200	0.0900	0.0757	0.0500	1.8509	1.3792	1.6226	0.1572	0.1587	0.0956	0.1203	0.9132	-	-	1.4451	1.7001	5.1737	4.9273
16	1.0880	0.3756	0.2200	0.0900	0.0757	0.0500	1.8992	1.3799	1.6234	0.1572	0.1587	0.0956	0.1203	0.9132	-	-	1.4451	1.7001	5.2227	4.9740
17	1.0880	0.3756	0.2200	0.0900	0.0757	0.0500	1.8992	1.3799	1.6234	0.1572	0.1587	0.0956	0.1203	0.9132	-	-	1.4451	1.7001	5.2227	4.9740
18	1.0880	0.3756	0.2200	0.0900	0.0757	0.0500	1.8992	1.3799	1.6234	0.1572	0.1587	0.0956	0.1203	0.9132	-	-	1.4451	1.7001	5.2227	4.9740
19	1.0880	0.3756	0.2200	0.0900	0.0757	0.0500	1.8992	1.3799	1.6234	0.1572	0.1587	0.0956	0.1203	0.9132	-	-	1.4451	1.7001	5.2227	4.9740
20	1.0880	0.3756	0.2200	0.0900	0.0757	0.0500	1.8992	1.3799	1.6234	0.1572	0.1587	0.0956	0.1203	0.9132	-	-	1.4451	1.7001	5.2227	4.9740
21	1.0880	0.3756	0.2200	0.0900	0.0757	0.0500	1.8992	1.3799	1.6234	0.1572	0.1587	0.0956	0.1203	0.9132	-	-	1.4451	1.7001	5.2227	4.9740
22	1.0880	0.3756	0.2200	0.0900	0.0757	0.0500	1.8992	1.3799	1.6234	0.1572	0.1587	0.0956	0.1203	0.9132	-	-	1.4451	1.7001	5.2227	4.9740
23	0.8882	0.3756	0.2200	0.0900	0.0757	0.0500	1.6994	1.3771	1.6201	0.1572	0.1587	0.0956	0.1203	0.9132	-	-	1.4451	1.7001	5.0196	4.7806
24	0.8882	0.3756	0.2200	0.0900	0.0757	0.0500	1.6994	1.3771	1.6201	0.1572	0.1587	0.0956	0.1203	0.9132	-	-	1.4451	1.7001	5.0196	4.7806
25	0.8882	0.3756	0.2200	0.0900	0.0757	0.0500	1.6994	1.3771	1.6201	0.1572	0.1587	0.0956	0.1203	0.9132	-	-	1.4451	1.7001	5.0196	4.7806
26	0.8882	0.3756	0.2200	0.0900	0.0757	0.0500	1.6994	1.3771	1.6201	0.1572	0.1587	0.0956	0.1203	0.9132	-	-	1.4451	1.7001	5.0196	4.7806
27	0.8882	0.3756	0.2200	0.0900	0.0757	0.0500	1.6994	1.3771	1.6201	0.1572	0.1587	0.0956	0.1203	0.9132	-	-	1.4451	1.7001	5.0196	4.7806
28	0.8882	0.3756	0.2200	0.0900	0.0757	0.0500	1.6994	1.3771	1.6201	0.1572	0.1587	0.0956	0.1203	0.9132	-	-	1.4451	1.7001	5.0196	4.7806
29	0.8882	0.3756	0.2200	0.0900	0.0757	0.0500	1.6994	1.3771	1.6201	0.1572	0.1587	0.0956	0.1203	0.9132	-	-	1.4451	1.7001	5.0196	4.7806
30	0.8882	0.3756	0.2200	0.0900	0.0757	0.0500	1.6994	1.3771	1.6201	0.1572	0.1587	0.0956	0.1203	0.9132	-	-	1.4451	1.7001	5.0196	4.7806
Average																				
1-10	1.1974	0.4623	0.2200	0.0900	0.0757	0.0500	2.0953	2.6983	3.1745	0.1572	0.1587	0.0956	0.1203	0.9132	1.1708	0.6064	3.2222	3.7908	9.0606	8.6292
11-30	0.9962	0.3756	0.2200	0.0900	0.0757	0.0500	1.8074	1.3809	1.6246	0.1572	0.1587	0.0956	0.1203	0.9132	0.0000	0.0000	1.4451	1.7001	5.1321	4.8877
1-30	1.0633	0.4045	0.2200	0.0900	0.0757	0.0500	1.9034	1.8200	2.1412	0.1572	0.1587	0.0956	0.1203	0.9132	0.3903	0.2021	2.0374	2.3970	6.4416	6.1348
Levelized																				
1-30	1.1480	0.4321	0.2200	0.0900	0.0757	0.0500	2.0157	2.3053	2.7121	0.1572	0.1587	0.0956	0.1203	0.9132	0.7127	0.4457	2.6034	3.0629	7.7907	7.4197

Levelized Tariff =

7.7907 Rs./kWh

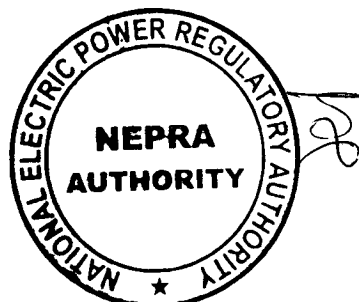
7.4197 Cents/kWh



39

Upfront Tariff - Debt Servicing on Local Financing
Single Unit on Wet Cooling

Period	Principal Million \$/MW	Principal Repayment Million \$/MW	Interest Million \$/MW	Balaance Million \$/MW	Debt Service Million \$/MW	Principal Repayment Rs./kW/hour	Interest Rs./kW/ Hour	Debt Servicing Rs./kW/h
1	0.90	0.01	0.02	0.88	\$0.03			
2	0.88	0.01	0.02	0.87	0.03			
3	0.87	0.01	0.02	0.86	0.03			
4	0.86	0.02	0.02	0.84	0.03	0.7648	1.0124	1.7771
1st Year		0.06	0.08		0.14			
5	0.84	0.02	0.02	0.82	0.03			
6	0.82	0.02	0.02	0.81	0.03			
7	0.81	0.02	0.02	0.79	0.03			
8	0.79	0.02	0.02	0.78	0.03	0.8348	0.9423	1.7771
2nd Year		0.06	0.07		0.14			
9	0.78	0.02	0.02	0.76	0.03			
10	0.76	0.02	0.02	0.74	0.03			
11	0.74	0.02	0.02	0.72	0.03			
12	0.72	0.02	0.02	0.71	0.03	0.9113	0.8659	1.7771
3rd Year		0.07	0.07		0.14			
13	0.71	0.02	0.02	0.69	0.03			
14	0.69	0.02	0.02	0.67	0.03			
15	0.67	0.02	0.01	0.65	0.03			
16	0.65	0.02	0.01	0.63	0.03	0.9947	0.7824	1.7771
4th Year		0.08	0.06		0.14			
17	0.63	0.02	0.01	0.61	0.03			
18	0.61	0.02	0.01	0.59	0.03			
19	0.59	0.02	0.01	0.57	0.03			
20	0.57	0.02	0.01	0.55	0.03	1.0859	0.6913	1.7771
5th Year		0.08	0.05		0.14			
21	0.55	0.02	0.01	0.52	0.03			
22	0.52	0.02	0.01	0.50	0.03			
23	0.50	0.02	0.01	0.48	0.03			
24	0.48	0.02	0.01	0.46	0.03	1.1853	0.5918	1.7771
6th Year		0.09	0.05		0.14			
25	0.46	0.02	0.01	0.43	0.03			
26	0.43	0.02	0.01	0.41	0.03			
27	0.41	0.03	0.01	0.38	0.03			
28	0.38	0.03	0.01	0.36	0.03	1.2939	0.4833	1.7771
7th Year		0.10	0.04		0.14			
29	0.36	0.03	0.01	0.33	0.03			
30	0.33	0.03	0.01	0.30	0.03			
31	0.30	0.03	0.01	0.28	0.03			
32	0.28	0.03	0.01	0.25	0.03	1.4124	0.3648	1.7771
8th Year		0.11	0.03		0.14			
33	0.25	0.03	0.01	0.22	0.03			
34	0.22	0.03	0.00	0.19	0.03			
35	0.19	0.03	0.00	0.16	0.03			
36	0.16	0.03	0.00	0.13	0.03	1.5417	0.2354	1.7771
9th Year		0.12	0.02		0.14			
37	0.13	0.03	0.00	0.10	0.03			
38	0.10	0.03	0.00	0.07	0.03			
39	0.07	0.03	0.00	0.03	0.03			
40	0.03	0.03	0.00	(0.00)	0.03	1.6829	0.0942	1.7771
10th Year		0.13	0.01		0.14			



Upfront Tariff on Wet Cooling for Thar Coal based Power Projects for Two Units on Foreign Financing

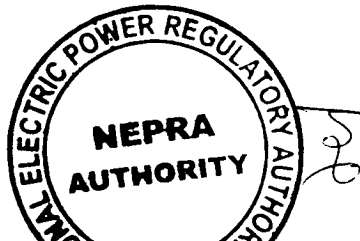
Annex - 3

Year	Energy Purchase Price (Rs./kWh)							Fixed FCC		Capacity Purchase Price (PKR/kWh/Hour)							Capacity Charge@ 85%	Total		
	Var. FCC	Water Charges	Ash Disposal	Lime Stone	Var. O&M		Total EPP	Rs./kWh/hr.	at 85% PF (Rs./kWh)	Fixed O&M		Cost of W/C	Insurance	ROE	Debt Repayment	Interest Charges		Total CPP	Rs. /kWh	Cents/kWh
					Foreign	Local				Local	Foreign									
1	1.2315	0.4373	0.2200	0.0900	0.0757	0.0500	2.1043	4.0040	4.7106	0.1457	0.1471	0.0956	0.1143	0.9470	0.8806	0.6520	2.9823	3.5086	10.3235	9.8319
2	1.3680	0.4373	0.2200	0.0900	0.0757	0.0500	2.2408	3.0837	3.6278	0.1457	0.1471	0.0956	0.1143	0.9470	0.9328	0.5998	2.9823	3.5086	9.3772	8.9307
3	1.2556	0.4373	0.2200	0.0900	0.0757	0.0500	2.1284	2.5646	3.0172	0.1457	0.1471	0.0956	0.1143	0.9470	0.9881	0.5445	2.9823	3.5086	8.6542	8.2421
4	1.2122	0.4373	0.2200	0.0900	0.0757	0.0500	2.0850	2.5365	2.9841	0.1457	0.1471	0.0956	0.1143	0.9470	1.0466	0.4859	2.9823	3.5086	8.5778	8.1693
5	1.1692	0.4373	0.2200	0.0900	0.0757	0.0500	2.0421	2.5136	2.9571	0.1457	0.1471	0.0956	0.1143	0.9470	1.1087	0.4239	2.9823	3.5086	8.5078	8.1027
6	1.1558	0.4373	0.2200	0.0900	0.0757	0.0500	2.0287	2.4564	2.8898	0.1457	0.1471	0.0956	0.1143	0.9470	1.1744	0.3582	2.9823	3.5086	8.4271	8.0258
7	1.1558	0.4373	0.2200	0.0900	0.0757	0.0500	2.0287	2.4564	2.8898	0.1457	0.1471	0.0956	0.1143	0.9470	1.2440	0.2886	2.9823	3.5086	8.4271	8.0258
8	1.1558	0.4373	0.2200	0.0900	0.0757	0.0500	2.0287	2.4564	2.8898	0.1457	0.1471	0.0956	0.1143	0.9470	1.3177	0.2148	2.9823	3.5086	8.4271	8.0258
9	1.1348	0.4373	0.2200	0.0900	0.0757	0.0500	2.0076	2.4560	2.8894	0.1457	0.1471	0.0956	0.1143	0.9470	1.3959	0.1367	2.9823	3.5086	8.4056	8.0054
10	1.1348	0.4373	0.2200	0.0900	0.0757	0.0500	2.0076	2.4560	2.8894	0.1457	0.1471	0.0956	0.1143	0.9470	1.4786	0.0540	2.9823	3.5086	8.4056	8.0054
11	1.0424	0.3657	0.2200	0.0900	0.0757	0.0500	1.8438	1.4094	1.6581	0.1457	0.1471	0.0956	0.1143	0.9470	-	-	1.4497	1.7055	5.2074	4.9594
12	1.0411	0.3657	0.2200	0.0900	0.0757	0.0500	1.8424	1.3943	1.6404	0.1457	0.1471	0.0956	0.1143	0.9470	-	-	1.4497	1.7055	5.1883	4.9413
13	1.0398	0.3657	0.2200	0.0900	0.0757	0.0500	1.8411	1.3792	1.6226	0.1457	0.1471	0.0956	0.1143	0.9470	-	-	1.4497	1.7055	5.1693	4.9231
14	1.0398	0.3657	0.2200	0.0900	0.0757	0.0500	1.8411	1.3792	1.6226	0.1457	0.1471	0.0956	0.1143	0.9470	-	-	1.4497	1.7055	5.1693	4.9231
15	1.0398	0.3657	0.2200	0.0900	0.0757	0.0500	1.8411	1.3792	1.6226	0.1457	0.1471	0.0956	0.1143	0.9470	-	-	1.4497	1.7055	5.1693	4.9231
16	1.0880	0.3657	0.2200	0.0900	0.0757	0.0500	1.8893	1.3799	1.6234	0.1457	0.1471	0.0956	0.1143	0.9470	-	-	1.4497	1.7055	5.2183	4.9698
17	1.0880	0.3657	0.2200	0.0900	0.0757	0.0500	1.8893	1.3799	1.6234	0.1457	0.1471	0.0956	0.1143	0.9470	-	-	1.4497	1.7055	5.2183	4.9698
18	1.0880	0.3657	0.2200	0.0900	0.0757	0.0500	1.8893	1.3799	1.6234	0.1457	0.1471	0.0956	0.1143	0.9470	-	-	1.4497	1.7055	5.2183	4.9698
19	1.0880	0.3657	0.2200	0.0900	0.0757	0.0500	1.8893	1.3799	1.6234	0.1457	0.1471	0.0956	0.1143	0.9470	-	-	1.4497	1.7055	5.2183	4.9698
20	1.0880	0.3657	0.2200	0.0900	0.0757	0.0500	1.8893	1.3799	1.6234	0.1457	0.1471	0.0956	0.1143	0.9470	-	-	1.4497	1.7055	5.2183	4.9698
21	1.0880	0.3657	0.2200	0.0900	0.0757	0.0500	1.8893	1.3799	1.6234	0.1457	0.1471	0.0956	0.1143	0.9470	-	-	1.4497	1.7055	5.2183	4.9698
22	1.0880	0.3657	0.2200	0.0900	0.0757	0.0500	1.8893	1.3799	1.6234	0.1457	0.1471	0.0956	0.1143	0.9470	-	-	1.4497	1.7055	5.2183	4.9698
23	0.8882	0.3657	0.2200	0.0900	0.0757	0.0500	1.6895	1.3771	1.6201	0.1457	0.1471	0.0956	0.1143	0.9470	-	-	1.4497	1.7055	5.0152	4.7764
24	0.8882	0.3657	0.2200	0.0900	0.0757	0.0500	1.6895	1.3771	1.6201	0.1457	0.1471	0.0956	0.1143	0.9470	-	-	1.4497	1.7055	5.0152	4.7764
25	0.8882	0.3657	0.2200	0.0900	0.0757	0.0500	1.6895	1.3771	1.6201	0.1457	0.1471	0.0956	0.1143	0.9470	-	-	1.4497	1.7055	5.0152	4.7764
26	0.8882	0.3657	0.2200	0.0900	0.0757	0.0500	1.6895	1.3771	1.6201	0.1457	0.1471	0.0956	0.1143	0.9470	-	-	1.4497	1.7055	5.0152	4.7764
27	0.8882	0.3657	0.2200	0.0900	0.0757	0.0500	1.6895	1.3771	1.6201	0.1457	0.1471	0.0956	0.1143	0.9470	-	-	1.4497	1.7055	5.0152	4.7764
28	0.8882	0.3657	0.2200	0.0900	0.0757	0.0500	1.6895	1.3771	1.6201	0.1457	0.1471	0.0956	0.1143	0.9470	-	-	1.4497	1.7055	5.0152	4.7764
29	0.8882	0.3657	0.2200	0.0900	0.0757	0.0500	1.6895	1.3771	1.6201	0.1457	0.1471	0.0956	0.1143	0.9470	-	-	1.4497	1.7055	5.0152	4.7764
30	0.8882	0.3657	0.2200	0.0900	0.0757	0.0500	1.6895	1.3771	1.6201	0.1457	0.1471	0.0956	0.1143	0.9470	-	-	1.4497	1.7055	5.0152	4.7764
Average																				
1-10	1.1974	0.4373	0.2200	0.0900	0.0757	0.0500	2.0702	2.6983	3.1745	0.1457	0.1471	0.0956	0.1143	0.9470	1.1567	0.3758	2.9823	3.5086	8.7533	8.3365
11-30	0.9962	0.3657	0.2200	0.0900	0.0757	0.0500	1.7976	1.3809	1.6246	0.1457	0.1471	0.0956	0.1143	0.9470	0.0000	0.0000	1.4497	1.7055	5.1277	4.8835
1-30	1.0633	0.3896	0.2200	0.0900	0.0757	0.0500	1.8884	1.8200	2.1412	0.1457	0.1471	0.0956	0.1143	0.9470	0.3856	0.1253	1.9606	2.3066	6.3362	6.0345
Levelized																				
1-30	1.1480	0.4123	0.2200	0.0900	0.0757	0.0500	1.9960	2.3053	2.7121	0.1457	0.1471	0.0956	0.1143	0.9470	0.7208	0.2781	2.4487	2.8808	7.5889	7.2275

Levelized Tariff =

7.5889 Rs./kWh

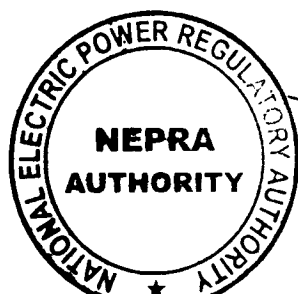
7.2275 Cents/kWh



(Handwritten marks)

Upfront Tariff - Debt Servicing on Foreign Financing
Two Units on Wet Cooling Technology

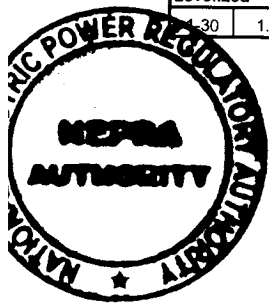
Period	Principal Million \$/MW	Principal Repayment Million \$/MW	Interest Million \$/MW	Balaance Million \$/MW	Debt Service Million \$/MW	Principal Repayment Rs./kW/hour	Interest Rs./kW/ Hour	Debt Servicing Rs./kW/h
1	0.89	0.02	0.01	0.87	\$0.03			
2	0.87	0.02	0.01	0.85	0.03			
3	0.85	0.02	0.01	0.84	0.03			
4	0.84	0.02	0.01	0.82	0.03	0.8806	0.6520	1.5326
1st Year		0.07	0.05		0.12			
5	0.82	0.02	0.01	0.80	0.03			
6	0.80	0.02	0.01	0.78	0.03			
7	0.78	0.02	0.01	0.77	0.03			
8	0.77	0.02	0.01	0.75	0.03	0.9328	0.5998	1.5326
2nd Year		0.07	0.05		0.12			
9	0.75	0.02	0.01	0.73	0.03			
10	0.73	0.02	0.01	0.71	0.03			
11	0.71	0.02	0.01	0.69	0.03			
12	0.69	0.02	0.01	0.67	0.03	0.9881	0.5445	1.5326
3rd Year		0.08	0.04		0.12			
13	0.67	0.02	0.01	0.65	0.03			
14	0.65	0.02	0.01	0.63	0.03			
15	0.63	0.02	0.01	0.61	0.03			
16	0.61	0.02	0.01	0.59	0.03	1.0466	0.4859	1.5326
4th Year		0.08	0.04		0.12			
17	0.59	0.02	0.01	0.57	0.03			
18	0.57	0.02	0.01	0.55	0.03			
19	0.55	0.02	0.01	0.53	0.03			
20	0.53	0.02	0.01	0.51	0.03	1.1087	0.4239	1.5326
5th Year		0.09	0.03		0.12			
21	0.51	0.02	0.01	0.49	0.03			
22	0.49	0.02	0.01	0.46	0.03			
23	0.46	0.02	0.01	0.44	0.03			
24	0.44	0.02	0.01	0.42	0.03	1.1744	0.3582	1.5326
6th Year		0.09	0.03		0.12			
25	0.42	0.02	0.01	0.39	0.03			
26	0.39	0.02	0.01	0.37	0.03			
27	0.37	0.02	0.01	0.35	0.03			
28	0.35	0.02	0.01	0.32	0.03	1.2440	0.2886	1.5326
7th Year		0.10	0.02		0.12			
29	0.32	0.02	0.00	0.30	0.03			
30	0.30	0.03	0.00	0.27	0.03			
31	0.27	0.03	0.00	0.25	0.03			
32	0.25	0.03	0.00	0.22	0.03	1.3177	0.2148	1.5326
8th Year		0.10	0.02		0.12			
33	0.22	0.03	0.00	0.19	0.03			
34	0.19	0.03	0.00	0.17	0.03			
35	0.17	0.03	0.00	0.14	0.03			
36	0.14	0.03	0.00	0.11	0.03	1.3959	0.1367	1.5326
9th Year		0.11	0.01		0.12			
37	0.11	0.03	0.00	0.09	0.03			
38	0.09	0.03	0.00	0.06	0.03			
39	0.06	0.03	0.00	0.03	0.03			
40	0.03	0.03	0.00	0.00	0.03	1.4786	0.0540	1.5326
10th Year		0.11	0.00		0.12			



Upfront Tariff on Wet Cooling for Thar Coal based Power Projects for Two Units on Local Financing

Annex - 4

Year	Energy Purchase Price (Rs./kWh)							Fixed FCC		Capacity Purchase Price (PKR/kWh/Hour)								Capacity Charge@ 85%	Total	
	Var. FCC	Water Charges	Ash Disposal	Lime Stone	Var. O&M		Total EPP	Rs./kWh/hr.	at 85% PF (Rs./kWh)	Fixed O&M		Cost of W/C	Insurance	ROE	Debt Repayment	Interest Charges	Total CPP		Rs./kWh	Cents/kWh
					Foreign	Local				Local	Foreign									
1	1.2315	0.4373	0.2200	0.0900	0.0757	0.0500	2.1043	4.0040	4.7106	0.1457	0.1471	0.0956	0.1143	0.9186	0.7329	0.9702	3.1243	3.6756	10.4905	9.9910
2	1.3680	0.4373	0.2200	0.0900	0.0757	0.0500	2.2408	3.0837	3.6278	0.1457	0.1471	0.0956	0.1143	0.9186	0.8000	0.9030	3.1243	3.6756	9.5443	9.0898
3	1.2556	0.4373	0.2200	0.0900	0.0757	0.0500	2.1284	2.5646	3.0172	0.1457	0.1471	0.0956	0.1143	0.9186	0.8733	0.8298	3.1243	3.6756	8.8213	8.4012
4	1.2122	0.4373	0.2200	0.0900	0.0757	0.0500	2.0850	2.5365	2.9841	0.1457	0.1471	0.0956	0.1143	0.9186	0.9533	0.7498	3.1243	3.6756	8.7448	8.3284
5	1.1692	0.4373	0.2200	0.0900	0.0757	0.0500	2.0421	2.5136	2.9571	0.1457	0.1471	0.0956	0.1143	0.9186	1.0406	0.6625	3.1243	3.6756	8.6749	8.2618
6	1.1558	0.4373	0.2200	0.0900	0.0757	0.0500	2.0287	2.4564	2.8898	0.1457	0.1471	0.0956	0.1143	0.9186	1.1359	0.5672	3.1243	3.6756	8.5942	8.1849
7	1.1558	0.4373	0.2200	0.0900	0.0757	0.0500	2.0287	2.4564	2.8898	0.1457	0.1471	0.0956	0.1143	0.9186	1.2399	0.4631	3.1243	3.6756	8.5942	8.1849
8	1.1558	0.4373	0.2200	0.0900	0.0757	0.0500	2.0287	2.4564	2.8898	0.1457	0.1471	0.0956	0.1143	0.9186	1.3535	0.3496	3.1243	3.6756	8.5942	8.1849
9	1.1348	0.4373	0.2200	0.0900	0.0757	0.0500	2.0076	2.4560	2.8894	0.1457	0.1471	0.0956	0.1143	0.9186	1.4775	0.2256	3.1243	3.6756	8.5727	8.1645
10	1.1348	0.4373	0.2200	0.0900	0.0757	0.0500	2.0076	2.4560	2.8894	0.1457	0.1471	0.0956	0.1143	0.9186	1.6128	0.0903	3.1243	3.6756	8.5727	8.1645
11	1.0424	0.3657	0.2200	0.0900	0.0757	0.0500	1.8438	1.4094	1.6581	0.1457	0.1471	0.0956	0.1143	0.9186	-	-	1.4212	1.6720	5.1739	4.9275
12	1.0411	0.3657	0.2200	0.0900	0.0757	0.0500	1.8424	1.3943	1.6404	0.1457	0.1471	0.0956	0.1143	0.9186	-	-	1.4212	1.6720	5.1548	4.9094
13	1.0398	0.3657	0.2200	0.0900	0.0757	0.0500	1.8411	1.3792	1.6226	0.1457	0.1471	0.0956	0.1143	0.9186	-	-	1.4212	1.6720	5.1358	4.8912
14	1.0398	0.3657	0.2200	0.0900	0.0757	0.0500	1.8411	1.3792	1.6226	0.1457	0.1471	0.0956	0.1143	0.9186	-	-	1.4212	1.6720	5.1358	4.8912
15	1.0398	0.3657	0.2200	0.0900	0.0757	0.0500	1.8411	1.3792	1.6226	0.1457	0.1471	0.0956	0.1143	0.9186	-	-	1.4212	1.6720	5.1358	4.8912
16	1.0880	0.3657	0.2200	0.0900	0.0757	0.0500	1.8893	1.3799	1.6234	0.1457	0.1471	0.0956	0.1143	0.9186	-	-	1.4212	1.6720	5.1848	4.9379
17	1.0880	0.3657	0.2200	0.0900	0.0757	0.0500	1.8893	1.3799	1.6234	0.1457	0.1471	0.0956	0.1143	0.9186	-	-	1.4212	1.6720	5.1848	4.9379
18	1.0880	0.3657	0.2200	0.0900	0.0757	0.0500	1.8893	1.3799	1.6234	0.1457	0.1471	0.0956	0.1143	0.9186	-	-	1.4212	1.6720	5.1848	4.9379
19	1.0880	0.3657	0.2200	0.0900	0.0757	0.0500	1.8893	1.3799	1.6234	0.1457	0.1471	0.0956	0.1143	0.9186	-	-	1.4212	1.6720	5.1848	4.9379
20	1.0880	0.3657	0.2200	0.0900	0.0757	0.0500	1.8893	1.3799	1.6234	0.1457	0.1471	0.0956	0.1143	0.9186	-	-	1.4212	1.6720	5.1848	4.9379
21	1.0880	0.3657	0.2200	0.0900	0.0757	0.0500	1.8893	1.3799	1.6234	0.1457	0.1471	0.0956	0.1143	0.9186	-	-	1.4212	1.6720	5.1848	4.9379
22	1.0880	0.3657	0.2200	0.0900	0.0757	0.0500	1.8893	1.3799	1.6234	0.1457	0.1471	0.0956	0.1143	0.9186	-	-	1.4212	1.6720	5.1848	4.9379
23	0.8882	0.3657	0.2200	0.0900	0.0757	0.0500	1.6895	1.3771	1.6201	0.1457	0.1471	0.0956	0.1143	0.9186	-	-	1.4212	1.6720	4.9817	4.7445
24	0.8882	0.3657	0.2200	0.0900	0.0757	0.0500	1.6895	1.3771	1.6201	0.1457	0.1471	0.0956	0.1143	0.9186	-	-	1.4212	1.6720	4.9817	4.7445
25	0.8882	0.3657	0.2200	0.0900	0.0757	0.0500	1.6895	1.3771	1.6201	0.1457	0.1471	0.0956	0.1143	0.9186	-	-	1.4212	1.6720	4.9817	4.7445
26	0.8882	0.3657	0.2200	0.0900	0.0757	0.0500	1.6895	1.3771	1.6201	0.1457	0.1471	0.0956	0.1143	0.9186	-	-	1.4212	1.6720	4.9817	4.7445
27	0.8882	0.3657	0.2200	0.0900	0.0757	0.0500	1.6895	1.3771	1.6201	0.1457	0.1471	0.0956	0.1143	0.9186	-	-	1.4212	1.6720	4.9817	4.7445
28	0.8882	0.3657	0.2200	0.0900	0.0757	0.0500	1.6895	1.3771	1.6201	0.1457	0.1471	0.0956	0.1143	0.9186	-	-	1.4212	1.6720	4.9817	4.7445
29	0.8882	0.3657	0.2200	0.0900	0.0757	0.0500	1.6895	1.3771	1.6201	0.1457	0.1471	0.0956	0.1143	0.9186	-	-	1.4212	1.6720	4.9817	4.7445
30	0.8882	0.3657	0.2200	0.0900	0.0757	0.0500	1.6895	1.3771	1.6201	0.1457	0.1471	0.0956	0.1143	0.9186	-	-	1.4212	1.6720	4.9817	4.7445
Average																				
1-10	1.1974	0.4373	0.2200	0.0900	0.0757	0.0500	2.0702	2.6983	3.1745	0.1457	0.1471	0.0956	0.1143	0.9186	1.1220	0.5811	3.1243	3.6756	8.9204	8.4956
11-30	0.9962	0.3657	0.2200	0.0900	0.0757	0.0500	1.7976	1.3809	1.6246	0.1457	0.1471	0.0956	0.1143	0.9186	0.0000	0.0000	1.4212	1.6720	5.0942	4.8516
1-30	1.0633	0.3896	0.2200	0.0900	0.0757	0.0500	1.8884	1.8200	2.1412	0.1457	0.1471	0.0956	0.1143	0.9186	0.3740	0.1937	1.9889	2.3399	6.3696	6.0663
Levelized																				
1-30	1.1480	0.4123	0.2200	0.0900	0.0757	0.0500	1.9960	2.3053	2.7121	0.1457	0.1471	0.0956	0.1143	0.9186	0.6829	0.4271	2.5313	2.9780	7.6861	7.3201
Levelized Tariff =											7.6861 Rs./kWh					7.3201 Cents/kWh				



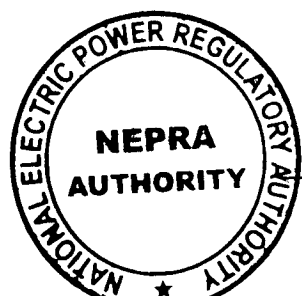
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Upfront Tariff - Debt Servicing on Local Financing
Two Units on Wet Cooling Technology

Period	Principal Million \$	Principal Repayment Million \$	Interest Million \$	Balaance Million \$	Debt Service Million \$	Principal Repayment Rs./kW/hour	Interest Rs./kW/ Hour	Debt Servicing Rs./kW/h
1	0.86	0.01	0.02	0.85	0.03			
2	0.85	0.01	0.02	0.83	0.03			
3	0.83	0.01	0.02	0.82	0.03			
4	0.82	0.01	0.02	0.80	0.03	0.7329	0.9702	1.7031
1st Year		0.06	0.07		0.13			
5	0.80	0.01	0.02	0.79	0.03			
6	0.79	0.02	0.02	0.77	0.03			
7	0.77	0.02	0.02	0.76	0.03			
8	0.76	0.02	0.02	0.74	0.03	0.8000	0.9030	1.7031
2nd Year		0.06	0.07		0.13			
9	0.74	0.02	0.02	0.73	0.03			
10	0.73	0.02	0.02	0.71	0.03			
11	0.71	0.02	0.02	0.69	0.03			
12	0.69	0.02	0.02	0.68	0.03	0.8733	0.8298	1.7031
3rd Year		0.07	0.06		0.13			
13	0.68	0.02	0.01	0.66	0.03			
14	0.66	0.02	0.01	0.64	0.03			
15	0.64	0.02	0.01	0.62	0.03			
16	0.62	0.02	0.01	0.60	0.03	0.9533	0.7498	1.7031
4th Year		0.07	0.06		0.13			
17	0.60	0.02	0.01	0.58	0.03			
18	0.58	0.02	0.01	0.56	0.03			
19	0.56	0.02	0.01	0.54	0.03			
20	0.54	0.02	0.01	0.52	0.03	1.0406	0.6625	1.7031
5th Year		0.08	0.05		0.13			
21	0.52	0.02	0.01	0.50	0.03			
22	0.50	0.02	0.01	0.48	0.03			
23	0.48	0.02	0.01	0.46	0.03			
24	0.46	0.02	0.01	0.44	0.03	1.1359	0.5672	1.7031
6th Year		0.09	0.04		0.13			
25	0.44	0.02	0.01	0.41	0.03			
26	0.41	0.02	0.01	0.39	0.03			
27	0.39	0.02	0.01	0.37	0.03			
28	0.37	0.02	0.01	0.34	0.03	1.2399	0.4631	1.7031
7th Year		0.10	0.04		0.13			
29	0.34	0.03	0.01	0.32	0.03			
30	0.32	0.03	0.01	0.29	0.03			
31	0.29	0.03	0.01	0.26	0.03			
32	0.26	0.03	0.01	0.24	0.03	1.3535	0.3496	1.7031
8th Year		0.10	0.03		0.13			
33	0.24	0.03	0.01	0.21	0.03			
34	0.21	0.03	0.00	0.18	0.03			
35	0.18	0.03	0.00	0.15	0.03			
36	0.15	0.03	0.00	0.12	0.03	1.4775	0.2256	1.7031
9th Year		0.11	0.02		0.13			
37	0.12	0.03	0.00	0.09	0.03			
38	0.09	0.03	0.00	0.06	0.03			
39	0.06	0.03	0.00	0.03	0.03			
40	0.03	0.03	0.00	(0.00)	0.03	1.6128	0.0903	1.7031
10th Year		0.12	0.01		0.13			



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Upfront Tariff on Air Cooling for Thar Coal based Power Projects for Single Unit on Foreign Financing

Annex - 5

Year	Energy Purchase Price (Rs./kWh)						Fixed FCC		Capacity Purchase Price (PKR/kWh/Hour)								Capacity Charge@ 85%	Total Tariff Rs./kWh	Total Tariff Cents/kWh
	Var. FCC	Ash Disposal	Lime Stone	Var. O&M		Total EPP	Rs./kWh/hr.	at 85% PF (Rs./kWh)	Fixed O&M		Cost of W/C	Insurance	ROE	Debt Repayment	Interest Charges	Total CPP			
				Foreign	Local				Local	Foreign									
1	1.2980	0.2200	0.0900	0.0757	0.0500	1.7337	4.2204	4.9652	0.1572	0.1587	0.1007	0.1255	0.9850	0.9613	0.7117	3.2001	3.7649	10.4637	9.9654
2	1.4419	0.2200	0.0900	0.0757	0.0500	1.8775	3.2503	3.8239	0.1572	0.1587	0.1007	0.1255	0.9850	1.0182	0.6547	3.2001	3.7649	9.4663	9.0155
3	1.3235	0.2200	0.0900	0.0757	0.0500	1.7591	2.7032	3.1803	0.1572	0.1587	0.1007	0.1255	0.9850	1.0786	0.5944	3.2001	3.7649	8.7042	8.2897
4	1.2777	0.2200	0.0900	0.0757	0.0500	1.7133	2.6736	3.1454	0.1572	0.1587	0.1007	0.1255	0.9850	1.1425	0.5305	3.2001	3.7649	8.6236	8.2130
5	1.2324	0.2200	0.0900	0.0757	0.0500	1.6680	2.6494	3.1170	0.1572	0.1587	0.1007	0.1255	0.9850	1.2103	0.4627	3.2001	3.7649	8.5499	8.1428
6	1.2183	0.2200	0.0900	0.0757	0.0500	1.6539	2.5891	3.0460	0.1572	0.1587	0.1007	0.1255	0.9850	1.2820	0.3910	3.2001	3.7649	8.4649	8.0618
7	1.2183	0.2200	0.0900	0.0757	0.0500	1.6539	2.5891	3.0460	0.1572	0.1587	0.1007	0.1255	0.9850	1.3580	0.3150	3.2001	3.7649	8.4649	8.0618
8	1.2183	0.2200	0.0900	0.0757	0.0500	1.6539	2.5891	3.0460	0.1572	0.1587	0.1007	0.1255	0.9850	1.4385	0.2345	3.2001	3.7649	8.4649	8.0618
9	1.1961	0.2200	0.0900	0.0757	0.0500	1.6317	2.5888	3.0456	0.1572	0.1587	0.1007	0.1255	0.9850	1.5237	0.1492	3.2001	3.7649	8.4422	8.0402
10	1.1961	0.2200	0.0900	0.0757	0.0500	1.6317	2.5888	3.0456	0.1572	0.1587	0.1007	0.1255	0.9850	1.6141	0.0589	3.2001	3.7649	8.4422	8.0402
11	1.0988	0.2200	0.0900	0.0757	0.0500	1.5344	1.4855	1.7477	0.1572	0.1587	0.1007	0.1255	0.9850	-	-	1.5272	1.7967	5.0787	4.8369
12	1.0974	0.2200	0.0900	0.0757	0.0500	1.5330	1.4697	1.7290	0.1572	0.1587	0.1007	0.1255	0.9850	-	-	1.5272	1.7967	5.0587	4.8178
13	1.0960	0.2200	0.0900	0.0757	0.0500	1.5316	1.4538	1.7104	0.1572	0.1587	0.1007	0.1255	0.9850	-	-	1.5272	1.7967	5.0386	4.7987
14	1.0960	0.2200	0.0900	0.0757	0.0500	1.5316	1.4538	1.7104	0.1572	0.1587	0.1007	0.1255	0.9850	-	-	1.5272	1.7967	5.0386	4.7987
15	1.0960	0.2200	0.0900	0.0757	0.0500	1.5316	1.4538	1.7104	0.1572	0.1587	0.1007	0.1255	0.9850	-	-	1.5272	1.7967	5.0386	4.7987
16	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1572	0.1587	0.1007	0.1255	0.9850	-	-	1.5272	1.7967	5.0386	4.7987
17	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1572	0.1587	0.1007	0.1255	0.9850	-	-	1.5272	1.7967	5.0903	4.8479
18	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1572	0.1587	0.1007	0.1255	0.9850	-	-	1.5272	1.7967	5.0903	4.8479
19	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1572	0.1587	0.1007	0.1255	0.9850	-	-	1.5272	1.7967	5.0903	4.8479
20	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1572	0.1587	0.1007	0.1255	0.9850	-	-	1.5272	1.7967	5.0903	4.8479
21	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1572	0.1587	0.1007	0.1255	0.9850	-	-	1.5272	1.7967	5.0903	4.8479
22	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1572	0.1587	0.1007	0.1255	0.9850	-	-	1.5272	1.7967	5.0903	4.8479
23	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1572	0.1587	0.1007	0.1255	0.9850	-	-	1.5272	1.7967	4.8762	4.6440
24	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1572	0.1587	0.1007	0.1255	0.9850	-	-	1.5272	1.7967	4.8762	4.6440
25	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1572	0.1587	0.1007	0.1255	0.9850	-	-	1.5272	1.7967	4.8762	4.6440
26	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1572	0.1587	0.1007	0.1255	0.9850	-	-	1.5272	1.7967	4.8762	4.6440
27	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1572	0.1587	0.1007	0.1255	0.9850	-	-	1.5272	1.7967	4.8762	4.6440
28	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1572	0.1587	0.1007	0.1255	0.9850	-	-	1.5272	1.7967	4.8762	4.6440
29	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1572	0.1587	0.1007	0.1255	0.9850	-	-	1.5272	1.7967	4.8762	4.6440
30	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1572	0.1587	0.1007	0.1255	0.9850	-	-	1.5272	1.7967	4.8762	4.6440

Average

1-10	1.2621	0.2200	0.0900	0.0757	0.0500	1.6977	2.8442	3.3461	0.1572	0.1587	0.1007	0.1255	0.9850	1.2627	0.4103	3.2001	3.7649	8.8087	8.3892
11-30	1.0501	0.2200	0.0900	0.0757	0.0500	1.4857	1.4555	1.7124	0.1572	0.1587	0.1007	0.1255	0.9850	0.0000	0.0000	1.5272	1.7967	4.9948	4.7569
1-30	1.1207	0.2200	0.0900	0.0757	0.0500	1.5564	1.9184	2.2570	0.1572	0.1587	0.1007	0.1255	0.9850	0.4209	0.1368	2.0848	2.4527	6.2661	5.9677

Levelized

1-30	1.2100	0.2200	0.0900	0.0757	0.0500	1.6457	2.4299	2.8587	0.1572	0.1587	0.1007	0.1255	0.9850	0.7869	0.3036	2.6176	3.0796	7.5839	7.2228
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Levelized Tariff =

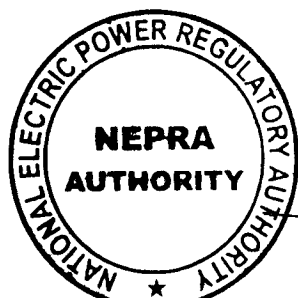
7.5839 Rs./kWh

7.2228 Cents/kWh



**Upfront Tariff - Debt Servicing on Foreign Financing
Single Unit on Air Cooling Technology**

Period	Principal Million \$/MW	Principal Repayment Million \$/MW	Interest Million \$/MW	Balaaance Million \$/MW	Debt Service Million \$/MW	Principal Repayment Rs./kW/hour	Interest Rs./kW/ Hour	Debt Servicing Rs./kW/h
1	0.97	0.02	0.01	0.95	0.03			
2	0.95	0.02	0.01	0.93	0.03			
3	0.93	0.02	0.01	0.91	0.03			
4	0.91	0.02	0.01	0.90	0.03	0.9613	0.7117	1.6730
1st Year		0.07	0.05		0.13			
5	0.90	0.02	0.01	0.88	0.03			
6	0.88	0.02	0.01	0.86	0.03			
7	0.86	0.02	0.01	0.84	0.03			
8	0.84	0.02	0.01	0.82	0.03	1.0182	0.6547	1.6730
2nd Year		0.08	0.05		0.13			
9	0.82	0.02	0.01	0.80	0.03			
10	0.80	0.02	0.01	0.78	0.03			
11	0.78	0.02	0.01	0.76	0.03			
12	0.76	0.02	0.01	0.73	0.03	1.0786	0.5944	1.6730
3rd Year		0.08	0.05		0.13			
13	0.73	0.02	0.01	0.71	0.03			
14	0.71	0.02	0.01	0.69	0.03			
15	0.69	0.02	0.01	0.67	0.03			
16	0.67	0.02	0.01	0.65	0.03	1.1425	0.5305	1.6730
4th Year		0.09	0.04		0.13			
17	0.65	0.02	0.01	0.62	0.03			
18	0.62	0.02	0.01	0.60	0.03			
19	0.60	0.02	0.01	0.58	0.03			
20	0.58	0.02	0.01	0.55	0.03	1.2103	0.4627	1.6730
5th Year		0.09	0.04		0.13			
21	0.55	0.02	0.01	0.53	0.03			
22	0.53	0.02	0.01	0.51	0.03			
23	0.51	0.02	0.01	0.48	0.03			
24	0.48	0.03	0.01	0.46	0.03	1.2820	0.3910	1.6730
6th Year		0.10	0.03		0.13			
25	0.46	0.03	0.01	0.43	0.03			
26	0.43	0.03	0.01	0.40	0.03			
27	0.40	0.03	0.01	0.38	0.03			
28	0.38	0.03	0.01	0.35	0.03	1.3580	0.3150	1.6730
7th Year		0.10	0.02		0.13			
29	0.35	0.03	0.01	0.32	0.03			
30	0.32	0.03	0.00	0.30	0.03			
31	0.30	0.03	0.00	0.27	0.03			
32	0.27	0.03	0.00	0.24	0.03	1.4385	0.2345	1.6730
8th Year		0.11	0.02		0.13			
33	0.24	0.03	0.00	0.21	0.03			
34	0.21	0.03	0.00	0.18	0.03			
35	0.18	0.03	0.00	0.15	0.03			
36	0.15	0.03	0.00	0.12	0.03	1.5237	0.1492	1.6730
9th Year		0.12	0.01		0.13			
37	0.12	0.03	0.00	0.09	0.03			
38	0.09	0.03	0.00	0.06	0.03			
39	0.06	0.03	0.00	0.03	0.03			
40	0.03	0.03	0.00	0.00	0.03	1.6141	0.0589	1.6730
10th Year		0.12	0.00		0.13			



Upfront Tariff on Air Cooling for Thar Coal based Power Projects for Single Unit on Local Financing

Annex - 6

Year	Energy Purchase Price (Rs./kWh)						Fixed FCC		Capacity Purchase Price (PKR/kWh/Hour)								Capacity Charge@ 85%	Total Tariff Rs./kWh	Total Tariff Cents/kWh
	Var. FCC	Ash Disposal	Lime Stone	Var. O&M		Total EPP	Rs./kWh/hr.	at 85% PF (Rs./kWh)	Fixed O&M		Cost of W/C	Insurance	ROE	Debt Repayment	Interest Charges	Total CPP			
				Foreign	Local				Local	Foreign									
1	1.2980	0.2200	0.0900	0.0757	0.0500	1.7337	4.2204	4.9652	0.1572	0.1587	0.1007	0.1255	0.9493	0.7950	1.0524	3.3389	3.9282	10.6270	10.1210
2	1.4419	0.2200	0.0900	0.0757	0.0500	1.8775	3.2503	3.8239	0.1572	0.1587	0.1007	0.1255	0.9493	0.8678	0.9796	3.3389	3.9282	9.6296	9.1710
3	1.3235	0.2200	0.0900	0.0757	0.0500	1.7591	2.7032	3.1803	0.1572	0.1587	0.1007	0.1255	0.9493	0.9473	0.9001	3.3389	3.9282	8.8675	8.4453
4	1.2777	0.2200	0.0900	0.0757	0.0500	1.7133	2.6736	3.1454	0.1572	0.1587	0.1007	0.1255	0.9493	1.0341	0.8133	3.3389	3.9282	8.7869	8.3685
5	1.2324	0.2200	0.0900	0.0757	0.0500	1.6680	2.6494	3.1170	0.1572	0.1587	0.1007	0.1255	0.9493	1.1288	0.7186	3.3389	3.9282	8.7132	8.2983
6	1.2183	0.2200	0.0900	0.0757	0.0500	1.6539	2.5891	3.0460	0.1572	0.1587	0.1007	0.1255	0.9493	1.2322	0.6152	3.3389	3.9282	8.6281	8.2173
7	1.2183	0.2200	0.0900	0.0757	0.0500	1.6539	2.5891	3.0460	0.1572	0.1587	0.1007	0.1255	0.9493	1.3450	0.5024	3.3389	3.9282	8.6281	8.2173
8	1.2183	0.2200	0.0900	0.0757	0.0500	1.6539	2.5891	3.0460	0.1572	0.1587	0.1007	0.1255	0.9493	1.4682	0.3792	3.3389	3.9282	8.6281	8.2173
9	1.1961	0.2200	0.0900	0.0757	0.0500	1.6317	2.5888	3.0456	0.1572	0.1587	0.1007	0.1255	0.9493	1.6027	0.2447	3.3389	3.9282	8.6055	8.1957
10	1.1961	0.2200	0.0900	0.0757	0.0500	1.6317	2.5888	3.0456	0.1572	0.1587	0.1007	0.1255	0.9493	1.7495	0.0979	3.3389	3.9282	8.6055	8.1957
11	1.0988	0.2200	0.0900	0.0757	0.0500	1.5344	1.4855	1.7477	0.1572	0.1587	0.1007	0.1255	0.9493	-	-	1.4915	1.7548	5.0368	4.7970
12	1.0974	0.2200	0.0900	0.0757	0.0500	1.5330	1.4697	1.7290	0.1572	0.1587	0.1007	0.1255	0.9493	-	-	1.4915	1.7548	5.0168	4.7779
13	1.0960	0.2200	0.0900	0.0757	0.0500	1.5316	1.4538	1.7104	0.1572	0.1587	0.1007	0.1255	0.9493	-	-	1.4915	1.7548	4.9967	4.7588
14	1.0960	0.2200	0.0900	0.0757	0.0500	1.5316	1.4538	1.7104	0.1572	0.1587	0.1007	0.1255	0.9493	-	-	1.4915	1.7548	4.9967	4.7588
15	1.0960	0.2200	0.0900	0.0757	0.0500	1.5316	1.4538	1.7104	0.1572	0.1587	0.1007	0.1255	0.9493	-	-	1.4915	1.7548	4.9967	4.7588
16	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1572	0.1587	0.1007	0.1255	0.9493	-	-	1.4915	1.7548	4.9967	4.7588
17	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1572	0.1587	0.1007	0.1255	0.9493	-	-	1.4915	1.7548	5.0484	4.8080
18	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1572	0.1587	0.1007	0.1255	0.9493	-	-	1.4915	1.7548	5.0484	4.8080
19	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1572	0.1587	0.1007	0.1255	0.9493	-	-	1.4915	1.7548	5.0484	4.8080
20	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1572	0.1587	0.1007	0.1255	0.9493	-	-	1.4915	1.7548	5.0484	4.8080
21	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1572	0.1587	0.1007	0.1255	0.9493	-	-	1.4915	1.7548	5.0484	4.8080
22	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1572	0.1587	0.1007	0.1255	0.9493	-	-	1.4915	1.7548	5.0484	4.8080
23	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1572	0.1587	0.1007	0.1255	0.9493	-	-	1.4915	1.7548	4.8343	4.6041
24	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1572	0.1587	0.1007	0.1255	0.9493	-	-	1.4915	1.7548	4.8343	4.6041
25	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1572	0.1587	0.1007	0.1255	0.9493	-	-	1.4915	1.7548	4.8343	4.6041
26	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1572	0.1587	0.1007	0.1255	0.9493	-	-	1.4915	1.7548	4.8343	4.6041
27	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1572	0.1587	0.1007	0.1255	0.9493	-	-	1.4915	1.7548	4.8343	4.6041
28	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1572	0.1587	0.1007	0.1255	0.9493	-	-	1.4915	1.7548	4.8343	4.6041
29	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1572	0.1587	0.1007	0.1255	0.9493	-	-	1.4915	1.7548	4.8343	4.6041
30	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1572	0.1587	0.1007	0.1255	0.9493	-	-	1.4915	1.7548	4.8343	4.6041
Average																			
1-10	1.2621	0.2200	0.0900	0.0757	0.0500	1.6977	2.8442	3.3461	0.1572	0.1587	0.1007	0.1255	0.9493	1.2171	0.6303	3.3389	3.9282	8.9720	8.5447
11-30	1.0501	0.2200	0.0900	0.0757	0.0500	1.4857	1.4555	1.7124	0.1572	0.1587	0.1007	0.1255	0.9493	0.0000	0.0000	1.4915	1.7548	4.9529	4.7170
1-30	1.1207	0.2200	0.0900	0.0757	0.0500	1.5564	1.9184	2.2570	0.1572	0.1587	0.1007	0.1255	0.9493	0.4057	0.2101	2.1073	2.4792	6.2926	5.9929
Levelized																			
1-30	1.2100	0.2200	0.0900	0.0757	0.0500	1.6457	2.4299	2.8587	0.1572	0.1587	0.1007	0.1255	0.9493	0.7408	0.4633	2.6957	3.1714	7.6758	7.3103

Levelized Tariff =

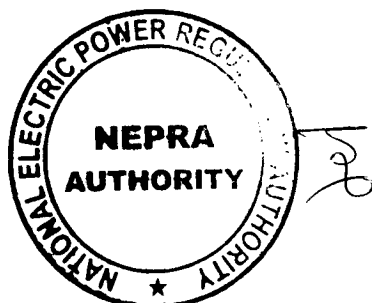
7.6758 Rs./kWh

7.3103 Cents/kWh



Upfront Tariff - Debt Servicing on Local Financing
Single Unit on Air Cooling Technology

Period	Principal Million \$/MW	Principal Repayment Million \$/MW	Interest Million \$/MW	Balaance Million \$/MW	Debt Service Million \$/MW	Principal Repayment Rs./kW/hour	Interest Rs./kW/ Hour	Debt Servicing Rs./kW/h
1	0.93	0.01	0.02	0.92	0.04			
2	0.92	0.02	0.02	0.90	0.04			
3	0.90	0.02	0.02	0.89	0.04			
4	0.89	0.02	0.02	0.87	0.04	0.7950	1.0524	1.8474
1st Year		0.06	0.08		0.14			
5	0.87	0.02	0.02	0.86	0.04			
6	0.86	0.02	0.02	0.84	0.04			
7	0.84	0.02	0.02	0.82	0.04			
8	0.82	0.02	0.02	0.81	0.04	0.8678	0.9796	1.8474
2nd Year		0.07	0.08		0.14			
9	0.81	0.02	0.02	0.79	0.04			
10	0.79	0.02	0.02	0.77	0.04			
11	0.77	0.02	0.02	0.75	0.04			
12	0.75	0.02	0.02	0.73	0.04	0.9473	0.9001	1.8474
3rd Year		0.07	0.07		0.14			
13	0.73	0.02	0.02	0.71	0.04			
14	0.71	0.02	0.02	0.69	0.04			
15	0.69	0.02	0.02	0.67	0.04			
16	0.67	0.02	0.01	0.65	0.04	1.0341	0.8133	1.8474
4th Year		0.08	0.06		0.14			
17	0.65	0.02	0.01	0.63	0.04			
18	0.63	0.02	0.01	0.61	0.04			
19	0.61	0.02	0.01	0.59	0.04			
20	0.59	0.02	0.01	0.57	0.04	1.1288	0.7186	1.8474
5th Year		0.09	0.06		0.14			
21	0.57	0.02	0.01	0.54	0.04			
22	0.54	0.02	0.01	0.52	0.04			
23	0.52	0.02	0.01	0.50	0.04			
24	0.50	0.02	0.01	0.47	0.04	1.2322	0.6152	1.8474
6th Year		0.09	0.05		0.14			
25	0.47	0.02	0.01	0.45	0.04			
26	0.45	0.03	0.01	0.42	0.04			
27	0.42	0.03	0.01	0.40	0.04			
28	0.40	0.03	0.01	0.37	0.04	1.3450	0.5024	1.8474
7th Year		0.10	0.04		0.14			
29	0.37	0.03	0.01	0.34	0.04			
30	0.34	0.03	0.01	0.31	0.04			
31	0.31	0.03	0.01	0.29	0.04			
32	0.29	0.03	0.01	0.26	0.04	1.4682	0.3792	1.8474
8th Year		0.11	0.03		0.14			
33	0.26	0.03	0.01	0.23	0.04			
34	0.23	0.03	0.01	0.20	0.04			
35	0.20	0.03	0.00	0.17	0.04			
36	0.17	0.03	0.00	0.13	0.04	1.6027	0.2447	1.8474
9th Year		0.12	0.02		0.14			
37	0.13	0.03	0.00	0.10	0.04			
38	0.10	0.03	0.00	0.07	0.04			
39	0.07	0.03	0.00	0.03	0.04			
40	0.03	0.03	0.00	(0.00)	0.04	1.7495	0.0979	1.8474
10th Year		0.13	0.01		0.14			



Upfront Tariff on Air Cooling for Thar Coal based Power Projects for Two Units on Foreign Financing

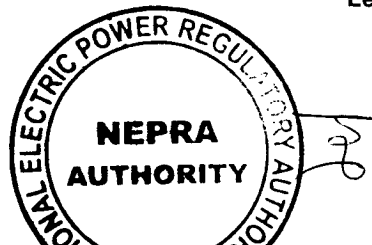
Annex - 7

Year	Energy Purchase Price (Rs./kWh)						Fixed FCC		Capacity Purchase Price (PKR/kWh/Hour)								Capacity Charge@ 85%	Total Tariff Rs./kWh	Total Tariff Cents/kWh	
	Var. FCC	Ash Disposal	Lime Stone	Var. O&M		Total EPP	Rs./kWh/hr.	at 85% PF (Rs./kWh)	Fixed O&M		Cost of W/C	Insurance	ROE	Debt Repayment	Interest Charges	Total CPP				
				Foreign	Local				Local	Foreign										
1	1.2980	0.2200	0.0900	0.0757	0.0500	1.7337	4.2204	4.9652	0.1457	0.1471	0.1007	0.1193	0.9848	0.9157	0.6780	3.0913	3.6368	10.3357	9.8435	
2	1.4419	0.2200	0.0900	0.0757	0.0500	1.8775	3.2503	3.8239	0.1457	0.1471	0.1007	0.1193	0.9848	0.9700	0.6237	3.0913	3.6368	9.3383	8.8936	
3	1.3235	0.2200	0.0900	0.0757	0.0500	1.7591	2.7032	3.1803	0.1457	0.1471	0.1007	0.1193	0.9848	1.0275	0.5662	3.0913	3.6368	8.5762	8.1678	
4	1.2777	0.2200	0.0900	0.0757	0.0500	1.7133	2.6736	3.1454	0.1457	0.1471	0.1007	0.1193	0.9848	1.0884	0.5053	3.0913	3.6368	8.4956	8.0910	
5	1.2324	0.2200	0.0900	0.0757	0.0500	1.6680	2.6494	3.1170	0.1457	0.1471	0.1007	0.1193	0.9848	1.1529	0.4408	3.0913	3.6368	8.4218	8.0208	
6	1.2183	0.2200	0.0900	0.0757	0.0500	1.6539	2.5891	3.0460	0.1457	0.1471	0.1007	0.1193	0.9848	1.2212	0.3725	3.0913	3.6368	8.3368	7.9398	
7	1.2183	0.2200	0.0900	0.0757	0.0500	1.6539	2.5891	3.0460	0.1457	0.1471	0.1007	0.1193	0.9848	1.2936	0.3001	3.0913	3.6368	8.3368	7.9398	
8	1.2183	0.2200	0.0900	0.0757	0.0500	1.6539	2.5891	3.0460	0.1457	0.1471	0.1007	0.1193	0.9848	1.3703	0.2234	3.0913	3.6368	8.3368	7.9398	
9	1.1961	0.2200	0.0900	0.0757	0.0500	1.6317	2.5888	3.0456	0.1457	0.1471	0.1007	0.1193	0.9848	1.4515	0.1422	3.0913	3.6368	8.3141	7.9182	
10	1.1961	0.2200	0.0900	0.0757	0.0500	1.6317	2.5888	3.0456	0.1457	0.1471	0.1007	0.1193	0.9848	1.5376	0.0561	3.0913	3.6368	8.3141	7.9182	
11	1.0988	0.2200	0.0900	0.0757	0.0500	1.5344	1.4855	1.7477	0.1457	0.1471	0.1007	0.1193	0.9848	-	-	1.4976	1.7619	5.0440	4.8038	
12	1.0974	0.2200	0.0900	0.0757	0.0500	1.5330	1.4697	1.7290	0.1457	0.1471	0.1007	0.1193	0.9848	-	-	1.4976	1.7619	5.0239	4.7847	
13	1.0960	0.2200	0.0900	0.0757	0.0500	1.5316	1.4538	1.7104	0.1457	0.1471	0.1007	0.1193	0.9848	-	-	1.4976	1.7619	5.0038	4.7655	
14	1.0960	0.2200	0.0900	0.0757	0.0500	1.5316	1.4538	1.7104	0.1457	0.1471	0.1007	0.1193	0.9848	-	-	1.4976	1.7619	5.0038	4.7655	
15	1.0960	0.2200	0.0900	0.0757	0.0500	1.5316	1.4538	1.7104	0.1457	0.1471	0.1007	0.1193	0.9848	-	-	1.4976	1.7619	5.0038	4.7655	
16	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1457	0.1471	0.1007	0.1193	0.9848	-	-	1.4976	1.7619	5.0038	4.7655	
17	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1457	0.1471	0.1007	0.1193	0.9848	-	-	1.4976	1.7619	5.0555	4.8148	
18	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1457	0.1471	0.1007	0.1193	0.9848	-	-	1.4976	1.7619	5.0555	4.8148	
19	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1457	0.1471	0.1007	0.1193	0.9848	-	-	1.4976	1.7619	5.0555	4.8148	
20	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1457	0.1471	0.1007	0.1193	0.9848	-	-	1.4976	1.7619	5.0555	4.8148	
21	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1457	0.1471	0.1007	0.1193	0.9848	-	-	1.4976	1.7619	5.0555	4.8148	
22	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1457	0.1471	0.1007	0.1193	0.9848	-	-	1.4976	1.7619	5.0555	4.8148	
23	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1457	0.1471	0.1007	0.1193	0.9848	-	-	1.4976	1.7619	4.8414	4.6109	
24	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1457	0.1471	0.1007	0.1193	0.9848	-	-	1.4976	1.7619	4.8414	4.6109	
25	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1457	0.1471	0.1007	0.1193	0.9848	-	-	1.4976	1.7619	4.8414	4.6109	
26	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1457	0.1471	0.1007	0.1193	0.9848	-	-	1.4976	1.7619	4.8414	4.6109	
27	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1457	0.1471	0.1007	0.1193	0.9848	-	-	1.4976	1.7619	4.8414	4.6109	
28	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1457	0.1471	0.1007	0.1193	0.9848	-	-	1.4976	1.7619	4.8414	4.6109	
29	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1457	0.1471	0.1007	0.1193	0.9848	-	-	1.4976	1.7619	4.8414	4.6109	
30	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1457	0.1471	0.1007	0.1193	0.9848	-	-	1.4976	1.7619	4.8414	4.6109	
Average																				
1-10	1.2621	0.2200	0.0900	0.0757	0.0500	1.6977	2.8442	3.3461	0.1457	0.1471	0.1007	0.1193	0.9848	1.2029	0.3908	3.0913	3.6368	8.6806	8.2673	
11-30	1.0501	0.2200	0.0900	0.0757	0.0500	1.4857	1.4555	1.7124	0.1457	0.1471	0.1007	0.1193	0.9848	0.0000	0.0000	1.4976	1.7619	4.9600	4.7238	
1-30	1.1207	0.2200	0.0900	0.0757	0.0500	1.5564	1.9184	2.2570	0.1457	0.1471	0.1007	0.1193	0.9848	0.4010	0.1303	2.0288	2.3869	6.2002	5.9049	
Levelized																				
1-30	1.2100	0.2200	0.0900	0.0757	0.0500	1.6457	2.4299	2.8587	0.1457	0.1471	0.1007	0.1193	0.9848	0.7496	0.2892	2.5364	2.9840	7.4884	7.1318	

Levelized Tariff =

7.4884 Rs./kWh

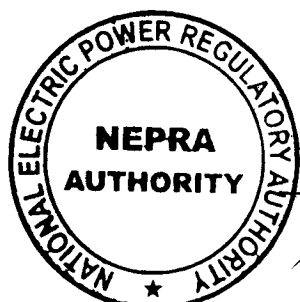
7.1318 Cents/kWh



49

Upfront Tariff - Debt Servicing on Foreign Financing
Two Units on Air Cooling Technology

Period	Principal Million \$	Principal Repayment Million \$	Interest Million \$	Balaance Million \$	Debt Service Million \$	Principal Repayment Rs./kW/hour	Interest Rs./kW/ Hour	Debt Servicing Rs./kW/h
1	0.92	0.02	0.01	0.91	0.03			
2	0.91	0.02	0.01	0.89	0.03			
3	0.89	0.02	0.01	0.87	0.03			
4	0.87	0.02	0.01	0.85	0.03	0.9157	0.6780	1.5937
1st Year		0.07	0.05		0.12			
5	0.85	0.02	0.01	0.83	0.03			
6	0.83	0.02	0.01	0.82	0.03			
7	0.82	0.02	0.01	0.80	0.03			
8	0.80	0.02	0.01	0.78	0.03	0.9700	0.6237	1.5937
2nd Year		0.07	0.05		0.12			
9	0.78	0.02	0.01	0.76	0.03			
10	0.76	0.02	0.01	0.74	0.03			
11	0.74	0.02	0.01	0.72	0.03			
12	0.72	0.02	0.01	0.70	0.03	1.0275	0.5662	1.5937
3rd Year		0.08	0.04		0.12			
13	0.70	0.02	0.01	0.68	0.03			
14	0.68	0.02	0.01	0.66	0.03			
15	0.66	0.02	0.01	0.64	0.03			
16	0.64	0.02	0.01	0.62	0.03	1.0884	0.5053	1.5937
4th Year		0.08	0.04		0.12			
17	0.62	0.02	0.01	0.59	0.03			
18	0.59	0.02	0.01	0.57	0.03			
19	0.57	0.02	0.01	0.55	0.03			
20	0.55	0.02	0.01	0.53	0.03	1.1529	0.4408	1.5937
5th Year		0.09	0.03		0.12			
21	0.53	0.02	0.01	0.50	0.03			
22	0.50	0.02	0.01	0.48	0.03			
23	0.48	0.02	0.01	0.46	0.03			
24	0.46	0.02	0.01	0.43	0.03	1.2212	0.3725	1.5937
6th Year		0.09	0.03		0.12			
25	0.43	0.02	0.01	0.41	0.03			
26	0.41	0.02	0.01	0.38	0.03			
27	0.38	0.02	0.01	0.36	0.03			
28	0.36	0.03	0.01	0.33	0.03	1.2936	0.3001	1.5937
7th Year		0.10	0.02		0.12			
29	0.33	0.03	0.00	0.31	0.03			
30	0.31	0.03	0.00	0.28	0.03			
31	0.28	0.03	0.00	0.26	0.03			
32	0.26	0.03	0.00	0.23	0.03	1.3703	0.2234	1.5937
8th Year		0.11	0.02		0.12			
33	0.23	0.03	0.00	0.20	0.03			
34	0.20	0.03	0.00	0.17	0.03			
35	0.17	0.03	0.00	0.15	0.03			
36	0.15	0.03	0.00	0.12	0.03	1.4515	0.1422	1.5937
9th Year		0.11	0.01		0.12			
37	0.12	0.03	0.00	0.09	0.03			
38	0.09	0.03	0.00	0.06	0.03			
39	0.06	0.03	0.00	0.03	0.03			
40	0.03	0.03	0.00	0.00	0.03	1.5376	0.0561	1.5937
10th Year		0.12	0.00		0.12			



Upfront Tariff on Air Cooling for Thar Coal based Power Projects for Two Units on Local Financing

Annex - 8

Year	Energy Purchase Price (Rs./kWh)						Fixed FCC		Capacity Purchase Price (PKR/kW/Hour)								Capacity Charge@ 85%	Total Tariff Rs. kWh	Total Tariff Cents/kWh
	Var. FCC	Ash Disposal	Lime Stone	Var. O&M		Total EPP	Rs./kW/hr.	at 85% PF (Rs./kWh)	Fixed O&M		Cost of W/C	Insurance	ROE	Debt Repayment	Interest Charges	Total CPP			
				Foreign	Local				Local	Foreign									
1	1.2980	0.2200	0.0900	0.0757	0.0500	1.7337	4.2204	4.9652	0.1457	0.1471	0.1007	0.1193	0.9552	0.7621	1.0088	3.2390	3.8105	10.5094	10.0089
2	1.4419	0.2200	0.0900	0.0757	0.0500	1.8775	3.2503	3.8239	0.1457	0.1471	0.1007	0.1193	0.9552	0.8319	0.9390	3.2390	3.8105	9.5120	9.0590
3	1.3235	0.2200	0.0900	0.0757	0.0500	1.7591	2.7032	3.1803	0.1457	0.1471	0.1007	0.1193	0.9552	0.9081	0.8628	3.2390	3.8105	8.7499	8.3332
4	1.2777	0.2200	0.0900	0.0757	0.0500	1.7133	2.6736	3.1454	0.1457	0.1471	0.1007	0.1193	0.9552	0.9913	0.7797	3.2390	3.8105	8.6693	8.2565
5	1.2324	0.2200	0.0900	0.0757	0.0500	1.6680	2.6494	3.1170	0.1457	0.1471	0.1007	0.1193	0.9552	1.0821	0.6889	3.2390	3.8105	8.5956	8.1863
6	1.2183	0.2200	0.0900	0.0757	0.0500	1.6539	2.5891	3.0460	0.1457	0.1471	0.1007	0.1193	0.9552	1.1812	0.5898	3.2390	3.8105	8.5105	8.1053
7	1.2183	0.2200	0.0900	0.0757	0.0500	1.6539	2.5891	3.0460	0.1457	0.1471	0.1007	0.1193	0.9552	1.2894	0.4816	3.2390	3.8105	8.5105	8.1053
8	1.2183	0.2200	0.0900	0.0757	0.0500	1.6539	2.5891	3.0460	0.1457	0.1471	0.1007	0.1193	0.9552	1.4075	0.3635	3.2390	3.8105	8.5105	8.1053
9	1.1961	0.2200	0.0900	0.0757	0.0500	1.6317	2.5888	3.0456	0.1457	0.1471	0.1007	0.1193	0.9552	1.5364	0.2346	3.2390	3.8105	8.4879	8.0837
10	1.1961	0.2200	0.0900	0.0757	0.0500	1.6317	2.5888	3.0456	0.1457	0.1471	0.1007	0.1193	0.9552	1.6771	0.0939	3.2390	3.8105	8.4879	8.0837
11	1.0988	0.2200	0.0900	0.0757	0.0500	1.5344	1.4855	1.7477	0.1457	0.1471	0.1007	0.1193	0.9552	-	-	1.4680	1.7270	5.0091	4.7706
12	1.0974	0.2200	0.0900	0.0757	0.0500	1.5330	1.4697	1.7290	0.1457	0.1471	0.1007	0.1193	0.9552	-	-	1.4680	1.7270	4.9891	4.7515
13	1.0960	0.2200	0.0900	0.0757	0.0500	1.5316	1.4538	1.7104	0.1457	0.1471	0.1007	0.1193	0.9552	-	-	1.4680	1.7270	4.9690	4.7324
14	1.0960	0.2200	0.0900	0.0757	0.0500	1.5316	1.4538	1.7104	0.1457	0.1471	0.1007	0.1193	0.9552	-	-	1.4680	1.7270	4.9690	4.7324
15	1.0960	0.2200	0.0900	0.0757	0.0500	1.5316	1.4538	1.7104	0.1457	0.1471	0.1007	0.1193	0.9552	-	-	1.4680	1.7270	4.9690	4.7324
16	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1457	0.1471	0.1007	0.1193	0.9552	-	-	1.4680	1.7270	5.0207	4.7816
17	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1457	0.1471	0.1007	0.1193	0.9552	-	-	1.4680	1.7270	5.0207	4.7816
18	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1457	0.1471	0.1007	0.1193	0.9552	-	-	1.4680	1.7270	5.0207	4.7816
19	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1457	0.1471	0.1007	0.1193	0.9552	-	-	1.4680	1.7270	5.0207	4.7816
20	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1457	0.1471	0.1007	0.1193	0.9552	-	-	1.4680	1.7270	5.0207	4.7816
21	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1457	0.1471	0.1007	0.1193	0.9552	-	-	1.4680	1.7270	5.0207	4.7816
22	1.1468	0.2200	0.0900	0.0757	0.0500	1.5824	1.4545	1.7112	0.1457	0.1471	0.1007	0.1193	0.9552	-	-	1.4680	1.7270	5.0207	4.7816
23	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1457	0.1471	0.1007	0.1193	0.9552	-	-	1.4680	1.7270	4.8066	4.5777
24	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1457	0.1471	0.1007	0.1193	0.9552	-	-	1.4680	1.7270	4.8066	4.5777
25	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1457	0.1471	0.1007	0.1193	0.9552	-	-	1.4680	1.7270	4.8066	4.5777
26	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1457	0.1471	0.1007	0.1193	0.9552	-	-	1.4680	1.7270	4.8066	4.5777
27	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1457	0.1471	0.1007	0.1193	0.9552	-	-	1.4680	1.7270	4.8066	4.5777
28	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1457	0.1471	0.1007	0.1193	0.9552	-	-	1.4680	1.7270	4.8066	4.5777
29	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1457	0.1471	0.1007	0.1193	0.9552	-	-	1.4680	1.7270	4.8066	4.5777
30	0.9362	0.2200	0.0900	0.0757	0.0500	1.3718	1.4516	1.7077	0.1457	0.1471	0.1007	0.1193	0.9552	-	-	1.4680	1.7270	4.8066	4.5777

Average

1-10	1.2621	0.2200	0.0900	0.0757	0.0500	1.6977	2.8442	3.3461	0.1457	0.1471	0.1007	0.1193	0.9552	1.1667	0.6043	3.2390	3.8105	8.8543	8.4327
11-30	1.0501	0.2200	0.0900	0.0757	0.0500	1.4857	1.4555	1.7124	0.1457	0.1471	0.1007	0.1193	0.9552	0.0000	0.0000	1.4680	1.7270	4.9251	4.6906
1-30	1.1207	0.2200	0.0900	0.0757	0.0500	1.5564	1.9184	2.2570	0.1457	0.1471	0.1007	0.1193	0.9552	0.3889	0.2014	2.0583	2.4215	6.2349	5.9380

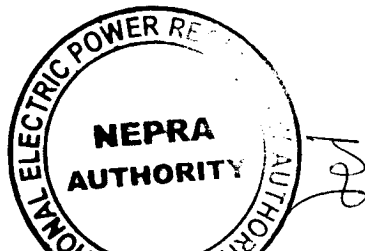
Levelized

1-30	1.2100	0.2200	0.0900	0.0757	0.0500	1.6457	2.4299	2.8587	0.1457	0.1471	0.1007	0.1193	0.9552	0.7102	0.4442	2.6223	3.0851	7.5895	7.2281
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Levelized Tariff =

7.5895 Rs./kWh

7.2281 Cents/kWh



(Handwritten initials/signature)

Upfront Tariff - Debt Servicing on Local Financing
Two Units on Air Cooling Technology

Period	Principal Million \$	Principal Repayment Million \$	Interest Million \$	Balaance Million \$	Debt Service Million \$	Principal Repayment Rs./kW/hour	Interest Rs./kW/ Hour	Debt Servicing Rs./kW/h
1	0.90	0.01	0.02	0.88	0.03			
2	0.88	0.01	0.02	0.87	0.03			
3	0.87	0.01	0.02	0.85	0.03			
4	0.85	0.02	0.02	0.84	0.03	0.7621	1.0088	1.7710
1st Year		0.06	0.08		0.14			
5	0.84	0.02	0.02	0.82	0.03			
6	0.82	0.02	0.02	0.81	0.03			
7	0.81	0.02	0.02	0.79	0.03			
8	0.79	0.02	0.02	0.77	0.03	0.8319	0.9390	1.7710
2nd Year		0.06	0.07		0.14			
9	0.77	0.02	0.02	0.76	0.03			
10	0.76	0.02	0.02	0.74	0.03			
11	0.74	0.02	0.02	0.72	0.03			
12	0.72	0.02	0.02	0.70	0.03	0.9081	0.8628	1.7710
3rd Year		0.07	0.07		0.14			
13	0.70	0.02	0.02	0.69	0.03			
14	0.69	0.02	0.02	0.67	0.03			
15	0.67	0.02	0.01	0.65	0.03			
16	0.65	0.02	0.01	0.63	0.03	0.9913	0.7797	1.7710
4th Year		0.08	0.06		0.14			
17	0.63	0.02	0.01	0.61	0.03			
18	0.61	0.02	0.01	0.59	0.03			
19	0.59	0.02	0.01	0.57	0.03			
20	0.57	0.02	0.01	0.54	0.03	1.0821	0.6889	1.7710
5th Year		0.08	0.05		0.14			
21	0.54	0.02	0.01	0.52	0.03			
22	0.52	0.02	0.01	0.50	0.03			
23	0.50	0.02	0.01	0.48	0.03			
24	0.48	0.02	0.01	0.45	0.03	1.1812	0.5898	1.7710
6th Year		0.09	0.05		0.14			
25	0.45	0.02	0.01	0.43	0.03			
26	0.43	0.02	0.01	0.41	0.03			
27	0.41	0.03	0.01	0.38	0.03			
28	0.38	0.03	0.01	0.35	0.03	1.2894	0.4816	1.7710
7th Year		0.10	0.04		0.14			
29	0.35	0.03	0.01	0.33	0.03			
30	0.33	0.03	0.01	0.30	0.03			
31	0.30	0.03	0.01	0.27	0.03			
32	0.27	0.03	0.01	0.25	0.03	1.4075	0.3635	1.7710
8th Year		0.11	0.03		0.14			
33	0.25	0.03	0.01	0.22	0.03			
34	0.22	0.03	0.00	0.19	0.03			
35	0.19	0.03	0.00	0.16	0.03			
36	0.16	0.03	0.00	0.13	0.03	1.5364	0.2346	1.7710
9th Year		0.12	0.02		0.14			
37	0.13	0.03	0.00	0.10	0.03			
38	0.10	0.03	0.00	0.07	0.03			
39	0.07	0.03	0.00	0.03	0.03			
40	0.03	0.03	0.00	(0.00)	0.03	1.6771	0.0939	1.7710
10th Year		0.13	0.01		0.14			

