Registrar

National Electric Power Regulatory Authority
Islamic Republic of Pakistan

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

No. NEPRA/R/SA(Tariff)/TRF-458/AEPL-2018/27946-27948
September 7, 2020

Subject: **Determination of National Electric Power Regulatory Authority in the matter of Tariff Petition filed by M/s. Asia Energy (Private) Ltd. for Determination of Generation Tariff in respect of 30 MWp Solar Power Project (Case No. NEPRA/TRF-458/AEPL-2018)**

Dear Sir,

Please find enclosed herewith the subject Determination of the Authority along with Annex-I & II (27 Pages) in Case No. NEPRA/TRF-458/AEPL-2018.

2. The Determination is being intimated to the Federal Government for the purpose of notification in the official gazette pursuant to Section 31(7) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997.

3. Order of the Authority along with Annex-I & II of the Determination is to be notified in the official Gazette.

Enclosure: As above

07 09 20

(Syed Safeer Hussain)

Secretary
Ministry of Energy (Power Division)
'A' Block, Pak Secretariat
Islamabad

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

DETERMINATION OF NATIONAL ELECTRIC POWER REGULATORY AUTHORITY IN THE MATTER OF TARIFF PETITION FILED BY M/S ASIA ENERGY (PRIVATE) LIMITED FOR DETERMINATION OF GENERATION TARIFF IN RESPECT OF 30 MWp SOLAR POWER PROJECT

1. M/s Asia Energy (Pvt.) Limited ("AEPL" or "the petitioner" or "the company/project company") filed a tariff petition before National Electric Power Regulatory Authority ("NEPRA" or "the Authority") on November 30, 2018 for determination of generation tariff in respect of its 30 MWp Solar PV Power Project ('the Project") to be set up at Noorsar, District Bahawalnagar, Punjab. The said petition was filed by AEPL under the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 ("the NEPRA Act") and NEPRA (Tariff Standards & Procedure) Rules, 1998 ("Tariff Rules"). The petitioner requested for the approval of levelized tariff of US Cents 5.1047/kWh over the tariff control period of 25 years.

2. The petitioner submitted that it is a company incorporated to set up the Project. During the proceedings, AEPL submitted a copy of its incorporation certificate issued by Securities and Exchange Commission of Pakistan ("SECP") dated November 06, 2015.

3. The petitioner submitted that it was issued Letter of Intent ("LOI") by Alternative Energy Development Board ("AEDB") on August 3, 2015 in favour of Asia Petroleum Limited for establishing an approximately 30 MW solar PV power generation project in Punjab. The said LOI was issued in accordance with the Government of Pakistan's Policy for Development of Renewable Energy for Power Generation, 2006 ("RE Policy, 2006") which was valid up to February 2, 2017. AEPL informed that AEDB vide its letter dated March 21, 2017 decided to grant a day-to-day extension in the validity of the said LOI till the time its Power Evacuation Consent & Power Acquisition Request are approved by Central Power Purchasing Agency (Guarantee) Ltd. ("CPPAGL"). AEPL submitted that AEDB vide its another letter dated January 24, 2018 extended the validity of aforesaid LOI till the time requisite approvals/consents from National Transmission and Despatch Co. Ltd. ("NTDCL") & CPPAGL are obtained and the company applies to AEDB for obtaining LOS. The petitioner, during proceedings of the subject petition, submitted a copy of latest extension in its LOI up to April 29, 2020, issued by AEDB on November 21, 2019.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

4. The petitioner has submitted a letter of AEDB dated February 28, 2017 informing that the technical feasibility study of the power project has been reviewed and approved by AEDB. NEPRA granted the Generation License to AEPL on December 10, 2019.

5. Summary of the key information as provided in the tariff petition is as follows:

Project Company	:	Asia Energy (Pvt.) Ltd.
Project Sponsor	:	Asia Petroleum Ltd.
Capacity	:	30 MWp
Project Location	:	Noorsar, District Bahawalnagar, Punjab
Land Area	:	205 Acres
Concession Period	:	25 years from Commercial Operations Date
Purchaser	:	Central Power Purchasing Agency (Guarantee) Ltd.
Project Type	:	Build, Own, Operate (BOO)
PV Modules	:	Polycrystalline
Mounting Structure	:	Single axis tracking
Inverter	:	Sungrow
Construction Period	:	10 months
Construction Mode	:	Turnkey EPC
Annual Energy production	:	58.37 GWh
Plant Capacity Factor	:	22.21%
EPC Contractors	:	Offshore: CSUN Solar International Ltd. Onshore: Consortium of CSUN Energy Pakistan (Pvt.) Ltd. and China Construction Installation Engineering Co. Ltd.
O&M Contractor	:	CSUN Energy Pakistan (Pvt.) Ltd.
Project Cost		**USD millions**
EPC Cost	:	19.740
Pre-COD Insurance	:	0.041
Project Development Cost	:	2.118
Financing Fee & Charges	:	0.516
Interest during Construction	:	0.457
Total Project Cost	:	**22.872**
Financing Structure	:	Debt: 75% : Equity: 25%
Debt composition	:	100% Local
Interest Rate	:	6% SBP Fixed Rate
Loan Tenor	:	10 years + Construction Period
Return on Equity	:	15%
Annual O&M Cost	:	USD 0.360 million
Insurance Cost	:	0.5% of EPC Cost

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA AUTHORITY

Tariff:		Rs./kWh	US Cents/kWh
Levelized	:	6.8505	5.1047
Exchange Rate	:	1 USD = PKR 134.2	

6. The Authority considered the tariff petition and admitted the same for further processing. Notice of Admission & Hearing was published in the daily national newspapers on March 07, 2019 stating hearing date as March 20, 2019 while also providing salient features of the petition, issues framed for hearing and invitation for filing comments/intervention request from the interested parties. Individual Notices of Admission & Hearing were sent to the stakeholders, considered relevant by NEPRA, and to the petitioner on March 08, 2019 for participation in the hearing. Tariff petition and Notice of Admission & Hearing were also hosted on NEPRA's website for information of general public.

7. Following issues were framed by the Authority for the hearing/proceedings:

- Whether the claimed EPC cost is competitive, comparative and based on the firm and final agreement(s)? and
- Whether the NEPRA (Selection of EPC Contractor by IPPs) Guidelines, 2017 have been fully complied with?
- Whether the details provided for Non-EPC cost are sufficient and claimed Non-EPC cost is justified? Also provide justification for land requirement as claimed by the petitioner?
- Whether the claimed O&M costs are justified?
- Whether the claimed insurance during operation cost is justified?
- Whether the claimed return on equity is justified?
- Whether the claimed financing/debt terms are justified?
- Whether the claimed annual energy generation and corresponding plant capacity factor are reasonable and justified?
- Whether the petitioner's proposed solar modules technology satisfies the international standards of quality and operation? and
- Whether the project grid interconnection study is approved by the relevant organization(s) and whether NTDCL has issued power evacuation certificate?
- Whether the claimed construction period is justified?
- Any other issue with the approval of the Authority

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA AUTHORITY

8. The hearing was held on March 20, 2019 (Wednesday) at NEPRA Tower, G-5/1, Islamabad which was attended by a number of participants including the petitioner, representatives of CPPAGL, NTDCL and other stakeholders. Post hearing, comments were advanced by CPPAGL vide letter dated April 04, 2019. The submission of CPPAGL were forwarded to the petitioner vide NEPRA's letter dated April 17, 2019 for response, on which the petitioner submitted its response vide letter dated May 07, 2019. The related comments of CPPAGL and response of the petitioner thereon are discussed in the relevant paragraphs of this determination.

9. The issue wise submissions of the petitioner and the Authority's findings and decision thereon are as under.

Whether the claimed EPC cost is competitive, comparative and based on the firm and final agreement(s) and
Whether the NEPRA (Selection of EPC Contractor by IPPs) Guidelines, 2017 have been fully complied with?

10. The petitioner has claimed USD 19.740 million on account of Engineering, Procurement and Construction ("EPC") cost in its tariff petition. In this regard, AEPL has submitted signed copies of EPC Offshore and Onshore Contracts. The details of the EPC cost as provided by the petitioner in the petition is given hereunder:

EPC Cost	USD Million
Off Shore	16.841
On Shore	2.899
Total	**19.740**

11. The petitioner submitted that it has split the scope of EPC works into two parts. First is Offshore Procurement and Supply Contract which relates to procurement and supply of electrical and mechanical equipment outside Pakistan, signed with CSUN-Solar International Limited on November 26, 2018. The second is Procurement and Construction Contract which comprises of civil works, erection, commissioning, testing, etc. has been signed with CSUN Energy Pakistan (Pvt.) Ltd. and China Construction Installation Engineering Company Ltd. on November 26, 2018.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

12. AEPL in its petition and during the hearing apprised the Authority that a transparent bidding process was carried out in accordance with NEPRA (Selection of Engineering, Procurement and Construction Contractor by Independent Power Producers) Guidelines, 2017 ("EPC Guidelines") for the selection of EPC Contractor. AEPL submitted that the Project was advertised through two international and four local newspapers as well as on four international tender websites on October 12, 2017. Pre-Qualification Document (PQD) was prepared with the assistance of the legal advisor and technical consultant. In response to advertisements, twenty one (21) EPC Contractors applied for pre-qualification, out of which seventeen (17) were pre-qualified. The petitioner submitted that the standardized Request for Proposal (RFP) was shared with the pre-qualified contractors. The bids were received from six (06) pre-qualified contractors and all of them were found technically acceptable and were invited for commercial negotiations. Subsequently, based on financial evaluations and negotiations, the bid from the consortium of CSUN Solar International Ltd. and China Construction Installation Engineering Company Ltd., being technically acceptable and lowest price was selected.

13. AEPL submitted that CSUN is one of the leading manufacturer of solar cells and modules and is a subsidiary of China Electric Equipment Group (CEEG). CEEG is one of the top two manufacturers of electrical transformers in China and also manufactures advanced composite materials used in the construction of aircraft and other transportation systems. The company told that CSUN has extensive experience in the PV industry and is known for outstanding innovation, efficiency and quality. AEPL further informed that CSUN has a solar module production capacity of 1.2 GW and has sold over 3.0 GW of modules. Moreover, the petitioner stated that CSUN ventured into EPC business in 2015 and has since successfully commissioned solar projects in various countries including Pakistan. About Onshore Contractor, the petitioner submitted that China Construction Installation Engineering Company Ltd. (CCIEC) is a specialized engineering subsidiary of China State Construction Engineering Corp., which is one of the Global Fortune 500 Companies. CCIEC has four main business sectors of chemical, high-end MEP, steel manufacture and infrastructure. The petitioner informed that CCIEC has worked as subcontractor for various renewable energy projects with different EPC Contractors in Pakistan.

14. The Authority has noted that the tariff determinations of eleven (11) solar PV projects have been issued by NEPRA in last few months. Looking at the EPC costs approved in those determinations, the EPC costs claim of the petitioner is found to be quite on the higher side. The process of selection of contractors followed by the petitioner may have been

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

transparent; however, that cannot be adopted for the provision of the EPC cost in this determination. The considerations of the Authority for the assessment of the EPC costs to be allowed to the petitioner are given in the following paragraph.

15. The Authority has relied upon the EPC cost and project cost data in different countries. The prices of different types of modules, inverters and mounting structures in different parts of the world were researched through a number of reports published by credible organizations. Moreover, a number of online sources providing spot prices data of equipment of solar power system were also surfed. Furthermore, the costs being claimed recently by other comparable projects were also checked. It has been noted that the average prices of solar modules of different types and brands have gone as low as USD 0.16 million per MW. Those average prices were at the level of USD 0.32-0.34 million per MW back in January, 2018. This shows that there has been a decline of more than 50% in the cost of modules in two years' time. The cost of inverters, inclusive of combiner boxes, has been found reported in different sources and has been claimed in other tariff petitions at or below the level of USD 0.04 million per MW. For mounting structures, the price of as low as USD 0.10 million per MW for single axis tracking has been stated by one of the solar projects. It has also been noted that the cost of around USD 0.11 million per MW for tracking mounting structure has been achieved by a solar PV power project which has recently been commissioned. On these base figures, the factors such as transportation cost, existing local market conditions, local manufacturing base, length of time allowed for achieving financial close etc. were given due consideration. Further, the cost of civil works as allowed by the Authority in the comparable tariff cases has been rationalized for the size of the Project. The cost of electrical balance of plant equipment has been allowed in line with the comparable projects. It has also been ensured to provide a reasonable amount of profits/margins to the companies carrying out above work. Keeping in view all these factors, the Authority has assessed the EPC cost for AEPL as USD 0.5145 million per MW (USD 15.435 million) which is hereby approved. The allowed EPC cost shall be adjusted at Commercial Operations Date ("COD") in accordance with the mechanism given in the Order part of this determination.

Whether the details provided for Non-EPC cost are sufficient and claimed Non-EPC cost is justified? Also provide justification for land requirement as claimed by the petitioner?

16. The petitioner has claimed USD 3.132 million on account of non-EPC cost. The break-up of the cost components as provided by the petitioner is as follows:

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

Non-EPC Cost	USD Million
Insurance during Construction	0.041
Project Development Cost	2.118
Financing Fee and Charges	0.516
Interest during Construction	0.457
Total Non-EPC Cost	**3.132**

Insurance during Construction

17. The petitioner has claimed USD 0.041 million on account of pre-COD insurance cost at the rate of 0.5% of EPC cost. The petitioner submitted that as per practice set by other Independent Power Producers in Pakistan and to adequately protect the interest of all relevant stakeholders, it intends to procure appropriate insurances coverage during the construction phase of the Project. The petitioner submitted that the claimed cost does not include the administrative surcharge, the federal insurance fee and the federal excise duty and requested to allow/adjust the same at the time of COD.

18. The Authority has noted that NEPRA (Benchmarks for Tariff Determination) Guidelines, 2018 ("Benchmarking Guidelines") issued vide S.R.O. 763(I)/2018 notification dated June 19, 2018 states the provision of insurance during construction at the rate of 0.40% of EPC cost for solar projects. In accordance therewith, the Authority has decided to allow insurance during construction, inclusive of taxes, charges and/or duties, at the rate of 0.4% of the approved EPC cost to AEPL. On this basis, the amount being approved under this head works out to be around USD 0.062 million.

Project Development Cost

19. The petitioner has claimed USD 2.118 million on account of Project Development Cost ("PDC"), including cost of land. The petitioner in petition and during hearing submitted the break-up of PDC which is as hereunder:

Project Development Cost	USD million
Administrative Cost	0.211
Consultancies & Technical Studies	0.678
Regulatory/legal Fees	0.149
Site Development	0.351

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

Travelling Cost	0.118
Land	0.611
Total	**2.118**

20. In its petition and during the hearing, the petitioner gave detailed justification of its claim of each cost item of PDC. Regarding administrative costs, the petitioner submitted that this cost head includes rent, utilities, accounting and admin staff, in-house technical team to oversee development of the Project, stationery, vehicle fuel and maintenance and other related expenses during the project development period. The claimed consultancies and technical studies cost includes cost of advisors engaged by the project sponsor for conducting studies and assisting various project development activities including selection of EPC Contractor. It also includes cost of consultants to be engaged for providing support during construction phase and cost of independent engineer required to monitor the construction and commissioning of the Project. Regarding regulatory/legal fees, AEPL submitted that this include fee, charges and other related expenses paid to various authorities including SECP, NEPRA, AEDB, etc. Site development cost related to site preparation such as ground levelling, clearing and grubbing, site access costs, etc. Travelling cost covers travelling and related expenses for staff during the development and construction of the Project.

21. AEPL has claimed USD 0.611 million on account of cost of land of 205 acres. The petitioner during the hearing submitted that private land has been acquired for the Project. In support of its claim, the petitioner vide letter dated January 29, 2019 submitted two separate copies of Sale Agreements of Land signed between Asia Petroleum Ltd. and a number of Land Owners on September 15, 2015 and November 2, 2015 and subsequent extensions of the Sale Agreements for procurement of total land area of around 205 acres. As per above dcouments, the landowners have agreed to sell the land at the rate of Rs. 320,000 per acre with total sale consideration of Rs. 65.644 million. The petitioner informed that the remaining claim comprises of agent commission of Rs. 3.075 million, stamp duties of Rs. 10.308 million and land consultancy of Rs. 2.505 million.

22. The Authority has examined the cost of PDC inclusive of land cost that has been allowed in tariff of comparable solar projects. The area of land as allowed in other solar PV projects and resultant cost has also been considered. Considering these factors while taking into account the size of the Project, the Authority has decided to approve the PDC of USD 1.00 million for AEPL, inclusive of cost of land, cost of Independent Engineer and cost of

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA AUTHORITY

Owner's Engineer. This amount is being approved on lump sum basis, i.e. the costs incurred on individual heads of PDC may change but should not exceed the overall amount. The duties and/or taxes as per the criteria given in the Order part of this determination shall be admissible.

Financing Fee and Charges

23. AEPL has claimed financing fees and charges of USD 0.516 million. The petitioner submitted that this cost head includes lenders' up-front fee and commitment fee, Letter of Credit (LC) charges, fees payable and stamp duty applicable on the financing documents, agency fee, security trustee fee, lenders' project monitoring fee and the fees for the lenders' various advisors. The petitioner also requested to adjust any taxes and levies related to financing fee and charges at the time of COD.

24. It is noted that Benchmarking Guidelines states the provision of financing fee & charges not exceeding 2% of the approved debt amount of the capital expenses. In accordance with the said benchmark, the Authority has decided to allow the captioned cost at the rate of 2% of approved debt portion of allowed capital expenses, inclusive of taxes, charges and/or duties, to the petitioner. Accordingly, the amount being approved under this head works out to be around USD 0.264 million.

Interest during construction (IDC)

25. The petitioner has submitted that Interest during Construction ("IDC") has been calculated as USD 0.457 million. This cost has been calculated based on fixed rate of 6% under State Bank of Pakistan ("SBP") Renewable Energy refinancing facility and 10 months construction period. The petitioner submitted that in the event the project company is required to procure foreign currency financing, adjustment for LIBOR/KIBOR based facility with appropriate spread shall be allowed. The petitioner submitted that IDC shall be subject to adjustments based on a firm offer from lending banks, the actual disbursement schedule and adjustments/true-up.

26. Based on the abovementioned approved costs while considering the drawdown schedule as given in the Order part of this determination; the IDC works out to be around USD 0.199 million and is hereby approved. The details of financing terms and construction period that have been used to work out the aforesaid amount of IDC is discussed in the ensuing relevant sections. The allowed IDC shall be re-computed at COD as per the mechanism given in the Order part of this determination.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA AUTHORITY

27. Recapitulating above, the approved project cost is given hereunder:

Project Cost	USD million
EPC Cost	15.435
Project Development Cost	1.000
Insurance during Construction	0.062
Financing Fee and Charges	0.264
Interest during Construction	0.199
Total	**16.960**

Whether the claimed O&M costs are justified?

28. The petitioner claimed O&M cost of USD 0.360 million per year which turns out to be USD 12,000 per MW per year. During the hearing and in its petition, the petitioner submitted that the claimed annual O&M cost is expected to cover costs related to routine, scheduled and major maintenance, staff salaries and benefits, corporate overheads and other miscellaneous costs. It also includes cost associated with replacement of parts necessitated due to regular operation / normal wear and tear. AEPL has claimed annual O&M cost in local and foreign currency at the ratio of 50:50. The petitioner submitted that it has signed O&M contract with CSUN Energy Pakistan (Pvt.) Ltd. on November 26, 2018 for the operations and maintenance of the Project for first 02 years of operations. AEPL submitted that the decision to continue with the same contractor or to change the contractor or to carryout O&M in-house will be taken by the project company at an appropriate later stage.

29. It was noted that as per the O&M contract submitted by the petitioner, the price is fixed amount of USD 270,000 (USD 9,000 per MW per year). Regarding the query of claim of higher O&M cost of (USD 3,000/MW/year) against the agreed contract price, AEPL during the proceedings submitted that the balance amount in O&M represents cost which does not cover under the O&M agreement which includes HR related costs, security services, corporate expenses e.g. audit fee and audit certifications, office space rentals, IT expenses, accounting administration, travelling, etc., legal and other professional services e.g. lawyers, tax consultants, technical consultancies, and other miscellaneous expenses.

30. To evaluate this claim of AEPL, the O&M cost being allowed in other parts of the world has been referred. Local market and security conditions of the area where Project is being

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

setup, required skilled manpower, spare parts etc. have also been deliberated. The cost recently being claimed by other solar power projects based on different technologies has also been compared. In view thereof, the Authority has decided to approve the O&M cost of USD 0.285 million per year to AEPL, i.e. USD 9,500 per MW per year.

31. In line with the recent tariffs approved for solar PV projects, the Authority has decided to allow whole of O&M cost in local currency to the petitioner. Additionally, the Authority has decided that it may consider making revisions in the O&M cost, while capping the allowed prevailing level, anytime during the tariff control period. Those revisions may also entail changing the mix of the approved O&M cost (local and foreign) as well as the indexation mechanism (indices, frequency etc.). For that purpose, the Authority may also direct the petitioner to carry out the competitive bidding to select the contractor for the provision of the O&M cost.

Whether the claimed insurance during operation is justified?

32. AEPL claimed insurance during operation at the rate of 0.5% of claimed EPC Cost. The petitioner submitted that the insurance shall be procured as per the standardized Energy Purchase Agreement ("EPA") for the solar PV projects. AEPL submitted that the insurance cover includes cost of all-risk of machinery breakdown, third party liability and consequential loss policies.

33. The Authority noted that in the recently approved solar tariff determinations, insurance during operation at the rate of 0.4% of the approved EPC cost has been allowed. Benchmarking Guidelines also provide insurance during operation at the rate of 0.4% of EPC cost for solar PV projects. In view thereof, the Authority has decided to allow insurance during operation at the maximum limit of 0.4% of the approved EPC cost, including all taxes/charges and/or duties, to the petitioner, subject to adjustment on actual basis as per the mechanism given in the Order part of this determination.

Whether the claimed return on equity is justified?

34. The petitioner has claimed Return on Equity (ROE) of 15% in its tariff petition. The Authority has noted that in the most recent comparable tariff cases of renewable technologies, it has allowed ROE (both during construction and operation) to the limit of 14%. Accordingly, the Authority has decided to approve the ROE of 14% for AEPL also.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

35. The approved components of ROE & ROEDC shall be adjusted on yearly basis as per the mechanism given in the Order part of this determination. The payment of this component of tariff, applicable to any year, shall be due to be made at the end of that year. It is to be noted that the approved amount of ROE shall be the maximum limit of the annual return to be earned by the project company. The amount of return of any year, if exceeds by the given limit, shall be shared between the power producer and consumers through claw back formula to be decided by the Authority.

Whether the claimed financing/debt terms are justified?

36. The petitioner has claimed following parameters regarding the debt:

Debt	75% (100% local)
Interest	6% SBP fixed rate
Debt Repayment	10 Years

37. In support of its claim, the petitioner submitted indicative term sheet issued by Askari Bank Limited for financing of the Project. AEPL also stated that In the event the project company is required to procure foreign currency financing or financing under SBP Policy is not available for any reason, adjustment for LIBOR/KIBOR based facility with appropriate spread allowed by the Authority in its other determinations shall be allowed.

38. The Authority has noted that Benchmarking Guidelines provide that the debt : equity ratio for all renewable power projects will be 80:20 and in case of change in ratio, the return approved on equity shall be adjusted to maintain cost of capital at the same level as under a 80:20 debt-equity ratio capital structure. The debt-equity ratio of 80:20 has also been approved by the Authority in the recent wind and solar tariff determinations. Therefore, the Authority has decided to compute and approve tariff of AEPL at debt to equity ratio of 80:20 as well.

39. Benchmarking Guidelines also provide that in case of renewable energy projects eligible for securing debt under the revised SBP Refinancing Scheme ("SBP Scheme"), a flat rate of 6% shall be approved with debt repayment period not exceeding 12 years. The size of the project being set up by the petitioner is 30 MW which makes it eligible to avail financing under SBP scheme. However, it has been noted that SBP vide its circular dated July 26, 2019 has decided that eligible renewable energy projects of more than 20 MW shall be given financing of up to 50% under the SBP Scheme. Nevertheless, as the

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

petitioner has claimed tariff on 100% financing under SBP Scheme, hence, the Authority has decided to compute tariff on 100% financing under SBP Scheme. In case the petitioner is not able to secure financing under SBP scheme then the tariff shall be adjusted with conventional local/foreign financing, or a mix of both, at the time of its COD. However, the petitioner shall have to prove through documentary evidence issued by SBP/commercial bank that it exhausted the option of availing financing under SBP scheme before availing conventional local/foreign loan.

40. The petitioner has claimed debt servicing period of ten years for financing for SBP financing. The Authority in recently approved wind and solar tariff determinations has allowed SBP debt repayment period of ten years and decided to allow same to the petitioner also.

Whether the claimed annual energy production and corresponding plant capacity factor are justified? And Whether the petitioner's proposed solar modules and inverter technology satisfies the international standards of quality and operation?

41. The petitioner has submitted the following in this regard:

Project Capacity	30 MWp
Annual Power Generation	58.37 GWh
Net Annual Capacity Factor	22.21%

42. The petitioner submitted that it has selected polycrystalline PV modules CSUN330-72P manufactured by CSUN for the Project. The selected PV module CSUN330-72P has certifications such as IEC 61215 and IEC 61730. The petitioner submitted that single axis tracking technology will be deployed which increased the annual energy yield considerably compared to fixed tilt. The petitioner submitted that inverters of Sungrow model SG 1250 with advanced three level topology and maximum inverter efficiency of 99% has been selected for the Project.

The petitioner submitted that based on the selected technologies and Global Horizontal Irradiance of 1859 kWh/m2/year, the estimated first year yield of the plant at P50 is estimated to be 58.37 GWh i.e, capacity factor of 22.21%.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

44. It has been noted that the Generation License for the proposed technology has already been approved for AEPL which actually addressed the issue with respect to the technology. For plant capacity factor, the Authority has considered the modules, inverters and other equipment as proposed by AEPL with respect to their quality and energy yield. The energy simulation parameters as submitted by the petitioner during proceedings has also been examined. The plant capacity factor that has been allowed for polycrystalline modules in the recent tariff cases of different regions of the country were also checked. Considering these factors, the Authority is of the view that the claimed net plant capacity factor is reasonable and therefore decided to compute the tariff of AEPL on the claimed capacity factor of 22.21%. The solar resource risk shall be borne by the power producer and a sharing mechanism given in the Order part of this determination shall be applied on the energy produced beyond the approved capacity utilization factor.

Whether the claimed construction period is justified?

45. During the hearing and in its tariff petition, the petitioner has proposed 10 months construction period for the Project. The Authority noted that it has approved construction period of 10 months (from the date of financial close) in the recently approved tariff cases of solar power projects (50-62 MW). However, the size of AEPL is considerably smaller than those projects, hence, the Authority has decided to approve construction period of 8 months for AEPL.

Whether the project grid interconnection study is approved by the relevant organization(s) and whether NTDCL has issued power evacuation certificate?

46. AEPL in the tariff petition submitted that a 132kV double circuit line has been proposed from the complex to the Noorsar 132kV Grid Station for the evacuation of power having interconnection length of 12 km. During hearing, the petitioner submitted that Grid Interconnection Study ("GIS") has been approved by Multan Electric Power Company Ltd. ("MEPCO") as well as by NTDCL. The copies of these approvals were also submitted by the petitioner along with the petition.

47. The Authority has noted that approval of project's GIS/power evacuation certificate by NTDCL is not a requirement for the award of generation tariff as given in the Tariff Rules. This issue was framed to confirm that the integration of the Project does not affect the overall grid system. The Authority has further noted that during the proceedings of the Generation License as awarded to AEPL on December 10, 2019, the matter of

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

interconnection of the Project has already been discussed and addressed. In view thereof, the Authority considered it appropriate to proceed further in the subject matter as per the stipulations given in the Tariff Rules.

Degradation Factor

48. AEPL submitted that annual average degradation of 0.50% per year has been assumed. The Authority has noted that degradation factor of modules at 0.5% per year has been taken into account in the recently approved tariff cases of solar PV power projects and decided to approve the same in AEPL's tariff. The Authority has decided to capitalize the impact of allowed degradation in the approved project cost. The amount of USD 0.559 million has been made part of the approved project cost while calculating the same at the levelized rate of 3.62% of the approved EPC cost.

Comments submitted by CPPAGL

49. Following submissions were advanced by CPPAGL:

- As per decision of the Cabinet Committee on Energy (CCOE) taken on February 27, 2019, the name of AEPL is appearing in the list of category III. The CCOE decision pertaining to APL is that "...may be allowed to proceed ahead subject to becoming successful in the competitive bidding process to be undertaken by AEDB specifically designed for each technology under this category based on the quantum ascertained for each technology by Indicative Generation Capacity Expansion Plan (IGCEP) by NTDCL...." Therefore, the process of tariff determination needs a review.
- Power generation in Pakistan is being procured according to NTDCL's IGCEP as per PC-4 of grid code in line with the demand vs supply position.
- Procurement of renewable energy resources and its integration into the national grid is dependent on the share determined by grid code review panel and duly approved by NEPRA. CPPAGL will procure power which will come under the approved IGCEP pursuant to PC-4 of grid code.
- New solar power plants are being set up globally at a tariff under 3 cents per kWh. Pakistan needs to induct cheap electricity into its existing mix to lower its basket price, in line with the IGCEP.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

- Using concentrated photovoltaic (CPV) and double axis technology through competitive bidding process can result in the acquisition of comparatively lower cost solar generation.

50. NEPRA vide letter dated April 17, 2019 forwarded the submissions of CPPAGL to AEPL for comments. In response, AEPL vide letter dated May 07, 2019 submitted that it was decided by NEPRA that CCOE is not the appropriate authority on this matter and any decision made by CCOE cannot restrict NEPRA to exercise its statutory mandate which is the sole regulator of the power sector of Pakistan. AEPL further submitted that it is highlighted that NEPRA has previously rejected CCOE's decision in similar cases like these and determined tariffs with its relevant existing statute and regulations. AEPL submitted that GIS of the project was approved by both MEPCO and NTDCL on July 6, 2017 and September 19, 2017 respectively confirming that the power to be generated will not have any adverse effect on the national grid as required under the prevailing grid code. AEPL in the said response letter appreciated the intention of having transparent price discovery mechanism through competitive bidding. AEPL submitted that in this regard the Authority vide its decision dated March 3, 2017 directed the relevant agencies to carry out competitive bidding under competitive bidding regulation, 2014. However, even after the lapse of two years, relevant agencies have failed to carry out the Authority's directions and have deprived the country of cheap, clean and indigenous sources of energy. Regarding low cost solar generation using dual axis tracking, AEPL submitted that dual axis trackers are suitable for regions at 45° latitude or higher while AEPL project is at 29.8° latitude. Yield increases for dual axis trackers vs single axis trackers at AEPL' project location are too insignificant, while project installation, operations and maintenance costs are significantly higher. Single axis tracking technology is a mature and wide used technology. Globally it has been deployed on over 20 GWs of solar PV project. Dual axis is more complex and has not been deployed in significant numbers globally thus creating challenges in financing and insuring the project, besides the O&M related challenges. Further, 40 acres land area would be required for dual axis tracking resulting increase in land cost. Regarding CPV technology AEPL submitted that this technology is not mature as yet and cumulative less than 1GW of different types of CPV technologies have been deployed globally for research and experimentation purposes. Typical of a nascent technology, very few manufacturers exist offering different technological solutions at high rates. Due to these reasons, this technology is not bankable which leads to high rate of financing and equipment. At the end, AEPL submitted that the technology it has proposed is the optimum solution at low cost providing lower tariffs.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

51. Regarding the comments with respect to CCOE decision, the Authority has noted that it has time and again clarified that Federal Government can give plan and guidelines to NEPRA to give effect to National Electricity Policy ("NEP") and NEPRA shall follow such guidelines while determining tariff as and when such NEP is approved by Council of Common Interest, as envisaged under Section 14-A of the NEPRA Act, 1997. The Authority considered the submission with respect to IGCEP and observed that no such plan has yet been approved by NEPRA. Regarding induction cheap electricity into its existing mix to lower its basket price, the Authority noted that the levelized tariff, being approved for the subject project, is less than half of the most expensive generation cost in the existing mix of the country. Therefore, it cannot be considered justified and rationale to not determine such economical tariffs for replacement of expensive electricity and consequent lowering of the average system generation cost.

52. **ORDER**

In pursuance of section 7(3)(a) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 and NEPRA (Tariff Standards & Procedure) Rules, 1998, the Authority hereby determines and approves the generation tariff along with terms and conditions for Asia Energy (Pvt.) Limited (AEPL) for its 30 MWp solar power project for delivery of electricity to the power purchaser as follows:

- Levelized tariff works out to be Rs. 6.1449/kWh (US Cents 3.6414/kWh).
- The tariff has been worked out on Build, Own and Operate basis.
- EPC cost of USD 15.435 million has been approved.
- Project Development Cost of USD 1.00 million inclusive cost of land has been approved.
- Insurance during constriction at the rate of 0.4% of the approved EPC cost has been approved.
- Financing fee at the rate of 2% of the debt portion of the capital cost has been approved.
- Debt to Equity ratio of 80:20 has been approved.
- Tariff has been computed using 100% local financing.
- The cost of debt of 6% (SBP scheme) has been used for local financing.
- Debt servicing period of 10 years from COD has been used for local financing under SBP scheme.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA AUTHORITY

- Annual ROE and ROEDC of 14% has been allowed.
- O&M Cost of USD 9,500 per MW per year has been allowed.
- Insurance during Operation has been calculated as 0.40% of the allowed EPC Cost.
- Construction period of 8 months has been allowed.
- Net Annual Plant Capacity Factor of 22.21% has been approved.
- Reference Exchange Rates of 168.75 PKR/USD has been used.
- IDC and ROEDC have been worked out using following drawdown schedule:

Month 1	5.00%
Month 2	5.00%
Month 3	5.00%
Month 4	15.00%
Month 5	15.00%
Month 6	15.00%
Month 7	20.00%
Month 8	20.00%

- Detailed component wise tariff is attached as Annex-I of this determination.
- Debt Servicing Schedule is attached as Annex-II of this determination.

A. One Time Adjustments at COD

- The EPC cost shall be verified and adjusted at actual considering the approved amount as the maximum limit. Applicable foreign portion of the EPC cost will be adjusted at COD on account of variation in PKR/USD parity during the construction period, on production of authentic documentary evidence by the petitioner to the satisfaction of the Authority. The adjustment in applicable portion of the approved EPC cost shall be made for the currency fluctuation against the reference parity values.
- PDC, including land cost, Insurance during construction and Financing Fee and Charges shall be adjusted at actual at the time of COD considering the approved amount as the maximum limit. The amounts allowed on these accounts in USD will be converted in PKR

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

using the reference PKR/USD rate of 168.75 to calculate the maximum limit of the amount to be allowed at COD.

- Duties and/or taxes, not being of refundable nature, relating to the construction period directly imposed on the company up to COD will be allowed at actual upon production of verifiable documentary evidence to the satisfaction of the Authority.

- The tariff has been determined on debt : equity ratio of 80 : 20. The tariff shall be adjusted on actual debt : equity mix at the time of COD, subject to equity share of not more than 20%. For equity share of more than 20%, allowed IRR shall be neutralized for the additional cost of debt : equity ratio.

- IDC will be recomputed at COD on the basis of actual timing of debt draw downs (for the overall debt allowed by the Authority at COD) for the project construction period of 8 months starting from the date of financial close.

- For full/part of commercial foreign or local loan or a mix of both, if applicable and availed by the company, the IDC shall also be allowed adjustment for change in applicable LIBOR/KIBOR.

- The reference tariff has been worked out on the basis of cost of 6% offered under SBP financing scheme. In case cost negotiated by the company under SBP scheme is less than the said limit of 6%, the savings in that cost shall be shared between the power purchaser and the power producer in the ratio of 60:40 respectively.

- For full or part of commercial local or foreign loan, if any, the savings in the approved spreads shall be shared between the power purchaser and power producer in the ratio of 60:40.

- ROEDC will be adjusted at COD on the basis of actual equity injections (within the overall equity allowed by the Authority at COD) during the project construction period of 8 months from the date of financial close.

B. Indexations during operations

ROE, ROEDC and Insurance shall be allowed adjustment on yearly basis starting from either 1st July or 1st January. O&M Components shall be adjusted on quarterly basis to be applicable from 1st July, 1st October, 1st January and 1st April. Adjustment of Debt Servicing Component (if any) shall be made either quarterly/bi-annually/annual,

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA AUTHORITY

depending upon the final terms approved by the Authority. The indexation mechanisms are given hereunder:

i) **Operation and Maintenance Costs**

O&M component of tariff shall be adjusted on account of change in local Inflation (CPI) as notified by the Pakistan Bureau of Statistics according to the following mechanism:

L. O&M (REV)	=	L. O&M (REF) * CPI (REV) / CPI (REF)
Where;		
L. O&M (REV)	=	The revised O&M Local Component of Tariff
L. O&M (REF)	=	The reference O&M Local Component of Tariff
CPI (REV)	=	The revised CPI (General)
CPI (REF)	=	The reference CPI (General) of 268.25 for the month of May, 2020

Note: *The reference index of CPI shall be revised for making the required adjustments in O&M component at the time of COD. For the adjustment of O&M component at COD, the revised CPI value for the middle month of preceding quarter prior to the date of COD shall be considered. Thereafter, the CPI value taken at COD shall become reference for subsequent adjustments in the O&M component.*

ii) **Insurance during Operation**

The actual insurance cost for the minimum cover required under contractual obligations with the power purchaser, not exceeding 0.4% of the approved EPC cost, will be treated as pass through. Insurance component of reference tariff shall be adjusted annually as per actual upon production of authentic documentary evidence according to the following formula:

AIC	=	Ins (Ref) / P (Ref) * P (Act)
Where;		
AIC	=	Adjusted insurance component of tariff
Ins (Ref)	=	Reference insurance component of tariff

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

P (Ref)	=	Reference premium @ 0.4% of approved EPC Cost at Rs. 168.75/USD
P (Act)	=	Actual premium or 0.4% of the approved EPC Cost converted into Pak Rupees on exchange rate prevailing on 1st day of the insurance coverage period whichever is lower

iii) **Return on Equity**

The ROE (ROE + ROEDC) component of the tariff will be adjusted annually on account of change in USD/PKR parity. The variation relating to these components shall be worked out according to the following formula:

ROE (Rev)	=	ROE (Ref) * ER (Rev) / ER (Ref)
Where;		
ROE (Rev)	=	Revised ROE Component of Tariff
ROE (Ref)	=	Reference ROE Component of Tariff
ER (Rev)	=	The revised TT & OD selling rate of US dollar as notified by the National Bank of Pakistan
ER (Ref)	=	The reference TT & OD selling rate of Rs. 168.75/USD

Note: *The reference tariff component shall be revised after making the required adjustments at the time of COD.*

iv) **Indexation applicable to Debt**

For full or part of conventional foreign debt, if any, respective principal and interest components will be adjusted on quarterly/bi-annual/annual basis, on account of revised TT & OD selling rate of US Dollar, as notified by the National Bank of Pakistan as at the last day of the preceding period, over the applicable reference exchange rate. The interest part of the foreign loan shall be allowed adjustment with respect to change in the applicable LIBOR. For full or part of conventional local loan, if any, the interest component shall be allowed adjustment with respect to change in applicable KIBOR.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

C. Terms and Conditions

The following terms and conditions shall apply to the determined tariff:

- All plant and equipment shall be new and of acceptable standards. The verification of the plant and equipment will be done by the independent engineer at the time of the commissioning of the plant duly appointed by the power purchaser.
- This tariff will be limited to the extent of net annual energy generation supplied to the power purchaser up to 22.21% net annual plant capacity factor. Net annual energy generation supplied to the power purchaser in a year, in excess of 22.21% net annual plant capacity factor, will be charged at the following tariffs:

Net annual plant capacity factor	% of prevalent tariff allowed to power producer
Above 22.21% to 22.50%	-
Above 22.50% to 23.25%	20%
Above 23.25% to 24.00%	40%
Above 24.00% to 24.75%	60%
Above 24.75%	70%

- The risk of solar resource shall be borne by the power producer.
- The maximum plant PV capacity shall not exceed as given in the Generation License.
- In the above tariff no adjustment for certified emission reductions has been accounted for. However, upon actual realization of carbon credits, the same shall be distributed between the power purchaser and the power producer in accordance with the applicable GOP Policy, amended from time to time.
- The petitioner is required to ensure that all the equipment is installed as per the details/specifications in the generation license/tariff as awarded by NEPRA.
- The petitioner is hereby directed to secure the maximum available loan under the SBP Scheme. The savings in the cost of financing under SBP Scheme shall be shared between power purchaser and power producer in the ratio of 60:40 at the time of COD or during any time of the loan tenor, as applicable.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

- In case the company shall secure full or part of local conventional loan then the tariff of company shall be adjusted at the time of COD at applicable KIBOR + spread of 2.25%. The savings in the approved spreads during the loan tenor shall be shared between the power purchaser and power producer in the ratio of 60:40. The tenor of the debt servicing shall not be less than thirteen years for this loan.

- In case the company shall secure full or part of foreign conventional loan then the tariff of company shall be adjusted at the time of COD at applicable LIBOR + spread of 4.25%. The savings in the approved spreads during the loan tenor shall be shared between the power purchaser and power producer in the ratio of 60:40. The tenor of the debt servicing shall not be less than thirteen years for this loan.

- In case the company shall secure foreign loan under any credit insurance (Sinosure etc.) then the cost of that insurance shall be allowed to the maximum limit of 0.6% of the approved yearly outstanding principal and interest amounts. For financing with Sinosure, the spread/margin over LIBOR shall be adjusted to the extent such that the total financing cost (applicable LIBOR + Adjusted Margin + Sinosure) shall not exceed the financing cost without Sinosure (applicable LIBOR + Approved Margin).

- The Authority may consider making revisions in the O&M cost, while capping the allowed prevailing level, anytime during the tariff control period. Those revisions may also entail changing the mix of the approved O&M cost (local and foreign) as well as the indexation mechanism (indices, frequency etc.). For that purpose, the Authority may direct the petitioner to carry out the competitive bidding to select the contractor for the provision of the O&M cost.

- The payment of ROE (including ROEDC) components of tariff shall be due to be made at the end of respective years.

- In case the company earns annual profit in excess of the approved return on equity (including ROEDC), then that extra amount shall be shared between the power producer and consumers through claw back formula to be decided by the Authority. For that purpose, the share of producer as given in the bonus energy mechanism shall be taken into account.

- Allowed limit of degradation has been made part of the approved project cost. No extra financial compensation shall be provided in the EPA.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

- The company will have to achieve financial close within one year from the date of issuance of tariff determination. The tariff granted to the company will no longer remain applicable/valid, if financial close is not achieved by the company, for whatever reason, in the abovementioned timeline or its generation license is declined/revoked by NEPRA.
- The targeted maximum construction period from prescribed date/time of financial close is 8 months. No adjustment will be allowed in this tariff to account for financial impact of any delay in project construction. However, the failure of the company to complete construction within 8 months will not invalidate the tariff granted to it.
- Pre COD sale of electricity is allowed to the power producer, subject to the terms and conditions of EPA, at the applicable tariff excluding debt servicing and return components. However, pre COD sale will not alter the required COD stipulated in the EPA in any manner.
- In case the company 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, 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. However, withholding tax on dividend shall not be allowed as pass through.
- No provision for the payment of Workers Welfare Fund and Workers Profit Participation has been made in the tariff. In case, the company has to pay any such fund, that will be treated as pass through item in the EPA.
- The approved tariff along with terms & conditions shall be made part of the EPA. General assumptions, which are not covered in this determination, may be dealt with as per the standard terms of the EPA.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

53. The Order part along with 2 Annexures is recommended for notification by the Federal Government in the official gazette in accordance with Section 31(7) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997.

AUTHORITY

(Rafique Ahmed Shaikh)
Member

(Eng. Bahadur Khan)
Member

(Rehmatullah Baloch)
Member

(Saif Ullah Chattha)
Vice Chairman
26.8.2020

(Tauseef H. Farooqi)
Chairman

07 09 20

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

Annex-I

ASIA ENERGY (PVT.) LIMITED
REFERENCE TARIFF TABLE

Year	O&M Local	Insurance	Return on Equity	Return on Equity during Construction	Principal Repayment	Interest Charges	Tariff
	Rs. / kWh	Rs. / kWh	Rs. / kWh	Rs. / kWh	Rs. / kWh	Rs. / kWh	Rs. / kWh
1	0.8240	0.1785	1.4182	0.0568	3.0545	2.3633	7.8952
2	0.8240	0.1785	1.4182	0.0568	3.2420	2.1759	7.8952
3	0.8240	0.1785	1.4182	0.0568	3.4409	1.9769	7.8952
4	0.8240	0.1785	1.4182	0.0568	3.6520	1.7658	7.8952
5	0.8240	0.1785	1.4182	0.0568	3.8761	1.5417	7.8952
6	0.8240	0.1785	1.4182	0.0568	4.1140	1.3038	7.8952
7	0.8240	0.1785	1.4182	0.0568	4.3664	1.0514	7.8952
8	0.8240	0.1785	1.4182	0.0568	4.6344	0.7834	7.8952
9	0.8240	0.1785	1.4182	0.0568	4.9188	0.4991	7.8952
10	0.8240	0.1785	1.4182	0.0568	5.2206	0.1972	7.8952
11	0.8240	0.1785	1.4182	0.0568	-	-	2.4774
12	0.8240	0.1785	1.4182	0.0568	-	-	2.4774
13	0.8240	0.1785	1.4182	0.0568	-	-	2.4774
14	0.8240	0.1785	1.4182	0.0568	-	-	2.4774
15	0.8240	0.1785	1.4182	0.0568	-	-	2.4774
16	0.8240	0.1785	1.4182	0.0568	-	-	2.4774
17	0.8240	0.1785	1.4182	0.0568	-	-	2.4774
18	0.8240	0.1785	1.4182	0.0568	-	-	2.4774
19	0.8240	0.1785	1.4182	0.0568	-	-	2.4774
20	0.8240	0.1785	1.4182	0.0568	-	-	2.4774
21	0.8240	0.1785	1.4182	0.0568	-	-	2.4774
22	0.8240	0.1785	1.4182	0.0568	-	-	2.4774
23	0.8240	0.1785	1.4182	0.0568	-	-	2.4774
24	0.8240	0.1785	1.4182	0.0568	-	-	2.4774
25	0.8240	0.1785	1.4182	0.0568	-	-	2.4774
Levelized Tariff	0.8240	0.1785	1.4182	0.0568	2.6183	1.0492	6.1449

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA AUTHORITY

Annex-II

ASIA ENERGY (PVT.) LIMITED
Debt Servicing Schedule

Relevant Quarters	Base amount (Rs.)	Principal Repayment (Rs.)	Interest (Rs.)	Balance Principal (Rs.)	Total Debt Service (Rs.)	Annual Principal Repayment (Rs./kWh)	Annual Interest (Rs./kWh)
1	2,365,049,748	43,581,012	35,475,746	2,321,468,736	79,056,758	3.0545	2.3633
2	2,321,468,736	44,234,727	34,822,031	2,277,234,009	79,056,758		
3	2,277,234,009	44,898,248	34,158,510	2,232,335,760	79,056,758		
4	2,232,335,760	45,571,722	33,485,036	2,186,764,038	79,056,758		
5	2,186,764,038	46,255,298	32,801,461	2,140,508,741	79,056,758	3.2420	2.1759
6	2,140,508,741	46,949,127	32,107,631	2,093,559,613	79,056,758		
7	2,093,559,613	47,653,364	31,403,394	2,045,906,249	79,056,758		
8	2,045,906,249	48,368,165	30,688,594	1,997,538,084	79,056,758		
9	1,997,538,084	49,093,687	29,963,071	1,948,444,397	79,056,758	3.4409	1.9769
10	1,948,444,397	49,830,093	29,226,666	1,898,614,304	79,056,758		
11	1,898,614,304	50,577,544	28,479,215	1,848,036,761	79,056,758		
12	1,848,036,761	51,336,207	27,720,551	1,796,700,554	79,056,758		
13	1,796,700,554	52,106,250	26,950,508	1,744,594,303	79,056,758	3.6520	1.7658
14	1,744,594,303	52,887,844	26,168,915	1,691,706,459	79,056,758		
15	1,691,706,459	53,681,162	25,375,597	1,638,025,298	79,056,758		
16	1,638,025,298	54,486,379	24,570,379	1,583,538,919	79,056,758		
17	1,583,538,919	55,303,675	23,753,084	1,528,235,244	79,056,758	3.8761	1.5417
18	1,528,235,244	56,133,230	22,923,529	1,472,102,014	79,056,758		
19	1,472,102,014	56,975,228	22,081,530	1,415,126,786	79,056,758		
20	1,415,126,786	57,829,857	21,226,902	1,357,296,930	79,056,758		
21	1,357,296,930	58,697,305	20,359,454	1,298,599,625	79,056,758	4.1140	1.3038
22	1,298,599,625	59,577,764	19,478,994	1,239,021,861	79,056,758		
23	1,239,021,861	60,471,431	18,585,328	1,178,550,430	79,056,758		
24	1,178,550,430	61,378,502	17,678,256	1,117,171,928	79,056,758		
25	1,117,171,928	62,299,180	16,757,579	1,054,872,749	79,056,758	4.3664	1.0514
26	1,054,872,749	63,233,667	15,823,091	991,639,082	79,056,758		
27	991,639,082	64,182,172	14,874,586	927,456,909	79,056,758		
28	927,456,909	65,144,905	13,911,854	862,312,005	79,056,758		
29	862,312,005	66,122,078	12,934,680	796,189,926	79,056,758	4.6344	0.7834
30	796,189,926	67,113,910	11,942,849	729,076,017	79,056,758		
31	729,076,017	68,120,618	10,936,140	660,955,398	79,056,758		
32	660,955,398	69,142,427	9,914,331	591,812,971	79,056,758		
33	591,812,971	70,179,564	8,877,195	521,633,407	79,056,758	4.9188	0.4991
34	521,633,407	71,232,257	7,824,501	450,401,150	79,056,758		
35	450,401,150	72,300,741	6,756,017	378,100,408	79,056,758		
36	378,100,408	73,385,252	5,671,506	304,715,156	79,056,758		
37	304,715,156	74,486,031	4,570,727	230,229,125	79,056,758	5.2206	0.1972
38	230,229,125	75,603,322	3,453,437	154,625,803	79,056,758		
39	154,625,803	76,737,371	2,319,387	77,888,432	79,056,758		
40	77,888,432	77,888,432	1,168,326	(0)	79,056,758		

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY