National Electric Power Regulatory Authority
Islamic Republic of Pakistan

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No. NEPRA/R/ADG(Trf)/TRF-538/SECL-2020/41715-41717
November 29, 2021

Subject: **Determination of National Electric Power Regulatory Authority in the matter of Tariff Petition filed by Siachen Energy Limited for Determination of Generation Tariff in respect of 100.008 MWp Solar Power Project** [Case # NEPRA/TRF-538/SECL-2020]

Dear Sir,

Please find enclosed herewith the subject Determination of the Authority along with Annexure-I & II (24 pages) in Case No. NEPRA/TRF-538/SECL-2020.

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. The Order part along with Annexure-I & II of the Authority's Determination are to be notified in the official Gazette.

Enclosure: As above

29.11.21
(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, 'Q' Block, Pak Secretariat, Islamabad.

DETERMINATION OF NATIONAL ELECTRIC POWER REGULATORY AUTHORITY IN THE MATTER OF TARIFF PETITION FILED BY SIACHEN ENERGY LIMITED FOR DETERMINATION OF GENERATION TARIFF IN RESPECT OF 100.008 MWp SOLAR POWER PROJECT

1. Siachen Energy Limited (hereinafter referred to as the "SEL" or "the petitioner" or the company/project company") filed a tariff petition vide letter dated June 25, 2020 before National Electric Power Regulatory Authority ("NEPRA" or "the Authority") under the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 ("NEPRA Act") and NEPRA (Tariff Standards & Procedure) Rules, 1998 ("Tariff Rules") for determination of generation tariff in respect of its 100.008 MWp solar PV power project (" the Project") to be set up at Taluka Mirpur Sakro, Gharo, District Thatta, Sindh. The petitioner requested for the approval of levelized tariff of US Cents 4.4632/kWh (Rs. 7.4746/kWh) over the tariff control period of 25 years.

2. The petitioner submitted that it is a company incorporated to setup the Project and registered with Securities and Exchange Commission of Pakistan ("SECP") vide incorporation certificate dated June 1, 2015. Letter of Intent ("LOI") was issued by Directorate of Alternative Energy, Government of Sindh ("GOS") on August 28, 2015 for establishing a 100 MW solar PV power project. On June 29, 2020, the validity of the said LOI was extended by GOS up to October 12, 2020.

3. The Generation License was issued by NEPRA to SEL on October 10, 2017. Subsequently, the company filed Licensee Proposed Modification ("LPM") on August 06, 2020 for change in technology. The Authority issued the decision on LPM on January 27, 2021.

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

Project Company	:	Siachen Energy Ltd.
Sponsor	:	Muhammad Sohail Shamsi
Capacity	:	100.008 MWp
Project Location	:	Taluka Mirpur Sakro, District Thatta, Sindh
Land Area	:	586 Acres
Concession Period	:	25 years from COD
PV Modules	:	Bifacial Mono PERC Module
Structures	:	Single Axis Tracking
Annual Plant Capacity Factor	:	22.96%
Annual Energy Production	:	201.130 GWh
Annual Degradation	:	0.5% of EPC Cost
Construction Period	:	10 months

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Project Cost		USD in Millions	
EPC Cost (including degradation)	:	67.989	
Non-EPC Cost	:	2.931	
Land Cost	:	2.500	
Insurance during Construction	:	0.272	
Financing Fee & Charges	:	1.496	
Interest during Construction	:	1.951	
Sinosure during Construction	:	0.372	
Total Project Cost	:	**77.511**	
Financing Structure	:	Debt: 80% : Equity: 20%	
Debt Composition	:	100% Foreign	
Interest Rate	:	6 month Libor (0.39450%) + Spread of 4%	
Repayment Period	:	14 years	
Return on Equity	:	14% IRR	
Annual O&M Cost	:	USD 13,515 per MW	
Insurance Cost	:	0.4% of EPC cost	
Tariff:		**PKR/kWh**	**US cents/kWh**
Levelized Tariff (Year 1-25)	:	**7.4746**	**4.4632**
Exchange Rate	:	1 USD = PKR 167.47	

5. The Authority considered the tariff petition and admitted the same for further processing. Post issuance of the LPM decision on January 27, 2021, the Authority decided to conduct hearing in the matter. Accordingly, Notice of Admission/Hearing containing salient features of the petition, hearing schedule and issues framed for hearing was published in two national daily newspapers on March 5, 2021. Through the said notice, NEPRA invited comments and intervention requests from the interested parties within seven (07) days of publication of notice. Tariff petition and Notice of Admission/Hearing were also hosted on NEPRA's website for information of general public. Individual Notices of hearing were also sent to the stakeholders, considered to be relevant, and the petitioner on March 9, 2021 for participation in the proceedings.

6. Following issues were framed for deliberation during the course of hearing:

- 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?

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- 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 claimed construction period is justified?
- Whether the project grid interconnection study is approved by the relevant organization(s)?
- Any other issue with the approval of the Authority

7. In response to Notice of Admission/Hearing, no comments or intervention request were received from any party. The hearing in the matter was held on March 17, 2021 (Wednesday) at 10:00 A.M. via Zoom, which was attended by the petitioner and other stakeholders. Later, during the proceedings of the case, the Authority decided to conduct another hearing on the following additional issues which were not considered during the earlier hearing held on March 17, 2021:

   - Whether the adjustment of Return on Equity component of tariff be made on quarterly or on annual basis?
   - Whether the adjustment of O&M component of tariff be made on quarterly or on annual basis?
   - Whether any compensation be allowed for pre-COD sale of energy?
   - What should be the treatment of income tax in light of the amendments made through Ordinance dated March 24, 2021?

8. Accordingly, Notice of Hearing containing additional issues were sent to the petitioner and relevant stakeholders on September 24, 2021 for participation in the proceedings. The hearing was held on October 4, 2021 (Monday) at 11:30 A.M via Zoom which was attended by the stakeholders including Central Power Purchasing Agency (Guarantee) Ltd. ("CPPAGL") and Alternative Energy Development Board ("AEDB"). However, the petitioner did not attend the hearing.

9. Post hearing, SEL vide letter No. SEL/NEPRA/TARIFF/2021-0018 dated October 5, 2021 submitted its response with respect to the additional issues. The issue wise submissions of the petitioner and other stakeholders followed by the Authority's findings and decision thereon are given in the following sections of this determination.

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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 67.989 million (including capitalized degradation) on account of Engineering, Procurement and Construction ("EPC") cost in its tariff petition. SEL informed that the impact of capitalized degradation of USD 2.547 million (3.62% of the EPC cost) has been made part of the claimed EPC cost. Subtracting the impact of degradation, the claimed EPC cost works out to be USD 65.442 million.

11. The petitioner has submitted copies of EPC contracts signed on May 29, 2020. The breakup of the EPC cost as provided in the EPC contracts is given hereunder:

EPC cost	USD (Million)
Supply Contract Price	53.780
Construction Contract Price	14.209
Total	**67.989**

12. The Supply Contract is signed on May 29, 2020 with Powerchina International Engineering Group Ltd. on lump sum fixed amount which includes cost of equipment, completion of the works and the remedying of any defects, as adjusted. The Construction Contract is signed on May 29, 2020 with Powerchina International Engineering Group Ltd. on total lump sum fixed amount payable to the Contractor for the design, execution, start-up, testing, commissioning, and completion of the works and the remedying of any defects, as adjusted.

13. The petitioner during hearing apprised the Authority that the EPC contractors were selected following the NEPRA (Selection of Engineering, Procurement and Construction Contractor by Independent Power Producers) Guidelines, 2017 ("EPC Guidelines, 2017"), however, the details (bidding documents etc.) were not submitted along with the petition. In this regard, NEPRA vide email communication dated June 14, 2021 directed the petitioner to provide a summary along with complete documents related to bidding process followed by the project company for the selection of the EPC Contractor. In response, the petitioner vide email submitted a copy of advertisement dated February 05, 2017 of Pre-Qualification Notice inviting quotations from EPC Contractors for the Project. SEL submitted that it gave advertisement in Gulf News for which three companies namely (i) China First Metallurgic Group Co Ltd., (ii) Power China Consortium and (iii) Zhuhai Singyes Green Building Technology Co Ltd. approached SEL. It submitted that the project company evaluated all the bidders according to the strict criteria set by SEL. Request for Proposal (RFP) was provided on March 30, 2017 to shortlisted two bidders. The company also submitted Bid Evaluation Report as per which Power China was qualified.

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14. SEL submitted that the Project was not able to proceed due to delays on part of AEDB, which was later called as a mistake. Due to that reason, the company was told to submit a new tariff petition by the honourable Authority. SEL submitted that during pandemic it was not possible for the project company to do the whole exercise again as everything in China and rest of the world was under strict lock down, therefore, it invited the bids from the same companies who had bid earlier, but unfortunately some of the suppliers did not take that seriously because of continuous delays in the Project. SEL submitted that the joint venture partners of the company namely Dan Solar and Kakay of Germany also left because of the delays. Stating above, SEL submitted that the project company negotiated the price with the previous winner i.e. Power China Consortium. Accordingly, the EPC contracts were executed with Power China Consortium as discussed in the preceding paragraphs.

15. SEL submitted that the claimed EPC cost is lesser than the previous EPC cost allowed to it in the last tariff Determination, i.e. USD 70.350 million. The petitioner apprised that the reason of lower EPC claim is the increased competition in the international solar market. Break-up of EPC cost as submitted by the petitioner in the tariff petition is as hereunder:

EPC Cost	USD (Million)	USD (Million/MW)
Module	26.000	0.260
Inverter	4.244	0.042
Mounting structure	10.678	0.107
Balance of Plant (Civil works, Cables, Transformers etc.)	27.067	0.271
Total EPC Cost	**67.989**	**0.680**

16. SEL in the petition and during the hearing submitted that in earlier tariff application, the company selected PV Module "Eagle 1500V-JKM345M-72-V" for the Project. For the subject petition, it has changed the design and selected Tier-1 PV Module "500 watt Bifacial Mono PERC Module". The petitioner stated that it shall install 200,016 pieces of 500Wp modules for the Project. SEL has stated the cost of new modules and related equipment at USD 26.0 million (USD 0.260 million/MW). Regarding inverters, SEL submitted that it has selected SG2500 HV type Inverters having system voltage of 1500V and the cost thereof is taken at USD 4.244 million. For mounting structure, SEL submitted that it has chosen single axis tracking technology over conventional fixed tilt system and has taken the cost of USD 10.678 million in this regard. Regarding Balance of Plant (Civil Works, Cables, Transformer etc.), SEL submitted that the cost of USD 27.067 million has been taken into account.

17. As stated above, the petitioner has not followed the EPC Guidelines, 2017 for selection of EPC contractor for the instant petition. The Authority noted that the tariff determinations of about fifteen (15) solar PV projects have been issued by NEPRA in last couple of years. Looking at the EPC costs approved in those determinations and prevailing prices of equipment, it is considered that the EPC

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cost claim of the petitioner is on the higher side. In view thereof, the Authority has decided to assess the EPC cost to be allowed to SEL and basis thereof is given in the following paragraph.

18. 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 approved recently for other comparable projects were also checked. It has been noted that the average prices of solar modules of different types and brands had gone as low as USD 0.18 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 had been a decline of more than 50% in the cost of modules in three years' time. This trend was intact till end of 2020, however, it has been noted that the solar module prices has been increasing since the start of the year 2021 and has reached at the level of USD 0.230-0.240 million per MW. 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 USD 0.107 million per MW for single axis tracking has been claimed, which is considered a good estimate. 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. The cost of civil works and electrical balance of plant equipment have been taken into account 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 SEL as USD 0.5744 million per MW (USD 57.440 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.

19. The petitioner has claimed USD 9.522 million on account of Non-EPC cost. The petitioner requested the Authority to consider the additional development costs considering the challenges the company has been facing to keep the Project viable despite all the adversaries, the delays in decisions from the regulatory agencies, inflationary pressures, and the increasing exchange rates. The break-up of Non-EPC cost components as provided by the petitioner is as follows:

Non-EPC cost	USD (Million)
Pre-COD Insurance	0.272
Project Development Cost	2.931
Land Cost	2.500

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Financing Fee & Charges	1.496
Sinosure during Construction	0.372
Interest during Construction	1.951
Total	**9.522**

Pre- COD Insurance

20. The petitioner has claimed USD 0.272 million on account of pre-COD insurance cost. The petitioner submitted that in its previous tariff determination dated November 19, 2018, the Authority allowed insurance during construction at the rate of 0.5% of approved EPC cost and requested the same for subject case as well.

21. The Authority has noted that NEPRA (Benchmarks for Tariff Determination) Guidelines, 2018 ("Benchmarking Guidelines, 2018") 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 of solar PV 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 SEL. On this basis, the amount being approved under this head works out to be around USD 0.230 million.

Project Development Cost

22. The petitioner has submitted following break-up of Project Development Cost ("PDC") in the tariff petition:

Project Development Cost	USD (Million)
Administrative Cost	0.500
Consultancy Costs & Technical Studies- Pre-Financial Close	0.892
Independent Engineer- Pursuant to the EPA	0.055
Regulatory/Legal Fees	0.500
Site Development	0.484
Travelling Costs	0.500
Others (Office Equipment/Office Expenses)	-
Total Project Development Cost	**2.931**

23. In its petition and during the hearing, the petitioner gave detailed justification of its claim of each cost item. It is noted that the Authority had earlier allowed USD 1.443 million to SEL while fixing the same

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in terms of PKR using the exchange rate of Rs. 120/USD, i.e. Rs. 173.16 million was approved. In the subject petition, the PDC of around USD 2.931 million has been claimed by the petitioner stating the reason of prolonged development period owing to no fault of the project company. The Authority considered the revised claim of PDC as submitted by the project company while comparing it with the PDC which has been allowed in the comparable solar power projects of similar sizes. The factors such as PKR devaluation, local inflation, prolong development period have also been considered. Taking into account these details, the Authority has decided to allow USD 1.668 million (Rs. 264 million) to SEL. This amount is being approved on lump sum basis, i.e. the cost incurred on individual heads of PDC may change but should not exceed the overall amount.

Land Cost

24. It was noted that GOS in its LOI dated August 28, 2015 confirmed that SEL has proposed to develop the project on its own land. SEL has claimed USD 2.500 million on account of land cost. The petitioner submitted that earlier the Authority determined the value of Project's land at Rs. 16.170 million. According to SEL, the earlier allowed cost of land was unjustified and not realistic for a land measuring 586 acres at prime location in District Thatta. SEL also stated that the earlier approved land cost was even much less than the prevailing rental rates in that area. The petitioner requested the Authority to determine the value of land fairly considering (i) land cost of USD 1.190 million allowed to Gharo Solar Ltd. in 2018, (ii) SEL has been holding land for approximately 4 years owing to delays in Project's approvals by the concerned authorities, (iii) GOS land lease rate of Rs. 288,000 per acre plus land commercialization and registration expense.

25. During the proceedings, SEL submitted three Sale Deeds and two matching Rectification Deeds of the land. As per the submitted documents, Mrs. Uroosa Sohail Shamsi has sold her owned inherited morosi land of around 586 acres to SEL. The amount that has been charged in two Sale Deeds for the land of around 204 acres each is Rs. 56,10,000. Whereas the third Sale Deed for the land of around 179 acres has been signed for Rs. 49,50,000. Accordingly, the total sale value of the land comes out to be Rs.16.170 million, i.e. the amount earlier allowed to SEL.

26. In addition to aforesaid sale deeds, SEL also submitted a Valuation Report of land dated July 04, 2017 carried out by M/s Sadruddin Associates. The said valuation has been done for around 731 acres of land and provides that the worth of each acre of land is around Rs. 700,000 per acre. Net of forced sale value, the worth of each acre of land, as per the Valuation Report, works out to be Rs. 560,000 per acre.

27. Furthermore, SEL submitted a copy of an Agreement executed on July 26, 2017 with the land owner Mrs. Uroosa Sohail Shamsi. The said land Agreement, inter-alia, states that the land owner has sold 736 acres of land to SEL for a sale consideration of Rs. 511.916 million, being the value of the property, as determined by a Professional Evaluator. It is stated in the agreement that the parties agreed that the said sale consideration shall be treated as the amount lent by the Owner to the company which

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SEL undertakes to repay by issuing shares of the company in her name, within one year or on any earlier date on which the amount may become repayable pursuant to the agreement.

28. To assess this cost head, the Authority considered the cost of land allowed to other solar PV power projects. It was noted that in majority of the cases, the respective Provincial Governments have leased land on concessional rates to solar PV projects for the tariff control period. In their tariffs, the arrangements were approved such that the majority part of that lease cost is paid by the companies out of their approved O&M cost. In the case of Gharo Solar Limited, a 50 MW solar PV Project, the land was purchased from private party and the cost in lieu thereof was approved in the project cost.

29. Though approved earlier, the Authority however deliberated upon whether to approve the cost of land (when purchased by the project company) under the project cost or otherwise. As stated above, the land leased to project companies by the relevant Government are given yearly rental through O&M cost. Whereas the cost of land, when purchased by the project company, is made part of the project cost and the recovery thereof (70-80%) is made through debt servicing and the equity part (20-30%) is allowed specified return. The ownership of land, when purchased, remains with the companies whereas the cases where land is leased, the same is to be returned back to leaser. The companies, having land on lease, shall only have the residual value of the equipment to recover the equity amount (under Build Own Operate basis) whereas the companies procuring land shall also have the ownership of land despite given cost recovery thereof in the tariff. In view of these points, the Authority is of the considered view that the appropriate method of approving cost of land – when purchased by the power companies – is to allow the rental value of the same in the O&M component of the tariff. Therefore, the Authority has decided not to approve the claimed land cost in the project cost of SEL and the same has been included in the approved O&M cost, as explained in the relevant section of this determination.

Financing Fee and Charges

30. The petitioner has claimed financing fees and charges of USD 1.496 million in its petition. The Authority has noted that Benchmarking Guidelines, 2018 states the provision of financing fee & charges not exceeding 2% of the approved debt amount of the capital expenses (EPC, PDC, and Insurance during Construction). In accordance with the said benchmark, the Authority has decided to allow the captioned cost, inclusive of taxes, charges and/or duties, at the rate of 2% of approved debt portion of allowed capital expenses, to the petitioner. Accordingly, the amount being approved under this head works out to be around USD 0.949 million.

Interest during construction (IDC)

31. The petitioner submitted that Interest during Construction (IDC) has been calculated as USD 1.951 million based on 10 month construction period. The petitioner has stated following bases for IDC calculations:

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6 month LIBOR	0.39450%
Spread	4%
Total	**4.39450%**

32. 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 0.791 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.

Sinosure during Construction

33. The petitioner has claimed Sinosure during Construction of USD 0.372 million as an item of the project cost. SEL submitted that the spread on the finance to be obtained from China was previously determined at 3.5% along with Sinosure of 0.6% which is now changed. It submitted Industrial and Commercial Bank of China ("ICBC") has offered an interest rate of 6-Month LIBOR plus 4% spread along with sinosure fee.

34. The Authority has noted that it has been allowing export credit/Sinosure fee on foreign loan either by including that fee as a lump sum amount in the project cost or in form of annual payments. In the upfront tariffs, Sinsoure fee was approved as a lump sum amount as part of the project cost. Later, the Authority considering the fact that annual payment of Sinosure has a favourable impact on tariff had allowed that fee at the maximum rate of 0.6% on the respective yearly outstanding amount of foreign debt and interest. Based on above details, the Authority has decided to allow the Provision of Sinosure fee to the petitioner on its foreign financing which, if availed, shall be made part of the tariff at the time of COD. The said fee shall be allowed as annual payment to the maximum limit of 0.60% on the approved yearly debt servicing amount. It is to be noted that for financing with Sinosure, the spread/margin over LIBOR, being approved in this determination, 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).

35. Recapitulating above, the details of the approved project cost is given hereunder:

Project Cost	**USD (Million)**
EPC Cost	57.440
Project Development Cost	1.668
Insurance during Construction	0.230
Financing Fee & Charges	0.949

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Interest during Construction	0.791
Total	**61.078**

Whether the claimed O&M costs are justified? Whether the adjustment of O&M component of tariff be made on quarterly or on annual basis?

36. The petitioner has claimed O&M cost of USD 13,515 per MW per year (USD 1.351 million/year). 50% of the claimed O&M cost has been denominated in local currency and remaining part in foreign currency (USD). In support of its claim, the petitioner submitted Warranty Period O&M Agreement executed with HDEC Engineering (Pvt.) Ltd. on May 29, 2020 for provision of O&M services for the Project during the warranty period (24 months) of the Project. As per the O&M Agreement, the annual contract price is agreed for USD 11,000 per MW per year. Additionally, SEL submitted that the O&M cost (administration and others) of the company has been estimated to be around USD 0.251 million per annum which translates into about USD 2,500 per MW per year.

37. To evaluate this claim of SEL, the O&M cost being allowed in other parts of the world has been referred while keeping in view the local market conditions, required skilled manpower, spare parts, etc. The cost recently being claimed and allowed to other solar PV power projects has also been compared. In view thereof, the Authority has decided to approve the O&M cost of USD 0.900 million per year i.e. USD 9,000 per MW per year, including cost of land rentals, for SEL.

38. 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, i.e. 1.54 million per MW per annum (Rs. 170.95/USD) to the petitioner. Additionally, the Authority has decided that it may direct the petitioner to follow NEPRA (Selection of Operation and Maintenance Contractors by Generation Companies) Guidelines, 2021 issued vide S.R.O.210/2021 notification dated February 16, 2021, during any time of tariff control period for the provision of O&M cost.

39. SEL requested for quarterly adjustment in the approved O&M cost whereas CPPAGL supported the yearly indexation thereof. It is noted that major portion of the O&M cost of solar PV projects comprises of administration expenses which generally require increase on yearly basis. Further, it was noted that the Authority has recently approved the benchmark tariff for the competitive bidding for solar PV projects whereby the annual indexation has been approved. In view of these details, the Authority has decided to allow the indexation in the approved O&M cost on yearly basis. The mechanism of the said adjustment is given in the Order part of this determination.

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Whether the claimed insurance during operation is justified?

40. The petitioner has submitted that insurance during operation cost be allowed at the rate of 0.4% of EPC cost. The Authority noted that in the recently approved solar PV tariff determinations, insurance during operation at the rate of 0.4% of the approved EPC cost has been allowed. Benchmarking Guidelines, 2018 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, including all taxes/charges and/or duties, at the maximum limit of 0.4% of the approved EPC cost 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? Whether the adjustment of Return on Equity component of tariff be made on quarterly or on annual basis?

41. The petitioner in the tariff petition and during hearing requested the Authority that Return on Equity and Return on Equity during Construction (collectively referred to as "ROE") of 14% be allowed, as was approved in the earlier tariff determination.

42. The Authority has noted that in the most recent comparable tariff cases of renewable technologies, the Authority has decided to approve the tariff allowing ROE of 12%. Accordingly, the Authority has decided to allow ROE of 12% to SEL as well.

43. It is important to highlight here that the component of ROE have been computed and approved while taking into account the monthly cash flows such that annual ROE comes out as 12%.

44. It is to be noted that the approved ROE amount shall be the maximum limit of the annual equity return to be earned by the project company. The amount of ROE 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 under the relevant framework.

45. SEL in its response letter dated October 5, 2021 requested the Authority to approve quarterly indexation mechanism on ROE. CPPAGL during the hearing supported the annual indexation on the ROE component. The Authority is of the view that as annualized Return is being allowed, hence, adjustment thereon should be made on annual basis. Further, it was noted that the Authority has recently approved the benchmark tariff for the competitive bidding for solar PV projects whereby the annual indexation has been approved. In view of these details, the Authority has decided to allow the indexation in the approved ROE component on yearly basis. The mechanism of the said adjustment is given in the Order part of this determination.

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Whether the financing/debt terms are justified?

46. The petitioner has submitted that the Project is envisaged to be setup at debt to equity ratio of 80:20. The financing cost of 6-months LIBOR plus a margin of 4% has been claimed for a debt servicing tenor of fourteen years. In support of its claim, the petitioner submitted an Indicative Terms and Conditions document dated June 03, 2020 of Industrial and Commercial Bank of China Limited ("ICBC") along with the petition. The petitioner has sated following information regarding the financing cost:

Debt	80% (100% foreign)
Interest	6 month LIBOR (0.39450%) + spread of 4%
Repayment period	14 Years

47. The Authority has noted that Benchmarking Guidelines, 2018 provide that the debt to 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 80:20 debt to equity capital structure. The debt to equity ratio of 80:20 has also been approved by the Authority in the recently approved wind and solar tariff determinations. Therefore, the Authority has decided to compute and approve tariff of SEL using debt to equity ratio of 80:20 as claimed by the petitioner.

48. Benchmarking Guidelines, 2018 provide that for renewable energy projects availing foreign financing, the spread not exceeding 4.25% over LIBOR shall be allowed. The petitioner has claimed margin of 4% over LIBOR along with the provision of Sinsoure. As Sinosure fee is not being reflected in this tariff and only Provision therefor is being allowed, hence, the Authority has decided to compute the tariff of SEL at the financing cost of LIBOR (0.14575%) plus margin of 4.25%. In case the petitioner shall avail financing with Sinsoure then its tariff shall be adjusted at COD on financing cost as per the mechanism given in the Oder part of this determination.

49. The petitioner has claimed debt servicing period of fourteen years. The Authority in recently approved wind and solar tariff determinations has allowed foreign debt repayment period of not less than thirteen years. In view of approvals given in the recent tariff determinations, the Authority has decided to approve foreign debt repayment period of fourteen years as claimed by the petitioner.

Whether the claimed annual energy generation and corresponding plant capacity factor are reasonable and justified?

50. The petitioner has submitted following in the regard:

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Project Capacity	100 MWp
Annual Energy Generation	201.130 GWh
Net Annual Capacity Factor	22.96%

51. The petitioner explained in detail about the technology it has proposed to install for the project. The Authority has noted that it has approved the application of LPM of SEL for the proposed technology which addresses the matter with respect to technology.

52. For plant capacity factor, the Authority has considered the modules, inverters and other equipment as proposed by SEL with respect to their quality and energy yield. The energy simulation parameters as submitted by the petitioner has also been examined. The plant capacity factor that has been allowed for bifacial mono crystalline 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 slightly on lower side and decided to compute and approve the tariff of SEL on capacity factor of 23.20%. 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 annual energy produced beyond the approved annual capacity factor.

Whether the claimed construction period is justified?

53. The petitioner has claimed the construction period of ten months from financial close. The Authority has noted that in other similar scale solar PV projects, the construction period of 10 months has been allowed. Therefore, the Authority has decided to allow of ten months construction time to SEL as well.

Whether the project grid interconnection study is approved by the relevant organization(s)?

54. The petitioner has submitted approval of grid interconnection study by National Transmission and Despatch Company Limited ("NTDCL") for the Project dated May 24, 2017. SEL submitted that the said approval was also submitted earlier for previous determination. The Authority has noted that during the proceedings of the LPM as approved for SEL on January 27, 2021, the matter of interconnection of the Project has already been discussed and addressed. The Authority further noted that as per the NTDCL's Indicative Generation Capacity Expansion Plan ("IGCEP"), approved by NEPRA on September 24, 2021, SEL's Project has been listed as Committed Project to be commissioned in 2023. In view thereof, the Authority considers this issue settled.

Whether any compensation be allowed for pre-COD sale of energy?

55. The Authority noted that it has been allowing payment of certain percentage of the tariffs to solar PV projects with respect to electricity generated and supplied by these sources during the commissioning tests, i.e. before achieving COD. For thermal power projects (coal, gas and furnace oil), electricity

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generated during testing phase is generally allowed the payment of fuel cost component on the pretext that it is additional cost incurred by thermal projects which is not covered otherwise in the tariff. On contrary, total tariffs of solar PV projects are of fixed nature whereby the recovery of all the approved costs are ensured, and there is no incurrence of any additional cost during the testing phase. In view thereof, the Authority considers that it is not justified to allow for the payment of electricity supplied during the commissioning tests by solar PV projects and hereby decides that no compensation shall be paid to SEL in this regard.

What should be the treatment of income tax in light of the amendments made through Ordinance dated March 24, 2021?

56. This additional issue was framed in light of the amendments made through Ordinance dated March 24, 2021 whereby, inter alia, the income tax exemptions given to power generation projects were discontinued. The petitioner in its letter dated October 5, 2021 submitted that Income Tax Ordinance circulated on March 24, 2021 is applicable on the power projects given LOI after June, 2021 and not applicable on its Project as it was given LOI in 2015. CPPAGL stated that the income tax should be a pass through item for SEL. The Authority noted that exemption from income tax is allowed in the relevant policies under which power generation projects are developed. Likewise, the provision of income tax exemption has also been stated in the Renewable Energy Policy, 2006 under which SEL is being developed. Referring the provisions given in the relevant policies, NEPRA has been stating a term of income tax exemption in the tariffs of all power generation projects. However, in light of above amendments, the Authority hereby decides that the relevant Government entities shall deal this matter while signing concession agreements with SEL.

Degradation factor

57. The petitioner submitted that capitalized degradation of USD 2.547 million is included in the claimed EPC cost. 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 SEL's tariff. The Authority has decided to capitalize the impact of allowed degradation in the approved project cost. The amount of USD 2.079 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.

58. **ORDER**

In pursuance of section 7(3) (a) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 read with NEPRA (Tariff Standards & Procedure) Rules, 1998, the Authority hereby determines and approves the following generation tariff along with terms and conditions for Siachen Energy Limited (SEL) for its 100.008 MWp solar power project for delivery of electricity to the power purchaser:

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- Levelized tariff works out to be Rs. 5.1213/kWh (US Cents 3.2352/kWh).
- The tariff has been worked out on Build, Own and Operate basis.
- EPC Cost of USD 57.440 million has been approved.
- Project Development Cost of USD 1.668 million has been approved.
- Insurance during constriction at the rate of 0.4% of the allowed EPC cost has been approved.
- Financing Fee & Charges @ 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% foreign financing.
- The cost of debt of 3 month LIBOR (0.14575%) + spread (4.25%) has been used.
- Debt Repayment has been scheduled for 14 years from COD.
- ROE of 12% has been allowed.
- O&M Cost including land cost of USD 9,000 per MW per year has been allowed.
- Insurance during Operation has been calculated as 0.40% of the allowed EPC Cost.
- Construction period of 10 months has been allowed.
- Net Annual Plant Capacity Factor of 23.20% has been approved.
- Degradation factor of 0.5% per year has been approved. The financial impact of the allowed degradation of USD 2.079 million has been taken into account in the approved project cost.
- Reference Exchange Rate of 158.30 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	6.67%
Month 8	6.67%
Month 9	13.33%
Month 10	13.33%

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

A. One Time Adjustments at COD

- The EPC cost shall be adjusted at actual considering the approved amount as the maximum limit. Applicable foreign portion (to the extent of 80% of the approved EPC cost) will be adjusted at COD on account of variation in PKR/USD parity, on production of authentic documentary evidence to the satisfaction of the Authority. The adjustment in approved EPC cost shall be made only for the currency fluctuation against the reference parity values.

- PDC, 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 using the reference PKR/USD rate of 158.30 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.

- 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 ten months allowed by the Authority. The IDC shall also be allowed adjustment for change in applicable LIBOR.

- 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%.

- 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) for the project construction period of ten months allowed by the Authority.

B. Indexations

Adjustment of O&M and ROE shall be made on annual basis starting from 1st July every year. Adjustment of Debt Servicing Component shall be made on quarterly/bi-annual basis. Insurance component shall be adjusted on annual basis starting from either 1st January or 1st July every year. The indexation mechanisms are given hereunder:

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i) **Operation and Maintenance Costs**

O&M component of tariff shall be adjusted based on revised rates of local Inflation (N-CPI) as notified by Pakistan Bureau of Statistics according to the following formula;

$O\&M_{(REV)}$	=	$O\&M_{(REF)} * N\text{-}CPI_{(REV)} / N\text{-}CPI_{(REF)}$
Where;		
$O\&M_{(REV)}$	=	The revised O&M Local Component of Tariff
$O\&M_{(REF)}$	=	The reference O&M Local Component of Tariff
$N\text{-}CPI_{(REV)}$	=	The revised N-CPI (General)
$N\text{-}CPI_{(REF)}$	=	The reference N-CPI (General) of 145.24 for the month of May, 2021

Note: The reference index of N-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 N-CPI value for the month of May prior to the date of COD shall be considered. Thereafter, the N-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
$P_{(Ref)}$	=	Reference premium @ 0.4% of approved EPC Cost at Rs. 158.30/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

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

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iii) **Return on Equity**

The ROE component of the tariff will be adjusted on annual basis on account of change in PKR/USD 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 on 30th of June of preceding financial year, as notified by the National Bank of Pakistan
$ER_{(Ref)}$	=	The reference TT & OD selling rate of Rs. 158.30/USD

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

iv) **Indexations applicable to Debt**

The debt servicing component of foreign loan will be adjusted on quarterly/bi-annually 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 quarter/bi-annual period, over the applicable reference exchange rate.

v) **Variations in LIBOR**

The interest part of tariff component for the foreign shall be allowed the adjustment due to change in interest rate as a result of variation in LIBOR according to the following formula:

ΔI	=	$P_{(REV)} * (LIBOR_{(REV)} - 0.14575\%) / 4$
Where;		
ΔI	=	The variation in interest charges applicable corresponding to variation in 3 month LIBOR. ΔI can be positive or negative depending upon whether 3 month $LIBOR_{(REV)}$ per annum > or < 0.14575%. The interest payment obligation will be enhanced or reduced to the extent of ΔI for each quarter under adjustment.

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$P_{(REV)}$	=	The outstanding principal (as indicated in the attached debt service schedule to this order), at the relevant quarterly calculations date. Quarter 1 shall commence on the commercial operations date (i.e. the first figure will be used for the purposes of calculation of interest for the first quarter after commercial operations date).
$LIBOR_{(Rev)}$	=	Revised 3 month LIBOR as at the last day of the preceding quarter

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

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 23.20% net annual plant capacity factor. Net annual energy generation supplied to the power purchaser in a year, in excess of 23.20% 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 23.20% to 23.5%	-
Above 23.5% to 24.25%	10%
Above 24.25% to 25.0%	20%
Above 25.0% to 25.75%	30%
Above 25.75%	40%

- The risk of solar resource shall be borne by the power producer.
- The maximum plant capacity shall not exceed from 100.008 MW.
- 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 directed to ensure that all the equipment is installed as per the details/specifications given in the latest generation license/tariff as awarded by NEPRA.

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- In case the company shall secure full or part of local commercial loan then the tariff of company shall be computed/adjusted at the time of COD at applicable KIBOR + spread of 2.25%. The savings in the approved spreads anytime 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.
- For full or part of foreign commercial loan, the savings in the approved spreads any time during the loan tenor shall be shared between the power purchaser and power producer in the ratio of 60:40.
- 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 changes in the approved O&M cost while capping the allowed prevailing level, which shall be governed under NEPRA (Selection of Operation and Maintenance Contractors by Generation Companies) Guidelines, 2021.
- In case the company earns annual profit in excess of the approved ROE, then that extra amount shall be shared between the power producer and consumers through claw back formula to be decided by the Authority through the relevant framework. 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.
- The company will have to achieve financial close within one year from the date of issuance of this tariff determination. The tariff granted to the company will no longer remain applicable/valid, if financial close is not achieved by the company 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 ten 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 ten months will not invalidate the tariff granted to it.
- No compensation for Pre COD sale of electricity is to be allowed to the power producer.
- Withholding tax on dividend shall not be a pass through item.
- 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.

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59. The Order part along with two 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

(Rehmatullah Baloch)
Member

24/11/21
(Engr. Maqsood Anwar Khan)
Member

(Rafique Ahmad Shaikh)
Member/Vice Chairman

(Tauseef H. Farooqi)
Chairman

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29.11.21

Annex-I

SIACHEN ENERGY LIMITED
REFERENCE TARIFF TABLE

Year	O&M Local	Insurance	Return on Equity	ROEDC	Loan Repayment	Interest Charges	Tariff
	Rs. / kWh	Rs. / kWh	Rs. / kWh	Rs. / kWh	Rs. / kWh	Rs. / kWh	Rs. / kWh
1	0.7010	0.1789	1.1202	0.0544	2.0831	1.6958	5.8334
2	0.7010	0.1789	1.1202	0.0544	2.1761	1.6027	5.8334
3	0.7010	0.1789	1.1202	0.0544	2.2734	1.5054	5.8334
4	0.7010	0.1789	1.1202	0.0544	2.3750	1.4039	5.8334
5	0.7010	0.1789	1.1202	0.0544	2.4811	1.2977	5.8334
6	0.7010	0.1789	1.1202	0.0544	2.5920	1.1868	5.8334
7	0.7010	0.1789	1.1202	0.0544	2.7078	1.0710	5.8334
8	0.7010	0.1789	1.1202	0.0544	2.8288	0.9500	5.8334
9	0.7010	0.1789	1.1202	0.0544	2.9552	0.8236	5.8334
10	0.7010	0.1789	1.1202	0.0544	3.0873	0.6915	5.8334
11	0.7010	0.1789	1.1202	0.0544	3.2253	0.5536	5.8334
12	0.7010	0.1789	1.1202	0.0544	3.3694	0.4094	5.8334
13	0.7010	0.1789	1.1202	0.0544	3.5199	0.2589	5.8334
14	0.7010	0.1789	1.1202	0.0544	3.6772	0.1016	5.8334
15	0.7010	0.1789	1.1202	0.0544	-	-	2.0545
16	0.7010	0.1789	1.1202	0.0544	-	-	2.0545
17	0.7010	0.1789	1.1202	0.0544	-	-	2.0545
18	0.7010	0.1789	1.1202	0.0544	-	-	2.0545
19	0.7010	0.1789	1.1202	0.0544	-	-	2.0545
20	0.7010	0.1789	1.1202	0.0544	-	-	2.0545
21	0.7010	0.1789	1.1202	0.0544	-	-	2.0545
22	0.7010	0.1789	1.1202	0.0544	-	-	2.0545
23	0.7010	0.1789	1.1202	0.0544	-	-	2.0545
24	0.7010	0.1789	1.1202	0.0544	-	-	2.0545
25	0.7010	0.1789	1.1202	0.0544	-	-	2.0545
							-
Levelized Tariff	**0.7010**	**0.1789**	**1.1202**	**0.0544**	**2.1340**	**0.9328**	**5.1213**

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Annex-II

SIACHEN ENERGY LIMITED
DEBT SERVICING SCHEDULE

Relevant Quarters	Base amount (USD)	Principal Repayment (USD)	Interest (USD)	Balance Principal (USD)	Total Debt Service (USD Million)	Annual Principal Repayment Rs./kWh	Annual Interest Rs./kWh
1	50,525,247	657,709	555,241	49,867,538	1,212,950	2.0831	1.6958
2	49,867,538	664,937	548,013	49,202,602	1,212,950		
3	49,202,602	672,244	540,706	48,530,358	1,212,950		
4	48,530,358	679,631	533,318	47,850,726	1,212,950		
5	47,850,726	687,100	525,850	47,163,626	1,212,950	2.1761	1.6027
6	47,163,626	694,651	518,299	46,468,975	1,212,950		
7	46,468,975	702,285	510,665	45,766,690	1,212,950		
8	45,766,690	710,002	502,947	45,056,688	1,212,950		
9	45,056,688	717,805	495,145	44,338,883	1,212,950	2.2734	1.5054
10	44,338,883	725,693	487,257	43,613,190	1,212,950		
11	43,613,190	733,668	479,282	42,879,522	1,212,950		
12	42,879,522	741,731	471,219	42,137,791	1,212,950		
13	42,137,791	749,882	463,068	41,387,910	1,212,950	2.3750	1.4039
14	41,387,910	758,122	454,827	40,629,787	1,212,950		
15	40,629,787	766,454	446,496	39,863,333	1,212,950		
16	39,863,333	774,877	438,073	39,088,457	1,212,950		
17	39,088,457	783,392	429,558	38,305,065	1,212,950	2.4811	1.2977
18	38,305,065	792,001	420,949	37,513,064	1,212,950		
19	37,513,064	800,705	412,245	36,712,359	1,212,950		
20	36,712,359	809,504	403,446	35,902,855	1,212,950		
21	35,902,855	818,400	394,550	35,084,455	1,212,950	2.5920	1.1868
22	35,084,455	827,394	385,556	34,257,062	1,212,950		
23	34,257,062	836,486	376,464	33,420,576	1,212,950		
24	33,420,576	845,679	367,271	32,574,897	1,212,950		
25	32,574,897	854,972	357,978	31,719,925	1,212,950	2.7078	1.0710
26	31,719,925	864,368	348,582	30,855,558	1,212,950		
27	30,855,558	873,866	339,083	29,981,691	1,212,950		
28	29,981,691	883,470	329,480	29,098,222	1,212,950		
29	29,098,222	893,178	319,771	28,205,043	1,212,950	2.8288	0.9500
30	28,205,043	902,994	309,956	27,302,049	1,212,950		
31	27,302,049	912,917	300,032	26,389,132	1,212,950		
32	26,389,132	922,950	290,000	25,466,182	1,212,950		
33	25,466,182	933,092	279,857	24,533,090	1,212,950	2.9552	0.8236
34	24,533,090	943,346	269,603	23,589,743	1,212,950		
35	23,589,743	953,713	259,237	22,636,030	1,212,950		
36	22,636,030	964,194	248,756	21,671,836	1,212,950		
37	21,671,836	974,790	238,160	20,697,047	1,212,950	3.0873	0.6915
38	20,697,047	985,502	227,448	19,711,544	1,212,950		
39	19,711,544	996,332	216,618	18,715,212	1,212,950		
40	18,715,212	1,007,281	205,668	17,707,931	1,212,950		
41	17,707,931	1,018,351	194,599	16,689,580	1,212,950	3.2253	0.5536
42	16,689,580	1,029,542	183,408	15,660,039	1,212,950		
43	15,660,039	1,040,856	172,094	14,619,183	1,212,950		
44	14,619,183	1,052,294	160,656	13,566,889	1,212,950		
45	13,566,889	1,063,858	149,092	12,503,031	1,212,950	3.3694	0.4094
46	12,503,031	1,075,549	137,400	11,427,482	1,212,950		
47	11,427,482	1,087,369	125,581	10,340,113	1,212,950		
48	10,340,113	1,099,318	113,631	9,240,794	1,212,950		
49	9,240,794	1,111,399	101,551	8,129,395	1,212,950	3.5199	0.2589
50	8,129,395	1,123,613	89,337	7,005,782	1,212,950		
51	7,005,782	1,135,961	76,989	5,869,822	1,212,950		
52	5,869,822	1,148,444	64,506	4,721,378	1,212,950		
53	4,721,378	1,161,065	51,885	3,560,313	1,212,950	3.6772	0.1016
54	3,560,313	1,173,824	39,126	2,386,489	1,212,950		
55	2,386,489	1,186,724	26,226	1,199,765	1,212,950		
56	1,199,765	1,199,765	13,185	(0)	1,212,950		

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