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PART II

Statutory Notifications (S. R. O.)

GOVERNMENT OF PAKISTAN
NATIONAL ELECTRIC POWER REGULATORY AUTHORITY

NOTIFICATION

Islamabad, the 21st October, 2022

S. R. O. 1952(I)/2022.—In pursuance of Sub-Section 7 of Section 31 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (XL of 1997), NEPRA hereby notifies the Determination of National Electric Power Regulatory Authority in the matter of Tariff Petition filed by M/s. Zorlu Solar Pakistan Limited for Determination of Reference Generation Tariff in respect of 100 MWp Solar Power Project in Case No. NEPRA/TRF-552/ZSPL-2021.

2. While effecting the Determination, the concerned entities including Central Power Purchasing Agency Guarantee Limited (CPPAGL) shall keep in view and strictly comply with the orders of the courts notwithstanding this Decision.

[No. NEPRA/TRF-552/20708-10.]

SYED SAFEER HUSSAIN,
Registrar.

4627 (1—26)
Price : Rs. 40.00

[9594 (2022)/Ex. Gaz.]



Determination of the Authority in the matter of Tariff Petition filed by
Zorlu Solar Pakistan Ltd.

**DETERMINATION OF NATIONAL ELECTRIC POWER REGULATORY AUTHORITY IN THE MATTER OF TARIFF
PETITION FILED BY M/S ZORLU SOLAR PAKISTAN LIMITED FOR DETERMINATION OF REFERENCE
GENERATION TARIFF IN RESPECT OF 100 MWp SOLAR POWER PROJECT**

1. M/s Zorlu Solar Pakistan Limited ("ZSPL" or "Zorlu" or "the petitioner" or "the company") filed a tariff petition ("the Petition") before National Electric Power Regulatory Authority ("NEPRA" or "the Authority") on February 22, 2022 for determination of generation tariff in respect of its 100 MWp solar power project ("the Project") to be set up at Qalad-e-Azam Solar Power Park (Extension), Lal Sohanra, District Bahawalpur, Punjab. Later, ZSPL on February 28, 2022 revised the Petition stating that there was an error in the calculation of the reference tariff in the earlier filing. The Petition was filed by ZSPL under the Regulation for Generation, Transmission and Distribution of Electric Power Act, 1997 ("the NEPRA Act") and NEPRA (Tariff Standards & Procedure) Rules, 1998 ("Tariff Rules"). The petitioner has requested for the approval of levelized tariff of US Cents 4.0701/kWh (Rs. 7.1268/kWh) over the tariff control period of 25 years.
2. ZSPL submitted that earlier it was awarded tariff for the Project vide determination of the Authority issued on January 15, 2020, whereby levelized tariff of US Cents 3.779/kWh was approved. The petitioner submitted that following issuance of the above tariff determination, it continued to work on development and financing of the Project in order to achieve Financial Close ("FC"). However, due to (i) Covid-19 Pandemic, (ii) non-issuance of Letter of Support ("LOS") by Alternative Energy Development Board ("AEDB") and (iii) changes in solar panel technology i.e. stoppage of mass production of 365 Wp modules, the company could not achieve FC as per the given timeline of one year, and the tariff lapsed.
3. Zorlu submitted that upon Authority's directions, it has changed the technology of the Project from mono facial modules with fixed tilt system to bifacial modules with tracking structures. It informed that the Authority has approved the Modification in its Generation License on aforesaid technology vide decision issued on January 07, 2022.
4. The company submitted that as per the Alternative & Renewable Energy Policy 2019 ("ARE Policy, 2019"), notwithstanding the expiry of the Policy for Development of Renewable Energy for Power Generation, 2006 ("RE Policy, 2006"), the projects granted Letters of Intent ("LOI")/LOS under the RE Policy, 2006 before its expiry, shall continue to be governed under the Cabinet Committee on Energy's ("CCOE") decision in case number CCE-12/04/2019(V) (as amended from time to time) and shall be dealt with accordingly. Zorlu submitted the Project is included in the Category-II of the above CCOE decision, therefore, it shall be implemented pursuant to the RE Policy, 2006 under the cost plus tariff regime (Tariff Rules). Further, ZSPL submitted that the Project has been included as Committed Project in the Indicative Generation Capacity Expansion Plan ("IGCEP") as approved by the Authority on 24th September, 2021.





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5. ZSPL explained that the Petition is filed on the basis that the expiry of earlier tariff determination was due to the reasons not attributable to the company, and therefore only contains information relating to the aspects of the Project which are either (i) impacted by the change in technology, (ii) change in international commodity prices and transportation (iii) more advantageous for the consumers. The petitioner informed that all other information (project approvals, LOI/LOS, land, environment and interconnection, EPC contracts, debt and equity funding etc.) is as contained in the previous tariff petition dated May 28, 2019 and in the determination dated January 15, 2020 be read as if incorporated in full in the instant Petition.
6. The summary of the key information as provided in the Petition is as follows:

Project Company	:	Zorlu Solar Pakistan Ltd.
Capacity	:	100 MWp
Project Location	:	Quaid-e-Azam Solar Park (Extension), Ial Sohanra, Bahawalpur, Punjab
Land Area	:	500 Acres
PV Modules	:	Bifacial Modules 640-645 Wp
Tracking	:	Single Axis
Construction Period	:	10 months
Annual Energy Production	:	201.218 GWh
Plant Capacity Factor	:	22.97%
Project cost:		(USD million)
EPC Cost	:	68.610
Capitalized Degradation	:	2.484
Non EPC	:	2.100
Pre COD Insurance Cost	:	0.274
Financing Charges	:	1.136
Interest during Construction	:	0.980
Total	:	75.584
Financing Structure	:	Debt: 80% : Equity: 20%
Debt Composition	:	100% Foreign Loan
Interest Rate	:	LIBOR (0.3663%) + Spread (4.25%)





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Debt Repayment	:	14 years
Return on Equity	:	14%
Annual O&M Cost	:	USD 9,000 per MW
Insurance during Operations	:	0.4% of the EPC Cost
Tariff:		Rs./kWh US Cents/kWh
Levelized	:	7.1268 4.0701
Exchange rate	:	1 USD = PKR 175.10

7. The Authority admitted the Petition and decided to hold a hearing in the matter. Notice of Admission & Hearing was published in the daily national newspapers on May 28, 2022 stating the hearing date as June 14, 2022 at 10:00 A.M, while also providing salient features of the Petition, Issues framed for hearing and invitation to file comments/intervention request from the interested parties. Subsequently, a Corrigendum of the above Notice was published in the newspapers on June 03, 2022. Individual Notices of hearing were sent to the stakeholders, considered relevant by NEPRA, and the petitioner on June 03, 2022 for participation in the hearing. The Petition and Notice of Admission & Hearing were also hosted on NEPRA's website for information of general public.
8. Following are the issues which were framed by the Authority for the hearing:
- Being in category-I of the decision of Cabinet Committee on Energy, Zorlu Solar was given tariff under cost plus regime on January 15, 2020, which had lapsed on January 14, 2021. Whether the above categorization of ZSPL merits the determination of its tariff under cost plus regime again or otherwise?
 - Whether the claimed tariff, which is higher than the tariff approved earlier through determination dated January 15, 2020, is justified viewing that the previous tariff lapsed due to non-achievement of milestones by the petitioner?
 - Whether the claimed EPC cost is competitive, comparative and based on the firm and final agreement(s)?
 - Whether the NEPRA (Selection of EPC Contractor by IPPs) Guidelines, 2017 have been fully complied with?
 - Whether the claimed Non-EPC cost is justified?
 - Whether the NEPRA (Selection of O&M Contractor) Guideline, 2021 have been fully complied with?





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- 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?
 - Whether the claimed insurance during operation cost is justified?
 - 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?
 - 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?
 - Whether the claimed construction period is justified?
 - Whether the project grid interconnection study has been approved by the relevant organization(s)?
 - 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 Finance Bill, 2021?
 - Any other issue with the approval of the Authority
9. The hearing was held on June 08, 2022 (Wednesday) which was attended by a number of participants including the petitioner, representatives of Punjab Power Development Board ("PPDB"), Central Power Purchasing Agency Guarantee Limited ("CPPAGL") and other stakeholders. Post hearing, comments were received from PPDB on June 07, 2022 and Zhenfa Pakistan New Energy Company (Private) Limited ("ZPNECPL") on June 16, 2022.
10. PPDB submitted that NEPRA granted Licensee Proposed Modification ("LPM") in Generation License of Zorlu on January 07, 2022, based on single-axis tracking with bi-facial mono crystalline PV panels. It submitted that its Panel of Experts have approved revised feasibility of the Project based on above technology. PPDB also submitted that the confirmation of grid availability to the Project was provided by NTDCL in March, 2020 and re-confirmation of power purchase consent to the Project was provided by CPPAGL in May, 2020. Further, the extension was accorded by Environmental Protection Agency in September, 2020 to the Project for further three years, i.e. till May 2023. In view of the above, PPDB submitted that it supports ZSPL for the tariff determination.





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11. ZPNECPL submitted that (i) Zorlu be given the Return on Equity ("ROE") of 14% instead of 12% (approved by NEPRA in case of Siachen Energy) with quarterly indexation due to change in PKR value against USD to make it bankable, (ii) the impact of price increase in modules and other equipment in last couple of years be given due consideration, (iii) sharing of tariff between power producer and purchaser with respect to bonus energy be balanced instead of being more inclined towards power purchaser, (iv) the project size may be written in approximate which can benefit the CPPAGL in shape of free units, (v) to lock the grid equipment specifications prevailing at the time of tariff determination enabling the project companies to meet the construction period timelines.
12. The issue wise submissions of the petitioner and the Authority's findings and decision thereon are as under:-

Being in category-II of the decision of Cabinet Committee on Energy (CCOE), Zorlu Solar was given tariff under cost plus regime on January 15, 2020, which had lapsed on January 14, 2021. Whether the above categorization of Zorlu Solar merits the determination of its tariff under cost plus regime again or otherwise?
13. The Project is placed in the list of Category II (LOI Stage) of CCOE's decision dated April 04, 2019. The decision of CCOE states the following in this regard:

"All those projects which have been granted LOIs and have been granted tariff by NEPRA and issued a generation license will be allowed to proceed ahead towards the achievement of their requisite milestones as per RE Policy 2006. However, if the tariff validity period has elapsed, NEPRA will be requested for review for the same to make it consistent with the current market environment and consumer interest. Such review will include appropriate time extension to reach financial closing."

And
"Projects that are going back for review of tariff, will be asked to submit their applications on the basis of latest technology and technology related factors"
14. In accordance with the above mentioned CCOE decision, the tariff for ZSPL was determined by the Authority on January 15, 2020 which has lapsed on January 14, 2021. The instant matter is the 2nd tariff petition which has been filed by ZSPL, post issuance of aforesaid CCOE decision. This issue was framed to find out that whether the CCOE decision allows tariff determination of any project under cost plus regime 2nd time also or it should participate in the competitive bidding as envisaged for the projects falling under category-III of the above CCOE decision.
15. The petitioner vide email communication dated June 13, 2022 submitted that earlier tariff determined by Authority under cost plus regime had lapsed, due to reasons not attributable to ZSPL. The solar modules approved by the Authority in previous determination have become obsolete and not available in the market.





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ZSPL also mentioned that the said period between January 15, 2020 and January 14, 2021 are the peak periods of restrictions due to global pandemic of Covid-19 restricting the movement of people and materials. Further, the petitioner requested to note that the Project is included in the IGCEP, 2021 as approved by Authority, based on the assumption that it is considered as Category-II project.

16. The Authority considered the decision of the CCOE dated April 4, 2019 and has decided to determine tariff in the instant matter. However, the Authority has noted that determination of tariff for the projects falling in category-II of the CCOE decision cannot be repeated for unlimited number of times. Therefore, the Authority has decided that the instant case is to be the last tariff being determined for ZSPL under the cost plus regime. In case the ZSPL would not be able to achieve the FC milestone given in instant tariff determination, it shall then have to participate in the competitive bidding for the approval of tariff from NEPRA.
17. With respect to latest technology, the Authority has noted that the Petition has been filed on the technology as approved by the Authority through LPM decision issued on January 07, 2022 - based on bifacial modules and singles axis trackers - as against mono facial modules with fixed tracking as approved by the Authority in the earlier tariff determination. The capacity factor of 22.97% has been claimed in the Petition as against ~19.75% approved in the earlier tariff determination. The Authority is of the view that the above information satisfies the condition of latest technology given in the above CCOE decision.

Whether the claimed tariff, which is higher than the tariff approved earlier through determination dated January 15, 2020, is justified viewing that the previous tariff lapsed due to non-achievement of milestones by the petitioner?

18. In the last tariff determination, ZSPL was allowed levelized tariff of US Cents 3.7739/kWh. In the instant Petition, the levelized tariff of US cents 4.0701/kWh has been claimed by ZSPL.
19. In this regard, the petitioner vide email communication dated June 13, 2022 reiterated that the lapse of tariff is due to the reasons, not attributable to the company. That is, the non-achievement of FC was attributed by ZSPL to delays caused by the Government Agencies, COVID-19 Pandemic and stoppage of mass production of 365Wp modules. The increase in the tariff compared to previous tariff has been associated by ZSPL with the increase in global energy and commodity prices. Zorlu submitted that considering the substantial increase in commodity prices (within a range of 50% to 600% for some items), approximately 8% increase in levelized tariff from US Cent 3.77/kWh to US Cents 4.07/kWh practically equates to a lower tariff.
20. The Authority has noted that in the month of February, 2020, four other solar PV projects (category-II) were given tariff by NEPRA while prescribing the time of one year to achieve FC. One of the solar PV project





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(ZPENCPL) achieved the FC on time and currently is in operation. The other three solar PV projects (HNDS, Meridian, Helios) have also achieved FC as per the given time. Therefore, the arguments with respect to delays by Government Agencies and COVID-19 Pandemic, which are applicable in the case of ZSPL only, may not be considered maintainable. With regards to the submission of stoppage of mass production of 365Wp modules, the Authority is of the view that the said technology was proposed by ZSPL itself, therefore, the obligation of ensuring the availability lies on the project company. Therefore, the Authority is of the considered view that the arguments put forth by Zorlu are not convincing for the claim of higher tariff. In the instant determination, the Authority has assessed the technical and financial parameters based on the technology approved in the LPM decision issued on January 07, 2022. However, it is been ensured that the tariff approved in this determination should not exceed from the tariff approved in the previous determination, on the basis of the same terms of financing (LIBOR value) and ROE as was approved in the previous tariff determination.

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?

21. The petitioner has claimed USD 0.6861 million/MW (USD 68.610 million) on account of Engineering Procurement and Construction ("EPC") cost. The Authority noted that an additional cost of USD 19.260 million has been claimed by the petitioner. In the earlier tariff determination of ZSPL, the EPC cost of USD 49.350 million was allowed to ZSPL.
22. The petitioner has submitted that higher EPC cost is being claimed due to (i) change in technology and resultant change in design of the Project and (ii) change in equipment prices and transportation cost globally. The petitioner submitted the following break-up of impact of additional cost of EPC as claimed in the Petition:

S.No	Cost Item	Additional Cost (USD Million)
1.	Solar Module	7.000
2.	Inverters	0.000
3.	Mounting Structures	5.500
4.	Balance of Plant	6.760
	Module Installation	(0.075)
	Foundation Works	1.585
	Extra Cleaning and Levelling	0.750
	Electrical Works/Cabling	2.200
	Transportation	2.300
	Total Increase in EPC Cost	19.26





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23. The detailed justifications were submitted by the petitioner for the above additional claim of the EPC cost. ZSPL highlighted that the claimed increase is partially linked to change in technology and in part associated to change in prices of equipment, materials and transportation. Additionally, Zorlu also explained that certain cost already incurred by the company being also claimed due to change in technology, as shift of technology is made on the directions of the Authority. The details (supported by data) with respect to change in prices/cost of equipment and transportation were furnished by ZSPL both in the Petition as well as during the hearing.
24. The petitioner during the hearing submitted that the EPC contractors are same as were approved by the Authority in the earlier tariff determination. The petitioner was asked to provide some documentary evidence in relation to its claim. In response, ZSPL vide email dated June 21, 2022 submitted a document "Amendment to EPC Contracts" stating, inter alia, contract price of USD 68.610 million.
25. The petitioner has signed the "Amendment to EPC Contracts", i.e. the EPC Contractor selection process has not been followed by ZSPL 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 few years. Looking at the EPC costs approved in those determinations while also taking into account the increase in the prices of equipment and cost of transportation in last couple of years, it is considered that the EPC cost claim of the petitioner is somewhat on the higher side. In view thereof, the Authority has decided to assess the EPC cost to be allowed to ZSPL and basis thereof is given in the following paragraph.
26. 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. Additionally, the data which was submitted by the petitioner was also given due deliberation. It has been noted that the average prices of solar modules of different types and brands have reached at the level of USD 0.250-0.260 million per MW. The cost of inverters (already purchased by ZSPL), 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 cost of USD 0.11 million per MW for single axis tracking had been allowed, which has been adjusted for impact of increase in material prices and cost of transportation. The cost of civil works and electrical balance of plant equipment have been taken into account in line with the comparable projects while accounting for the impact of increased cost of material and transportation. On these base figures, the factors such as existing local market conditions, local manufacturing base, length of time allowed for achieving financial close etc. were given due consideration. 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





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assessed the EPC cost for Zorlu as USD 0.6500 million per MW (USD 65.000 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 claimed Non-EPC cost is justified?

Project Development Cost:

27. The petitioner has submitted that the Authority while considering the impact of prolonged development period had already allowed Project Development Cost ("PDC") of USD 1.7 million in earlier tariff determination, however, the Project is further delayed due to reasons not attributable to ZSPL. The petitioner also submitted that due to the changes in the technology and project design, certain technical and financial studies as well as project agreements will be required to be revised. Furthermore, as a result of extended project development period, additional administrative expenses will be incurred by ZSPL, in addition to extra costs for generation license modification, annual license fees for extended periods of development and tariff petition fees. Consequently, the petitioner submitted that this will result in an increase of USD 0.4 million in addition to already approved PDC of USD 1.7 million in previous tariff determination. Stating the above, ZSPL has requested the Authority to allow PDC of USD 2.1 million.
28. It is noted that the Authority had earlier allowed USD 1.7 million to ZSPL while fixing the same at exchange rate of Rs. 155.35/USD, i.e. about Rs. 264 million was approved. In the Petition, the PDC of around USD 2.1 million has been claimed by the petitioner. As stated above, the Authority does not agree with the submissions of the petitioner that previous tariff was lapsed due to the reasons which are not attributable to the company. Therefore, the Authority has decided to maintain the earlier allowed PDC of Rs. 264 million for ZSPL. Based on the exchange rate (Rs. 200/USD) being used in this tariff determination, the amount works out to be about USD 1.320 million to ZSPL. 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.

Pre-COD Insurance cost

29. The Authority in the earlier tariff determination of ZSPL allowed insurance during construction cost at 0.4% of the approved EPC cost. Zorlu in the Petition has requested to allow the captioned cost on the same benchmark. The Authority has noted that NEPRA (Benchmarks for Tariff Determination) Guidelines, 2018 ("Benchmark 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 of solar PV projects. In accordance therewith,





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the Authority has decided to allow insurance during construction at the rate of 0.4% of the approved EPC cost to ZSPL. On this basis, the amount being approved under this head works out to be around USD 0.260 million.

Financing Fee and Charges

30. The Authority in the earlier tariff determination of ZSPL allowed financing fee and charges at 2% of the approved debt portion of the allowed capital expenses. Zorlu in the Petition has requested to allow financial fees and charges based on the same benchmark. It has been noted that Benchmark Guidelines states the provision of financing fee & charges not exceeding 2.00% of the approved debt amount. In light of above benchmark, the Authority has decided to allow the captioned fees/charges at the rate of 2%, including all the taxes/charges, of approved debt portion of allowed capital expenses, as maximum limit, to the petitioner. In accordance therewith, this amount works out to be around USD 1.065 million.

Interest during construction

31. The petitioner has claimed Interest during Construction ("IDC") of USD 0.980 million. Zorlu submitted that IDC has been calculated based on construction period of 10 months, debt financing at 80% of the project cost using LIBOR (0.3663%) + margin of 4.25%.
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 1.325 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 recomputed/adjusted at COD as per the mechanism given in the Order part of this determination.
33. Recapitulating above, the summary of the approved project cost is given hereunder:

Project Cost	USD Million
EPC Cost	65.000
Project Development Cost	1.320
Insurance during construction	0.260
Financing Fee and Charges	1.065
Interest During Construction	1.325
Total	68.970





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

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

Project Capacity	100 MWp
Annual Energy Generation	201.218 GWh
Net Capacity Factor	22.97%

35. The earlier tariff of ZSPL was approved based on mono crystalline with fixed tilt structure. The instant Petition, has been filed on bifacial modules (640-645 Wp) with single-axis technology. The petitioner has stated that as a result of change in technology, the capacity factor of the Project has been increased from 19.75% to 22.97%, corresponding to estimated annual energy generation of 201.218 GWh per annum at P50.
36. The Authority has considered the modules and inverters proposed by ZSPL with respect to their quality and energy yield. The energy yield simulations as submitted by the petitioner has also been examined. On these bases, the Authority is of the view that the proposed net annual capacity factor of 22.97% is reasonable and decided to approve the same. Further, the Authority has decided that 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 annual capacity factor.
37. With respect to the issue of compliance of international standards of proposed module technology, the Authority considers that the decision of LPM of ZSPL has been issued on January 07, 2022 for the technology as claimed in the Petition. Accordingly, this matter is considered settled.

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

38. The petitioner has submitted that NTDC on April 19, 2017 approved the Grid Interconnection Study ("GIS") report of the Project. In addition, Power Evacuation Certificate of NTDC having No. GMPP/CEMP/TRP-380/3415 dated June 15, 2017 was also submitted. PPDB commented that the confirmation of grid availability to the Project has been provided by NTDC.
39. The Authority has noted that during the proceedings of the LPM as approved for ZSPL on January 07, 2022, the matter of interconnection of the Project has already been discussed and addressed. The Authority further





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noted that as per the IGCEP, approved by NEPRA on September 24, 2021, ZSPL's Project has been listed as Committed Project. In view thereof, the Authority considers this issue settled.

Whether the NEPRA (Selection of O&M Contractor) Guideline, 2021 have been fully complied with? 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?

40. ZSPL in the Petition has requested to allow the same O&M cost of USD 0.9 million/year (USD 9,000 per MW per year) as was approved by the Authority in its earlier tariff determination dated January 15, 2020. During the hearing, the petitioner submitted that though the single axis tracker systems have higher O&M Costs in comparison to fixed tilt systems, but it has not increased the O&M costs for the Project.
41. To evaluate this claim of ZSPL, 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, inverters etc. The cost recently being approved for other solar PV power projects based on different technologies has also been compared. On this basis, the Authority considered that the cost earlier approved for ZSPL is reasonable and decided to approve USD 0.9 million per year.
42. 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. 1.80 million per MW per annum (@ Rs. 200/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.
43. ZSPL has requested for quarterly adjustment in the approved O&M cost. 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 addition, the yearly indexation was approved by the Authority in the tariff matter of Siachen Energy issued in November, 2021. 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.

Whether the claimed insurance during operation is justified?

44. The Authority in the earlier tariff determination of ZSPL allowed insurance during operations cost at 0.4% of the EPC cost, ZSPL in the Petition has requested to allow the same benchmark for the operation phase insurance. The Authority noted that in the recently approved tariffs of solar PV projects, the insurance during





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operation at the rate of 0.4% of the approved EPC cost has been allowed. Benchmark Guidelines also provide insurance during operation at the rate of 0.4% of EPC cost for solar 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, 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?

45. The Authority in the earlier tariff determination of ZSPL allowed ROE of 14% with quarterly indexation due to change in exchange rates. The petitioner in the Instant Petition has requested to allow the same level of return with the same indexation thereon.
46. During the hearing, the petitioner submitted that while considering Pakistan's 10 years Government Bonds as risk free rate, 14% ROE is already on the lower side. Additionally, the petitioner during the hearing emphasized that the Indexation of ROE due to change in exchange rates, be allowed on quarterly basis as against on annual basis, as approved by the Authority in the tariff case of Siachen Energy. ZSPL said that with annual indexation, the company shall be exposed to the risk of PKR devaluation for one year, which actually decreases the ROE to the level below 10% (considering 20% devaluation). Additionally, if the factor of delayed payments by CPPAGL is considered, then the ROE reduced to the level of 7-8%. ZSPL stated that this arrangement shall not be accepted to the lenders and resultantly the Project shall not remain bankable.
47. The Authority has noted that in two most recent comparable cases of renewable technologies, the ROE of 12% has been approved by NEPRA. That approved ROE component was allowed adjustment, due to change in exchange rates, on annual basis. The Authority is of the view that the ROE of 12% along with yearly Indexation thereon, as approved in the recent tariff cases, be also allowed in the tariff case of Zorlu also. However, the Authority considered the submissions of the petitioner and is of the view that given the significant PKR devaluation, especially in the last couple of years, the yearly indexation would have a negative impact on the approved ROE. To neutralize the impact thereof, the Authority has decided to approve ROE for ZSPL at 13%, while maintaining the annual indexation on this tariff component due to change in exchange rates. The mechanism of the said adjustment is given in the Order part of this determination.
48. It is important to highlight here that the component of ROE has been computed and approved while taking into account the monthly cash flows such that annual ROE comes out as 13%.





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49. 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.

Whether the claimed financing/debt terms are justified?

50. The petitioner submitted that the financing terms as approved earlier in the tariff determination dated January 15, 2020 may be allowed. ZSPL submitted that financing on earlier terms as approved by NEPRA has been arranged, which are given hereunder:

Debt : Equity	80 : 20
Debt	100% foreign
Interest Rate	3 month LIBOR + 4.25%
Debt Term	14 Years

51. The Authority has noted that Benchmark Guidelines provides that the debt to equity ratio for all renewable power projects are to 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 ratio capital structure. The debt to 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 ZSPL at debt to equity ratio of 80:20 as claimed by the petitioner.
52. Benchmark Guidelines provide that for renewable energy projects availing foreign financing, the spread not exceeding 4.25% over LIBOR shall be allowed. In the previous tariff of ZSPL, the margin of 4.25% was approved. Therefore, the Authority has decided to approve tariff of ZSPL at margin of 4.25% over LIBOR. For the instant case, the LIBOR value (2.28514%) as prevailing on June 30, 2022 has been taken into account. In case of sharing of saving in interest rate, the same shall be shared in the ratio of 60:40 between the power purchaser and power producer respectively.
53. The petitioner has claimed debt servicing period of fourteen years. The Authority has noted that earlier tariff of ZSPL had been approved on debt servicing tenor of fourteen years. It has also been noted that recent tariffs for solar power projects have been approved on debt servicing tenor (commercial financing) of not less than thirteen years. In view thereof, the Authority has decided to compute and approve the tariff of ZSPL on debt servicing period of fourteen years.





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Whether the claimed construction period is justified?

54. ZSPL in the Petition and during hearing has proposed 10 month construction period for the Project. The Authority has considered the submissions of the petitioner and has decided to approve 10 months construction period as allowed in the projects of similar scale by the Authority.

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 (except in the case of Siachen issued in November, 2021) 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 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 (both during construction and operations) are confirmed, 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 ZSPL in this regard.

What should be the treatment of income tax in light of the amendments made through Finance Bill, 2021?

55. This additional issue was framed in light of the amendments made through Finance Bill, 2021 whereby, inter alia, the income tax exemptions given to power generation projects were discontinued. 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 RE Policy, 2006 under which ZSPL is being developed. Nevertheless, given the above amendments in the Finance Bill, the Authority hereby decides that the relevant Government Entities shall deal this matter while signing concession agreements with ZSPL.

Degradation factor

57. The petitioner has claimed capitalized degradation of USD 2.547 million as part of the project 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 ZSPL's tariff. The Authority has decided to capitalize the impact of allowed degradation in the approved project cost. The amount of USD 2.353 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.





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58. ORDER

In pursuance of section 7(3)(a) read with 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 Zorlu Solar Pakistan Limited (ZSPL) for its 100 MWp solar power project for delivery of electricity to the power purchaser as follows:

- Levelized tariff works out to be Rs. 8.0271/kWh (US Cents 4.0136/kWh).
- The tariff has been worked out on Build Own and Operate basis.
- EPC cost of USD 65.000 million has been approved.
- Project Development Cost of USD 1.320 million has been approved.
- Insurance during construction 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 on 100% foreign financing.
- ROE and ROEDC of 13% has been allowed.
- The cost of debt of 3 month LIBOR (2.28514%) + spread (4.25%) has been used for foreign financing.
- Debt servicing period of 14 years from COD has been used.
- O&M 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 22.97% has been approved.
- Degradation factor of 0.5% per year has been approved. The financial impact of the allowed degradation of USD 2.353 million has been taken into account in the approved project cost.
- Reference Exchange Rates of 200 PKR/USD has been used.
- IDC and ROEDC have been worked out using following drawdown schedule:





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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%

- 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

- 80% of the approved EPC cost is being allowed in terms of USD, and shall be adjusted at COD at lower or equal to the corresponding approved USD amount. At the time of COD, the PKR amount for this portion of the EPC cost shall be re-computed, on the exchange rates prevailing on the respective payment dates during the approved construction period OR on the exchange rates as decided in the relevant contracts, whichever is lower.
- 20% of the approved EPC cost is being allowed in terms of PKR (@ Rs. 200/USD), and shall be adjusted at lower or equal to the corresponding approved PKR amount. At the time of COD, the USD amount for this portion of the EPC cost shall be re-computed, on the exchange rates prevailing on the respective payment dates during the approved construction period. The adjusted amount, in terms of USD, shall not exceed beyond the USD amount computed at Rs. 200/USD.
- PDC, Insurance during construction and Financing Fee and Charges shall be adjusted at COD at lower or equal to the corresponding approved PKR amount, computed using the exchange rate of Rs. 200/USD. At the time of COD, the USD amount for these cost heads shall be re-computed, on the exchange rates prevailing on the respective payment dates during the approved construction period.





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- iii. The adjusted amount, in terms of USD, shall not exceed beyond the USD amount computed at Rs. 200/USD.
- iv. The amounts retained or payable by the company, on account of EPC cost, PDC, Insurance during Construction and Financing Fee & Charges, till the date of COD, shall be given approval upon payment of such amount. The adjustment on such amounts under the respective heads, as per the mechanism given in (i), (ii) and (iii) above, shall be made on the exchange rate used in the COD decision.
- v. 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.
- vi. The amount of degradation, as approved in this determination, shall be converted in PKR using the exchange rate of Rs. 200/USD at the time of COD.
- vii. 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) during the project construction period. The IDC shall also be adjusted for the changes in LIBOR, as applicable in the financing documents, during the project construction period.
- viii. The tariff has been determined on debt: equity ratio of 80:20. The tariff shall be adjusted at COD while taking actual debt: equity mix on the approved project cost, subject to equity share of not more than 20%.
- ix. The savings in the approved spreads shall be shared between the power purchaser and power producer in the ratio of 60:40.
- x. 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.
- xi. For the above adjustments, the construction period of lower or equal to ten months, as approved by the Authority, shall be considered.

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, as applicable in the financing documents. 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 on account of change in local inflation (NCPI) 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 N-CPI (General)
CPI (REF)	=	The reference N-CPI (General) of 165.23 for the month of May, 2022

Note: 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. That revised component shall be applicable for the supply of electricity from the date of COD till the 30th of June, after COD. Afterwards, the N-CPI for the next month of May shall be used to compute the revised O&M for the next year starting from the month of July, and so on.

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. 200/USD
P (Act)	=	Actual premium or 0.4% of the approved EPC Cost converted into Pak Rupees on exchange rate prevailing on 1 st 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 (ROE + ROEDC) component of the tariff will be adjusted on yearly 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 as notified by the National Bank of Pakistan
ER (Ref)	=	The reference TT & OD selling rate of Rs. 200/USD

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

iv) **Indexations applicable to debt**

For foreign debt, respective principal and interest components will be adjusted on quarterly/bi-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 as approved at COD.

v) **Variations in LIBOR**

The interest part of tariff component for the loan shall remain unchanged throughout the term except for the adjustment due to variation in interest rate as a result of variation in LIBOR according to the following formula:





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ΔI	=	$P \text{ (REV)} * (\text{LIBOR (REV)} - 2.28514\%) / 4$
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 < 2.28514%. The interest payment obligation will be enhanced or reduced to the extent of ΔI for each quarter under adjustment.
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 22.97% net annual plant capacity factor. Net annual energy generation supplied to the power purchaser in a year, in excess of 22.97% 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 22.97% to 23.0%	-
Above 23.0% to 23.75%	10%
Above 23.75% to 24.50%	20%
Above 24.50% to 25.25%	30%
Above 25.25%	40%





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- The risk of solar resource shall be borne by the power producer.
- The maximum plant PV capacity shall not exceed 100 MWp.
- 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 given in the generation license and tariff determination.
- The savings in the approved limit of spread over foreign loan 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 loan tenor, as applicable.
- For the provision of the O&M cost, 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 Energy Purchase Agreement.
- 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 10 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 10 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.





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- The approved tariff along with terms & conditions shall be made part of the Energy Purchase Agreement. General assumptions, which are not covered in this determination, may be dealt with as per the standard terms of the Energy Purchase Agreement.
59. The Order part along with 2 Annexures is recommended for notification in the official gazette in accordance with Section 31(7) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997.

AUTHORITY

(Engr. Maqsood Anwar Khan)
Member

(Engr. Rafique Ahmed Shaikh)
Member

(Tauseef H. Farooqi)
Chairman



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ANNEX-1

ZORLU SOLAR PAKISTAN LIMITED
REFERENCE TARIFF TABLE

Year	O&M Local Rs. / kWh	Insurance Rs. / kWh	Return on Equity Rs. / kWh	ROEDC Rs. / kWh	Loan Repayment Rs. / kWh	Interest Charges Rs. / kWh	Tariff Rs. / kWh
1	0.8946	0.2584	1.7417	0.0897	2.5694	3.6442	9.1979
2	0.8946	0.2584	1.7417	0.0897	2.7415	3.4721	9.1979
3	0.8946	0.2584	1.7417	0.0897	2.9251	3.2885	9.1979
4	0.8946	0.2584	1.7417	0.0897	3.1210	3.0926	9.1979
5	0.8946	0.2584	1.7417	0.0897	3.3300	2.8836	9.1979
6	0.8946	0.2584	1.7417	0.0897	3.5530	2.6606	9.1979
7	0.8946	0.2584	1.7417	0.0897	3.7910	2.4226	9.1979
8	0.8946	0.2584	1.7417	0.0897	4.0449	2.1687	9.1979
9	0.8946	0.2584	1.7417	0.0897	4.3158	1.8978	9.1979
10	0.8946	0.2584	1.7417	0.0897	4.6048	1.6088	9.1979
11	0.8946	0.2584	1.7417	0.0897	4.9132	1.3004	9.1979
12	0.8946	0.2584	1.7417	0.0897	5.2422	0.9714	9.1979
13	0.8946	0.2584	1.7417	0.0897	5.5933	0.6203	9.1979
14	0.8946	0.2584	1.7417	0.0897	5.9679	0.2457	9.1979
15	0.8946	0.2584	1.7417	0.0897	-	-	2.9843
16	0.8946	0.2584	1.7417	0.0897	-	-	2.9843
17	0.8946	0.2584	1.7417	0.0897	-	-	2.9843
18	0.8946	0.2584	1.7417	0.0897	-	-	2.9843
19	0.8946	0.2584	1.7417	0.0897	-	-	2.9843
20	0.8946	0.2584	1.7417	0.0897	-	-	2.9843
21	0.8946	0.2584	1.7417	0.0897	-	-	2.9843
22	0.8946	0.2584	1.7417	0.0897	-	-	2.9843
23	0.8946	0.2584	1.7417	0.0897	-	-	2.9843
24	0.8946	0.2584	1.7417	0.0897	-	-	2.9843
25	0.8946	0.2584	1.7417	0.0897	-	-	2.9843
Levelized Tariff	0.8946	0.2584	1.7417	0.0897	2.9774	2.0654	8.0271



Annex-II

ZORLU SOLAR PAKISTAN LIMITED DEBT SERVICING SCHEDULE							
Half Yearly Quarter	2022 January (USD)	2022 February (USD)	2022 March (USD)	2022 April (USD)	2022 May (USD)	2022 June (USD)	2022 Annual Principal Repayment in Rs. AWP
1	57,050,781	630,845	932,218	55,427,635	1,562,855		2.5694
2	56,427,635	640,948	921,906	55,786,687	1,562,855		
3	55,786,687	651,420	911,435	55,335,267	1,562,855		
4	55,135,267	662,063	900,792	54,473,204	1,562,855		
5	54,473,204	672,880	889,975	53,800,324	1,562,855		
6	53,800,324	683,873	878,982	53,116,451	1,562,855		2.7415
7	53,116,451	695,046	867,829	52,421,405	1,562,855		
8	52,421,405	706,402	856,453	51,715,003	1,562,855		
9	51,715,003	717,943	844,912	50,997,060	1,562,855		
10	50,997,060	729,672	833,182	50,267,388	1,562,855		
11	50,267,388	741,594	821,261	49,525,794	1,562,855		2.9251
12	49,525,794	753,710	809,145	48,772,084	1,562,855		
13	48,772,084	766,024	796,831	48,006,061	1,562,855		
14	48,006,061	778,539	784,316	47,227,522	1,562,855		
15	47,227,522	791,259	771,596	46,436,263	1,562,855		
16	46,436,263	804,186	758,669	45,632,077	1,562,855		3.1210
17	45,632,077	817,325	745,530	44,814,753	1,562,855		
18	44,814,753	830,678	732,177	43,984,074	1,562,855		
19	43,984,074	844,250	718,605	43,139,825	1,562,855		
20	43,139,825	858,043	704,812	42,281,782	1,562,855		
21	42,281,782	872,061	690,793	41,409,721	1,562,855		3.3330
22	41,409,721	886,305	676,546	40,523,412	1,562,855		
23	40,523,412	900,789	662,065	39,622,623	1,562,855		
24	39,622,623	915,508	647,348	38,707,136	1,562,855		
25	38,707,136	930,464	632,391	37,776,653	1,562,855		
26	37,776,653	945,665	617,189	36,830,987	1,562,855		3.7910
27	36,830,987	961,116	601,739	35,869,872	1,562,855		
28	35,869,872	976,818	586,037	34,893,653	1,562,855		
29	34,893,653	992,777	570,077	33,900,776	1,562,855		
30	33,900,776	1,008,997	553,858	32,891,279	1,562,855		
31	32,891,279	1,025,482	537,375	31,865,797	1,562,855		4.0449
32	31,865,797	1,042,236	520,619	30,823,561	1,562,855		
33	30,823,561	1,059,264	503,591	29,764,297	1,562,855		
34	29,764,297	1,076,570	486,285	28,687,727	1,562,855		
35	28,687,727	1,094,159	468,696	27,593,568	1,562,855		
36	27,593,568	1,112,035	450,820	26,481,333	1,562,855		4.3158
37	26,481,333	1,130,203	432,651	25,351,339	1,562,855		
38	25,351,339	1,148,669	414,186	24,202,661	1,562,855		
39	24,202,661	1,167,435	395,419	23,038,226	1,562,855		
40	23,038,226	1,186,509	376,346	21,848,717	1,562,855		
41	21,848,717	1,205,894	356,961	20,642,823	1,562,855		4.9132
42	20,642,823	1,225,595	337,259	19,417,228	1,562,855		
43	19,417,228	1,245,619	317,236	18,171,609	1,562,855		
44	18,171,609	1,265,970	296,885	16,905,639	1,562,855		
45	16,905,639	1,286,653	276,202	15,618,986	1,562,855		
46	15,618,986	1,307,674	255,181	14,311,312	1,562,855		5.2422
47	14,311,312	1,329,039	233,816	12,982,273	1,562,855		
48	12,982,273	1,350,752	212,192	11,631,571	1,562,855		
49	11,631,571	1,372,821	190,034	10,258,700	1,562,855		
50	10,258,700	1,395,250	167,605	8,863,451	1,562,855		
51	8,863,451	1,418,045	144,810	7,443,406	1,562,855		5.5933
52	7,443,406	1,441,213	121,842	6,004,193	1,562,855		
53	6,004,193	1,464,759	98,096	4,539,434	1,562,855		
54	4,539,434	1,488,690	74,165	3,050,244	1,562,855		
55	3,050,244	1,513,012	49,043	1,537,292	1,562,855		
56	1,537,292	1,537,292	25,123	(0)	1,562,855		0.2457

