

28 May 2019

The Registrar  
National Electric Power Regulatory Authority  
NEPRA Tower, Ataturk Avenue (East)  
Sector G-5/1, Islamabad

Subject: Submission of Tariff Petition of 100 MWp Solar Power Project by Zorlu Solar Pakistan Limited

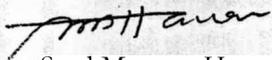
Dear Sir

We herewith submit the Company's Tariff Petition along with the fee as determined by the National Electric Power Regulatory Authority ("NEPRA") or the Authority for kind consideration and favorable approval by the Authority in accordance, inter alia, with section 31 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 read with Rule 3 of the NEPRA tariff Standards and Procedures Rules, 1998 and other applicable provisions of NEPRA law.

The Tariff Petition (including its Annexures) is submitted in triplicate together with:

- a) The Bank Draft No. 21854697 dated 03 May 2019, amounting to PKR 1,016,540 (Pakistan Rupees One Million Sixteen Thousand Five Hundred and Forty) as requisite fee for the Tariff Petition
- b) Board Resolution of Zorlu Solar Pakistan Limited
- c) Affidavit of Mr. Syed Mumtaz Hassan

Yours Sincerely



Syed Mumtaz Hassan  
Country Manager  
Zorlu Solar Pakistan Limited



For information & n/a H.  
bPO-11 / DRG-I

G.P. No.

29 05 (-9)

— 544 )

— D

— A )

— 1-46 UCT-( ) - mf

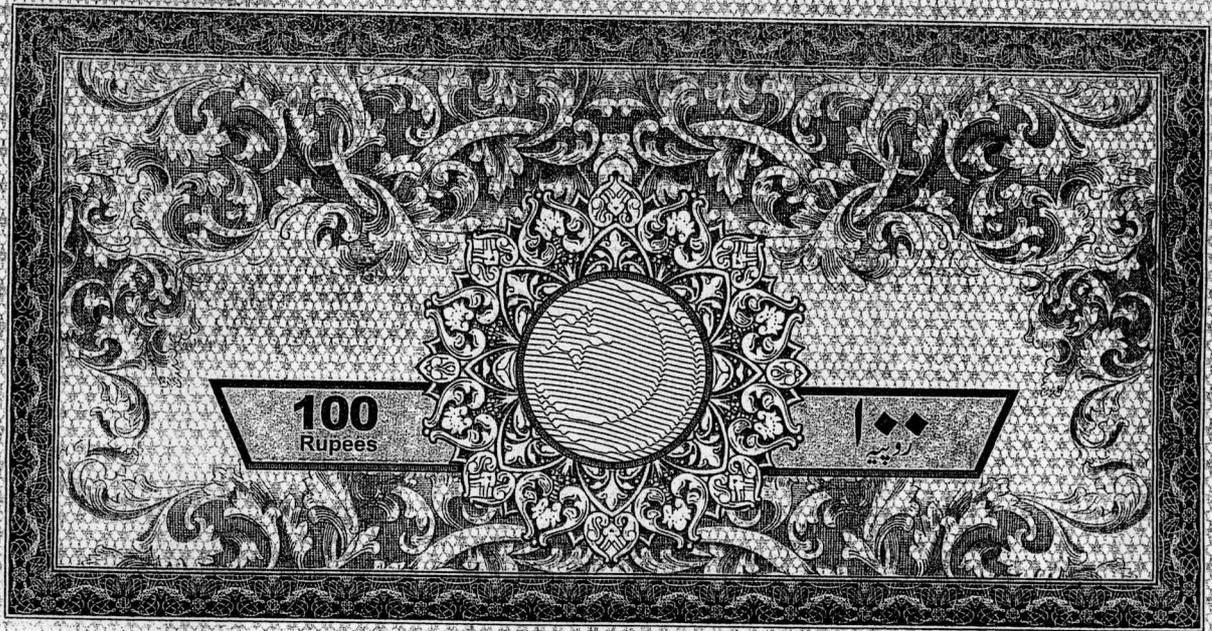
Chairman  
43-ho-8

m(CA)

IV-ILE4-

Petition received for registration from Zorlu Solar Pakistan Limited dated 28/05/2019

REGIS-  
No. 47  
dated 29-05-19



BEFORE THE NATIONAL ELECTRIC POWER REGULATORY AUTHORITY

100 MWp SOLAR POWER PROJECT BY ZORLU SOLAR PAKISTAN LIMITED AT QUAID-E-AZAM SOLAR PARK, LAL SOHANRA, BAHAWALPUR, PUNJAB

AFFIDAVIT

I, Syed Mutnta2 Hassan, Country Manager of Zorlu Solar Pakistan Limited, C -117, Block-2, Clifton, Karachi, Pakistan, do hereby d8date and affirm oh oath as under:

1. That the aCcOnipanyirig Tariff Petition has been filed before National •Electric Power Regulatory Aithothity and the contents of the same may kindly be read as an integal part of this affidavit.
2. That the contents of the accompanying Tariff Petition are true and correct to the best of my knowledge and belief and nothing has been concealed or mis-stated therein.

Deponent



Verification

Vetified on oath at Islamabad oh this 28 may 2019 that the contents of the above affidavit are true and correct to the best of rhy knowledge and belief.

Deponent



---

# Contents

01	Details of the Petitioner .....	6
02	Grounds of the Petition .....	7
03	Issues for Authority's Consideration .....	9
04	Project Cost, Tariff and Conclusion .....	21
05	Prayer.....	24



---

## 01 Details of the Petitioner

### 1.1 Petitioner's Name and Address

Zorlu Solar Pakistan Limited  
C -117, Block-2, Clifton, Karachi, Pakistan  
Tel: +922135291682, +92 21 35875366  
Fax: +92 21 35291681

### 1.2 Representatives of Petitioner

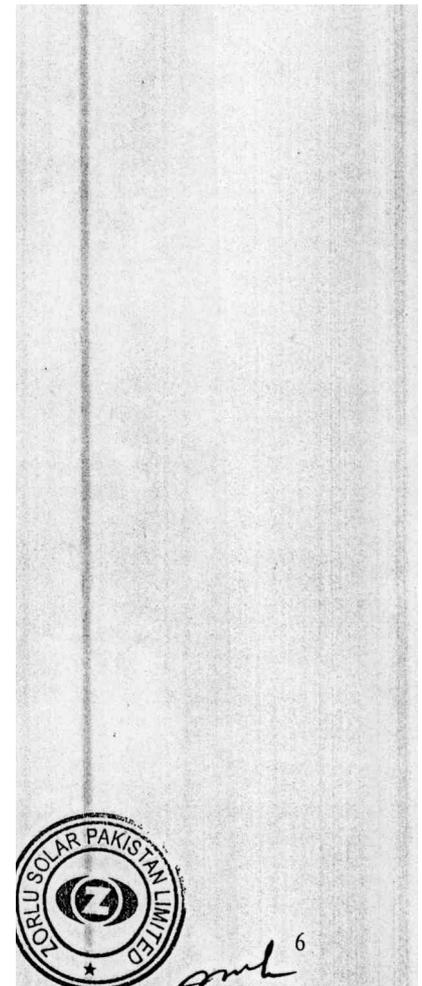
Mr. Syed Mumtaz Hassan  
Authorized Representative, Zorlu Solar Pakistan Limited

### 1.3 Project Sponsors

Zorlu Group

### 1.4 Project Advisors

Bridge Victor (Private) Limited  
Renewable Resources (RRL)  
Axis Law Chambers



*smh* 6

## 02 Grounds of the Petition

### 2.1 Legal Context and Project Background

Under the Regulation for Generation, Transmission and Distribution of Electric Power Act (XL of) 1997 (the **NEPRA Act**), the National Electric Power Regulatory Authority (**NEPRA** or **Authority**) is responsible, inter alia, for determining tariffs and other terms and conditions for the supply of electricity through generation, transmission and distribution. NEPRA is also responsible for determining the process and procedures for reviewing tariffs and recommending tariff adjustments. Further, pursuant to the enabling provisions of the NEPRA Act, the procedure for tariff determination has been prescribed in the NEPRA (Tariff Standards and Procedure) Rules, 1998 (the **NEPRA Rules**).

Zorlu Solar Pakistan Limited (**ZSPL**) filed tariff petition to NEPRA on 16 May 2017 for 100 MWp solar power project to be set up at Quaid-e-Azam Solar Park, Bahawalpur (the **Project**). Notice of Admission was published in the daily national newspapers on 08 July 2017, while the hearing for the Project was held on 07 September 2017. Based on the hearing and submission, Authority determined tariff for the Project on 25 January 2018 (the **Determination**).

As per paragraph 68 of the Determination, Federal Government was intimated to notify the tariff in the official gazette pursuant to Section 31(4) of the NEPRA Act. However, neither any such notification was made by Federal Government, nor ZSPL was issued a Letter of Support (**LOS**) by relevant agencies, in spite of it being compliant with all the requirements (ZSPL also submitted requisite performance guarantee to Alternative Energy Development Board (**AEDB**) of US\$ 250,000) of the Policy for Development of Renewable Energy 2006 (the **RE Policy 2006**). Because of these reasons, ZSPL could not achieve financial close and the reference tariff awarded to ZSPL expired on 24 January 2019 (as per the Determination).

We understand that the reasons behind the failure of the government agencies in notification of the tariff / issuance of the LOS etc. emanates from the Cabinet Committee on Energy (**CCoE**) decision of December 2017 and February 2018, that halted progress on all renewable energy power projects under pipeline, including ZSPL.

In this regard, it is important to highlight that ZSPL continued development activities on the Project during 2018 based on the NEPRA's Determination (since NEPRA had issued the Determination after the CCoE decision of December 2017) and the expectation that the said CCoE decision will be reversed (being in contradiction with the rights conferred to ZSPL under RE Policy 2006 and the Constitution of Pakistan).

Lately, another CCoE decision dated 29 March 2019 / 4 April 2019 (the **Latest CCoE Decision**), reactivated the renewable energy projects, which were in pipeline and were on halt, through amending the earlier CCoE decision that halted RE projects for over a year.

As per paragraph V of the Latest CCoE Decision: *'All projects that have been issued 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 the RE Policy 2006. However, if the tariff validity period has elapsed, NEPRA will be requested for review of 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'*. The scope of the review in the earlier Determination is established under paragraph XI that states: *Projects that are going back to review of tariff, will be asked to submit their applications on the basis of latest technology and technology related factors*".

Based on the Latest CCoE Decision on the matter and the fact that more than 1 year has elapsed from the Determination of Authority with regard to the Project, ZSPL omits tariff

petition for determination by the Authority in light of the above referred clauses of Latest CCoE Decision, the NEPRA Act, and Rule 3 of the NEPRA Rules which states that any licensee, consumer or person interested in the tariff may file a petition with the Authority by filing it with the Registrar along with such fees as may be determined by the Authority from time to time. A petition "means a petition made to the Authority for the determination, modification or revision of tariff".

## 2.2 Basis for Request of Tariff Determination

Further to the Latest CCoE Decision, ZSPL hereby submits petition before NEPRA for determination of tariff, keeping in view the following:

- (a) All Project approvals including LOI, land, environment and interconnection have already been submitted in the earlier petition dated 16 May 2017.
- (b) Binding EPC arrangement for supply, construction, erection and commissioning of the Project already submitted under the earlier petition dated 16 May 2017.
- (c) Project debt funding has been arranged (on the basis of earlier debt equity structure approved by NEPRA in the Determination dated 25 January 2018) and lenders have taken their internal approvals, and sponsors have committed the required equity for the Project.

## 2.3 Submission

Pursuant to the Latest CCoE Decision, the relevant provisions of the NEPRA Rules, read with the provisions of the NEPRA Act and the Rules and Regulations made thereunder ZSPL hereby submits following for consideration of the Authority:

- **Change in Technology and resultant impact on EPC cost and Capacity factor**
- **Increased Project Development Cost due to delays discussed in 2.1 above**
- **Revised Construction Period as allowed by the Authority to the other projects on similar technology**

To be clear ZSPL would not be filing this tariff petition had the Determination been notified in the official gazette, the LOS issued, Energy Purchase Agreement (**EPA**)/ Implementation Agreement (**IA**) signed etc., basically had the Project been allowed to continue, ZSPL would have timely achieved financial close and would not be having to submit another petition to NEPRA. This petition therefore only contains information relating to the Project that (a) has been demanded by the Latest CCoE Decision or (b) is a consequence of the delay faced by ZSPL in project development due to the failure of the government agencies in following the RE Policy 2006 — all other information is as contained in the original tariff petition and as determined by NEPRA in the Determination (both the original tariff petition and Determination to be read as if incorporated in full herein).

Further, to comply with paragraph X of the Latest CCoE Decision, the petition filed by ZSPL before the honorable Islamabad High Court challenging the earlier CCoE decision of December 2017 has been disposed of.

## 03 Issues for Authority's Consideration

The issues discussed under this section are requested to be considered by Authority, keeping in view the following facts:

- a. The levelized reference tariff of the Project (based on the Determination) was USc 5.3086/kWh at a LIBOR of 1.69%, had the levelized reference tariff been updated on 'As Is' basis at a LIBOR of 2.40% (as used by Authority in its last determination for similar size solar IPP i.e. Siachin) the same would have increased to USc 5.4359/kWh.
- b. ZSPL incurred huge costs (by importing first batch of 10 MWp of first solar's panel from own equity) to achieve construction period of 6 months as allowed by the Authority in the Determination. Said irrecoverable costs have not been requested in this petition, rather existing ground works and development activities (that can be used) and design after being optimized to adapt the new technology proposed and only related costs that have been incurred or to be incurred are requested,
- c. It is further important to highlight that had the construction period allowed under the Determination been in line with other projects (i.e. 10 months) the levelized tariff would have increased to USc 5.4951/kWh, including impact of change in LIBOR discussed above.
- d. ZSPL refers Authority's decision of 11 October 2018 on Motion for Leave for Review filed by M/s. Access Solar (Private) Ltd, under which following decisions were made by Authority;
  - ".....compensation of legitimate cost of the project company due to its prolonged development period would be given due deliberations on the basis of verifiable documentary evidence. ...."
  - Debt to Equity ratio and return on equity and similar other terms were maintained at same level as allowed in the original determination dated 18 January 2018 for Access Solar (Private) Limited, though NEPRA (Benchmark for Tariff Determination) Guidelines 2018 were issued on 19 June 2018.
- e. In case of hydro sector where two stage structure for establishing reference tariff is applicable, the parameters related to sponsor's returns and capital structure are not generally changed.
 

Case Reference: Para 4.17.2 of NEPRA's Tariff determination dated May 17 2018 for EPC stage tariff determination of 700.7 MW Azad Pattan Hydro Power Projects states "The Authority has observed that the feasibility stage tariff determination request for Azad Pattan Hydropower Project was submitted by NTDC on 23 October 2012 (after approval of the feasibility study in December 2011 by PPM) based on the then prevailing financial/capital market situation, Whereby the Authority had allowed a rate of 17% to Azad Pattan Hydropower Project at par with other comparable Hydropower Project. The Authority considers that it will not be fair to reduce the return at this stage on the same analogy as was done in other similar projects. In view thereof return on equity at 17% (IRR based) is allowed in the instant case."
- f. ZSPL Determination was issued in 25 January 2018, and the reasons behind non-achievement of financial close are not attributable to ZSPL.

Keeping in view the above it is requested to kindly allow continuation of tariff structure and other terms conditions of Me Determination, except for the matters discussed hereunder:



### 3.1 Change in Technology

#### 3.1.1 Original EPC Design and Site Status

The original EPC design was based on First Solar thin film modules on fixed tilt structures, which was selected because of the high energy yield under high temperature, high humidity location of Bahawalpur.

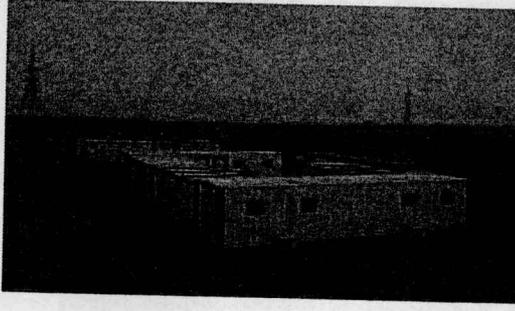
In order to achieve required timelines the management of ZSPL decided to start construction of the Project in 2017. Until now ZSPL has completed all ground leveling, 95% of foundations for the solar panels, construction of substation building and necessary ancillary facilities at site as required for construction of the Project. ZSPL has already procured 10MWp solar panels and these panels arrived at site in early 2018.

Pictures below shows the status of the Project at site:

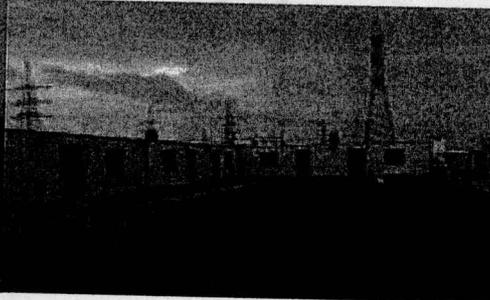
Solar Panels & other equipment in stock and area Site office area



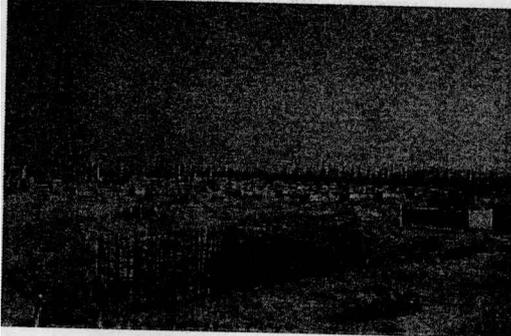
Camp area — Local Staff



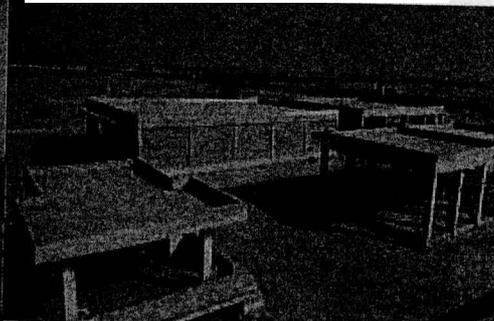
Camp area — Turkish Staff



Substation construction



Control, Admin and Security Building Area



*msk*

### 3.1.2 Considerations for Change in Design

As discussed above, original design of the Project was based on First Solar Series 4 CdTe thin film solar modules based on a fixed tilt structure. In order to achieve the strict construction timelines, manufacturing and delivery of the solar modules were scheduled for 1<sup>st</sup> Qtr. and 2<sup>nd</sup> Qtr. 2018, whereby the initial batch of 10 MWp solar panels have been delivered to Project site in January 2018. However, due to unforeseen suspension of the Project by COE decision, the remaining 90 MWp solar modules have not been transported to Pakistan and stored at manufacturer's facility until beginning of 2019. However, in beginning of 2019, the delivery of 90 MWp was terminated at the cost of EPC Contractor, since there was no clarity on the Project future till that time and further delay in taking delivery would have increased the ZSPL losses.

It is important to highlight that in 2018 First Solar has introduced a new product (First Solar Series 6 solar modules) in the market, which is based on the same technology but with different dimensions and specifications. (The data sheet of First Solar Series 4 and First Solar Series 6 solar modules is attached herewith as Annexure A-1 for reference). After ramp-up period of Series 6 modules, First Solar have started phasing out the manufacturing of the Series 4 solar modules and only Series 6 modules will be available from 2020. Official letter from First Solar Inc. confirming this is attached as Annexure A-2.

Due to the difference in the dimensions between the FS Series 4 and FS Series 6 modules, it became imperative to make a change in the design of the Project, since the same design cannot entertain the different sized solar modules. ZSPL therefore, re-evaluated the revised design based on the prevailing market conditions and during this process of re-evaluation also considered alternate technologies.

One of the key aspects of re-evaluation process was market prices of different technologies viz-a-viz correlation between US and Chinese markets. The prevailing conditions and dynamics of the US and Chinese markets are detailed below:

- United States is one of the largest market for Solar PV installations globally having installation of 10.6 GW in 2018 and reached a total installed capacity of 64.2 GW by end of 2018.
- In 2018 the administration of US have put additional custom taxes on import of solar panels from China in order to protect US manufacturer from un-equitable competition coming from China.
- Due to imposition of these additional taxes, First Solar being the major US solar panel manufacturer have started gaining from the resultant price advantage against its Chinese competitors in US market and for this reason, US market has become first priority in First Solar's sales strategy.
- Due to the above extraordinary market conditions in US, the pricing of First Solar panels are off-market and First Solar is actually not following the pricing trend of Chinese market.
- Detailed article from Bloomberg on this issue is attached as Annexure A-3,

Based on above facts, and in order to come up with the best possible solution, ZSPL has considered to change the solar panels technology and decided that Monocrystalline panels on fixed tilt structures as the most optimal solution under current circumstances for the given location and land size of the Project.

### 3.1.3 The Proposed Technology and Cost

ZSPL shall now install Monocrystalline Modules from Tier 1 manufacturers on fixed tilt mounting structures for the Project. The inverters shall remain same as allowed in the earlier Determination by the Authority.

Breakup of targeted EPC cost is provided hereunder:



	1*	1*H
Modules	28.000	0.280
Inverters	4.000	0.040
Mounting Structure	10.000	0.100
Balance of Plant (Civil Works, Cables, Transformer etc.)	25.000	0.250
<b>Total EPC cost</b>	<b>67.000</b>	<b>0.670</b>

Based on the review of the Authority views on allowed EPC costs in various tariff determinations of different solar power projects issued by Authority in past, we understand that Authority has considered following benchmarks for different solar technologies at stated dates in finalizing EPC costs for the related projects:

NM: (cost Benchmarks)	V.SI'l	IINDS	LSS NI/IW		%limb	\<L',..	\<ck. :,*
			t 11,,	Siachin			
Determination Date	Jan 2018	Jan 2018	Jan 2018	Nov 2018	Aug 2018	Jan 2018	Oct 2018
Proposed design	Fixed tilt	Si-poly single axis tracking	Single axis tracking	Monocrystalline, Single Axis Tracking	Si-poly - 30% single axis tracking -70% fixed tilt	Fixed tilt	Single axis tracking
Modules	0.320	0.320	0.340	0.270	0.240	Break up not available	
Inverters	0.040	0.040	0.060	0.040	0.040		
Mounting Structure	0.080	0.150	0.150	0.150	0.108		
Balance of Plant (Civil Works, Cables, Transformer etc.)	0.274	0.236	0.200	0.244	0.229		
<b>EPC cost allowed</b>	<b>0.714</b>	0.746	0.750	<b>0.704 i</b>	<b>0.617</b>	0.724	0.704

#### a) Modules

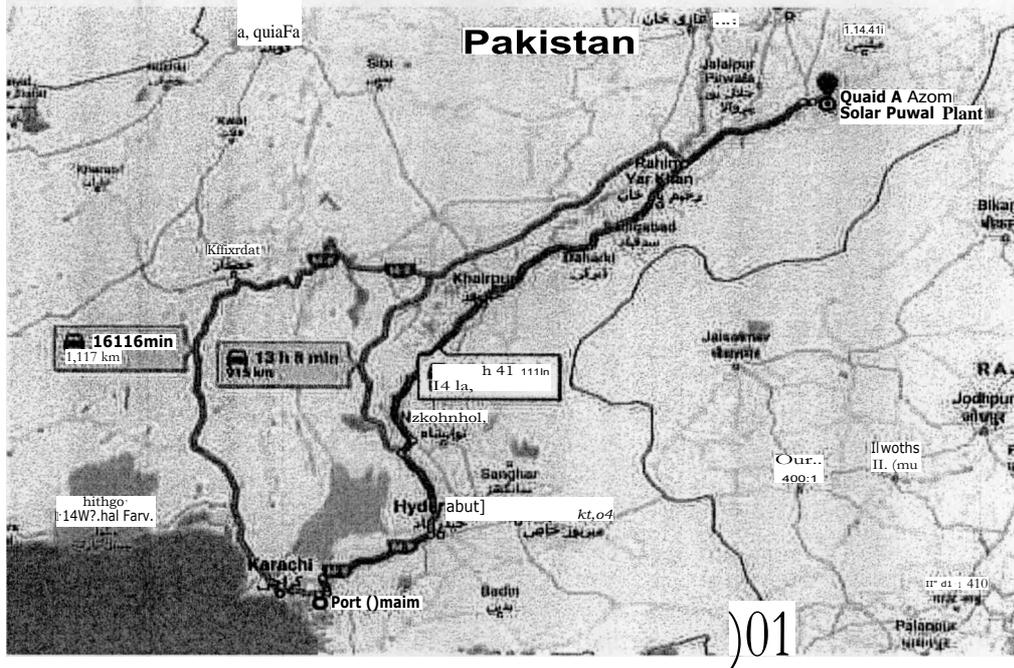
As per the recent tariff determination (November 2018) for Siachin, we understand that the Authority has allowed US\$ M 0.27/MW for Monocrystalline modules based on review of the prices then prevailing in November 2018, we understand that US\$ M 0.27/MW also includes transportation costs till site.

However, since August 2018, market dynamics have changed and estimated prices are around US\$ 0.28/Watt as per Bloomberg price index provided in Annexure B-1, and after including transportation cost.

It is important to highlight that current price levels of solar modules are subject to increase keeping in view the recent change in China's Policy. After 2018's sudden policy revamp in China, that resulted in dramatic decrease in domestic PV installations, there was a downward pressure on the module prices. However, based on the revised policy in 2019, it is expected that the solar module prices will stabilize and even may increase in 2nd Half 2019 and 2020. A report from Bloomberg explaining the situation is attached as Annexure B-2.

Further ZSPL would like to submit that the distance of Project site in Bahawalpur is approximately 845 km from Karachi (Port Qasim) which results in additional costs of transportation compared to the Siachin project. This is to highlight here that for 100 MWp Solar Project, a total of approximately 275,000 solar panels will be transported in approximately 600 containers. The estimated price of inland transportation is approximately US\$ 1,200 per container from Port Qasim to Bahawalpur whereas the same is approximately US\$ 500 per container in case of Ghara which results in US\$ 0.420 M additional cost of transportation compared to Siachin project. ZSPL has assumed this in the module cost of US\$ 0.28/Watt and humbly request Authority to allow the requested module cost keeping in view the fact that it is already an aggressive target set by ZSPL for this Project, considering current market dynamics, expected changes in same and additional transportation compared to other projects.

Rout map from Karachi Port to Project Site



**b) Inverters**

Since we are using same inverter (Siemens WSTECH), the benchmark price for the inverters used for calculation of EPC for Authority consideration is same as set in other determinations and earlier Determination for ZSPL.

However, it is highlighted that, based on discussions with the EPC contractors, the actual cost of Inverters is higher compared to the benchmark cost assumed above (US\$ M 0.040 /MW) for the consideration of Authority. The EPC contractor has shared extract of its contract with Siemens which indicate that actual cost of Inverters is US\$ M 0.0485/MW. The relevant extract of the contract shared by EPC Contractor is attached at Annexure C.

**c) Mounting Structure**

NEPRA in past has considered a cost benchmark of US\$ M 0.09/MW as mentioned in tariff determinations of Zhenfa and Access Solar for fixed tilt mounting structures, while ZSPL is requesting US\$ M 0.10/MW. The reasons behind this request are discussed hereunder:

a) Almost 90% of the foundation has been completed on the basis of design under earlier modules technology (First Solar Series 4 Modules).

b) Above foundations and their relative positions were based on the dimensions of the table (mounting structure) according to First Solar Series 4 modules (ex table), please note that the dimensions of new table design for Monocrystalline mod

is

since the dimensions of the Monocrystalline modules are different than First Solar Series 4 modules.

- c) The location of foundations, based on ex-table design, were close to each other i.e. the distance between the last column of first ex table and the first column of second ex table as shown in picture below. Accordingly regular mounting structure for Monocrystalline Modules cannot be used, on the existing foundations and is revised.



- d) Had ZSPL been using the design of new table from the beginning, the distance between foundations would not have been that much close and one layer of foundations indicated above would not have existed and cost of mounting structure would also have been lower.
- e) However, to use the same foundations for the above-proposed Modules, ZSPL has to strengthen the steel structure (in the new table design) to optimize based on available foundation design,
- f) Summarily, for the revised technology requires further steel reinforcement in the mounting structure for Monocrystalline modules table and size.

Keeping in view the above, Authority is requested to allow US\$ M 0.10/MW for mounting structure to ZSPL.

**d) Balance of Plant (Civil Works, Cables, Transformer etc.)**

As a result of soil study, ZSPL had to construct mini concrete piles instead of direct ramming for Project, as the soil is sandy-silt and lean clay and the bearing capacity of the ground is very low.

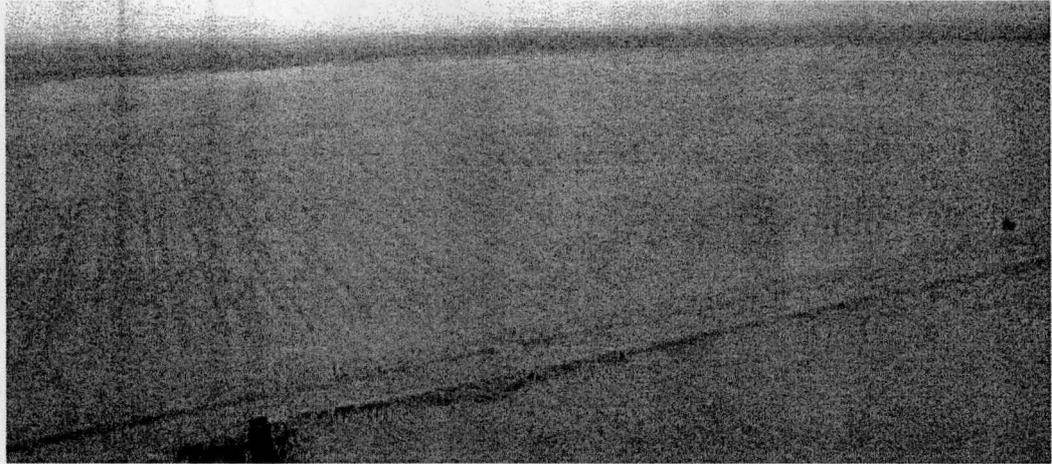
Since direct steel column ramming cannot be applied as a foundation method and concrete mini pile needs to be constructed, which is resulting in higher civil costs of the Project. Mini pile method is much more expensive method comparing to direct ramming, because of the fact that direct ramming can be done by only one ramming machine, which is very fast and cheap method if the ground is suitable for it.

For the purpose of concrete mini piles, main cost items include:

- Drilling
- Concrete
- Reinforcement Bar
- Steel anchor
- Workmanship

Mini piles require above mentioned works, which also require separate machines and workers, instead of those used in direct ramming, which require only one machine and relatively low skilled staff. Mini pile work is at least 5 times expensive than direct ramming. 90% Mini Piles have already been made as shown in picture provided hereunder.





There are about 90,000 mini piles already complete at project site, out of 101,000 and cost per mini pile is US\$ 62/mini pile (compared to US\$ 15/column in case of direct ramming), resultantly this cost of civil works increased by about US\$ 4.7 million compared to other similar size projects in Pakistan. However, ZSPL has managed to keep the cost of Balance of Plant in similar and comparable level with the benchmarks allowed by the Authority in its earlier determination, and even reduced the benchmark level from US\$ 27.4 Million for Balance of Plant in Determination to US\$ 25.0 Million with the new design in instant case.

ZSPL takes this opportunity to request Authority to authorize a site visit (of NEPRA relevant officers) to observe and verify ground realities as discussed above.

Authority is therefore requested to allow Balance of Plant cost of US\$ M 0.25/MW (including civil works cost) for the Project, which might not be required in case of other projects.

ZSPL would like to submit that it has managed to reduce the EPC Cost by US\$ 4.4 Million to achieve a levelized tariff lower than previously approved tariff in the Determination (adjusted as per the prevailing rates approved by NEPRA) although it has encountered numbers of difficulties and delays in implementation of the Project which resulted in considerable financial burden on the Project. ZSPL humbly request the Authority to allow US\$ 67.0 Million for the account of EPC Cost.

**3.1.4 Capacity Factor**

As a result of change in technology, Capacity factor of the Project has been changed from 20.50% to 19.75% with an energy generation of 173,010,000 kWh per annum. The Yield Assessment Report is attached as Annexure D,

Research shows that annual yield of C-Si technology is around 6% lower as compared to thin film technology due to its better temperature coefficient, spectral response and shading response. By changing technology form thin film to Monocrystalline, the capacity factor has been reduced from 20.50% to 19.75%, however it is highlighted that ZSPL's proposed capacity factor is still considerably higher than other solar projects in the vicinity at fixed-tilt.

Projects of IOU NIW in the Vicinity	TIRA		Actual		
	%age	2016-17	2016-17	2017-18	
Quaid-e-Azam Solar Power (Pvt) Ltd	%age	17.50%	18.27%	18.46%	18.78%
	GWh	153,300	160,076	161,701	164,506
Crest Energy Pakistan Ltd	%age	17.50%	19.38%	19.38%	19.00%



15 *msk*

	GWh	153,300		169,737	166,403
Best Green Energy Pakistan Ltd	%age	<b>17.50%</b>	-	<b>19.11%</b>	18.93%
	GWh	153,300		167,389	165,804
Appollo Solar Development Pakistan Ltd	%age	<b>17.50%</b>	-	<b>19.05%</b>	<b>18.47%</b>
	GWh	153,300	-	166,896	161,799

Source: CPPA Energy Purchase Data

Authority is therefore requested to approve a capacity factor of 19.75% for the Project, based on Monocrystalline technology.

### 3.2 Non-EPC and Project Development Cost

Authority allowed US\$ 1.5 M as project development cost in ZSPL Determination, however the said cost has already incurred till date and an Audit Certificate about this fact is attached at Annexure E.

The detailed breakup of the project development cost incurred to date and further expected to be incurred compared with cost allowed in Determination is provided hereunder.

	(Original Determination)	(Costs Incurred)	Costs To be Incurred US\$ M	Financial Close	Requested Cost
Consultancy Costs & Technical Studies - Pre-Financial Close	0.655	0.767	0.350	1.117	1.017
Owner's Engineer Supervision - Post Financial Close	0.150		0.150	0.150	-
Independent Engineer - Pursuant to the EPA	0.100	-	0.100	0.100	0.100
Permits, Permissions and Related Costs	0.050	0.096	0.080	0.176	0.146
Site, Security and Infrastructure	0.350	0.237	0.250	0.487	0.457
Administration Cost	0.120	0.151	0.100	0.251	0.201
Travelling Costs	0.075	0.225	0.100	0.325	0.275
<b>Non-EPC &amp; Project Dev. Cost -</b>	<b>1.500</b>	<b>1.475</b>	<b>1.130</b>	<b>2.606</b>	<b>2.195</b>

Based on above it can be observed that ZSPL has incurred a sum of US\$ 1.475 Million as Project development cost till date, and a further sum of US\$ 1.130 Million is required to be incurred till financial close, based on which a total project development cost of US\$ 2.606 Million is estimated. However, ZSPL is requesting a project development cost of US\$ 2.195 Million, despite of the fact that actual expenditure under this head is expected to be over US\$ 2.6 Million.

It is further highlighted that above table does not include lender's due-diligence cost and lender's processing fee already incurred till date (about US\$ 0.725 Million) as ZSPL completed lender's due-diligence process based on earlier Determination for the Project by the Authority. Since said cost is allowed by Authority under the head of 'Financing Fee & Charges', ZSPL requests the Authority to allow any overrun under 'Financing Fee and Charges' head (because of reperformance of lender's due-diligence based on the determination issued by the Authority on this petition) under this head i.e. 'Project Development Cost'. The said overrun may kindly be allowed based on submission of verifiable evidence at True-up Stage'

Paragraphs below explain the reasons for increase in project development cost, provided in above table, for each of the above sub-head for Authority's consideration.

(a) Consultancy Costs & Technical Studies (Owners & Lenders) - Pre Financial Close:

ZSPL has engaged highly reputed and leading consultants as Project advisors that have unmatched expertise in planning, engineering, financial, legal and technical matters. ZSPL has endeavored to put together the best team of consultants for the Project so as to ensure that solar power sector in the country is developed and the Project is bankable.



aspects. Based on the requirements of technical consultants, ZSPL has already completed electrical, geotechnical, topographical, soil and other related studies for the purpose of completing Project's feasibility study.

This is to highlight that cost for certain consultants were on time cap basis which were initially forecasted based on the assumption that the financial close will be achieved in early 2018. However, due to delays in the Project, additional costs have been incurred and expected to be further incurred in order to achieve financial close after the time cap period which have increased the overall cost of consultants engaged for the Project.

ZSPL has also incurred a sum of US\$ 0.035 Million for legal cases due to CCoE earlier decision. Similarly, further cost (legal and financial consultants) has been incurred for development of this tariff petition based on Latest CCoE Decision. Also, technical studies have been updated due to change in design of the Project because of which additional amount is to be paid to owner's technical consultants.

ZSPL has already incurred a sum of US\$ 0.767 Million for the cost of consultants and technical studies, and a further sum of US\$ 0.350 Million is expected to be incurred till financial close making a sum of US\$ 1.117 Million for the cost of consultants and technical studies. However, ZSPL is requesting a sum of US\$ 1,017 Million under this sub head.

(b) Owner's Engineer & Supervision Costs — Post Financial Close:

Owner's Engineer cost will be incurred post financial close, therefore ZSPL has kept it same as approved the Authority in its earlier Determination for this Project.

(c) Independent Engineer:

Similarly, Independent Engineer cost will be incurred post financial close, therefore ZSPL has kept it same as approved by the Authority in its earlier Determination for this Project,

(d) Permits, Permissions and Related Costs:

This head includes fees to be paid to different regulatory authorities, i.e. NEPRA, AEDB, PPDB, NTDC etc.

ZSPL has already paid annual generation license renewal fee for two (2) years, and a further fee for two (2) more years is expected to be paid until 2020. ZSPL was also required to pay additional processing fee to AEDB. This head also includes cost of Bank Guarantee for the LOI and LOS. Bank guarantee for LOS is already extended for an additional period of two (2) years.

ZSPL has also incurred a sum of US\$ 0.07079 Million (approx.) to Securities and Exchange Commission of Pakistan for increasing share capital of ZSPL (in the attached audit certificate same is appearing as a separate line item).

ZSPL has already incurred a sum of US\$ 0.096 Million for the cost of permits, permissions and related costs, and a further sum of US\$ 0.080 Million is expected to be incurred till financial close resulting in a total sum of US\$ 0.176 Million for the cost of permits, permissions and related costs. However, ZSPL, is requesting a sum of US\$ 0.146 Million under this sub head.

(e) Site, Security and Infrastructure:

ZSPL has to follow strict security protocols at site as per instructions of management of Quaid-e-Azam Solar Park. Furthermore, the level of security required at site is based on the fact that Project is adjacent to solar projects under CPEC and ZSPL has to follow same security guidelines/protocols as applicable on CPEC projects. These costs may not be applicable in case of other projects, but are mandatory for this Project.



In addition to this Special Security Unit (SPU) of Pakistan Army is deployed for security at site, for which ZSPL is providing accommodation from time to time, Depending upon the security level in the country. Authority for the purpose of determination can through its case officer visit the site any time to check the ground realities at site.

Pictures below show deployment of security at site with watch towers as per security requirement of QA Solar Park:

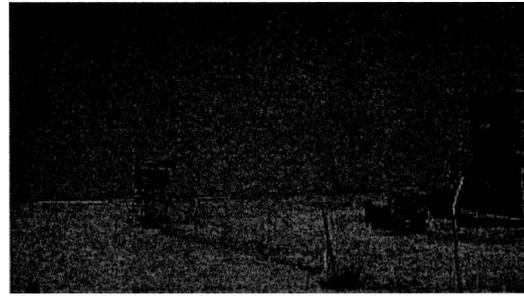
Solar Panels &amp; other equipment in stockyard area

Site office area



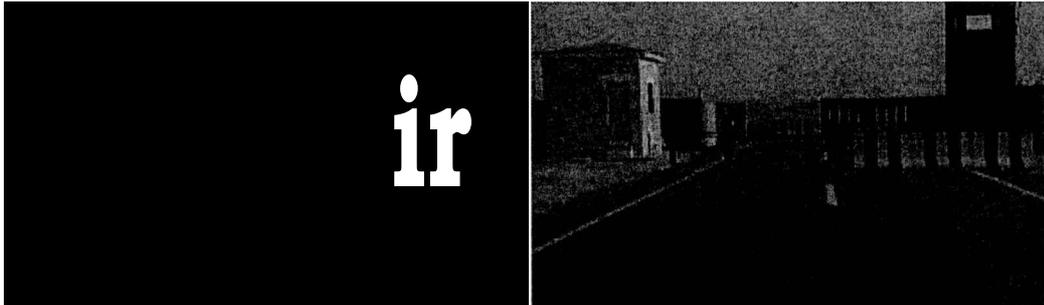
Fence Boundary Wall and Watch Tower

Security Watch Tower



Camp Security

Jersey Barriers and Entrance Security



In this regard following is highlighted for the consideration of Authority:

- Management of Quaid-e-Azam solar park required a minimum 144 (48 in one shift) private security guards at ZSPL's site, which are deployed at Project boundary wall, watch towers, entrance gates, and office/work and residence areas.
- In addition to this Rangers and Special Protection Unit (SPU) of Pakistan Army are deployed for security of Chinese/foreigners at site.
- Besides above, the Project site work areas are fenced (through barbed/mesh wire) keeping in view the fact that Turkish engineers are working on those sites and any mishap can impact the CPEC projects in the vicinity.
- Letters of District Police Officer (DPO), Energy Department Govt. of Punjab and minutes of meeting regarding deployment of private security guards, Rangers, SPU, security towers, CCTV cameras with control room for security monitoring, Jersey Barriers, firefighting equipment, search lights, boundary walls, Mesh walls, patrolling tracks and facilities for security staff (including residence, electricity and other utilities) are attached as Annexure F. These letters and minutes shows that the Project is required to maintain security protocols similar to the C projects.



*mk*

ZSPL has already incurred a sum of US\$ 0.237 Million for the cost of site security and infrastructure, and a further sum of US\$ 0.250 Million is expected to be incurred till financial close making a total sum of US\$ 0.487 Million for the cost of site security and infrastructure. However, ZSPL is requesting a sum of US\$ 0.457 Million under this sub-head.

In this regard, it is highlighted that Authority has allowed higher security cost to CPEC Power Projects and it is requested that above proposed security cost is considered on the same grounds.

(f) Administration Costs:

This sub-head includes Administration costs of ZSPL's head office (Karachi), branch office (Lahore) and site office (Bahawalpur). This portion of the Non-EPC Cost includes costs associated with accounting and admin staff, rent, utilities, equipment inspection, communication charges, printing & stationery, supplies, communication charges, vehicles fuel and maintenance and other allied expenses during the construction period.

Authority has already allowed a sum of US\$ 0.120 Million under this sub-head. The main reason for increase in administration costs is due to extension in duration of for the Project development period. The initial assumptions for administration costs were for a period of twelve (12) month i.e. on the basis of six (6) month development period and six (6) month construction period. However, in actual the development period has been extended to a period thirty four (34) months, i.e. twenty four (24) months project development plus ten (10) months of Project construction.

ZSPL has already incurred a sum of US\$ 0.151 Million for administration costs, and a further sum of US\$ 0.100 Million is expected to be incurred till financial close making a total sum of US\$ 0.251 Million for administration costs. However, ZSPL is requesting a sum of US\$ 0.201 Million under this sub-head.

(g) Travelling Cost:

This head covers costs related to travelling, accommodation, daily allowances and other allied expenses of the Turkish and local staff, incurred for development, arrangement of financing & EPC and for progress/ monitoring meetings etc. during development and construction period of the Project.

ZSPL earlier estimated travelling costs for a six (6) month project development period, but due to increased project development period travelling costs have increase many fold. This sub-head also includes travelling for court case and meeting Government officials for follow up with respect to the Project.

ZSPL has already incurred a sum of US\$ 0.225 Million for travelling costs, and a further sum of US\$ 0.100 Million is expected to be incurred till financial close making a total sum of US\$ 0.325 Million for travelling costs. However, ZSPL is requesting a sum of US\$ 0.275 Million under this sub-head.

Authority is requested to allow compensation of legitimate project development costs of US\$ 2.195 Million to ZSPL due to its prolonged development period (due to delay on part of GOP) since ZSPL is inl process of development of the Project since a period of more than 2 years, and a further period is required till financial close of the Project,

Authority is also requested to allow higher cost expected to be incurred under the head of "financial fees and charges" due' to re-performance of lenders due-diligence for the financial close, because of new tariff and change in technology. The over-run expected under financial fees and charg6 are requested to be allowed under project development cost, as...ninewould not have incurred had the LOS been issued by the relevant Government de based on the earlier Determination of Authority.

### 3.3 Construction Period

Construction period of the Project has been revised from 6 months to a period of 10 months considering the fact that the design and procurement of the Project have been changed from the initial design. ZSPL would like to submit that the initial proposed construction period of 6 months was focused on fast track deployment and commissioning, and in order to achieve this, ZSPL have started construction at site prior to Financial Closing with its equity in order to show its commitment to the Project. However, the Project was delayed due to the reasons not attributable to ZSPL, which resulted in change in complete implementation schedule.

Further ZSPL would like to highlight that supply of solar modules is the most critical factor in the construction schedule, therefore, change in solar modules and its availability timeline directly impacts construction period of the Project.

Lastly, ZSPL would like to submit that all other projects with similar size and technology have been allowed a construction period of 10 months, accordingly Authority, is requested to also allow ZSPL with similar construction period of 10 months. Work schedule for the construction of the Project is attached at Annexure G.

### 3.4 Other Assumptions

As mentioned in Section 3 above, it requested that the Authority may consider this Petition as a continuation of the earlier Determination, and allow the assumptions already allowed in its earlier Determination (except the economic assumptions and indices i.e. LIBOR, Exchange rate, Pak CPI and US CPI). The tariff assumptions allowed by the Authority are reproduced in below table for ready reference, and the Authority is requested to allow the same for the sake of equality and justice.

	Assumptions in the earlier Determination	Assumptions for this Petition
Insurance During Construction	0.5% of the EPC Cost	0.5% of the EPC Cost
Financing Costs	2.5% of the Debt Amount excluding the impact of IDC and Financing Cost	2.5% of the Debt Amount excluding the impact of IDC and Financing Cost
Capitalized Degradation	3.62% Of the EPC Cost	3.62% of the EPC Cost
O&M Cost (Local)	US\$ 0.550/MWp	US\$ 0.550 /MWp
O&M Cost (Foreign)	US\$ 0.550 /MWp	US\$ 0.550 /MWp
Insurance During Operation	0.5% of the EPC Cost	0.5% of the EPC Cost
Tariff Period	25 years	25 years
Debt Equity Ratio	75:25	75:25
LIBOR Rate	1.694%	2.40%
Spread Margin (Foreign)	4.25%	4.25%
Loan Repayment Period	14 years	14 years
US\$/PKR exchange rate	105	150
Discount Rate for Levelization	10%	10%
Return on Equity	15%	15%
True up conditions	Same as per the earlier Determination except for the change in exchange rate provided above	
Sharing Mechanism	As allowed in the earlier Determination	
Indexation	US CPI and Pak CPI to be established by Authority	



## 04 Project Cost, Tariff and Conclusion

### 4.1 Revised Project Cost

Factor mentioned in section 03 above have consequential impact on other cost components resulting is revised Project cost as follows:

Component	Value (PKR)
EPC Cost	67.000
Capitalized Degradation	2.425
Non-EPC & Project Development Cost	2.195
Pre-COD Insurance Cost	0.335
Financial Charges	1.304
Interest During Construction	1.369
<b>Total Project Cost</b>	<b>74.628</b>

### 4.2 Financing Terms

The following terms for financing the debt portion of the Project Cost have been agreed and locked, between ZSPL and the lenders:

Term	Value
Total Value of Debt @ 75% of total project Value USD 1 74.628	55.971
Base Rate	2.40%
Spread	4.25%
Debt Markup	5.20%
Repayment Period	14 years
Grace Period	Up to 12 months
Re-Payment Schedule	Quarterly

### 4.3 Summary of Reference Generation Tariff

A summarized Reference Generation Tariff table setting out the two bands is provided below. An exchange rate of US\$ 1 = 150 PKR has been used:

Component	Local (PKR)	Foreign (US\$)
O&M	0.4769	0.4769
Insurance	0.2904	0.2904
ROE	2.5748	2.5748
Debt Servicing	- 5.3528	
<b>Total</b>	<b>9.1717</b>	<b>3.8189</b>



4.4 Reference Generation Tariff

Sl. No.	Reference Tariff							
1	0.4769	0.4769	0.2904	2.5748	2.1801	3.1726	9.1717	6.1145
2	0.4769	0.4769	0.2904	2.5748	2.3287	3.0240	9.1717	6.1145
3	0.4769	0.4769	0.2904	2.5748	2.4875	2.8653	9.1717	6.1145
4	0.4769	0.4769	0.2904	2.5748	2.6570	2.6958	9.1717	6.1145
5	0.4769	0.4769	0.2904	2.5748	2.8381	2.5147	9.1717	6.1145
6	0.4769	0.4769	0.2904	2.5748	3.0316	2.3212	9.1717	6.1145
7	0.4769	0.4769	0.2904	2.5748	3.2382	2.1146	9.1717	6.1145
8	0.4769	0.4769	0.2904	2.5748	3.4589	1.8939	9.1717	6.1145
9	0.4769	0.4769	0.2904	2.5748	3.6947	1.6581	9.1717	6.1145
10	0.4769	0.4769	0.2904	2.5748	3.9465	1.4063	9.1717	6.1145
11	0.4769	0.4769	0.2904	2.5748	4.2155	1.1373	9.1717	6.1145
12	0.4769	0.4769	0.2904	2.5748	4.5028	0.8500	9.1717	6.1145
13	0.4769	0.4769	0.2904	2.5748	4.8097	0.5431	9.1717	6.1145
14	0.4769	0.4769	0.2904	2.5748	5.1375	0.2152	9.1717	6.1145
15	0.4769	0.4769	0.2904	2.5748	0.0000	0.0000	3.8189	2.5460
16	0.4769	0.4769	0.2904	2.5748	0.0000	0.0000	3.8189	2.5460
17	0.4769	0.4769	0.2904	2.5748	0.0000	0.0000	3.8189	2.5460
18	0.4769	0.4769	0.2904	2.5748	0.0000	0.0000	3.8189	2.5460
19	0.4769	0.4769	0.2904	2.5748	0.0000	0.0000	3.8189	2.5460
20	0.4769	0.4769	0.2904	2.5748	0.0000	0.0000	3.8189	2.5460
21	0.4769	0.4769	0.2904	2.5748	0.0000	0.0000	3.8189	2.5460
22	0.4769	0.4769	0.2904	2.5748	0.0000	0.0000	3.8189	2.5460
23	0.4769	0.4769	0.2904	2.5748	0.0000	0.0000	3.8189	2.5460
24	0.4769	0.4769	0.2904	2.5748	0.0000	0.0000	3.8189	2.5460
25	0.4769	0.4769	0.2904	2.5748	0.0000	0.0000	3.8189	2.5460
Average Tariff							6.8165	4.5443
Levelized Tariff							8.1631	5.4421

**Assumptions:**

- Financing Rate: 6.65%
- LIBOR rate 2.40%
- Spread: 4.25%
- US\$ Exchange rate: PKR 150



4.5 Debt Repayment Schedule	Principal Repayment (Rs)	Principal Component (Rs)	Interest Component (Rs)	Interest Component (Rs)	Interest Component (Rs)	Installment - Tariff Component (Rs/kWh)
1	61,3186	0.5316	930,288	0.8060	1,543,474	1.3382
2	623,377	0.5405	920,097	0.7977	1,543,474	1.3382
3	633,739	0.5495	909,735	0.7887	1,543,474	1.3382
4	644,272	0.5586	899,202	0.7796	1,543,474	1.3382
5	654,980	0.5679	888,494	0.7703	1,543,474	1.3382
6	665,867	0.5773	877,607	0.7609	1,543,474	1.3382
7	676,934	0.5869	866,540	0.7513	1,543,474	1.3382
8	688,185	0.5967	855,289	0.7415	1,543,474	1.3382
9	699,624	0.6066	843,850	0.7316	1,543,474	1.3382
10	711,252	0.6167	832,222	0.7215	1,543,474	1.3382
11	723,074	0.6269	820,400	0.7113	1,543,474	1.3382
12	735,092	0.6373	808,382	0.7009	1,543,474	1.3382
13	747,310	0.6479	796,164	0.6903	1,543,474	1.3382
14	759,731	0.6587	783,743	0.6795	1,543,474	1.3382
15	772,358	0.6696	771,116	0.6686	1,543,474	1.3382
16	785,196	0.6808	758,278	0.6574	1,543,474	1.3382
17	798,246	0.6921	745,228	0.6461	1,543,474	1.3382
18	811,514	0.7036	731,960	0.6346	1,543,474	1.3382
19	825,002	0.7153	718,472	0.6229	1,543,474	1.3382
20	838,714	0.7272	704,760	0.6110	1,543,474	1.3382
21	852,655	0.7393	690,819	0.5989	1,543,474	1.3382
22	866,827	0.7515	676,647	0.5867	1,543,474	1.3382
23	881,234	0.7640	662,240	0.5742	1,543,474	1.3382
24	895,881	0.7767	647,593	0.5615	1,543,474	1.3382
25	910,771	0.7896	632,703	0.5486	1,543,474	1.3382
26	925,909	0.8028	617,565	0.5354	1,543,474	1.3382
27	941,299	0.8161	602,175	0.5221	1,543,474	1.3382
28	956,944	0.8297	586,530	0.5085	1,543,474	1.3382
29	972,849	0.8435	570,625	0.4947	1,543,474	1.3382
30	989,019	0.8575	554,455	0.4807	1,543,474	1.3382
31	1,005,458	0.8717	538,016	0.4665	1,543,474	1.3382
32	1,022,169	0.8862	521,305	0.4520	1,543,474	1.3382
33	1,039,159	0.9010	504,315	0.4372	1,543,474	1.3382
34	1,056,431	0.9159	487,043	0.4223	1,543,474	1.3382
35	1,073,989	0.9312	469,485	0.4070	1,543,474	1.3382
36	1,091,840	0.9466	451,634	0.3916	1,543,474	1.3382
37	1,109,988	0.9624	433,486	0.3758	1,543,474	1.3382
38	1,128,437	0.9784	415,037	0.3598	1,543,474	1.3382
39	1,147,192	0.9946	396,282	0.3436	1,543,474	1.3382
40	1,166,260	1.0111	377,214	0.3270	1,543,474	1.3382
41	1,185,644	1.0280	357,830	0.3102	1,543,474	1.3382
42	1,205,351	1.0450	338,123	0.2932	1,543,474	1.3382
43	1,225,385	1.0624	318,089	0.2758	1,543,474	1.3382
44	1,245,752	1.0801	297,722	0.2581	1,543,474	1.3382
45	1,266,457	1.0980	277,017	0.2402	1,543,474	1.3382
46	1,287,507	1.1163	255,967	0.2219	1,543,474	1.3382
47	1,308,907	1.1348	234,567	0.2034	1,543,474	1.3382
48	1,330,662	1.1537	212,812	0.1845	1,543,474	1.3382
49	1,352,779	1.1729	190,695	0.1653	1,543,474	1.3382
50	1,375,263	1.1924	168,211	0.1458	1,543,474	1.3382
51	1,398,122	1.2122	145,352	0.1260	1,543,474	1.3382
52	1,421,360	1.2323	122,114	0.1059	1,543,474	1.3382
53	1,444,984	1.2528	98,490	0.0854	1,543,474	1.3382
54	1,469,001	1.2736	74,473	0.0646	1,543,474	1.3382
55	1,493,417	1.2948	50,057	0.0434	1,543,474	1.3382
56	1,518,239	1.3163	25,235	0.0219	1,543,474	1.3382

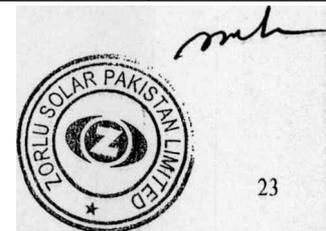
**Assumptions:**

Financing Rate: 6.65%

LIBOR rate 2.40%

Spread: 4.25%

US\$ Exchange rate: PKR 150



---

## 05 Prayer

In light of the foregoing, it is respectfully prayed that the earlier Determination may be reviewed based on the proposed technology and related factors, current market environment and consumer interest as per paragraph V and XI of the Latest CCoE Decision.

In terms of paragraph V of the CCoE decision, the Authority is also requested to allow a further period of 12 months for financial close of the Project.

Authority is requested to allow (a) change in technology, (b) decrease in EPC cost and capacity factor because of change in technology, (c) increase in project development cost because of the prolonged development period and re-performance of lenders due-diligence due to reasons discussed in this petition, (d) higher security cost (as part of PDC) as Project is in vicinity of CPEC projects, and (e) increase in the construction period to 10 months as allowed to other projects on similar technology.

Authority is further requested to maintain original decision (as per the Determination) with regard to debt equity structure, return on equity, other costs and all indexations, escalations, adjustments and sharing mechanism, as per para XI of Latest CCoE Decision. Any other relief that the Petitioner may be entitled to, be also allowed to the Project in the interest of justice.

Authority is also requested to approve a reference tariff table based on assumptions (LIBOR rate and Exchange rate parity) as requested in the petition.

Further any taxes, stamp duties, fees and levies (sales tax of non-refundable nature) etc. of federal, provincial, local or district governments, which are not factored in the tariff calculation are requested to be allowed as pass through.

Authority is kindly requested to process the Tariff Petition at the earliest thereby enabling ZSPL to proceed further with the development process.

Respectfully submitted on the behalf of Petitioner.



---

Zorlu Solar Pakistan Limited  
Dated: 28 May 2019