16th May 2017

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

Subject: Submission of the Tariff Petition of 100 MWp Solar Power Project of Zorlu Solar Pakistan (Private) Limited (Company)

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 Poser Act, 1997 read with Rule 3 of the NEPRA tariff Standards and Procedure 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. 01074433 dated 10-05-2017, amounting to PKR 901,008 (Pakistan Rupees Nine hundred one thousand and eight only) as requisite for fee for Tariff Petition as communicated by NEPRA.

b. Board Resolution of Zorlu Solar Pakistan (Private) Limited

c. Affidavit of Mr. Syed Mumtaz Hassan

Yours sincerely,

Syed Mumtaz Hassan
Country Manager
Zorlu Solar Pakistan (Private) Limited

ZORLU SOLAR PAKISTAN (PRIVATE) LIMITED

BEFORE
THE NATIONAL ELECTRIC POWER REGULATORY AUTHORITY (NEPRA)

TARIFF PETITION

PURSUANT TO NEPRA (TARIFF STANDARDS AND PROCEDURE) RULES, 1998
READ WITH THE PROVISIONS OF
THE REGULATION FOR GENERATION, TRANSMISSION AND DISTRIBUTION OF ELECTRIC POWER ACT (XL OF) 1997 & THE RULES AND REGULATIONS MADE THERE UNDER

ON BEHALF OF

ZORLU SOLAR PAKISTAN (PRIVATE) LIMITED

FOR NEPRA'S APPROVAL OF REFERENCE GENERATION TARIFF FOR ZORLU SOLAR PAKISTAN (PRIVATE) LIMITED

FOR A POWER PROJECT OF 100 MWP

AT

QAUID E AZAM SOLAR POWER PARK (EXTENSION), LAL SOHANRA, BAHAWALPUR, PUNJAB

DATED: 16 May 2017

ZORLU SOLAR PAKISTAN (PRIVATE) LIMITED
C -117, BLOCK-2, CLIFTON, KARACHI, PAKISTAN
TEL: +922135291682, +92 21 35875366
FAX: +92 21 35291681

COPY OF ZORLU SOLAR PAKISTAN (PRIVATE) LIMITED BOARD RESOLUTION

BOARD RESOLUTIONS

The following resolutions were discussed in detail by the Board and approved unanimously on 09.05.2017:

"RESOLVED THAT Zorlu Solar Pakistan (Private) Limited (a company incorporated under the laws of Pakistan with its registered office located at C -117, Block-2, Clifton, Karachi, Pakistan (the Company) be and is hereby authorized to file tariff petition (including any review petitions and any motion for leave for review) for submission to National Electric Power Regulatory Authority for determination of the reference generation tariff in respect of its 100 MWp Solar Power Project to be located at Qauid E Azam Solar Power Park [Extension], Lal Sohanra, Bahawalpur, Punjab (the Project) and in relation thereto, enter into and execute all required documents, make all filings and pay all applicable fees, in each case, of any nature whatsoever, as required."

"FURTHER RESOLVED THAT in respect of filing a tariff petition (including any review petitions and any motion for leave for review) for submission to National Electric Power Regulatory Authority, **Mr. Syed Mumtaz Hassan, Country Manager,** be empowered and authorized for and on behalf of the Company to:

(i) review, execute, submit, and deliver the tariff petition (including any review petitions and any motion for leave for review) and any related documentation required by National Electric Power Regulator Authority for the determination of the reference generation tariff, including any contact, documents, power of attorney, affidavits, statements, letters, forms, applications, deeds, guarantees, undertakings, approvals, memoranda, amendments, letters, communications, notices, certificates, requests, statements and any other instruments of any nature whatsoever;

(ii) represent the Company in all negotiations. Representations, presentations, hearings, conferences and /or meetings of any nature whatsoever with any entity (including, but in no manner limited to National Electric Power Regulatory Authority, any private parties, companies, partnerships, individuals, governmental and/or semi-governmental authorities and agencies, ministries, boards, departments, regulatory authorities and/or any other entity if any nature whatsoever);

(iii) sign and execute the necessary documentation, pay the necessary fees, appear before the National Electric Power Regulatory Authority as needed, and do all acts necessary for completion and processing of the tariff petition including any review petition (including any review petitions and any motion for leave for review) and procuring National Electric Power Regulatory Authority's tariff determination;

(iv) appoint or nominate any one or more officers of the Company or any other person or persons, singly or jointly, in their discretion to communicate with, make presentations to and attend the National Electric Power Regulatory Authority hearings;

(v) do all such acts, matters and things as may be necessary for carrying out the purposes aforesaid and giving full effect to the above resolutions/resolution."

"AND FURTHER RESOLVED THAT MR. SYED MUMTAZ HASSAN, COUNTRY MANAGER, be and is hereby authorized to delegate all or any of the above powers in respect of the forgoing to any other officials of the Company as deemed appropriate.

Mr. Olgun Zorlu
Chief Executive Officer

Mr. Mehmet Emre Zorlu
Director

Mr. Ömer Yüngül
Director

IN WITNESS THEREOF, I hereunder set my hands as such Secretary/Chief Executive and affixed the corporate seal of said company.

Mr. Olgun Zorlu
Chief Executive Officer

ZORLU SOLAR PAKISTAN (PRIVATE) LIMITED

COPY OF AFFIDAVITS

BEFORE
THE NATIONAL ELECTRIC POWER REGULATORY AUTHORITY

100 MWp SOLAR POWER PROJECT AT QAUID E AZAM SOLAR POWER PARK [EXTENSION], LAL SOHANRA, BAHAWALPUR, PUNJAB

AFFIDAVIT

I, Syed Mumtaz Hassan, Country Manager of Zorlu Solar Pakistan (Private) Limited, C -117, Block-2, Clifton, Karachi, Pakistan, do hereby declare and affirm on oath as under:

1. That the accompanying Tariff Petition has been filed before the National Electric Power Regulatory Authority and the contents of the same may kindly be read as an integral 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

Verified on oath at Islamabad on this 16th May 2017 that the contents of the above affidavit are true and correct to the best of my knowledge and belief.

Deponent

ATTESTED
ULAM JAVED KHAN (Advocate)
NOTARY

423d. 43/6039-) [illegible] [illegible] 42005

on behalf of Zorlu Solar Power Ltd

in favour of Nepra for filing of

Tariff petition 16 MAY 2017

MAQSOOD AHMAD
Stamp Vendor Lic No. 204
Islamabad

COPY OF BANK DRAFT

Account Payee Only

HBL HABIB BANK

S.C. No. 01074433

Stationary No: 01074433

D 1 | 0 | M 0 | 5 | 1 | 7

Pay to National Electric Power Regulatory Authority (NEPRA) or Order

Pakistan Rupee Nine Hundred One thousand Eight only

PKR ******901,008.00

Payable at any HBL Branch In Pakistan
Centralised Cheque Payable Account
30019903906586

Signatory
PA No. 7758

Signatory
PA No. 8252

Please do not write below this line.

⑈01074433⑈054300⑆00300199039065866⑈010⑈

Account Payee Only

HBL HABIB BANK حبیب بینک

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⑈01074433⑈054300⑆00300199039065 86⑈010⑈

HBL HABIB BANK حبیب بینک

01074433

Smart Cheque

Customer Advice

Cheque No. 01074433

Date 10-05-2017

By Order Of Zorlu Solar Pakistan Private Limited

WE CONFIRM HAVING ISSUED THE FOLLOWING SMART CHEQUE AT YOUR REQUEST

Favouring National Electric Power Regulatory Authority (NEPRA)

The Sum of: Pakistan Rupee Nine Hundred One thousand Eight only PKR :******901,008.00

Islamabad

Funding Account 07867911013703

Delivery Instruction :

Reference # 9052017

THIS IS A SYSTEM GENERATED ADVICE AND DOES NOT REQUIRE A SIGNATURE

TABLE OF CONTENTS

1. DETAILS OF THE PETITIONER

NAME AND ADDRESS

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

REPRESENTATIVES OF M/S ZORLU SOLAR PAKISTAN (PRIVATE) LIMITED

- **Mr. Syed Mumtaz Hassan**
  Authorized Representative, Zorlu Solar Pakistan (Private) Limited

2. REGULATORY FRAMEWORK LEADING TO TARIFF PETITION

2.1 NATIONAL ELECTRIC POWER REGULATORY AUTHORITY – THE COMPETENT AUTHORITY FOR DETERMINATION OF TARIFF

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**) 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**).

2.2 PROCESS LEADING TO TARIFF PETITION

2.2.1 Submission of the Feasibility Study and approval of the same

In compliance with the requirements laid out in the Punjab Policy and the Letter of Interest dated 17 January 2017 (the **LOI**), Zorlu Solar Pakistan (Private) Limited (**ZSPL**) completed the detailed feasibility study for the project and submitted the same to Punjab Power Development Board (**PPDB**) for their review (the **Project Feasibility Study**).

Following completion of its detailed review by the Panel of Experts, PPDB vide its letter # No. PPDB/432/2017 dated 13 March 2017 (the **Feasibility Study Approval Letter**), granted approval of the Project Feasibility Study submitted by ZSPL.

2.2.2 Request for Determination of Tariff

As:

(a) LOI granted by Government of Punjab (**Annex-A**),

(b) land for the project has been allocated within QA Solar Park (Extension), (**Annex-B**) by Government of Punjab

(c) grid has been allocated and interconnection study approved by NTDC (**Annex-C**),

(d) the Project Feasibility Study has been approved by PPDB (**Annex-D**),

(e) applicable environmental approvals have been obtained from Environment Protection Agency, Punjab (**Annex-E**),

(f) binding EPC arrangement for supply, construction, erection and commissioning of the project is in place (**Annex-F**),

(h) Project debt funding has been arranged (**Annex-G**) and sponsors have committed the required equity for the project,

(i) contractors are mobilized at the project site (**Annex-H**) .

Accordingly, it is submitted that the requirements of the regulatory process for applying to NEPRA for the tariff determination of ZSPL's 100 MWp power generation facility to be located at Quaid-e-Azam Solar Power Park (Extension) Lal Sohanra, District Bahawalpur, Punjab, Pakistan (the **Project**) have been completed.

2.3 SUBMISSION

Pursuant to the relevant provisions of the NEPRA Rules, read with the provisions of the NEPRA Act and the Rules and Regulations made there under; AND in view of compliance by ZSPL and Zorlu Enerji Elektrik Uretim A.S., **ZSPL SUBMITS HERE WITH** before NEPRA, the competent regulatory authority lawfully authorized to determine tariff for solar PV power generation companies, for its approval, a tariff petition (the **Tariff Petition**) for approval of:

(i) the reference generation tariff (the **Reference Generation Tariff**);
(ii) the Indexations and Adjustments;
(iii) Adjustments at commercial operations date; and
(iv) other matters set out in this Tariff Petition.

Given the advance stage of the Project, NEPRA is kindly requested to process the Tariff Petition at the earliest, thereby enabling ZSPL to achieve financial close and start generation by the 3rd quarter of 2017 as per the requirements of the Goverement of Punjab (**GoPb**).

3. EXECUTIVE SUMMARY

3.1 PROJECT SUMMARY

This Project is 'fast track' initiative of the GoPb, the LOI was issued on January 10, 2017 and land allocated on the condition that the Project is commissioned within 2017. Accordingly, ZSPL expeditiously carried out all the required studies to complete the feasibility for this Project. The feasibility study was submitted to PPDB in February 2017 and was approved by the Panel of Experts on March 10, 2017. The Project's grid interconnection study was approved by NTDC on April 19, 2017, while environmental study was approved by Environment Protection Agency, Punjab on May 02, 2017.

Since allocation of land and award of LOI, ZSPL has mobilized and committed funds and resources to move the Project forward towards financial close. ZSPL has both competent in-house financial, technical and legal teams as well as external legal, financial and technical consultants.

EPC Approach & Arrangement:

With the prime objectives of earliest Project completion, quality solution and lowest cost of energy, Zorlu Group based on its extensive experience adopted a hybrid EPC Model incorporating favorable elements of "multiple contracting approach" and "single EPC approach" for construction and commissioning of this Project. This hybrid approach was the only solution to ensure the availability of financing from the international lenders under the project finance structure, at the least cost and based on support and risk coverage from Zorlu parent company - Zorlu Holding A.S.

Based on above approach ZSPL appointed a Consortium consisting of Zorlu Enerji Elektrik Uretim A.S (**ZEEU**) and Zorlu Industrial Pakistan (Private) Limited (**ZIPL**) to carry out the EPC works. Accordingly, ZEEU and ZIPL will be entering into multiple contracts with renowned suppliers and service providers. ZEEU has already selected world class PV module vendor "First Solar USA Inc." and PV inverter supplier "Sungrow" for the Project.

First Solar:

First Solar is known for its superior thin film technology and is considered as one of the leading global providers of comprehensive photovoltaic (PV) solar systems based on advanced module and system technology. First Solar has developed, financed, engineered, constructed and currently operates many of the world's largest grid-connected PV power plants. Their experience across the solar value chain reduces risk while delivering more reliable, dependable and cost-effective solutions. First Solar's modules are amongst the highest quality, most reliable modules in the world, having passed the industry's most rigorous multi-stress testing protocols. ZSPL will be using the "First Solar's cadmium-telluride (CdTe) thin film solar modules (mix of FS4115-3 for 50 MW and FS4117-3 for remaining 50 MW)" that is characterized for its area efficiency and is benchmarked for industry-leading performance.

Sungrow:

Sungrow is a global leading PV inverter system solution supplier with over 31GW installed worldwide as of December 2016. Founded in 1997 by University Professor Renxian Cao, Sungrow is a global leader in research and development in solar inverters,

with numerous patents and a broad product portfolio offering PV inverter systems as well as energy storage systems for utility-scale, commercial, and residential applications. With a 20-year track record of growth and success, Sungrow has established 16 subsidiaries worldwide located throughout the Americas, APAC, the Middle East, Europe and Africa, maintaining a market share of over 20% in Germany and 10% in the world. ZSPL will be using "Sungrow SG 2500HV" PV inverter.

O&M Arrangement

For Operations and Maintenance (O & M) works during operations phase of the Project, ZSPL selected Zorlu O & M Pakistan (Private) Limited (ZOMP). For this purpose, an O & M arrangement between ZSPL & ZOMP is in process of finalization. Under O & M arrangement, 80% of total O & M cost will be incurred in foreign currency i-e US$ while remaining 20% will be in local currency.

Project Funding

The capital structure of the Project is envisaged at 75:25 (Debt: Equity). ZSPL intends to obtain 100% of the debt through foreign financing sources. International Finance Corporation (IFC), Asian Development Bank (ADB) and ECO Trade & Development Bank have provided their indicative commitment to contribute 100% of the required debt. The signed term sheets for the financing of the Project are attached to the petition as **Annexure G**. Zorlu Enerji Elektrik Uretim A.S. will own 100% of the Project.

3.2 SALIENT FEATURES OF THE PROJECT

Subject to the assumptions contained in this Tariff Petition, please find below a summary of the Project for NEPRA's perusal:

Project Company	Zorlu Solar Pakistan (Private) Limited
Sponsor	Zorlu Enerji Elektrik Uretim A.S.
Project Capacity	100 MWp
Project Location	Quaid-e-Azam Solar Power Park (Extension), Lal Sohanra, District Bahawalpur, Province of Punjab, Pakistan
Land Area	500 Acres
Concession Period	25 years from commercial operations date
Purchaser	Central Power Purchasing Agency (Guarantee) Limited
PV Modules	First Solar's cadmium-telluride (CdTe) thin film solar modules
Invertor	Sungrow SG 2500HV PV inverter
Energy Production	179.6 GWh net annum
EPC Contractor	Consortium of Zorlu Enerji Elektrik Uretim A.S (offshore) and Zorlu Industrial Pakistan (Private) Limited (onshore)

Project Capital Cost	*(US$ in '000)*	**Amount**
	EPC Price	96,800.0
	Non-EPC Cost & Project Development Cost	1,500.0
	Insurance during Construction	580.8
	Financial Charges	2,224.8
	Interest During Construction	1,129.7
	Total Project Cost (CAPEX)	***102,235.3***

Funding Plan	Debt 75%:Equity 25%
Equity	US$ 25.559 million
Long Term Debt	US$ 76.676 million
Lenders	*Foreign Financiers* • International Finance Corporation (IFC) • Asian Development Bank (ADB) • ECO Trade & Development Bank (ETTDB)

Terms of Long Term Debt	*Currency*	US Dollars (100%)	
	Term	Up to 15 years (door to door)	
	Grace Period	Up to 12 months	
	Repayment Period	14 years	
	Debt Repayment	In equal quarterly installments	
	Interest Rate	Base Rate: 3 months LIBOR Spread: 460 basis points	
O&M Contractor	Zorlu O & M Pakistan (Private) Limited		
			(US$ in '000)
Project Operation Cost	*Years*	*1 – 14*	*15 – 25*
	O&M Cost	1,200	1,200
	Insurance Cost	242	242
	Total Operating Cost	1,442	1,442
Levelized Tariff	Requested levelized tariff US¢ 6.000 per kWh at 11.93% rate of return on equity. (Levelized tariff would have been US¢ 6.579/kWh and US¢ 7.0675/kWh, had the rate of return on equity been requested at 16% as allowed to other RE projects and 19.43% based on CAPM method, respectively)		
Concession Documents	• Energy Purchase Agreement • Implementation Agreement • Government of Pakistan Guarantee • Site Lease Deed		
Applicable Policy	Punjab's Power Generation Policy 2006 – Revised 2009		
Technical Advisors	Renewable Resources (RE2)		
Financial Advisors	Bridge Factor		
Legal Counsel	Axis Law Chambers		
Current Status of the Project	***Major Tasks Completed***		
	✓ EPC & O&M arrangement	✓ Term sheet from Project lenders	✓ Topographical Study
	✓ Feasibility Study	✓ Solar Resource Assessment Study	✓ Electrical grid study
	✓ Transportation Study	✓ Geo-technical Study	✓ Land Allotted
	✓ Design of solar PV farm	✓ Environmental impact assessment	✓ LOI
	✓ Mobilization for construction works has started		

3.3 KEY FEATURES OF THE PROJECT

Amongst various other factors, the following are proposed as key strengths of the Project:

3.3.1 ZSPL offers an unprecedented Reference Tariff for solar project in Pakistan:

Zorlu Group, because of its experience in setting-up RE projects in Pakistan and abroad, is confident that it can setup a commercially viable solar PV project in Pakistan at the lowest possible tariff to set a precedent for other upcoming solar power projects in Pakistan.

The Zorlu Group's objective is in line with the recent statement of Turkish President Recep Tayyip Erdogan at the joint sitting of the Senate and National Assembly of Pakistan where it was acknowledged that

"The relations between Turkey and Pakistan are of exclusive nature far beyond diplomatic contacts between two states. We are two brotherly countries, not in words but in real meaning....."

By offering this tariff, Zorlu Group has significantly driven down the solar tariff and has changed the landscape of renewable energy projects in Pakistan.

3.3.2 Executed EPC Agreement with firm prices and fixed commercial operations date and O&M arrangement:

After considering the lenders requirements, the past transactions and fast track nature of the Project an EPC heads of agreement (the **EPC Agreement**) was signed on 15 May 2017 with the consortium of local and foreign parties, backed by guarantees from Zorlu Holding A.S. ZSPL is in process of finalizing the O & M arrangement for operations phase of the Project.

Furthermore, in view of Zorlu Holding's (main sponsor of ZSPL) strong commitment towards the Project and in order to lock the EPC price and the commercial operations date for the Project, ZSPL has made a legally binding commitment for payment of 15% of the contract amount to the EPC Contractor by a hard date, irrespective of achievement of financial close.

A copy of the EPC Agreement is attached hereto as **Annex-F**.

3.3.3 State-of-the-art Solar PV Modules & PV Inverter – FS4115-3/FS4117-3 & SG 2500HV:

The PV modules chosen for this project are FS 4115-3 (50MW) and FS4117-3 (50MW) which generate more energy than conventional crystalline silicon solar modules with the same power due to superior temperature coefficient and superior spectral response. These series 4™ PV modules are anti-reflective coated glass (Series 4A™) which enhances energy production. This PV module series is compatible with advanced 1500V plant architectures, gives highly predictable energy in all climates and applications, and is independently certified for reliable performance in high temperature, high humidity, extreme desert and coastal environments.

Sungrow SG 2500HV PV inverter provides maximum system efficiency up to 99% with ½ MPPT wide MPPT voltage range. This inverter model resists derating up to 50°C and its IP54 protection degree is suitable for harsh environment conditions.

3.3.4 Project Site – Lal Sohanra, Bahawalpur:

The site allotted is near Quaid-e-Azam Solar Park and there are four projects under development near the Project area. This will be the first solar farm being constructed in Qauid e Azam Solar Power Park -Extension (QASPE). The Sponsor has conducted various studies including geo-tech and road surveys to assess the viability of establishing a solar farm in QASPE. The Lal Sohanra is almost barren and consists of small bushes and sand dunes. The proposed location for the installation of the plant is totally barren land and there is no plantation in the vicinity of the Project area. Water level in this area is higher than in the upland. The soil is sandy. The upland is flat plains. General height of the area is from 118 to 127 meters above the sea level.

3.3.5 Commercially finalized foreign debt financing structure:

ZSPL has finalized the commercial term sheet for arrangement of financing for the Project with International Finance Corporation, Asian Development Bank and ECO Trade.

3.3.6 Experienced Sponsor:

Zorlu Group, through its energy wing, provides integrated services covering electricity and steam generation and sales, electricity distribution, electricity trading, turnkey power plant construction, operation, maintenance and repair, gas distribution and projects designed around trading. Worldwide total generation capacity installed, owned and managed by Zorlu's energy wing is 1046 MW.

3.3.7 Strong Project Team:

ZSPL has engaged leading consultants as Project advisors who have played a key role in the development of the RE sector in Pakistan.

Renewable Resources	– Technical Advisors
Axis Law Chambers	– Legal Counsel
Bridge Factor	– Financial Advisors

The project advisors are presently also advising various stakeholders of other IPPs and are playing a pivotal role in the consummation of most of the upcoming projects in the industry.

4. THE PROJECT & KEY CONSIDERATIONS

4.1 RATIONALE FOR SOLAR POWER

4.1.1 Pakistan's Current Electric Power Shortage

Pakistan currently has around 24.823 (State of Industry Report 2015) GW of installed capacity for electricity generation. Conventional thermal plants (oil, natural gas, coal) account for 67.74% of Pakistan's capacity, with hydroelectricity making up 28.67%, nuclear 3.17% and wind 0.43%.

Pakistan's huge energy crisis is jeopardizing its economic progress and social development. The major reasons for the energy crises are the lack of investment in power sector in the past, non-development of renewable energy sector i.e. hydel, wind and solar etc. and the depleting of oil and gas reserves. It is imperative for Pakistan to look for indigenous/cheap energy resources for sustainable growth through self-reliance.

One of the utilizable resources in the short term is solar power generation. Although it is a relatively new technology in Pakistan, it has a proven track record globally and is recognized as a commercially viable technology. With over 227 GW installed capacity around the globe and over 17.2 GW of installed capacity in India and China alone, the case for development of solar energy in Pakistan is very strong.

4.1.2 Solar Power Projects – A Natural Choice

To ensure a sustainable energy future for Pakistan, it is necessary that the energy sector be accorded a high priority. It is considered that solar power generation could become a significant contributor to Pakistan's electricity supply in the near future. The development of solar generation projects supports the environmental objectives of the Government of Pakistan by:

(a) reducing dependence on fossil fuels for thermal power generation;

(b) increasing diversity in Pakistan's electricity generation mix;

(c) reducing greenhouse gas emissions through the avoidance of thermal power generation; and

(d) helping in reduction of the exorbitant trade deficit.

4.1.3 The Solar Power Generation Potential & Government of Pakistan's Support

National Renewable Energy Laboratory of USA, estimates the solar energy potential of 2.9 million MW in the country. Pakistan being in the sunny belt is ideally located to take advantage of the solar energy technologies. This energy source is widely distributed and abundantly available in the country with about 2500-3000 sunshine hours and 1.9 - 2.3 MWh per m2 per year. It has an average daily global insulation of 19 - 20 MJ/m2 per day with annual mean sunshine duration of 8 to 8.5 hours a day. These values are among the highest in the world. For daily global radiation up to 23MJ/m2, 24 (80%) consecutive days are available in this area. If harnessed adequately, solar energy would eradicate energy shortages in the country. The Government of Pakistan is currently looking to build solar farms in the high solar irradiance areas.

The Government of Pakistan has clearly articulated its support for the development of renewable energies. Due to the fact that solar energy is one of the most economical and efficient of renewable energy production techniques, the focus is on supporting the development of solar farms through independent power producers (the **Solar IPPs**).

4.2 THE EPC CONTRACTOR: FIRM EPC COST AND FIXED COMMERCIAL OPERATIONS DATE

4.2.1 EPC Contractor Selection and the Turn Key EPC Agreement

Multiple contracts /.contractors:

The 'multiple contracting approach' involves multiple contracts and contractors who are involved in supply, erection, construction, commissioning etc. of the various parts of the plant.

This approach is highly efficient and cost effective (inevitably cheaper than the turn key EPC arrangement), however it exposes the sponsors/developers with risks related to non-timely completion, cost over-runs and under-performance of the plant.

Turnkey EPC:

Lenders to Pakistan IPPs are used to turnkey EPC contracts where there is, effectively, a single EPC contractor, responsible for timely completion, achievement of minimum performance levels, completing the project within cost/agreed price without escalation and change orders etc. These factors inherently increase the lenders' risk and accordingly lenders require the EPC arrangement to be lump sum, fixed price, date certain and turnkey, for allowing limited recourse project financing.

This form of contracting is time consuming and involves a substantial premium but mitigates significantly any risk on the project company and its sponsors / lenders.

The Solution:

The two approaches are distinct and used interchangeably all across the world, depending upon the economy of the relevant country and the stage & quantum of solar penetration in the utility scale projects as well as the key objectives of the project sponsors.

Given the particular dynamics of this project (i.e. the tariff number offered, start of construction from equity, the COD completion deadline etc.), on the one hand ZSPL required a solution which was readily available and which could, without compromising on quality, allow lower project cost, and on the other also provide the blanket completion coverages that the financiers of Pakistan IPPs are used to.
Since, certain companies of the Zorlu Group, unlike many of the other sponsors of Pakistan IPP sector, have both the ability and expertise to act as the 'turn-key EPC

contractors', the optimal solution was to enter into a turnkey EPC contract with its affiliated entities, and Zorlu Group can ensure:

(i) an unprecedented Reference Tariff on take and pay basis, that has already changed the solar landscape in Pakistan;

(ii) an EPC contract price that is lower, in line with the multiple contracting approach;

(iii) an EPC structure that is bankable (with the lenders relying on the completion guarantee provided by the Zorlu Group);

(iv) guaranteed completion of the plant under fast track implementation plan, as agreed with GoPB

The above EPC solution is designed keeping in view the state of development of solar industry in Pakistan, the premiums charged by EPC contractors for providing a "wrap", the lenders' strict requirement for turnkey EPC solutions and the GoPb's resolve to provide cheap electricity on fast track basis.

The approach implies that the Zorlu Group is taking unprecedented measures to bring the solar tariff to a reasonable level where it is below the energy purchase price of majority of the thermal power plants (new and old).

Turnkey EPC Agreement

As mentioned above in this Tariff Petition, ZSPL has already entered into an EPC Agreement and is in the process of working with the EPC Contractors of finalising the detailed form of the onshore agreement (the **Onshore Agreement**) and the offshore agreement (the **Offshore Agreement**).

ZEEU and ZIPL being the EPC contractors shall be responsible for the overall management, coordination and implementation of the Project. Being subsidiaries of the Zorlu Group, ZEEU and ZIPL will have access to Zorlu's international technical resources and parts distribution networks and have agreed to commit the same to the Project as part of their obligations set out in the EPC Agreement.

The EPC Agreement is attached at **Annex-F**

4.2.2 The Selected EPC Contractor – Zorlu Enerji Elektrik Uretim A.S.

Zorlu Energy Group was founded with the establishment of Zorlu Enerji Elektrik Üretim Inc. (Zorlu Energy) in 1993. Zorlu Energy is one of the leading actors of the industry with its balanced portfolio, experience and strong position in the domestic and regional market. Zorlu Energy Group is competent in providing integrated services, which comprises of production, distribution, sale and trade of electricity, generation of steam, turnkey installation of power plants, including the project development process,

long term operation, maintenance and repair of power plants and natural gas distribution, sales and trading.

Zorlu Energy is only company open to public and also it is the first company to calculate its carbon footprint in Turkey. Total installed capacity of the operating plants of Zorlu Energy is 1046MW. Electricity production portfolio of Zorlu Energy by sources constitutes of 7 hydroelectric, 4 wind, 3 geothermal and 3 natural gas power plants.

Zorlu Energy operates with the principle to make projects that contribute to sustainability in every way and envisage the variability of sustainable resources in its portfolio including geothermal and wind. Installed power of the company in geothermal is 140 MW and in wind is 271 MW. 45% of the total installed power of Zorlu Energy is based on renewable energy sources. Zorlu Elektrik Enerji Üretim A.S has done all the engineering, procurement and construction "EPC" activities of its projects by its own resources.

4.2.3 The Selected EPC Contractor – Zorlu Industrial Pakistan (Private) Limited

Zorlu Industrial Pakistan (Private) Limited (the Company) was incorporated on June 25, 2010 as a private limited company under the provisions of Companies Ordinance, 1984. The objects of the Company include management, administration and supervision of the works conducted for industrial, power plants and other infrastructure projects. During the year, the Company has successfully provided these services under an agreement to Zorlu Enerji Pakistan Limited, which has been completed during the year.

With an installed capacity of 56.4 MW, constructed in the Jhimpir region of Pakistan by Zorlu Energy Pakistan Limited, a wholly-owned subsidiary of Zorlu Energy, is the first wind farm backed by foreign capital in Pakistan. The Wind power plant in Jhimpir started commercial activity in July 2013. As the first wind farm to be realized via foreign investment, the plant supplies power to 350,000 houses for a period of 20 years. The facility generates approximately 159 million kWh of electricity per year and contributes to the growth of Pakistan's renewable capacity and to the lowering of the country's dependence on imported energy sources.

The plant received the award for "The Best Renewable Energy Financing in Middle East" by the Project Finance Journal in 2011.

Wind Power Plant is placed on Gharo-Keti-Bandar-Hyderabad wind corridor, contributes significantly to the increase in renewable energy installed power in Pakistan and helps reducing the foreign oil dependency.

It is highlighted, as one of the key strengths of the Project, that ZEEU & ZIPL appointment as the EPC contractors is based on a firm EPC price and confirmed commercial operations date, failing which the EPC Contractors will be liable to compensate (through liquidated damages) ZSPL for all its losses incurred due to the delay.

*ZSPL, therefore, humbly submits to NEPRA that its Tariff Petition is submitted on the basis of firm EPC cost (the **Firm EPC Cost**) and fixed COD.*

4.3 PROPOSED O&M CONTRACTOR - ZORLU O&M PAKISTAN (PRIVATE) LIMITED

Zorlu O&M Pakistan (Private) Limited (ZOMP or the **O&M Contractor**) provides services to 56,4MW Jhimpir Wind Power Plants. Expert operation teams of ZOMP conduct reliable, efficient and productive plants operations in accordance with production schedule and technical and environmental requirements. Weekly and monthly reports that include all site activities, detailed data of production and performance, inventory levels enable the plant owner to closely monitor progress of the production.

ZSPL is in process of finalizing the O&M arrangement with ZOMP, wherein the initial term of O & M arrangement for the Project will be fourteen years. Under the arrangement the O&M Contractor will procure to perform the required services, works and supplies under agreed standards, maintenance procedures, environmental plans and monitoring framework, thus minimizing the technical operational risk of the Project. The O & M arrangement will cover applicable performance standards of the Facility and provides a complete turn-key O&M solution for the Project.

4.4 TECHNOLOGY & EQUIPMENT

4.4.1 Technology Selection Criteria

The technology selected for the Project has been selected after detailed analyses of various power generation technologies available internationally for the purposes of solar power generation. The Zorlu Group reviewed a range of technologies for solar power generation. Various factors were considered in selection of equipment and technology that included:

(a) equipment to be of latest technology, high rated power and more efficiency;
(b) compliance of the proposed equipment with local climatic conditions;
(c) references and experiences of the equipment manufacturers under similar environmental conditions (e.g. temperature, solar farm size, area);
(d) sufficient track record of the equipment in the utility scale projects i-e 100 MWp project size or higher;
(e) cost of equipment to be competitive;
(f) energy output with guaranteed degradation and other performance guarantees;
(g) grid compatibility; and
(h) suitability of operation and maintenance concept for the size and location of projects with suitable availability of spare parts, consumables and main components.

4.4.2 The Selected Technology

After a consummate search and elaborate analysis, the following equipment has been selected for the Project:

A- PV Modules

MANUFACTURER	First Solar Inc USA
TYPE	Cadmium-telluride (CdTe) thin film solar modules
MODEL	FS4115-3 for 50 MW and FS4117-3 for remaining 50 MW
NUMBER OF MODULES	860,314
TOTAL INSTALLED CAPACITY	100 MWp

As a global leader in PV energy, First Solar's advanced thin film solar modules have set the industry benchmark with over 10 gigawatts (GW) installed worldwide and a proven performance advantage over conventional crystalline silicon solar modules. Generating more energy than competing modules with the same power rating, First Solar's Series 4™ and Series 4A™ PV Modules deliver superior performance and reliability.

a) *Proven energy yield advantage:* These PV modules generate more energy than conventional crystalline silicon solar modules with the same power due to higher temperature coefficient, superior spectral response and Anti-reflective coated glass (Series 4A™) that absorb maximum irradiation and thus enhances energy production.

b) *Advanced performance & reliability:* The technology is compatible with advanced 1500V plant architectures. These have also proven track record for highly predictable energy in all climates and applications and are independently certified for reliable performance in high temperature, high humidity, extreme desert and coastal environments.

c) *Certifications & tests:* First Solar's PV modules have passed following performance and quality tests;
   - PID-Free, Thresher Test1, Long-Term Sequential Test1, and ATLAS 25+1
   - IEC 61646 1500V, IEC 61730 1500V, CE
   - IEC 61701 Salt Mist Corrosion, IEC 60068-2-68 Dust and Sand Resistance
   - ISO 9001:2008 and ISO 14001:2004
   - UL 1703 Listed Fire Performance PV Module Type 102
   - CSI Eligible, FSEC, MCS, CEC Listed (Australia), SII1, InMetro

   First Solar provides a 25-year linear performance warrantee and a 10-year limited product warrantee.

B- PV Inverter

MANUFACTURER	SUNGROW
MODEL	SG 2500HV
NUMBER OF INVERTERS	34
INVERTER RATING	2500 kW

Sungrow is a global leading PV inverter system solution supplier with over 31GW installed worldwide as of December 2016. Founded in 1997 by University Professor Renxian Cao, Sungrow is a global leader in research and development in solar inverters, with numerous patents and a broad product portfolio offering PV inverter systems as well as energy storage systems for utility-scale, commercial, and residential applications. With a 20-year track record of growth and success, Sungrow has established 16 subsidiaries worldwide located throughout the America, APAC, the Middle East, Europe and Africa, maintaining a market share of over 20% in Germany and 10% in the world. The selected PV Inverter has following distinguishing features:

a) *Secured yield:* It provides maximum system efficiency up to 99% and ½ MPPT wide MPPT voltage range. It also resists de-rating up to 50°C and if one unit fails, other units maintain safety operation.

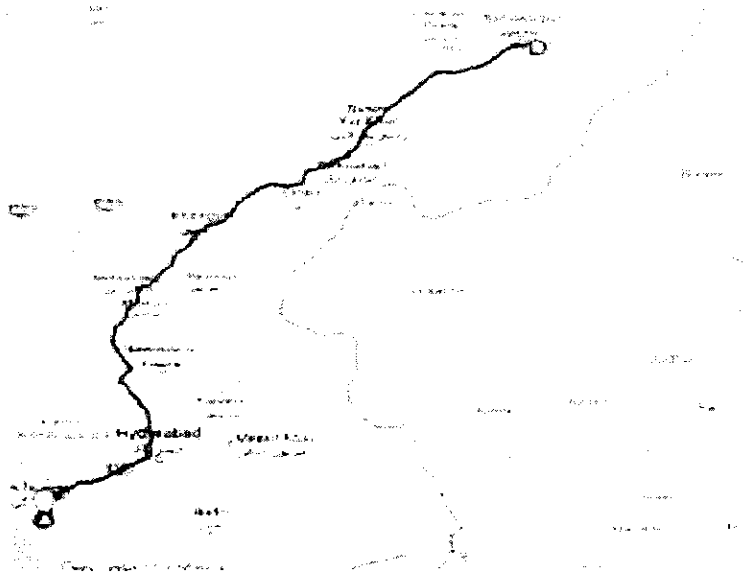
b) *Flexibility:* It provides complete grid support: LVRT, HVRT, ZVRT IP54 protection degree suitable for harsh environment condition.

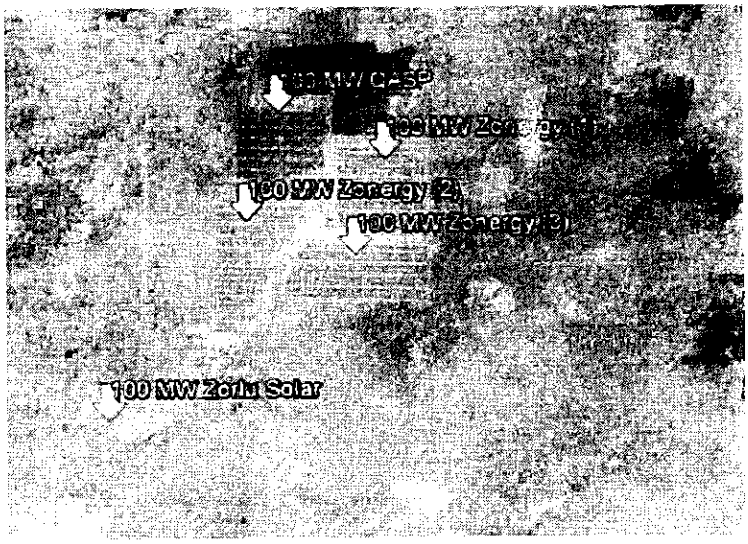
In addition to the above, this PV Inverter module is cost effective and easy to maintain.

The sponsor requires that only state-of-the-art equipment, capable of withstanding the harsh climatic conditions prevailing at the site, is used for the Project. Therefore PV Modules (that are directly exposed to climate conditions) are procured from vendors having their manufacturing facilities in Malaysia as opposed to other projects that procure their equipment from China.

4.5 THE SITE

The Project will be located near Bahawalpur, Punjab, towards approx. 660 kilometers Northeast of Karachi. Figure below shows general overview of the Site. 500 acres have been allocated to ZSPL in Quaid e Azam Solar Power Park (Extension) Lal Sohanra, District Bahawalpur, Punjab near 04 operational solar plants of 100 MW each.





The land allocation letter is attached as **Annex- B**

4.6 SITE CONDITIONS, INTERCONNECTION & ACCESSIBILITY

(a) Location of the Grid:

The Project site is located around 1 km from the 220 kV NTDC Lal Sohanra Grid Station. A separate electrical and grid interconnection study has been conducted for the project including 'Power Quality', 'Load Flow', 'Short Circuit' and 'Power Evacuation', that has been vetted and approved by NTDC (refer Annex-C).

(b) Site Accessibility:

The major route from Karachi to the site is a multi-lane road. The terrain is flat. In general, the route has no issue and access is available to the site area. The Bin Qasim Port is the proposed point of delivery of equipment from overseas and for the proposed point of delivery at site is located towards the southwest of the site.

(c) Climate Conditions:

The summer season begins in April and continues until October. June and July are the hottest months in Bahawalpur with its average high temperatures at 34.8°C, maximum temperature goes above 50°C. The coldest month is January with average temperature around 11.1°C. The average high temperatures rise to 34.8°C in June and fall to 25.2 °C with an average 21 mm of rainfall.

Bahawalpur has more than 8 hours of sunshine daily on average. The mean maximum and minimum temperatures for the coldest month are 12 and 5 degree Celsius respectively.

Rainfall towards the end of June, monsoon conditions appear and during the following two months the rainy season alternates with humid weather. The winter rain falls during December, January and February ranging from 18 to 21 millimeters.

4.7 POWER OFF-TAKE AND THE GOVERNMENT OF PAKISTAN'S IMPLEMENTATION AGREEMENT

The electricity generated through the Project will be sold to Central Power Purchasing Agency Guarantee Limited on behalf of ex-WAPDA distribution companies (the **Purchaser**) pursuant to the energy purchase agreement (the **EPA**), which in turn will distribute and modulate the electricity generated by ZSPL.

In furtherance of the Government of Pakistan's model for setting up IPPs in Pakistan, ZSPL will also enter into an Implementation Agreement (the **IA**) with AEDB in respect of the Project.

The EPA will be finalized and executed by and between ZSPL and the Purchaser and the IA will be finalized and executed by and between ZSPL and the Government of Pakistan (through AEDB), in each case, following NEPRA's approval of ZSPL's 25 years Reference Generation Tariff the grant of a generation license to ZSPL and after execution of the tripartite LOS with AEDB and PPDB.

4.8 ESTIMATED OUTPUT

In line with PPDB's guidelines, the Project's technical consultant - Renewable Resources (one of Pakistan's leading consultants on renewable energy technology) carried out detailed evaluations to estimate the energy production for the Project, based on:

(a) the technical specifications of the plant components;
(b) the site conditions; and
(c) layout.

The summary of the results is as follows:

GROSS DC CAPACITY	100 MWp
NET CAPACITY FACTOR	20.5 %
ANNUAL ENERGY GENERATION	179,598 MWh

4.9 PROJECT COST AND CAPITAL STRUCTURE

Based on the assumptions contained in this Tariff Petition and in light of the proposed discussion contained in Section 5, the proposed Project cost is USD $102,235,318 (United States Dollars One Hundred Two Million Two Hundred Thirty Five Thousand Three Hundred & Eighteen Only) (the **Project Cost**).

The planned financing of the Project Cost is by:
(a) 25% equity (the **Equity**); and
(b) 75% debt (the **Debt**).

4.10 MAIN SPONSOR – ZORLU GROUP

Foundations of the Zorlu Group were laid in 1953 by establishment of the Zorlu Mensucat Denizli. Pursuing its operations via leading and powerful companies engaged in the fields of textiles, consumer electronics, information technology, white goods, energy, property development, and mining & metallurgy, the group is focused on creating and increasing permanent added-value to Turkey. Zorlu Group is acknowledged for its sense of responsibility towards future generations that is evident from its activities and projects contributing towards better economy, environment, community, and a sustainable and reliable future drawing on its corporate values and principles.

TEXTILES GROUP: The Group's product portfolio consists of threads and home textile products. The largest integrated polyester thread manufacturer and exporter in the Middle East and Europe; the leading home textiles manufacturer in Europe. Main products include polyester yarn, curtain and cotton based home textiles.

VESTEL GROUP of COMPANIES: One of Turkey's and Europe's leading producers of consumer electronics, IT, white goods and defense technologies driven by strong R&D. Vestel is Turkey's hallmark in technology exports to the world. With its

diversified product portfolio based on its technology and design development capability. Vestel caters to different consumer tastes in 152 countries. Vestel undertakes manufacturing in Manisa, at Vestel City, one of the largest industrial complexes in Europe to undertake production activities under a single roof.

ENERGY GROUP: Integrated services covering electricity and steam generation & sales, electricity distribution, electricity trading, turnkey power plant construction, operation, maintenance and repair, gas distribution and projects designed around energy trading. Total installed capacity is 1046 MW.

In Pakistan, Zorlu Energy Group established its footprint by installing a wind farm project of 56.4 MW capacity, constructed in the Jhimpir region of Pakistan through Zorlu Energy Pakistan Limited, which is a wholly-owned subsidiary of Zorlu Energy. The project is recognized as a milestone in wind power industry of Pakistan as it was the first wind farm backed by foreign capital.

PROPERTY GROUP: Development & Investment, a Zorlu Holding company, was founded in 2006 in order to develop and sell, lease or manage high quality residences, office space, business plazas, shopping centers, hospitals, hotels and warehouses on prime property in and out of Turkey. Outstanding real estate projects designed around modern architectural concepts, comfort and functionality.

MINING & METALLURGY: Developing its mineral deposits with the goal of becoming a regional supplier of different forms of nickel and cobalt, Meta Nikel has nickel and cobalt investment projects in Turkey.

With more than 60 companies in Turkey, Pakistan & Russia and with about 23,000 employees, today Zorlu Holding A.S. continues to work for the future and to improve the quality of life of people everywhere. Zorlu Holding A.S. Turkey is the ultimate holding company in the Zolu Group.

4.11 CARBON CREDITS

The Clean Development Mechanism (the **CDM**) is one of the flexible, project-based mechanisms for greenhouse gas emission reductions (the **GHG**) under the Kyoto Protocol. By using the CDM, two countries can jointly develop GHG emission reductions projects. While the project proponents in the host country sell the emission reductions from the project as Certified Emission Reductions (the **CERs**), project participants in the partner country act as the CER buyer. In this set-up, the host country of the project benefits from domestic investment and technology transfer. For the owners of the CDM project, selling CERs means additional revenues to the project. Each CER represents one ton of carbon dioxide equivalent abated by the project.

The CDM was initiated under the Kyoto Protocol of the United Nations Framework Convention on Climate Change (the **UNFCCC**) in order to explore cost- effective options to mitigate the impacts of climate change. It is one of the instruments that help the developing countries in achieving sustainable development, while at the same time contributes to the ultimate objective of the UNFCCC. CDM assists the developing countries to implement project activities that reduce GHG emissions in return for generating carbon credits/ CERs.

Pakistan deposited its instrument of accession to the Kyoto Protocol on January 11, 2005, and thus became eligible to benefit from CDM. For this purpose, the Ministry of Environment has been declared as the Designated National Authority (the **DNA**). A 'CDM Cell' was established in Pakistan in August 2005 for providing technical and policy support to conduct awareness raising, enhancement of capacity for CDM project development, review of CDM projects for grant of approval by the DNA and to advise the Government of Pakistan in technical matters related to CDM in Pakistan. It was also established to implement the CDM strategy.

Pakistan national operational strategy for CDM was approved by the Prime Minister of Pakistan in February 2006. The strategy provides policy guidance for implementation of CDM in Pakistan in line with national sustainable development goals. It is an incentive based strategy that ensures efficiency and transparency. The strategy defines institutional arrangement for implementation of CDM in Pakistan, tax and credit sharing policy and the criteria grant of host country approval to CDM projects.

While it appears possible that the Project may be able to realize monetary gains from such carbon credit schemes, the actual timing, amount, and other details of the outcome are quite uncertain at this point. It is thus proposed that the Reference Generation Tariff for the Project be approved irrespective of the outcome of the carbon credits.

However, if any CER related revenues are realized, it is submitted that they will be shared as per the policy of the Government of Pakistan. Regardless of the outcome, ZSPL has already initiated the CDM project for the Project at its own cost and negotiations with various internationally reputed CDM consultants have already been initiated to complete the CDM project

5. PROJECT COST AND TARIFF

5.1 PROJECT COST SUMMARY

The total Project Cost, expressed in United States Dollars, has been calculated after thorough analysis, evaluation and understanding of the dynamics that affect the development and operation of a solar PV project. The reference exchange rates used to convert the relevant costs into United States Dollars are USD 1 = PKR 105.

For NEPRA's benefit and approval, a summary of the Project Cost is given below:

SR. NO.	INVESTMENT / COST	USD IN THOUSANDS
1.	EPC COST	96,800.00
2.	NON-EPC & PROJECT DEVELOPMENT COST	1,500.00
3.	PRE-COD INSURANCE COST	580.80
4.	FINANCIAL CHARGES	2,224.82
5.	INTEREST DURING CONSTRUCTION	1,129.70
	TOTAL PROJECT COST	**102,235.32**

5.2 DETAILS OF PROJECT COST

5.2.1 EPC Cost

The breakup of costs contained in the EPC Agreement are as follows:

(Figures in Thousands)

SR. NO.	COST HEAD (IN MILLIONS)	USD
1	OFFSHORE AGREEMENT	76,700
2	ONSHORE AGREEMENT	20,100
	TOTAL EPC COST	**96,800**

The EPC Cost includes the cost of 860,314 (Eight Hundred Sixty Thousand Three Hundred and Fourteen) PV Modules, 34 (Thirty Four) PV inverters, electrical equipment, together with ancillary equipment and other goods, systems and machinery and includes the cost of, inter alia, the erection, testing, completion and commissioning of the equipment and construction of the facility that is capable of fulfilling the intended purpose.

The EPC Cost also includes; staff accommodation (construction of the camping building(s)), supply of drinking water and electricity (to camping buildings), catering services for the staff, certain project vehicles, standby generator (including fuel) , site security during construction period and internal access roads.

It is pertinent to mention here that EPC Contractors normally require confirmed LCs for projects undertaken in Pakistan, which cost around 2% of the offshore component. However, under EPC structure adopted by ZSPL, confirmed LC is not required as a result of which substantial savings have been achieved.

ZSPL will pay, as mobilization advance, 15% (aggregate) of the total amounts payable to the EPC Contractor pursuant to the EPC Agreement upon achievement of the following milestones:

(a) issuance of 'Preliminary Notice to Commence'; and
(b) tariff determination by NEPRA.

To meet the aggressive timelines given by PPDB, ZSPL intends to initiate full scope work on the Project and completely mobilize the EPC Contractor upon the issuance of acceptable tariff by NEPRA through upfront equity injection. These activities normally commence upon achievement of financial close.

The above costs are subject to escalations in accordance with the EPC Agreement if the above milestones are not timely achieved.

The sponsors while ensuring state-of-the-art equipment that is capable of withstanding the harsh climatic conditions prevailing at the site also achieved an unprecedented low solar tariff. The efforts made in this regard are evident from the fact that the EPC cost, achieved by ZSPL, is significantly lower compared to the EPC costs allowed in previous upfront solar tariff determinations issued by NEPRA till date, while there is also a discount if it is compared with the EPC cost assumed in last Suo-Moto proceedings initiated by NEPRA in May 2016. However kindly note that appropriate comparisons would be on overall Project Cost and Levelized Tariff, as ZSPL EPC cost also include certain Non EPC and project development cost elements like staff accommodation building(s), certain project vehicles and standby generator etc. required at Project site which can not be separated from EPC cost.

5.2.2 Non-EPC and Project Development Cost

The Non-EPC Cost includes the cost of items that are not part of the EPC Contractor's scope of work pursuant to the EPC Agreement while Project development costs include the costs incurred for the purpose of Project development and all costs, fees and expenses incurred or to be incurred for such purpose. These costs include, inter alia, costs of feasibility studies, topographical survey of land, geotechnical investigation of land, electric grid interconnection studies; fees of consultants; costs related to the bank guarantee to be furnished to PPDB, costs related to the Purchaser letter of credit to be furnished to the Purchaser pursuant to the provisions of the EPA, various regulatory fees to be paid to NEPRA and other governmental agencies, costs incurred during ZSPL's formation and capital enhancement; and costs relating to various permits for the Project, land cost, post financial close technical supervision and site security etc.

A breakdown of some of such costs is provided below:

SR. NO.	COST	USD IN 000'
1.	Consultancy Costs & Technical Studies – Pre-Financial Close	655.0
2.	Owner's Engineer Supervision – Post Financial Close	150.0
3.	Independent Engineer - Pursuant to the EPA	100.0
5.	Permits, Permissions and Related Costs	50.0
6.	Site, Security and Infrastructure	350.0
7.	Administration Cost	120.0
8.	Travelling Costs	75.0
	TOTAL NON-EPC & PROJECT DEV. COST	**1,500.0**

(a) Consultancy Costs & Technical Studies- 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 from all 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.

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

ZSPL will engage an experienced engineering supervision team to ensure the contractor's compliance with the relevant contracts, as well as reporting on progress and budget. The construction supervision team will comprise a site engineer supported by technical experts. The Owner's Engineer will also conduct review of proposed designs, construction monitoring and witnessing of key tests to ensure project's success.

(c) Independent Engineer:

ZSPL is required to engage an Independent Engineer pursuant to the EPA. Under the terms of the EPA the Independent Engineer will be a firm of engineering consultants that would be appointed and hired by ZSPL, with the approval of the CPPA, to monitor the construction of the Complex and Commissioning and to deliver the related certificates and carry out all of the responsibilities specified in the EPA, including certifying the results of the commissioning tests, readiness of interconnection facilities and synchronization.

(d) Permits, Permissions and Related Costs:

During development and construction of the Project ZSPL will incur costs related to various fees and charges payable in respect of permits and permissions required from various authorities and regulatory bodies including but not limited to cost

of bank guarantees for LOI and LOS, SBLC in favor of power purchaser, NOC from competition commission, LOI Fee, AEDB/PPDB facilitation and legal fee, NTDC vetting charges for Grid Electrical Grid Studies, NEPRA fee and charges, registration and other charges to SECP etc. to be incurred during development and construction of the Project.

(e) Site, Security and Infrastructure:

This head includes upfront payment of the site lease for 25 years and costs related to site leveling & preparation, site access, infrastructure, electricity connection and security costs etc. ZSPL is also responsible for the security of its local and foreign personnel and the EPC contractors' staff.

(f) Administration Costs:

ZSPL's head office is based in Karachi and branch office in Lahore. Lahore office will coordinate the project related activities and liaison with various government agencies in Pakistan while the head office in Karachi will coordinate with lenders regarding the financing arrangements up to COD. In addition there will be a site office with limited accommodation to coordinate the construction and monitoring activities at site. 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.

(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.

Any other cost that relates to development and construction of the Project, if incurred, will be provided at True-up stage

5.2.3 Pre-COD Insurance Cost

Pre-COD Insurance Cost covers the insurance cost of ZSPL's assets during construction and the same are incurred prior to COD. These cost estimates have been developed based on the ZSPL's determination to obtain Pre-COD insurance at relatively lower rates (0.60% of EPC cost) at the strength of its Zorlu Group.

However in the any event ZSPL cannot arrange the insurance at 0.60%, due to any reasons beyond its control, NEPRA is requested to allow the actual Pre-COD Insurance Cost at actual up to 1.0% of the EPC cost in line with earlier tariff determinations by NEPRA for other IPPs.

ZSPL, in view of the practices set by other IPPs in Pakistan and in accordance with the requirements set out by the lenders funding the Project, intends to procure the following insurances during the construction phase of the Project:

(a) Construction All Risk Insurances (CAR);
(b) CAR Delay in Start-up Insurance;
(c) Terrorism Insurance;
(d) Marine and Inland Transit Insurance;
(e) Marine - Delay-In Startup Insurances; and
(f) Comprehensive General Liability.

The premiums payable under the above stated Pre-COD insurances do not include the administrative surcharge, the Federal Insurance Fee and the Federal Excise Duty, and ZSPL prays that the same kindly be allowed by NEPRA as part of the One-Time Adjustments allowed at the time of COD.

ZSPL requests to allow pre-COD insurance cost at 0.60% of EPC however in case of an deviation NEPRA is requested to allow the actual Pre-COD Insurance Cost capped at 1.0% of the EPC cost in line with earlier tariff determinations by NEPRA for other IPPs.

5.2.4 Financial Charges

Financial Charges include the costs related to the debt financing of the Project. Such costs include, inter alia, the lenders' up-front fee and commitment fee; mandate and processing fee, fees payable, and stamp duty applicable on the financing documents; agency fee; security trustee fee; lenders' Project monitoring fee and the fees for the lenders' various advisors.

These financial charges are in line with the prevailing market conditions and practices applicable for project financing transactions and as allowed by NEPRA in its other tariff determinations. The term sheets for arrangement of debt financing agreed with the lenders are attached with this Tariff Petition (**Annex-G**).

ZSPL requests NEPRA that as ZSPL has not considered any duties and taxes on account of Financial Fees and Charges, any duties and taxes if applicable on account of these costs may kindly be allowed as adjustment for actual cost at the time of COD.

5.2.5 Interest During Construction

The Interest During Construction (the **IDC**) has been calculated on the basis of the term sheets executed between ZSPL and the lenders, which stipulate a base rate equal to 3 months LIBOR plus a margin in the range of 460 - 475 basis points (USD financing). However, ZSPL expects that financing will be available at LIBOR plus 460 basis points and has assumed this rate for the development of the Tariff Petition.

Actual IDC, however, shall be subject to change depending on the fluctuations in base rate (i.e. 3-month LIBOR), funding requirement (draw-downs) of the Project during the construction period, changes in Project Cost including changes due to Taxes and Duties, and variations in PKR / USD exchange rate.

BASIS FOR IDC CALCULATIONS	3 – MONTH LIBOR
BASE RATE	0.60%
SPREAD	4.60%
TOTAL INTEREST RATE	**5.20%**

IDC, at this stage, is an estimated figure, which is adjustable at COD, based on actual LIBOR, timing and amount of loans drawdown during the Project construction period after financial close, therefore, it is prayed that NEPRA kindly allow adjustment for the same at the time of tariff true-up at COD.

5.2.6 Permanent Working Capital

Inflow of Funds During Operating Period:

Under the terms of the EPA to be executed between ZSPL and the Purchaser, ZSPL shall invoice the Purchaser for the settlement of the Monthly Energy Payment on or after the first day of the month following the month to which the Monthly Energy Payment relates. The Purchaser has to make the payment of the same by the thirtieth day following the day of submission of the invoice i.e. 31st day.

Outflow of Funds & Requirement for Working Capital:

(a) ZSPL is required to collect sales tax from the Purchaser on behalf of the Government of Pakistan and deposit the same by the 25th day of the month to which it relates. However, as explained above, the Purchaser is only obligated to make payment to ZSPL against the invoice raised within 30 days from the date of invoice – thus creating an inherent mismatch in the availability of cash flows to ZSPL for settlement of its liabilities.

(b) The terms of debt financing stipulate repayment of debt on quarterly basis commencing from COD. By the time the first repayment is to be made to the lenders, assuming the Purchaser pays without even one day of delay, ZSPL would have received 2 only months of revenue in accordance with the 30-day payment terms under the EPA. Thus a permanent shortfall of 1/3rd of the debt installment would be created which ZSPL intends to fund through upfront permanent working capital; this requirement is standard in all financing transactions of this type.

(c) Besides above there is also an expected mismatch of cash flows for meeting O&M expenses.

Zorlu Group has agreed to provide a working capital line to ZSPL without any cost. Accordingly, the Petitioner will not claim any cost of such working capital, which will ensure a cost-effective tariff.

5.2.7 Taxes & Customs Duty

(a) Customs Duty:

The amount of customs duty to be paid on renewable energy projects is to be calculated based on Section 18(1A) of the Customs Act 1969 read with Serial 11 to the Part I of Fifth Schedule of the Customs Act 1969 (the Schedule), which allows Customs Duty at a rate of Zero% for the following items;

"Machinery, equipment and spares meant for initial installation, balancing, modernization, replacement or expansion of projects for power generation through nuclear and renewable energy sources like solar, wind, micro-hydel, bio-energy, ocean, waste-to-energy and hydrogen cell etc."

Accordingly, ZSPL has assumed Zero% customs duty regarding imported plant, equipment, machinery etc. in accordance with the above.

However, in case of applicability of any duty, ZSPL prays NEPRA to allow adjustment of capital cost of the Project and tariff at COD, for actual customs duty paid.

(b) Special Excise Duty:

Special Excise Duty is assumed at Zero%, as the same is correlated with the rate of customs duty (discussed above - Zero Rated). In case the Project has to pay customs duty then the Special Excise Duty at 1% is levied. Accordingly, ZSPL requests NEPRA to kindly allow adjustment in capital cost of the Project and the tariff at COD, for actual special excise duty paid.

(c) Sales Tax:

No Sales Tax is assumed on import and local supply of the imported plant, equipment, and machinery etc., as per Sixth Schedule (the Schedule) to the Sales Tax Act 1990 read with Section 13 (1) of the Sales Tax Act 1990 wherein exemption from applicability of sales tax is provided. Serial # 7 of the Schedule cites following items which are exempt from sales tax:

"1. Machinery, equipment and spares meant for initial installation, balancing, modernization, replacement or expansion of projects for power generation through nuclear and renewable energy sources like solar, wind, micro hydel bio-energy, ocean, waste-to-energy and hydrogen cell etc."

Furthermore, for the purpose of this Tariff Petition, ZSPL has not taken into account the impact (if any) of the Punjab Sales Tax on Services Act, 2012. The true implications and procedures with regard applicability of the 'Punjab Sales Tax of Services Act, 2012' are not clear at this time, however, in case the said Sales Tax on services become applicable on the EPC Onshore Agreement, then the related impact will be adjusted against output sales tax on electricity sales receipts (post COD) and there will be no impact on the Project Cost because of provincial sales tax on services.

However, in case of change in laws by virtue of which if either (a) federal sales tax applicable on procurement of plant, machinery and equipment becomes applicable, or (b) provincial sales tax on services does not remain adjustable

against sales tax charged on sale of electricity, the same is requested to be adjusted in Project Cost and Tariff allowed at COD / Tariff true-up stage.

(d) Advance Income Tax:

Advance Income Tax @ 0.00% (Zero Percent) has been assumed at the time of import of machinery, equipment, goods, spares and materials for the Project in line with exemption provided under Section 53 of the Income tax Ordinance 2001, read with clause 77 to the Part II of 2nd Schedule to the Income Tax Ordinance, as reproduced hereunder

"(77) Provisions of section 148 and 153 shall not be applicable on import and subsequent supply of items with dedicated use of renewable sources of energy like solar and wind etc., even if locally manufactured, which include induction lamps, SMD, LEDs with or without ballast with fittings and fixtures, wind turbines including alternator and mast, solar torches, lanterns and related instruments, PV modules (with or without) the related components including invertors, charge controllers and batteries.".

However, in case of change in laws before import of related plant, equipment and machinery by virtue of which such advance income tax rate is increased from currently applicable zero percent then the same is requested to be adjusted in Project Cost and Tariff allowed at COD / Tariff true-up stage.

(e) Sindh Infrastructure Development Surcharge (SIDS):

Since SIDS is dependent upon the weight and distance covered in the Sindh province from the port for delivery of imported plant, machinery, equipment and other ancillary items to the Project site, ZSPL has not assumed Sindh Infrastructure Development Surcharge on account of imports under the Off-Shore Contract, and same is requested to be allowed for adjustment in the Project Cost/ tariff at the COD /true-up stage.

(f) Federal Excise Duty (FED):

FED on the payments to be made to (1) local financial institutions; and (2) insurer's, has not been assumed. In case FED is levied on the financial advisors and lead arrangers' fee, debt arrangement fee and commitment fee, L/C commission and charges, loan administration charges, and insurance premium the same should be allowed as pass-through under the tariff.

The taxes and duties are requested to be adjusted at actual at the COD stage tariff adjustment / Tariff true-up.

5.3 PROJECT COST COMPARISON WITH NEPRA'S PREVIOUS UPFRONT TARIFFS

The Petitioner respectfully submits hereunder a comparison of proposed levelized tariff and Project costs with NEPRA's previous upfront tariffs.

Project Cost & Tariff comparison	USD/MWp					
	Proposed by ZSPL	Suo-Moto May 2016	Upfront Tariff Dec, 2015	Upfront Tariff May, 2015	Upfront Tariff Jan, 2015	Upfront Tariff Jan, 2014
EPC Cost	968,000	968,847	1,071,431	1,358,865	1,358,865	1,692,708
Non-EPC & PDC	15,000	60,468	60,468	80,158	80,158	132,000
Pre-COD Insurance Cost	5,808	9,688	10,714	10,191	10,191	12,695
Base Project Cost / Sub-total	988,808	1,039,003	1,142,613	1,142,613	1,449,214	1,837,404
Financial Charges	22,248	23,378	29,994	38,042	38,042	48,232
Interest During Construction	11,297	18,544	21,334	38,042	38,042	15,052
Total Project Cost - USD/MWp	1,022,353	1,080,925	1,193,941	1,514,314	1,514,314	1,900,688
Savings 100 MW - USD		5,857,180	17,158,780	49,196,080	49,196,080	87,833,430
Levelized Tariff - US¢/kWh	6.0000	9.4511	10.7251	14.1516	14.1516	16.3063

Above comparison indicates that the Project cost and ZSPL's proposed levelized tariff is substantially lower than the previously allowed project costs and levelized tariffs.

It is also pertinent to mention here that in all previous up-front tariff determinations and suo-moto proceedings, NEPRA has benchmarked crystalline silicone technology based on which a capacity factor of 17.5%-18% was considered. However, ZSPL plans to use thin film technology, which is considered superior to crystalline silicone technology and has proposed a capacity factor of 20.5%, at almost same EPC price.

The thin film technology envisaged to be used by ZSPL is of First Solar's PV modules that are frame-less/ glass-to-glass solar panels and is one of only five modules in the world to pass following tests that are in addition to standard IEC tests:

- Atlas 25+ Test; a proprietary multi-dimensional durability test program that provides third party confirmation about long-term durability of PV modules. ,
- Thresher Test; gathers and reports degradation through the course of the test sequences - test terminates if power output degrades more than 20% from initial test data, and
- TUV Long-Term Sequenual Test; that verifies quality - failure is based on more than 20% power loss.

6. PROJECT FUNDING STRUCTURE (DEBT & EQUITY)

6.1 THE FUNDING ARRANGEMENT

The Project Cost will be funded on the basis of a Debt: Equity ratio of 75:25, thereby resulting in the following capital structure for the Project:

		USD IN '000
DEBT	FOREIGN (100%)	76,676.5
EQUITY		25,558.8
TOTAL PROJECT COST		102,235.3

6.2 BRIEF ABOUT DEBT AND EQUITY FINANCING

The envisaged debt-equity structure of the Project is 75:25 implying a total debt requirement of USD 76.677 million (based on a project cost of USD 102.235 million).

The debt financing will be funded in the following manner:

- US$ 25.558 million by International Finance Corporation (IFC),
- US$ 40.000 million by Asian Development Bank (ADB), (Out of this US$ 40, M, an amount of up to $20 million of may be provided by ADB as trustee of the Leading Asia's Private Sector Infrastructure (LEAP) Fund - an ADB administered trust fund by Japan International Cooperation Agency).
- US$ 11.117 million by ECO Trade and Development Bank (ETDB)

Debt amount will be denominated in USD (repayment in USD, interest payments to be indexed to LIBOR).

Based on the current Project cost estimates, the equity required to be injected by the Sponsor amounts to USD 25.559 million. The principal Sponsor, Zorlu Group through its subsidiary Zorlu Enerji Elektrik Uretim A.S. will subscribe for 100% of the equity requirement.

6.3 RETURN ON EQUITY

The Tariff Standards prescribed under Rule 17.3(ii) of the Tariff Rules require that the return on investment should be "*commensurate with other investments of comparable risk*". In this regard it is submitted that:

- NEPRA has allowed 17% return to hydel projects where the hydrology risk and unforeseen soil conditions are both well mitigated under the Power Purchase Agreement and NEPRA's tariff guidelines which permit a "3 stage" tariff process permitting a reopening of the tariff parameters, whereas resource risk in solar power projects rests with the project companies/ sponsors.

- Solar and wind energy projects were allowed IRR based ROE at 17% in previous upfront tariff determinations by NEPRA. However, in a recent Determination for Wind Power Generation Projects dated 27th January 2017 and "Suo Moto

Proceedings for Development of New Tariff for Solar PV Power Projects", by NEPRA, an ROE of 16% on IRR basis has been allowed to RE Projects.

Provided hereunder are CAPM calculations for assessment of ZSPL's rate of return, NEPRA's consideration:

6.4.1. Calculation of ROE under Capital Asset Pricing Model (CAPM)

Based on the internationally accepted methods for calculation of required rate of returns, the required rate of returns is follows:

Required Return Calculations	
Risk-Free rate	2.38%
Equity Market Return (S&P 500)	7.70%
Re-levered Beta	1.82
Country Risk Premium (Credit Rating)	7.29%
Required Rate of Return	**19.43%**

a) Risk-Free Rate:

The 10 year US Treasury bond rate has been used as the risk free rate, by taking cut-off yield of 2.38% as at 27th March, 2017. The same can be accessed using the following link:

http://www.treasury.gov/resource-center/data-chart-center/interest-rates/pages/textview.aspx?data=yield

Date	1 Mo	3 Mo	6 Mo	1 Yr	2 Yr	3 Yr	5 Yr	7 Yr	10 Yr	20 Yr	30 Yr
3/27/2017	0.73	0.78	0.91	1.00	1.27	1.51	1.93	2.20	2.38	2.73	2.98

b) Equity Market Return (S&P 500):

To calculate Market risk premium, last 30 years S&P 500 Index is used based on which the geometric mean return comes to be 7.70%. This period takes into account economic upturns and downturns sufficiently. Data as collected by Damodaran since 1960-2016 has been used for the Index level. The same may be accessed on the following link:

http://www.stern.nyu.edu/~adamodar/pc/datasets/histimpl.xls

Year	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
S&P 500	247	278	353	330	417	436	466	459	616	741	970	1229	1469	1320	1148
YoY Growth	2%	12%	27%	-7%	26%	4%	7%	-2%	34%	20%	31%	27%	20%	-10%	-13%
Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
S&P 500	880	1115	1212	1248	1418	1468	903	1115	1258	1258	1426	1848	2059	2044	2239
YoY Growth	-23%	26%	9%	3%	14%	4%	-38%	23%	13%	0%	13%	30%	11%	-1%	10%

30 years		
Cumulative Aggregate Growth	**Geometric Mean**	**Arithmetic Mean**
7.62%	7.69%	9.10%

c) Calculation of 'Beta'

For the computation of Beta, a dataset of 68 power companies in the United States of America, has been analyzed, keeping in view the debt-equity structure of ZSPL. For the calculation of Beta, we have considered the dataset from Damodaran, which is a comprehensive list of existing publicly, traded IPPs in the USA. The dataset includes unlevered Betas of the companies.

We have calculated adjusted Beta as per Blume method to account for the fact that Beta is expected to revert to the mean level in the long term. This is calculated using the adjusted Beta formula ((Beta) x 2/3) + ((Market Beta of 1) x 1/3). The adjustment is required as the Beta is to be used for a Project that has 25 years project life (long term perspective) while associated risk-free rates used in CAPM calculations are based on 10 year US treasury bond rates. Accordingly, the associated adjusted unlevered Beta for US power sector is 0.55.

This is re-levered on 70:30 Debt-to-Equity basis, as allowed by NEPRA. Given the 0% tax rate applicable to ZSPL, the same has been used for calculation of Beta. The final levered beta based on adjusted unlevered beta comes out to 1.82, which appropriately reflects the associated risks of the project.

d) Country Risk Premium (Credit Rating)

We have used Moody's Default Spread for the credit rating of Pakistan (B3) as a measure of country risk premium. This corresponds to a country risk premium of 7.29%. We have not applied the adjustment (using adjustment factor of 1.4) to the CRP as suggested by Damodaran, which increases the CRP to 10.21%. The same can be accessed at the following link:

http://www.stern.nyu.edu/~adamodar/pc/datasets/ctryprem.xls

6.4.2. ROE requested by ZSPL

Pakistan and Turkey are bound by an exemplary relationship characterized by warmth, cordiality, and mutual trust. These are embedded deep in history, common faith, cultural and linguistic affinities and a sense of common destiny. Frequent exchanges at the leadership and ministerial levels and growing cooperation in diverse fields are the hallmarks of the unique bonds between Pakistan and Turkey. The leadership of both countries is committed to transforming this historic relationship into a strong strategic partnership, in line with the realities of the 21st century.

Bilateral ties between Pakistan and Turkey have seen tremendous growth and dynamism in recent years, and both sides are working to boost trade, investment, and commercial cooperation as part of efforts to build a robust economic partnership, according to the Pakistani Foreign Ministry statement.

The Turkish ambassador in Islamabad, Sadik Babur Girgin stated at one occasion that ***"This agreement (Free Trade Agreement) will not be only for trade. It will include the service industry and investments." Additionally, the diplomat said Turkey is planning to invest in Pakistan in the fields of solar and wind power.***

Based on the facts detailed above, it is justified to request NEPRA to determine the ROE component based on a return of 16 percent or higher (IRR basis) for the Project, however, given the brotherly relations between Turkey and Pakistan and the Zorlu Group's strategic vision to help eradicate the electricity shortfall in Pakistan by investing in low cost clean energy projects, ZSPL accepts ROE at 11.93% (IRR basis), subject to the condition that the assumptions and Project Costs detailed in this Tariff Petition are accepted and allowed by NEPRA. In the event the NEPRA disallows or reduces any Project Costs or assumptions of ZSPL, the ROE requested shall proportionately increase, in all cases to arrive at a levelized tariff of US 6 Cents/kWh.

Further ZSPL has not assumed any Return on Equity During Construction Period and same is requested to be allowed at the time of one-time adjustment / tariff true-up at COD

A comparison of the tariff based on different rates of return are provided hereunder:

Impact of ROE on Levelized Tariff	At 11.93% proposed by ZSPL	US¢/kWh Based on 16% allowed in recent tariffs	Based on 19.43% under CAPM
Tariff during 1st 14 Years	6.8125	7.3919	7.8800
Tariff during remaining 11 Years	2.5005	3.0799	3.5686
Levelized Tariff - US¢/kWh	**6.0000**	**6.5794**	**7.0675**

6.4 DEBT SERVICING

The capital structure of the Projects is envisaged at 75:25 (Debt: Equity). International Finance Corporation (IFC), Asian Development Bank (ADB), and ECO Trade & Development Bank will contribute 33.33%, 52.17% and 14.50% of the required debt respectively. The door to door tenor of the loan agreed with the lenders is 15 year. The financing will be based on 3-month LIBOR plus assuming a margin of 4.6 percent adjustable on quarterly basis.

6.4.1 Terms of Debt Financing

The following terms for financing the debt portion of the Project Cost have been agreed and locked, between ZSPL and the lenders, through execution of the financing term sheets attached at Annex-G:

Cost Head	Terms
Total Project Value USD M	102.235
Total Value of Debt @ 75% of total project Value USD M	76.677
Base Rate	*3-month LIBOR*
Spread	4.60%
Debt Markup	5.20%
Repayment Period	14 years
Grace Period	Up to 12 months
Re-Payment Schedule	Quarterly

7. OPERATIONAL COSTS

7.1 UNDERSTANDING & BENCHMARKS

ZSPL is in process of finalizing the O&M arrangement with Zorlu O&M Pakistan (Private) Limited (ZOMP or the **O&M Contractor**), wherein the initial term of O&M arrangement for the Project will be fourteen (14) years. Under the arrangement the O&M Contractor shall be responsible for provision or procurement and performance of all the works, services, supplies and other activities including management services necessary to operate and maintain the Project to ensure energy production is maximized and that the Project is operated and maintained in accordance with the applicable performance standards, agreed environmental-social & monitoring plans and prudent operating practices.

The initial term of 14 years for O&M services through a fixed contract is ensured to match the debt repayment period of the Project and provide additional comfort to the Lenders.

In this regard, kindly note that ZSPL has proposed significantly low O&M cost compared to previous upfront tariffs and suo-moto proceedings, because of the use of superior technology and by involving one of its experienced group companies to avoid high profit expectations and premiums charged by third party O&M contractors.

In view of the foregoing, the O&M costs suggested in the Tariff Petition are clearly well within international and local benchmarks. It is the humble request of ZSPL that the O&M costs presented below may kindly be allowed by NEPRA in order to ensure smooth, efficient, and effective operation of the Project.

7.2 BREAKUP OF OPERATING COST

The operations cost of ZSPL comprises of the operations and maintenance cost and the cost of the operational insurances to be taken out by ZSPL. Break-up of the same is provided hereunder:

	USD IN THOUSANDS (PER ANNUM)	
YEARS	1 – 14	15 – 25
O&M COST (FOREIGN COMPONENT)	1,000	1,000
O&M COST (LOCAL COMPONENT)	200	200
INSURANCE COST	242	242
TOTAL OPERATING COST	***1,442***	***1,442***

7.2.1. O&M Cost

The O&M arrangement will be executed through two separate contracts covering:

(i) Years 1 – 14 (Initial O&M Contract); and

(ii) Years 15 – 25 (Option of extended O&M Contract)

The O&M costs to be paid to the O&M Contractor comprises of costs to be incurred in USD. Break-up of the same is provided hereunder:

YEARS	USD IN THOUSANDS (PER ANNUM)		REQUESTED INDEXATIONS
		USD	
1–25	FOREIGN CURRENCY COMPONENT:	1,000	USD plus US CPI
	LOCAL CURRENCY COMPONENT:	200	Local CPI

External O&M services have to be procured by the Project for 14 years in order to fulfill the lenders requirement to have experienced O&M Contractors performing O&M services during the debt repayment period.

Upon completion of the 14year O&M period (during which the O&M Contractor will be responsible for carrying out the O&M activities), ZSPL will carry out a cost benefit analysis of carrying out the O&M themselves or again outsourcing the work to an operations and maintenance contractor. The decision to either carry out the O&M function in-house or through an external source will depend on a number of factors including (i) level of development of the local solar industry, (ii) availability of critical spare parts in the secondary market, (iii) presence of skilled manpower in the local market etc.

Based on the reasons discussed above, ZSPL estimates that the cost of carrying out or out-sourcing the entire O&M function of the project is expected to remain same throughout the life of the Project.

7.2.2. Comparison of O&M Cost with NEPRA's previous upfront tariff determinations for Solar PV Projects

ZSPL has proposed O&M cost of US$ 12,000/MW/annum, compared to US$ 27,005/MW/annum proposed by NEPRA in Suo-Moto proceedings held in May 2016 and previous tariff upfront determinations for Solar Tariff determinations. The reduction has been achieved because of superior technology selection, as part of EPC process, by ZSPL and risk assumption by Zorlu Group to achieve unprecedented low tariff for solar PV industry of Pakistan. Under customary O & M arrangements, operators/manufacturers charge substantial premiums in full scope wrap contract. However, in case of ZSPL, the Operator, being a subsidiary of Zorlu Group has undertaken this role without any expectation of additional premium.

In this regard, it is further submitted that First Solar's PV Modules, envisaged for for the Project are frame-less/ glass-to-glass solar panels that require less cleaning in dusty areas. Because of this technology the dust is not collected around the frames and slips over the panels, that ends up in less maintenance requirements for the Project. Also First Solar PV Module, used in the Project, is one of only five modules in the world to pass Atlas 25+ Test, Thresher Test and TUV Long-Term Sequential Test besides regular IEC tests applied for testing Solar PV Modules.

Based on the above facts and superior panel technology the expected O&M costs of the Project is comparatively lower.

7.3 INSURANCE DURING O&M

The Insurance Cost consists of the insurances required under the Implementation Agreement and the Energy Purchase Agreement coupled with those customarily required for project financing transactions, including all-risk insurance/reinsurance, business interruption insurance, and machinery break-down, natural calamities, sabotage and terrorism. As these risks are an impediment to the smooth and efficient running of the day-to-day affairs of the Project, it is critical that all risks associated with the Project are adequately addressed and all insurable events are catered for in a foolproof manner. Keeping in view the generally adopted global trends and the magnitude of the Project, a comprehensive operational insurance and reinsurance arrangement is also fundamental to ensure bankability of the Project.

During the operations phase, ZSPL intends to acquire insurance from one of the leading insurance companies in the country. As it is standard practice for local insurers to only retain 5% of the risk and acquire reinsurance for the remaining 95% through foreign re-insurer, it is prayed to NEPRA that the insurance costs for the operations phase be allowed in US Dollars (as has been done in case of all other power projects). The requirement to have the operational phase insurance cost denominated in US Dollars is further supported by the fact that the lenders financing the Project will inevitably require the Project to be insured on replacement cost basis; since a major part of the total Project Cost is already denominated in US Dollars, the replacement cost basis insurance would also need to be taken out in US Dollars. It is pertinent to highlight, that any replacement costs incurred as a consequence of the occurrence of an insurable event will also be incurred in US Dollars.

ZSPL, in view of the practices set by the other IPP's in Pakistan and in accordance with the requirements set by the lenders, proposes to procure the following insurance during the operational phase of the Project:

- Property Damage and Comprehensive Machinery Insurance (including Business Interruption insurance);
- Third Party Liability;
- Terrorism insurance;
- Group Personal Accident Insurance; and
- Motor Comprehensive Insurance

The insurance cost has been estimated at 0.25% of the EPC Cost based on the strength of the Zorlu Group, however any increase therefrom up to 0.75% of the EPC Cost may kindly be allowed upon submission of evidences. The insurance cost shall be charged by ZSPL at actual (subject to proposed cap) and will be recoverable as the insurance cost component of the Reference Generation Tariff.

The insurance cost (for the operations phase) set out in the Tariff Petition does not, however, covers the administrative surcharge, Federal Excise Duty and Federal Insurance Fee, that might be applicable on the insurance cost, the same should be treated as a pass-through item under the tariff determination.

8. REFERENCE GENERATION TARIFF & DEBT SCHEDULE

8.1 TARIFF CONTROL PERIOD

As the Project is 75 % debt funded with loan tenure of 14 years for repayment, this means that there will be higher debt service cost requirements in the first 14 years of the Project. In the last 11 years of the Project, the tariff will be decreased due to no debt service related costs.

The proposed tariff is for the life of the Project i.e. term of the EPA, signed with the Purchaser, which is 25 years from COD. The tariff is divided into two (02) bands i.e. year 1 – 14 and year 15 – 25 to cover the variations due to the debt repayment period.

8.2 SUMMARY OF REFERENCE GENERATION TARIFF

A summarized Reference Generation Tariff table setting out the two bands is provided below:

PKR /kWh

		YEARS	1 – 14	15 – 25
FIXED O&M	LOCAL		0.1169	0.1169
	FOREIGN		0.5846	0.5846
ROE			1.7825	1.7825
DEBT SERVICING			4.5276	-
INSURANCE			0.1415	0.1415
TOTAL			**7.1531**	**2.6255**

8.3 REFERENCE GENERATION TARIFF

Year	O&M (Local)	O&M (Foreign)	Insurance	ROE	Loan Repayment	Interest Payment	Total Tariff	Total Tariff
	PKR/kWh	PKR/kWh	PKR/kWh	PKR/kWh	PKR/kWh	PKR/kWh	PKR/kWh	US¢/kWh
1	0.1169	0.5846	0.1415	1.7825	2.2397	2.2879	7.1532	6.8125
2	0.1169	0.5846	0.1415	1.7825	2.3585	2.1691	7.1532	6.8125
3	0.1169	0.5846	0.1415	1.7825	2.4836	2.0440	7.1532	6.8125
4	0.1169	0.5846	0.1415	1.7825	2.6152	1.9124	7.1532	6.8125
5	0.1169	0.5846	0.1415	1.7825	2.7539	1.7737	7.1532	6.8125
6	0.1169	0.5846	0.1415	1.7825	2.8999	1.6277	7.1532	6.8125
7	0.1169	0.5846	0.1415	1.7825	3.0537	1.4739	7.1532	6.8125
8	0.1169	0.5846	0.1415	1.7825	3.2156	1.3120	7.1532	6.8125
9	0.1169	0.5846	0.1415	1.7825	3.3861	1.1415	7.1532	6.8125
10	0.1169	0.5846	0.1415	1.7825	3.5656	0.9620	7.1532	6.8125
11	0.1169	0.5846	0.1415	1.7825	3.7547	0.7729	7.1532	6.8125
12	0.1169	0.5846	0.1415	1.7825	3.9538	0.5738	7.1532	6.8125
13	0.1169	0.5846	0.1415	1.7825	4.1634	0.3642	7.1532	6.8125
14	0.1169	0.5846	0.1415	1.7825	4.3842	0.1434	7.1532	6.8125
15	0.1169	0.5846	0.1415	1.7825	0.0000	0.0000	2.6256	2.5005
16	0.1169	0.5846	0.1415	1.7825	0.0000	0.0000	2.6256	2.5005
17	0.1169	0.5846	0.1415	1.7825	0.0000	0.0000	2.6256	2.5005
18	0.1169	0.5846	0.1415	1.7825	0.0000	0.0000	2.6256	2.5005
19	0.1169	0.5846	0.1415	1.7825	0.0000	0.0000	2.6256	2.5005
20	0.1169	0.5846	0.1415	1.7825	0.0000	0.0000	2.6256	2.5005
21	0.1169	0.5846	0.1415	1.7825	0.0000	0.0000	2.6256	2.5005
22	0.1169	0.5846	0.1415	1.7825	0.0000	0.0000	2.6256	2.5005
23	0.1169	0.5846	0.1415	1.7825	0.0000	0.0000	2.6256	2.5005
24	0.1169	0.5846	0.1415	1.7825	0.0000	0.0000	2.6256	2.5005
25	0.1169	0.5846	0.1415	1.7825	0.0000	0.0000	2.6256	2.5005
						AVERAGE TARIFF	5.1610	4.9153
						LEVELIZED TARIFF	6.3000	6.0000

8.4 DEBT REPAYMENT SCHEDULE

Quarters	Principal Repayment - US$	Principal Repayment - Tariff Component (Rs/kWh)	Interest - US$	Interest - Tariff Component (Rs/kWh)	Instalments US$	Installment - Tariff Component (Rs/kWh)
1	939,272	0.5491	996.794	0.5828	1,936,066	1.13190
2	951.482	0.5563	984.584	0.5756	1,936,066	1.13190
3	963,857	0.5635	972,215	0.5684	1,936,066	1.13190
4	976,387	0.5708	959.684	0.5611	1,936,066	1.13190
5	989,074	0.5783	946,992	0.5536	1,936,066	1.13190
6	1,001,932	0.5858	934.134	0.5461	1,936,066	1.13190
7	1,014,958	0.5934	921.108	0.5385	1,936,066	1.13190
8	1,028,152	0.6011	907.914	0.5308	1,936,066	1.13190
9	1,041,518	0.6089	894,548	0.5230	1,936,066	1.13190
10	1,055,058	0.6168	881,008	0.5151	1,936,066	1.13190
11	1,068,773	0.6248	867,293	0.5071	1,936,066	1.13190
12	1,082,668	0.6330	853,398	0.4990	1,936,066	1.13190
13	1,096,742	0.6412	839,324	0.4907	1,936,066	1.13190
14	1,111,000	0.6495	825,066	0.4824	1,936,066	1.13190
15	1,125,443	0.6580	810,625	0.4739	1,936,066	1.13190
16	1,140,074	0.6665	795,992	0.4654	1,936,066	1.13190
17	1,154,895	0.6752	781,171	0.4567	1,936,066	1.13190
18	1,169,908	0.6840	766,158	0.4479	1,936,066	1.13190
19	1,185,117	0.6929	750,949	0.4390	1,936,066	1.13190
20	1,200,524	0.7019	735,542	0.4300	1,936,066	1.13190
21	1,216,130	0.7110	719,936	0.4209	1,936,066	1.13190
22	1,231,940	0.7202	704,126	0.4117	1,936,066	1.13190
23	1,247,955	0.7296	688,111	0.4023	1,936,066	1.13190
24	1,264,179	0.7391	671,887	0.3928	1,936,066	1.13190
25	1,280,613	0.7487	655,453	0.3832	1,936,066	1.13190
26	1,297,261	0.7584	638,805	0.3735	1,936,066	1.13190
27	1,314,125	0.7683	621,941	0.3636	1,936,066	1.13190
28	1,331,209	0.7785	604,857	0.3536	1,936,066	1.13190
29	1,348,515	0.7884	587,551	0.3435	1,936,066	1.13190
30	1,366,045	0.7986	570,021	0.3333	1,936,066	1.13190
31	1,383,804	0.8090	552,262	0.3229	1,936,066	1.13190
32	1,401,793	0.8195	534,273	0.3124	1,936,066	1.13190
33	1,420,017	0.8302	516,049	0.3017	1,936,066	1.13190
34	1,438,477	0.8410	497,589	0.2909	1,936,066	1.13190
35	1,457,177	0.8519	478,889	0.2800	1,936,066	1.13190
36	1,476,120	0.8630	459,946	0.2689	1,936,066	1.13190
37	1,495,310	0.8742	440,756	0.2577	1,936,066	1.13190
38	1,514,749	0.8856	421,317	0.2463	1,936,066	1.13190
39	1,534,441	0.8971	401,625	0.2348	1,936,066	1.13190
40	1,554,389	0.9088	381,677	0.2231	1,936,066	1.13190
41	1,574,596	0.9206	361,470	0.2113	1,936,066	1.13190
42	1,595,065	0.9325	341,001	0.1994	1,936,066	1.13190
43	1,615,801	0.9447	320,265	0.1872	1,936,066	1.13190
44	1,636,807	0.9569	299,259	0.1750	1,936,066	1.13190
45	1,658,085	0.9694	277,981	0.1625	1,936,066	1.13190
46	1,679,640	0.9820	256,426	0.1499	1,936,066	1.13190
47	1,701,476	0.9947	234,590	0.1372	1,936,066	1.13190
48	1,723,595	1.0077	212,471	0.1242	1,936,066	1.13190
49	1,746,001	1.0208	190,065	0.1111	1,936,066	1.13190
50	1,768,699	1.0341	167,367	0.0978	1,936,066	1.13190
51	1,791,693	1.0475	144,373	0.0844	1,936,066	1.13190
52	1,814,985	1.0611	121,081	0.0708	1,936,066	1.13190
53	1,838,579	1.0749	97,487	0.0570	1,936,066	1.13190
54	1,862,481	1.0889	73,585	0.0430	1,936,066	1.13190
55	1,886,693	1.1030	49,373	0.0289	1,936,066	1.13190
56	1,911,220	1.1174	24,846	0.0145	1,936,066	1.13190

8.5 CORRECTION FACTOR

The method for tariff calculation employed by NEPRA is based on the assumption that the energy produced on a monthly basis is the average of the annual energy production figure (i.e. annual energy production / 12) and therefore, the Project is expected to receive harmonized cash flows throughout the year.

However, the energy produced by the Project for a given month is directly dependent on the solar irradiation for that month, which varies significantly from one month to the next and thus results in erratic Project cash flows.

The total Project Cost is to be funded on a 75:25 Debt: Equity basis and variation in monthly solar irradiation will result in an un-even behavior of the cash flows – thus hampering the debt servicing capability of ZSPL. Therefore, ZSPL requests NEPRA to allow a correction factor to be applied to the monthly energy production figure (to be used for calculation of the Monthly Energy Payment (as defined under the EPA)) (the **Correction Factor**) that is similar to the treatment provided in Schedule 10 of the standard Power Purchase Agreements for thermal power producers.

The Correction Factor formula proposed to be applied for calculation of Monthly Energy (to be used for determining the Monthly Energy Payment) is set out below:

$$Correction\ Factor = \frac{\left(\frac{Sum\ of\ Monthly\ Benchmark\ Energy\ for\ a\ year}{12}\right)}{Monthly\ Benchmark\ Energy\ for\ the\ relevant\ month}$$

The Correction Factor being requested will not impact the total annual revenues of ZSPL and will only provide means of self-sustenance to the Project.

9. INDEXATIONS, ESCALATIONS AND COST ADJUSTMENT

9.1 INDEXATIONS

NEPRA is requested to allow indexation for the various Reference Generation Tariff components in the following manner.

9.1.1 Fixed O&M (Local) Cost Component

The Reference Fixed O&M (Local) Cost Component shall be quarterly indexed to the WPI of manufacturing in Pakistan, as notified by the Federal Bureau of Statistics based on the following formula:

$$FO\&M_{(LRev)} = \text{Relevant Reference Generation Tariff Component} * (WPI_{(Rev)} / WPI_{(Ref)})$$

Where:

$FO\&M_{(LRev)}$ = the revised Fixed O&M (Local) Cost Component applicable for the relevant quarter.

$WPI_{(Rev)}$ = the revised WPI of manufacturing in Pakistan for the month prior to the month in which indexation is applicable, as notified by the Federal Bureau of Statistics.

$WPI_{(Ref)}$ = the WPI of manufacturing in Pakistan for the month in which tariff is determined, as notified by the Federal Bureau of Statistics.

9.1.2 Fixed O&M (Foreign - USD) Cost Component

The Reference Foreign Fixed O&M (Foreign - USD) Cost Component shall be quarterly indexed to both:

(a) the USD/PKR exchange rate, based on the revised TT & OD selling rate of USD notified by the National Bank of Pakistan; and

(b) the US CPI (for all Urban-consumers), issued by the US Bureau of Labor Statistics.

The applicable formula shall be as follows:

$$FO\&M_{(FUSD-Rev)} = \text{Relevant Reference Generation Tariff Component} * (US\ CPI_{(Rev)} / US\ CPI_{(Ref)}) * (FX\ USD_{(Rev)}/105)$$

Where:

$FO\&M_{(FUSD-Rev)}$ = the revised Foreign O&M (Foreign – USD) Cost

Component, applicable for the relevant quarter

$US\ CPI_{(Rev)}$ = the revised US CPI (for all Urban-consumers) for the month prior to the month in which indexation is applicable, issued by US Bureau of Labor Statistics.

$US\ CPI_{(Ref)}$ = the US CPI (for all Urban-consumers) for the month in which tariff is determined, as issued by US Bureau of Labor Statistics.

$FX\ USD_{(Rev)}$ = the revised TT & OD selling rate of PKR/USD as on the date on which indexation is applicable, as notified by the National Bank of Pakistan.

9.1.3 Insurance Cost

The Reference Insurance Cost Component shall be quarterly indexed to USD/PKR exchange rate, based on the revised TT & OD selling rate of USD notified by the National Bank of Pakistan.

Furthermore, the Reference Insurance Cost Component has been calculated on the basis of insurance premium of US$ 242 thousands (0.25% of the EPC Price) per annum, which is subject to a maximum cap of 0.75% of the EPC Price per annum on the production of actual insurance premium. This adjustment of Insurance Cost Component of the Reference Generation Tariff for increased insurance premium shall only be applicable if the actual insurance premium for any year is more than US$ 242,000 (0.25% of the EPC Price) and shall be applied for by ZSPL along with the quarterly indexations and shall be applicable for the then subsequent year.

(a) Indexation Formula

The indexation of the Insurance Cost Component shall be based on the following formula:

$$\mathbf{Insurance_{(Rev)} = Relevant\ Reference\ Generation\ Tariff\ Component * (FX\ USD_{(Rev)} / 105)}$$

Where:

$Insurance_{(Rev)}$ = the revised Insurance Cost Component applicable for the relevant quarter.

$FX\ USD_{(Rev)}$ = the revised TT & OD selling rate of PKR/USD as on the date on which indexation is applicable, as notified by the National Bank of Pakistan.

(b) Adjustment Formula

The adjustment of the Insurance Cost Component for increase in insurance premium shall be based on the following formula:

$$\text{Insurance}_{(Adj)} = \text{Relevant Reference Generation Tariff Component} * (P_{(Act)} / P_{(Ref)})$$

Where:

$\text{Insurance}_{(Adj)}$ = the revised Insurance Cost Component applicable for the relevant year.

$P_{(Act)}$ = Actual Insurance Premium or 0.75% of the EPC Price whichever is lower.

$P_{(Ref)}$ = Reference Insurance Premium of US$ 242,000 (0.25% of the EPC Price).

9.1.4 Return On Equity

In line with NEPRA's previous determinations for thermal IPPs and the RE IPPs, the ROE Component of the Reference Generation Tariff shall be quarterly indexed to the USD/PKR exchange rate, based on the revised TT & OD selling rate of USD notified by the National Bank of Pakistan.

The applicable formula shall be as follows:

$$\text{ROE}_{(Rev)} = \text{Relevant Reference Generation Tariff Component} * (\text{FX USD}_{(Rev)} / 105)$$

Where:

$\text{ROE}_{(Rev)}$ = the revised ROE component applicable for the relevant quarter.

$\text{FX USD}_{(Rev)}$ = the revised TT & OD selling rate of PKR/USD as on the date on which indexation is applicable, as notified by the National Bank of Pakistan.

9.1.5 Principal Component (Foreign)

The Reference Principal Component (Foreign) shall be quarterly indexed to USD/PKR exchange rate, based on the revised TT & OD selling rate of USD notified by the National Bank of Pakistan.

The applicable formula shall be as follows:

$$PRIN_{(FRev)} = \text{Relevant Reference Generation Tariff Component} * (FX\ USD_{(Rev)} / 105)$$

Where:

$PRIN_{(FRev)}$ = the revised Principal Component (Foreign) applicable for the relevant semi-annual period.

$FX\ USD_{(Rev)}$ = the revised TT & OD selling rate of PKR/USD as on the date on which indexation is applicable, as notified by the National Bank of Pakistan.

9.1.6 Interest Charges (Foreign)

The Interest Charges (Foreign) part of the Reference Debt Service Component shall be quarterly adjusted for variations in interest rate as a result of variation in 3 months LIBOR & foreign exchange fluctuations in the PKR / USD exchange rate.

The Interest Charges (Foreign) of the Debt Service Component shall be indexed based on the following formula:

$$I_{(Rev)} = \text{Relevant Generation Tariff Component} * (LIBOR_{(Rev)} + 4.6\%) / (LIBOR_{(Ref)} + 4.6\%) * (FX\ USD_{(Rev)} / 105)$$

Where:

$I_{(Rev)}$ = the revised Interest Charge component applicable for the relevant semi-annual period.

$Libor_{(Rev)}$ = the revised 3 month LIBOR rate at the end of each 3 months period.

$Libor_{(Ref)}$ = 3 month LIBOR rate prevailing on the date of tariff determination.

$FX\ USD_{(Rev)}$ = the revised TT & OD selling rate of PKR/USD as on the date on which indexation is applicable, as notified by the National Bank of Pakistan.

9.2 ANNUAL DEGRADATION ADJUSTMENT

Aging and degradation of PV modules has an impact on the electricity generation and revenue inflows of the Project over 25 years, accordingly ZSPL requests that actual degradation subject to a cap of 0.7% per annum of initial power may kindly be allowed through adjustment in Reference Tariff in respective years in line with the "Determination of National Electric Power Regulatory Authority in the Matter of Upfront Generation Tariff for Solar PV Power Plants" dated January 22, 2015.

For this purpose following formula is proposed for adjustment of annual degradation on the Project:

End of Year	Energy (GWh) at the busbar
1	$X_1=X_0$
2	$X_2=X_1*0.993$
3	$X_3=X_2*0.993$
4	$X_4=X_3*0.993$
....	

X_0= Energy generation assumed for development of Tariff that is 179,598,000 kWh

a) 0.993 corresponds to a degradation factor of 0.7% which will be changed according to the actual degradation in the respective year.
b) $X_1, X_2, X_3, \ldots$ are energy values at the end of year 1, year 2, year 3, and so on if degradation is allowed subject to conditions to be satisfied are not above.
c) Reference tariff will be correspondingly adjusted in respective years.

9.3 ADJUSTMENTS AT COD

NEPRA is requested to allow the below adjustments to the Reference Generation Tariff at the time of true up at COD.

9.3.1 Adjustments to Project Cost

It is submitted that the Project Cost be adjusted at COD for the following based on the assumptions detailed in Section 5 (*Project Cost & Tariff*) and the adjustment to the Project Cost to be reflected in the relevant tariff components (Return on Equity and Debt Servicing):

(a) The Principal Repayment and cost of debt be adjusted at COD as per the actual borrowing composition;

(b) Interest During Construction be adjusted as per actual based on actual disbursement of loans and prevailing LIBOR rates during the project construction period;

(c) The specific items of Project Cost to be incurred in foreign currency (US$) be adjusted at COD based on the PKR / US$ exchange rate prevailing on the date the transaction was carried out;

(d) Customs duty and other taxes (including SIDS) be adjusted/allowed as per actual;

(e) Any negative financial implications resulting from changes in tax rates, duties etc. and currently applicable sales tax structure may kindly be adjusted in the Project Cost.

(f) Pre-COD Insurance Cost be adjusted at actual subject to a cap of 1.0% of the EPC cost in line with earlier tariff determinations by NEPRA for other IPPs.

(g) Return on Equity be adjusted at COD in order to ensure an IRR based return of 11.93% on equity (while treating the project as a Build-Own-Operate type project). However as discussed in the relevant section of this Tariff Petition that 11.93% on equity is subject to acceptance of assumptions and Project Costs detailed in this Tariff Petition. Any resultant upward revision in 11.93%, because of any revision in assumptions or Project Cost, the revised increased rate is to be used for adjustments in Project Costs at COD.

(h) ROEDC is to be allowed at the time of COD, as true-up adjustment, based on actual equity injections to the ZSPL by the Project Sponsors.

10. CONSIDERATIONS WITH RESPECT TO EPA

10.1 ENERGY PRODUCTION

ZSPL has assumed an initial energy estimate of 179,598 MWh for development of this tariff petition. This estimate is based on *Probability of Exceedance (PoE) level of* P50 – 50% probability that energy production will be below this level.

The probability of Exceedance describes how confident a calculated result is; in this case it relates to energy production.

For calculation of P-50 based energy estimate following method has been used for resource assessment of the Project:

In order to conduct the detailed resource assessment, Site assessment surveys were conducted, solar resource from different commonly used meteorological database were reviewed and conceptual PV plant design was modelled in "PVsyst".

Based on the preliminary findings from site assessment, Solar GIS is selected for the solar resource and energy yield calculations. The long term annual average solar resources i.e. Global Horizontal Irradiation (GHI) estimated based on 16 years of solar data (1999-2015) is found to be 1,930 kWh/m2. This level of solar resource is attractive for the development of PV project. The Project energy has been estimated based on the specifications provided by the equipment manufacturer (datasheet).

For the energy estimation, following equipment is considered:

- Panels: First Solar Series 4™
- Inverters: Sungrow SG2500 HV

The calculations are performed in professional software PVSyst 6.3.8 and all losses have been taken into account. The energy yield estimation considers a preliminary conceptual design comprising of CdTe solar PV module from First Solar and central inverter from Sungrow.

The 100 MWp ZSPPL Solar PV is expected to produce 179,598 MWh during its first year of operation. The corresponding capacity factor is estimated as 20.5%.

11. GENERAL ASSUMPTIONS

The following have been assumed while calculating the Reference Generation Tariff and changes in any of these assumptions will result in changes in the Reference Generation Tariff.

1. Debt: Equity ratio is assumed to be 75:25.

2. Foreign lenders shall contribute towards funding 100% of the Debt (LIBOR based financing).

3. Interest rate for LIBOR based debt has been determined based on 3 Month LIBOR (0.60%) plus 4.6% spread and quarterly indexation on the same will be allowed by NEPRA.

4. Indexation against PKR / USD variations will be permitted for debt servicing payments to be made for settlement of foreign source debt.

5. A constant ROE of 11.93% (IRR based) is assumed, that is subject to the acceptance by NEPRA of the assumptions and Project Costs set out in this Tariff Petition.

6. Exchange rate have been assumed to be: PKR 105 /USD.

7. Any taxes federal, provincial, local or district, stamp duties and levies etc. which are not factored in the tariff calculation shall be treated as pass through items, in terms of the EPA.

8. No customs duties and income tax have been considered for imports. Any changes in the customs duties or any other duty or tax on import of equipment and material will be treated as "pass through" to the Purchaser. Similarly, customs duties on spare parts after COD will be "passed through" to the Purchaser.

9. Any change in the existing structure of sales tax that results in negative impact on project is assumed to be adjusted in tariff at COD.

10. Deduction of withholding tax is assumed only in the On-Shore Contract. No withholding tax has been considered in the Off- Shore Contract. Any additional tax, if levied, will be "pass through" to the Purchaser.

11. 7.5% withholding tax on dividend is assumed. Any changes in the aforesaid withholding tax regime will be "pass through" to the Purchaser.

12. The Zakat deduction on dividends (currently @ 2.5%), as required to be deducted under Zakat Ordinance, is to be considered as "pass through".

13. Sindh Infrastructure Development Surcharge on the imports for the Project has not been assumed and shall be adjusted upon COD as per actual.

14. Federal Excise Duty has not been assumed as part of the Project Cost; in case the same is required to be paid by the Project, the same should be treated as pass-through under the tariff.

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15. The Purchaser shall be exclusively responsible for the financing of construction, operation and maintenance of the interconnection and transmission lines as per the prevailing policy at the time of tariff determination

16. Main Energy meter will be provided by the Purchaser at its own cost

17. Financing terms are based on the initial discussion with the financial institutions and hence are subject to final negotiations once tariff has been determined by NEPRA and the EPA / LA are signed. This will include mainly the debt-equity ratio, grace period and loan repayment term, benchmark index (LIBOR/KIBOR) and the spread margin of the financial institution.

18. Pre-COD insurance costs are considered based on the estimates in line with market rates and Group's strengths. Premium rate for the insurance arrangements will be finalized at the time of financial close.

19. No hedging cost is assumed for exchange rate fluctuations during construction and all cost overruns resulting from variations in the exchange rate during construction shall be included in the Project Cost.

20. Project contingency and maintenance reserves are not included in Reference Generation Tariff calculations. If required by lenders, these will be adjusted accordingly in the Reference Generation Tariff.

21. Any other assumptions that are not expressly stated herein but are based on the EPA draft negotiated by ZSPL with the Purchaser. Consequently, any change in any such assumptions may lead to change in the Reference Generation Tariff.

22. The payments to Workers Welfare Fund and Workers Profit Participation Fund have not been accounted for in the Project budget and have been assumed to be reimbursed at actual by the Purchaser.

23. Adjustment in Reference Tariff in respective years for annual degradation, as provided under Section 9.2.

24. Insurance during operations will be allowed annually by NEPRA subject to the maximum cap of 0.75% of EPC cost.

25. Any incentives given in any other solar IPP shall also be given to ZSPL.

12. TARIFF SUMMARY

In summation, ZSPL herewith most respectfully submits before NEPRA for its approval the matters set out in this Tariff Petition and further prays for NEPRA to kindly approve the following:

12.1 The Project Costs and related arrangements stated in this Tariff Petition be allowed to the Petitioner.

12.2 Energy production estimate of 179.598 GWh per annum for calculation of the tariff and energy payments for the years 1 – 25 after COD.

12.3 Funding of the Project on an 75:25 – Debt: Equity basis.

12.4 100 % foreign debt on LIBOR basis.

12.5 LIBOR based debt financing (100%) with a base rate equal to 3-Month LIBOR plus a spread of 4.60%.

12.6 Sharing of any CER related revenues subsequently realized, as per the Government of Pakistan policy.

12.7 A Return on Equity of 11.93%, reasons for which have been provided in detail in Section 6.3 (*Equity*) above.

12.8 Indexations and adjustments for the individual tariff components, as detailed in Section 9 (*Indexations, Adjustments and Cost Escalations*) above.

12.9 The Reference Generation Tariff provided under Section 8.3 (*Reference Generation Tariff Table*) above along with individual tariff components and debt schedule provided under Section 8.4 (*Debt Schedule*) above.

12.10 Adjustment in Reference Tariff in respective years for annual degradation, as provided under Section 9.2 (*Adjustment for Annual De-gradation*).

12.11 Adjustments at COD, as provided under Section 9.3 (*Adjustments at COD*) above.

12.12 The General Assumptions, as provided in this Section 11 (*General Assumptions*).

Furthermore, given the advance stage of the Project, NEPRA is kindly requested to process the Tariff Petition at the earliest thereby enabling ZSPL to proceed further with the development process.

Zorlu Solar Pakistan Limited
Dated: 16 May 2017