

MASTER GREEN ENERGY LTD.

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MGEL/NEPRA/TARIFF/008

October 28, 2017

The Registrar.

National Electric Power Regulatory Authority,
NEPRA Tower Attaturk Avenue (East),
Sector G-5/I, Islamabad.

Subject: Submission of the Tariff Petition (Cost Plus) of 50 MW Master Green Energy Limited

Dear Sir,

We herewith submit the Tariff Petition (Cost Plus) of Master Green Energy Limited, along with the fee as determined by the National Electric Power Regulatory Authority ("NEPRA" or the "Authority") for kind consideration and favorable approval by the Authority in accordance, inter alia, with Section 31 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 read with Rule 3 of the NEPRA (Tariff Standards and Procedure) Rules, 1998 and other applicable provisions of the NEPRA law.

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

- 1) The Bank Draft # 04039394 dated 24-10-2017, amounting to PKR 605,344/- (Six Hundred Five Thousand Three Hundred and Forty Four Only) as requisite for fee for Tariff Petition as communicated by NEPRA.
- 2) The Board Resolution of Master Green Energy Limited
- 3) Affidavit of Mr. Rumman Arshad Dar, authorized representative of Master Green Energy Limited

We humbly request that the annexures of the attached Tariff Petition, particularly the EPC contracts and financing term sheet for the proposed wind power project, be treated as confidential and not be made available to the public as it may be detrimental to our project.

We thank you for your support in this regard.

Yours sincerely,

For and on behalf of

Master Green Energy Limited

Rumman Arshad Dar
Chief Operating Officer

For my personal use
24/10/17
- DRC/Reg-E
Spillo
- SA (Tech)
- SA (E) -
- DG (M&E) - Durrani
- LA (KLP)
- M/F
cc: Chairman
Vice President
M (T)
M (C)
M (C)

Registration No.	10268
By No.	
Dated	28/10/17

Enclosed return of charge in three copies (copy for M&E, KLP, M/F)

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

MASTER GREEN ENERGY LIMITED

FOR NEPRA'S APPROVAL OF REFERENCE GENERATION TARIFF FOR

MASTER GREEN ENERGY LIMITED

FOR A POWER PROJECT OF 50 MW

AT

JAMSHORO, SINDH

DATED:

27th OCTOBER 2017

MASTER GREEN ENERGY LIMITED

ADDRESS: 82-C-1, GULBERG III, LAHORE, PAKISTAN

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TABLE OF CONTENTS

1.	<u>Details of the Petitioner</u>	10
2.	<u>Regulatory Framework</u>	11
3.	<u>Executive Summary</u>	13
4.	<u>The Project & Key Considerations</u>	18
5.	<u>Project Cost & Tariff</u>	34
6.	<u>Project Funding Structure (Debt & Equity)</u>	40
7.	<u>Operation Cost</u>	43
8.	<u>Energy Yield</u>	46
9.	<u>Reference Generation Tariff & Debt Schedule</u>	50
10.	<u>Indexations, Escalations & Cost Adjustment</u>	54
11.	<u>General Assumptions</u>	49
12.	<u>Tariff Summary</u>	62



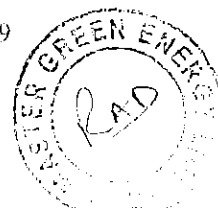
1 Details of the Petitioner

Name and Address

MASTER GREEN ENERGY LIMITED
ADDRESS: 82-C-1, GULBERG III, LAHORE, PAKISTAN
PHONE #: +92-42-35752683-84
FAX #: +92-42-35752685

Representatives of MASTER GREEN ENERGY LIMITED

- Rumman Arshad Dar
Authorized Representative, Chief Operating Officer



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 Project Feasibility Study and approval of the same

In compliance with the requirements laid out in the Letter of Intent issued by Government of Sindh on October 1, 2015 (**LOI**), Master Green Energy Limited (the **Project Company** or **MGEL**), completed the detailed feasibility study for the project and submitted the same to Department of Energy, Government of Sindh (**DOEGOS**) for their review (the **Project Feasibility Study**) in February 2016.

Following completion of its detailed review, DOEGOS, vide its letter dated October 12, 2017 (Ref: DAE/GEN/119/2016) (the **Feasibility Study Approval Letter**), granted approval of the Project Feasibility Study submitted by Master Green Energy Limited and allowed MGEL to proceed with filing of its tariff petition with NEPRA. A copy of the Feasibility Study Approval Letter is attached hereto as **Annexure D**.

2.2.2 Background of Petition

This Petition is being filed in less than two (02) years from the date of issuance of the LOI to the Project. Since the issuance of the LOI the Project completed the Project Feasibility Study in a record time of four (04) months and submitted the same to the provincial energy department in February 2016. Due to the non-issuance of the regulatory approvals required for filing a tariff petition by relevant governmental entities, by mid 2016, under-development wind power projects, including MGEL, were unable to apply for a tariff under the then prevailing upfront tariff regime.

The proceedings for a new upfront tariff started and a hearing was called by NEPRA to discuss the new proposed upfront tariff. The topic of tariff through reverse bidding was also discussed in the hearing. After approx. six (06) months, a reverse bidding tariff was announced by NEPRA in January 2017 (**Benchmark Tariff Determination**) with an instruction to the relevant agencies to conduct a competitive bidding process – an outcome that was completely unexpected, against the prevailing tariff mechanism and against the spirit of the power policy where there were no solicited sites available for such bidding. It is worth highlighting that the sites on which bidding is being proposed have already been allocated to different projects that have conducted their own independent feasibility studies on their sites – this make the entire scheme a very unique example for competitive bidding.

It has been over eleven (11) months since announcement of NEPRA's Benchmark Tariff Determination and subsequent instruction to relevant agencies to conduct the bidding process, however, no mechanism for competitive bidding has been announced to date. The



only option available, which is an IPP's fundamental right, is to file a petition for determination of a cost-plus tariff under the NEPRA Rules.

The Petitioner hereby pleads NEPRA, and through NEPRA other relevant stakeholders, to take a view on this Project, the viability of which has been discussed in the next sections of the Petition.

2.2.3 Request for Determination of Tariff

As:

- | | |
|--|----------|
| 1. LOI has been issued by Directorate of Alternative Energy, Government of Sindh (including amendments to the same) | Annex. A |
| 2. Land for Project has been allocated by Government of Sindh and land lease agreement has been signed | Annex. B |
| 3. Interconnection studies have been approved and Power Evacuation Certificate issued | Annex. C |
| 4. Project Feasibility Study approved by DOEGOS | Annex. D |
| 5. Environmental permit obtained from Sindh Environmental Protection Agency | Annex. E |
| 6. Binding EPC arrangement for supply, construction, erection and commissioning of the Project is in place | Annex. F |
| 7. Project debt funding has been arranged and sponsors have committed the required equity | Annex. G |
| 8. Request for Issuance of Power Acquisition Request to Central Power Purchasing Agency (Guarantee) Limited has been submitted | Annex. H |

Accordingly, it is submitted that the requirements of the regulatory process for applying to NEPRA for the tariff determination of 50 MW wind power project of Master Green Energy Limited 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 **MASTER GREEN ENERGY LIMITED** of the LOI in respect of meeting the requirements of the same so as to be eligible for application for a tariff: **MASTER GREEN ENERGY LIMITED SUBMITS HEREWITH** before NEPRA, the competent regulatory authority lawfully authorized to determine tariff for wind 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; (v) Adjustments at commercial operations date; and (vi) other matters set out in this Tariff Petition. in each case, for **MASTER GREEN ENERGY LIMITED's** 50 MW power generation facility to be located at Jamshoro, Sindh (the **Project**).

Given the advance stage of the project, NEPRA is kindly requested to process the Tariff Petition at the earliest, thereby enabling **MASTER GREEN ENERGY LIMITED** to proceed further with the development process.



3 Executive Summary

Project Company	MASTER GREEN ENERGY LIMITED		
Sponsors	Master Group of Industries		
Project Capacity	50 MW		
Project Location	Jamshoro, District Thatta, Province of Sindh, Pakistan		
Land Area	300 Acres		
Concession Period	25 years from Commercial Operations Date		
Power Purchaser	Central Power Purchasing Authority (Guarantee) Limited (CPPA-G)		
Wind Turbines	Gamesa G114-2.0MW		
Energy Production	166,440 MWh p.a. (Capacity Factor: 38%)		
EPC Contractor	Powerchina Huadong Engineering Corporation Limited		
Project Capital Cost	(US\$ in '000)		
	CAPEX	Amount	
	EPC Price	78,500	
	Non-EPC & Project Development Cost	3,000	
	Insurance during Construction	432	
	Financial Charges	2,286	
	Interest During Construction	3,406	
	Total Project Cost (CAPEX)	87,624	
Funding Plan	Debt: Equity 75:25		
Equity	US\$ 21.906 million		
Long Term Debt	US\$ 65.718 million		
Lenders	Foreign Financiers: <ul style="list-style-type: none">Islamic Corporation for Development of the Private Sector Local Financiers: <ul style="list-style-type: none">Meezan Bank Limited (MBL)		
Terms of Long Term Debt		Local	Foreign
	Currency	PKR	USD
	Term	15 years	15 years
	Grace Period	02 years	02 years
	Repayment Period	13 years	13 years
	Repayment Frequency	Quarterly	Quarterly
	Interest Rate	KIBOR + 2.50%	LIBOR + 4.50%
O&M Contractor	Powerchina Huadong Engineering Corporation Limited		
Project Operations Cost	(US\$ in '000)		
	Years	1 - 13	14 - 25
	O&M Cost	1,900	1,900
	Insurance Cost	400	400
	Total Operating Cost	2,300	2,300
Levelized Tariff	US\$ 7.2428 per kWh		
Concession Documents	<ul style="list-style-type: none">Energy Purchase AgreementImplementation AgreementGovernment of Pakistan GuaranteeSite Lease Deed		
Applicable GOP Policy	Policy for Development of Renewable Energy for Power Generation 2006		
Technical Advisors	Lahmeyer International & Renewable Resources (Pvt.) Limited		



Financial Advisors	In-house financial team		
Legal Counsel	In-house legal team		
Current Status of the Project	Major Tasks Completed		
	✓ Executed EPC & agreements	✓ Executed term sheet with Project lenders	✓ Environmental impact assessment
	✓ Feasibility Study	✓ Wind Resource Assessment Study	✓ Topographical Study
	✓ Transportation Study	✓ Geo-technical Study	✓ Electrical grid study
	✓ Design of wind farm	✓ Land Acquired	

3.1 Project Summary

After the successful commissioning of a 52.8 MW wind power project under Master Wind Energy Limited, Master Group started development of a 100 MW wind power project, namely Master Green Energy Limited in the neighboring district of Jamshoro. MGEL completed all requirements of the LOI in record time and was the first of the under-development projects to submit a complete technical feasibility to DOEGOS for review in February 2016. Due to delays on the part of the power purchaser to issue grid data for conducting a grid interconnection study, Master Green was unable to complete that specific milestone, and was duly granted an extension of the LOI up to December 22, 2017 to allow for completion of the same.

The Project was initially envisaged as a single 1x100 MW project, however, due to limitations of the grid capacity in District Jamshoro, the Project was converted into 2x50 MW projects and will be developed in two phases. This Petition pertains to the first phase of the Project. The LOI was duly converted on May 11, 2017 by Government of Sindh to give effect to the aforementioned scheme.

The Project Feasibility Study conducted by LAHMEYER INTERNATIONAL, with their local partners RENEWABLE RESOURCES (PVT.) LTD. submitted in February 2016, was subsequently approved by a panel of experts appointed by DOEGOS in October 2017.

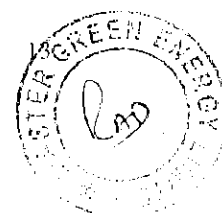
Since the start of the development process, the Project Company has committed funds and resources to move the Project forward towards Financial Close. In doing so, a competent in-house team was developed that consisted of legal, financial and technical experts.

3.1.1 EPC Arrangement

In November 2015, after issuance of the LOI for the Project, the Project Company carried out a competitive bidding process and floated the RFP to four (04) shortlisted internationally renowned EPC Contractors and WTG suppliers for award of a turnkey EPC Contract for development of the Project. After an extensive technical, financial and commercial evaluation process, the Project Company selected POWERCHINA HUADONG ENGINEERING CORPORATION LIMITED (HDEC), as their preferred EPC Contractor. Consequentially, the EPC was initiated in January 2016 followed by execution of the turnkey EPC Contracts under an off-shore and on-shore arrangement between MGEL and HDEC in February 2017.

3.1.2 WTG Technology

The Project Company evaluated a number of wind turbine generators (WTGs) available in Pakistan including the WTGs being offered by General Electric, Nordex, Goldwind and Siemens Gamesa Renewable Energy (Gamesa). After extensive cost-benefit analysis, and keeping in view the suitability of the turbines for Pakistan and more specifically the



environment in Jamshoro, Gamesa's G114-2.0 MW model (hub height 93 m) was chosen as the WFG for the Project.

3.1.3 O&M Arrangement

A long-term O&M agreement (13 years to cover the tenor of the loan) will be agreed between the Project Company and the Original Equipment Manufacturer (Siemens Gamesa Renewable Energy). The O&M agreement is currently in the process of finalization. Based on discussions with Gamesa, the Project Company is confident that the cost of the O&M structure will be in line with the Benchmark Tariff Determination.

3.1.4 Capital Structure

The capital structure of the Project is envisaged at 75:25 (Debt: Equity). The Project Company intends to obtain 48.1% of the debt through local financiers with Meezan Bank Limited acting as the Mandated Lead Arranger (MLA) for MGEL. The MLA has received in-principle commitments for the entire debt amount from the local debt market.

In line with the recently enforced directions from State Bank of Pakistan, approximately 51.7% of the debt financing required for the Project will be arranged through foreign financiers. MGEL has signed a term sheet for arrangement of foreign debt with Meezan Bank Limited on behalf of Islamic Corporation for the Development of the Private Sector (ICD). The signed term sheets for the financing of the Project are attached to the petition as Annexure G. Master Group will fund 100% of the equity requirements of the Project through its own cash flows.

3.2 Key Features of the Project

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

3.2.1 Tariff offered by MGEL lower than NEPRA's Benchmark Tariff Determination:

Through the concerted efforts of its sponsors, the Project has been able to achieve a tariff that is even lower than the competitive bidding tariff offered by NEPRA through its determination earlier this year. However, since the debt: equity ratio (80:20) envisaged under the Benchmark Tariff Determination and spread on LIBOR (425bps) is not acceptable to any foreign financier, MGEL had to propose a tariff based on debt: equity of 75:25 along with a spread of 450bps over LIBOR resulting in a tariff which is slightly higher than the Benchmark Tariff Determination. Maintaining the debt: equity at 80:20 and spread over LIBOR at 425bps, MGEL's tariff comes to US Cents 7.0183/kwh which is US Cents 0.2050 /kWh lower than the Benchmark Tariff Determination as applicable for a project having a local: foreign debt mix similar to that of MGEL.

3.2.2 Power Purchaser not required to build additional substation for Grid connectivity of the Project:

Unlike all other wind power projects currently under development MGEL does not require the Power Purchaser to construct a new substation to be able to connect to the National Grid. MGEL is located only 15km away from the 132/220/500kV New Jamshoro grid station. As part of MGEL's interconnection study a variety of options were considered for connectivity including connecting to the (i) Old Jamshoro (132kV) grid station, (ii) the New Jamshoro (132/220/500kV) grid station, (iii) the circuit running between Old Jamshoro to New Jamshoro, and (iv) the circuit between Old Jamshoro to Nooriabad grid station. The final decision, as proposed by NEDCO, was to connect MGEL through option (iv) i.e. on the circuit between Old Jamshoro to Nooriabad - a distance of only 7km between the proposed interconnection point and MGEL substation.

It is highlighted that while each of the other upcoming projects are dependent on the New Jamshoro II (220kV) grid station for their connectivity to the National Grid, no such pre-requisites exist in the case of MGEL.

- 3.2.3 Project Company initiated a competitive bidding process to select the EPC Contractor** for carrying out construction on a turn-key basis of the wind farm project. A Request for Proposal (RFP) stating all the technical and commercial requirements for a state of the art wind farm in Pakistan was floated to four (04) shortlisted world renowned EPC Contractors/WTG Suppliers to bid for the development of the project on a turnkey basis. After detailed evaluation of the Technical Bids submitted by the bidders, only those bids were selected for financial and commercial evaluation that passed the technical requirements of the RFP. After an extensive procurement process Powerchina Huadong Engineering Cooperation Limited emerged as the most responsive contractor with the most bankable commercial and technical package.
- 3.2.4 Executed EPC agreement with firm prices:** After detailed negotiations with the selected bidder, definitive and legally binding EPC agreements were signed between the parties in February 2017. The contracts include multiple warranties and guarantees to safeguard the interests of the sponsors and lenders and to ensure high performance for the life of the Project.
- 3.2.5 State-of-the-art Wind Turbine – Gamesa G114-2.0MW:** The 2.0 MW Gamesa platform, with over 20 GW installed capacity in 34 countries, bases its technology on speed control and variable pitch, incorporating the latest technologies in order to obtain maximum wind energy capture with the greatest efficiency. With a new 114m rotor and 2.0 MW rated power, the Gamesa G114-2.0 MW is the new Class III model for the Gamesa G9X-2.0 MW platform, one of the most successful in the industry, having availability levels well above 98%.
- 3.2.6 Project Site – Jamshoro:** MGEL's 50 MW wind power project is located in District Jamshoro, Sindh, that is towards North-East of Karachi. The Project site area is of 300 acres and was identified by the sponsors for allocation from DDEGOS for the Project Company. The Karachi-Hyderabad Motorway (Super Highway) is the connecting road to the Project site.
- The general area of Jamshoro is classified as semi-desert area, consisting of flat and rocky terrain with an elevation of 40m to 50m above sea level. The vegetation is sparse and mostly consists of small, shrubby bushes, which do not present any major obstruction to the flow of wind. The area is also very sparsely populated. These two factors make it an ideal location for large wind farms.
- 3.2.7 Commercially finalized foreign and local financing structure:** The Project Company has finalized the commercial term sheet for arrangement of local financing for the Project with Meezan Bank Limited. Foreign financing will be arranged through Meezan Bank Limited in collaboration with the Islamic Corporation for the Development of the Private Sector – the private sector development arm of Islamic Development Bank.
- 3.2.8 Promotion of Local Manufacturing Industry:** In an attempt to play its role in achieving the national objective of creating employment opportunities, developing local industry and enhancing technical skills in the renewable energy sector of the country, the Project Company has ensured that the EPC Contractor promotes the local manufacturing industry through transfer of technology.
- 3.2.9 Strong Project Team:** The Project Company has engaged leading consultants as project advisors who have played a key role in the development of wind energy sector in Pakistan.

Lahmeyer International &
Renewable Resources (Pvt.) Limited
Pakistan Alternative Engineering Services (Pvt.) Limited
Power Planners International

- Technical Advisors
- Soil and Geotechnical Expert
- Grid Study Consultants



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

- 3.2.10 Financially Strong & Experienced Sponsors:** Master Group is one of the most dynamic and leading business groups of Pakistan. Having an annually increasing group turnover of more than Rs. 30 billion, the sponsor is committed to playing its part in the development of Pakistan's various sectors.

The Group has extensive experience in development and operations of complex manufacturing facilities and plants. All manufacturing facilities currently in operation in Master Group were developed on a non-turnkey basis under the direct supervision of the sponsors. Each of these facilities were completed without any cost overrun and within the time frames envisaged for development of the same. However, keeping in view the structure adopted for development of IPPs in Pakistan, the sponsors had opted for development of their first wind power project namely Master Wind Energy Limited on a turnkey EPC basis. This has allowed the Sponsors to gain first-hand experience in developing projects based on an EPC structure.



4 The Project & Key Considerations

4.1 Rationale for Wind Power

Pakistan's Current Electric Power Shortage

Pakistan currently has 28.089 GW of installed capacity for electricity generation. Conventional thermal plants (oil, natural gas, coal) account for 65.50% of Pakistan's capacity, with hydroelectricity making up 28.04%, nuclear 3.10% and renewables contributing 3.26%. The current installed capacity is expected to reach 33.776 GW by the year 2021. The current installed capacity of wind power in Pakistan is 730 MW and another 450 MW is currently under construction, hence making the total installed capacity of wind power to be 1180 MW by 2018. Therefore, the share of wind power is still tiny in the overall mix despite major progress being made by the sector in the past couple of years.

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, non-development of renewable energy sector i.e. hydel, wind & solar etc. and the depleting oil & 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 wind power generation. It has a proven track record globally and is recognized as a commercially viable technology. With over 150,000 MW installed capacity around the globe and over 36,000 MW of installed capacity in India and China alone, the case for development of wind energy in Pakistan is very strong.

Wind 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 wind power generation could become a significant and reliable contributor to Pakistan's electricity supply in the near future. The development of wind generation projects supports the environmental objectives of the Government of Pakistan by:

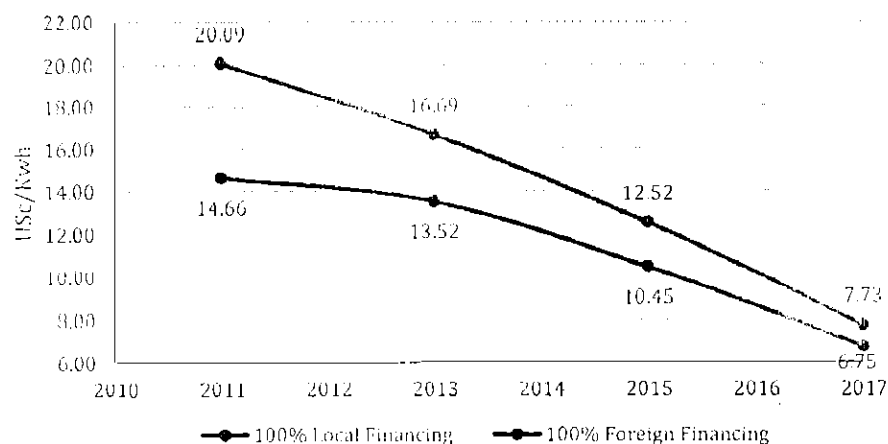
- (a) reducing dependence on imported fossil fuels for thermal power generation;
- (b) increasing diversity in Pakistan's electricity generation mix;
- (c) reducing greenhouse gas emissions through the avoidance of thermal power generation; and
- (d) helping in reduction of the exorbitant trade deficit.

Wind Tariff at an all-time low

The current tariffs of wind power are at an all-time low in Pakistan. The graph below shows the history of wind power tariffs since the start of the upfront tariff regime:



Levelised Tariffs for Wind Power Projects

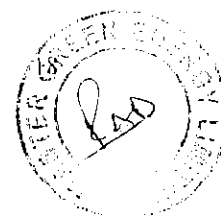


Wind Tariff is cheaper than other technologies

The wind tariffs are even lower than each of the newly constructed / under construction / under pipeline projects of Hydro and Coal. Moreover, the Coal and LNG tariffs are not expected to come down in future due to fuel charge whereas the wind power tariff does not have a fuel charge at all. With regards to the emerging LNG, the tariffs are cosmetically low at the moment but these are subject to escalations on the LNG price in future, which is definitely expected to rise.

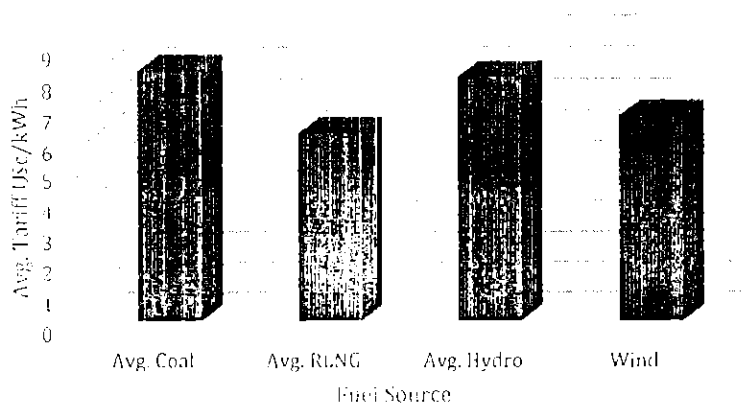
The following computation is of the tariffs determined for various technologies by NEPRA:

Technology	Description	Levelized Tariff
Thermal Coal	Upfront Thar Coal	Foreign Financing: 7.3356 US\$/kWh Local Financing: 7.4197 US\$/kWh
	330 MW ThalNova Thar Coal	8.5015 US\$/kWh
	330 MW Thar Energy Thar Coal	8.5015 US\$/kWh
	330 MW CMEC Kallar Kahar Local Coal	8.2982 US\$/kWh
	350 MW Siddique Sons (Local Coal)	7.2228 US\$/kWh
	660 MW Lucky (Local Coal)	9.2100 US\$/kWh
	1320 MW Suiwal Coal (Imported Coal)	8.3601 US\$/kWh
Thermal RLNG	1180 MW Bhikki	6.0644 US\$/kWh



	1230 MW Haveli Bahadar Shah	6.1145 US\$/kWh
	1223 MW Balluki	6.1223 US\$/kWh
	1263 MW Punjab Thermal (Tariff approval I/P)	6.7294 US\$/kWh
Hydro	720 MW Karot Power	7.5746 US\$/kWh
	870 MW Suki Kinari	8.8145 US\$/kWh
	Upfront Small Hydro (Low Head)	Foreign Financing: 8.1602 US\$/kWh Local Financing: 10.6857 US\$/kWh
	Upfront Small Hydro (High Head)	Foreign Financing: 7.4719 US\$/kWh Local Financing: 9.8048 US\$/kWh
Wind	Benchmark Tariff	Foreign Financing: 6.7467 Rs./kWh Local Financing: 7.7342 US\$/kWh

Average Tariff of prevailing technologies



The tariff of wind is in one part and is continuously decreasing over the life cycle. The tariff of thermal plants is in two parts, wherein 70%-80% of the total tariff goes in fuel cost – a component that is expected to rise in future. The tariffs of thermal plants are expected to rise and will become practically unaffordable due to increasing fuel cost.

Wind Power has more usefulness when Base Load is secured



The Petitioner is hopeful that the country will overcome the power shortfalls faced in recent years and achieve security of base load soon. It is pertinent to note that wind power generation becomes even more useful in cases where secure base load is available. The cheaper electricity offered by wind projects can be utilized as much as possible when available and demand in low wind period can be supplemented through base load plants.

Tariffs for all base load plants are split between the Capacity Purchase Price (CPP-fixed costs) and Energy Purchase Price (EPP-fuel costs). Most of the base load plants have an EPP component (excluding capacity charge) higher than the total wind tariff. The Power Purchaser (and as a result the consumers) can realise significant savings by replacing expensive base load plants with wind power generation in high wind periods. It is also important to highlight the fact that high wind periods in Pakistan coincide with the highest demand periods (summer months). In low winds, the wind power plants can continue dispatch of this cheaper electricity to the extent generated and rest can be met from base load plants. The Petitioner firmly believes that advantages of having wind power in the mix (including cost saving in generation of electricity) cannot be undermined.

Sustainability of Power Sector – Need to look back in history

The presumption that Pakistan will overcome its electricity shortfall due to current pipeline projects, therefore no further expansion in generation capacity is required can prove to be fatal for Pakistan in the years to come. It is important to highlight that a similar situation existed after the Thermal IPPs were constructed under the Power Policy of 2002. It was expected that Pakistan will generate surplus electricity by 2005-06 and the Planning Commission of Pakistan was initiating plans to export electricity to our neighbours. No material generation plans were developed during that time period and the country's generation mix became heavily dependent on imported fuel based thermal power plants. As a result, Pakistan was one of the few developing countries during last one decade that experienced crippling electricity shortfalls of as much as 8-10 hours per day in urban areas and 15-18 hours per day in rural areas. The main reasons for the energy crisis are briefly summarised below:

- The heavily imported fuel-dependent energy mix collapsed on a huge scale when (1) oil prices across the world sky-rocketed, and (2) the PKR-USD parity went sky high. Generation of electricity from thermal sources became extremely unviable and the country was unable able to operate its existing thermal plants at full capacity due to lack of capacity to purchase imported fuel.
- Local gas reserves were over-exploited and failed to meet demand requirements, especially during the winter months. Either gas power plants were required to be shut down or supply of gas to other sectors (industry, transport, domestic) suffered.
- There were no power projects in the pipeline that could start contributing on short notice and replace the then expensive thermal sources.

The dynamics of the power sector are such that new power projects cannot be planned and implemented overnight. After an extensive feasibility and planning stage, prospective developers are required to attract the relevant stakeholders who will develop projects including sponsors, lenders, supplier and contractors. Typically, development of a batch of projects from the LOI stage till commencement of commercial operations, takes approximately five (05) years; for large hydro projects this period may stretch to up to ten (10) years. These timings are evident in each development era of the power sector in Pakistan.

Another factor that must be highlighted is that demand for electricity is constantly expected to increase. Current demand forecasts for Pakistan are based on the suppressed demand that exists during a power crisis. Future demand forecasting should not merely account for the increase in demand from existing consumers; rather, it should also account for consumption of electricity from other sources (like electric trains, electric buses, public infrastructure,



rural electrification, electrical heating etc.), which have contributed to the accelerated development of western nations when they had more electricity than they require. *A key change being noticed globally is the move towards electric automobiles; with the momentum picking up it is expected that traditional petrol based cars will no longer be available in the coming decade. This on its own has the potential to throw current generation forecasts out the window.*

Due to the aforementioned lack of perception, the reaction to the energy crisis could only begin once the country was already in a state of emergency. After more than a decade of crippling shortfalls, we are finally at a point where the shortfalls can be overcome. A conservative approach toward setting up of new projects from now onwards is completely contrary to the lessons learnt from the past. This applies to wind power projects in particular, which are even cheaper than many base load plants that are currently being constructed. The country's position is extremely vulnerable because the up-coming power plants are largely operating on imported fuels where the cost of fuel and exchange rates have a role to play during their entire life. On the other hand, wind is cheaper than these sources and does not have such cost escalations. The wind industry needs continuity so that certain rate of capacity addition continues to ensure a more balanced generation mix based on our country's indigenous resources.

Wind Power has no technical challenges on the Grid System

Very recently, NTDC has granted Grid Interconnection Study approval to wind power projects totalling 1224 MW; thereby establishing the technical capacity of the grid to sustain these projects. There is no instability caused by integration of these power plants in the national grid. The timing of these plants to come into operations is also in-line with NTDC's plans to make the required infrastructure for them.

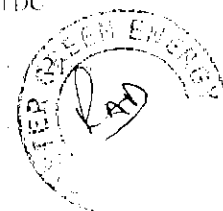
It is worth recognising the handsome effort made to undertake a wider study, funded by USAID and conducted by renowned international consultant Intec Gopa of Germany, in order to verify the technical viability of additional wind and solar capacity in Pakistan. The study concluded that 1731 MW of wind power capacity could be installed by 2016-2017; of which a total of 500 MW is yet to be installed. Moreover, the same study also concluded that a cumulative 5455 MW of wind (3724 MW in addition to the 1731 MW) can be integrated into the grid system by the year 2019-20 or later, without destabilizing the national grid system. For a clear understanding, 1224 MW approved by NTDC in the form of grid studies is 500 MW out of the 1731 MW (Spot Year 1 – 2016-17) and remainder 724 MW out of 3724 MW (Spot Year 2 (2019-20) or later), if read in the context of Gopa report.

Time Period for start of Operations	Cumulative Planned Capacity (GOPA Study / NTDC Plans)	Constructed / Under Construction Capacity	Pipeline Capacity (Tariff not awarded)	Cumulative Available for further allocation
Spot Year 1 (2016-17)	1731 MW	1231 MW	0 MW	500 MW (1731-1231)
Spot Year 2 (2019-20)	5455 MW	0 MW	1224 ¹ MW	3000 (5455-1231-1224)

In view of the above, it is a crime to ignore these efforts and under-utilize the capacity available for wind and solar projects. The 1224 MW plan should be put up right away as there is no technical challenge. It is well within the studies & plans and wind power is cheaper than other available option.

There is no reason to say NO to Wind Power

¹ Interconnection of 1224 MW of in-the-pipeline wind power projects has already been approved by NTDC



There is no doubt regarding the benefits of adding wind power capacity to the energy mix of Pakistan, as summarised in the preceding sections. It will be extremely detrimental for Pakistan as a whole to lose out on the benefits of wind power while debating issues such as the quota of wind power, commenting on the wind tariff values (which are at an all-time low) etc. The potential of wind resource in Pakistan, the lower tariff for wind power projects and the short construction period (typically 15 months for a project) all make this technology a strong candidate for promotion and inclusion in the energy mix. **Every single unit of electricity generated by a wind power project will reduce the burden faced by the national exchequer from generation through other foreign fuel dependent sources.**

The International Statistics of Wind Power²

In order to further understand where wind power can extend itself, it is very important to observe the growth trends of wind power in the world and the massive deployment taking place every year all across the globe, while we are still struggling against barriers.

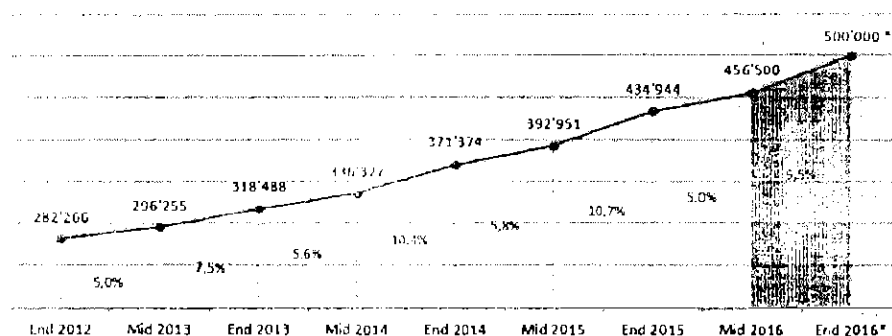
The worldwide wind capacity reached 456,486 MW by the end of June 2016, out of which 21,714 MW were added in the first six months of 2016. This increase is similar like in the first half of 2015, when 21.6 GW were added. All wind turbines installed worldwide by mid 2016 can generate around 4.7 % of the world's electricity demand.

The global wind capacity grew by 5% within six months (after 5.8 % in the same period in 2015 and 5.6 % in 2014) and by 16.1 % on an annual basis (mid 2016 compared with mid 2015).

In the second half of 2016, an additional capacity of over 40 GW was installed worldwide, which brought new annual installations to at least 65 GW, adding just 1.5 GW more than in the previous year. The total installed capacity of wind globally was 456,486 MW by June 2016.

The following figure shows the trend in increase in global capacity in last years.

Total Installed Capacity 2012-2016 [MW]



* Prognosis

Total installed capacity: Includes all installed wind capacity, connected and not-connected to the grid.

© WWEA

The Country wise installation of Wind Power till June 2016 is shown in figure below:

Position	Country /Region	Total Capacit y	Added Capacit y 2016 [MW]	Total capacit y end 2015	Added Capacit y 2015 [MW]	Total capacit y end 2014	Added Capacit y 2014 [MW]	Total capacit y end 2013	Added Capacit y 2013 [MW]
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² Source: Stats of World Wind Energy Association

		June 2016 [MW]		[MW]		[MW]		[MW]	
1.	China	158,000	10,000	148,000	10,101	114,763	7,175	91,324	80,827
2.	United States	74,696	830	73,867	1,994	65,754	833	61,108	59,884
3.	Germany	47,420	2,389	45,192	1,991	40,468	1,830	34,660	32,458
4.	India	27,151	2,392	24,759	1,297	22,465	1,112	20,150	19,564
5.	Spain	22,987	-	22,987	-	22,987	-	22,950	22,918
6.	United Kingdom	13,940	320	13,614	872	12,440	649	10,711	9,776
7.	Canada	11,298	109	11,205	510	9,694	723	7,698	6,578
8.	France	10,861	568	10,293	523	9,296	338	8,254	7,697
9.	Brazil	9,810	1,095	8,715	838	5,962	1,301	3,466	2,788
10.	Italy	9,101	143	8,958	124	8,663	30	8,551	8,417
11.	Sweden	6,338	309	6,029	157	5,425	354	4,470	4,271
12.	Poland	5,300	200	5,100	283	3,834	337	3,390	2,798
13.	Turkey	5,146	428	4,718	431	3,763	466	2,959	2,619
14.	Denmark	5,089	25	5,064	76	4,883	83	4,772	4,578
15.	Portugal	5,040	6	5,034	-	4,953	105	4,724	4,547
	Rest of World	44,309	2900	41,409	2,600	35,968	2,275	29,718	26,861
	Total	456,486	21,714	434,944	21,678	371,317	17,613	318,914	296,581

4.2 World Class EPC Contractor; Firm EPC Cost and Construction Period

The Project Company has executed a fixed-price, turn-key, non-escalable EPC Contract with Powerchina Huadong Engineering Corporation Limited (with Gamesa 2.0 wind turbines) for development of the MGEL project, with ample guarantees and warranties built in for protection of the lenders and equity sponsors.

Selection of HDEC was based on the competitive bidding exercise carried out by MGEL in November 2015. The sponsors of MGEL have had an excellent working relationship with HDEC through construction of their first 50 MW wind power project, Master Wind Energy Limited (MWEL). It is pertinent to mention that HDEC completed construction for MWEL in record time, despite significant delays on the part of the Power Purchaser in completing the interconnection facilities.

In addition to the EPC Contract, MGEL will enter into a long-term O&M contract with Gamesa, the wind turbine supplier, to ensure smooth and uninterrupted operations and protection for the entire term (13 years) of the loan.

4.3 EPC Contractor and WTG Selection - The Competitive Bidding Process

The Project will be developed under a fixed-price, turnkey EPC Contract, as is customary in project finance transactions. With an objective of setting up its Project in compliance with the highest standards and, *inter alia*, to select the most efficient and reliable wind turbine generator (the WTG) supplier and engineering, procurement & construction (EPC) contractor for its Project, the Project Company conducted thorough research of various WTG suppliers and EPC contractors in the global wind industry.



In October 2015, MGEL issued a RFP to renowned EPC Contractors shortlisted by its technical advisors for the Project. Proposals were received in November 2015 from the following world-renowned EPC contractors:

1. Powerchina Huadong Engineering Corporation Limited
2. Nordex Energy GmbH
3. Vestas Wind Systems A/S
4. Descon Engineering Limited

Following detailed review of the proposals, the Project Company and its advisors analyzed the risks associated with the execution of the Project on the basis of the bids received. Lengthy discussions were held with consultants, advisors and prospective lenders of the Project for evaluation of the proposals and for structuring of an EPC arrangement that would not only benefit the Project in its timely completion in accordance with the highest applicable standards but would also enhance bankability of the Project.

The first round of discussions was held with the bidders to seek further clarifications and negotiate the commercial aspects of the Project. After completion of the extensive evaluation process, Powerchina Huadong Engineering Corporation Limited (HDEC) was shortlisted as the preferred bidder. An EPC Contract was initiated between the parties in January 2016; the same was to be executed upon confirmation from local regulatory authorities on the way forward for development under the then prevailing upfront tariff regime, however, this confirmation never came and the upfront tariff expired. The Project Company continued to wait for the new upfront tariff which also never came.

The non-conducive environment throughout 2016 did not permit the Project Company to return to the negotiating table for finalization of the EPC Contract. However, the issuance of the Benchmark Tariff Determination gave hope that things would once again start progressing towards development of Wind IPPs. Taking note of this the Project Company immediately commenced negotiation for the EPC contract, and the EPC Contract was finalized and executed in February 2017.

MGEL and its technical advisors also shortlisted various technologies and WTG vendors for its wind farm. A number of WTG options were considered including:

1. GE 1.7 MW
2. GW 2.5 MW
3. Gamesa 2.0 MW
4. Nordex 3.0 MW
5. Vestas 3.3 MW

After a complete, site-specific Energy Yield Assessment, the Gamesa G114 2.0 MW turbine has been selected as the WTG of choice. A turn-key O&M contract for provision of O&M services for the first thirteen years of operations will also be signed with the WTG supplier.



4.3.1 The Selected EPC Contractor – Powerchina Huadong Engineering Cooperation Limited

As a result of negotiations and proposal evaluations and thorough due diligence, Powerchina Huadong Engineering Cooperation Limited was selected as the EPC contractor for the Project at the conclusion of the competitive bidding process.

HDEC has extensive on ground experience specific to Pakistan and has to date, successfully executed the engineering, procurement and construction of around 180 MW of wind power projects in Pakistan. A further 300 MW of wind power projects are currently under construction by HDEC.

4.3.2 The Turn-key EPC Agreement

Given the past experience of HDEC in the Pakistan market and the continually changing dynamics of the sector, negotiating the EPC Contract with HDEC for incorporation of changes required by the power purchaser, the grid operator, local regulation, etc. was a huge challenge for the Project Company. Following intense negotiations between the parties, a definitive and legally binding turn-key EPC agreement (comprising of an (1) Agreement for Procurement and Supply of Equipment (**Offshore Agreement**); and (2) Agreement for Engineering and Construction (**Onshore Agreement**)) (the **EPC Agreement**) was executed in February 2017.

The EPC Agreement is based on Powerchina Huadong Engineering Corporation Limited, being the EPC contractor whereby it shall be primarily responsible for the overall management, coordination and implementation of the Project. HDEC will have access to its international technical resources and parts distribution networks and has agreed to commit the same to the Project as part of its obligations set out in the EPC Agreement. As the lead turn-key EPC contractor of the Project, HDEC will provide its performance guarantees backed by bank bonds for a period of two years following commercial operations date – thus minimizing the technical completion risk of the Project for a period even beyond commercial operations date.

*The Project Company humbly submits to NEPRA its Tariff Petition based on the firm EPC cost (the **Firm EPC Cost**) agreed with HDEC for development of the Project.*

4.3.3 Powerchina Huadong Engineering Corporation – An Introduction

Powerchina Huadong Engineering Corporation Limited (formerly known as East China Investigation and Design Institute), is a multi-specialized, interdisciplinary and comprehensive international engineering corporation. The company was founded in 1954 and has its headquarters in Hangzhou, HDEC has its branches in Sichuan, Chongqing, Fujian, Guangdong, Jiangxi and Yunnan, as well as its overseas branches and subsidiaries, such as in Vietnam, Thailand, Indonesia, Pakistan, Turkey, Ethiopia, Kenya, Nigeria and Costa Rica etc. The Large Dam Safety Supervision Center under National Energy Administration is set up by HDEC.

HDEC operates in both domestic and international target markets, devoting itself to three main engineering fields (hydropower & renewable energy, urban construction & environmental engineering, dams & infrastructure safety), and three main business (design & consultancy, EPC contracting and investment). HDEC possesses the capability of providing systematic solutions at every stage of the development process; throughout the resource identification, planning and design, investment and financing, procurement

End

management, construction management, and operations management etc., and has the modern management structure compatible to its undertakings.

4.3.4 Siemens Gamesa Renewable Energy – OEM and O&M contractor

A turn-key O&M contract for provision of O&M services for the first thirteen years of operations will also be signed with the WTG supplier. Siemens Gamesa Renewable Energy (formerly Gamesa Corporación Tecnológica) is a Spanish manufacturing company principally involved in the fabrication of wind turbines and the construction of wind farms. With 22 years' experience in the wind industry and more than 35,200 MW installed, Gamesa is a global technological leader in the wind industry, with a footprint in 55 countries. Its comprehensive response includes also the wind turbine's operation and maintenance services, that manages for more than 22 GW. The company has production centres in the main wind markets: Spain and China, as the global production and supply hubs, while maintaining its local production capacity in India and Brazil.

4.4 Technology & Equipment

4.4.1 Technology Selection Criteria

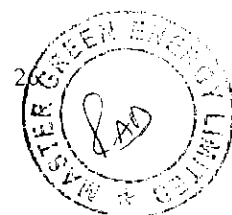
The technology selected for the Project has been selected after detailed analyses of various power generation technologies available internationally for the purposes of power generation through wind. A range of technologies were reviewed by the Project Company for wind power generation, which included, inter alia, synchronous or asynchronous generators and geared or gearless WTGs. Various factors were considered in selection of equipment and technology which included:

- (a) equipment to be of latest technology, megawatt class and high efficiency;
- (b) compliance of the proposed WTG with local wind conditions in Pakistan;
- (c) references and experiences of the wind turbine manufacturers under similar environmental conditions (e.g. temperature, wind farm size, area);
- (e) sufficient track record of the turbine type;
- (f) cost of equipment to be competitive;
- (g) commitment to the market: willingness to commit to Pakistan market;
- (h) energy output with warranted power curve and performance warranty;
- (i) grid compatibility; and
- (j) 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 complete, site-specific Energy Yield Assessment the Gamesa G114-2.0 turbine has been selected as the WTG of choice:

MANUFACTURER	Siemens Gamesa Renewable Energy
WIND TURBINE GENERATOR	Gamesa G114 2.0 MW
HUB HEIGHT	93m
NUMBER OF TURBINES	25
TOTAL INSTALLED CAPACITY	50 MW



The G114-2.0 is the latest version of the tried and tested 2.0 platform of Gamesa and has inherited many of the technologies developed over the last fifteen years for the 2.0 MW. Key features include:

- Higher yield: With a rotor diameter of 114m, the G114-2.0 has a 38% larger swept area than previous versions of the 2.0 platform and produces over 20% more energy annually. The large swept area allows it to generate more power even at relatively low wind speeds, making it an ideal turbine for the Pakistan market.
- It offers adaptability to the terrain: Gamesa active yaw system ensures optimum adaptation to complex terrain and its Aerodynamic design and the Gamesa NRS00 control system minimize noise emissions.
- It is reliable: (1) as it is a further development of the 2.0 MW turbine class, which has proven itself hundreds of times all around the world (2) as all components are supplied by renowned certified manufacturers, thus guaranteeing their quality, (3) as the rotor blades undergo stress testing beyond the design limits and are subject to regular extensive material testing, (4) as the high aluminum content in the tip acts as an extraordinarily effective lightning receptor, and (5) as grid compliance is based on the proven electrical and mechanical model implemented in the range of 2.0 platform products

It is highlighted that Master Group (main sponsor) expects the EPC Contractor to ensure the highest levels of workmanship and compliance with the most stringent of standards employed internationally for development of wind power projects in development of the Project so as to ensure that the Project is not subject to any operational issues during the life of the Project.

The EPC Contractor, in order to comply with the Sponsors requirements selected various renowned manufacturers for procurement of all equipment (electrical and other BOP equipment) to be imported for the Project. To ensure the highest quality along with cost efficiency, the Project Company has elected to procure equipment from renowned European companies only, from their respective manufacturing facilities in China.

4.5 The Site

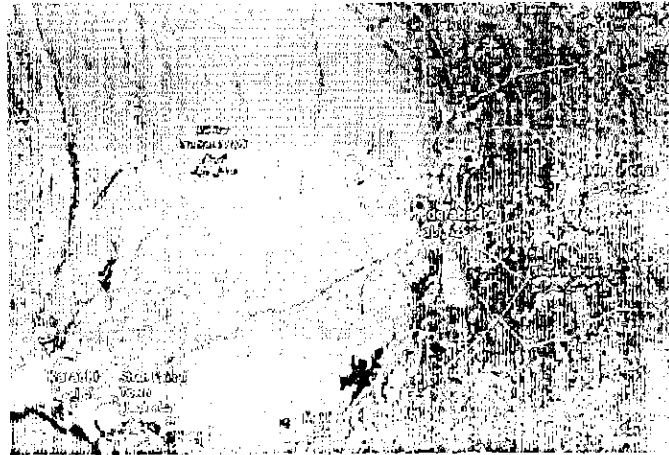
4.5.1 Land Allocation

MGEL was allocated suitable land by DOEGOS in Goth Dehson Walhar, District Jamshoro, adjacent to the Super Highway in January 2016. The Project Company formally signed the land lease agreement for land measuring 300 acres, in October 2017.

4.5.2 Accessibility

District Jamshoro borders Dadu to the north; to the east, the Indus separates it from Nawab Shah, Matyari and Hyderabad districts; Thatta district lies to the south, and Karachi district to the south west; to the west, the Kheerthar Range separates it from the Sindh and Lasbela district of Baluchistan. Jamshoro is accessible via the Super Highway which runs between Karachi and Hyderabad.





4.5.3 Grid Interconnection

After a thorough Grid Interconnection Study, the proposed interconnection point for the Project is the 132kV single circuit between Nooriabad grid station and old Jamshoro grid station. The Project is located a mere 7km from the interconnection point and minimum investment in infrastructure is required for connection of the Project to the national grid.

4.5.4 Topography

The general area of Jamshoro is classified as semi-desert area, consisting of flat and rocky terrain with an elevation of 40m to 50m above sea level. The vegetation is sparse and mostly consists of small, shrubby bushes, which do not present any major obstruction to the flow of wind. The area is also very sparsely populated. These two factors make it an ideal location for a wind farm.

4.5.5 Climatic Conditions

The climate of this area is characterised by fluctuating temperatures and scarce rainfall. The summers (May to September) are hot and humid with average temperature ranging between 33°C to 37°C, with a high of 45°C. The winters (November to February) are pleasant with average temperature in the range of 15°C to 25°C. In July and August, the region usually experiences the summer monsoon, characterised by spells of long, heavy rainfall.

4.6 Power off-take & the Government of Pakistan's Implementation Agreement

The electricity generated through the Project will be sold to Central Power Purchasing Agency (CPPA-G) (the **Power Purchaser**) pursuant to the energy purchase agreement (the EPA), which in turn will distribute and modulate the electricity generated by the Project Company.

In furtherance of the Government of Pakistan's model for setting up IPPs in Pakistan, the Project Company will also enter into an Implementation Agreement (the **IA**) with the Government of Pakistan in respect of the Project. The EPA will be finalized and executed by and between the Project Company and the Power Purchaser and the IA will be finalized and executed by and between the Project Company and the Government of Pakistan, in each case, following NEPRA's approval of the Project Company's 25 years Reference Generation Tariff, the grant of a generation license to the Project Company and the issuance of the LOS.

4.4 ESTIMATED OUTPUT

The Project's technical consultant Lahmeyer International and Renewable Resources carried out detailed investigations to estimate the energy production of the Project based on different WTGs. As a result of the investigations (specified below) and cost-benefit analysis carried out by the Sponsors (as elaborated in Section 4.3 and Section 4.4.2), the Gamesa G114 - 2.0MW WTG was selected:

- (a) the selected equipment;
- (b) the Site conditions; and
- (c) micrositing.

A summary of the results for the selected WTG are provided below:

GROSS CAPACITY	50 MW
NET CAPACITY FACTOR	38%
ANNUAL ENERGY GENERATION	166,440 MWH p.a.

4.5 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 (Project Cost and Tariff), the proposed Project cost is US\$87.624 million (United States Dollars) (the **Project Cost**).

The planned financing of the Project Cost is by:

- (a) 25% equity (the **Equity**); and
- (b) 75% debt (the **Debt**).

4.6 MAIN SPONSORS – MASTER GROUP

Master Group, the main sponsor of MGEL, is one of the most dynamic and diverse business groups of Pakistan. The Sponsor started its operations by entering into the bedding industry in 1963 as a licensee of Bayer A.G. (Germany) to manufacture foam mattresses in Pakistan and became a pioneer in the bedding industry.

In the year 1988, the Sponsor entered into the manufacturing and supply of automobile interiors including seats with reclining mechanism and assembly, roof headlining and door trims to renowned OEMs such as Honda, Toyota, Suzuki, Nissan, Daihatsu, Hino and Volvo and today fulfils 70% of the requirements of the OEMs in Pakistan. In 1993, the Sponsor installed its first state of the art weaving unit marking its entry into the textile business.

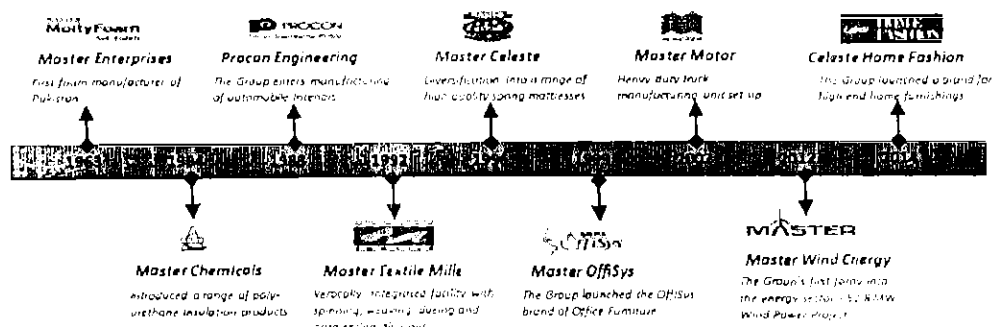
Today, Master Group has a strong fixed/current asset base of over Rs. 30 billion and an annually increasing group turnover of more than Rs. 25 billion. The Sponsor is not only the leading player in the bedding market, but has also diversified over the period into the textile, automobile, engineering, power and retail sectors.

The Sponsor is committed to play its part in the development of Pakistan's various sectors. Realizing the role of clean energy in development of the nation, the Sponsor ventured into the power generation sector by developing a 52.8 MW wind power project in Jhimpir, Master



Wind Energy Limited (MWEL), which commenced commercial operations in October 2016. Over the past year, the MWEL project has achieved all benchmark performance targets and has given the sponsors invaluable, first-hand knowledge of both development and operations of a wind power project in Pakistan.

Master Green Energy Limited is the Sponsor's second project in the wind power sector, which is expected to achieve financial close by December, 2018.



4.7 CARBON CREDITS

Pakistan's national operational strategy for Carbon Development Mechanism (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.

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 wind farm. 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
1.	EPC COST	78,500
2.	NON EPC COST & PROJECT DEVELOPMENT COST	3,000
3.	PRE-COD INSURANCE COST	432
4.	FINANCIAL CHARGES	2,286
5.	INTEREST DURING CONSTRUCTION	3,406
TOTAL PROJECT COST		87,624

(Figures in thousands)

5.2 Details of Project Cost

5.2.1 EPC Cost

Breakup of cost associated with each Contract forming part of the turnkey EPC entered into by the Project Company is provided below:

Sr. No.	COST HEAD (IN MILLIONS)	TOTAL (IN EQUIVALENT USD)
1	OFFSHORE AGREEMENT	66,998
2	ONSHORE AGREEMENT	11,502
TOTAL EPC COST		78,500

(Figures in Thousands)

Note: the turnkey price being charged by the EPC Contractor for the Project is based on firm legally binding EPC Agreements (comprising the Offshore Agreement and the Onshore Agreement) executed between the Project Company and the EPC Contractor.

The EPC Cost represents the cost of twenty-five (25) G114-2.0 Wind Turbine Generators, seventy-five (75) blades (114m rotor dia), 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.

It is highlighted, as a major strength of the Project's EPC cost structure that the EPC Cost is inclusive of all withholding taxes payable in respect of the payments to be made to the EPC Contractor pursuant to the EPC Agreement.

The Project Company is contractually committed to pay, as mobilization advance, 20% (aggregate) of the total amounts payable to the EPC Contractor pursuant to the EPC Agreement.



5.2.2 Non EPC Cost 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 executed EPC Agreement. Such costs mainly include, inter alia, the costs of:

(Figures in Thousands)

SR. NO.	COST	USD
1.	FIXED ASSETS	460
2.	COST OF SECURITY ARRANGEMENTS	150
3.	INDEPENDENT ENGINEER – EPA REQUIREMENT	125
4.	FEASIBILITY STUDY & COST OF TECHNICAL CONSULTANT	900
5.	PERMITS, LICENSES, & FEES FOR COMPANY FORMATION	350
6.	ADMINISTRATION AND SUPERVISION COSTS	825
7.	LEGAL CONSULTANTS	250
	TOTAL NON-EPC COST	3,000

- (a) Fixed Assets: This includes cost of various instruments, equipment and other assets (excluding such assets that are supplied under EPC Agreement) that include:
- (i) Vehicles, equipment and furniture; and
 - (ii) Facility connectivity for remote monitoring.
- (b) Cost of Security Arrangement: The Project Company is concerned about the security of its personnel in the Jamshoro area. Therefore, security arrangement costs become one of the most important components of the Project cost. This represents the costs associated with providing security at offices, accommodation and site and also includes the cost for providing security to the expatriates engaged for the Project. It is highlighted that in view of the security situation prevalent at the Site, the provision of security by the Project Company is considered critical. The Project Company has hired the services of a dedicated Security Manager to oversee and monitor the security related matters along with other security staff.
- (c) Independent Engineer – EPA Requirement: MGEL 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 by MGEL, with the approval of CPPA, to monitor the construction and commissioning of the complex and to deliver the relevant certificates and carry out all responsibilities specified in the EPA, including certifying the results of the commissioning tests, readiness of interconnection facilities and synchronization.
- (d) Feasibility study and cost of Technical Consultant: The Project Company has engaged highly reputed and experienced technical consultants to carry out all technical studies required for compilation of a bankable feasibility study report. As required under the LOI, the Project Company installed a wind mast at the site and carried out numerous investigations including a topographical survey, geotechnical assessment, transport survey, wind resource assessment and initial environmental examination. Costs for hiring services of relevant consultants has been included in the project costs. Post financial close, the Technical Consultants will provide construction supervision services to oversee the EPC contractor and ensure timely completion of the Project in line with the highest quality standards.

- (e) Permits, Licenses and Fees for company formation: During development and construction of the Project, the Project Company will be required to incur various fees and charges in respect of permits and permissions required including but not limited to cost of bank guarantees for LOM/LOS, SBLC in favour of power purchaser, LOI fee, AEDB/DOEGOS facilitation and legal fees, fees for vetting grid interconnection study, NEPRA fees and registration with SECP fees. This is in addition to fees paid for the purposes of formation of the Project Company.
- (f) Project Administration and Supervision: The Project Company's head office is based in Lahore. This office will be required to maintain coordination with the Project Company's lenders, shareholders and various governmental agencies. The Project Company will also maintain a Project coordination office with limited accommodation at Karachi to coordinate the construction and monitoring activities at Site. The Project Company will engage an experienced in-house engineering team for supervising construction activities post financial close. The team will include at a minimum two civil engineers, two electrical engineers and a mechanical engineer to ensure all construction activities are appropriately monitored. This head covers all expenses related to maintaining the required offices as well as the human resource costs associated with the relevant technical, legal and financial experts required to monitor the project during the implementation phase.
- (g) Legal Consultants: Includes costs related to procurement of legal services for drafting of required project contracts, including but not limited to the EPC contract, the Implementation Agreement, the Energy Purchase Agreement and the Financing Agreements.

5.2.3 Taxes & Custom Duty

- (a) Custom 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 percent for the following items:

"Machine, 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, MGEL has assumed zero percent customs duty regarding imported plant, equipment, machinery etc. in accordance with the above.

In case of applicability of any duty, MGEL 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 percent, as the same is related 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, MGEL 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. Machine: 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, MGEL has not taken into account the impact (if any) of the Sindh Sales Tax on Services Act, 2011. The true implications and procedures with regard to applicability of the 'Sindh Sales Tax on Services Act, 2011' 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) Income Tax:

Advance Income Tax at 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 sections 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 inverters, 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, MGEL 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.

As elaborated above no customs duties or taxes have been assumed for the purposes of this Petition, however, in case any taxes (customs duty/sales tax/income tax etc.) are levied, contrary to above, the same should be reimbursed to the Project Company on the basis of actual levy at the time of COD.

5.2.4 Pre-COD Insurance Cost

Pre-COD Insurance Cost covers the insurance cost of Project Company's assets during construction and the same are incurred prior to COD. These cost estimates have been developed based on indications received from the insurance market.

The Project Company, 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 Project Company has approached insurance advisors operating in the market to get quotations for the cost of pre-COD insurance for the Project. In the past year, due to a high number of occurrences of hurricanes and tsunamis globally, reinsurers that hold over 95% of the risk for such insurances world-wide have been required to honor an unusually large number of claims. Therefore, due to the impact on the global insurance market as a whole, it has been brought to our notice that the 0.5% of EPC costs assumed in the Benchmark Tariff Determination will not be sufficient to cover the entire scope of insurances outlined above; it is expected that the required insurances can be obtained within approximately 0.55% of the proposed EPC cost.

Based on the aforementioned reasons, the Project Company requests NEPRA to allow a Pre-COD insurance cost of 0.55% of the EPC cost.

5.2.5 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; charges related to various letters of credit to be established in favor of various contracting parties, 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.



Financial charges negotiated with the lenders and are in line with the prevailing market conditions and practices applicable for project financing transactions. The term sheets for arrangement of Debt financing signed with the lenders are attached as Annexure – D.

The Project Company requests that as it has not considered any taxes on account of Financial Fees and charges, any taxes, if applicable on account of these costs may kindly be allowed as adjustment at actual cost at the time of COD

It is humbly submitted before NEPRA that Financial Charges proposed by the Project Company be favorably granted.

5.2.6 Interest During Construction

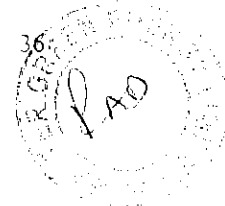
The Interest During Construction (the IDC) has been calculated on the basis of (i) a fifteen (15) month construction period, as agreed under the EPC Contract, and (ii) the term sheets executed between the Project Company and the lenders, which stipulate a base rate equal to 3-month KIBOR plus a margin of 250 basis points (PKR financing) and 3-month LIBOR plus a margin of 450 basis points (USD financing). Actual IDC, however, shall be subject to change depending on the fluctuations in base rate (i.e. 3-month KIBOR & 3-month LIBOR), funding requirement (draw-downs) of the Project during the construction period, changes in Project Cost including changes due to duties and taxes, and variations in PKR / USD exchange rate.

BASIS FOR IDC CALCULATIONS	3 - MONTH KIBOR	3 - MONTH LIBOR
BASE RATE ³	6.00%	0.00%
SPREAD	2.50%	4.50%
TOTAL INTEREST RATE	8.50%	5.10%

We understand that NEPRA had assumed a spread of 425bps over LIBOR for the purposes of the Benchmark Tariff Determination; however, even after undergoing extensive negotiations with numerous foreign financiers, we have not been able to get any foreign financier to accept a spread of 425bps for our Project. It is therefore humbly requested that a spread of 450bps may please be accepted for the purposes of our Petition.

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

³ Kindly note that base rates for LIBOR and KIBOR have been assumed in line with assumptions of the Benchmark Tariff Determination issued by NEPRA in January 2017 to ensure ease of comparability with the Benchmark Tariff Determination.



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:

Figures in millions USD

DEBT	FOREIGN (51.7%)	34.00
	LOCAL (48.3%)	31.72
EQUITY		21.91
TOTAL PROJECT COST		87.62

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 65.72 million (based on a project cost of USD 87.62 million). We understand that NEPRA's Benchmark Tariff Determination assumes a debt: equity ratio of 80:20, as opposed to the standard 75:25 debt-equity mix proposed for the Project in this Petition. The Project Company has approached all major foreign development financial institutions (DFI) operating in Pakistan for arrangement of financing on an 80:20 basis, however, despite our considerable efforts, each DFI we approached has categorically refused to finance a project with equity below 25%. Therefore, we humbly submit to NEPRA that since the financing mix assumed in the Benchmark Tariff Determination is not bankable for Pakistan, we request that a debt: equity mix of 75:25 be accepted for the Project.

A term sheet for arrangement of local and foreign financing has been signed with Meezan Bank Limited (MBL). The estimated amount to be raised from local lenders is USD 31.72 Million (approx. PKR 3.331 billion) while the remaining USD 34.00 Million will be arranged by MBL through foreign financial institutions. It is pertinent to mention that the debt raised through foreign banks will be denominated in USD (repayment in USD, interest payments to be indexed to LIBOR) while debt to be provided by the local banks will be denominated in PKR (repayment in PKR, interest payments to be indexed to KIBOR).

Based on the current Project cost estimates, the equity required to be injected by the Sponsors amounts to USD 21.91 million. The Sponsor, Master Group of Industries will subscribe to 100% of the equity requirement.

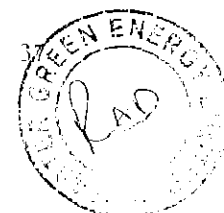
6.3 Equity Participants / Sponsors

6.3.1 Master Group of Industries

Master Group is one of the most *dynamic* and *diverse* business groups in Pakistan. The Group started its operations in the mattress industry in 1963, as a licensee of Bayer A.G. (Germany). Since then, Group has expanded into the *textile, automobile, engineering and energy sectors*. It has been 53 years since MG's inception, the Group has accomplished:

- A turnover of PKR 30 Billion
- Fixed Asset Base of PKR 25 Billion and
- A team of 12,000 skilled professionals

After the successful Commissioning of Master Wind Energy Limited's 52.8 MW Wind Power Project in Jhimpir the Group started development of a second 50 MW project, Master Green Energy Limited, in the neighboring district of Jamshoro, based on their experience in wind power projects.



6.4 Return On Equity

Based on past upfront tariff determinations issued by NEPRA, the petitioner is aware that NEPRA has permitted a return on equity (on IRR basis) of 17% to similar wind power projects in Pakistan.

The Petitioner is also cognizant of the fact that the 17% return was allowed to encourage the nascent wind industry in Pakistan, and in its recently announced Benchmark Tariff Determination for wind power projects, NEPRA has acknowledged the reduced risk of wind power projects and reduced the allowed return to 15%. In order to avoid prolonged debate on the subject and to continue expedited project development, the Petitioner accepts the returns allowed by NEPRA and requests NEPRA to allow it the same return on equity i.e. 15% (net of applicable withholding tax), as permitted to conventional power projects.

The Project Company humbly submits before NEPRA that it may be allowed a 15% return on equity (net of applicable withholding tax).

6.5 Return On Equity During Construction (ROE DC)

As per past precedent, IPPs have been allowed to claim return during the term of the Implementation Agreement commencing from the start date of construction i.e. the date from which payments are made to the EPC Contractors. For the purpose of this Petition, the ROE DC (included as part of the ROE component) has been approximated in line with forecasted costs and equity draw-downs.

It is humbly requested that a one-time adjustment be allowed at COD for determination of ROE DC based on the tried-up Project costs and actual equity draw-down.

6.6 Debt Servicing

The capital structure of the Projects is envisaged at 75:25 (Debt: Equity). Meezan Bank Limited will arrange 48.3 % of the required debt in PKR and the remaining 51.7 % shall be arranged through foreign banks in USD.

The tenor of the loan agreed with the banks is 13 years plus a 2-year Grace Period. The foreign source financing will be based on 3-month LIBOR plus a margin of 4.50% adjustable on quarterly basis. Whereas the local financing will be based on 3-month KIBOR, plus a margin of 2.50%, also adjustable on quarterly basis.

We understand that NEPRA had assumed a spread of 425bps over LIBOR for the purposes of the Benchmark Tariff Determination; however, even after undergoing extensive negotiations with numerous foreign financiers, we have not been able to get any foreign financier to accept a spread of 425bps for our Project. It is therefore humbly requested that a spread of 450bps may please be accepted for the purposes of our cost plus tariff petition.

i. Terms of Financing

The following terms for financing the debt portion of the Project Cost have been agreed and locked between the Project Company and the lenders through the execution of the financing term sheets:

Sr. No.	Cost Head	USD	
1	Total Project Value	87.62 Million	
2	Total Value of Debt @ 75% of total project Value	65.72 Million	
		3-month LIBOR	3-month KIBOR
3	Base Rate	0.60%	6.00%
4	Spread	4.50%	2.50%
5	Debt Markup	5.10%	8.50%
6	Loan Tenure (door-to-door)	15 years	
7	Repayment Period	13 years	
8	Grace Period	2 years	
9	Re-Payment Schedule	Quarterly	

Furthermore, the Project Company, under the terms of the executed financing term sheet, is required to bear the expenses of the Lenders' advisors. These include costs associated with the Lenders:

- (i) legal advisers;
- (ii) technical advisers;
- (iii) insurance advisers;
- (iv) audit;
- (v) tax advisers; and
- (vi) any other advisors deemed necessary by the Lenders.

⁴ Kindly note that base rates for LIBOR and KIBOR have been assumed in line with assumptions of the Benchmark Tariff Determination issued by NEPRA in January 2017 to ensure ease of comparability with the Benchmark Tariff Determination

7 Operation Cost

7.1 Understanding & Benchmarks

In the first batch of wind power, O&M expenses was one of the major unknowns. NEPRA permitted a significant O&M component in both cost-plus petitions as well as in its upfront tariff determinations. Today, with almost 700 MW of wind power projects installed and operational in Pakistan, there are a number of international OEMs providing O&M services to wind power projects. Consequently, O&M components in tariff determinations issued by NEPRA have seen a sharp decrease over the years, as shown in the table below:

	2013	2015	2017
O&M Component	1.604	1.5039	1.1986

The O&M component proposed by NEPRA in its recent Benchmark Tariff Determination is the lowest to date and is significantly below the full scope O&M packages currently being offered in the market. However, the Project Company has engaged in negotiations with the shortlisted O&M contractors to ensure that a full scope O&M package is achieved within the benchmark set by NEPRA.

The Project Company hereby requests that NEPRA permit its O&M costs in line with the Benchmark Tariff Determination.

7.2 Breakup of Operating Cost

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

	THOUSANDS USD
O&M COST	1,900
INSURANCE COST	400
TOTAL OPERATING COST	2,300

7.3 O&M Cost

The Project Company will enter into legally binding O&M Contracts with Siemens Gamesa Renewable Energy (O&M Contractor) for a period of thirteen years after COD. The Contract will be entered into in two stages:

1. Years 1-13 (initial contract) to cover the loan repayment period and satisfy requirements of the Project lenders
2. Year 14-25 (optional extended contract), to be entered into at the end of the initial contract, after taking into account the operational history and prevailing conditions at the plant.

It is estimated that regardless of whether the Project Company opts for the Optional Contract, the overall cost of O&M services will not vary significantly over the life of the Project.

During the operations phase, the Project Company is also expected to incur numerous costs related to daily operations and management of the plant, including but not limited to costs related to:

- Fixed Assets including vehicles, office furniture, tools and other supporting equipment required
- Human resource required including accounting team, management team and site supervision teams
- Land lease costs payable to Government of Sindh for renewal of land lease for the Project Company
- Financing related costs including annual maintenance fee, monitoring fee and security trustee fee
- Other Administrative expenses including travelling, rent utilities etc.

As stated above, the Project Company acknowledges the benchmarks set by NEPRA in its Benchmark Tariff Determination. While management of all expected costs and expenses within the benchmark will be a challenging task requiring extreme economy on the part of the Project Company, we are confident that with the implementation of proper budgets and prudent policies, the costs will be managed within the benchmark.

Break-up of the indexations requested by the Project Company are as follows:

COST HEAD	USD	Requested Indexation
O&M COST	1,900	(1) USD /PKR (2) US CPI
INSURANCE COST	400	(1) USD /PKR

External O&M services will be procured by the Project for 13 years (extendable by another 12 years) in order to fulfill the lenders requirement to have experienced O&M Contractors performing O&M services during the debt repayment period.

7.4 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, the Project Company 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 chunk 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 because of the occurrence of an insurable event will also be incurred in US Dollars.

The Project Company, in view of the practices set by the other IPP's in Pakistan and in accordance with the requirements set out 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 0.5% of the EPC Cost and any increases therefrom up to 0.75% of the EPC Cost shall be charged by the Project Company at actual 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 petition does not, however, cover 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 Energy Yield

8.1 Basis of Wind Resource Assessment and Energy Estimates

The Petitioner engaged Renewable Resources (Pvt) Limited (RE2) of Pakistan backed by its foreign partners Lahmeyer International GmbH (LI) of Germany to carry out a bankable Wind Resource and Energy Yield Assessment for the Project.

The wind studies have been carried out using onsite wind data from a met mast that was installed in early 2016. Ten (10) minute interval data from 01.04.2016 to 31.07.2017 having duration of 16 months has been used in the analysis.

Out of the available data, a measurement period of 12 months from 01.05.2016 to 30.04.2017 was selected for the annual average wind speed and wind direction having highest data coverage period with good quality data, which is considered as a bankable time series. Analyzed average wind speed for the selected period is calculated as 7.40m/s at 100m height. For the assessment of long-term wind speed, reference data set of EMD-Global Wind Data based on ERA-Interim (EmdERA) has been considered and resulted in the coefficient of determination of (R^2) = 82%. Resultantly, the long-term wind speed of 7.36 m/s is calculated at 100 m height above ground level (a.g.l.) at the mast location.

Twenty-five (25) Gamesa wind turbines (G114-2.0) at 93 m hub height have been used for the Project. The micro-siting was performed based on site-specific topographic map.

The WindPRO (ver.2.9) / WAsP (ver.11) software is used to estimate the wind conditions at each turbine location within the wind farm area based on the measured input wind data at a height of 100m. The potential influence by all surrounding wind farms has been taken into account for the wake analysis. Losses are occurring along the whole energetic transformation chain from the rotor (kinetic energy) to the substation's delivery point (electricity) and has been considered on basis of turbine specifications and prudent assumptions.

Following losses have been considered to arrive at net energy number from the total gross:

- Wake Effects
- Availability
- Turbine Performance
- Electrical
- Environmental

Additionally, an uncertainty assessment was also carried out. Uncertainty sources are associated to measuring equipment, data acquisition, data processing, energy model development, turbine parameters and energy estimation.

The expected energy output of the Project is determined as 166,440MWh per annum, which translates into a 38% annual capacity factor, and is considered very attractive for wind generation given the precedent cases in the sector and the expectations of NEPRA.

8.2 Wind Risk during operations

In past cost-plus tariff petitions for wind power projects, wind risk (i.e. risk of lower than benchmark wind speeds) was borne by the Power Purchaser in line with the Policy for Renewable Energy, 2006. The energy output, for the purpose of tariff computation was determined based on a reference 'benchmark wind speed'. Payments to the Project were adjusted with reference to the benchmark, in accordance with the actual wind speeds observed at the sites. In order to minimize risks and disruptions to the project's cash-flows,



the tariffs were adjustable to wind speeds at both higher and lower than the benchmark. This procedure remains aligned with the spirit of cost plus tariff and is also captured in the Policy for Renewable Energy, 2006.

With the successful growth of the wind power industry in Pakistan, NEPRA began announcing upfront tariffs for wind power projects. Wind risk protection was not included in the upfront tariff regimes as the upfront tariff was considered a 'take it or leave it option', with all opportunities as well as all risks taken by the project developers.

The Petitioner understands that the Power Purchaser, AEDB and NEPRA are not in favor of providing coverage against wind speed risks to project developers. Therefore, the Petitioner has not requested any allowance or provision in the Reference Tariff for coverage against wind risk, provided that the Reference Tariff is approved on the estimated 38% annual capacity factor. The Petitioner has accepted all potential risks arising from unpredictable wind speeds, which may result in energy shortfalls during the operations period and the Petitioner is also absorbing all such potential costs (including lender's requirements) related to this aspect.

The Petitioner has not requested any allowance or provision in the Reference Tariff for coverage against wind risk, provided that the Reference Tariff is approved on the estimated 38% annual capacity factor.

8.3 Compensation against higher than assumed energy yields

Despite the sophisticated forecasting techniques available, it is impossible to accurately predict the wind speed and wind direction over the course of the life of the Project. Both these parameters affect the energy output of the plant; wind speed directly and wind direction indirectly through "wake effects". It is also pertinent to mention that the annual energy assumed for the purpose of this Petition is based on an average energy output; the Project may experience energy output higher than the benchmark assumption in some years, whereas in other years the energy output may be significantly lower than the benchmark of 166,440 MWh per annum.

As mentioned in the preceding section, *the Petitioner is bearing the risks associated with the potential of lower than predicted wind speeds*, as well as their further repercussions. Therefore, in order to have an opportunity to recover its potential energy shortfall on account of wind speed, the Petitioner has assumed that any such energy generated over and above the 38% capacity factor shall be paid at the full tariff rate to the Project.

It is humbly emphasized that the Petitioner should be allowed compensation for energy output above 38% capacity factor at the Reference Generation Tariff to cater for the risks of variability in the wind speed, from which the Petitioner will most definitely suffer during the life of the Project.

It is pertinent to highlight that this has been permitted by NEPRA to Projects developed under the upfront tariff regime and in this regard, there is no difference between upfront and cost-plus tariff conceptually. A project under upfront tariff will only be pursued & developed if the baseline generation assumed for the purposes of the upfront tariff meets the projects generation capabilities while ensuring (i) bankability and (ii) acceptable returns for the developer; similarly, a cost-plus tariff is based on a bankable energy yield and an acceptable return for the developer. Since the premise behind the two regimes is exactly the same, the Petitioner should be allowed compensation, as in the case of upfront tariffs, against energy production above the capacity factor assumed for this Petition.

Given that the Petitioner is taking on the downside risks (wind speed risks), it is prayed that the Petitioner be allowed compensation at full tariff for energy yield above 38% capacity factor (166,440 MWh per annum).

8.4 Non Project Missed Volume (NPMV)

The Petitioner expects that the Non-Project Missed Volume (NPMV) shall be paid by CPPA on the basis of actual generation missed by the Project Company due to the occurrence of a non-project event (NPE). Given the sophisticated SCADA systems and forecasting tools (as also specified under the Grid Code Addendum No. 1 (Revision 1) now available, missed generation can be accurately determined without human intervention; therefore, the same should be compensated at actual – we believe that the aforementioned mechanism is the only fair method which ensures neither party (Project Company or Power Purchaser) are unduly burdened / penalized due to occurrence of the NPE. If such a practical solution is not workable, then firstly, the requirement for having forecasting tools should be removed from the Grid Code Addendum No. 1 (Revision 1), secondly, the Petitioner requests to go with the precedent mechanism of NPMV compensations (as reflected in the previously available tariff determinations and previously executed EPAs).

It is worth highlighting that the Grid Code Addendum No. 1 (Revision 1) provides for levy of penalties on wind IPPs for not remaining within the forecast error thresholds, therefore, while the wind IPPs are now obligated to maintain compliance with such stringent standards for forecasting the same method for determining projected energy yield should be used for compensating the wind IPPs during the occurrence of a NPE.

8.5 Energy Purchase Agreement (EPA)

The Petitioner has assumed that the EPA shall be signed with CPPA on the same concept as the case of all previously executed EPAs for wind power, that is, the EPAs of latest upfront tariffs will only be modified to the extent of capturing the project specific and tariff specific aspects. Any further changes therein shall make the finalization of the EPA a cumbersome challenge and the Project might become unviable.

8.6 Energy Sale Prior to COD

It is standard practice for wind power projects internationally to come online one WTG at a time, thereby, enabling the wind farm to commence dispatching energy to the grid as soon as a WTG is capable of power generation. Commissioning of a WTG cannot be completed without the substation being completed, tested and commissioned, therefore, all protection and safety equipment required to ensure smooth, safe operation of the wind farm (and the grid) would already be in place prior to commissioning of the WTGs. As soon as a WTG has been commissioned, it is ready to supply energy to the grid.

The standard EPA approved by the GOP permitted wind power developers to claim compensation from NTDC for supply of electricity prior to achievement of COD. The same has been allowed to wind power projects developed under the upfront tariff regimes.

As it has been allowed for past wind IPPs, NEPRA is humbly requested to allow the Project to claim compensation from the Power Purchaser for all electricity supplied into the grid system prior to achievement of COD at the tariff rate applicable for the first year of operation minus the debt servicing components of the tariff.



9 Reference Generation Tariff & Debt Schedule

9.1 Tariff Control Period

As the Project is 75 % debt funded with loan tenure of 13 years for repayment, this means that there will be higher debt service cost requirements in the first 13 years of the Project. In the last 12 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. duration of the EPA signed with the Power Purchaser, which is 25 years from COD. The tariff is divided into two (02) bands i.e. year 1-13 and years 14-25 to cover the variations due to debt repayment period.

9.2 Summary of Reference Generation Tariff

A summarized Reference Generation Tariff table setting out the two bands is provided below (Rs. / kWh):

	YEARS	1-13	14-25
FIXED O&M		1.1986	1.1986
ROE (INCLUDING WHT ON ROE)		2.3782	2.3782
DEBT SERVICING		4.8249	-
INSURANCE		0.2523	0.2523
TOTAL		8.6541	3.8292



9.3 Reference Generation Tariff

Years	Fixed O&M	Insurance	ROE	Debt (Local)		Debt (Foreign)		Total	
				Principal	Interest	Principal	Interest	Rs./kWh	US C/kWh
1	1.1986	0.2523	2.3782	0.8848	1.6731	1.1957	1.0713	8.6541	8.2420
2	1.1986	0.2523	2.3782	0.9624	1.5955	1.2579	1.0091	8.6541	8.2420
3	1.1986	0.2523	2.3782	1.0468	1.5110	1.3233	0.9437	8.6541	8.2420
4	1.1986	0.2523	2.3782	1.1387	1.4191	1.3921	0.8749	8.6541	8.2420
5	1.1986	0.2523	2.3782	1.2386	1.3192	1.4644	0.8026	8.6541	8.2420
6	1.1986	0.2523	2.3782	1.3473	1.2105	1.5406	0.7265	8.6541	8.2420
7	1.1986	0.2523	2.3782	1.4655	1.0923	1.6206	0.6464	8.6541	8.2420
8	1.1986	0.2523	2.3782	1.5941	0.9637	1.7049	0.5621	8.6541	8.2420
9	1.1986	0.2523	2.3782	1.7340	0.8238	1.7935	0.4735	8.6541	8.2420
10	1.1986	0.2523	2.3782	1.8862	0.6717	1.8868	0.3803	8.6541	8.2420
11	1.1986	0.2523	2.3782	2.0517	0.5062	1.9848	0.2822	8.6541	8.2420
12	1.1986	0.2523	2.3782	2.2317	0.3261	2.0880	0.1790	8.6541	8.2420
13	1.1986	0.2523	2.3782	2.4275	0.1303	2.1966	0.0705	8.6541	8.2420
14	1.1986	0.2523	2.3782	-	-	-	-	3.8292	3.6469
15	1.1986	0.2523	2.3782	-	-	-	-	3.8292	3.6469
16	1.1986	0.2523	2.3782	-	-	-	-	3.8292	3.6469
17	1.1986	0.2523	2.3782	-	-	-	-	3.8292	3.6469
18	1.1986	0.2523	2.3782	-	-	-	-	3.8292	3.6469
19	1.1986	0.2523	2.3782	-	-	-	-	3.8292	3.6469
20	1.1986	0.2523	2.3782	-	-	-	-	3.8292	3.6469
21	1.1986	0.2523	2.3782	-	-	-	-	3.8292	3.6469
22	1.1986	0.2523	2.3782	-	-	-	-	3.8292	3.6469
23	1.1986	0.2523	2.3782	-	-	-	-	3.8292	3.6469
24	1.1986	0.2523	2.3782	-	-	-	-	3.8292	3.6469
25	1.1986	0.2523	2.3782	-	-	-	-	3.8292	3.6469
Levelized								7.6050	7.2428



9.4 Debt Repayment Schedule

9.4.1 Foreign Debt Repayment Schedule

Quarter	Principal Repayment (USD)	Principal Tariff Component (Rs./kWh)	Interest on Outstanding Debt (USD)	Interest Tariff Component (Rs./kWh)	Total Installment (USD)	Debt Servicing Component of Tariff (Rs./kWh)
1	464,885	0.2933	433,500	0.2735	898,385	0.5668
2	470,812	0.2970	427,573	0.2697	898,385	0.5668
3	476,815	0.3008	421,570	0.2660	898,385	0.5668
4	482,894	0.3046	415,490	0.2624	898,385	0.5668
5	489,051	0.3085	409,334	0.2588	898,385	0.5668
6	495,287	0.3125	403,098	0.2553	898,385	0.5668
7	501,601	0.3164	396,783	0.2503	898,385	0.5668
8	507,997	0.3205	390,388	0.2463	898,385	0.5668
9	514,474	0.3246	383,911	0.2422	898,385	0.5668
10	521,033	0.3287	377,351	0.2381	898,385	0.5668
11	527,677	0.3329	370,708	0.2339	898,385	0.5668
12	534,404	0.3371	363,980	0.2296	898,385	0.5668
13	541,218	0.3413	357,167	0.2252	898,385	0.5668
14	548,119	0.3458	350,266	0.2210	898,385	0.5668
15	555,107	0.3502	343,278	0.2166	898,385	0.5668
16	562,185	0.3547	336,200	0.2121	898,385	0.5668
17	569,353	0.3592	329,032	0.2076	898,385	0.5668
18	576,612	0.3638	321,773	0.2030	898,385	0.5668
19	583,964	0.3684	314,421	0.1984	898,385	0.5668
20	591,409	0.3731	306,976	0.1937	898,385	0.5668
21	598,950	0.3778	299,435	0.1889	898,385	0.5668
22	606,586	0.3827	291,798	0.1841	898,385	0.5668
23	614,320	0.3875	284,065	0.1792	898,385	0.5668
24	622,153	0.3925	276,232	0.1743	898,385	0.5668
25	630,085	0.3975	268,299	0.1693	898,385	0.5668
26	638,119	0.4026	260,266	0.1642	898,385	0.5668
27	646,255	0.4077	252,130	0.1591	898,385	0.5668
28	654,495	0.4129	243,890	0.1539	898,385	0.5668
29	662,839	0.4182	235,545	0.1486	898,385	0.5668
30	671,291	0.4235	227,094	0.1433	898,385	0.5668
31	679,850	0.4289	218,535	0.1379	898,385	0.5668
32	688,518	0.4344	209,867	0.1324	898,385	0.5668
33	697,296	0.4399	201,088	0.1269	898,385	0.5668
34	706,187	0.4455	192,198	0.1212	898,385	0.5668
35	715,191	0.4512	183,194	0.1156	898,385	0.5668
36	724,309	0.4569	174,075	0.1098	898,385	0.5668
37	733,544	0.4628	164,840	0.1040	898,385	0.5668
38	742,897	0.4687	155,488	0.0981	898,385	0.5668
39	752,369	0.4746	146,016	0.0922	898,385	0.5668
40	761,962	0.4807	136,423	0.0861	898,385	0.5668
41	771,677	0.4868	126,708	0.0799	898,385	0.5668
42	781,515	0.4930	116,869	0.0737	898,385	0.5668
43	791,480	0.4993	106,905	0.0674	898,385	0.5668
44	801,571	0.5057	96,814	0.0611	898,385	0.5668
45	811,791	0.5121	86,594	0.0546	898,385	0.5668
46	822,142	0.5187	76,243	0.0481	898,385	0.5668
47	832,624	0.5253	65,761	0.0415	898,385	0.5668
48	843,240	0.5320	55,145	0.0348	898,385	0.5668
49	853,991	0.5387	44,394	0.0280	898,385	0.5668
50	864,879	0.5456	33,505	0.0211	898,385	0.5668
51	875,907	0.5526	22,478	0.0142	898,385	0.5668
52	887,074	0.5596	11,310	0.0071	898,385	0.5668

9.4.2 Local Debt Repayment Schedule

Quarter	Principal Repayment (PKR)	Principal Component (Rs. 4,000)	Interest on Outstanding Debt (PKR)	Interest Component (Rs. 4,000)	Total Installment (PKR)	Debt Outstanding Component of Total (Rs. 4,000)
1	35,661,940	0.2141	70,770,147	0.4252	106,432,086	0.6395
2	36,419,756	0.2188	70,012,331	0.4206	106,432,086	0.6395
3	37,193,676	0.2235	69,238,411	0.4160	106,432,086	0.6395
4	37,984,041	0.2282	68,448,045	0.4108	106,432,086	0.6395
5	38,791,202	0.2330	67,640,884	0.4062	106,432,086	0.6395
6	39,615,515	0.2380	66,816,571	0.4015	106,432,086	0.6395
7	40,457,345	0.2431	65,974,742	0.3967	106,432,086	0.6395
8	41,317,063	0.2482	65,115,923	0.3912	106,432,086	0.6395
9	42,195,051	0.2535	64,237,035	0.3859	106,432,086	0.6395
10	43,091,696	0.2589	63,340,391	0.3806	106,432,086	0.6395
11	44,007,394	0.2644	62,424,692	0.3751	106,432,086	0.6395
12	44,942,551	0.2700	61,489,535	0.3699	106,432,086	0.6395
13	45,897,581	0.2758	60,534,506	0.3647	106,432,086	0.6395
14	46,872,904	0.2816	59,559,182	0.3598	106,432,086	0.6395
15	47,868,953	0.2876	58,563,133	0.3549	106,432,086	0.6395
16	48,886,169	0.2937	57,545,918	0.3497	106,432,086	0.6395
17	49,925,000	0.3000	56,507,086	0.3455	106,432,086	0.6395
18	50,985,906	0.3063	55,446,180	0.3411	106,432,086	0.6395
19	52,069,357	0.3128	54,362,730	0.3366	106,432,086	0.6395
20	53,175,830	0.3195	53,256,256	0.3320	106,432,086	0.6395
21	54,305,817	0.3263	52,126,270	0.3272	106,432,086	0.6395
22	55,459,815	0.3332	50,972,271	0.3223	106,432,086	0.6395
23	56,638,336	0.3403	49,793,750	0.3172	106,432,086	0.6395
24	57,841,901	0.3475	48,590,185	0.3119	106,432,086	0.6395
25	59,071,042	0.3549	47,361,045	0.3066	106,432,086	0.6395
26	60,326,301	0.3625	46,105,785	0.3010	106,432,086	0.6395
27	61,608,235	0.3702	44,823,851	0.2953	106,432,086	0.6395
28	62,917,410	0.3780	43,514,676	0.2894	106,432,086	0.6395
29	64,254,405	0.3861	42,177,681	0.2834	106,432,086	0.6395
30	65,619,811	0.3943	40,812,275	0.2772	106,432,086	0.6395
31	67,014,232	0.4026	39,417,854	0.2709	106,432,086	0.6395
32	68,438,285	0.4112	37,993,802	0.2643	106,432,086	0.6395
33	69,892,598	0.4199	36,539,488	0.2575	106,432,086	0.6395
34	71,377,816	0.4289	35,054,271	0.2506	106,432,086	0.6395
35	72,894,594	0.4380	33,537,492	0.2435	106,432,086	0.6395
36	74,443,605	0.4473	31,988,482	0.2362	106,432,086	0.6395
37	76,025,531	0.4568	30,406,555	0.2287	106,432,086	0.6395
38	77,641,074	0.4665	28,791,013	0.2210	106,432,086	0.6395
39	79,290,946	0.4764	27,141,140	0.2131	106,432,086	0.6395
40	80,975,879	0.4865	25,456,207	0.2050	106,432,086	0.6395
41	82,696,616	0.4969	23,735,470	0.1966	106,432,086	0.6395
42	84,453,920	0.5074	21,978,167	0.1880	106,432,086	0.6395
43	86,248,565	0.5182	20,183,521	0.1792	106,432,086	0.6395
44	88,081,347	0.5292	18,350,739	0.1703	106,432,086	0.6395
45	89,953,076	0.5405	16,479,010	0.1610	106,432,086	0.6395
46	91,864,579	0.5519	14,567,507	0.1515	106,432,086	0.6395
47	93,816,701	0.5637	12,615,385	0.1418	106,432,086	0.6395
48	95,810,306	0.5757	10,621,780	0.1318	106,432,086	0.6395
49	97,846,275	0.5879	8,585,811	0.1216	106,432,086	0.6395
50	99,925,508	0.6004	6,506,578	0.1111	106,432,086	0.6395
51	102,048,926	0.6131	4,383,161	0.1003	106,432,086	0.6395
52	104,217,465	0.6262	2,214,621	0.0893	106,432,086	0.6395

10 Indexations, Escalations And Cost Adjustment

a. INDEXATIONS

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

i. Fixed O&M Cost Component

The Reference Fixed O&M 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:

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

Where:

$FO\&M_{(Rev)}$	=	the revised Fixed O&M 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.

ii. Insurance Cost

The Reference Insurance Cost Component shall be annually 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\$ 0.4 million (0.50% of the EPC Price) per annum. 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\$ 0.4 million (0.50% of the EPC Price) and shall be applied for by the Project Company along with the quarterly indexations and shall be applicable for the next year.

(a) Indexation Formula

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

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

Where:

$\text{Insurance}_{(\text{Rev})}$ = the revised Insurance Cost Component applicable for the relevant quarter

$\text{FX USD}_{(\text{Rev})}$ = 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.

iii. Return On Equity

In line with NEPRA's previous determinations for 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.

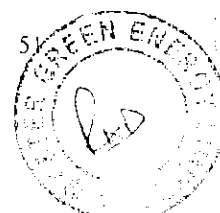
The applicable formula shall be as follows:

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

Where:

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

$\text{FX USD}_{(\text{Rev})}$ = 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.



iv. 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:

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

Where:

$PRIN_{(Rev)}$ = the revised Principal Component (Foreign) applicable for the relevant quarterly 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.

v. Interest Charges (Local)

The Interest Charges (Local) part of the Reference Debt Service Component shall be quarterly adjusted for variations in interest rate as a result of variation in 3 months KIBOR.

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

$$I_{(Rev)} = \text{Relevant Generation Tariff Component} * (KIBOR_{(Rev)} + 2.50\%) / (KIBOR_{(Ref)} + 2.50\%)$$

Where:

$I_{(Rev)}$ = the revised Interest Charge component applicable for the relevant quarterly period

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

$KIBOR_{(Ref)}$ = 3 month KIBOR rate prevailing on the date of tariff determination (6.00%)



vi. **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:

$$I_{(Rev)} = \frac{\text{Relevant Generation Tariff Component} * (LIBOR_{(Rev)} + 4.5\%)}{(LIBOR_{(Ref)} + 4.5\%) * (FX USD_{(Rev)} / 105)}$$

Where:

- $I_{(Rev)}$ = the revised Interest Charge component applicable for the relevant quarterly 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 (0.60%)
- $FX USD_{(Rev)}$ = 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. **ADJUSTMENTS AT COD**

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

i. **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):

- The Principal repayment and cost of debt be adjusted at COD as per the actual borrowing composition;
- Interest during Construction be adjusted as per actual based on actual disbursement of loans and prevailing KIBOR / LIBOR rates during the project construction period;
- 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;
- Customs duty and other taxes be adjusted as per actual;
- Any negative financial implications resulting from changes in the tax rates, duties etc. and currently applicable sales tax structure may kindly be adjusted in the Project Cost;



- (f) Impact of Sindh Sales Tax on Services Act 2011, Sindh Infrastructure Development Surcharge, and Federal Excise Duty be allowed as a pass-through;
- (g) Return on Equity be adjusted at COD in accordance with the GOP Policy for Development of Renewable Energy for Power Generation 2006 in order to ensure an IRR based return of 15% (net of withholding taxes) on equity (while treating the project as a Build-Own-Operate type project).
- (h) ROEDC to be adjusted at actual at the time of COD true up, based on actual equity injection by the Project Sponsors.



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 viability of the Project as a whole and specifically the Reference Generation Tariff.

1. Debt: Equity ratio is assumed to be 75:25.
2. Foreign lenders shall contribute towards funding 51.74% of the Debt (LIBOR based financing) while the remaining 48.26% will be funded through local financial institutions (KIBOR based financing).
3. Interest rate for LIBOR based debt has been determined based on 3 Month LIBOR (0.60%⁵) plus 4.50% 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. Interest rate for KIBOR based debt has been determined based on 3 Month KIBOR (6.00%⁶) plus 2.50% Spread and quarterly indexation on the same will be allowed by NEPRA.
6. A constant ROE of 15% (IRR based) is assumed (net of withholding tax on dividends) over 25 years. The ROE DC (included as part of the ROE component) shall be accrued from the achievement of financial close up to COD and adjusted based on the actual schedule of equity disbursement at the time of COD true-up.
7. Exchange rate have been assumed to be: PKR 105 /USD⁷
8. 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 term of EPA.
9. No customs duties and / or taxes 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 Power Purchaser. Similarly, customs duties on spare parts after COD will be "passed through" to the Power Purchaser.
10. The EPC Onshore Contract does not come under the ambit of Sindh Sales Tax on Services Act, 2011 and if so sales tax paid will be claimable as input tax against output tax payable post-COD on sale of electricity. In case sales tax is payable and the same cannot be claimed against output tax, the same is to be treated as a pass-through.
11. Deduction of withholding tax is assumed only in the EPC Onshore Contract. Any additional tax, if levied, will be "pass through" to the Power Purchaser.
12. No withholding tax on dividend is assumed. Any taxes levied will be treated as "pass through" to the Power Purchaser. General Sales Tax and all other taxes will also be treated as a "pass through"

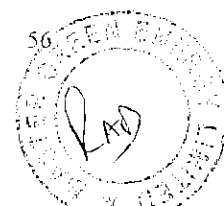
⁵ In line with Benchmark Tariff Determination for ease of comparability

⁶ In line with Benchmark Tariff Determination for ease of comparability

⁷ In line with Benchmark Tariff Determination for ease of comparability



13. The Zakat deduction on dividends, as required to be deducted under Zakat Ordinance, is to be considered as "pass through".
14. Sindh Infrastructure Development Surcharge on the imports for the Project has not been assumed and the same will be considered as "pass through".
15. 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.
16. The Return on Equity for the construction and commissioning period shall be adjusted on IRR basis at the time of COD according to the actual Equity disbursement during such period.
17. The Power Purchaser / CPPA-G 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.
18. Main Energy meter and electronic recorder for continuous recording of readings will be provided by Power Purchaser at its own cost.
19. Financing Terms are as yet 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 / IA 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.
20. Pre-COD insurance costs are considered based on the indications communicated from top local insurance companies. Premium rate for the insurance arrangements will be finalized at the time of financial closure.
21. 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.
22. Insurance during operations phase will be adjustable up to a maximum cap of 0.75% of EPC Cost upon application by the Project Company to NEPRA.
23. 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.
24. Any other assumptions that are not expressly stated herein but are based on the EPA draft negotiated by the Project Company with the Power Purchaser. Consequently, any change in any such assumptions may lead to change in the Reference Generation Tariff.
25. 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 Power Purchaser.
26. Any incentives given to any other Wind JPP shall also be given to the Project Company.



12 Tariff Summary

In summation, the Project Company 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:

- a. The Project Costs and related arrangements stated in this Petition be allowed to the Petitioner.
- b. Energy production estimate of 166.44 GWh per annum for calculation of the tariff and energy payments for the years 1 – 25 after COD.
- c. Non-Project Missed Volume and upside for generation above aforementioned yield in accordance with Section 8.4
- d. The Project be allowed to claim compensation for energy supplied prior to COD at the tariff allowed by NEPRA for the first year minus debt servicing components.
- e. Funding of the Project on an 75:25 – Debt: Equity basis.
- f. Debt to be split on 51.74:48.26 foreign (LIBOR): local (KIBOR) basis.
- g. LIBOR based debt financing (51.74%) with a base rate equal to 3-Month LIBOR plus a spread of 4.50%, reasons for which have been explained under Section 6.6 (Debt Servicing) above.
- h. KIBOR based debt financing (48.26%) with a base rate equal to 3-Month KIBOR plus a spread of 2.50%, reasons for which have been explained under Section 6.6 (Debt Financing) above.
- i. Sharing of any CER related revenues subsequently realized, as per the Government of Pakistan policy.
- j. A Return on Equity of 15% (net of withholding tax) on IRR basis along with Return on Equity during Construction, reasons for which have been provided in detail in Section 6.4 (Return on Equity) above.
- k. Indexations and adjustments for the individual tariff components, as detailed in Section 10 (Indexations, Adjustments and Cost Escalations) above.
- l. The Reference Generation Tariff provided under Section 9.2 (Reference Generation Tariff Table) above along with individual tariff components and debt schedule provided under Section 9.4 (Debt Schedule) above.
- m. Adjustments at COD, as provided under Section 10 (Adjustments at COD) above.
- n. The General Assumptions, as provided in 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 the Project Company to proceed further with the development process.

