



Registrar

National Electric Power Regulatory Authority Islamic Republic of Pakistan

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No. NEPRA/R/DL/LAG-394/11/096-102

August 16, 2017

Mr. Saleem Bandukda,
Chief Operating Officer,
Indus Wind Energy Limited (IWEL),
5th Floor, 508, Beaumont Plaza, Beaumont Road,
Civil Lines Quarter, PIDC,
Karachi.

Subject: **Grant of Generation Licence No. WPGL/50/2017
Licence Application No. LAG-394
Indus Wind Energy Limited (IWEL)**

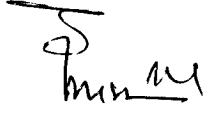
Reference: *IWEL's application vide its letter received on April 25, 2017.*

Enclosed please find herewith Generation Licence No. WPGL/50/2017 granted by National Electric Power Regulatory Authority (NEPRA) to Indus Wind Energy Limited (IWEL) for its 50.00 MW Wind Power Plant located at 7/3 & 7/4 Tapo Jungshahi, Deh Kohistan, Taluka & District Thatta in the province of Sindh, pursuant to Section 15 of the Regulation of Generation, Transmission and Distribution of Electric Power Act (XL of 1997). Further, the determination of the Authority in the subject matter is also attached.

2. Please quote above mentioned Generation Licence No. for future correspondence.

Enclosure: **Generation Licence
(WPGL/50/2017)**




16 08 17
(Syed Safer Hussain)

Copy to:

1. Secretary, Ministry of Water and Power, A-Block, Pak Secretariat, Islamabad.
2. Chief Executive Officer, Alternative Energy Development Board (AEDB), 2nd Floor, OPF Building, G-5/2, Islamabad
3. Chief Executive Officer, NTDC, 414-WAPDA House, Lahore.
4. Chief Executive Officer, CPPA-G, ENERCON Building, Sector G-5/2, Islamabad.
5. Chief Executive Officer, Hyderabad Electric Supply Company Limited (HESCO), WAPDA Offices Complex, Hussainabad, Hyderabad
6. Director General, Environment Protection Department, Government of Sindh, Complex Plot No. ST-2/1, Korangi Industrial Area, Karachi.

National Electric Power Regulatory Authority
(NEPRA)

Determination of the Authority
in the Matter of Application of Indus Wind Energy Limited for
the Grant of Generation Licence

August , 2017
Case No. LAG-394

(A). Background

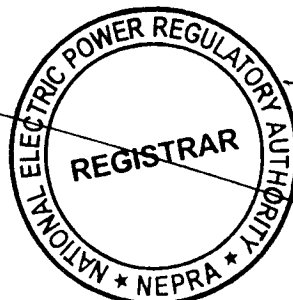
(i). In order to harness the potential of Renewable Energy (RE) resources in the country, the Government of Pakistan (GoP) has formulated a policy titled "Policy for Development of Renewable Energy for Power Generation 2006 (the "RE Policy"). The said policy is in field since 2006 under which both Federal Government and the Provincial Governments are supporting the implementation of RE projects in the country.

(ii). In consideration of the above, the Federal and Provincial Governments have been issuing Letter of Intent (LoI) to various developers for setting up different type of RE projects across the country. In this regard, Energy Department of Government of Sindh (EDGoS) issued LoI to Indus Wind Energy Limited (IWEL) for setting up a 50.00 MW wind based generation facility/Wind Power Plant/Wind Farm in the wind corridor of Jhimpir, district Thatta in the province of Sindh.

(iii). In order to implement the project, the services of various consultants were hired and a feasibility study of the project was carried out. The feasibility study *inter alia* included technical details of the project, micro-siting, power production estimates, soil test reports, electrical and environmental studies etc. After the said, IWEL decided to approach the Authority for the grant of generation licence.

(B). Filing of Application

(i). IWEL submitted an application on April 25, 2017 for the grant of generation licence in terms of Section-15 of Regulation of Generation,



Transmission and Distribution of Electric Power Act, 1997 (the "NEPRA Act") read with the relevant provisions of the NEPRA Licensing (Application and Modification Procedure) Regulations, 1999 (the "Licensing Regulations").

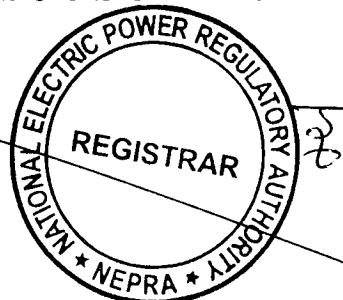
(ii). The Registrar examined the submitted application to confirm its compliance with the Licensing Regulations and observed that the application lacked some of the required information/documentation. Accordingly, IWEL was directed for submitting the missing information/documentation and the same was received on May 10, 2017. The Authority considered the matter and found the form and content of the application in substantial compliance with Regulation-3 of the Licensing Regulations. Accordingly, the Authority admitted the application on June 14, 2017 for consideration of the grant of the generation licence as stipulated in Regulation-7 of the Licensing Regulations. The Authority approved an advertisement to invite comments of general public, interested and affected persons in the matter as stipulated in Regulation-8 of the Licensing Regulations. Accordingly, notices were published in one (01) Urdu and one (01) English newspapers on June 17, 2017.

(iii). In addition to the above, the Authority also approved a list of stakeholders for seeking their comments for assistance of the Authority in the matter in terms of Regulation-9(2) of the Licensing Regulations. Accordingly, letters were sent to said stakeholders on June 19, 2017, soliciting their comments for assistance of the Authority.

(C). Comments of Stakeholders

(i). In reply to the above, the Authority received comments from five (05) stakeholders. These included Engineering Development Board (EDB), EDGoS, Anwar Kamal Law Associates (AKLA), Pakistan Council of Renewable Energy Technologies (PCoRET) and Ministry of Science and Technology (MoST). The salient points of the comments offered by the said stakeholders are summarized below:-

- (a). EDB did not express any reservation to the grant of generation licence to IWEL. However, EDB suggested that efforts should be made to utilize

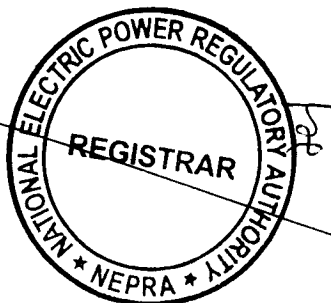


indigenous potential available for the proposed project;

- (b). EDGoS explained the huge potential of the RE in the country especially in the province of Sindh and the benefits that can be achieved through the use of the same in generation of electric power. EDGoS supported the grant of generation licence to IWEL;

- (c). AKLA raised various issues being faced by the electric power sector of the country. It was highlighted that there is under-utilization of various existing generation facilities and resultantly there is surplus capacity. Therefore, induction of new power plants on "Take or Pay" basis etc. is not justifiable. AKLA contested that RE based generation facilities have higher upfront tariff and also enjoy the status of "must run" making such facilities not viable financially and economically. AKLA questioned the induction of RE projects in the scenario of reducing oil prices, proposed long term contracts of R-LNG and under construction coal power projects. AKLA opined that instead of setting up new power plants having higher cost, efforts should be made to utilize the available generation capacity first to its full. Further, efforts should be made to encourage investors to setup new generation facilities under "Take and Pay" regime in a competitive power market. AKLA opposed the grant of generation licence to IWEL;

- (d). PCoRET stated that it cannot comment on the financial aspects of the project but as per the



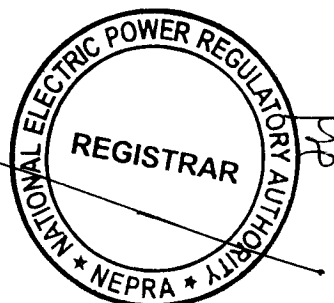
supplied/available information it has no objection to the grant of generation licence to IWEL; and

- (e). MoST endorsed the above comments of PCoRET and expressed its no objection for the grant of generation licence to IWEL.

(ii). The Authority reviewed the above comments of the stakeholders and decided to seek the perspective of the IWEL on the observations of EDB and AKLA. On the comments of EDB, it was submitted that the company shall make all possible efforts to utilize the indigenous potential available for development of the project, while remaining within the domain of RE Policy and other relevant rules and regulations.

(iii). Regarding the comments/observations of AKLA, it was submitted that the comments are general in nature and more focused on policy matters, misguided information, misinterpretation of data, incorrect and irrelevant data representation. Further, it was stated that AKLA had filed its comments without fully understanding the dynamics of electric power sector of the country, constraints of project financing, political & economic stability and other associated risks. IWEL expressed that country is facing energy shortfall due to which unprecedented load shedding of electricity has made the lives of people miserable and playing havoc with economic development of the country in aggregate. IWEL stated that in the said scenario, the prudent policy will be to encourage affordable generation which is cheap, clean and economical. Whereas to oppose such power generation is beyond comprehension and contrary to future strategic objectives and planning.

(iv). IWEL stated that the population of our country is growing exponentially and so is the demand for electricity. However, installation of new plants to meet with the demand is lagging behind, resultantly the gap between demand and supply of electricity is continuing. IWEL urged that the recent efforts to put up new power plants to reduce this gap is a step in the right direction and efforts should be made to keep this momentum. IWEL stated that the assertion of

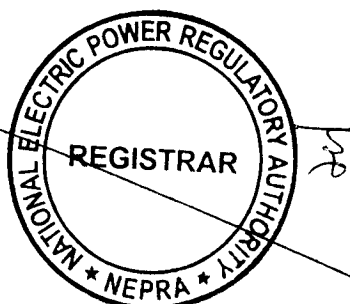


AKLA against the installation of new plants on pretext of efficiency and unutilized capacity, tantamount to disrupt the said efforts thus damaging the economic growth and social development of the country.

(v). IWEL remarked that comments of AKLA have been repetitive for every power development project for which the Authority had invited the comments for the stakeholder. Many at times in processing of NEPRA License application of upfront tariffs for wind projects, the Authority had already deliberated upon these comments and set it aside. Hence, comments of AKLA which are identical to earlier does not warrant any further deliberation.

(vi). Further, IWEL submitted that AKLA in its comments claimed that generation capacity of Pakistan is surplus. It appears that the commentator is not fully aware about the operational capacity and installed capacity, for instance the installed capacity of the hydro projects cannot operate at full load throughout the year as it dependent on the hydrology. Furthermore, a sizeable portion of installed capacity is inefficient and not economically viable to be operated. Fuel prices are volatile and we cannot assume the fuel prices to remain on the existing low level. Though there are projects under construction on coal and RLNG fuels, however, the ever increasing demand of electricity will continue to exist, therefore, renewable has to maintain a sizeable share in the overall energy mix.

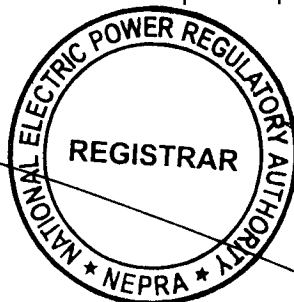
(vii). IWEL stated that it is pertinent to mention that indigenous renewable sector will result in savings of precious foreign exchange. Presently, country has the lowest contribution of renewable in the energy mix which needs to be improved to the level of other developing countries. The comparison of earlier upfront tariffs with the current upfront tariff reveals the improvement of technology/plant factor and reduction in cost, these benefits are reflected in the current upfront tariff offered by the Authority.



(viii). IWEL further stated that owing to the instability of the transmission line, the wind based generation facilities/Wind Power Plants/Wind Farms that are already in the phase of operations are not able to supply the required 700 MW to the National Grid, due to which a shortfall is being experienced. While AKLA letter may be well intentioned, it betrays a fundamental lack of understanding of the dynamics of what is involved in a viable power policy. Most of the comments are directed at NEPRA and the Renewable Power Policy with the biggest concern over "Take or Pay" feature which AKLA would like to be changed to "Take and Pay". It appears that AKLA does not seem to understand that replacing "Take or Pay" to "Take and Pay" would result in the end of IPP industry in country, which to date has been one of the most successful.

(ix). In consideration of the above, the Authority observed that AKLA while submitting its comments has referred to its previous correspondences to NEPRA in different licence and tariff matters wherein it raised different issues including (a) surplus capacity; (b) capacity payment without supplying electricity (c); addition of high cost renewable plants (d); underutilization of power plants; and (e) induction of new power plants on "Take or Pay" basis and others etc. In this regard, the Authority has observed that it had duly addressed the aforementioned objections/comments and sent a comprehensive reply to AKLA through letter no. NEPRA/SAT-I/TRF-100/17060, dated December 27, 2016. The Authority reiterates its earlier findings and observations given in the aforementioned letter and is of the considered opinion that in fact there is considerable supply demand gap resulting in load-shedding and load management.

(x). The aforementioned is strengthened from the fact that the proposed generation facility/Wind Power Plant/Wind Farm of IWEL is included in the future expansion plan of National Transmission and Despatch Company Limited (NTDC). Regarding the observations of AKLA that RE Projects should have "Take and Pay" tariff, the Authority hereby clarifies that through its determination No. NEPRA/TRF-WPT/2017/1542-1544 January 27, 2017, it has already determined a benchmark tariff for future wind power projects which is on unit



delivered basis meaning thereby that a power producer/generation company is paid only for the energy it delivers. In view of foregoing, the Authority considers that the observations of AKLA stand addressed.

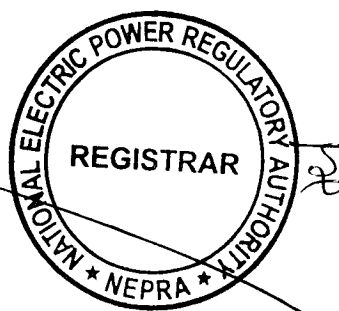
(xi). In consideration of the above and having addressed the comments/objections, the Authority considered it appropriate to proceed further in the matter of application of IWEL for the consideration of grant of generation licence as stipulated in the Licensing Regulations and NEPRA Licensing (Generation) Rules 2000 (the "Generation Rules").

(D). Evaluation/Findings

(i). The Authority has examined the submissions of IWEL including the information provided in its application for the grant of generation licence. The Authority has also considered the feasibility study of the project, Grid Interconnection Study (GIS), provisions of the RE Policy and the relevant rules & regulations.

(ii). The Authority has observed that the main sponsors of the project is Indus group which is one of the oldest business group of the country mainly dealing textile products. The group comprises of four ginning factories, five spinning mills and the largest terry towel plant of the country. The group employs over 9000 people and almost 75% of production is export based. The group has set up captive power plants with a cumulative capacity of around 30.00 MW running on furnace oil and natural gas for self-use at its different manufacturing units. The group is now diversifying its business by venturing into electric power sector and plan to set up a wind based generation facility. Further, the group is working on solar and hydel projects.

(iii). In order to implement the project, the group incorporated a new company in the name of IWEL under Section-32 of the Companies Ordinance, 1984 (having Corporate Universal Identification No. 0091801, dated February 04, 2015). The registered office of the company is located at Office No. 508, 5th floor, Beaumont Plaza, Beaumont Road, Civil Lines Quarters, Karachi in the province

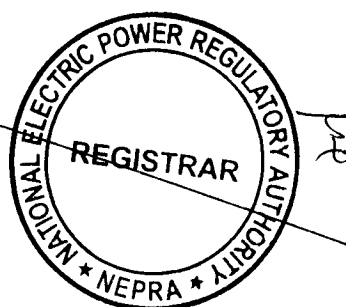


of Sindh. According to the Memorandum of Association, the objects of the company, inter *alia*, include business of power generation and its sale thereof.

(iv). The Govt. of Sindh (GoS) has allocated 428 acres of land to IWEL in the Jhimpir wind corridor at deh Kohistan 7/3 & 7/4 tapo Jungshahi, taluka and district Thatta, in the province of Sindh for setting up a 50.00 MW generation facility/ Wind Power Plant/Wind Farm. According to the latest balance sheet, the sponsor group has a total assets of around Rs. 16.00 billion. It is pertinent to mention that based on the financial strength and other evaluation parameters, EDGoS issued Lol to IWEL for development of the project.

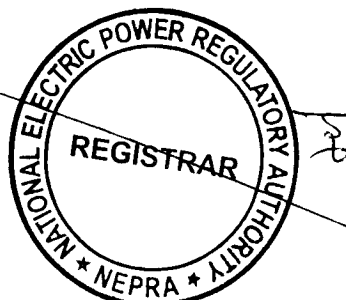
(v). In view of the explanation given above, the Authority considers that the sponsors have strong financial and technical background to carry out the project. It is pertinent to mention that a consortium of local banks consisting of Meezan Banks Limited and Bank Al-Habib have expressed their willingness to fund the debt part of the project. According to the submitted information, the total outlay of the project will be U.S. \$ 90.73 million which will be financed through a combination of debt (U.S. \$ 68.05 million) and equity (U.S. \$ 22.68 million) in a ratio of 75:25 which is in line with the benchmark set out in the RE Policy and the determinations of the Authority.

(vi). As explained in the preceding paragraphs, IWEL had carried out a feasibility study of the project. The review of the feasibility study reveals that the company has considered various world class manufactures of Wind Turbine Generator (WTG) including General Electric-GE, VESTAS, Gamesa, Nordex, Suzlon, Ming Yang and Goldwind etc. The selection procedure for WTG duly considered various parameters including (a). wind resource position of the corridor of Jhimipir (b). capital cost of equipment/WTG; (c). lead time for supply of equipment/WTG; (d). expected energy yield of WTG; (e). reliability and compliance with Grid Code; (f). availability of suitable operation and maintenance teams (including easiness/availability spare parts for WTG etc.



(vii). After considering the above mentioned factors, IWEL decided to select WTG of G114-2.0 MW of Gamesa Corporation, Spain. It is pertinent to mention that Gamesa is one of the world leader in the wind industry and has significant share worldwide. The feasibility study also optimized the size of the proposed generation facility/Wind Power Plant/Wind Farm to 50.00 MW having 25 x 2.00 MW of WTG. In consideration of the above, it is clarified that the proposed WTG is third generation (Type-III) having induction generator with gearbox. The said WTG inherits many of the technologies developed over the last 15 years for the Gamesa 2.0 MW platform. Now, with a rotor diameter of 114 m, the G114-2.0 MW has a 38% larger swept area than the G97-2.0 MW and produces over 20% more energy annually. The new blade having length of 56 m and with state of the art airfoil design ensures maximum energy production, reduced noise levels and a significantly lower cost of energy for the selected site(s). The proposed WTG has better feedback and control system with good characteristics for grid reliability and stability for grid as required in the Grid Code.

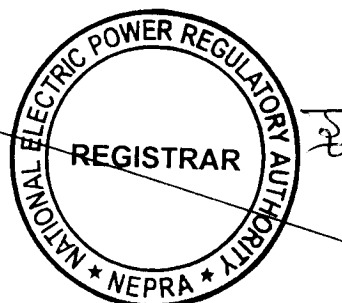
(viii). The Authority has noted that sponsors of the project carried out the required GIS for dispersal of electric power from the proposed generation facility/Wind Power Plant/Wind Farm. According to the said, the dispersal of electric power will be made at voltage level of 132kV. The dispersal/interconnection arrangement will be consisting of 132kV D/C transmission line (approximately 0.8 km long, on twin-bundled AASC Greeley conductor) for making an In/Out of 132kV Single Circuit (S/C) transmission line at the generation facility/Wind Power Plant/Wind Farm of IWEL, connecting the project of IWEL and other WPPs of Noor and Shafi Energy to the grid station of Jhimpir-2. In this regard, NTDC has confirmed that the electric power from the proposed generation facility/Wind Power Plant/Wind Farm will not have any adverse effect on the National Grid. Further, the necessary arrangements for evacuation of electric power will be made available well before the Commercial Operation Date (COD) of the generation facility/Wind Power Plant/Wind Farm.



(ix). The Authority considers that the proposed project, for which generation licence is being sought, is based on RE source and does not cause pollution as in the case of conventional power plants. However, the Authority considers that the construction and operation of the generation facility/Wind Power Plant/Wind Farm may cause soil pollution and noise pollution. In this regard, the Authority has observed that IWEL also carried out the Initial Environment Examination and submitted the same for the consideration and approval of Sindh Environmental Protection Agency, Government of Sindh (EPAGoS). The Authority is satisfied that EPAGoS has issued a No Objection Certificate (NOC) for the construction of the project.

(x). In terms of Rule-3 of the Generation Rules, the Authority may grant a generation licence to any person to engage in the generation business. The said rule stipulates various conditions pertaining to the grant of generation licence as explained in Rule-3(2), Rule-3(3), Rule-3(4) and Rule-3(5) of the Generation Rules. In this particular case, the Authority has observed that conditions of Rule-3(2) and Rule-3(3) stands satisfied as IWEL has provided details of location, technology, size, net capacity/energy yield, interconnection arrangements, technical limits, technical functional specifications and other details specific to the generation facilities. The provision of Rule-3(4) of the Generation Rules regarding holding a public hearing is not applicable as there is no issue which require this exercise.

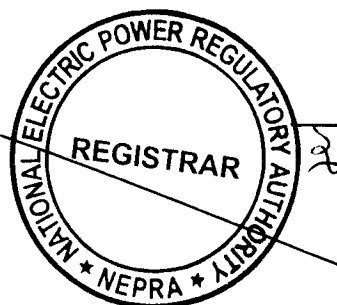
(xi). Further, Rule-3(5) of the Generation Rules stipulates that the Authority may refuse to issue a generation licence where the site, technology, design, fuel, tariff or other relevant matters pertaining to the generation facility proposed in an application for a generation licence are either not suitable on environmental grounds or do not satisfy the least cost option criteria. In this regard, Rule-3(5) of the Generation Rules also stipulates the conditions pertaining to least cost option criteria which include (a). sustainable development or optimum utilization of the renewable or non-renewable energy resources proposed for generation of electric power; (b). the availability of indigenous fuel



and other resources; (c). the comparative costs of the construction, operation and maintenance of the proposed generation facility against the preferences indicated by the Authority; (d). the costs and right-of-way considerations related to the provision of transmission and interconnection facilities; (e). the constraints on the transmission system likely to result from the proposed generation facility and the costs of the transmission system expansion required to remove such constraints; (f). the short-term and the long-term forecasts for additional capacity requirements; (g). the tariff resulting or likely to result from the construction or operation of the proposed generation facility; and (h) the optimum utilization of various sites in the context of both the short-term and the long-term requirements of the electric power industry as a whole.

(xii). In consideration of the above, the Authority clarifies that AEDB/GoP has identified two wind corridors (of Jhimpir and Gharo) in the province of Sindh. The estimated potential for these two corridors is more than 50,000 MW. At the moment, around fourteen (14) projects with a cumulative installed capacity of around 750.00 MW have been installed and commissioned whereas another twenty four (24) projects including that of IWEL with cumulative capacity of around 1300.00 MW are in various stages of implementation.

(xiii). The proposed project will result in optimum utilization of the RE resources which was earlier untapped, resulting in pollution free electric power. It is relevant to mention that wind is an indigenous resource and such resources have a preference for the energy security. It is pertinent to state that the Authority has determined a benchmark levelized tariff for the future wind projects which works out to be U.S. Cents 7.7342/kWh & 6.7467/kWh for local & foreign financing respectively. The said determination envisages conducting bidding among companies/sponsors of the project(s) as stipulated in NEPRA Competitive Bidding (Approval Procedure) Regulations, 2014. The said regulation envisages that companies/sponsors of the project(s) will be offering a discount on the announced benchmark tariff meaning thereby that tariff for future wind projects will be less than U.S Cents 7.7342/kWh & 6.7467/KWh for local & foreign financing respectively, which will be very competitive.



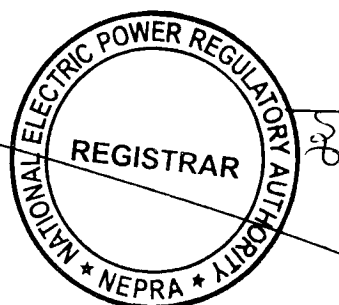
(xiv). As explained in the preceding paragraphs, the sponsors of the project carried out the GIS which concludes that the project will not face any constraints in transmission system. Further, being located in close proximity to the transmission system, the project will not result in cost and right-of-way issues for the provision of transmission and interconnection facilities. It is pertinent to mention that NTDC has included the project in its long-term forecasts for additional capacity requirements.

(xv). In view of the above, the Authority is of the considered view that the project of IWEL fulfills the eligibility criteria for grant of generation licence as stipulated in the NEPRA Act, rules and regulations and other applicable documents.

(E). Grant of Generation Licence

(i). The sustainable and affordable energy/electricity is a key prerequisite for socio-economic development of any country. In fact, the economic growth of any country is directly linked with the availability of safe, secure, reliable and cheaper supply of energy/electricity. In view of the said reasons, the Authority is of the considered opinion that for sustainable development, all indigenous power generation resources including RE must be developed on priority basis.

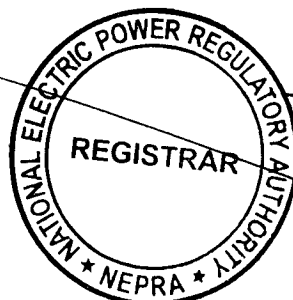
(ii). The existing energy mix of the country is heavily skewed towards thermal power plants, mainly operating on imported fossil fuel. The continuous import of fossil fuel not only creates pressure on the precious foreign exchange reserves of the country but is also an environmental concern. Therefore, in order to achieve sustainable development it is imperative that indigenous RE resources are given priority for power generation and their development is encouraged. The Energy Security Action Plan 2005 approved by GoP, duly recognizes this very aspect of power generation through renewable energy and envisages that at least 5% of total national power generation capacity (i.e. 9700 MW) to be met through RE resources by 2030.



(iii). The Authority considers that the proposed project of IWEL is consistent with the provisions of Energy Security Action Plan 2005. The project will help in diversifying the energy portfolio of the country. Further, it will not only enhance the energy security of the country by reducing the dependence on imported fuel but will also help in reducing in carbon emission by generating clean electricity, thus improving the environment.

(iv). As explained in the preceding paragraphs, IWEL has provided the details of location, technology, size, net capacity/energy yield, interconnection arrangements, technical details and other related information for the proposed generation facility/Wind Power Plant/Wind Farm. In this regard, the Authority has observed that Govt. of Sindh has allocated land to IWEL for setting up a generation facility/Wind Power Plant/Wind Farm. The said details have been incorporated in Schedule-I of the proposed generation licence. The Authority directs IWEL to utilize the allocated land exclusively for the proposed generation facility/Wind Power Plant/Wind Farm and not to carry out any other generation activity on the said land except with its prior approval.

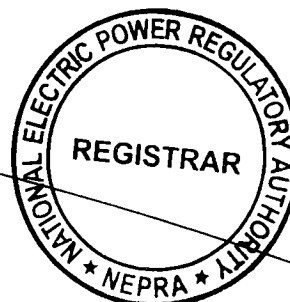
(v). The term of a generation licence under Rule-5(1) of the Generation Rules is required to match with the maximum expected life of the units comprised in a generating facility, except where an applicant for a generation licence consents to a shorter term. According to the information provided by IWEL, its generation facility/Wind Power Plant/Wind Farm will achieve COD by October 31, 2019 and will have a useful life of more than twenty (20) years from its COD. In this regard, IWEL has requested that the term of the proposed generation licence may be fixed as twenty (20) years. The Authority considers that said submission of IWEL about the useful life of the generation facility/Wind Power Plant/Wind Farm and the subsequent request of to fix the term of the generation licence is consistent with international benchmarks therefore, the Authority fixes the term of the generation licence to twenty (20) years from COD of the project.



(vi). Regarding the tariff, it is hereby clarified that under Section-7(3)(a) of the NEPRA Act, determining tariff, rate and charges etc. is the sole prerogative of the Authority. In view of the said, the Authority through Article-6 of the generation licence directs IWEL to charge the power purchaser only such tariff which has been determined, approved or specified by the Authority. The Authority directs IWEL to adhere to the Article-6 of the generation licence in letter and spirit without any exception.

(vii). About the compliance with the environmental standards, as discussed in the preceding paragraphs, IWEL has provided the NOC from EPAGoS and has confirmed that the project will comply with the required standards during the term of the generation licence. In view of the importance of the issue, the Authority has decided to include a separate article (i.e. Article-10) in the generation licence along with other terms and conditions making it obligatory for IWEL to comply with relevant environmental standards at all times. Further, the Authority directs IWEL to submit a report on a bi-annual basis, confirming that operation of its generation facility/Wind Power Plant/Wind Farm is in compliance with the required environmental standards as prescribed by the concerned environmental protection agency.

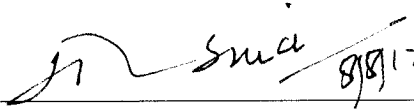
(viii). The proposed generation facility/Wind Power Plant/Wind Farm of IWEL will be using RE resource for generation of electric power. Therefore, the project may qualify for the carbon credits under the Kyoto Protocol. Under the said protocol, projects coming into operation up to the year 2020 can qualify for the carbon credits. IWEL has informed that the project will achieve COD by October 31, 2019 which is within the deadline of the Kyoto Protocol. In view of the said, an article (i.e. Article-14) for carbon credits and its sharing with the power purchaser has been included in the generation licence. Accordingly, the Authority directs IWEL to initiate the process in this regard at the earliest so that proceeds for the carbon credits are materialized. IWEL shall be required to share the proceeds of the carbon credits with the power purchaser as stipulated in Article-14 of the generation licence.



(ix). In view of the above, the Authority hereby approves the grant of generation licence to IWEL on the terms and conditions set out in the generation licence annexed to this determination. The grant of generation licence will be subject to the provisions contained in the NEPRA Act, relevant rules, regulations framed there under and other applicable documents.

Authority


Maj. (R) Haroon Rashid
(Member)


8/8/17

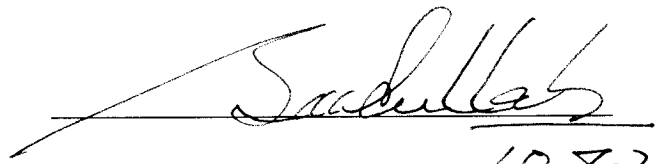
Syed Masood-ul-Hassan Naqvi
(Member)


8/8

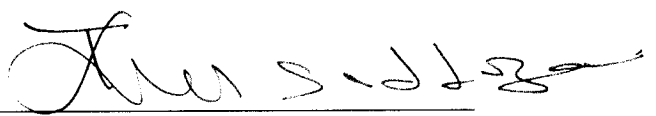

Himayat Ullah Khan
(Member)


9.8.17

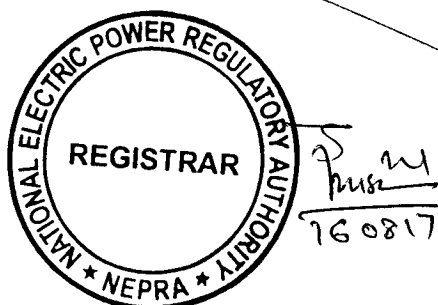
Saif Ullah Chattha
(Member/Vice Chairman)


10.8.2017

Tariq Sadozai
(Chairman)





**National Electric Power Regulatory Authority
(NEPRA)
Islamabad – Pakistan**

GENERATION LICENCE

No. WPGL/50/2017

In exercise of the Powers conferred under Section-15 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997, the Authority hereby grants the Generation Licence to:

INDUS WIND ENERGY LIMITED

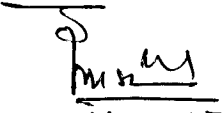
Incorporated Under Section-32 of the Companies Ordinance 1984 (XLVII of 1984) Having Corporate Universal Identification No. 0091801, dated February 04, 2015

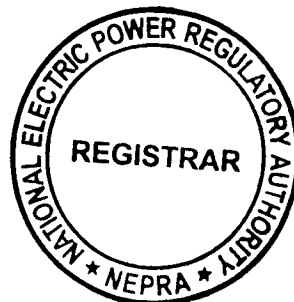
**for its Generation Facility/Wind Power Plant/Wind Farm
Located at 7/3 & 7/4 Tapo Jungshahi, Deh Kohistan
Taluka & District Thatta in the Province of Sindh**

(Total Installed Capacity: 50.00 MW Gross ISO)

to engage in generation business subject to and in accordance with the Articles of this Licence.

Given under my hand this on 16th day of August Two Thousand & Seventeen and expires on 30th day of October Two Thousand & Thirty Nine.


16 08 17
Registrar

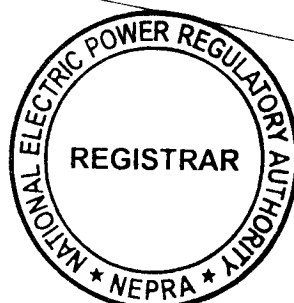


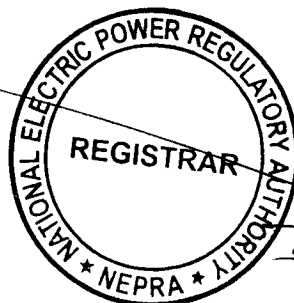
Article-1
Definitions

1.1 In this licence

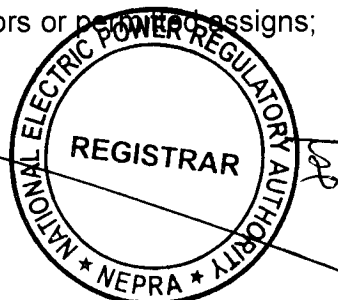
- (a). "Act" means the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 as amended or replaced from time to time;
- (b). "AEDB" means the Alternative Energy Development Board or any other entity created for the like purpose established by the GoP to facilitate, promote and encourage development of renewable energy in the country;
- (c). "Applicable Documents" mean the Act, the rules and regulations framed by the Authority under the Act, any documents or instruments issued or determinations made by the Authority under any of the foregoing or pursuant to the exercise of its powers under the Act, the Grid Code, the applicable Distribution Code, if any, or the documents or instruments made by the Licensee pursuant to its generation licence, in each case of a binding nature applicable to the Licensee or, where applicable, to its affiliates and to which the Licensee or any of its affiliates may be subject;
- (d). "Applicable Law" means all the Applicable Documents;
- (e). "Authority" means the National Electric Power Regulatory Authority constituted under Section-3 of the Act;
- (f). "Bus Bar" means a system of conductors in the generation facility/Wind Power Plant/Wind Farm of the Licensee on which the electric power from all the WTGs is collected for supplying to the Power Purchaser;



- (g). "Carbon Credits" mean the amount of Carbon Dioxide (CO₂) and other greenhouse gases not produced as a result of generation of electric energy by the generation facility/Wind Power Plant/Wind Farm and other environmental air quality credits and related emissions reduction credits or benefits (economic or otherwise) related to the generation of electric energy by the generation facility/Wind Power Plant/Wind Farm, which are available or can be obtained in relation to the generation facility/Wind Power Plant/Wind Farm after the COD;
- (h). "Commercial Operations Date (COD)" means the day immediately following the date on which the generation facility/Wind Power Plant/Wind Farm of the Licensee is commissioned;
- (i). "CPPA-G" means Central Power Purchasing Agency (Guarantee) Limited or any other entity created for the like purpose;
- (j). "Distribution Code" means the distribution code prepared by the concerned XW-DISCO and approved by the Authority, as it may be revised from time to time with necessary approval of the Authority;
- (k). "Energy Purchase Agreement (EPA)" means the energy purchase agreement, entered or to be entered into by and between the Power Purchaser and the Licensee, for the purchase and sale of electric energy generated by the generation facility/Wind Power Plant/Wind Farm, as may be amended by the parties thereto from time to time;
- (l). "Generation Rules" mean the National Electric Power Regulatory Authority Licensing (Generation) Rules, 2000 as amended or replaced from time to time;
- (m). "Grid Code" means the grid code prepared and revised from time to time by NTDC with necessary approval of the Authority;



- (n). "GoP" means the Government of Pakistan acting through the AEDB which has issued or will be issuing to the Licensee a LoS for the design, engineering, construction, insuring, commissioning, operation and maintenance of the generation facility/Wind Power Plant/Wind Farm;
- (o). "HESCO" means Hyderabad Electric Supply Company Limited or its successors or permitted assigns;
- (p). "IEC" means "the International Electrotechnical Commission or its successors or permitted assigns;
- (q). "IEEE" means the Institute of Electrical and Electronics Engineers or its successors or permitted assigns;
- (r). "Implementation Agreement (IA)" means the implementation agreement signed or to be signed between the GoP and the Licensee in relation to this particular generation facility/Wind Power Plant/Wind Farm, as may be amended from time to time;
- (s). "Letter of Support (LoS)" means the letter of support issued or to be issued by the GoP through the AEDB to the Licensee;
- (t). "Licensee" means Indus Wind Energy Limited or its successors or permitted assigns;
- (u). "Licensing Regulations" mean the National Electric Power Regulatory Authority Licensing (Application & Modification Procedure) Regulations, 1999 as amended or replaced from time to time;
- (v). "Net Delivered Energy" means the net electric energy expressed in kWh generated by the generation facility/Wind Power Plant/Wind Farm of the Licensee at its outgoing Bus Bar and delivered to the Power Purchaser;
- (w). "NTDC" means National Transmission and Despatch Company Limited or its successors or permitted assigns;

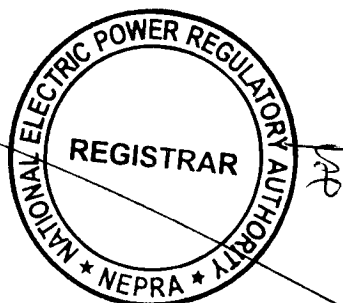


- (x). "Policy" means the Policy for Development of Renewable Energy for Power Generation, 2006 of GoP as amended from time to time;
- (y). "Power Purchaser" means CPPA-G which will be purchasing electric energy from the Licensee either on behalf of all XW-DISCOs or any single XW-DISCO, pursuant to an EPA for procurement of electric energy;
- (z). "SCADA System" means the supervisory control and data acquisition system for gathering of data in real time from remote locations to control equipment and conditions;
- (aa). "Wind Power Plant/Wind Farm" means a cluster of WTGs situated in the same location of a generation facility used for production of electric energy;
- (bb). "Wind Turbine Generator (WTG)" means the machines installed at the generation facility/Wind Power Plant/Wind Farm with generators for conversion of wind energy into electric energy;
- (cc). "XW-DISCO" means "an Ex-WAPDA distribution company engaged in the distribution of electric power".

1.2 The words and expressions used but not defined herein bear the meaning given thereto in the Act or Generation Rules and Licensing Regulations issued under the Act.

Article-2
Applicability of Law

This licence is issued subject to the provisions of the Applicable Law, as amended from time to time.



Article-3
Generation Facilities

3.1 The location, size (capacity in MW), technology, interconnection arrangements, technical limits, technical functional specifications and other details specific to the generation facility/Wind Power Plant/Wind Farm of the Licensee are set out in Schedule-I of this licence.

3.2 The net capacity/Net Delivered Energy of the generation facility/Wind Power Plant/Wind Farm of the Licensee is set out in Schedule-II of this licence. The Licensee shall provide the final arrangement, technical and financial specifications and other specific details pertaining to its generation facility/Wind Power Plant/Wind Farm before its COD.

Article-4
Term of Licence

4.1 This licence shall become effective from the date of its issuance and will have a term of twenty (20) years from the COD of the generation facility/Wind Power Plant/Wind Farm of the Licensee.

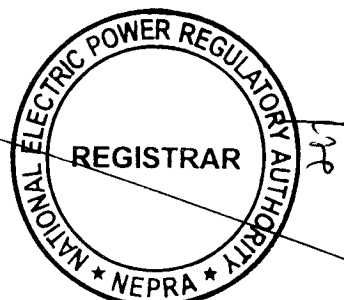
4.2 Unless suspended or revoked earlier, the Licensee may apply for renewal of this Licence ninety (90) days prior to the expiry of the above term, as stipulated in the Licensing Regulations.

Article-5
Licence fee

The Licensee shall pay to the Authority the licence fee as stipulated in the National Electric Power Regulatory Authority (Fees) Rules, 2002 as amended or replaced from time to time.

Article-6
Tariff

The Licensee shall charge only such tariff from the Power Purchaser which has been determined, approved or specified by the Authority.



Article-7
Competitive Trading Arrangement

7.1 The Licensee shall participate in such manner as may be directed by the Authority from time to time for development of a Competitive Trading Arrangement. The Licensee shall in good faith work towards implementation and operation of the aforesaid Competitive Trading Arrangement in the manner and time period specified by the Authority. Provided that any such participation shall be subject to any contract entered into between the Licensee and another party with the approval of the Authority.

7.2 Any variation or modification in the above-mentioned contracts for allowing the parties thereto to participate wholly or partially in the Competitive Trading Arrangement shall be subject to mutual agreement of the parties thereto and such terms and conditions as may be approved by the Authority.

Article-8
Maintenance of Records

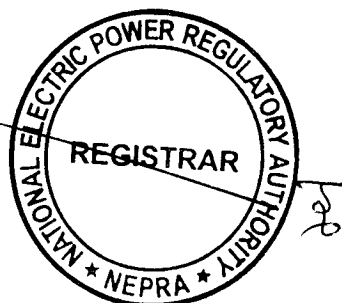
For the purpose of sub-rule(1) of Rule-19 of the Generation Rules, copies of records and data shall be retained in standard and electronic form and all such records and data shall, subject to just claims of confidentiality, be accessible by authorized officers of the Authority.

Article-9
Compliance with Performance Standards

The Licensee shall comply with the relevant provisions of the National Electric Power Regulatory Authority Performance Standards (Generation) Rules 2009 as amended or replaced from time to time.

Article-10
Compliance with Environmental & Safety Standards

10.1 The generation facility/Wind Power Plant/Wind Farm of the Licensee shall comply with the environmental and safety standards as may be prescribed by the relevant competent authority from time to time.



10.2 The Licensee shall provide a certificate on a bi-annual basis, confirming that the operation of its generation facility/Wind Power Plant/Wind Farm is in conformity with required environmental standards as prescribed by the relevant competent authority.

Article-11
Power off take Point and Voltage

The Licensee shall deliver the electric energy to the Power Purchaser at the outgoing Bus Bar of its generation facility/Wind Power Plant/Wind Farm. The Licensee shall be responsible for the up-gradation (step up) of generation voltage up to the required dispersal voltage level.

Article-12
Performance Data

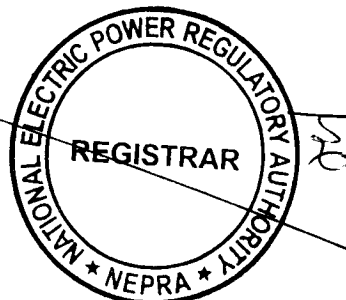
12.1 The Licensee shall install monitoring mast with properly calibrated automatic computerized wind speed recording meters at the same height as that of the WTG.

12.2 The Licensee shall install SCADA System or compatible communication system at its generation facility/Wind Power Plant/Wind Farm as well as at the side of the Power Purchaser.

12.3 The Licensee shall transmit the wind speed and power output data of its generation facility/Wind Power Plant/Wind Farm to the control room of the Power Purchaser.

Article-13
Provision of Information

In accordance with provisions of Section-44 of the Act, the Licensee shall be obligated to provide the required information in any form as desired by the Authority without any exception.



Article-14
Emissions Trading /Carbon Credits

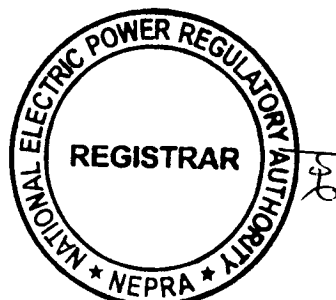
The Licensee shall process and obtain expeditiously the Carbon Credits admissible to the generation facility/Wind Power Plant/Wind Farm. The Licensee shall share the said proceeds with the Power Purchaser as per the Policy.

Article-15
Design & Manufacturing Standards

The WTGs and other associated equipment of the generation facility/Wind Power Plant/Wind Farm shall be designed, manufactured and tested according to the latest IEC, IEEE standards or any other equivalent standard in the matter. All the plant and equipment of the generation facility/Wind Power Plant/Wind Farm shall be unused and brand new.

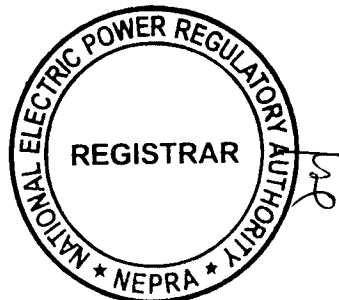
Article-16
Power Curve

The power curve for the WTG provided by the manufacturer and as mentioned in Schedule-I of this generation licence, shall form the basis in determining the cumulative power curve of the generation facility/Wind Power Plant/Wind Farm.

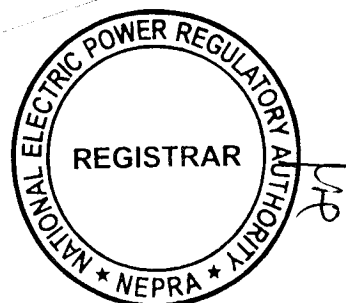


SCHEDULE-I

The Location, Size (i.e. Capacity in MW), Type of Technology, Interconnection Arrangements, Technical Limits, Technical/Functional Specifications and other details specific to the Generation Facilities of the Licensee are described in this Schedule.

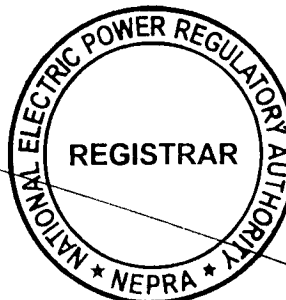
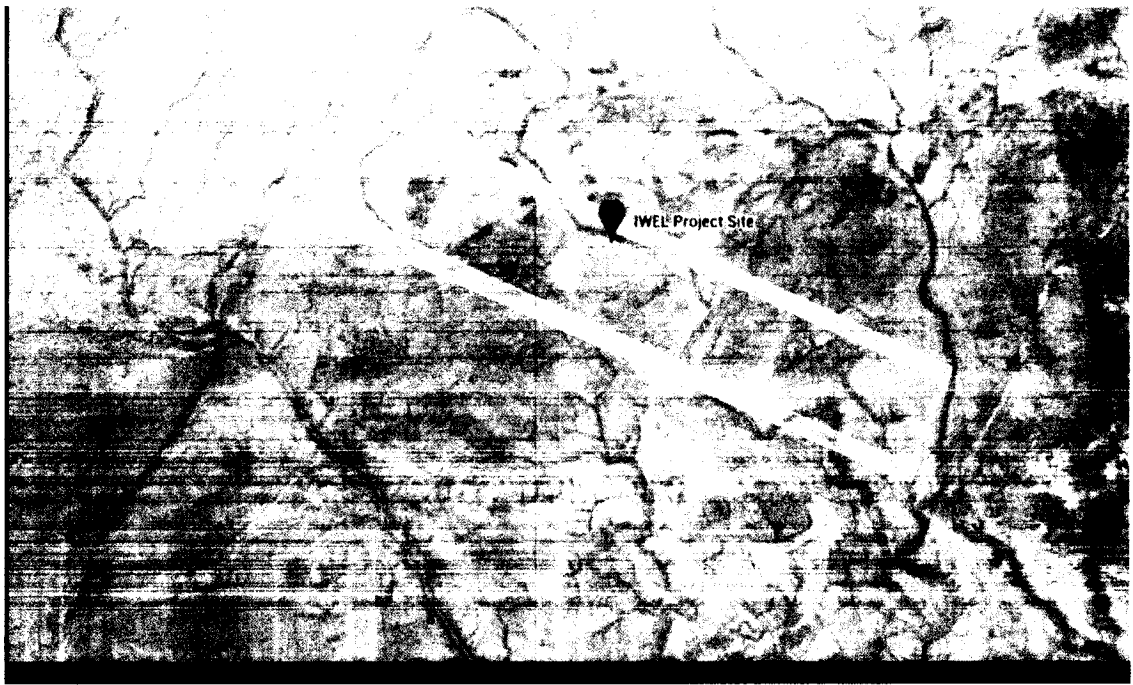


**Location of the
Generation Facility/Wind Power Plant/Wind Farm
of the Licensee**

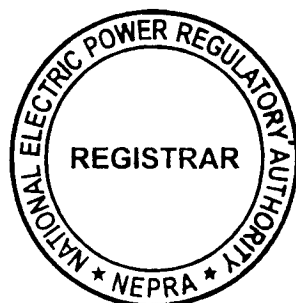
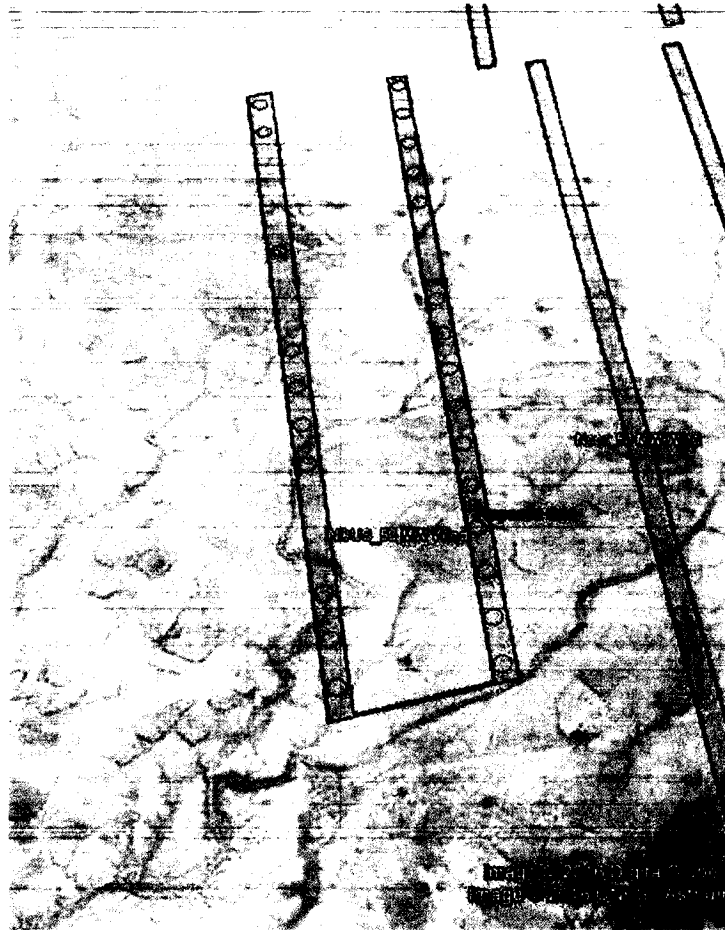


**Land Coordinates of the
Generation Facility/Wind Power Plant/Wind Farm
of the Licensee**

Sr. No.	Latitude	Longitude
1	67°42'46.74"E	24°56'8.88"N
2	67°42'43.74"E	24°56'4.79"N
3	67°45'39.24"E	24°54'30.83"N
4	67°45'36.19"E	24°54'26.81"N
5	67°45'21.35"E	24°54'2.70"N
6	67°45'19.21"E	24°53'58.21"N
7	67°42'23.95"E	24°55'39.73"N
8	67°42'21.00"E	24°55'33.94"N

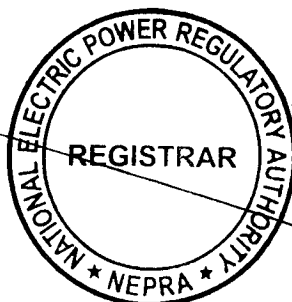


**Layout of the
Generation Facility/Wind Power Plant/Wind Farm
of the Licensee**

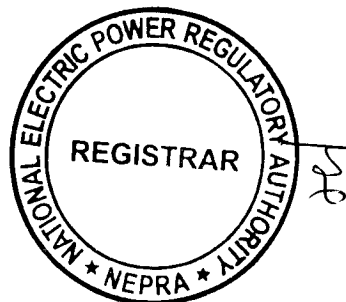
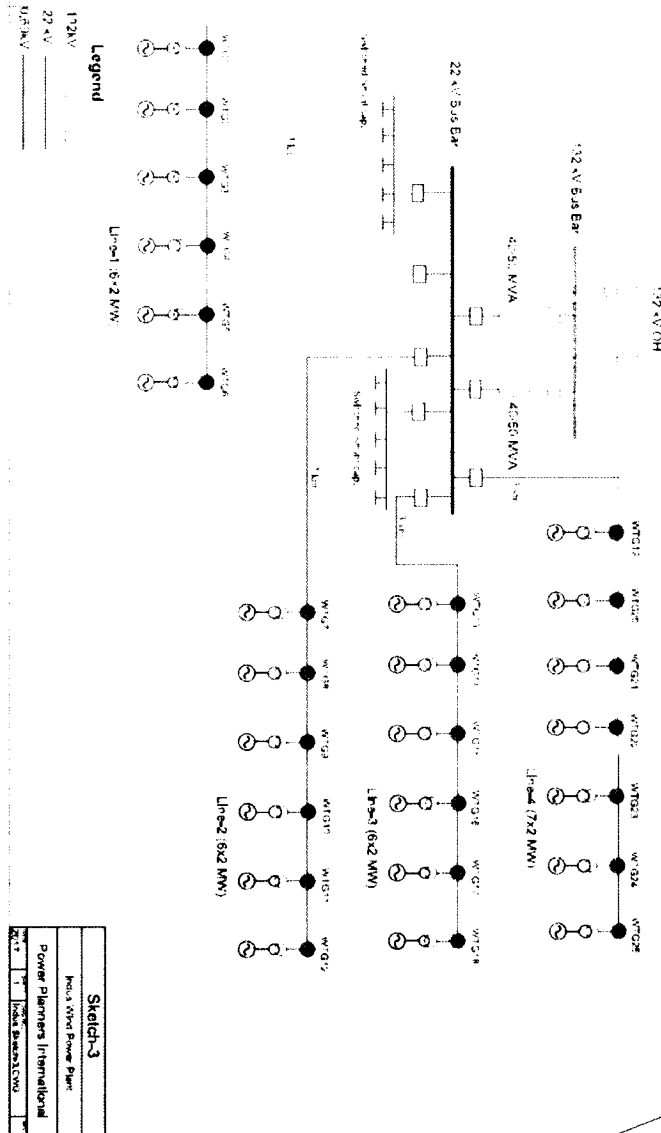


Micro-Sitting of the
Generation Facility/Wind Power Plant/Wind Farm
of the Licensee

Turbine No.	Easting [m]	Northing [m]
INDUS_G01	369463.469	2757410.658
INDUS_G02	369755.738	2757233.054
INDUS_G03	370106.823	2758335.359
INDUS_G04	370394.94	2758151.097
INDUS_G05	370683.057	2757966.835
INDUS_G06	370924.813	2756522.64
INDUS_G07	370971.174	2757782.573
INDUS_G08	371259.291	2757598.31
INDUS_G09	371801.619	2755989.83
INDUS_G10	372093.888	2755812.226
INDUS_G11	372123.642	2757045.524
INDUS_G12	372386.156	2755634.623
INDUS_G13	372411.759	2756861.261
INDUS_G14	372678.425	2755457.019
INDUS_G15	372699.876	2756676.999
INDUS_G16	372987.993	2756492.737
INDUS_G17	373276.11	2756308.475
INDUS_G18	373555.231	2754924.209
INDUS_G19	373564.228	2756124.212
INDUS_G20	373847.5	2754746.605
INDUS_G21	373852.345	2755939.95
INDUS_G22	374139.768	2754569.002
INDUS_G23	374140.462	2755755.688
INDUS_G24	374428.579	2755571.426
INDUS_G25	374716.696	2755387.163



Single Line Diagram (Electrical System)
of the Generation Facility/Wind Power Plant/Wind Farm
of the Licensee



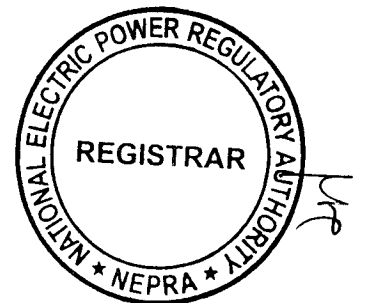
**Interconnection Facilities/
Transmission Arrangements for Dispersal of Electric Power from
the Generation Facility/Wind Power Plant/Wind Farm**

The electric power generated from the Generation Facility/Wind Power Plant/Wind Farm of the Licensee i.e. Indus Wind Energy Limited (IWEL) shall be dispersed to the National Grid through the load center of HESCO.

(2). The proposed Interconnection Arrangement/Transmission Facilities for dispersal of power from Generation Facility/Wind Power Plant/Wind Farm of IWEL will consist of the following:-

- (i). A total of two 220 kV D/C transmission lines (measuring approx. 5km long each on twin bundled AASC Greeley conductor) for making double In/out of existing 220 kV Double Circuit (D/C) Jamshoro-KDA-33 transmission lines at the proposed 220/132kV Jhimpir-2 grid station/substation;
- (ii). Addition of 4th power transformer (of 250 MVA) at the newly proposed 220/132kV Jhimpir-2 grid station/substation;
- (iii). A 132kV D/C transmission line (approx. 135 km long on twin bundled AASC Greeley conductor) for connecting eight (08) Wind Power Plants (WPPs) in the first loop¹ to newly proposed 220/132kV Jhimpir-2 grid station/substation;

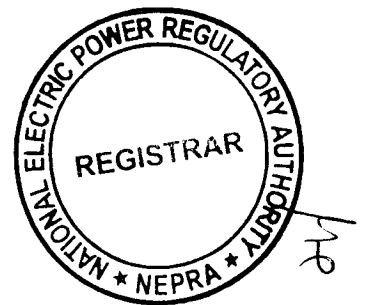
¹ Lakeside, Nasda, Trans-Atlantic, Uni-Energy, Iran Pak, Artistic, Act-2 and Cacho WPPs



(iv). 132kV D/C transmission line (approx. 168 km long on twin bundled AASC Greeley conductor) for connecting eight (08) WPPs in the second loop² to newly proposed 220/132 kV Jhimpir-2 grid station/substation.

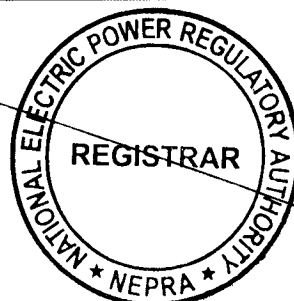
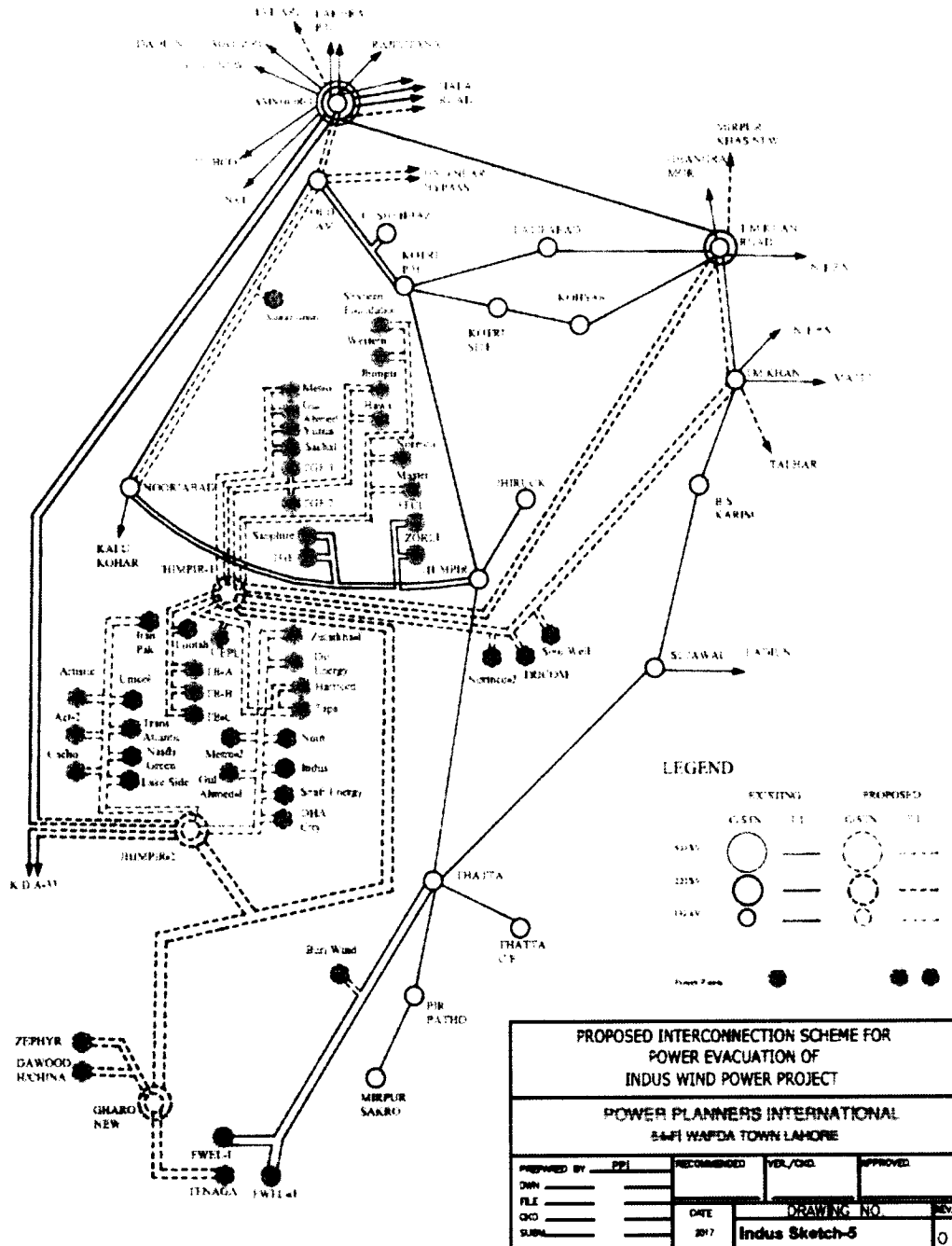
(3). In the above scheme the interconnection for the generation facility/Wind Power Plant/Wind Farm of IWEL (which is placed in second loop) includes a 132 kV D/C transmission line (measuring approx. 0.80 km in length, on twin bundled AASC Greeley conductor) for making in/out of 132kV single circuit transmission line connecting the WPP of Noor and Shafi Energy to the newly proposed 220/132 kV Jhimpir-2 grid station/substation.

(4). Any change in the above mentioned Interconnection Arrangement/Transmission Facilities duly agreed by Licensee, Power Purchaser, NTDC and HESCO shall be communicated to the Authority in due course of time.



² Noor, Gul Ahmed, Metro-2, Zulaikha, Din Energy, Indus, Shafi Energy and DHA-City WPPs

Schematic Diagram
for Interconnection Arrangement/Transmission Facilities for
Dispersal of Electric Power from the Licensee



**Detail of
Generation Facility/Wind Power Plant/
Wind Farm**

(A). General Information

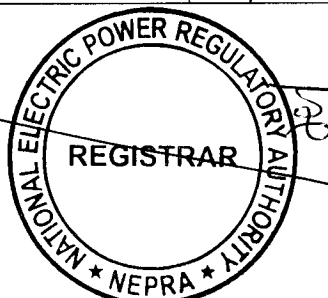
(i).	Name of Company/Licensee	Indus Wind Energy Limited
(ii).	Registered Office of Company/Licensee	Office No. 508, 5 th Floor, Beaumont Plaza, Beaumont Road, Civil Lines Quarter, PIDC, Karachi.
(iii).	Business Office of Company/Licensee	-Do-
(iv).	Location of the generation facility/Wind Power Plant/Wind Farm	at Deh Kohistan 7/3 & 7/4 Tapo Jungshahi, Taluka & District Thatta in the Province of Sindh
(v).	Type of the generation facility/Wind Power Plant/Wind Farm	Wind Power

(B). Wind Farm Capacity & Configuration

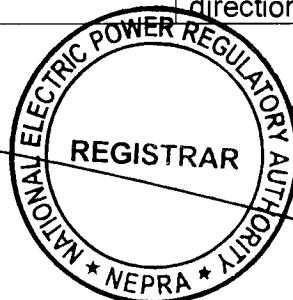
(i).	Wind Turbine type, Make & Model	Gamesa G114-2.0 MW
(ii).	Installed Capacity of Wind Farm (MW)	50.00 MW
(iii).	Number of Wind Turbine Units/Size of each Unit (MW)	25 x 2.0 MW

(C). Wind Turbine Details

(a). <u>Rotor</u>		
(i).	Number of blades	3
(ii).	Rotor diameter	114 m
(iii).	Swept area	10207 m ²
(iv).	Power regulation	Combination of blade pitch angle adjustment, and generator / converter torque control.



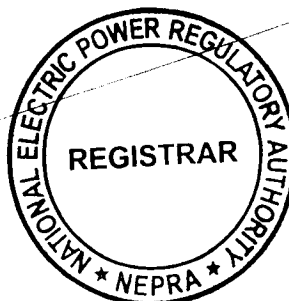
(v).	Cut-in wind speed	3 m/s
(vi).	Cut-out wind speed	25 m/s
(vii).	Rated wind speed	13.07 m/s
(viii).	Survival wind speed	59.5 m/s (Maximum 3 sec)
(ix).	Pitch regulation	Electric motor drives a ring gear mounted to the inner race of the blade pitch bearing.
(b). <u>Blades</u>		
(i).	Blade length	56 m
(ii).	Material	Composite material reinforced with fiberglass through resin infusion technology.
(c). <u>Gearbox</u>		
(i).	Type	3 combined stages: 1 stage planetary, 2 parallel shift gears.
(ii).	Gear ratio	1:128.5
(iii).	Main shaft	Cast shaft
(d). <u>Generator</u>		
(i).	Nominal Power	2040 (kVA)
(ii).	Voltage	690 V
(iii).	Type	Doubly fed with coil rotor and slip rings
(iv).	Degree of Protection	IP54 Turbine – IP21 Ring Body
(v).	Coupling	Main Shaft: Cone Collar, High Speed Shaft: Flexible coupling.
(vi).	Power factor	0.95
(e). <u>Control System</u>		
(i).	Type	Automatic or manually controlled.
(ii).	Scope of monitoring	Remote monitoring of different parameters, e.g. temperature sensors, pitch parameters, speed, generator torque, wind speed and direction, etc.



(iii).	Recording	Production data, event list, long and short-term trends
(f). <u>Brake</u>		
(i).	Design	Mechanical brakes
(ii).	Operational brake	Aerodynamic brake achieved by feathering blades.
(iii).	Secondary brake	Mechanical brake on (high speed) shaft of gearbox.
(g). <u>Tower</u>		
(i).	Type	Conical barrel tube
(ii).	Hub heights	80 m
(h). <u>Yaw System</u>		
(i).	Yaw bearing	PETP
(ii).	Brake	Active Yaw
(iii).	Yaw drive	Motor Drive
(iv).	Speed	0.42°/s controlling speed

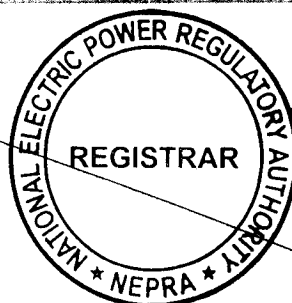
(D). Other Details

(i).	COD of the generation facility/Wind Power Plant/Wind Farm	October 31, 2019 (anticipated)
(ii).	Minimum Expected Useful Life of the generation facility/Wind Power Plant/Wind Farm from COD	20 Years

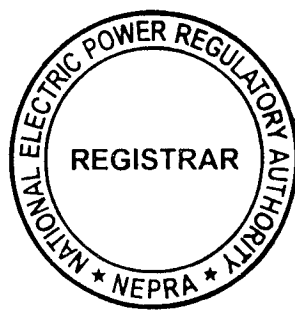
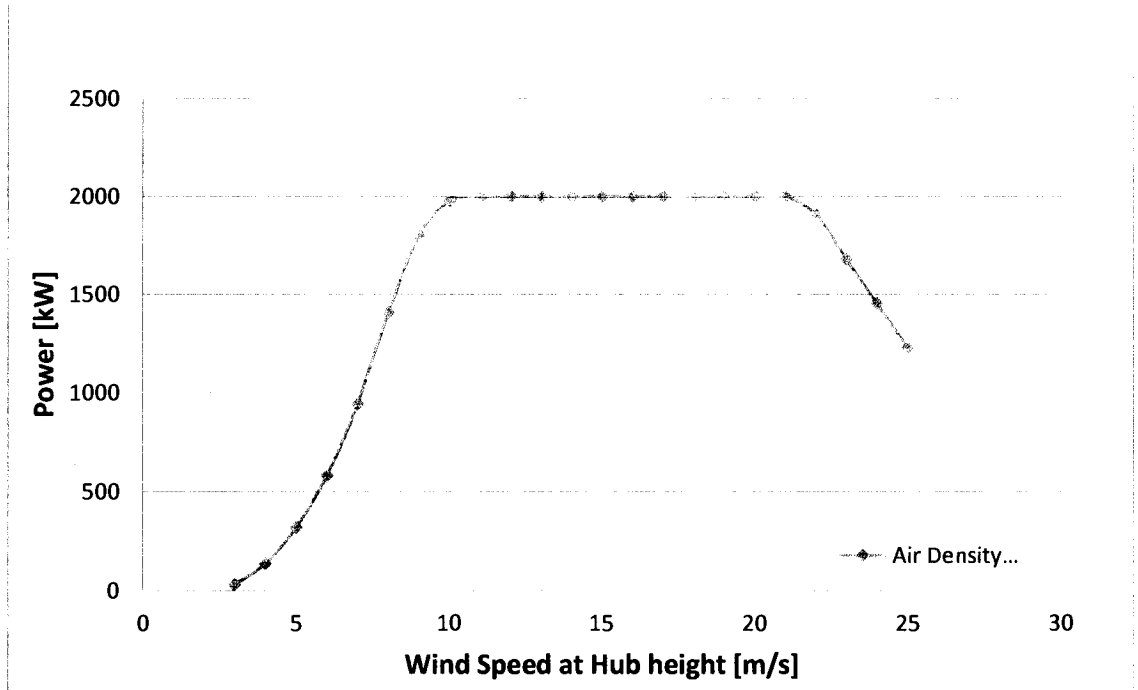


Power Curve
of Wind Turbine Generator (WTG) of Gamesa G114-2.0 MW
(in Tabular Form)

Wind Speed (m/s)	Power (kW)
3	29
4	135
5	319
6	581
7	943
8	1408
9	1864
10	1977
11	1993
12	1999
13	2000
14	2000
15	2000
16	2000
17	2000
18	2000
19	2000
20	2000
21	2000
22	1908
23	1500
24	1455
25	1200

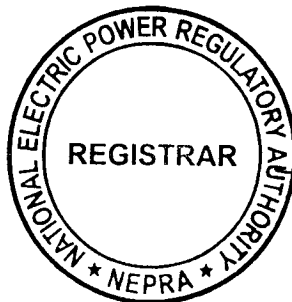


Power Curve
of Wind Turbine Generator (WTG) of Gamesa G114-2.0 MW
(in Graphical Form)



SCHEDULE-II

The Total Installed/Gross ISO Capacity (MW), Total Annual Full Load Hours, Average Wind Turbine Generator (WTG) Availability, Total Gross Generation of the Generation Facility/Wind Farm (in GWh), Array & Miscellaneous Losses (GWh), Availability Losses (GWh), Balance of Plant Losses (GWh) and Annual Energy Generation (GWh) of the Generation Facility /Wind Farm of Licensee is given in this Schedule



SCHEDULE-II

(1).	Total Installed Gross ISO Capacity of the Generation Facility /Wind Power Plant/Wind Farm (MW/GWh)	50.00 MW
(2).	Total Annual Full Load Hours	3066
(3).	Average Wind Turbine Generator (WTG) Availability	97%
(4).	Total Gross Generation of the Generation Facility/Wind Farm (in GWh)	173.74 GWh
(5).	Array & Miscellaneous Losses GWh	12.58 GWh
(6).	Availability Losses GWh	4.72 GWh
(7).	Balance of Plant Losses GWh	3.14 GWh
(8).	Annual Energy Generation (20 year equivalent Net AEP) GWh	153.30 GWh
(9).	Net Capacity Factor	35 %

Note

All the above figures are indicative as provided by the Licensee. The Net Delivered Energy available to Power Purchaser for dispatch will be determined through procedures contained in the Energy Purchase Agreement (EPA) or the Applicable Document(s).

