National Electric Power Regulatory Authority
Islamic Republic of Pakistan

Registrar

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No. NEPRA/R/DL/LAG-440/ 26988-995

December 10, 2019

Mr. Tabish Tapal,
Chief Executive Officer,
Sino Well (Private) Limited,
F-25, Block-5, Rojhan Street, Kehkeshan,
Clifton, Karachi.

Subject: **Grant of Generation Licence No. WPGL/56/2019**
Licence Application No. LAG-440
Sino Well (Private) Limited (SWPL)

Reference: *SWPL's application vide letter No. SWL/NEPRA/002/2019 dated November 14, 2018 (received on November 15, 2018).*

Enclosed please find herewith Determination of the Authority in the matter of Application of "Sino Well (Private) Limited (SWPL)" for grant of Generation Licence along with Generation Licence No. WPGL/56/2019 annexed to this determination granted by the National Electric Power Regulatory Authority (NEPRA) to SWPL for its 50.00 MW Wind Power Plant located at Deh Kohistan 7/1, Tapo Jhimpir, Taluka & District Thatta, in the province of Sindh, pursuant to Section 14B of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (The Amended Act).

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

Enclosure: Generation Licence
(WPGL/56/2019)

10.12.19

(Syed Safeer Hussain)

Copy to:

1. Secretary, Ministry of Energy, Power Division, 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, CPPA-G, ENERCON Building, Sector G-5/2, Islamabad.
4. Managing Director, NTDC, 414-WAPDA House, Lahore.
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.
7. The Secretary, Energy Department, Government of Sindh, 3rd Floor, State Life Building No. 3, Opposite CM Secretariat, Karachi.

National Electric Power Regulatory Authority (NEPRA)

Determination of the Authority in the Matter of Application of Sino Well (Private) Limited for the Grant of Generation Licence

December 10, 2019
Case No. LAG-440

(A). Background

(i). Energy Department, Government of Sindh (EDGoS) is entrusted with the responsibility for planning and development of energy projects in the province of Sindh. EDGoS has issued Letter of Intent (LoI) to various RE developers for setting up the energy projects in the province. EDGoS also issued LoI to Western Energy (Pvt.) Limited (WEPL) for setting up a fifty (50) MW wind based Generation Facility/Wind Power Plant (WPP)/Wind Farm (WF) in the Jhimpir Wind Corridor, District Thatta, in the Province of Sindh. Later on, under the Policy for Development of Renewable Energy for Power Generation-2006 (the "RE Policy"), in order to develop the project, WEPL incorporated a company in the name of Sino Well (Pvt.) Limited (SWPL) as a special purpose vehicle.

(ii). According to the terms and conditions of the LoI, SWPL carried out a Feasibility Study of the project including, *inter alia*, Wind Power Plant equipment and Micro-Sitting details, detailed power production estimates based on wind mast data of project site, soil tests reports, technical details pertaining to selected Wind Turbine Generator (WTG) and other allied equipment to be used in the WPP/WF, Electrical Studies (including but not limited to short-circuit study, power quality study, load flow study and stability study), environmental study, project costing, financing plan, carbon credits, financing terms, tariff calculations and assumptions for financial calculations including economic/financial analysis. Accordingly, SWPL completed the Feasibility Study of the project and decided to approach the Authority for the grant of generation licence and tariff.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY REGISTRAR NEPRA

(B). Filing of Application

(i). In accordance with Section-14B of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (hereinafter referred to as the "NEPRA Act"), read with the relevant provisions of the NEPRA Licensing (Application and Modification Procedure) Regulations, 1999 (the "Licensing Regulations"), SWPL submitted an application on November 15, 2018 for the grant of generation licence.

(ii). The Registrar examined the application to confirm its compliance with the Licensing Regulations and found that the application was deficient in terms of the said Regulations. Accordingly, the Registrar directed SWPL for submitting the missing information/documents as required under the said Regulations. SWPL completed the submission of missing information/documentation on November 27, 2018 and accordingly the Registrar presented the matter before the Authority for admission of the application or otherwise.

(iii). The Authority considered the matter and found the form and content of the application in substantial compliance with Regulation-3 of the Licensing Regulations, the Authority admitted the application on December 10, 2018 for consideration of the grant of generation licence as stipulated in Regulation-7 of the Licensing Regulations. The Authority approved the advertisement containing (a). the prospectus; and (b). a notice to the general public about the admission of the application of SWPL, to invite the general public for submitting their comments 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 December 12, 2018.

(iv). In addition to the above, the Authority also approved a list of stakeholders for seeking their comments for its assistance in the matter in terms of Regulation-9(2) of the Licensing Regulations. Accordingly, letters were sent to different stakeholders as per the approved list on December 12, 2018, 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 Karachi Shipyard & Engineering Works Limited (KSY&EWL), Engineering Development Board of Ministry of Industries and Production

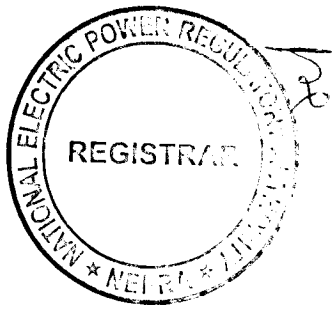
NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(EDB), Central Power Purchasing Agency (Guarantee) Limited (CPPA-G), National Transmission and Despatch Company Limited (NTDC) and Ministry of Science and Technology (MoST). The salient points of the comments offered by the said stakeholders are summarized below:-

(a). EDB commented that none of the clauses of said application are related to it and recommended that all efforts should be made to utilize indigenous potential available for the project;

(b). KSY&EWL expressed that addition of a new generation facility of 50 MW WPP will definitely be helpful in decreasing the shortfall of power in the county therefore, it has no objection to the grant of generation licence to SWPL. KSY&EWL further stated that it is fully capable of manufacturing the towers for wind turbines. The fabrication facilities are available in the vicinity of Karachi, much near to Thatta. The offered rates of fabrication and onsite installation are quite competitive and at par with the market. KSY&EWL requested to advise the company to consider its facilities for local fabrication, erection and installation of the WPP;

(c). CPPA-G in its comments submitted that (a). it cannot provide consent for purchase of power from SWPL; (b). Cabinet Committee on Energy (CCoE) has decided that all renewable energy projects will be awarded through competitive bidding and according to quota allocation by Grid Code Review Panel; (c). currently there is no Policy for induction of RE; (d). for the proposed additions of capacity in the system, due consideration should be carried out by NEPRA prior to issuance of generation licence, in particular light of Rule-3(5) of the NEPRA Licensing (Generation) Rules, 2000 (the Generation Rules); (e). according to NEPRA State of the Industry Report, 2017 (SIR-2017) the capacity addition in the system without rationalizing the same with the demand projections, is currently yielding a capacity surplus of 908 MW, which is projected to rise to approximately 13,934 MW by the year 2025, which has significant financial implications for the end consumers; and (f). NEPRA must review the proposal in the context of the demand vs. supply situation, coupled



with the quantum of renewable energy to be induced in the national grid according to the recommendations of the Grid Code Review Panel duly approved by NEPRA from time to time;

(d). NTDC informed that Grid Interconnection Study (GIS) of SWPL was approved on December 12, 2018. But now Norinco International Thatta Power (Pvt.) Limited (NITPPL) has proposed merger of its two 50 MW Wind Power Plants (WPPs) into one 100 MW WPP by swapping one of its 50 MW WPP (NITPPL-II) with that of SWPL. Due to the said swapping/merger the interconnection scheme of SWPL has been changed and GIS has been revised which is under review; and

(e). MoST stated that installation of the WPP at District Thatta will help to prevent/overcome the electricity shortfall in the designated area. The proposed WTG of GAMESA G114-2.0 with net capacity factor of 37% is good for a WPP. Furthermore, MoST cannot comment on financial and other TORs of the project.

(ii). The Authority reviewed the above comments of the stakeholders and in view of the observations of EDB, KSY&EWL, CPPA-G and NTDC considered it appropriate seeking the perspective of SWPL on the same. Regarding the observations/comments of EDB and KSY&EWL, SWPL confirmed that it would certainly make best efforts to utilize locally available engineering capabilities and skills at the appropriate time.

(iii). Regarding the comments of CPPA-G, it was submitted that CPPA-G has relied on the decision of the CCoE. The NEPRA Competitive Bidding Tariff (Approval Procedure) Regulations, 2017 which provide a procedure for approval of tariff that is to be arrived through a competitive bidding process, shall not apply to the project at hand as these Regulations apply in cases where detailed feasibility studies are available and are not applicable in cases of raw sites. Moreover, notwithstanding the CCoE decision, NEPRA has proceeded with determining tariffs for various wind power projects holding LoI from the relevant government agencies. In such determinations NEPRA has confirmed that the process of competitive bidding cannot yet take place as regulatory agencies have failed to provide an acceptable framework including request for proposals

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY REGISTRAR * NEPRA *

for such bidding. Furthermore, NEPRA has also stated that it may not be considered appropriate to stop entertaining applications under Tariff Rules, 1998 merely on the basis of the decision of CCoE. Moreover, NEPRA has also granted generation licences in respect of various renewable energy projects after the issuance of the CCoE decision. In view of the said, it is requested that the subject project be treated on similar basis and be granted the requested generation licence, as the application is for the grant of a generation licence and the same as no nexus with the award of tariff.

(iv). On the observations of CPPA-G that the generation licence should not be granted on account of expiry of the RE Policy, SWPL submitted that, as with other projects that have recently been granted generation licences and tariffs, the company was nonetheless awarded LoI by the EDGoS on March 01, 2016 under the RE Policy and has placed reliance on the same in respect of the development of the project including incurring substantial costs for implementation of the project. SWPL further highlighted that no objection were brought up to other similar applications and generation licences have been granted;

(v). In relation to compliance with the Generation Rules, SWPL submitted that: (a). it has selected the most appropriate WTGs to get the maximum annual energy output; (b). Panel of Experts (PoE) of EDGoS has approved the Feasibility Study on November 11, 2018; (c). The company has carried out a detailed GIS for the project as per the data provided by NTDC and NTDC has approved the GIS and concluded that the power injected through the project will not have any adverse effect on the national grid; (d). NTDC has issued the Power Evacuation Certificate and the project is duly included in the expansion plan of NTDC; (e). The existing energy mix of the country is heavily skewed towards the costlier thermal power plants, mainly operating on imported fuels. The significant portion of the installed capacity is inefficient and it is not economically viable to operate while recent tariffs determined by NEPRA are the lowest and has no comparison with the available fuel based power plants. Further the fuel prices are volatile and would further worsen the circular debt which has already raised to PKRs 755 billion; (f). In the merit order list, out of total 124 thermal units, the current tariff of renewables is in the range of 10-15 in the merit order. This means that any of the thermal units from 15 to 124 on the merit order can be replaced by wind or solar. Even if these units are kept idle, it makes economic sense; (g). The most efficient RLNG based power plants are 29, 30 & 31 in the merit order. The cost of RLNG projects has almost doubled within first year

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY REGISTRAR

of operation which will continue to increase in years to come due to volatility of LNG market; (h). Almost 50% of the thermal IPPs are at more than Rs.15 per kWh, which is thrice the levelized tariff of wind; and (i). RLNG and Coal plants require huge quantities of cooling water which is our precious and depleting resource.

(vi). On the observations of CPPA-G regarding the SIR-2017, SWPL opined that SIR-2017 states surplus capacity of 2,009 MW at peak times in year 2019 while the CCoE was recently briefed by the Power Division that there will be load shedding in 2019 peak seasons. In the summer of 2017, the electricity shortfall was projected to peak at 2,240 MW, but the National Power Control Centre (NPCC) data showed that the deficit was far higher at 7,000 MW on some occasions in May 2017. While it may be arguable that the demand and supply gap in electricity is soon to be bridged, as indicated by CPPA-G, however, the same does not account for the fact that a developing economy, coupled with growing consumption and demand could result in another cycle of shortfall in potential supply. Such a shortfall could be the major cause for stunned growth in the industrial sector in Pakistan. Further Pakistan has one of the lowest per capita annual energy consumption of approximately 500 kilowatt-hours as compared to global average of 2,600 kWh and 4,400 kWh for China. According to the International Energy Agency's (IEA) Energy Access Outlook 2017, 25% of Pakistani households are not connected to the national grid. In other words, over 50 million Pakistanis may be living without access to the grid. By keeping the policy and political debate fixated on the grid-connected consumer, the most vulnerable segment of our rural population have been excluded from the 'power equation'. Therefore, it is in the national interest to overcome the illusion of surplus power and a systematic analysis has to be made to analyze the electricity demand.

(vii). Further, current power mix of the country has an over-reliance on outdated fossil fuels technology and seasonal hydro-power generation, roughly split in a ratio of 70:20:10, being 70% thermal and 20% hydro, with nuclear power making up most of the rest. Oil/LNG imports are already a significant burden on the national exchequer and the increasing import bill continues to exert further pressure on the foreign exchange reserves. Therefore, securing electricity generation through alternative fuels should be promoted, such as wind power, so that a cleaner source of energy, can play a very important role in overcoming growing energy crisis of Pakistan. In view of the above, SWPL requested to consider its project on par with other renewable energy projects that

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY REGISTRAR NEPRA

have recently been granted generation licences and to issue the required generation licence at the earliest.

(viii). On the observations/comments of NTDC, SWPL submitted that at the outset, we appreciate NTDC's support/approval of the first GIS (the "Original GIS") of the project. SWPL informed that NITPPL was originally developing two WPPs of 50 MW each, namely NITPPL-I and NITPPL-II. However, in order to avail the benefit of economies of scale, NITPPL is now pursuing a merger of its two 50 MW WPPs into a single project of 100 MW (NITPPL-100 MW). The problem with the merger was that both WPPs of NITPPL were connected in different loops and either of the loops does not have enough transmission capacity to accommodate the additional 50 MW. The only solution available was the swapping of one 50 MW WPP of NITPPL with any other 50 MW WPP in either of the loops. Therefore, NITPPL approached the SWPL requesting its support and facilitation by swapping the Project with NITPPL-II and interconnecting the project with the recently constructed Jhimpir 220/132 kV grid station, so that the NITPPL-100 MW project may connect to the Jhimpir-TM Khan 132 kV Transmission Line. In the spirit of co-operation, the SWPL, in principal consented to the request and accordingly, a revised GIS was conducted and submitted to NTDC for approval and NTDC vide its letter no. GMPSP/CETP/TRP380/883-88 dated January 29, 2019 approved the same.

(ix). The Authority examined the above submissions of SWPL and found the same plausible. Accordingly, the Authority considered it appropriate to proceed further in the matter for the consideration of grant of generation licence to SWPL as stipulated in the Licensing Regulations and the Generation Rules.

(D). Evaluation/Findings

(i). The Authority has examined the entire case in detail including the information provided by SWPL along with the generation licence application, feasibility study of the project, the interconnection and dispersal arrangement studies, environmental study, provisions of the RE Policy and other relevant information.

(ii). The Authority has observed that the main sponsor of the project is WEPL which is already developing a 50 MW WPP at Jhimpir for which a generation licence (No. WPGL/37/2017 dated January 05, 2017) has been granted to it. WEPL is an associated company of Western Electric Limited (WEL) which is a public limited company,

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY * NEPRA * REGISTRAR

incorporated in Pakistan on March 17, 2004 under the Companies Ordinance, 1984. The principal activity of WEL is to develop, own, manage and operate power generation facility for sale of electricity. The ownership of WEL lies with the Tapal Group, the principals of Ameejee Valeejee & Sons (Private) Limited are major shareholders of 126 MW Tapal Energy (Private) Limited.

(iii). In consideration of the above and other evaluation parameters, EDGoS issued LoI to WEPL for development of the project and allocated of 335 acres of land in the Jhimpir wind corridor near Nooriabad, district Thatta in the province of Sindh for setting up the WPP. As explained above, for the implementation of the project, the sponsors incorporated an SPV in the name of SWPL under Section-32 of the Companies Ordinance, 1984 (Corporate Universal Identification No. 0100200, dated June 14, 2016). According to the Memorandum of Association, the objects of the company, *inter alia*, include business of power generation and its sale thereof.

(iv). According to the submitted information, the total outlay of the project will be U.S. $ 85.396 million which will be financed through a combination of debt (U.S. $ 64.050 million) and equity (U.S. $ 21.346 million) in a ratio of 80%:20% which is in line with the prevailing benchmark set out in the RE Policy and the determinations of the Authority. In this regard, the Authority has observed that in view of the good repute of the sponsor which have strong financial and technical background to carry out the project, various local and foreign financing institutions have expressed their willingness to fund the debt part of the project.

(v). Regarding feasibility of the project, the Authority has observed that the sponsors carried out a detailed feasibility study of the project, *inter alia*, including wind power plant equipment details, micro-sitting details, power production estimates based on wind mast data of the project site, soil tests reports, technical details pertaining to the selected Wind Turbine Generator (WTG) and other allied equipment to be used in the proposed WPP, GIS, Initial Environmental Examination (IEE) and project financing etc.

(vi). The review of the feasibility study reveals that the company has considered various world class manufactures of WTGs. After duly considering the various factors including (a). wind resource position of the corridor of Jhimpir (b). capital cost of equipment/WTG; (c). lead time for supply of equipment/WTG; (d). expected energy yield

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY REGISTRAR

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., the company decided to select WTG of G114-2.0 MW of Gamesa Corporation Spain. The feasibility study also optimized the size of the proposed WPP to 50 MW having 25 x 2.0 MW of WTGs. The proposed WTGs have better feedback and control system with good characteristics for grid reliability and stability for grid as required in the Grid Code.

(vii). Regarding grid interconnection of the project, the Authority has noted that the sponsors of the project carried out the GIS for dispersal of electric power from the proposed WPP. According to the said study, the dispersal of electric power will be made on 132kV Voltage. The dispersal/interconnection arrangement will be consisting of 132 kV D/C transmission line by looping In-Out on the 132kV S/C transmission line between the WPPs of WEPL and Master Wind. In this regard, NTDC through its letter dated January 29, 2019 has approved the revised GIS.

(viii). Regarding Power Evacuation Certificated (PEC) from NTDC for evacuation of power generated from solar and wind projects, the Authority observed that most of the solar and wind projects are suffering from unnecessary delays in their processing and implementation due to non-issuance of PEC by NTDC as required by the Authority. In order to avoid such hindrances/delays in development of the projects, the Authority reviewed its earlier decision and decided to dispense with the requirement of PEC for grant of generation licences to solar and wind projects.

(ix). Regarding the project of SWPL, the Authority has observed that according to decision of Cabinet Committee on Energy (CCoE) dated February 27, 2019 the proposed WPP of SWPL falls in the Category-III of RE projects (i.e. Projects that have been issued LOI prior to the expiry of RE Policy, 2006 on March 08, 2018 but have not received a Tariff from NEPRA) and all Category-III projects are allowed to proceed ahead subject to becoming successful in the competitive bidding process to be undertaken by AEDB specifically designed for each technology under this category based on the quantum ascertained for each technology by Indicative Generation Capacity Expansion Plan (IGCEP) by NTDCL. Once the IGCEP determines how much additional power it needs to induct in the system by June 2023 as approved by the Authority and NTDCL confirms its interconnection including the completion of pre-requisites for the issuance of Power Acquisition Request, AEDB will conduct competitive bidding, one for each

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

technology, for the capacity to be procured under each technology, with resource risk being borne by the Project.

(x). Regarding impact of the project on environment, the Authority is of the view 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 operation of the WPP may cause soil pollution, water pollution and noise pollution during construction and operation. In this regard, the Authority has observed that SWPL carried out the Initial Environment Examination Study and submitted the same for the consideration and approval of Sindh Environmental Protection Agency, Government of Sindh (SEPA). In this regrard, it is confirmed that SEPA has issued the required approval/No Objection Certificate (NOC) for construction of the project.

(xi). The Authority has considered the comments of stakeholders and observed that all the stakeholders have supported the grant of generation licence except CPPA-G. In its comments CPPA-G has raised certain observations regarding the surplus capacity in the system while making specific reference to SIR-2017, the Authority has observed that CPPA-G has not provided any specific comments rather based on the contents of SIR-2017 it has contested that according to said report there will be surplus capacity in the years 2018-25. In this regard, the Authority hereby clarifies that the specific provisions referred by CPPA-G are based on the data provided by NTDC whereby it has been indicated that there may be some surplus installed capacity due to addition of various types of power generation facilities including Coal, Gas, Wind, Solar, Bagasse, Hydro and Nuclear. However, it has been clearly mentioned in Section 1.1 of said report that "...the capacity surplus in the later years i.e.2022 to 2025 may not be available due to multiple issues and resulting uncertainties in completion of large hydro-based power projects..." In this regard, the Authority hereby refers to the linked information contained in Table-31, Table-34 and Table-35 which when read together gives the capacity and the expected Commissioning Year of future projects pertaining to Hydel projects in the Public Sector, Hydel, Coal and RLNG Projects being set in the Private Sector Solar, Wind and Bagasse/Biomass based generation facilities to be set up in the private Sector.

(xii). A detailed review of these project reveals projects like Dasu (Phase-I), Up-gradation of Mangla and Diamer Bhasha having accumulated installed capacity of 6970

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

MW, were expected to be commissioned by the year 2024. However, the same are delayed and may not achieve the said time lines due to the fact that a number of milestones pertaining to these projects including acquisition of land, preparation/approval of PC-I and award of contract(s) are facing delays for one reason or the other. Similarly, projects of coal and hydel in the private sector namely (a). Kohala; (b). Chakothi-Hattian; (c). Azad Pattan; (d). Kaigah; (e). Mahl; (f). Turtonas-Uzghor; (g). Athmuqam with accumulated installed capacity of 3810 MW, which earlier envisaged expected COD by December 2024 and 2025, are facing delays in Financial Close and thus construction and other related activities;.

(xiii). The Authority also considered the latest update available from PPIB which indicates that the said projects will not be coming online before December 2028. Further, Imported/Local Coal projects of (a). Grange; (b). Shanghai Electric; and (c). Oracle Thar of accumulated installed capacity of 2803 MW having expected COD between September 2019-2021 are also facing delays. According to the information available from PPIB, for the project of Grange, a notice for encashment of Guarantee has been issued which is under litigation. Further, the expected COD for projects of Shanghai and Oracle Thar will now be at least 2023.

(xiv). Regarding WPPs, the Authority has issued licences and tariff to a number of WPPs which are facing delay due to non-issuance of Letter of Support (LoS) due to which it is not clear that projects of (a). Shaheen Renewable Energy 1 (Private) Limited; (b). Western Energy (Private) Limited; (c). Lakeside Energy (Private) Limited; (d). Artistic Wind Power (Private) Limited; (e). Trans Atlantic Energy (Private) Limited; (f). Tricom Wind Power (Private) Limited; (g). Din Energy Limited; Act 2 Wind (Private) Limited; and (h). NASDA Green Energy (Private) Limited, having accumulated installed capacity of 449.3 MW which were earlier anticipated to be connected to the national grid between 2019-2020, will come online.

(xv). On the front of Solar, similar kind of situation is prevailing as the power projects mentioned in the Table-35 consist of (a). Access Solar (Pvt.) Limited; (b). Buksh Solar (Pvt.) Limited; (c). Jan Solar (Pvt.) Limited; (d). Lalpir Solar Power (Pvt.) Limited; (e). Siddiqsons Energy Limited and (f). Zurlu Energy (Pvt.) Limited of accumulated installed capacity of 191.52 MW are also delayed for same reasons as mentioned in the case of wind power projects;

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(xvi). Similarly for the Bagasse based project, the Authority granted generation licences and tariff to different projects including: (a). Hunza Power (Pvt.) Limited; (b). Indus Energy Limited; (c). Faran Power (Pvt.) Limited; (d). Etihad Power Generation Limited; and (e). Bahawalpur Energy (Pvt.) Limited with accumulated installed capacity of 212.90 MW, however, the said projects have shown no progress as Energy Purchase Agreements have not been signed yet due to which these projects are facing delays and their expected COD will now be postponed for at least two (02) years instead of what is given in the SIR 2017.

(xvii). In view of the above explanation, it is clear that around thirty (30) power projects on different fuels with cumulative installed capacity of around 11000 MW are facing delays due to different problems/issues as explained above and their COD is not certain. In view of the said, the Authority considers that instead of making cursory remarks based on the report which provides only snapshot of the power sector, CPPA-G and NTDC should carry out a proper demand-supply assessment/analysis truly aligned with the actual implementation schedule of the projects to determine whether practically there is any surplus or not. The Authority is also of the considered opinion that with the delays being experienced by the major projects it is very unlikely that there will be any surplus as claimed by CPPA-G. Therefore, the Authority is of the considered opinion that all the projects approaching it must be processed in accordance with the Law. The issues of surplus capacity and addition of new generation capacity in the system, have also been clarified in SIR 2018. In view of the above, the Authority considers that the observations of CPPA-G regarding surplus power in the system needs to be reviewed.

(xviii). On the specific observations raised by CPPA-G regarding Rule-3(5) of the Generation Rules, the Authority has observed that the said Rule describes a broad criterion for the grant of generation licence which includes: (a). sustainable development or optimum utilization of the RE or non-RE 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 proposed generation facility against the preferences indicated by the Authority; (d). the cost 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

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY REGISTRAR NEPRA

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. In this regard, the Authority clarifies that while, deciding the applications for the grant of generation licences it invariably considers the provisions of the above mentioned Rules.

(xix). In this regard, the Authority considers it appropriate to mention that AEDB/GoP has identified two wind corridors (at Jhimpir and Gharo) in the province of Sindh of the country. The estimated potential for these two corridors is more than 50,000 MW. At the moment, around twenty three (23) projects with a cumulative Installed Capacity of around 1186 MW have been installed and commissioned whereas another twenty-three (23) projects including that SWPL with cumulative capacity of around 1250.00 MW are in various stages of implementation. The proposed project of SWPL will result in optimum utilization of the RE which was earlier untapped, resulting in pollution free electric power. It is clarified that that wind is an indigenous RE resource and such resources have a preference for the energy security. 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 at reasonable distance from the thick population, 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 approved the GIS of the project considering the project in its long-term forecasts for additional capacity requirements.

(xx). In view of the clarification and justifications given above, the Authority is of the considered view that the project of SWPL fulfills the eligibility criteria for grant of generation licence as given under 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, the Authority is of the considered opinion that for

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY * NEPRA * REGISTRAR

sustainable development, all indigenous power generation resources including renewable energy must be developed on priority basis.

(ii). The existing energy mix of the country is heavily skewed towards the costlier thermal power plants, mainly operating on imported fuel. The import of fuel for electric power generation not only causes depletion of 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 be encouraged. The Authority considers that the proposed project of SWPL 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 furnace oil but will also help reduction in carbon emission by generating clean electricity, thus improving the environment.

(iii). The Authority considers that the proposed WPP of SWPL will help in diversifying the energy portfolio as well increasing share of RE in 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 carbon emissions by generating clean electricity, thus improving the environment.

(iv). As explained in the preceding paragraphs, SWPL has provided the details of location, technology, size, net capacity/energy yield, interconnection arrangements, technical details and other related information for the proposed WPP. In this regard, the Authority has observed that GoS has allocated 335 acres of land to SWPL in Jhimpir wind corridor for setting up the generation WPP. The said details are being incorporated in the generation licence. The Authority directs SWPL to utilize the allocated land exclusively for the proposed WPP and not to carry out any other activity on the said allocated land except with the prior approval of the competent authority.

(v). Regarding the term of the generation licence, the Authority has noted that under Rule-5(1) of the Generation Rules, the term of a generation licence shall be commensurate with the maximum expected useful life of the units comprised in a generating facility, except where an applicant consents to a shorter term. According to the information provided by SWPL, the WPP will tentatively achieve COD by June 30, 2021 and will have a useful life of more than twenty-five (25) years from its COD. In this

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

regard, SWPL has requested that the term of the proposed generation licence may be fixed as twenty-five (25) years. The Authority has noted that as per international benchmark, the useful life of wind turbine generators is normally considered as 20 to 25 years. The WTGs selected by SWPL for its WPP are type certified and the proposed term of licence is in-line with international standards, term of generation licences tariff control period of 25 years granted by the Authority to other similar wind projects. In view the said, the Authority fixes the term of the generation licence as twenty five (25) 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 this regard, it is pertinent to mention that SWPL has filed a tariff petition for determination of its tariff on cost plus basis. The Authority has admitted the same and the same is in advance stage of processing. Further to the said, the CCoE has decided that RE projects which are at the stage of LoI will be going through Competitive Bidding (CB). In view of the said, it is still not clear whether SWPL will be having a cost plus tariff or a tariff through CB. In view of the said, the Authority considers appropriate to direct SWPL to charge the power purchaser only such tariff which has been determined, approved or specified by it. In view of the said, the Authority decides to include a specific article in the generation licence. Further, the Authority directs SWPL to adhere to the said in letter and spirit without any exception.

(vii). About the compliance with the environmental standards, as discussed in the preceding paragraphs, SWPL has provided the NOC from SEPA 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 specific article in the generation licence along with other terms and conditions making it obligatory for SWPL to comply with relevant environmental standards at all times. Further, the Authority directs SWPL to submit a report on a bi-annual basis, confirming that operation of its WPP is in compliance with the required environmental standards as prescribed by the concerned environmental protection agency.

(viii). The proposed generation facility of SWPL will be using RE resource for generation of electric power therefore, the project may qualify for the carbon credits. In view of the said, an article for carbon credits and sharing its proceeds with the power

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY REGISTRAR

purchaser has been included in the generation licence. Accordingly, the Authority directs SWPL to initiate the process in this regard at the earliest so that proceeds for the carbon credits are materialized. SWPL shall be required to share the proceeds of the carbon credits with the power purchaser as stipulated in the generation licence.

(ix). In view of the above, the Authority hereby approves the grant of generation licence to SWPL on the terms and conditions set out in the generation licence annexed to this determination. The grant of generation licence is subject to the provisions contained in the NEPRA Act, relevant rules, regulations made thereunder and other applicable documents.

Authority

Rafique Ahmed Shaikh
(Member) (Did not Attend the meeting-Away)

Rehmatullah Baloch
(Member)

Saif Ullah Chattha
(Member) (Did not Attend the meeting-Away)

Engr. Bahadur Shah
(Member/Vice Chairman)

Tauseef H. Farooqi
(Chairman)

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
★ NEPRA ★

10 12 19

National Electric Power Regulatory Authority (NEPRA)
Islamabad – Pakistan

GENERATION LICENCE

No. WPGL/56/2019

In exercise of the powers conferred upon the National Electric Power Regulatory Authority (NEPRA) under Section-14B of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 as amended or replaced from time to time, the Authority hereby grants the Generation Licence to:

SINO WELL (PRIVATE) LIMITED

Incorporated Under Section-32 of the Companies Ordinance 1984 (XLVII of 1984) Having Corporate Universal Identification No. 0100200, dated June 14, 2016

for its Generation Facility/Wind Farm/Wind Power Plant Located at Deh Kohistan 7/1, Tapo Jhimpir, 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 10th day of December Two Thousand & Nineteen and expires on 29th day of June Two Thousand & Forty-Six.

10 12 19

Registrar

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ 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, Commercial 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;

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(g). "Carbon Credits" mean the amount of Carbon Dioxide (CO_2) 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 for functioning as market operator;

(j). "Distribution Code" means the distribution code prepared by the concerned distribution company 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;

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(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 **Sino Well (Private) 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;

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(x). "Policy" means the Policy for Development of Renewable Energy for Power Generation, 2006 of GoP as amended or replaced from time to time;

(y). "Power Purchaser" means any person or registered entity or licence holder which will be purchasing electric power from the Licensee, 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;

1.2 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 or replaced 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.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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-five (25) years from the COD of the generation facility/Wind Power Plant/Wind Farm of the Licensee, subject to the provisions of Section-14(B) of the Act.

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, in accordance with Applicable Law.

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.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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.

NATIONAL POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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.

Article-17
Compliance with Applicable Law

The Licensee shall comply with the provisions of the Applicable Law, guidelines, directions and prohibitory orders of the Authority as issued from time to time.

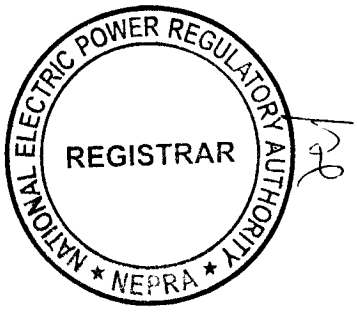
Article-18
Corporate Social Responsibility

The Licensee shall provide the descriptive as well as monetary disclosure of its activities pertaining to Corporate Social Responsibility (CSR) on annual basis.

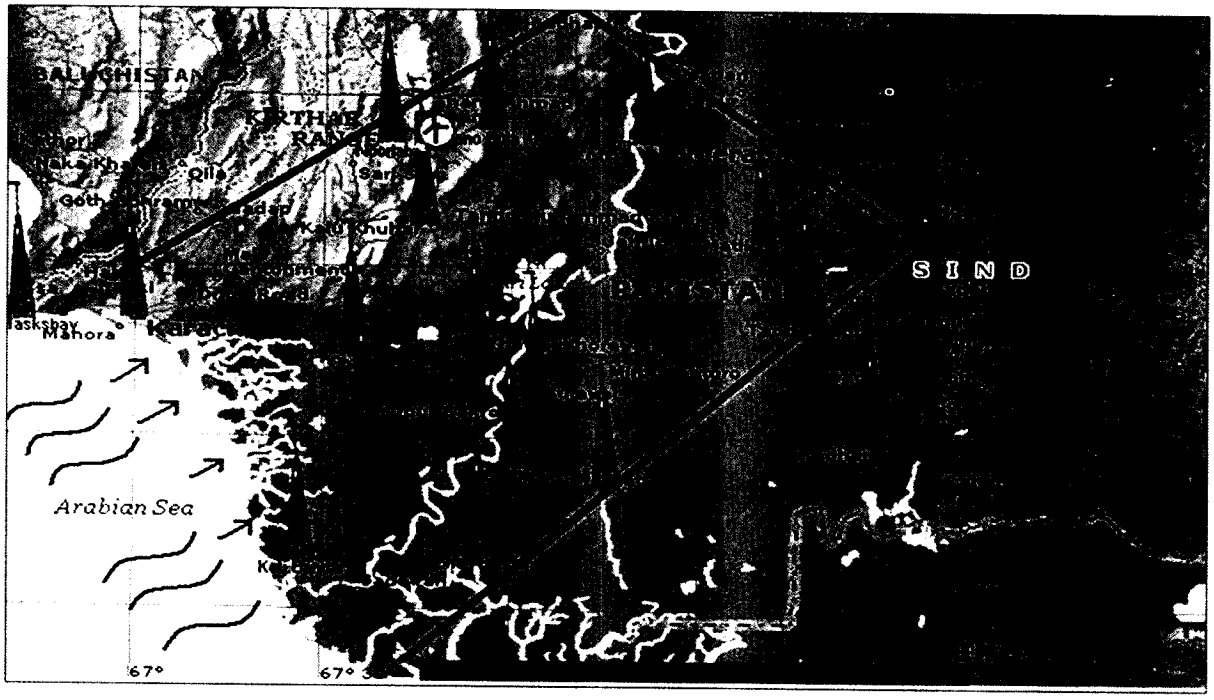
NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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 Facility of the Licensee are described in this Schedule.



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



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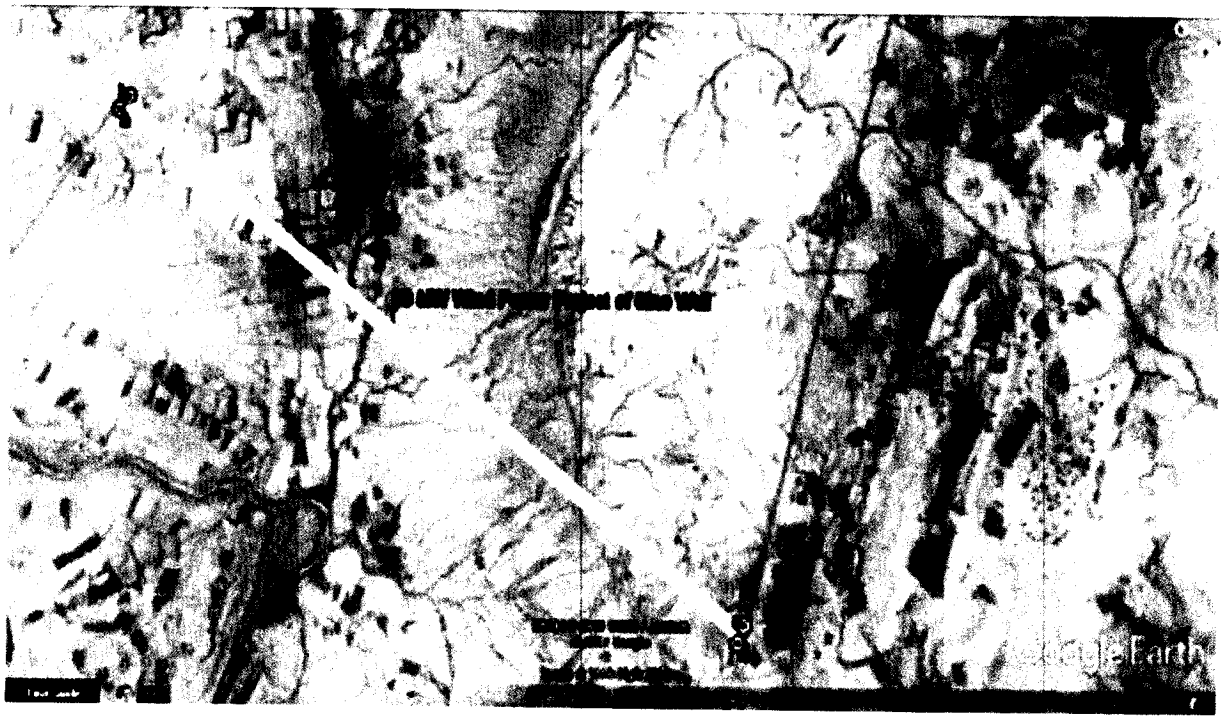
NEPRA

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

TOTAL LAND AREA: 335 ACRES		
Geodetic Coordinates		
SR. NO.	Latitude	Longitude
1	25° 10' 08.14" N	68° 02' 01.95" E
2	25° 10' 04.21" N	68° 01' 58.86" E
3	25° 07' 16.19" N	68° 06' 30.89" E
4	25° 07' 20.82" N	68° 06' 32.69" E



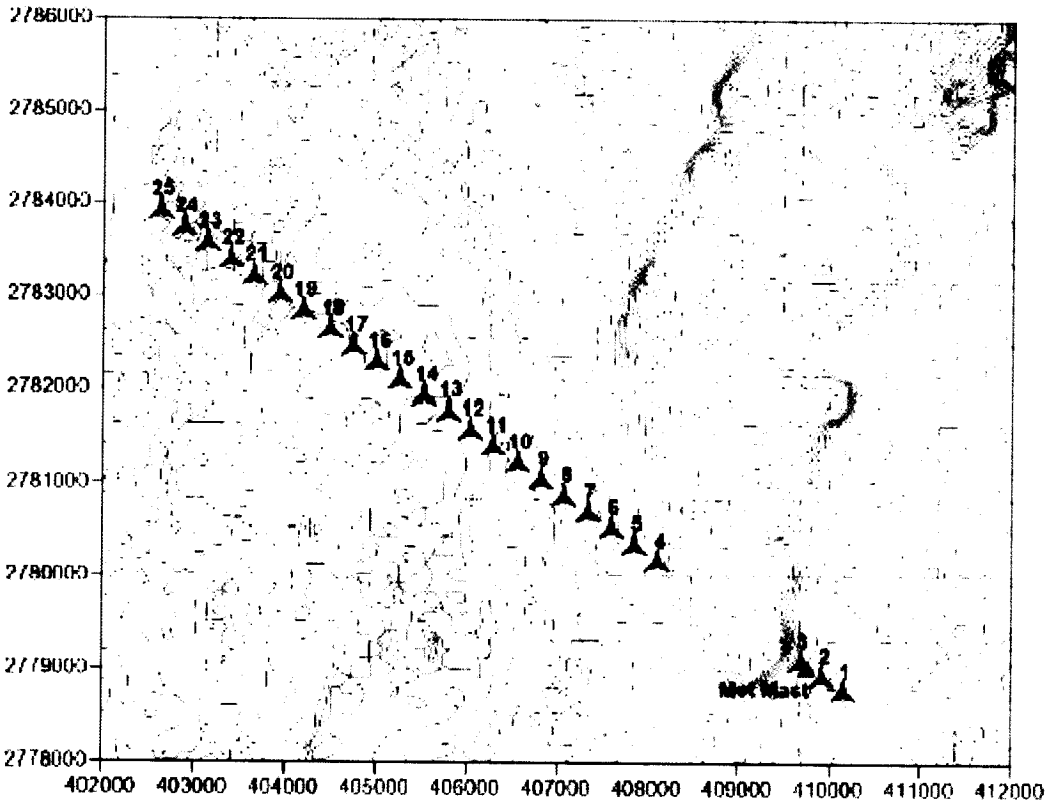
NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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

WTGs ID	Coordinate X (m)	Coordinate Y (m)
1	410157	2778804
2	409945	2778945
3	409735	2779087
4	408102	2780197
5	407844	2780374
6	407587	2780552
7	407327	2780723
8	407068	2780900
9	406808	2781077
10	406551	2781256
11	406286	2781427
12	406028	2781602
13	405781	2781793
14	405515	2781957
15	405252	2782130
16	404997	2782314
17	404737	2782484
18	404477	2782662
19	404175	2782863
20	403921	2783041
21	403637	2783238
22	403382	2783415
23	403128	2783595
24	402867	2783765
25	402611	2783943

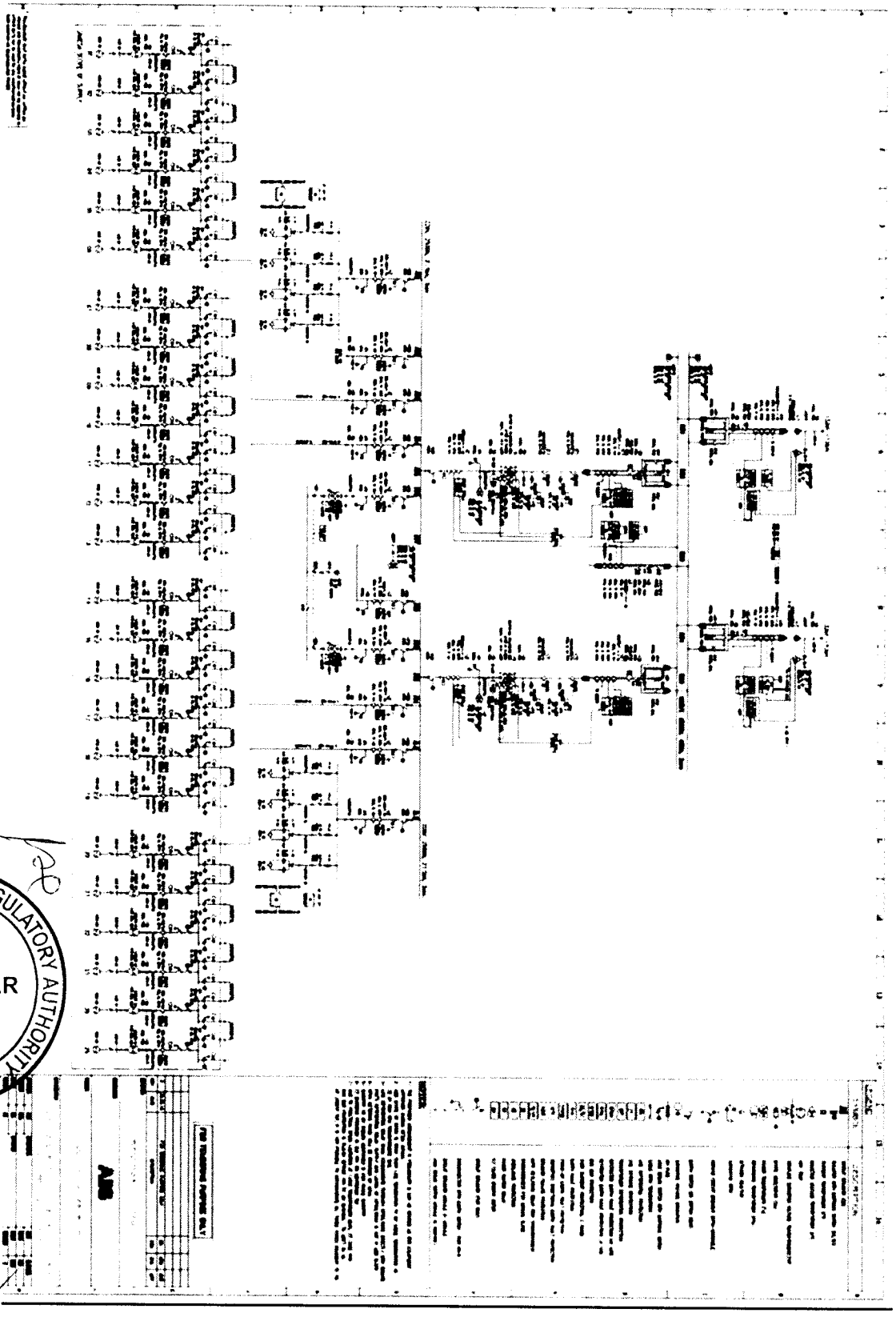
NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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



NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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



Interconnection Arrangement/Transmission Facilities for Dispersal of Power from Generation Facility/Wind Power Plant/Wind Farm

The electric power generated from the Generation Facility/Wind Power Plant of SWPL 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 of SWPL will consist of the following:-

(a). A 132 KV double circuit transmission line approx. 5 km long on Greeley conductor for looping in-out on the 132 kV single circuit of Western WPP and Master WPP to Jhimpir-I 220/132 kV grid station.

3. The scheme of interconnection of Wind Power Plant of SWPL also proposes the following reinforcements in place at Jhimpir cluster:-

(a). 220 kV D/C transmission line, approximately 5 km long, on twin-bundled Greeley conductor for looping In/Out of second circuit of the existing Jamshoro-KDA-33 220 kV D/C transmission line at the proposed Jhimpir-2 220/132 kV substation;

(b). Addition of 4th 220/132 kV transformer at the newly proposed Jhimpir-2 220/132 kV substation;

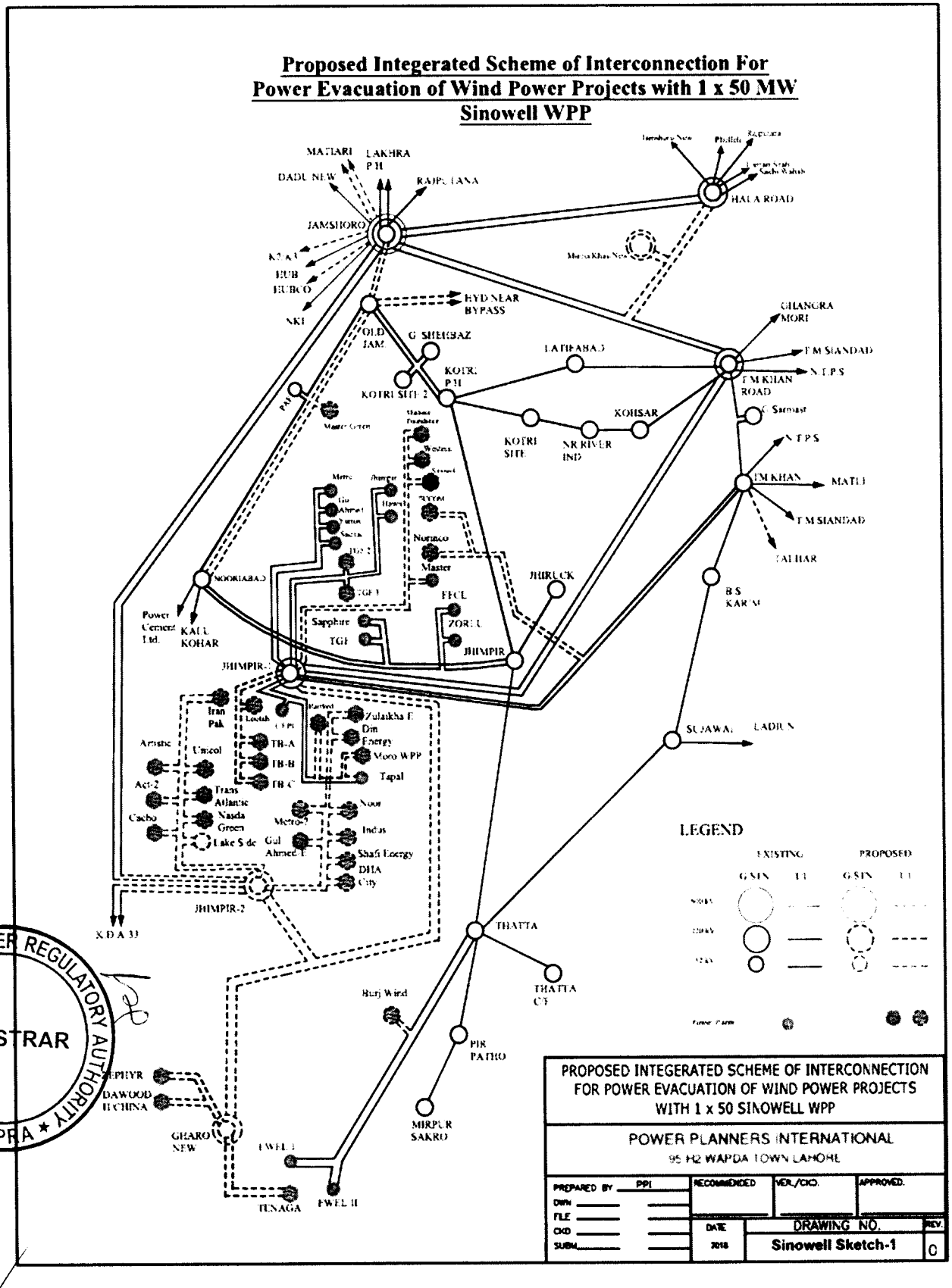
(c). 132 kV D/C transmission line, approximately 135 km long, on twin-bundled Greeley conductor for connecting 8 WPPs in the first loop to Jhimpir-2 220/132 kV newly proposed substation;

(d). 132 kV D/C transmission line, approximately 168 km long, on twin-bundled Greeley conductor for connecting 8 WPPs in the second loop to Jhimpir-2 220/132 kV newly proposed substation.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

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.

Schematic Diagram of Interconnection Arrangement/Transmission Facilities for Dispersal of Power from Generation Facility/Wind Power Plant/Wind Farm



Details of Generation Facility/Wind Power Plant/ Wind Farm

(A). General Information

(i).	Name of Company/Licensee	Sino Well (Pvt.) Limited.
(ii).	Registered Office of Company/Licensee	F-25, Block 5, Rojhan Street Kehkashan, Clifton Karachi, Pakistan.
(iii).	Business Office of Company/Licensee	-Do-
(iv).	Location of the generation facility/Wind Power Plant/Wind Farm	Deh Kohistan 7/1, Tapo Jhimpir, Taluka & District Thatta in the Province of Sindh
(v).	Type of the generation facility/Wind Power Plant/Wind Farm	Wind Power Plant

(B). Wind Farm Capacity & Configuration

(i).	Wind Turbine Type, Make & Model	Gamesa G114-2.0 MW
(ii).	Installed Capacity of Wind Farm (MW)	50 MW
(iii).	Number of Wind Turbine Units/Size of each Unit (KW)	25 x 2.0 MW

(C). Wind Turbine Details

(a). Rotor		
(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

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(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 3s)
(ix).	Pitch regulation	Electric motor drives a ring gear mounted to the inner race of the blade pitch bearing
(b). Blades		
(i).	Blade Length	56 m
(ii).	Material	Composite material reinforced with fiberglass through resign infusion technology
(c). Gear Box		
(i).	Type	3 combined stages: 1 stage planetary , 2 parallel shift gears
(ii).	Gear ratio	1:128.5
(iii).	Main shaft	Cast shaft
(d). Generator		
(i).	Nominal Power	2040 kVA
(ii).	Voltage	690 V
(iii).	Type	Double feed induction generator with coil rotor and slip rings
(iv).	Degree of Protection	IP 54 Turbine- IP21 Ring Body
(v).	Coupling	Main shaft: Cone collar High Speed Shaft: Flexible Coupling
(vi).	Power Factor	0.95
(e). Yaw System		
(i).	Yaw Bearing	PETP
(ii).	Brake	Active Yaw

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

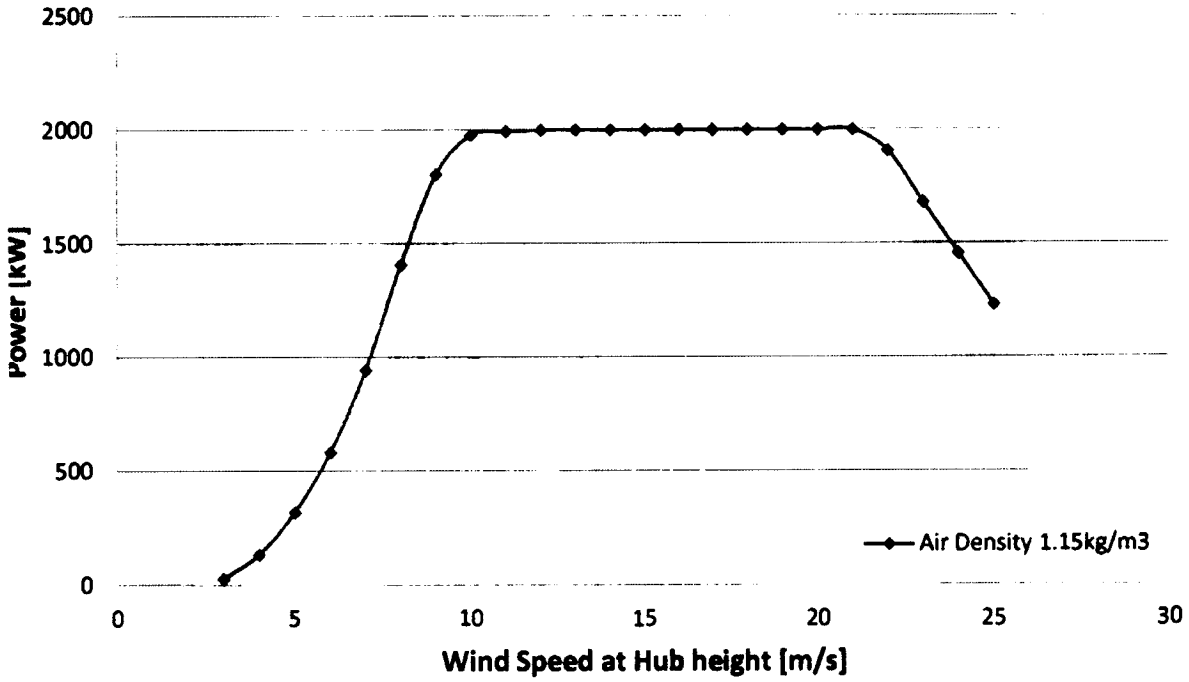
(iii).	Yaw Drive	Motor drive
(iv).	Speed	0.42/s Controlling speed
(f). Control System		
(i).	Type	Automatic or manually controlled
(ii).	Scope of Monitoring	Remote monitoring of different parameters, eg: temperature, pitch parameters speed, generator torque ,wind speed and direction
(iii).	Recording	Production data ,event list , long and short term trends
(g). Brake		
(i).	Design	Mechanical brakes
(ii).	Operational Brake	Aerodynamic brake achieved by feathering blades
(iii).	Secondary Brake	Mechanical brakes on high speed shaft of gear box
(h). Tower		
(i).	Type	Conical barrel tube
(ii).	Hub Heights	80 m

(D). Other Details

(i).	COD of the generation facility/Wind Power Plant/Wind Farm	June 30, 2021 (anticipated)
(ii).	Minimum Expected Useful Life of the generation facility/Wind Power Plant/Wind Farm from COD	25 years

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Power Curve of Wind Turbine Generator (WTG) of Gamesa G114-2.0 MW (Graphical/Tabular)



3	29	15	2000
4	135	16	2000
5	319	17	2000
6	581	18	2000
7	943	19	2000
8	1408	20	2000
9	1804	21	2000
10	1977	22	1906
11	1993	23	1681
12	1999	24	1455
13	2000	25	1230
14	2000		

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

SCHEDULE-II

(1).	Total Installed Gross ISO Capacity of the Generation Facility /Wind Farm (MW/GWh)	50 MW
(2).	Total Annual Full Load Hours	3241 Hrs
(3).	Average Wind Turbine Generator (WTG) Availability	95.0 %
(4).	Total Gross Generation of the Generation Facility/Wind Farm (in GWh)	200.77 GWh
(5).	Array & Miscellaneous Losses GWh	24.62 GWh
(6).	Availability Losses GWh	8.81 GWh
(7).	Balance of Plant Losses GWh	5.28 GWh
(8).	Annual Energy Generation (25 year equivalent Net AEP) GWh	162.06 GWh
(9).	Net Capacity Factor	37 %

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 Applicable Documents(s).

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA