National Electric Power Regulatory Authority
Islamic Republic of Pakistan

Registrar

NEPRA Tower, Attaturk Avenue (East), G-5/1, Islamabad
Ph: +92-51-9206500, Fax: +92-51-2600026
Web: www.nepra.org.pk, E-mail: registrar@nepra.org.pk

No. NEPRA/R/DL/LAG-389/ 13441-47 August 1, 2017

Mr. Ubaid Amanullah
Authorized Representative
Gul Ahmed Electric Limited
7th Floor, Al-Tijarah Centre,
32-1-A, Block 6, PECHS,
Main Shahrah-e-Faisal, Karachi

Subject: **Grant of Generation Licence No. WPGL/47/2017**
Licence Application No. LAG-389
Gul Ahmed Electric Limited (GAEL)

Reference: GAEL's application vide letter dated April 05, 2017 (received on April 11, 2017).

Enclosed please find herewith Generation Licence No. WPGL/47/2017 granted by National Electric Power Regulatory Authority (NEPRA) to Gul Ahmed Electric Limited (GAEL) for its 50.0 MW Wind Power Plant located at Deh Kohistan 7/3 and 7/4 Tapo Jungshahi, Taluka and 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/47/2017)

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(Syed Safeer 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 Gul Ahmed Electric Limited for the Grant of Generation Licence

August , 2017
Case No. LAG-389

(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 Gul Ahmed Electric Limited (GAEL) 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, GAEL decided to approach the Authority for the grant of generation licence.

(B). Filing of Application

(i). GAEL submitted an application on April 11, 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

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with the relevant provisions of the NEPRA Licensing (Application and Modification Procedure) Regulations, 1999 (the "Licensing Regulations").

(ii). The Registrar examined the submitted application and found the same in compliance with the Licensing Regulations. 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 May 16, 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 May 19, 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 May 22, 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), Anwar Kamal Law Associates (AKLA), EDGoS, 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 GAEL. However, EDB suggested that efforts should be made to utilize indigenous potential available for the proposed project;

(b). 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

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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 GAEL;

(c). 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 GAEL;

(d). PCoRET stated that it cannot comments 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 GAEL; and

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

(ii). The Authority reviewed the above comments of the stakeholders and decided to seek the perspective of the GAEL 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

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the project, while remaining within the domain of RE Policy and other relevant rules and regulations.

(iii). Regarding the comments of AKLA, it was submitted that comments are general in nature and not specifically related to the application of GAEL. In this regard, AKLA has raised various issues which are related to policy of GoP for promotion of RE in the country. AKLA has submitted its comments without fully appreciating the dynamics of the project, energy sector, financial and technical considerations relevant for determining the project parameters with no nexus to the issue to the grant of generation licence to the GAEL. The project company submitted that mainstreaming of RE and greater use of indigenous resources can help to diversify the energy mix and reduce the dependence of country on any single source, particularly imported fossil fuels, thereby mitigating against supply disruptions and price fluctuation risks. Additional costs and risks related to fuel stocking, transportation, and temporary substitute arrangements are also irrelevant for RE systems, except for backup purposes. GAEL stated that AKLA in its comments claimed that generation capacity of Pakistan is surplus. It appears that AKLA is not fully aware about the operational capacity and installed capacity of the country. For instance, the installed capacity of the hydro power plants/projects cannot operate at full load throughout the year as it is dependent on the hydrology of the project site. Furthermore, a sizeable portion of installed capacity is inefficient and not economically viable to be operated.

(iv). Further to the above, GAEL submitted that fuel prices are volatile and it cannot be assumed that the same will remain on the existing low level. GAEL acknowledged that there are projects under construction on coal and RLNG fuels, however, the ever increasing demand of electricity will continue to exist, and therefore, RE has to maintain a sizeable share in the overall energy mix. GAEL maintained that indigenous RE will result in savings and considerable reduction in precious foreign exchange flight out of the country. It was also clarified that presently, in comparison to other developing countries, Pakistan has the lowest contribution of RE energy in the overall energy mix, which needs to be improved and brought at par with other developing countries. GAEL stated that comparison of earlier wind upfront tariffs with the current wind benchmark tariff, announced by the Authority, reveals improvement in technology/plant factor and considerable

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reduction in overall reference project cost, hence making RE projects much more cost effective on per MW basis. It was submitted that AKLA had raised the biggest concern over "Take or Pay" feature which is suggested to be changed to "Take and Pay". In this regard, AKLA has not taken into consideration a fundamental aspect that replacing "Take or Pay" with "Take and Pay" would result in the end of industry pertaining to the private power projects in country.

(v). The Authority has considered the comments of the stakeholders, the reply of GAEL and observes that except AKLA, all the stakeholders have supported the grant of generation licence to GAEL. The Authority has observed that AKLA while submitting its comments has referred to its previous correspondences in different licensing 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. The aforementioned is strengthened from the fact that the proposed generation facility/Wind Power Plant/Wind Farm of GAEL 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.

(vi). 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 GAEL for the consideration of grant of generation

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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 GAEL 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 Gul Ahmed Group. The group is one of the oldest business house of the country having interest in various areas including textile, electric power generation, banking, chemicals and information technology. The group has a very good track record in the power sector considering the fact it set up a 136.00 MW fuel oil based generation facility in the name of Gul Ahmed Energy Limited (GAEYL) in the early nineties. The said generation facility started operations in November 1997 and has successfully completed over 19 years of operation. The group diversified its electric power business by setting up a 50.00 MW wind based generation facility in the Jhimpir wind corridor in district Thatta in the province of Sindh through GAEYL. The said wind based project has already achieved the milestone of commercial operation and is supplying electric power to the National Grid since September 16, 2016. GAEL is another project which is being sponsored by group in the area of RE technologies.

(iii). In order to implement the project, the group incorporated a new company in the name of GAEL under company under Section-32 of the Companies Ordinance, 1984 (having Corporate Universal Identification No. 0096868, dated December 23, 2015). The registered office of the company is located at 36-F, Block 6, P.E.C.H.S, Karachi. 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 370 acres of land in the Jhimpir wind corridor at deh Kohistan 7/3 & 7/4 tapo Jungshahi, taluka and district

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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 i.e. GAEYL has a total assets of around Rs. 8.50 billion. It is pertinent to mention that based on the financial strength and other evaluation parameters, EDGoS issued LoI to GAEL 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 Asian Development Bank (ADB), International Finance Corporation (IFC) and consortium of local banks consisting of United Bank Limited, Askari Bank Limited and Dubai Islamic Bank Limited 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. $ 90.00 million which will be financed through a combination of debt (U.S. $ 72.00 million) and equity (U.S. $ 18.00 million) in a ratio of 75:25 which is in line the benchmark set out in the RE Policy and the determinations of the Authority.

(vi). As explained in the preceding paragraphs, GAEL 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). As explained in the preceding paragraphs, GAEL feasibility study of the project was carried out. 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. After duly considering the various factors including (a). wind resource position of the corridor of Jhimipir (b). capital cost of

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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.

(viii). After considering the above mentioned factors GAEL decided to select WTG of GW-121-2.5MW of Goldwind P.R. China. The feasibility study also optimized the size of the proposed generation facility/Wind Power Plant/Wind Farm to 50.00 MW having 20 x 2.50 MW of WTG. In consideration of the above, it is clarified that the proposed WTG is the latest fourth generation (Type-IV) machine having synchronous generator. The said WTG are based on permanent magnet direct-drive technology consisting of a wind-driven turbine rotor turning a permanent magnet synchronous generator, which does not require a gearbox to operate. The generator produces alternating current which is delivered to the grid via AC-DC-AC conversion by a full-power converter.

(ix). The key advantages of the direct-drive permanent magnet full-power rectification technology are (a). High power generating efficiency and a better power curve; (b). The permanent Magnet (PM) generator avoids all rotor winding and mechanical energy losses associated with gearboxes and couplings; (c). the PMDD full power converter provides the flexibility to optimize rotational speed for maximum energy capture, which reduces transmission loss and allows higher generation levels, especially at low wind velocities; (d). lower maintenance costs and less downtime. As a result of a low component count, passive and modular designs and the absence of a gearbox, the proposed turbines offer improved reliability and maintenance costs that are the lowest in its class. As a result of these efforts, the projects use cranes less often and enjoy a lower operational expenditure better grid connectivity, a full power converter enables superior low-voltage ride-through (LVRT) and enables high levels of reactive power control.

(x). 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

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dispersal/interconnection arrangement will be consisting of 132kV D/C transmission line, approximately 7-km long, on twin-bundled 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 GAEL, connecting the projects of Metro Wind Power Limited, Zulaikha Energy (Pvt.) Limited and GAEL 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.

(xi). 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 GAEL 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.

(xii). 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 GAEL 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.

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(xiii). 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.

(xiv). 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 GAEL with cumulative capacity of around 1300.00 MW are in various stages of implementation.

(xv). 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 fuel and such fuels 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

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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.

(xvi). 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.

(xvii). In view of the above, the Authority is of the considered view that the project of GAEL 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

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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 GAEL 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, GAEL 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 GAEL 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 GAEL 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 GAEL, its generation facility/Wind Power Plant/Wind Farm will achieve COD by December 31, 2019 and will have a useful life of more than twenty five (25) years from its COD. In this regard, GAEL has requested that the term of the proposed generation licence may be fixed as twenty five (25) years. The Authority considers that said submission of GAEL 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

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Authority fixes the term of the generation licence to 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 view of the said, the Authority through Article-6 of the generation licence directs GAEL to charge the power purchaser only such tariff which has been determined, approved or specified by the Authority. The Authority directs GAEL 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, GAEL 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 GAEL to comply with relevant environmental standards at all times. Further, the Authority directs GAEL 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 GAEL 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. GAEL has informed that the project will achieve COD by December 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 GAEL to initiate the process in this regard at the earliest so that proceeds for the carbon credits are materialized. GAEL shall be required to share

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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 GAEL 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)

Syed Masood-ul-Hassan Naqvi
(Member)

Himayat Ullah Khan
(Member)

Saif Ullah Chattha
(Member/Vice Chairman)

27.7.2017

Tariq Saddozai
(Chairman)

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National Electric Power Regulatory Authority
(NEPRA)
Islamabad – Pakistan

GENERATION LICENCE

No. WPGL/47/2017

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

GUL AHMED ELECTRIC LIMITED

Incorporated Under Section-32 of the Companies Ordinance 1984 (XLVII of 1984) Having Corporate Universal Identification No. 0096868, dated December 23, 2015

for its Generation Facility/Wind Farm/Wind Power Plant Located at Deh Kohistan 7/3 & 7/4 Tapo Jungshahi, 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 01st day of August Two Thousand & Seventeen and expires on 30th day of December Two Thousand & Forty Four.

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Registrar

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
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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;

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(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;

(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;

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(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 **Gul Ahmed Electric 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;

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(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.

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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 five (25) 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.

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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.

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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.

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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.

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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.

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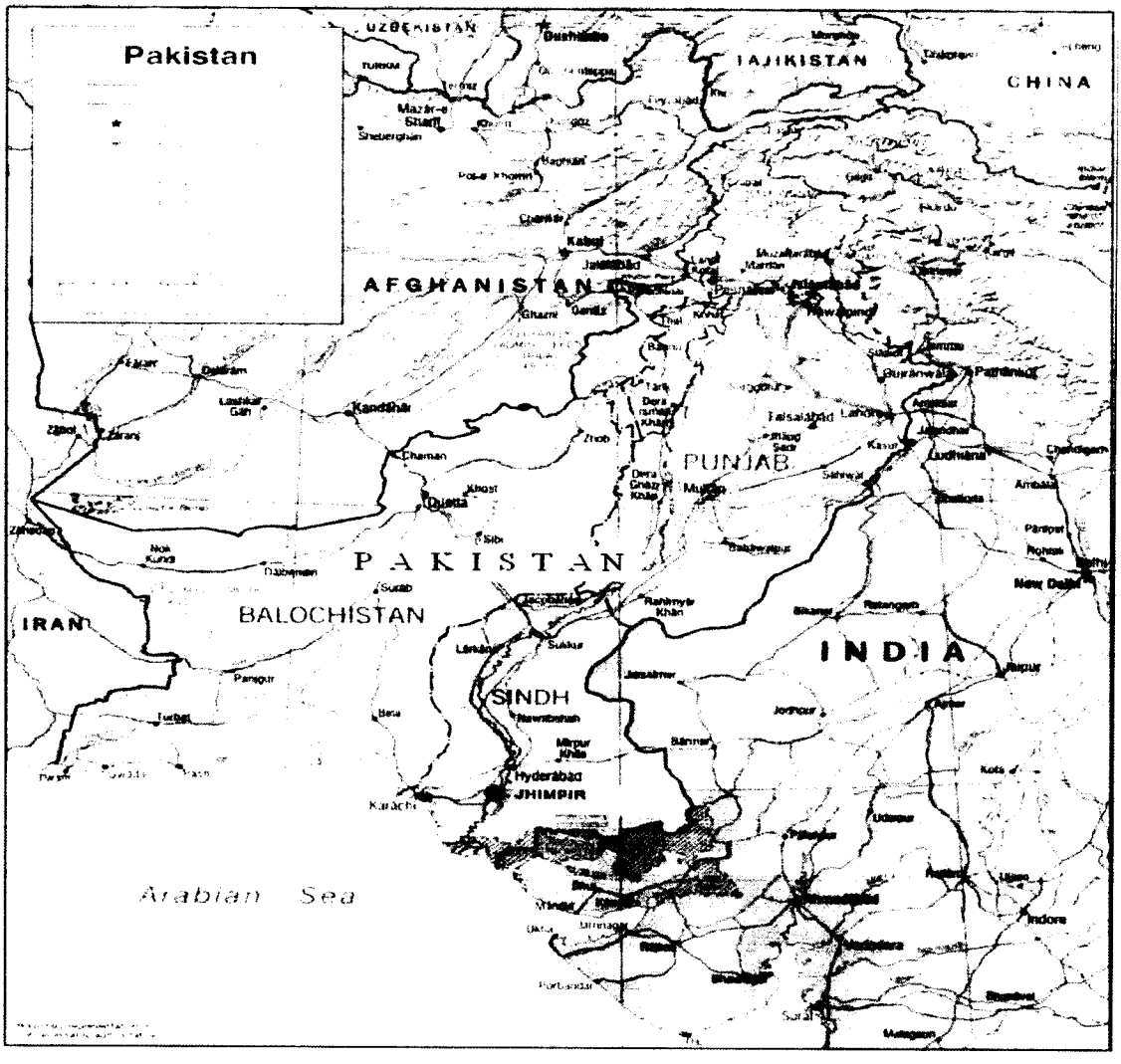
Location of the Generation Facility/Wind Power Plant/Wind Farm of the Licensee



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

Total Land Area: 370 Acres

	Geodetic Coordinates	
Point No.	Latitude (N)	Longitude (E)
Boundary 1	25° 2.603'N	67° 40.730'E
Boundary 2	25° 2.892'N	67° 46.794'E
Boundary 3	24° 58.912'N	67° 46.[illegible]'E
Boundary 4	24° 58.[illegible]'N	67° 44.[illegible]'E

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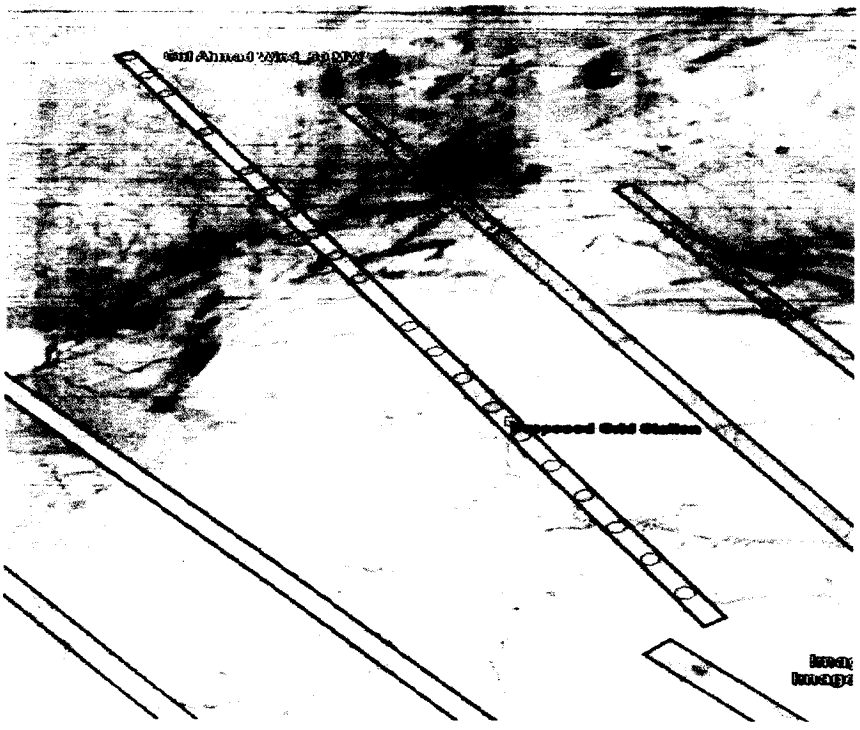
Layout of the Generation Facility/Wind Power Plant/Wind Farm of the Licensee



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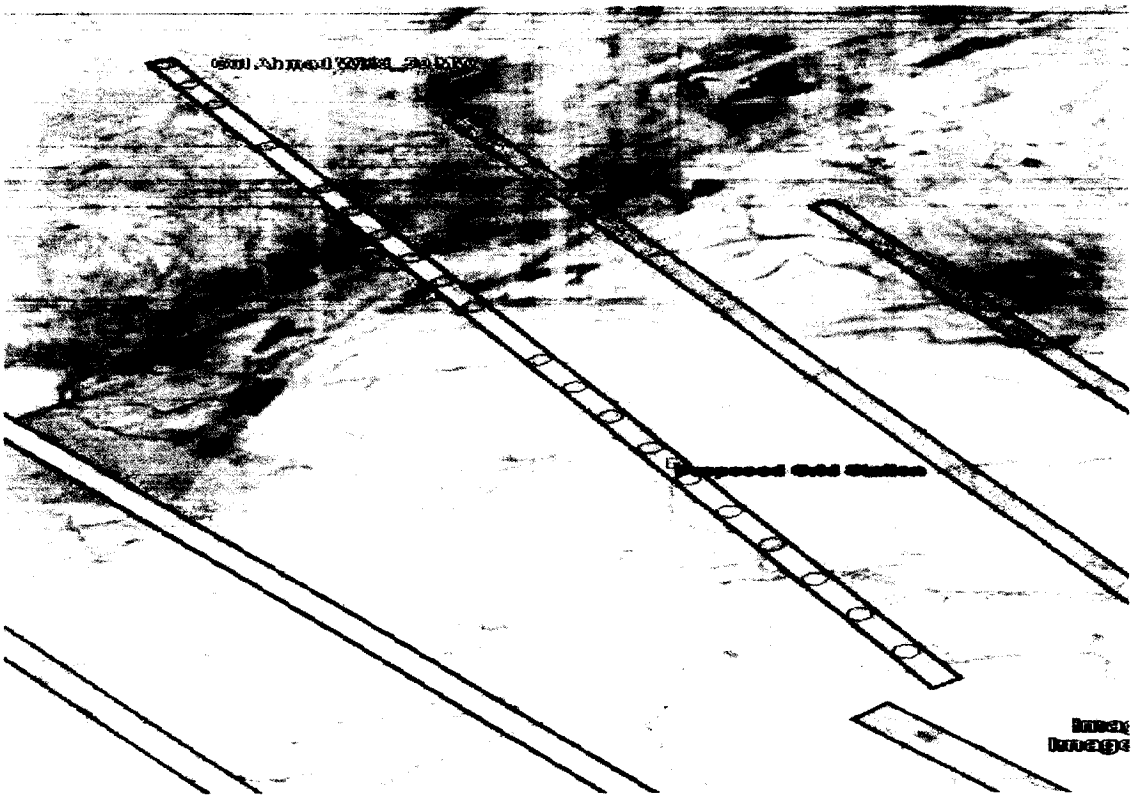
Micro-Sitting (Graphical) of the Generation Facility/Wind Power Plant/Wind Farm of the Licensee



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

[illegible] Coord[illegible]42		
[illegible] ine No[illegible] [m[illegible]		
GEL_GW01	366830	2770402
GEL_GW02	367125	2770098
GEL_GW03	367421	2769794
GEL_GW04	368012	2769187
GEL_GW05	368604	2768579
GEL_GW06	368900	2768275
GEL_GW07	369195	2767971
GEL_GW08	369491	2767667
GEL_GW09	369787	2767363
GEL_GW10	370082	2767060
GEL_GW11	370674	2766452
GEL_GW12	370969	2766148
GEL_GW13	371265	2765844
GEL_GW14	371561	2765540
GEL_GW15	371857	2765236
GEL_GW16	372152	2764933
GEL_GW17	372448	2764629
GEL_GW18	372744	2764325
GEL_GW19	373039	2764021
GEL_GW20	373335	2763717

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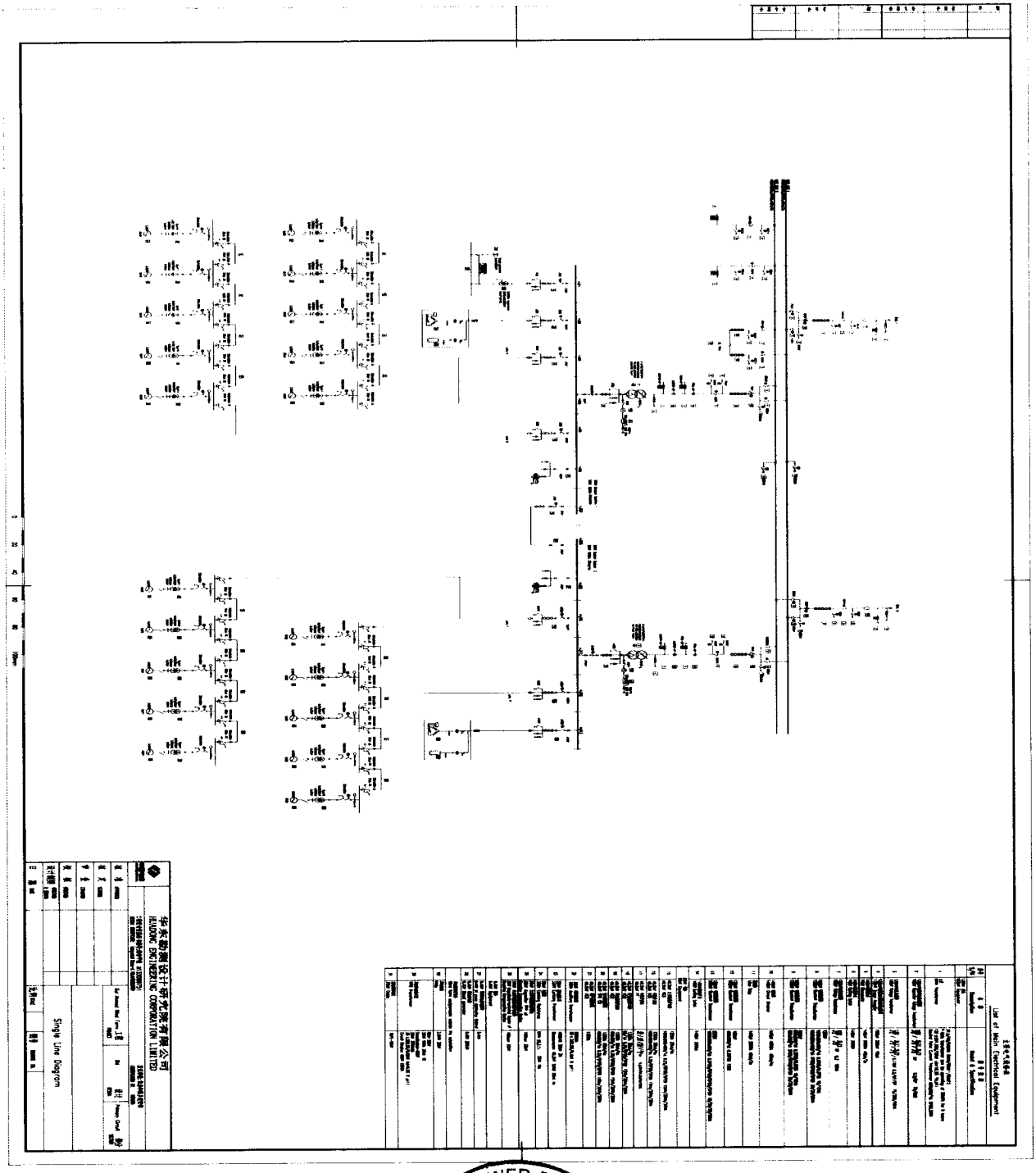
Single Line Diagram (Electrical System) of the Generation Facility/Wind Power Plant/Wind Farm of the Licensee



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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. Gul Ahmed Electric Limited (GAWL) 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 GAWL will consist of the following:-

(i). 220 kV D/C transmission line (approx. 5km long on twin bundled AASC Greeley conductor) for making In/out of second circuit of existing 220 kV Double Circuit (D/C) Jamshoro–KDA-33 transmission line at the proposed 220/132 kV Jhimpir-2 grid station/substation;

(ii). Addition of 4th power transformer (of 250 MVA) at the newly proposed 220/132 kV 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 loop[1] to newly proposed 220/132 kV Jhimpir-2 grid station/ substation;

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

[1] Lakeside, Nasda, Trans-Atlantic, Uni-Energy, Iran Pak, Artistic, Act-2 and Cacho WPPs
[2] Noor, Gul Ahmed, Metro-2, Zulaikha, Din Energy, Indus, Shafi Energy and DHA-City WPPs

(3). In the above scheme the interconnection of GAEL (which is placed in second loop) includes a 132 kV D/C transmission line (measuring approx. 7.00 km in length, on twin bundled AASC Greeley conductor) for making in/out of 132kV single circuit transmission line at generation facility/Wind Power Plant/Wind Farm of GAWL connecting the WPPs of Metro Wind Power Limited and Zulaikha Energy Limited 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.

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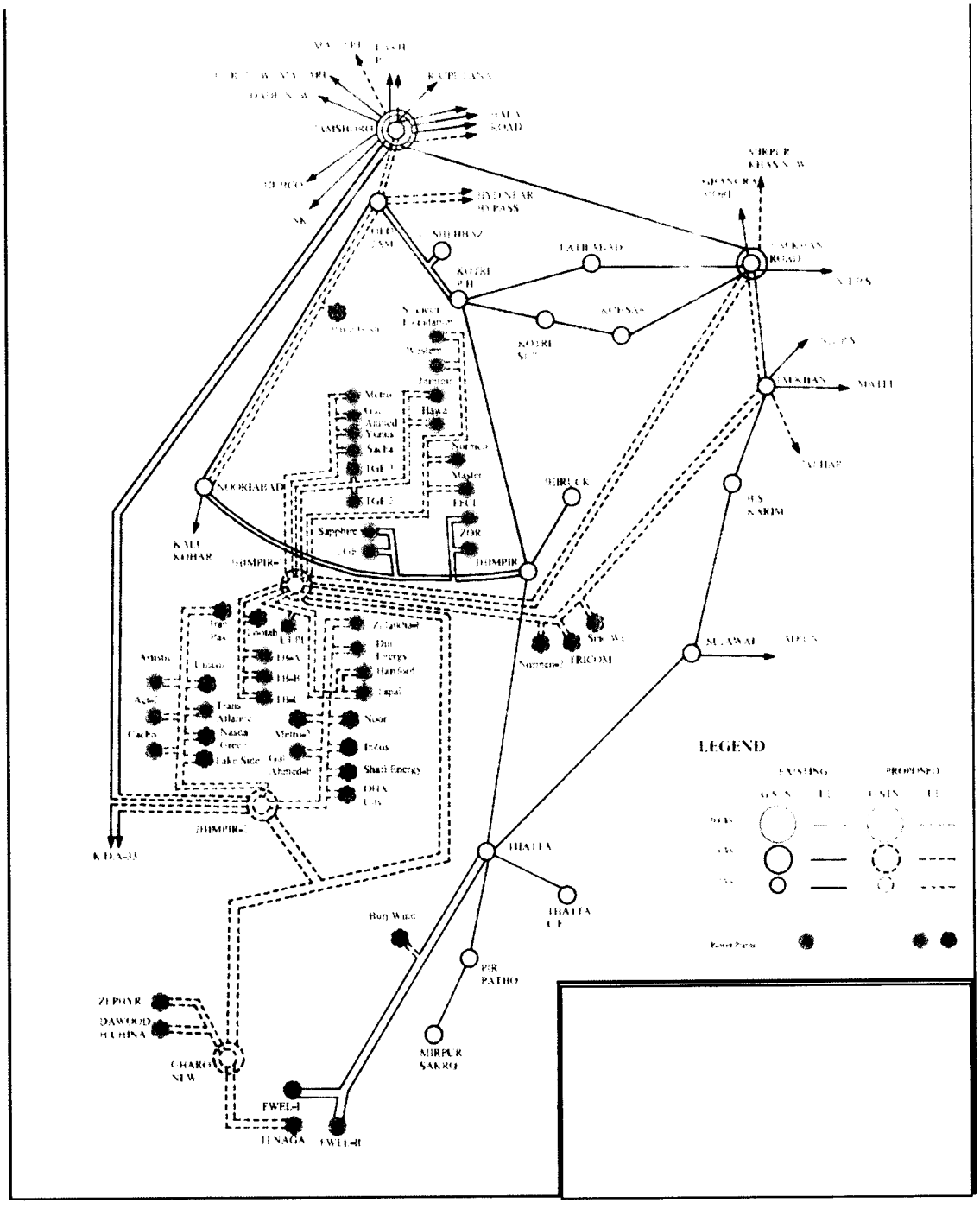
Schematic Diagram
for Interconnection Arrangement/Transmission Facilities for Dispersal of Electric Power from the Licensee



Detail of Generation Facility/Wind Power Plant/ Wind Farm

(A). General Information

(i).	Name of Company/Licensee	Gul Ahmed Electric limited
(ii).	Registered Office of Company/Licensee	36-F, Block 6, P.E.C.H.S, Karachi - 75400
(iii).	Business Office of Company/Licensee	7th floor, Al-Tijarah Centre, 32-1-A, Block 6, P.E.C.H.S., Main Shara-e-Faisal, Karachi
(iv).	Location of the generation facility/Wind Power Plant/Wind Farm	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	Goldwind GW121-2.5 MW
(ii).	Installed Capacity of Wind Farm (MW)	50 MW
(iii).	Number of Wind Turbine Units/Size of each Unit (MW)	20 x 2500 kW

(C). Wind Turbine Details

(a).	**Rotor**	
(i).	Rated Power	2.5 MW

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(ii).	Number of Blades	3 Each
(iii).	Rotor Speed	7~15.2 rpm
(iv).	Rotor Diameter	121 m
(v).	Swept Area	11595 m^2
(vi).	Power Regulation	Variable speed and variable pitch
(vii).	Rated power at	9.3 m/s(static, air density = 1.225 kg/m^3)
(viii).	Cut-in Wind Speed	3.0 m/s
(ix).	Cut-out Wind Speed	22 m/s
(x).	Survival Wind Speed	37.5m/s (10 mins average) 52.5m/s (3 seconds average)
(xi).	Hub Height	90 m
(xii).	Pitch Regulation	Independent Electrical Pitch control system, belt transmission, one for each blade.
(b).	**Blades**	
(i).	Number of Blades	3 Each
(ii).	Blade Length	59.5 m
(iii).	Material	Glass Fiber reinforced resin
(iv).	Weight	14200kg (per piece)
(c).	**Generator**	
(i).	Power	2500 KW
(ii).	Voltage	690 V
(iii).	Type	PMDD Synchronous Generator
(iv).	Speed	Range:7-15.5rpm; Speed at rated power:13.5 rpm
(v).	Enclosure Class	IP 54
(vi).	Coupling	No coupling
(vii).	Efficiency	92.7%
(viii).	Weight	55400 Kg

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(ix).	Power Factor	±0.95 (Leading to Lagging)
(d).	**Yaw System**	
(i).	Yaw Bearing	Fixed system : outer slew bearing ring Rotating system :inner ring of the slew bearing
(ii).	Brake	7 pairs of braking pads Fixed system : static brake disc Rotating system :hydraulic brakes
(iii).	Yaw Drive	4 induction drive motors
(iv).	Speed	0.316 degrees/Sec
(e).	**Control System**	
(i).	Type	Microprocessor Controlled, DFÜ (SCADA)
(ii).	Grid Connection	Full power converter automatically synchronization
(iii).	Scope of Monitoring	Central monitoring and remote monitoring system
(iv).	Recording	The SCADA system is integrated into the turbine through the main controller. Normal operation, safety protection, fault inspection and handling, operation parameters setting and data recording
(f).	**Brake**	
(i).	Design	3 Aerodynamic brakes for each blade
(ii).	Operational Brake	Aerodynamic brake
(iii).	Secondary Brake	Hydraulic brake (only for maintenance)
(g).	**Tower**	
(i).	Type	4 section tubular steel tower
(ii).	Hub Heights	90m

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(D). Other Details

(i).	COD of the generation facility/Wind Power Plant/Wind Farm	December 31, 2019 (anticipated)
(ii).	Minimum Expected Useful Life of the generation facility/Wind Power Plant/Wind Farm from COD	25 Years

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Power Curve
of Wind Turbine Generator (WTG) of Goldwind GW121-2.5 MW (in Tabular Form)

Wind [illegible] hub [illegible])	[illegible]er (kW[illegible]
3.0	63
3.5	113
4.0	188
4.5	279
5.0	384
5.5	513
6.0	666
6.5	876
7.0	1114
7.5	1365
8.0	1640
8.5	1904
9.0	2181
9.5	2428
10.0	2494
10.5	2520
11.0	2530
11.5	2538
12.0	2545
12.5	2550
13.0	2550
13.5	2550
14.0	2550
14.5	2550
15.0	2550
15.5	2550
16.0	2550
16.5	2550
17.0	2550
17.5	2550
18.0	2550
18.5	2550
19.0	2550
19.5	2550
20.0	2550
20.5	2550
21.0	2550
21.5	2550
22.0	2550

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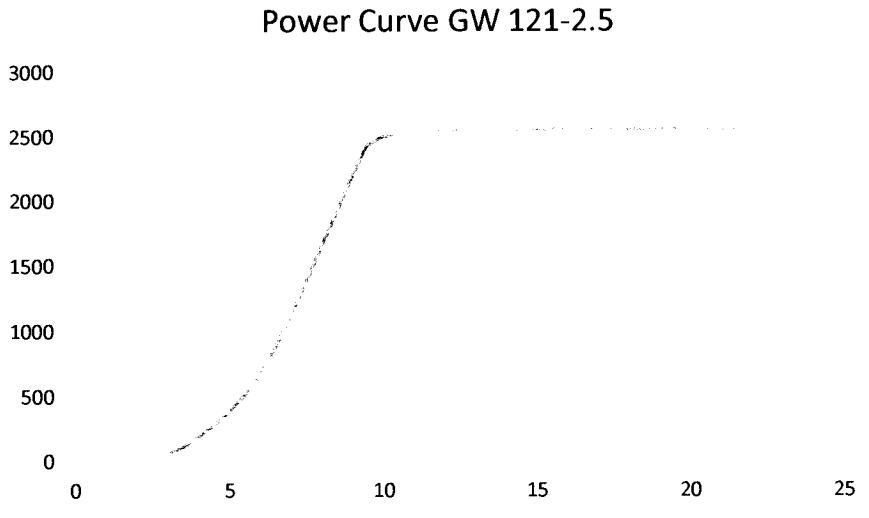
Power Curve
of Wind Turbine Generator (WTG) of Goldwind GW121-2.5 MW (in Graphical Form)



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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

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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 Hrs
(3).	Average Wind Turbine Generator (WTG) Availability	97.0 %
(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	4.72GWh
(7).	Balance of Plant Losses GWh	3.14 GWh
(8)	Annual Energy Generation (25 year equivalent Net AEP) GWh	153.3 GWh
(9).	Net Capacity Factor	35.00 %

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).

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