Arab Republic of Egypt
The Cabinet of Ministries
Ministry of State for Environmental Affairs
Egyptian Environmental Affairs Agency

Fill out this form accurately and clearly and take the responsibility for authenticity of data therein, provided that the administrative body authorize it and send a copy of the form to the apparatus for review and opinion. Any inspection reports or other additional attachments can also be used.

Environmental Impact Assessment – Scoped Form (B)

1. General Information

1.1 Name of Project:

262.5 MW Wind Power Project at Gulf of Suez, owned by Ras Ghareb Wind Energy S.A.E. (RGWE), Ras Ghareb, Gulf of Suez.

1.2 Project Type: Energy

1.3 Project Address:

The aforementioned project area is located on the western bank of the Gulf of Suez, 120 km North of Hurgada city and 10 to 15 km to the West Hurgada-Suez Road. The distance by road to Cairo city is about 350 km. The area is about 20 km away from Ras Ghareb. It is partly located in the West of wind parks already under development such as a Japanese financed wind park of 220 MW and a private developed wind park of Italgen, an international cement prodcution company, approximately 100 MW in the south-east.

Table 1. RGWE project plot coordinates

Point	Coordinates	
1	N 28º 10'38.02"	E 33º 2'9.86"
2	N 28º 13'39.53"	E 33º 0'26.32"
3	N 28º 10'48.65"	E 32º 57'13.48"
4	N 28º 8'28.42"	E 32º 59'44.58"

The following figure illustrates the location of RGWE project location from satellite view

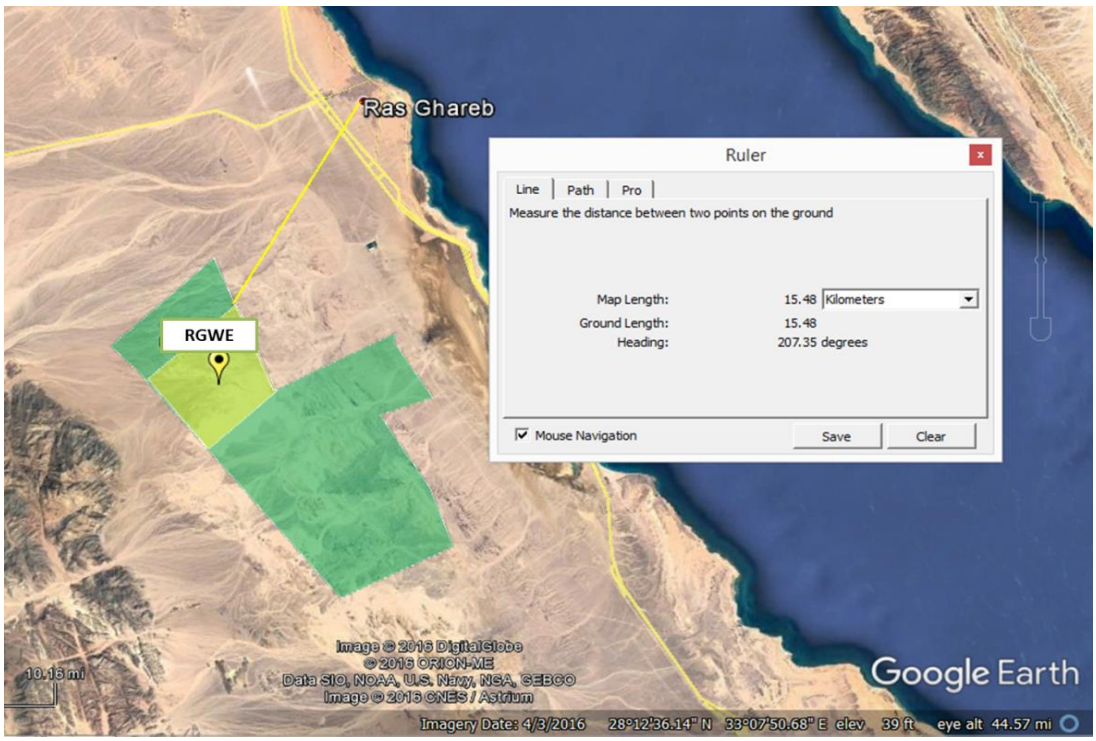

Figure 1 . RGWE project location , Gulf of Suez

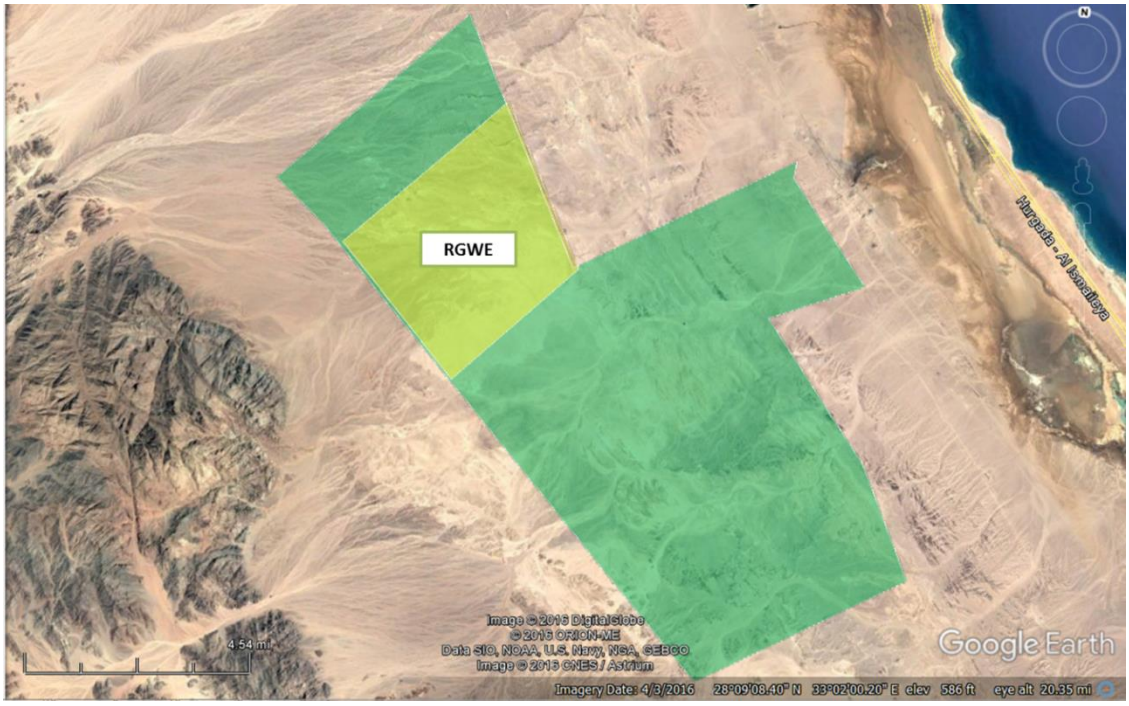

Figure2 . RGWE location for neighboring stations

The project is to utilize wind's kinetic power to generate electric power with a capacity of 262.5MW to be connected to the national grid. The proposed wind farm consists of the following main components:

- **Wind Turbine:** The most important component on a wind farm. This device converts the kinetic power of the wind into electric energy. The main components of a wind turbine are:

1. Tower and foundation
In order to guarantee the stability of a wind turbine a pile or flat foundation is used, depending on the consistency of the underlying ground.

The tower construction doesn't just carry the weight of the nacelle and the rotor blades, but must also absorb the huge static loads caused by the varying power of the wind. Generally, a tubular construction of concrete or steel is used. An alternative to this is the lattice tower form.

The foundation anchors the wind turbine to the ground.

2. Rotor and rotor blades
The rotor is the component which, with the help of the rotor blades, converts the energy in the wind into rotary mechanical movement.

Currently, the three-blade, horizontal axis rotor dominates. The rotor blades are mainly made of glass-fibre or carbon-fibre reinforced plastics (GRP, CFRP). The blade profile is similar to that of an aeroplane wing. They use the same principle of lift: on the lower side of the wing the passing air generates higher pressure, while the upper side generates a pull. These forces cause the rotor to move forwards, i.e. to rotate.

3. Nacelle with drive train
The nacelle holds all the turbine machinery. Because it must be able to rotate to follow the wind direction, it is connected to the tower via bearings. The build-up of the nacelle shows how the manufacturer has decided to position the drive train components (rotor shaft with bearings, transmission, generator, coupling and brake) above this machine bearing.

a) Gearbox

The gearbox converts the rotor motion of 18-50 rpm into the approx. 1,500 rpm which the generator requires. The gearbox thus takes on the task of matching the rotation speeds of the slow-moving rotor and the fast-moving generator, and generally has several steps to cover for various wind conditions. If a specially developed multi-pole ring generator is used, the gearbox is no longer required.

b) Generator

For high power wind turbines, doubly-fed asynchronous generators are most frequently used. Here, the operating rotation speed can be varied somewhat, unlike when using conventional asynchronous generators. Another concept uses synchronous generators. A grid connection of synchronous generators is only possible via transformers, due to the fixed rotation behavior. The disadvantage of requiring complicated control systems is countered by the overall efficiency and better grid compatibility.

c) Coupling and brake

Because of the enormous torque, the coupling between the main shaft and the transmission is a rigid one. The type of brake depends on the control mechanism for the blades.

4. Electronic equipment

The electronic equipment of a wind turbine is composed of the generator (see above), the system for the grid infeed of the electricity, and various sensors. The sensors for measuring temperature, wind direction, wind speed and many other things can be found in and around the nacelle, and assist in turbine control and monitoring.

5. Other components

Finally, the wind turbine contains components for following the wind direction, for cooling, heating and lightning protection, as well as lifting gear (e.g. winches for spare parts) and fire extinguishing equipment.

- **Other components of the wind farm:**

  Such as electric and/or electromechanical system components, such as cables, inverters, transformers, switchgear and controls are used to control and condition the power output of the solar field.

- **Connection to the grid:**

  Routing energy generated from solar field to the national electricity grid.

Wind turbine Technology

Renewable energies avoid the pollutant emissions that are the result of conventional thermal power generating stations which may release large volumes of sulphur dioxide, oxides of nitrogen and carbon dioxide (CO_2). A key argument for wind power and solar power is the avoidance of CO_2, the most common greenhouse gas. Wind turbine technology selected for the Project consists of the following components:

Wind turbine	Gamesa G97-2.1MW Maxpower
Rotor diameter	97 m
Hub height	71.5 m
Blades	47.5 m
Wind speed in operation (rmp)	9 : 19
Increased power by generator	2.0MW WTG to 2.1MW WTG is +5%.
Transformer	three-phase, dry encapsulated, with different output voltage options between 6.6 kV and 35 kV
Model of the Converter	ABB AF2X50 or EATON DILH2XXX
Control System	PLC-based system (Programmable Logic Controller)
Management system	Gamesa WindNet®,
Lightning Protection System	Maximum protection level Class I in accordance with standard IEC 62305. IEC 61400-24 and IEC61024
Wind Sensors	1 2D ultrasonic anemometer with simultaneous speed and direction measurement +1 cup anemometer and wind vane

1.4 Name of the owner of the project:
Ras Ghareb Wind Energy S.A.E. (**RGWE**), Ras Ghareb, Gulf of Suez.

1.5 Name of the person in charge:
Name: Khaled El Degwy
Phone Number: +202 2461 1212
Email: Khaled.eldegwy@orascom.com

Form prepared by: EcoConServ Environmental Solutions

oN	Name	responsibilities
1	Dr. Tarek Genena	General Supervision
2	Chem. Fakhry Abdel Khalek	Study supervisor and Auditor
3	Eng. Emad Raouf	- Project description and facilities. - Environmental impacts assessment, alternative analysis and pollution reduction. - Pollution prevention. - Preparation of self-monitoring programme.
4	Ms. Hend Keseby	- Project description and facilities. - Environmental impacts assessment, alternative analysis and pollution reduction. - Pollution prevention. - Preparation of self-monitoring programme.
5	Ms. Zeinab Hafez	Social studies and consultation with concerned authorities.

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1.6 Licensing Body: New and Renewable Energy Authority

1.7 Nature of Project: New

1.8 Is the project located within a wider development: Yes

The site is owned by NREA and divided into different plots for wind farms projects. The proposed 38.900 km^2 project site lies within the Suez governorate administrative borders. The area designated for the project is part of a larger area (220 Km^2) desert land.

- **Has there been a study for environmental impact assessment been prepared of this development?)** Yes

A strategic environmental and social impact assessment for Ras Ghareb power plant has been prepared, reviewed and approved by Egyptian Environmental Affairs Agency.

2. <u>Project Information:</u>

2.1 The total area of the project (km^2):

The proposed 38.900 m^2 project site lies within the Suez governorate administrative borders. The area designated for the project is part of a larger area (220 Km^2) desert land owned by NREA. The site is divided into different plots for wind farms projects.

Total area of project buildings (Km^2): No permanent buildings will be constructed in the project area, rather special designated caravans for monitoring and storage will be used during construction and operation phase

2.2 Primary Product: Electricity generation using wing energy

2.3 Secondary Product: Does not exist

2.4 Project place and location:
Annex No (4): General description of project location from all direction, illustrating the location boundaries in relation to nearby activities, developments, land uses and roads.

2.5 The distance between the site and the nearest residential block:
Ras Ghareb city is located circa 19.5 km southeast of the RAS GHAREB WIND ENERGY S.A.E. (RGWE)'s project. At the 2006 Egyptian national census, the population numbered 32,369.

2.6 Nature of the area where the project is located: Desert Area

2.7 General description of project area:
Annex No. (6): Description of environmental, biological, social and cultural baseline of project location

2.8 Available Infrastructure:

- Water Network: Not Available
- Electricity Network: Not Available
- Sewage Network: Not available
- Road / railway network: Available (access road)
- Source of fuel: Available (fuel station is nearby)

2.9 Proposed alternatives to the project site:
Annex No.(7): Detailed description of all projects alternatives

<u>3. Description of project phases:</u>

3.1 Construction phases:

Construction Date: construction of RGWE project is scheduled to start in second quarter of 2017 (April 2017) and to be completed in second quarter of 2019.

Timetable for execution: 24 months.

3.1.1 Brief description of the activities during construction phases:
The construction phase of the project will include activities such as:

- Construction/improvement of internal access roads
- Levelling the ground if is required

- Installation of inverters/transformers
- Excavation, trenching and cable laying
- Placing the wind turbines
- Construction of buildings such as warehouse, workshop, and guard house
- testing and commissioning of equipment and the project as a whole
- Site clean-up.

Typical works to be carried out for wind power projects are limited to:

- **Earth works**: Excavation, backfilling and compaction works for road and platform construction as well as for foundation pits and trenches. Typical equipment used on the construction site are excavators, front-loaders, graders and compactors. No material will be taken from or to the area.
- **Concrete works for foundations**. As no water will be available at the site it is expected that ready mix concrete will be used. Otherwise aggregates and water will have to be brought to the site for concrete making in Contractor's batching plant.
- **Wind turbine installation works** using large mobile lifting capacities.

- **Water Sources:** Water will to be brought to the site using water trucks.
- **Uses: Construction activities and human uses**
- **Expected employment and places of residence:** About 250-350 workers, and there will be no need to establish a construction accommodation camp near project location since most permanent staff is likely to live locally and should be sourced on the basis of non-discrimination. Labor and working conditions covering the full suite of employment issues from contractual terms and setting wages needs to be fully considered and applied in a consistent manner between all developers and their contractors.

3.1.2 Waste resulting from construction and how to get rid of it:

- **Solid waste:** Produced as a result of construction activities

  Type: Soil waste during excavation work and construction waste

  Quantity: Moderate amount

  Disposal method: An adequate space in the project location will be allocated to temporary accommodate the waste (twice a week) or it will be in other locations that will be agreed with the local concerned authorities of the governorate.

  - **Liquid residues:** Produced as a result of construction activities

  Type: Human wastewater from the sanitary facilities established in the site

  Quantity: 6.201 ton/month

Disposal method: An adequate space will be allocated to establish special septic tanks designated to temporary accommodate waste water and then it will be transported and disposed of.

Gaseous emissions (smoke – smell – particle materials): Gaseous emissions and suspended particles are expected to exist in the working area as a result of ground operations and land leveling. However the

emissions will not exceed the legal limits by law as the construction site is in open deserted construction area

Noise:
The nearest sources of man-made noise emission sources are:

- A singular case of smaller noise emissions caused by the operation of a water pump at a distance of about 4,000 m to the palm-thatch huts of the Bedouin family.
- Wind farm operation sites that are located at around 14 km from the southern border of the studied area.
- Wind farm under construction at around 17 km from the southern border of the studied area.
- In the absence of regular car traffic inside or nearby the area (the coastal Hurghada – Suez road is at a minimum distance of 13.2 km from the eastern border of the project area) and other human activities there is no significant man-made background noise that need to be considered.

As part of the mentioned survey, the noise propagation from the wind park was checked by a standard wind park modelling programme. The calculation was exemplarily carried out using the noise calculation standard ISO 9613-2, Germany and a typical 2 MW configuration with the Vestas V80, 67 m hub height and the highest noise emission level at full load being 106.4 dB(A). For the calculation a condensed wind park configuration was used to consider an accumulation of noise levels. The configuration used is just exemplary and does not consider siting restrictions resulting from the environmental assessment.

The results of the ambient noise level of 50.8 dB (A) is already achieved at distances of 250 m around the wind turbines. Thereby, the impact of the noise generates is negligible due the nearest settlement is circa 4 km away of the southern part of the RAS GHAREB WIND ENERGY S.A.E. (RGWE) wind farm. This distance is considered to be sufficient to assure a noise level being below the required 50 dB (A).

- **Others:** Air Quality

Due to the desert character of the area the level of dust and fine sand content in the air is quite high in case of high wind speeds, e.g. 15 m/s and more. Outside the eastern part of the project area, sulphate containing flare gases from Egyptian General Petroleum Corporation (EGPC) exploration/production wells cause acidic emissions to the surroundings. However, as 98 % of the wind is blowing from or parallel to the project area there should be almost no impact on the project area.

The desert soil contains significant concentration of salt, which is taken by stronger winds. Moreover, about 10 % of the wind is coming from the northern sector and has absorbed salt, when passing the Gulf of Suez at a distance of about 10 to 20 kms. High variation of the daily temperature can cause condensation during early morning times out of the salt containing air.

Accordingly the environment has to be classified having a high corrosion level (C4, ISO12944-2).

3-2 operation phase:

3.2.1 Detailed description of the operation phase (attached forms or illustrations)

- **Main components of the project**: The life span of power plant is approximately 20 years

- Once the facility is complete and operational, it is expected that it will have a lifespan of approximately 20 years. Day to day facility operations will involve both regular on site preventive and corrective maintenance tasks in order to keep the power plant in optimal working order throughout the operational period. The preventive maintenance follows a routine service schedule aimed at preventing faults from occurring and keeping the plant operating at its optimum level. The frequency of the preventive maintenance depends on a number of factors such as the technology selected, environmental conditions of the site, warranty terms and seasonal variances. It contains for example activities like wind turbines maintenance, inverter servicing and checks on structural integrity of the mounting structure. Corrective maintenance is carried out in response to failures, for example the repair/exchange of damaged or faulty equipment.
- Job opportunities will arise during the operation phase, including skilled and semi-skilled labor (such as electrical and mechanical technicians) and unskilled labor (such as maintenance laborers and security personnel) for the duration of the project lifespan.

- **Water sources:** The water will be manageable and could even be brought in by tanker.

Attach a description of the activities and operations for each component of the project supported by illustrations of the sequence of activities and operating maps showing inputs and outputs of each component and their quantities:

Annex No. (3): Full description of project components and activities.

Alternatives taken into account for inputs used, technology, design or activity distribution, etc..

Annex No. (5): Full description on all project alternatives

Expected employment and their places of residence:

It is expected to need 200 permanent workers (local employment) on site of RGWE.

3.2.2 Waste treatment and disposal:

- **Air pollutants:** Does not exist

- **Liquid waste:**

  Wastewater: RGWE will provide sanitary facility caravans and septic tanks for temporary storage of waste water.

  Discharge rate: 1.053 ton/month

  Method of disposal: An adequate space will be allocated to establish special septic tanks designated to temporary accommodate waste water then it will be transported and disposed of by a contractor in coordination with local concerned authorities of the governorate.

In case of a unit for sewage treatment: There is no any need to establish a sewage treatment plant

Industrial waste: There is no industrial waste during operation phase

- **Solid and Hazardous Waste:**

  Types of waste produced and rate of generation: It is expected to generate small amounts of solid and liquid waste from the periodic preventive maintenance operations. But it is not expected to generate any hazardous waste

  Methods of transport, handling and storage: A space for temporary storage will be allocated in accordance to the type of solid waste then transported in special vehicles for disposal in designated places in full coordination with the local authorities of the Governorate.

  Hazardous Waste Management Plan (contractor- secured landfill- other):
  - Identify and contract certified hazardous waste handling and transportation contractors.
  - Develop a hazardous waste management plan.
  - Transfer hazardous waste containers to Alexandria facilities (Nasreya or UNICO) and landfill(s).

- **Work Environment**

  Work environment indicators: RGWE S.A.E undertake to compel all the employees to abide to occupational health and safety regulations. The company will provide all employees on site with personal protection equipment such as helmets, boots and etc.

  Methods for workers protection (safety tools, gas suction systems, etc…): Workers will be required to follow occupational health and safety rules by a contractual clause in addition to the periodic inspection of the company's employees. The company will undertake to provide all the necessary personal protection equipment tools

4. Applicable Laws and Legislations:

Annex No. (1): A list of environmental laws applicable to the project with identifying aspects defined by legislation and number of Articles.

5. Environmental Impact Assessment (EIA):

Annex No. (6): Attach an analysis of the likely environmental impacts of the project in both phases of construction and operation, which may include effects on the quality of air, soil or surface water and groundwater or biological environment, social life, infrastructure and nearby activities etc.

6. Environmental management plan to mitigate environmental impacts:

Annex No. (7): Environmental and Social Management Plan to mitigate project impacts and it includes description of mitigations and monitoring programs and determine the responsibilities necessary for the application of mitigation and monitoring procedures

6. Attachments:

Please fill in the following table, which shows the list of annexes, with attaching the required documents and explaining the reason for not attaching it. (Other annexes can be also added as needed)

Serial No.	**Annexes**	**Attached? Y / N**	**Reason for non-attachment**
1	EEAA approval on the EIA for the original project (in case of expansions)	No	No expansions
2	Copy of the project license (in case of expansions)	No	No expansions
3	EEAA approval on the environmental impact assessment for development (in case the project falls in a wider development)		
4	General description of the project site with a map of appropriate scale	Yes Annex No.(2)	
5	General description of the project area	Yes Annex No.(3)	
6	Description of project activities with attached illustrations	Yes Annex No.(3)	
	Environmental and social baseline description in projection location	Yes Annex No.(5)	
7	Analyses of expected gas emissions	Does not exist	NA
8	Specifications of the treatment unit for sanitary and / or industrial sewage	Does not exist	NA
9	List of environmental laws and regulations	Yes Annex No.(1)	
10	Environmental Impact Assessment	Yes Annex No.(6)	
11	Environmental and Social Management Plan	Yes Annex No.(7)	

Declaration by the Form Applicant

I, the undersigned, declare that the above data is true and correct. In case of any modifications in the information received, the EEAA will be notified of by the licensor in a timely manner.

Name of Project Owner: **RAS GHAREB WIND ENERGY S.A.E. (RGWE)**

Name of Person in Charge: Khaled El Degwy

Phone Number: +202 2461 1212

Address:

Date:

Information to be completed by the competent administrative authority or licensor

Authorization of the administrative body:

Name: ----------

Title : ----------

Signature : ----------

Seal, Emblem of the republic