Project design document form
(Version 11.0)

BASIC INFORMATION	
Title of the project activity	Ras Ghareb Wind Energy Project
Scale of the project activity	☒ Large-scale ☐ Small-scale
Version number of the PDD	06
Completion date of the PDD	14/10/2020
Project participants	Ras Ghareb Wind Energy SAE (RGWE) Egyptian Electricity Transmission Company (EETC) Egyptian Environmental Affairs Agency (EEAA)
Host Party	Egypt
Applied methodologies and standardized baselines	ACM0002 - Grid-connected electricity generation from renewable sources
Sectoral scopes	01 - Energy industries (renewable - / non-renewable sources)
Estimated amount of annual average GHG emission reductions	730,788 tCO_2e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

The Ras Ghareb Wind Energy project (here after also referred to as “Project”) has an installed capacity of 262.5 MW. The Project is a Non-Conventional Renewable Energy (NCRE) generation plant that will be developed in Ras Ghareb on the Gulf of Suez, Egypt, by an Independent Power Producer (IPP). The project is an alternative to dispatching existing and developing new, fossil fuel based and greenhouse gas (GHG) intensive, power generation plants connected to the electricity grid (the baseline situation). The substitution of the generation of more GHG intensive electricity will lead to GHG emission reductions that will be monitored during the lifetime of the project activity.

This project activity is a voluntary initiative of the project participants and Ras Ghareb Wind Energy SAE (RGWE) as the Project Developer. The relation between the Project Participants is based on a tender for the right to build, own and operate the project based on a Power Purchase Agreement with EETC. Ras Ghareb Wind Energy SAE, which is a consortium of ENGIE (France), Toyota Tsusho – Eurus (Japan) and Orascom Construction (Egypt), submitted a successful proposal and was awarded with the right to develop the project. The RGWE project will be connected to Egypt’s national grid and all its energy will be sold to EETC based on the tariff established by the auction process. The project achieved financial close on 14 December 2017, which is the date where construction agreements were enacted, and is expected to reach full commercial operations around 24 months later.

The project boundary includes the project power plant and each of its power units and all power plants/units physically connected to the same electricity grid that the power plant is connected to. The RGWE project is aligned with Egypt’s governmental policies to increase NCRE generation to 30% of total energy demand by 2035. To pursue this objective and the resulting GHG mitigation, Egypt has enacted diverse incentives and promotional policies and is planning to establish a national, or even regional, carbon market to attract foreign direct investment.

The Project will contribute to Egypt's sustainable development in several ways:

- Environmental: The proposed project will help mitigate local pollution caused by air emissions from thermal power plants that would have provided the same amount of power in the absence of the project activity. The proposed project will provide electricity without the generation of any local pollution.

- Economic: The proposed project will enable the country to save natural gas and/or fuel oil (LFO) that would otherwise be combusted for power generation. It will also contribute to the diversification of energy sources for the country.

- Social: The proposed project will create new job opportunities and enhance both technology transfer and public awareness of renewable energy technologies, specifically wind power generation.

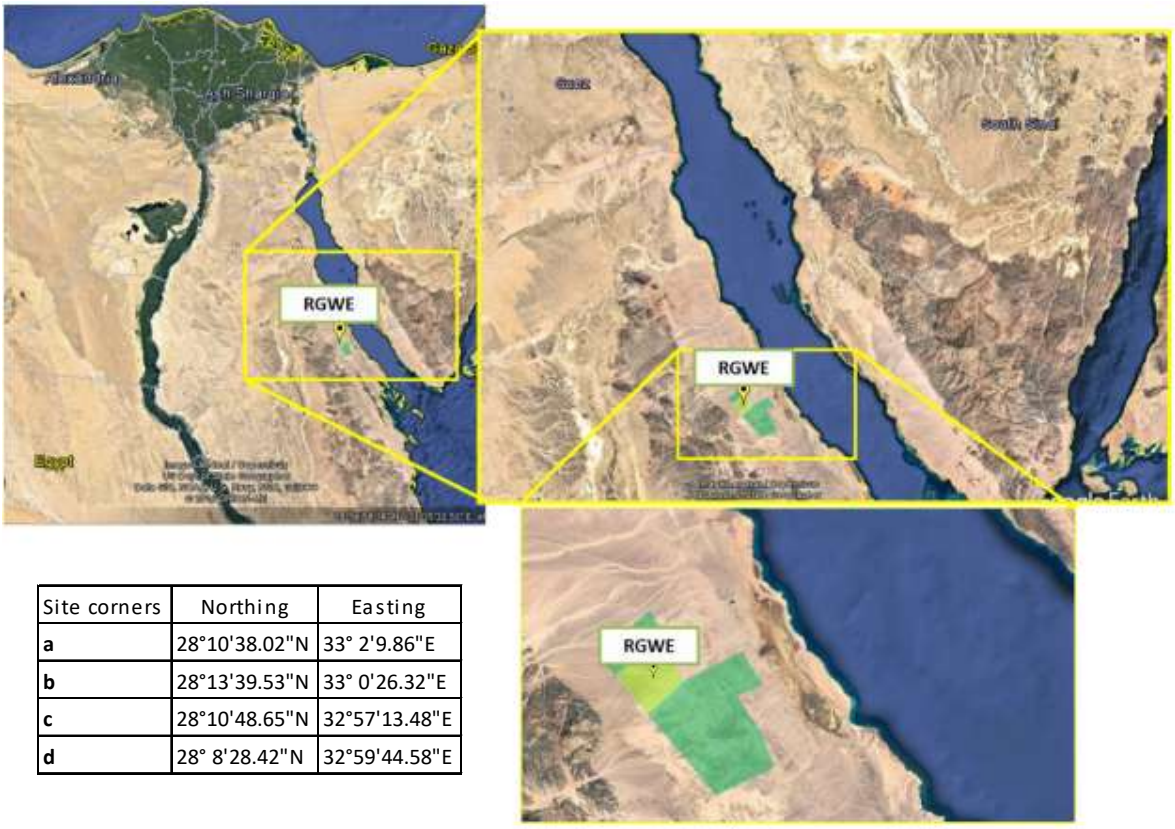
Estimates of GHG emission reductions for the chosen crediting period: Annual average = 730,788 tCO_2e; Total for the crediting period = 5,115,516 tCO_2e.

The entity responsible for developing the PDD, including baseline determination, methodological choices and application of the CDM rules and regulations is **EcoSecurities. Contact details: www.ecosecurities.com or info@ecosecurities.com**.

Name	Role
Mr. Pablo Fernandez	Project Manager
Mr. Thiago Viana	CDM Specialist
Mr. Philipp D. Hauser	Technical Reviewer
Mr. Amr Osama	Local Expert

A.2. Location of project activity

The project area is located on the western bank of the Gulf of Suez, 120 km in the North of Hurgada Province 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 District, the northernmost of the municipalities in the Red Sea Governorate on the African side of the Gulf of Suez, from the Arab Republic of Egypt.



Site corners	Northing	Easting
a	28°10'38.02"N	33° 2'9.86"E
b	28°13'39.53"N	33° 0'26.32"E
c	28°10'48.65"N	32°57'13.48"E
d	28° 8'28.42"N	32°59'44.58"E

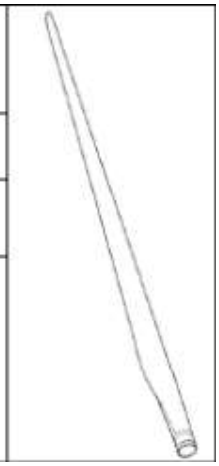
A.3. Technologies/measures

The plant consists of 125 wind turbines model G97, with 2.1 MW of installed capacity each located along the project area. The equipment will be manufactured by Siemens Gamesa Renewable Energy (SGRE), a German/Spanish company.
The expected technical characteristics of the project activity power plant is the following:

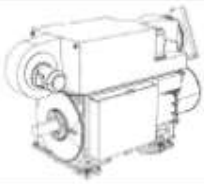
Rotor:

Wind turbine	G97
Rotor diameter (m)	97
Swept area (m^2)	7389.8
Wind speed in operation (rpm)	9 : 19

Blades:

Material		Composite material with fiberglass, carbon fiber and preimpregnated.	
Length (m)	G97	47.5	
Blade cord (maximum/minimum) (m)	G97	3.41 / 0.057	
Torsion (°)	G97	8.50	

Generator:

Type	Doubly-fed with coil rotor and slip rings	
Nominal power (kW)	2070 (stator + rotor)	
Voltage (Vac)	690	
Frequency (Hz)	50	

Siemens Gamesa Renewable Energy (SGRE), the manufacturer of the equipment, will also handle the facility's maintenance. The useful life of the Project is estimated to 20 years.
The plant is expected to have the following electricity generation pattern:

Wind Turbines Unit capacity (MW/WTG)	2.1
Total number of WTGs	125
Wind farm total installed capacity (MW)	262.5
Total expected AEP (MWh/yr) - P50	**1,379,756**
Estimated Plant Load Factor	60%

Electricity meters - main and backup (meter technical specifications described in section B.7.1) - will be installed for monitoring the electricity export to grid.

A.4. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Egypt (host Party)	Ras Ghareb Wind Energy SAE	No
	Egyptian Electricity Transmission Company (EETC)	No
	Egyptian Environmental Affairs Agency (EEAA)	No

A.5. Public funding of project activity

The proposed CDM project activity does not receive public funding from Parties included in Annex I to the Convention.

A.6. History of project activity

The proposed CDM project activity:

a) is neither registered as a CDM project activity nor included as a component project activity (CPA) in a registered CDM programme of activities (PoA);
b) is not a project activity that has been deregistered;
c) was not a CPA that has been excluded from a registered CDM PoA.

Moreover, there is no registered CDM project activity or CPA under a registered CDM PoA whose crediting period has or has not expired in the same geographical location as the proposed CDM project activity.

In addition, as stated in the CDM project activity's prior consideration form dated 19 March 2018, as submitted to the UNFCCC secretariat, the Project Developers declares its intention to adjust, adapt or transfer this project activity to any new project-based market mechanism that may arise under article 6 of the Paris Agreement or any other regulation that may be established by the UNFCCC, ICAO or other multilateral bodies. In complement to the intended use under future international carbon market arrangements as mentioned, the project activity and its emission reductions may also be accredited and used on Egypt's domestic or on regional carbon markets that are being developed. Any such transfer or use under different market mechanisms and regimes will be subject to the respective rules as well as the principles of sound accounting, best regulatory practice and transparency to avoid double counting or double use of Certified Emission Reductions or other emission reduction units.

A.7. Debundling

Not applicable

SECTION B. Application of methodologies and standardized baselines

B.1. References to methodologies and standardized baselines

The following methodology is applicable to the project activity:

Category	Sectoral Scope	Title	Version
ACM0002	01	Grid-connected electricity generation from renewable sources	20.0

The following accessory documents are used in order to apply the main methodology above:

Reference	Title	Version
TOOL01	Tool for the demonstration and assessment of additionality	7.0.0
TOOL05	Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation	03.0
TOOL07	Tool to calculate the emission factor for an electricity system	7.0
TOOL24	Common practice	3.1
TOOL27	Investment analysis	10.0
GLOSSARY	CDM terms	09.1
PROCEDURE	CDM project cycle procedure for project activities	02.0
STANDARD	CDM project standard for project activities	02.0

The large-scale methodology as well as all the tools can be found at the UNFCCC website below: http://cdm.unfccc.int/methodologies/PAmethodologies/approved.

B.2. Applicability of methodologies and standardized baselines

The project type, i.e. the installation of a large-scale greenfield grid connected wind power plant for renewable electricity generation, is fully applicable to all conditions listed in the documents used for reference, according to methodologies/tools and respective versions mentioned in the section above.

Standardized baselines were not applied.

Please see Appendix 3 for the detailed list of applicability conditions and comments on how each specific condition is being met.

B.3. Project boundary, sources and greenhouse gases (GHGs)

According to ACM0002, the spatial extent of the project boundary includes the project power plant/unit and all power plants/units connected physically to the electricity system that the CDM project power plant is connected to.
Thus, this project boundary is the site of the project activity, where wind energy is used to generate renewable electricity, measured as $EG_{facility}$, and includes all the plants connected to Egypt's national grid, for the purpose of calculating the grid emission factor $Ef_{grid,CM}$.

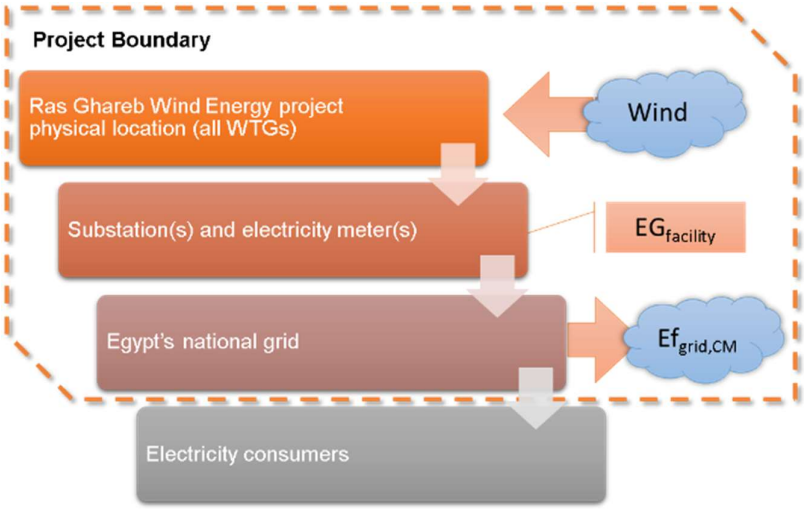


Figure: Schematic representation of the project boundary

	Source	GHG	Included?	Justification/Explanation
Baseline	CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
Project activity	For dry or flash steam geothermal power plants, emissions of CH_4 and CO_2 from non-condensable gases contained in geothermal steam	CO_2	No	Not Applicable. The project consists of a wind power plant.
		CH_4	No	
		N_2O	No	
	For binary geothermal power plants, fugitive emissions of CH_4 and CO_2 from non-condensable gases contained in geothermal steam	CO_2	No	
		CH_4	No	
		N_2O	No	
	For binary geothermal power plants, fugitive emissions of hydrocarbons such as n-butane and isopentane (working fluid) contained in the heat exchangers	CO_2	No	
		CH_4	No	
		N_2O	No	
	CO_2 emissions from combustion of fossil fuels for electricity generation in solar thermal power plants and geothermal power plants	CO_2	No	
		CH_4	No	
		N_2O	No	
	For hydro power plants, emissions of CH_4 from the reservoir	CO_2	No	
		CH_4	No	
		N_2O	No	

B.4. Establishment and description of baseline scenario

The project type, i.e. the installation of a large-scale Greenfield grid connected wind power plant for renewable electricity generation, follows the methodology ACM0002 for the definition of the baseline scenario. Therefore, the baseline scenario is, as stated by ACM0002:

> *If the project activity is the installation of a Greenfield power plant, the baseline scenario is **electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources**, as reflected in the combined margin (CM) calculations described in "TOOL07: Tool to calculate the emission factor for an electricity system".*

Currently (based on year 2016/17), prior to project implementation, the total national grid installed capacity was equivalent to 45,008 MW, of which 6% are hydropower plants and 2% are other renewable energy plants (mostly wind, with a small amount of solar). Fossil fuel thermal generation represents the dominant source of power generation with a total of 92% of total installed generation capacity.

Based on Egypt's Integrated Sustainable Energy Strategy (ISES) to 2035, the power generation mix shall evolve to a situation where the share of fossil fuel based thermal power generation (coal, natural gas and oil plants) is reduced and renewable technologies (including solar, wind, nuclear and hydro capacities) increase their share. The government's latest targets call for 20% of Egypt's power generation to be based on renewables by 2022, and 42% by 2035 (IRENA, 2018). Wind power specifically will represent, according to this plan, around 14.6% of the energy mix in 2035.

Details on the calculation of the grid emission factor and related assumptions following TOOL07 are described in section B.6.1.

B.5. Demonstration of additionality

According to the CDM Project Standard, the project participants shall demonstrate, in accordance with the applied methodologies and the requirements relating to prior consideration of the CDM, that the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the proposed CDM project activity.

According to the CDM glossary of terms (as indicated in the Project Standard), for a CDM project activity, "*the start date of the project should be the date on which the project participants commit to making expenditures for the construction or modification of the main equipment or facility (e.g. a wind turbine). Where a contract is signed for such expenditures (e.g. for procurement of a wind turbine), it is the date on which the contract is signed.*"

The development of a large wind farm such as the RGWE project requires the negotiation and concomitant execution of several agreements. The most relevant contracts are the Wind Turbine Supply Agreement (TSA) and the Civil Works and Electrical Systems Agreement. These contracts were negotiated and signed in November 2017, but their validity was subject to the effective investment decision and the subsequent issuance of a Notice to Proceed by the Project Developer. This Notice to Proceed was issued on the 14/12/2017, which defines the commencement dates of these agreements and thus represents the start date for the project activity (please see section C.1 - Start date of project activity), with an expected construction period of 24 months.

As indicated by the Project Cycle Procedure, the Project Developer has 180 days of the start date of the project activity to communicate the intention of seeking CDM benefits for the project. For this proposed project activity, this limit date would be 12/06/2018. The project participant has notified the commencement of the project activity and their intention to seek the CDM status for the project activity to the UNFCCC secretariat and to the Designated National Authority (DNA) of Egypt, in

attention to the Manager of the CDM Department, Egyptian Environmental Affairs Agency (EEAA) on 19/03/2018.

The Project follows the methodology ACM0002 for the demonstration of additionality. Since the project technology is not included in the positive list stated in "TOOL32: Positive lists of technologies", the additionality of the project activity shall be demonstrated and assessed using the latest version of the "TOOL01: Tool for the demonstration and assessment of additionality". The detailed application of TOOL01 is described below.

Step 0 – Not applicable

This step is optional. If it is not applied, it shall be considered that the proposed project activity is not the first-of-its-kind. The project is not a first of its kind in Egypt, thus, Step 0 is not applicable.

Step 1 – Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a: Define alternatives to the project activity

Scenario 1: continuation of the current situation (no project activity or other alternatives undertaken). This scenario is equivalent to the baseline situation where ***electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources.***

Egypt uses a mix of generating technologies currently dominated by thermal generation and possesses significant reserve of primary energy resources (e.g. Oil and Gas). Moreover, the fact that all plants in the build margin (as summarized in Appendix 4), are fossil fuel fired power plants and have been commissioned between 2013 and 2017 demonstrates the natural tendency to continue the expansion of fossil fuel powered generation units to satisfy growing energy demands. Since then, other fossil fuel powered projects have been commissioned and are being developed.

Thus, the continued operation of grid-connected power plants and the addition of new generation sources is equivalent to the non-implementation of the Project and represents a reasonable scenario that will be further assessed in the next steps.

Scenario 2: proposed project activity undertaken **without being registered as a CDM project activity.**

The proposed project activity is the result of an innovative arrangement to attract international investments for the expansion of wind power generation. To attract such investors, the *New and Renewable Energy Authority* (NREA), a state entity that is responsible for the promotion of renewable energy investments, has developed a large area for wind developments. Part of this area has been awarded as a concession to RGWE. The area for the proposed project is therefore designated and suitable for the development of the project activity or other wind power plants. However, RGWE, as an Independent Power Producer (IPP), has the option but not the obligation to implement the project. The fact that IPP investments are an innovative form for promoting power generation investments is demonstrated by the fact that the historical portion of electricity provided by IPPs in the national electricity grid, as shown by table Electricity Generation for the past 5 years (page 22), is only around 0.02%. Therefore, even with the IPP scheme existing for some years now, the proportion of electricity being provided by this type of enterprise is very small. Now in spite of this observation, the hypothesis that the wind power plant could be implemented without registration as a CDM project is a reasonable scenario and will be further assessed in the next steps.

Scenario 3: Other Power Generation technology. This alternative is equivalent to **other realistic and credible alternative scenario to the proposed CDM project activity scenario that deliver outputs services or services with comparable quality, properties and application areas.**

RGWE, as an Independent Power Producer (IPP), has the option but not the obligation to implement the project. Given the baseline definition from ACM0002, this scenario would be similar to the ***"addition of new generation sources"*** and, thus, this alternative does not need to be assessed.

Therefore, the realistic and credible alternatives available to the Project Developer comparable with the proposed CDM project are the following scenarios:

1) Continuation of the current situation;

2) The proposed project activity undertaken without being registered as a CDM project activity;

Sub-step 1b: Consistency with mandatory laws and regulations

There are no laws or regulations preventing any investment or installation of a renewable electricity generation plant on the location or obliging the Project Developers to implement the project activity. Therefore, there is no legal restriction either to build or not to build the proposed power plant. Nevertheless, there are several policies that seek to address barriers and obstacles to the development of renewable energy plants in order to expand carbon neutral power generation.

According to the Renewable Energy Outlook for Egypt developed by the International Renewable Energy Agency (IRENA)[1], Egypt adopted its first renewable energy strategy in 1982. The target was to increase the share of renewable energy generation to 5% by year 2000. However, this target could not be reached.

In February 2008, following the emergence of the energy supply/demand gap in 2007, Egypt's Supreme Energy Council (SEC) established a new target. The objective was to source 20% of generated electricity from renewable energy sources by 2022. The SEC planned to meet its ambitious targets through the deployment of a variety of renewable energy sources, including 12% wind, 2% solar and 6% hydropower (IRENA, 2018).

To realize these targets, the intention was that the majority of the necessary new renewable energy installation should be implemented by the government, with the remainder by the private sector. Unfortunately, by January 2011, it was apparent that Egypt's political and economic instability would not allow meeting the established renewable energy targets (IRENA, 2018).

In January 2013, the Government of Egypt thus started developing a new 20-year strategy, the Integrated Sustainable Energy Strategy (ISES) to cover the period from 2015 to 2035. The project was funded by the European Union and implemented in co-operation with all relevant national partners. In October 2016, the SEC agreed to a new energy strategy for Egypt, approved with the Technical Assistance to Support the Reform of the Energy Sector for Egypt (TARES) (IRENA, 2018)[1].

The sustainable development targets for Egypt, according to IRENA 2018, as far as they relate to energy are:

Goal I – Ensuring security of supply
• The core objective is to ensure the availability of reliable energy supplies to satisfy the future development needs of the country with a more diverse energy mix. This shall be achieved with diverse investments in a range of fossil fuel based, renewable and nuclear power generation technologies. Moreover, it includes rationalizing the demand side and reforming energy subsidies without putting excessive financial costs onto citizens.

[1] https://www.irena.org/publications/2018/Oct/Renewable-Energy-Outlook-Egypt

Goal II – Ensuring sustainability
• The core objective is to achieve both the technical and financial sustainability of the energy sector: This requires ensuring a sufficient and resilient supply of diversified sources that can be utilized to deliver reliable electricity and by ensuring sufficient income that is capable to finance the necessary infrastructure as well as operating costs.

Goal III – Improving institutional and corporate governance
• The core objective is to modernize the current institutional structure of public enterprises to cater for a more commercial framework, by realigning the organizational structures of the Egyptian Electricity Holding Company (EEHC), Egyptian General Petroleum Corporation (EGPC) and their subsidiary companies, and introducing the necessary training assistance to responsible entities, along with action plans to enhance energy planning and energy efficiency.

Goal IV – Strengthening competitive markets and regulation
• The core objective is to establish an environment that can help build competitive energy markets as a key step in driving down costs and promoting market liberalization to support greater transparency and efficiency within the electricity, gas and oil markets.

The Egyptian government implemented a set of new laws and regulations to facilitate the implementation of its renewable energy targets for 2035, in line with the ISES as described above. The key laws and regulations behind this national energy transition are summarized below.

Renewable Energy Law (Decree Law 203/2014)	To endorse the creation of a promising economic environment for a major increase in renewable energy investment in the country.
Cabinet Decree No. 1947 of the year 2014 on Feed-in Tariff (1st round)	To establish the basis for the Feed in Tariffs for electricity produced from renewable energy projects and thus support such investments.
Prime Ministerial Decree No. (37/4/15/14) of the year 2015	To endorse the regulations to provide land for renewable energy projects.
New Electricity Law No. 87 of 2015	To offer legislative and regulatory frameworks that allow reaching the electricity market reform targets.
Prime ministerial decree no. 2532 of the year 2016 on Feed in Tariff (2nd round)	Modifies the prices of the electricity (FIT) generated from renewable sources, establishes the contractual period for wind projects which is 20 years and for solar energy projects is 25 years.
Investment Law No. 72 of the year 2017	▪ To confirm investment guarantees and amendments as of May 2017. ▪ To create a new arbitration center for settling disputes. ▪ To codify social responsibility. ▪ To initiate foreign investment in Egypt.

Within the regulatory framework described above, the following schemes are applied for the implementation of renewable energy projects in Egypt and are applicable to this proposed CDM project activity:

Competitive bidding

In the early 1990s, the NREA started the competitive bidding process for renewable electricity generating capacity for government projects. In 2009, EETC launched the first auctions for large-scale private projects using the BOO scheme where the NREA secured the land and data on resources. In the following years, a number of other tenders were launched by EETC: 200 MW of solar PV in 2013; 250 MW wind, 200 MW solar PV and 100 MW CSP in 2015 (Eversheds and PricewaterhouseCoopers, 2016 *apud* IRENA, 2018).

As a result of the declining cost of renewable energy sources, in 2017 Egypt moved to the auction mechanism (competitive bidding) for large-scale solar and wind projects. Auctions for large-scale solar PV projects were announced to be carried out under state-owned EPC contracts with the

NREA, or under a BOO scheme with an IPP through PPA agreements with EETC. In this regard, EETC issued a tender for a 600 MW of PV capacity in the West of Nile area in December 2017.

Other support mechanisms

The Prime Ministerial Decree No. (37/4/15/14) of 2015 was issued to allocate land for renewable energy projects through usufruct rights. In line with the decree, the government assigned about 7,600km^2 in the Gulf of Suez, east and west of the Nile, Benban and Kom Ombo regions, of which about 5,700 km^2 are for wind projects (75% share) and about 1,900 km^2 for solar energy projects (25% share).

In further support of renewable energy schemes, EETC proposed and discussed with both the NREA and the Egyptian Electric Utility and Consumer Protection Regulatory Agency (EgyptERA) a transmission code for the interconnection of wind projects. The code was approved by EgyptERA, in addition to the rules and regulations for the interconnection of solar PV systems with the low- and medium-voltage networks (IRENA, 2018).

Plans and preparations for the establishment of carbon market mechanisms[2]

in order to address the difficulty to attract investments for its GHG mitigation strategy, Egypt's NDC[3] announced the possibility of implementing a national market for carbon trading that may be developed into a regional market. In support to this objective, the European Bank for Reconstruction and Development (EBRD) has launched a project to develop an up-scaled CDM-based mechanism in the southern and eastern Mediterranean region, including Egypt, Morocco, Tunisia and Jordan. According to the EBRD's concept, the intention is to:

- Develop, implement and purchase CDM-style credits from the renewable energy sector in one or more SEMED countries.
- Contribute and support the carbon market development by reviewing the options, including domestic use of carbon credits, and developing local capacity, in particular in the area of MRV and large emission reduction project management.
- Contribute to the further development of up-scaled CDM-based carbon credit instruments, such as PoAs under the CDM or new market mechanisms.

In complement to this initiative by the multilateral development bank EBRD, the Project Participant EETC, which is Egypt's state utility that purchases the electricity of the project activity, is already positioning for the continuation of the CDM or the development of new market mechanisms. This is referenced by the fact that the PPA contains a provision that regulates responsibilities and rights to any Environmental Attributes generated by the project activity (for example CERs from CDM or any future mechanism established by the UNFCCC). According to the agreement, EETC and RGWE will cooperate to undertake all regulatory steps to achieve the necessary accreditations and registrations and share the Environmental Attributes in an equal proportion of 50% (PPA).

[2] Details are available on http://www.semedcarbonmarket.com/ and references from Carbon Pulse have been provided to the DOE

[3] Available from https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Egypt%20First/Egyptian%20INDC.pdf

Step 2 – Investment Analysis

In this step, it should be defined whether the proposed project activity is not

(a) The most economically or financially attractive; or

(b) Economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs).

Given that the project does not involve a comparison of alternatives, the Investment analysis will be based on the **demonstration of economic or financial feasibility of the project activity**, without the revenue from the sale of certified emission reductions (CERs).

Sub-step 2a: Determine appropriate analysis method

In order to determine the appropriate analysis method, the following options are available to be used in the additionality analysis:

- Option I - Apply simple cost analysis;
- Option II - Apply investment comparison analysis;
- Option III - Apply benchmark analysis

Since the CDM project activity generates economic benefits other than CDM related income (i.e. sales of electricity), the simple cost analysis (Option I) is not viable. There is no alternative scenario, other than the project activity to be compared. Therefore, the investment comparison analysis (Option II) is not recommended. **Thus, the benchmark analysis (Option III) will be used,** as this is the option that best represents the discretion of Project Developer to implement or not implement the project.

Sub-step 2b: Option III. Apply benchmark analysis

The financial/economic indicator to be used for the benchmark analysis will be the **Equity IRR.**

The IRR will be calculated based on parameters that are standard to Egypt's power market, considering the specific characteristics of the project activity, but not linked to the subjective profitability expectation or risk profile of a particular Project Developer.

The benchmark analysis is performed comparing the IRR with the benchmark.

Sub-step 2c: Calculation and comparison of financial indicators

The established benchmark for this comparison is calculated based on TOOL27 - Investment Analysis. The cost of equity was extracted from Appendix 1 from TOOL27 based on parameters that are standard in the market and valid, in real terms, for US$ denominated long-term returns. So, considering the TOOL27, Appendix, Table 1, Host Country Egypt, Group 1 (which includes Energy Industries), the reference value for the **Cost of Equity is 16.63%.**

The Internal Rate of Return (IRR), that was calculated for the project activity according to the rules and provisions of the CDM, and the benchmark are presented in the table below. As can be concluded from this comparison, the equity IRR is below the benchmark. The Investment Analysis therefore shows that the project is not economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs).

Table: Project activity IRR and the benchmark comparison in real terms

Benchmark Cost of Equity	Project Equity IRR
16.63%	10.86%

The Financial analysis calculation is available as an excel spreadsheet attached to this PDD. The input values used for this discounted free cash flow analysis, their source and a brief comment can be found in the table below.

Parameter	Total Value	Unit	Source	Comments
Installed Capacity	262.5	MW	PPA	N/A
Capex Assumption	316,789	kUSD	Due Dilligence Report	The Due Dilligence report is dated 06 December 2017 and thus compatible with the project starting sate
Equity Portion	50%	%	TOOL27	Paragraph 26 suggest the use of 50/50 Equity/Debt in case information is not readily available.
Debt Portion	50%	%	TOOL27	Paragraph 26 suggest the use of 50/50 Equity/Debt in case information is not readily available.
Cost of Debt (nominal terms)	7.50%	%	Egypt Country Bond USD	https://www.bourse.lu/security-documents/US038461AL31/246753
Inflation Rate (US$ - IMF)	2.2%	%	IMF	US$ Inflation rate as projected by the IMF
Cost of Equity (real terms)	16.63%	%	TOOL27	Value applicable to Egypt, group 1 of industries
Energy Generation	1,379.7	GWh/y	PPA	P50 value as referenced by the PPA
Electricity Price	36.8	USD/MWh	PPA	Electricity Tarrif as defined by the PPA for the 20 year project lifetime
Plant Comissioning	31.12.2019		Due Dilligence Report	Based on the projected date für plant comissioning we assume commercial energy generation as of 01 January 2020
Cashflow Period	20	years	TOOL27 and PPA	-
Amortization Period	20	years	TOOL27 and PPA	-
VAT Tax rate	0.0%	%	PWC Report	https://www.pwc.com/m1/en/tax/documents/pwc-newsalert-egypt-vat-law-sept2016.pdf
Income Tax rate	22.5%	%	PWC Report	https://www.pwc.com/m1/en/tax/documents/doing-business-guides/egypt-tax-and-legal-doing-business-guide.pdf
O&M costs years 1-5	6,100.0	kUSD	Due Dilligence Report	The Due Dilligence report is dated 06 December 2017 and thus compatible with the project starting sate
O&M costs years 6-10	7,100.0	kUSD	Due Dilligence Report	The Due Dilligence report is dated 06 December 2017 and thus compatible with the project starting sate
O&M costs years 11-15	7,800.0	kUSD	Due Dilligence Report	The Due Dilligence report is dated 06 December 2017 and thus compatible with the project starting sate
O&M costs years 15-20	8,900.0	kUSD	Due Dilligence Report	The Due Dilligence report is dated 06 December 2017 and thus compatible with the project starting sate

Sub-step 2d: Sensitivity analysis

In order to better substantiate the financial analysis, a sensitivity analysis was performed to check the financial impact of changes to the main parameters on the project. The result of this sensitivity analysis demonstrates that even with these variations the Equity IRR does not overcome the benchmark of 16.63%, can be seen below.

Parameter	+10%	-10%
OPEX	10.54%	11.18%
CAPEX	8.99%	13.04%
Revenues	13.12%	8.45%
Debt cost	N/A	11.39%

To contextualize the results of this sensitivity analysis, some additional context on the potential variability of each parameter is provided as follows:

OPEX:
As referenced by the Project's independent Due Diligence Report, OPEX is defined by a Long-term Service Agreement "LTSA" and comprises all O&M activities that have been delegated to a third-party contractor. As these costs are defined by a firm contract with a third party, they are not subject to any further reduction. Other costs that will be incurred directly by the Project Developer have not been included, which is conservative from the perspective of an investment analysis for the demonstration of additionality. Nevertheless, the fact that the O&M costs as referenced by the project's Due Diligence report are low and that further reduction is not a reasonable assumption is demonstrated by comparing them with an applicable benchmark. In IRENA's Renewable Energy Outlook for Egypt [4], published in 2018, the reference cost for the O&M of a wind farm is 60USD/KW/yr, a figure that would translate into an annual cost of 15.75MM USD per year for our project activity. This is more than double than the average O&M cost that is being referenced for our project activity, a fact that demonstrates that the referenced figures for OPEX are conservative and that further reduction does not represent a reasonable assumption.

CAPEX
The predominant share of 272,5 million USD, i.e. 86% of total Capex, are related to the Wind Turbine Supply Agreement and the Civil Works and Electrical Systems Agreement, which entered into force at the project start date and therefore represent a cost component without the potential for reduction. For the rest of the development costs, a reduction of 75% would be necessary to achieve an overall Capex reduction of 10%, which is not a reasonable assumption. Moreover, it is important to mention that the Project's specific Capex of 1,207 USD/kW is already low when compared to applicable benchmarks. According to the Due Diligence report, the project's specific cost is lower than the range from USD 1,878 per kW to 2,041 USD per kW, with an average of USD 1,973 / kW, which is cited as an applicable benchmark. Moreover, the project activity's specific Capex is also lower than the reference cost of 1700 USD/KW of installed wind power capacity in Egypt as published in 2018 by IRENA[5].

REVENUES:
When it comes to Revenues, it is unlikely to have substantial changes. Power Tariff is fixed by the PPA and the projected volume of energy generation is based on P50, i.e. the long-term average of projected power generation. While power generation will be higher or lower in any given year, it is unlikely that average power generation will significantly differ from this estimate. Another possibility of increasing revenues is the possibility that project commissioning is anticipated by a successful project implementation. Now to exceed the standard variation of 10% that has been applied, the construction time would have to be reduced to zero, which is impossible.

[4] Source: https://irena.org/publications/2018/Oct/Renewable-Energy-Outlook-Egypt

[5] Source: https://irena.org/publications/2018/Oct/Renewable-Energy-Outlook-Egypt

DEBT

The cost of debt has been defined according to TOOL27 and shall be based on parameters that are standard in the market. In order to reflect the minimum cost of US denominated capital in Egypt, the cost of debt is referenced by the interest rate of a governmental bond with 10-year maturity. While the TOOL27 allows to include a suitable risk premium to reflect private investment and/or the project type, we opted not to include such a premium, which is conservative from the perspective of an investment analysis for the demonstration of additionality. Given the fact that we have used the lowest possible market rate for US denominated investments in Egypt and that no project specific risk premium has been included, we can conclude that any further reduction of the cost of debt is not a reasonable assumption.

In addition to this analysis, a Breakeven Point Analysis was calculated in order to discuss the likelihood that substantial changes in key parameters could change this conclusion. As referenced by the table below, revenues would have to be 26.51% higher in order to improve the project's profitability to a level that reaches the benchmark. Given the fact that the tariff is fixed by the PPA, this is unlikely scenario. The reduction in CAPEX would have to be 23.40% in order to reach the benchmark. As CAPEX is defined by the Turbine Supply and Construction arrangement at the projects starting date, such a change must also be seen as improbable.

Parameter	Variation to cross the benchmark
Revenues	26,51%
CAPEX	-23.40%

Outcome of Step 2: After the sensitivity analysis, it is concluded that the proposed CDM project activity is unlikely to be financially/economically attractive (as per Step 2c).

Step 3 – Barrier analysis

As described under Sub-step 1b above, renewable energy projects and therefore the project activity have been facing substantial barriers that are being addressed with economic policies and incentives including the CDM and the development of carbon market mechanisms. Nevertheless, the project's additionality has already been demonstrated with the results of the investment analysis and therefore the Project Participant opt to not present a formal Barrier Analysis.

Step 4 – Common practice analysis

The above additionality tests are complemented with an analysis of the extent to which the proposed project type (e.g. technology or practice) has already diffused in the relevant sector and region. This test is a credibility check to complement the investment analysis (Step 2).

As per TOOL01, the proposed project activity applies Measure (ii): Switch of technology with or without change of energy source including energy efficiency improvement as well as use of renewable energies (example: energy efficiency improvements, power generation based on renewable energy).

Sub-step 4a: The proposed CDM project activity(ies) applies measure(s) that are listed in the definitions section above

The latest guidelines on common practice, i.e. Methodological TOOL24, is applied.

Step 1: calculate applicable capacity or output range as +/-50% of the total design capacity or output of the proposed project activity. The project will have an installed capacity of 262.5 MW, thus the range of a capacity of +/-50% can be calculated to be from 131.25 MW to 393.75 MW.

Step 2: identify similar projects (both CDM and non-CDM) which fulfil all of the following conditions:
(a) The projects are located in the applicable geographical area; for this case, electricity generation plants connected to Egypt's Unified National Grid.
(b) The projects apply the same measure as the proposed project activity; for this case, all electricity generation plants.
(c) The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity; which would be wind energy for this case.
(d) The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant; which is not applicable to this case.
(e) The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1; which would be between 131.25 MW and 393.75 MW.
(f) The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity. The earliest date for this case is 14/12/2017.

In total, 9 full scale grid connected wind farm projects were operational in Egypt before the project starting date, with cumulative installed capacity of almost 800 MW.

Table: Operational wind power plants in Egypt[6]

Name	Power (MW)	Start of Operations
Zafarana 1	30	2001
Zafarana 2	33	2001
Zafarana 3	30.36	2004
Zafarana 4	46.86	2004
Zafarana 5	85	2006
Zafarana 6	79.9	2008
Zafarana 7	119.85	2009
Zafarana 8	119.85	2010
Gulf of El-Zayt	200	2015

However, as can be seen, only **1** (one) project, the Gulf of El-Zayt Wind Power Plant of 200 MW is inside the capacity range calculated in Step 1.

Step 3: within the projects identified in Step 2, identify those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note their number N_{all}.

Currently, Egypt has 04 (four) registered wind farm CDM projects, with no other under any status, as follows:

Table: Wind farms developed as CDM projects in Egypt

Registered	Title	Methodology	CERs	Ref
08/08/2011	Zafarana 85 MW Wind Power Plant Project	ACM0002 ver. 12	170364	4687
23/09/2010	Zafarana 8 - Wind Power Plant Project, Arab Republic of Egypt	ACM0002 ver. 10	209714	3501
02/03/2010	Zafarana KfW IV Wind Farm Project, Arab Republic of Egypt	ACM0002 ver. 7	171500	2742
22/06/2007	Zafarana Wind Power Plant Project	ACM0002 ver. 6	248609	740

However, all of these projects are below the capacity range threshold (as explained in Step 2). Therefore, the Gulf El-Zayt project continues to be the only project that is similar.
Therefore: $N_{all} = 1$

Step 4: within similar projects identified in Step 3, identify those that apply technologies that are different to the technology applied in the proposed project activity. Note their number N_{diff}.

[6] https://www.thewindpower.net/windfarms_list_en.php and IRENA 2018 (pg. 24).

According to TOOL24, section 4, Different Technologies are technologies that deliver the same output, but differ by at least one of several criteria. Among these criteria is the dimension of (d) Investment climate on the date of the investment decision, inter alia:

(i) Access to technology;
(ii) Subsidies or other financial flows;
(iii) Promotional policies;
(iv) Legal regulations.

When comparing the Gulf of El-Zayt Wind Farm with the project activity it is important to recognize that the projects have been developed by completely different actors under different promotional policies. In order to analyse this difference, we replicate a table from the Project's Due Diligence report to define and discuss different routes for the development of wind power projects in Egypt:

	NREA (New and Renewable Energy Authority)	Competitive Bidding
Program size	2,200MW	2,500MW
Single Wind Farm Size	Large (100-400MW)	Large (250MW)
Developer	NREA	Private
Financing	Gov't, international development agencies	Commercial finance
Tariff Setting	Proposed by regulator, Approved by Cabinet	Dictated by the bid
Grid Contracts	20 years	20 years
Offtaker	Grid Operator	Grid Operator
Construction	NREA, via EPC	Developer
Operation and Maintenance	NREA	Developer

The project activity has been developed under the category of competitive bidding. This implies that the project is financed by a private investor (IPP), with commercial finance and based on a power tariff that is defined by a competitive bid.
In contrast to this IPP development, The Gulf of El-Zayt Wind Farm, as referenced by NREA's annual report for the year 2018[7] has been developed directly by Egypt's national agency NREA and financed by national and international development agencies. The tariff for such projects is proposed by the regulator and approved by the cabinet.
It is therefore clear that the project activity and the Gulf of El-Zayt project have been developed under different legal regulations, are subject to different promotional policies, as well as to differences in terms of subsidies and financial flows. Given the fact that the Gulf of El-Zayt project has been developed by the state agency, financed by domestic and international public funds and based on a tariff that was defined by the state, the project is not subject to the same investment risks and there is no private investor who would have to balance financial rewards with these risks.

We can therefore conclude that the Gulf of El-Zayt Wind Farm is different from our project activity and therefore $\mathbf{N_{diff} = 1}$.

Step 5: calculate factor $F=1-N_{diff}/N_{all}$ representing the share of similar projects (penetration rate of the measure/technology) using a measure/technology similar to the measure/technology used in the proposed project activity that deliver the same output or capacity as the proposed project activity.

F = 1-1/1 = 0

Factor F is, therefore, lower than 0.2.

[7] The document is available from: http://nrea.gov.eg/Content/reports/English%20AnnualReport.pdf

In complement to this assessment we can also determine that the calculation N_{all} - N_{diff} = 1 - 1 = 0, which is lower than 3. Therefore, the proposed project activity is not regarded as "common practice", and thus can be considered additional.

B.6. Estimation of emission reductions

B.6.1. Explanation of methodological choices

Please see section B.1 for more information regarding versions and location of tools and methodologies.

Project emissions

The proposed project activity will calculate project emissions according to ACM0002. Thus, for all renewable energy power generation project activities, emissions due to the use of fossil fuels for the backup generator can be neglected. Since this proposed project activity is not geothermal, solar or hydro:

$PE_y = 0$

Baseline emissions

The proposed project activity will calculate baseline emissions according to ACM0002. Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$$ ACM0002 Equation 11

Where:

BE_y	=	Baseline emissions in year *y* (t CO_2/yr)
$EG_{PJ,y}$	=	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh/yr)
$EF_{grid,CM,y}$	=	Combined margin CO_2 emission factor for grid connected power generation in year *y* calculated using the latest version of "TOOL07: Tool to calculate the emission factor for an electricity system" (t CO_2/MWh)

Since the project activity is the installation of a Greenfield power plant, then:

$$EG_{PJ,y} = EG_{facility,y}$$ ACM0002 Equation 12

Where:

$EG_{PJ,y}$	=	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh/yr)
$EG_{facility,y}$	=	Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y* (MWh/yr)

According to the TOOL07, the baseline methodology procedure to calculate $EF_{grid,CM,y}$ is the following:

Step 1: Identify the relevant electricity systems.

For determining the electricity emission factors, the project participant is identifying the relevant project electricity system or any connected electricity systems. No connected electricity system is located partially or totally in Annex I countries, thus the project electricity system is defined by using the three options stated in TOOL07.

Since the Egyptian DNA has not published a delineation of the project electricity boundary to be used, Option 1 (the priority option) is not feasible. Therefore, the Project Developer will use option 2 (the next option in the priority order).

> *Option 2. A delineation of the project electricity system defined by the dispatch area of the dispatch center responsible for scheduling and dispatching electricity generated by the project activity. Where the dispatch area is controlled by more than one dispatch center, i.e. layered dispatch area, the higher-level area shall be used as a delineation of the project electricity system (e.g. where regional dispatch centers are required to comply with dispatch orders of the national dispatch center then area controlled by the national dispatch center shall be used).*

In Egypt, the Egyptian Electricity Holding Company (EEHC) is the main electricity operator and regulator in Egypt. Among its objectives are producing, transmitting and distributing electrical energy for all uses on the various voltages, and also managing, operating and maintaining electricity transmission and distribution networks at the various voltage levels, selling electrical energy on the various voltages throughout the country and making the optimal utilization of these networks. Therefore, this company is the responsible for defining all characteristics of the electricity grid in the country.

In its Annual Report for 2017[8], the EEHC mentions the Unified National Grid as being the national grid for electricity transmission in Egypt.

In Egypt, all the power plants are connected to the unified Egyptian National Grid in which the Egyptian Electricity Transmission Company (EETC), a subsidiary from EEHC, acts as a single buyer of bulk power, purchasing electricity from the generating companies through Power Purchase Agreements (PPAs) and selling it to the distribution companies and UHV and HV customers.

All power stations connected to the unified electric grid, are managed as a pool. The priority of dispatch is defined on the basis of least marginal cost optimisation where priority is given to renewable sources, then to thermal units with low specific fuel consumption (Ton Oil equivalent/MWh) and cost as base load and with those that have high operational costs as peak load. The great majority of the annual electricity generation is concentrated within a 250 Km radius around Cairo, which is the country`s load center. Hydro plants are concentrated at Aswan, about 900 Km south of Cairo, and provide another substantial portion. The Unified national grid, comprising all those power plants that are physically connected through transmission and distribution lines to the project activity, constitutes a clear grid boundary. Egypt is a net exporter of electricity so no emission calculations for imported electricity are to be included.

[8] http://www.eehc.gov.eg/eehcportal/Eng/YearlyReports.aspx

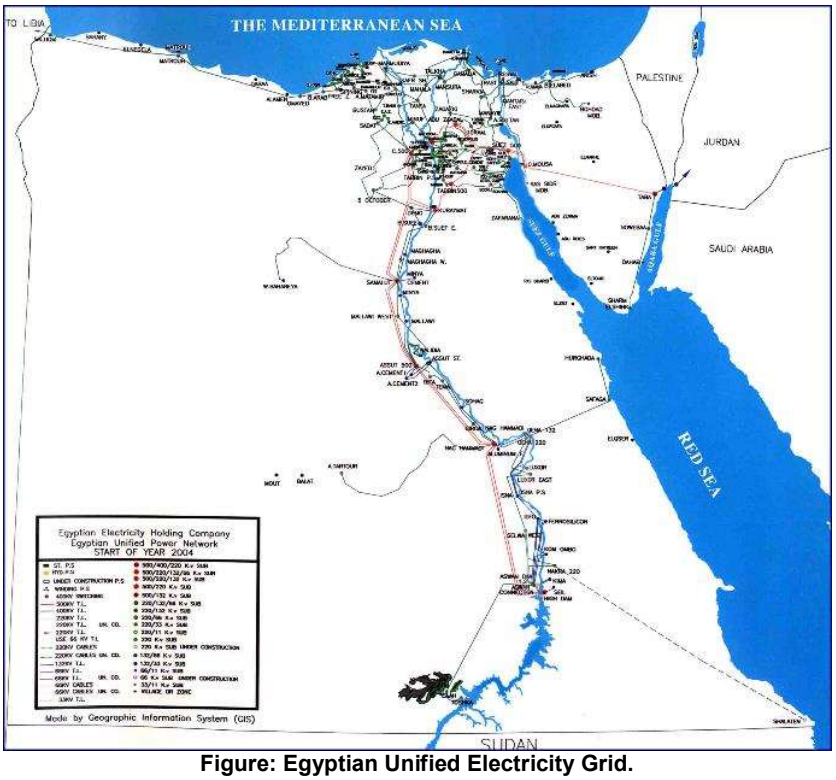


Figure: Egyptian Unified Electricity Grid.

Step 2: Choose whether to include off-grid power plants in the project electricity system

The Project Developer chooses Option I: Only grid power plants are included in the calculation. Power plants, which are isolated and not connected to the power grid, are not considered part of this grid boundary.

Step 3: Select a method to determine the operating margin (OM)

The calculation of the operating margin emission factor (*EFgrid,OM,y*) is based on one of the following methods:
(a) Simple OM, or (b) Simple adjusted OM, or (c) Dispatch data analysis OM, or (d) Average OM.

Any of the four methods can be used, however, the simple OM method (option a) can be used if low-cost/must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydro electricity production. Approach 1 has been used to verify that the low-cost/must-run resources constitute less than 50% of total grid generation on average of the five most recent years.

$$Share_{\text{LCMR}} = \text{average}\left[\frac{EG_{LCMR\,(y-4)}}{total_{(y-4)}}, \ldots, \frac{EG_{LCMRy}}{total_y}\right]$$

Where:

- $Share_{LCMR}$ = Share of the low cost/must run resources (per cent)
- EG_{LCMRy} = Electricity generation supplied to the project electricity system by the low cost/must run resources in year y (MWh)
- $Total_y$ = Total electricity generation supplied to the project electricity system in year y (MWh)
- y = The most recent year for which data is available

The following values are provided by the Egyptian Electricity Holding Company annual reports for years[9] 2012/2013; 2013/2014; 2014/2015; 2015/2016; and 2016/2017[10].

Table: Electricity Generation per type of source for the past 5 years

Type	Electricity Generated (GWh)				
	2012/2013	**2013/2014**	**2014/2015**	**2015/2016**	**2016/2017**
Hydro Power Plants	12,997	13,227	13,704	13,410	12,726
Wind Parks	1,219	1,288	1,391	2,031	2,173
Solar	228	110	-	168	580
Total - low-cost/must run	**14,444**	**14,625**	**15,095**	**15,608**	**15,479**
Private sector (BOOT plants)	13,428	13,334	13,479	12,496	11,383
Electricity purchased from IPP	33	62	32	42	35
Thermal	131,084	134,299	140,350	152,106	156,574
Total Net - all plants[11]	**158,989**	**162,320**	**168,956**	**180,253**	**183,471**
Low-cost/must-run portion	9.08%	9.01%	8.93%	8.66%	8.44%
Five -year average for low-cost/must-run plants:	**8.82%**				

Since low cost/must run electricity generation sources resources represent 8.82% of the total grid electricity generation and constitute less than 50% of total grid generation on average of the five most recent years, therefore, Simple OM can be applied.

For the simple OM, the emission factor is calculated using the following data vintage:

> *(a) Ex ante option: the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. Since only grid power plants are being considered, a period of 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation is being used.*

Step 4: Calculate the operating margin emission factor according to the selected method

The ex-ante option will be used for the calculation of the simple OM. The simple OM may be calculated by one of the following two options:

> **Option A:** Based on the net electricity generation and a CO_2 emission factor of each power unit; or
> **Option B:** Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

Option B can only be used if:

i. The necessary data for Option A is not available; and
ii. Only nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and
iii. Off-grid power plants are not included in the calculation (i.e. if Option I have been chosen in Step 2).

[9] The administrative year for Egypt's power sector and statistic starts and ends on 30 June and initiates on 01 July of each year.

[10] http://www.moee.gov.eg/english_new/report.aspx

[11] Excluding Isolated Plants

Since data on each power unit is not available for the project's case, only renewable is being considered for low-cost/must-run (with quantity of electricity known) and Option I has been chosen in Step 2, **Option B** will be used for the calculation of simple OM emission factor.

Information regarding Net Electricity Production and fossil fuels amounts consumed in the project electricity system in the most recent 3 years (07/2014 to 06/2015; 07/2015 to 06/2016; 07/2016 to 06/2017) can be found in appendix 4.

Where Option B is used, the simple OM emission factor is calculated as follows:

$$ER_{grid,OM\,Simple,y} = \frac{\sum_{i,} FC_{i,,y}.NCV_{i,y}.EF_{CO2,i,y}}{EG_y}$$

Where:

$EF_{grid,OMsimple,y}$	=	Simple operating margin CO_2 emission factor in year y (tCO_2/MWh)
$FC_{i,,y}$	=	Amount of fuel type i consumed in the project electricity system in year y (mass or volume unit)
$NCV_{i,y}$	=	Net calorific value (energy content) of fossil fuel type i in year y (GJ / mass or volume unit)
$EF_{CO2,i,y}$	=	CO_2 emission factor of fossil fuel type i in year y (tCO_2/GJ)
$EG_{,y}$	=	Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost / must-run power plants / units, in year y (MWh)
i	=	All fuel types combusted in power sources in the project electricity system in year y
Y	=	The relevant year as per the data vintage chosen in step 3 (Ex-ante option)

Table: Simple Operating Margin for Year 2016/2017

Fuel type	Fuel Consumption[12]	Units	NCV TJ/Tonne [13]	CO_2 emissions factor (tCO_2/TJ)[14]	CO_2 Emissions (tCO_2/t fuel)
HFO	7,281,000	Tonnes	0.0398	75.5	21,878,677
NG	33,640,000,000	m^3	-	-	-
NG (converted to tonnes from data above)	26,178,988	Tonnes	0.0465	54.3	66,100,637
LFO	558,700	Tonnes	0.0414	72.6	1,679,251
Special LFO	-	Tonnes	0.0414	72.6	-
CO_2 emissions (tCO_2)					**89,658,565**
Simple operating margin CO_2 emission factor 2016/2017 (tCO_2/MWh)					**0.5337**

[12] Source: MOEE Annual Reports for the indicated year, Table: Fuel Consumption by Type. Website: http://www.moee.gov.eg/english_new/report.aspx

[13] IPCC default values at the lower limit of the uncertainty at a 95 per cent confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories

[14] IPCC default values at the lower limit of the uncertainty at a 95 per cent confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories

Table: Simple Operating Margin for Year 2015/2016

Fuel type	Consumption[15]	Units	NCV TJ/Tonne	CO_2 emissions factor (tCO_2/TJ)	CO_2 Emissions (tCO_2 / t fuel)
HFO	8,402,149	Tonnes	0.0398	75.5	26,917,894
NG	27,818,831,774	m^3	-	-	-
NG(converted to tonnes from data above)	21,648,896	Tonnes	0.0465	54.3	59,708,681
LFO	1,074,200	Tonnes	0.0414	72.6	3,228,658
Special LFO	121,500	Tonnes	0.0414	72.6	365,185
CO_2 emissions (tCO_2)					**90,220,419**
Simple operating margin CO_2 emission factor 2015/2016 (tCO_2/MWh)					**0.5480**

Table: Simple Operating Margin for Year 2014/2015

Fuel type	Consumption[16]	Units	NCV TJ/Tonne	CO_2 emissions factor (tCO^2/TJ)	CO_2 Emissions (tCO_2 / t fuel)
HFO	8,627,000	Tonnes	0.0398	75.5	25,923,272
NG	29,332,000,000	m^3	-	-	-
NG(converted to tonnes from data above)	22,826,459	Tonnes	0.0465	54.3	57,635,668
LFO	355,600	Tonnes	0.0414	72.6	1,068,806
Special LFO	128,400	Tonnes	0.0414	72.6	385,924
CO_2 emissions (tCO_2)					**85,013,670**
Simple operating margin CO_2 emission factor 2014/2015 (tCO_2/MWh)					**0.5525**

The Simple OM is then calculated as the average Net CO_2 emissions from electricity generation / Net electricity supplied to the grid in the most recent 3 years.

Simple Operating Margin (OM) Grid Emissions factor = 0.5444 tCO_2/MWh

Step 5: Calculate the build margin (BM) emission factor

In terms of vintage of data, project participants choose

> *Option 1 - for the first crediting period, calculate the build margin emission factor ex ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period;*

Capacity additions from retrofits of power plants are not included in the calculation of the build margin emission factor.

The sample group of power units (m) used to calculate the build margin is determined as follows:

[15] Source: MOEE Annual Reports for the indicated year, Table: Fuel Consumption by Type. Website: http://www.moee.gov.eg/english_new/report.aspx

[16] Source: MOEE Annual Reports for the indicated year, Table: Fuel Consumption by Type. Website: http://www.moee.gov.eg/english_new/report.aspx

a. Identify the set of five power units, other than the power units registered as CDM project activities[17], that started to supply electricity to the grid most recently ($SET_{5\ units}$) and determine their annual electricity generation ($AE_{GSET\text{-}5\text{-}units}$, in MWh). In fact, the annual electricity generation from the set of five power units, other than the power units registered as CDM project activities, that started to supply electricity to the grid most recently (year 2017) is 4.1%. Detailed calculations are indicated in Appendix 4;
b. Determine the annual electricity generation of the project electricity system, not including power units registered as CDM project activities (AE_{Gtotal}, in MWh). Identify the set of power units, excluding power units registered as CDM project activities, that started to provide electricity to the grid most recently and that include 20 per cent of AEG_{total} (if 20 per cent falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) ($SET_{>20\ per\ cent}$) and control their annual electricity generation (AEG_{SET}-≥20 per cent, in MWh). This option is performed, and detailed calculations are indicated in Appendix 4;
c. From $SET_{5\text{-}units}$ and $SET_{>20\ per\ cent}$ identify the set of power units that includes the larger annual electricity generation (SET_{sample}). The set of power units that includes the larger annual electricity generation is option b (the set of power units excluding power units registered as CDM project activities, that started to provide electricity to the grid most recently and that include 20 per cent of AEG_{total}). Detailed calculations are indicated in Appendix 4;

   Set the date when the power units in SET_{sample} began to supply electricity to the grid. If none of the power units in SET_{sample} started to provide electricity to the grid more than 10 years ago, then use SET_{sample} to calculate the build margin. In this case, the date is year 2012. Thus, none of the power units in SET_{sample} started to provide electricity to the grid more than 10 years ago, and $SET_{>20\ per\ cent}$ is used to calculate the build margin. Therefore, steps (d), (e) and (f) are ignored.

The set of power units that have been built most recently are specified in appendix 4.

The build margin emissions factor is the generation-weighted average emission factor (tCO_2/MWh) of all power units m during the most recent year y for which power generation data is available, calculated as follows:

$$EF_{grid,\,BM,\,y} = \frac{\sum_m EG_{\,m,\,y}.EF_{EL,\,m,\,y}}{\sum_m EG_{\,m,\,y}}$$

Where:

$EF_{grid,BM,y}$	=	Build margin CO_2 emission factor in year y (tCO_2/MWh)
$EG_{m,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$	=	CO_2 emission factor of power unit m in year y (tCO_2/MWh)
M	=	Power units included in the build margin
Y	=	Most recent historical year for which power generation data is available

The list of each power unit and its specific CO_2 emissions per MWh are specified in appendix 4.

[17] The list of Registered Egyptian CDM Projects (as of January 2018) can be found on: http://www.eeaa.gov.eg/portals/0/eeaaReports/N-CC/Update%20of%20registered%20CDM%20Projects%20January%202018.pdf

Table: Calculation of the build margin emission factor

Power Plant	Net Electricity Generated (MWh)	tCO_2/MWh	tCO_2
Banha	4,780,700	0.381	1,821,239
Ataka	1,308,100	0.609	796,679
West Damietta Ext	1,022,300	0.631	644,606
West Assiut	1,093,400	0.880	961,994
Burulls	1,387,400	0.553	767,172
Beni Suef	3,225,000	0.560	1,806,713
New Capital	727,200	0.521	379,047
Thermal Suez	1,816,500	0.695	1,262,123
Giza North	12,857,400	0.387	4,977,313
6-Oct	2,583,500	0.649	1,676,430
Ain Sokhna	5,963,500	0.496	2,959,968
Damietta West	1,614,300	0.618	997,324
Sharm El-Sheikh Ext	4,000	1.138	4,552
El-Huraghda Ext	435,200	0.563	245,132
Port Said Ext	5,500	0.883	4,855
Cairo Mobile	43,000	0.812	34,899
New Mahmoudia	38,900	0.665	25,875
Upper Mobile	198,000	0.843	166,907
TOTAL	**39,103,900**	**-**	**19,532,828**

The CO_2 emission factor of each power unit m ($EF_{EL,m,y}$) is determined as per the guidance in Step 4 above for the simple OM using Options A1, using for y the most recent historical year for which electricity generation data is available, and using for "m" the power units included in the build margin.

Build Margin Grid Emissions Factor = 0.4854 tCO_2/MWh

Step 6: Calculate the combined margin emissions factor

The calculation of the combined margin (CM) emission factor (EF grid,CM,y) is based on the Weighted average CM, as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$$

Where:

$EF_{grid,BM,y}$	=	Build margin CO_2 emission factor in year y (tCO_2/MWh)
$EF_{grid,OM,y}$	=	Operating margin CO_2 emission factor in year y (tCO_2/MWh)
w_{OM}	=	Weighting of operating margin emissions factor (%)
w_{BM}	=	Weighting of build margin emissions factor (%)

The following default values are used for this wind power generation project activity (owing to their intermittent and non-dispatchable nature) for the first crediting period and for subsequent crediting periods: w_{OM} = 0.75 and w_{BM} = 0.25

Combined Margin (CM) Grid Emissions factor = 0.5332 tCO_2/MWh

Leakage

No leakage emissions are considered according to ACM0002. The emissions potentially arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport etc.) are neglected.

Emission reductions

$ER_y = BE_y - PE_y$ ACM0002 Equation 17

Where:

ER_y = Emission reductions in year *y* (t CO_2e/yr)

BE_y = Baseline emissions in year *y* (t CO_2/yr)

PE_y = Project emissions in year *y* (t CO_2e/yr)

B.6.2. Data and parameters fixed ex ante

Data/Parameter	**$EF_{grid,OM,y}$**
Data unit	tCO_2/MWh
Description	Operating Margin CO_2 emission factor in year y
Source of data	Calculated using data from Egyptian Electricity Holding Company annual reports
Value(s) applied	0.5444
Choice of data or measurement methods and procedures	Calculated as per TOOL07 using the ex-ante option. The 03 most recent years being used are 07/2014 to 06/2015; 07/2015 to 06/2016; 07/2016 to 06/2017.
Purpose of data	Baseline emissions
Additional comment	This parameter is fixed ex-ante for the entire crediting period.

Data/Parameter	**$EF_{grid,BM,y}$**
Data unit	tCO_2/MWh
Description	Build Margin CO_2 emission factor in year y
Source of data	Calculated using data from Egyptian Electricity Holding Company annual reports
Value(s) applied	0.4854
Choice of data or measurement methods and procedures	Calculated as per TOOL07 using the ex-ante option. The 03 most recent years being used are 07/2014 to 06/2015; 07/2015 to 06/2016; 07/2016 to 06/2017.
Purpose of data	Baseline emissions
Additional comment	This parameter is fixed ex-ante for the entire crediting period.

Data/Parameter	**$EF_{grid,CM,y}$**
Data unit	tCO_2/MWh
Description	Combined Margin CO_2 emission factor in year y
Source of data	Calculated from $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$ above.
Value(s) applied	0.5297
Choice of data or measurement methods and procedures	Calculated as per TOOL07 using w_{OM} = 0.75 and w_{BM} = 0.25.
Purpose of data	Baseline emissions
Additional comment	This parameter is fixed ex-ante for the entire crediting period.

B.6.3. Ex ante calculation of emission reductions

The emission reductions, according to detailed information described in sections above, are calculated as:

$ER_y = BE_y - PE_y$

Where:

ER_y	=	Emission reductions in year *y* (t CO_2e/yr)
BE_y	=	Baseline emissions in year *y* (t CO_2/yr)
PE_y	=	Project emissions in year *y* (t CO_2e/yr)

Since, as described in section B.6.1, PEy = 0, then ERy = BEy.

$BE_y = EG_{PJ,y} \times EF_{grid,CM,y} = EG_{facility,y} \times EF_{grid,CM,y}$

BE_y	=	Baseline emissions in year *y* (t CO_2/yr)
$EG_{PJ,y}$	=	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh/yr)
$EG_{facility,y}$	=	Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y* (MWh/yr)
$EF_{grid,CM,y}$	=	Combined margin CO_2 emission factor for grid connected power generation in year *y* (t CO_2/MWh)

The plant is expected to have the following electricity generation pattern:

Wind Turbines Unit capacity (MW/WTG)	2.1
Total number of WTGs	125
Wind farm total installed capacity (MW)	262.5
Total expected AEP (MWh/yr) - P50	**1,379,756**

$EG_{facility,y}$= $EG_{PJ,y}$ = 1,379,756 MWh/yr

The estimated grid emission factor is calculated as follows:

$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$ = 0.5444 x 0.75 + 0.4854 x 0.25

$EF_{grid,CM,y}$ = 0.5332 tCO₂/MWh

Therefore, the estimated Certified Emission Reductions (CERs) to be expected annually are:

ERy = BEy = $EG_{facility,y} \times EF_{grid,CM,y}$ = 1,379,756 MWh/yr x 0.5332 tCO₂/MWh = **730,788 t CO₂e/yr**

B.6.4. Summary of ex ante estimates of emission reductions

Year	Baseline emissions (t CO_2e)	Project emissions (t CO_2e)	Leakage (t CO_2e)	Emission reductions (t CO_2e)
2020	730,788	0	0	730,788
2021	730,788	0	0	730,788
2022	730,788	0	0	730,788
2023	730,788	0	0	730,788
2024	730,788	0	0	730,788
2025	730,788	0	0	730,788
2026	730,788	0	0	730,788
Total	5,115,516	0	0	5,115,516
Total number of crediting years	7			
Annual average over the crediting period	730,788	0	0	730,788

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Data/Parameter	$EG_{PJ,y}$ **or** $EG_{facility,y}$
Data unit	MWh/yr
Description	Quantity of electricity generated and supplied by the project power plant to the grid in year y
Source of data	Direct measurement or calculated based on measurements from more than one electricity meters
Value(s) applied	1,379,756
Measurement methods and procedures	The main monitoring data will be provided by electricity meters (main and backup meters) installed for monitoring the electricity export to grid. Meters are located in the delivery point of the electricity generated to the grid. Total MWh delivered by the project to the grid will be recorded by the export meters A1800 ALPHA meter, IEC 62053 accuracy Class 0.2%, or similar, calibrated at least every three years as certified by the Egyptian Electricity Transmission Company (EETC).
Monitoring frequency	Continuous measurement and monthly recording
QA/QC procedures	Meters (main and backup) will be calibrated according to the Grid Procedures. Data will be recorded using an automatic electronic system and will be crosschecked with a reliable reference (ex.: dispatch reports).
Purpose of data	Baseline emissions
Additional comment	This parameter should be either monitored using bi-directional energy meter or calculated as difference between (a) the quantity of electricity supplied by the project plant/unit to the grid; and (b) the quantity of electricity the project plant/unit from the grid. If it is calculated, then the following parameters shall be measured: (a) The quantity of electricity supplied by the project plant/unit to the grid; and (b) The quantity of electricity delivered to the project plant/unit from the grid.

B.7.2. Sampling plan

No data and parameters to be monitored in section B.7.1 above are to be determined by a sampling approach.

B.7.3. Other elements of monitoring plan

Following guidance provided by ACM0002, all data collected as part of monitoring will be archived electronically and be kept at least for two years after the end of the last crediting period. 100% of the data will be monitored, unless calculated as indicated in the table above. All measurements will be conducted with calibrated measurement equipment according to relevant industry standards.

In addition, ACM0002 states that the monitoring provisions in the tools referred to in this methodology apply. Accordingly, $EG_{facility,y}$ data should be determined as per TOOL05, and $EF_{grid,CM,y}$ data should be determined as per TOOL07. When applying the tools, requirement for the $EG_{PJ,grid,y}$ should apply to parameter $EG_{facility,y}$.

During the first fifteen years of Project operation, Gamesa will perform O&M of the WTGs, the activity considered the highest risk to Project performance. The Project Company will recruit an O&M team to manage the administrative and technical tasks. After this period, this agreement with Gamesa may be extend or the Project Developer can take over the O&M activities of the WTGs. Both options are typical in the wind industry. A CDM operator named by the Project Developer, which will be the responsible for crosschecking and archiving, will manage the monitoring of all the CDM data.

The effective Monitoring Plan to be put in place will have the following objectives:
• Allocate roles and responsibilities to project staff
• Gather data on the net electricity supplied to the grid by the project;
• Establish Quality Assurance & Quality Control procedures, as well as data archiving procedures;
• Generate periodical reports for verification purposes indicating the amounts of CO_2 reduced by the project.

Electricity generation will be monitored automatically by the Project owner and will be crosschecked using electricity dispatch reports (or electricity invoices, or sales receipts. A reliable third-party reference will be preferred, if available. Otherwise, the most reliable reference possible). Electricity data will be aggregated monthly and presented as a summary in periodical monitoring report.

Metering

The project electricity generation will be monitored through the use of metering equipment at the relevant delivery point connecting the power generated to the grid.
There will be sets of two metering system equipment:
1. Main metering system equipment
2. Backup metering system equipment

Regarding the metering system, RGWE is responsible for adjust, operate, check and maintain the Primary Meters and the Back Up Meters. The RGWE and EETC both have the right to read either meter and the two meters will have the provisions to record on memory the accumulated kilowatt-hours. The metering results will be supplied by EETC on a monthly basis.

Recording and Archiving

Electricity generated by the Project and supplied to the national grid will be monitored and recorded by a Data Management System at the on-site control centre. Collected data will be cross-checked against relevant minutes of meetings as well as any other pertinent records concerning the electricity production upon which the invoices to EETC are prepared. The Project owner will ensure that the meter readings be readily available for verification.

Data will be recorded electronically as well as on paper for backup. All the records or copies of these will be kept by the project owner for verification purposes. All data collected as part of monitoring should be archived electronically and kept for at least 2 years after the end of the last crediting period.

O&M Logs

Each shift leader will maintain daily operation and maintenance logs on a real time basis. They will provide detailed on-the-spot information about the operations at the plant and any event of significance will be reported.

Calibration

Project developers will be responsible for the equipment calibration and will do this according to international standards. Project developers will install and maintain all electricity metering equipment and associated transformers conforming to specifications set by EETC. The metering equipment is to be sealed in the presence of both RGWE and EETC representatives. Seals can only be opened in the presence of RGWE and EEHC representatives for inspection, testing or calibration. The measured electricity meter installed is bidirectional type (meter technical details described in section B.7.1 above), and will be calibrated at least every three years. The national entity entrusted by the Ministry of Electricity and Energy, and NREA to do so is the Egyptian Electricity Transmission Company (EETC).

Management structure

Project staff have been identified to carry out the above tasks and ensure that the objectives of the monitoring plan are met. The Project Co-ordinator, will be the person responsible for CDM data monitoring and recording activities. He will report to, the project's General Manager. The daily monitoring activities will be performed by technical Operators on-site, reporting to the Site Manager, who in turn reports to the Project Co-ordinator.

SECTION C. Start date, crediting period type and duration

C.1. Start date of project activity

14/12/2017

The start date has been determined in accordance with the definition of start date provided in the "Glossary: CDM terms" as per the date of when Project Developer communicated the Egyptian Energy Transmission Company (EETC) that all the Outstanding Conditions Precedent from the PPA have now been satisfied, such that Financial Close has occurred.

C.2. Expected operational lifetime of project activity

20 years 00 months

C.3. Crediting period of project activity

C.3.1. Type of crediting period

Renewable. First period.

C.3.2. Start date of crediting period

15/12/2020

C.3.3. Duration of crediting period

7 years 00 months

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

A summary of the analysis of the environmental impacts of the project activity, including transboundary impacts, is provided below. Environmental impacts were evaluated and reported in the "Environmental & Social Impact Assessment for 262.5 MW Wind Power Project at Gulf of Suez" (ESIA), dated February 2017.

Waste

The waste has potential to generate several impacts if the storage and final disposal is not performed properly. That is the main reason to consider and to apply some strategies to handle and control them during all the phases of the project. It is expected that the waste generated will include municipal solid waste; paper and plastic packaging waste; and waste from construction and maintenance of the electric installations (e.g. construction materials; hazardous materials such as cleaners, solvents; paints and their containers, etc.).

As a general condition, waste will be generated during all the phases of the project however, is predicted that some phases will have less generation of waste than others. Construction and Decommissioning phases will generate the highest rates; meanwhile Operation will generate the lowest.

Biodiversity (excluding birds)

Given the characteristics of the studied area (desert characterized by very low biodiversity) as revealed during the baseline survey, construction activities on the site are not likely to affect sensitive faunal or floral species, or disturb valuable ecological habitats. The few recorded floral and faunal species are common and rarely found on the site.

Uncontrolled waste disposal will affect negatively the fauna through attracting birds, rodents, feral dogs and cats and other vectors; hence, the proper control and handling of waste must be applied. Given the characteristics of the project plant's site (desert without vegetation), it is concluded that neither the construction activities nor the subsequent operations will affect endangered fauna or flora species or disturb valuable habitats; therefore, impacts are considered Minor.

Migratory birds

A point of environmental concern for renewable energy installations, especially wind farms, is their potential impact on birds. The main risk that large-scale wind farms may pose on migratory birds is the risk of collision with the wind turbines.

During the Construction phase, the main activity will be delivery of materials and construction works, thus it is not expected to have direct impacts on bird populations. During the Operations phase, given the importance of the west coast of the Red Sea as a migratory path for soaring birds in spring and autumn, precautionary mitigation and bird monitoring measures should be applied. Considering utilization of wind energy within the studied area, the major potential hazards to birds are collision risk and mortality but also barrier effects.

In 2007, a Study of Birds Collision was conducted at a wind farm (220 turbines) at the western bank of the Gulf of Suez (Egypt) corpse searches were carried out over a four-week period in spring 2007. The results strongly indicate that the number of collisions was very low to zero throughout the period of investigation. It should be noted, however, that the study is limited due to the short period of investigation.

In 2016, during period of 43 days (from Sep. 25th to Nov. 6th) Monitoring of Bird and Bat Collisions rate with Wind Turbines in KFW 200MW wind farm at Gebel El Zeit was performed during autumn

season, within the framework of migratory soaring birds conservation activities initiated by the New and Renewable Energy Authority. The windfarm surveyed has the same area and it is located at the south of the current studied area.

The wind farm studied has total of 100 wind turbines arranged in seven rows in north east south west direction. The lines wind turbines vary in length between about 1.7 km and about 5.2 km long, the distance between wind turbine lines is about 1.1km.

The results of this survey suggest that:
- The overall avoidance rate of migratory soaring birds is 99% indicating that 99% of migratory soaring birds flying at rotor swept area are able to avoid collusion with wind turbines.
- The avoidance rate of White Stork is high (99%), while the avoidance rate of Marsh Harrier is relatively low (91%), which makes this species in high risk of collusion than other migratory species.

According to the results, it is expected that if mitigation actions are applied, such as the Shutdown protocol, the risk of collision should not be a major concern.

Cumulative Impacts on Birds

The main pressure on migratory bird's populations will occur during the operation phase due, as was previous detailed, the area is important for the migration and the region has several wind farm projects. This situation increases the negative impacts and risks on migratory birds. In order to reduce the expected risk of collision and barrier effects for migrating birds at wind farms an effective Shutdown Programme has to be developed and established for the Spring migration period (Note that a shutdown programme has to be coordinated with the National LDC). With regard to the development of such a shutdown programme, a two-step approach is conceivable:
- A fixed shutdown (FS) programme stopping all turbines from March 1st to May 18th during daytime (1 hour after sunrise to 1 hour before sunset). Based on long-term wind data, the expected energy loss caused by such a FS-programme is estimated to be about 10 %.
- Improve the FS-programme and develop a shutdown-on-demand (SOD) programme. Applying the SOD-programme should stop all turbines during times of high migratory activity and when large flocks approach the wind farm. Within the SOD-programme, a monitoring of bird migration in spring (e.g. March 1st to May 18th) carried out by experienced ornithologists is required (probably using radar technology). The ornithologists should stay in close contact with the engineering office in charge of monitoring the operation of the wind farms, so that the wind farm can be shutdown rapidly if required. This implies the requirement that all wind farms are centrally controlled (including installation of central control facilities).

Sanitary Installations and Wastewater

The control of Wastewater must be applied during the phases of the project. Wastewater can represent negative impacts on environmental and health of the workers if not appropriate measures are applied. It is very relevant to consider facilities to storage and control the wastewater.

D.2. Environmental impact assessment

In accordance with the applicable provisions in the project standard, the conclusions from the environmental impact assessment the "Environmental & Social Impact Assessment for 262.5 MW Wind Power Project at Gulf of Suez", dated February 2017 are presented below.

- The Construction phase will have most of the impacts. However, based on the methodology applied, the overall impact of this phase is considered NEGATIVE MINOR.
- The Operation & Maintenance and Decommissioning phases will have NEGATIVE IRRELEVANT impacts.

- Most of the impacts will be on the Biological receptors, especially in the “Fauna Component” due the construction, operation and the activities related. Mitigation actions must to be focused to prevent and minimize the negative impacts.
- According to the methodology applied, the impacts produced by the project can be considered as NEGATIVE IRRELEVANT.
- The “Wind turbines foundation” and “Operation of the wind turbines” will be the most critical activities that need attention during the project, due the risk of disturbance of the flora and for the risk of collision of the migratory birds. It is important to mention that some mitigations actions can be applied in order to avoid and/or minimize the impacts.
- The project will have a POSITIVE impact in the Socioeconomic Factors due the local consumption of products, the need of local manpower and the generation of energy.
- Decommissioning phase is considered as POSITIVE. And the critical activity of this phase is to control the waste generated during the dismantling activities.
- Migratory Birds is the most key receptor. It is extremely necessary to perform all measures mutually agreed between RAS GHAREB WIND ENERGY S.A.E. (RGWE), other developers and NREA with the coordination of RCREEE.

SECTION E. Local stakeholder consultation

E.1. Modalities for local stakeholder consultation

Effective Stakeholder Engagement can lead to improved financial, social and environmental outcome and must take the form of an ongoing process in a structurally and culturally appropriate manner with Affected Communities and, where relevant, other Stakeholders. In order to achieve an effective Stakeholder Engagement, Project Developer has a formal document named “Stakeholders Engagement Plan” involving: the stakeholder analysis and planning; disclosure and dissemination of information; consultation and participation; grievance mechanism; ongoing reporting to Affected Communities.

Stakeholder Engagement is developed as a documented system, deployed from the Stakeholder Engagement and Corporate Social Responsibility policy, with a strong legal framework – ranging from relevant Egyptian laws, permits, and authorizations until international legal obligations. All the documents shall be managed by the same approach.

Egyptian Regulations

The Egyptian stakeholder consultation regulation is grounded on the following legal norms: Environmental Law no. 4/ 1994 and the Executive Amendment no. 9/2009 modified by Ministerial Decrees no. 1095/2011 and no. 710/2012. According to this legal framework, stakeholder consultations are required to take place prior to the approval of proposed projects that requires an Environmental Impact Assessment – such as the current project. Such regulations also require certain groups of institutional stakeholders, such as representatives of the Egyptian Environmental Affairs Agency "EEAA" and its regional branches, related governmental authorities, governorate where the project is located, local parliaments and influenced groups of nearby institutions or residents.

Public Consultations (2010 and 2011)

Based on the Egyptian regulation pertaining stakeholder consultations, the project description containing relevant information for stakeholder consultation including the project area, has been prepared and distributed for information until 06.09.2010 by delivery with receipt confirmation. Comments were received until 30.09.2010 – the table below depicts the stakeholder groups that took part in such process:

Designation	Address	Received by Stakeholder	Comments received until September 30th, 2010
Chairman Egyptian General Petroleum Corporation (EGPC)	Palestine Street part 4, New Maadi, Cairo, Egypt Fax: 702 88 13 / 703 14 57 E-mail: info@egpc.com.eg	Sep 1st, 2010	None
Chairman Gulf of Suez Petroleum Company	Palestine Street 4th New Maadi, Cairo, Egypt Tel +202-702 0985	Sep 6th, 2010	None
The Manager for Assistance Services Gulf of Suez Petroleum Company	Ras Shukheir	Sent Aug 30th 2010 and signed for receipt	None
General Secretary Red Sea Governorate	Dahar-Hurghada	Sep 2nd, 2010	Comments see below
General Manager of Environmental Department Red Sea Governorate	Dahar-Hurghada Tel: 002 065 3546892 E-mail: info@redsea.gov.eg	Sep 2nd, 2010	None
Chairman Egyptian Environmental Affairs Agency (EEAA)	30 Misr - Helwan Agricultural Road - Maadi - Cairo, Egypt P.O. Box 11728 Tel: 25256452 Fax: 25256490	Sep 5th,2010	None
Chairman Ras Gharib City Administration	Ras Gharib	Sep 5th, 2010	None
Chairman Ras Gharib Local Council	Ras Gharib	Sep 5th, 2010	None
Swalam Amen Family	On site	Sep 5th, 2010	None

A public hearing carried out by NREA in 21.09.2011 had the participation of 80 participants of various stakeholders' groups. Invitations for the public hearing were distributed for the stakeholder groups as required by the Egyptian regulation in 3 weeks in advance - Arabic version of the project's executive summary was made available simultaneously to the public hearing participants. This information and procedure were verified and certified through the Environmental and Social Impact Assessment dated of February 2017 and may be verified by the Public Hearing Workshop registration forms depicted below:

During the Public Hearing no new concerns or issues on environmental or social issues were raised. The Public Hearing was mainly focused on clarifications and better understanding of the project description, in particular the Environmental Management Plan (EMP).

Further Consultations (2018 and 2019)

In addition to the Public Hearing held in 2011, the Project Developer also conducted further initiatives pertaining stakeholder consultations with a view to better consider eventual local stakeholder concerns. In June 2018 a Corporate Social Responsibility delegation was sent to the site are to meet local residents and business owners of Ras Ghareb as well as the site stakeholders. The delegation held a community meeting with the city Chairman and met with schools and hospital directors of the city. Further, the delegation also visited the site, met with the construction team, some of the current workers and the Bedouins. Finally, the delegation held a housing and minimum salary audit with regards to the construction subcontractors.

What is more, the Project Developer also carried out further and additional processes to consult local stakeholders on the impacts of the proposed CDM project and address their comments as an additional step to promote the continued engagement with stakeholders throughout the development of the project. A meeting was held in Cairo on 11/02/2019 at Orascom Construction office, Nile City towers, where representatives from various organizations were invited. The objective of the meeting was to reinforce the elements and aspects that were discussed in the Public Hearing in 2011, address eventual new comments and inquiries of the local stakeholders on the proposed CDM project and ensure that their comments have been taken into consideration while preparing the PDD.

The list of invitees to the additional consultation meeting included representatives from the following organizations:

Governmental Organizations	Consultants and Research Centers
Ras Ghareb City Council	Arabian Company for Technical and Engineering Services
Egyptian Designated National Authority (DNA)	Elgiza Misr Company
Egyptian Environmental Affairs Agency (EEAA), Climate Change Central Department (National Focal point to UNFCCC)	Rabiah General Contracting & Engineering Consultancy
EEAA, Central Environmental Impact Assessment	EHE Consult
EEAA, Central department of air quality and noise	General & Electromechanical Co.
New and Renewable Energy Authority (NREA)	**Others**
Egyptian Electricity Transmission Company (EETC)	Banque Misr
Egyptian Electricity Holding Company (EEHC)	Brisk Business Egypt – LTD
-	MAS ENGINEERING & TRADING CO
-	Media representatives

Project Developer sent private invitations to the aforementioned concerned parties and an announcement was publicized in three different and popular local newspapers (Almasry Alyoum, AlAhram and AlAkhbar Newspapers) on 29/01/2019 to invite interested organizations and personnel from the public. The executive summary of the project (in Arabic and English Languages) was made available online as well as the PDD on the company's website (http://rgwe.co/en/cdm/) 15 days in advance of the consultation meeting. The company also published on its website a public invitation to the meeting and an online enquiry form to receive stakeholders' inquiries and comments on the proposed project activity.

During the meeting, it was presented an overview of the project activities in Ras Ghareb, the timeline for project implementation, and the company's commitment to environmental improvement and sustainable development. The main topics presented were: Objectives of the Meeting; Project Drivers; The greenhouse effect; Kyoto Protocol and CDM; Clean Development Mechanism; How does CDM project cycle work; Benefits of CDM; CDM Methodology; Baseline and Project Scenarios; Duration of Project Activity; Estimated CERs; Environmental Impacts; Contribution of the Project to Sustainable Development.

The importance of stakeholders meeting to take the comments and inquiries of stakeholders into consideration was stressed. After the presentation, a discussion session was held to address the inquiries of the attendees. The consultant and company representatives replied to inquiries from the attendees. A questionnaire form was distributed to the attendees afterwards to provide any comments they have and also mention their opinions on the project.

E.2. Summary of comments received

In the Public Hearings that took place in 2011 no new concerns or arguments on environmental or social issues appeared that had not already been addressed in the draft ESIA document. Other than that, no comment received resulted in a direct change in the project design. All comments received during the meeting that were specifically related to this CDM proposed project activity were already addressedby the ESIA.

Most of the replies to the questionnaires in the subsequent additional stakeholder engagement conducted in 2019 howed that the attendees agreed that the project will contribute to the sustainable development of the area. The attendees explained their agreement by stating that the project will contribute in reducing CO_2 emissions, developing clean and renewable energy available in Egypt to produce electricity, increasing job opportunities in the area of Ras Ghareb (since most of the job opportunities in that area are in the oil and gas field), transferring of new technology and experience and improving air quality by reducing the country's dependency on producing electricity from fossil fuels.

Most of the replies to the questionnaire in the subsequent additional stakeholder engagement conducted in 2019 also showed that the attendees agree that the project will have positive environmental impacts on the surrounding area. The positive environmental aspects reflected in their replies included reducing local air pollutants, specifically SO_x and NO_x resulting from fossil fuels combustion, reducing greenhouse gases and using clean source of energy to produce electricity. Some of the attendees agree that the project will impact the environment positively in case the negative impacts of the project are mitigated properly (such as bird migration).

All replies to the questionnaire in the subsequent additional stakeholder engagement conducted in 2019 showed that the attendees agree on the implementation of the project activity. The attendees agreed that the project is in line with Egypt's sustainable development strategy.

Moreover, all replies to the questionnaire showed that the industrial area in Egypt will benefit from the project activity. Their answers justification is that the project will contribute to increasing the energy mix of Egypt's electricity grid, which in turn will provide energy stability to all consumers. Some of the replies pointed out that the values of CERs sold can reflect also on the industrial field in Egypt, indirectly. Other replies also referred to the technology transfer that the project will provide, which will in turn influence the industrial sector by possibly encouraging local manufacturing of the projects components in Egypt.

E.3. Consideration of comments received

All the comments during the meeting and in subsequent additional consultations were responded exhaustively to the attendee's satisfaction. No comment resulting from the local stakeholders' consultation presented any need or request to change the PDD.

In addition to that, there are no complaints or negative comments provided by local stakeholders to this date.

SECTION F. Approval and authorization

Project participants listed in the PDD should be authorized by at least one Party involved in the project activity, i.e. Egypt as the Host Party and only party involved, in the respective letter of approval. No separate letters are needed.

The Letter of Approval (LoA) from Egypt (the Host Party and the only Party involved in the proposed project activity), dated 15/03/2020, was obtained after submitting the PDD to the DOE for validation.

The Host Party approval process is now completed and made available to the DOE before the end of validation.

Appendix 1. Contact information of project participants

Organization name	Ras Ghareb Wind Energy S.A.E. - RGWE
Country	Egypt
Address	Unit 1418, Floor 14, Nile City, Southern Tower, Ramlet Boulaq, Cairo, Egypt
Telephone	+201277775980
Fax	N/A
E-mail	miklos.almasy@rasgharebwindenergy.com
Website	https://www.linkedin.com/company/rasgharebwind/
Contact person	Miklos Almasy, CEO of RGWE

Organization name	Egyptian Electricity Transmission Company (EETC)
Country	Egypt
Address	Emtedad Ramsis St., ABBASSEYA, Waily, Cairo Governorate, Egypt
Telephone	+20 100 122 9053
Fax	N/A
E-mail	eman_eetc@yahoo.com boo.wind.egypt@gmail.com
Website	http://www.eehc.gov.eg/
Contact person	Eng. Eman Rashad

Organization name	Egyptian Environmental Affairs Agency (EEAA)
Country	Egypt
Address	30 Misr Helwan El-Zyrae Road, Maadi , 11728 Cairo, Egypt
Telephone	+201027800997
Fax	N/A
E-mail	unfccc_eg.cccu@yahoo.com
Website	http://www.eeaa.gov.eg/
Contact person	Dr. Mohamed Salah El Said, CEO

Appendix 2. Affirmation regarding public funding

Not applicable

Appendix 3. Applicability of methodologies and standardized baselines

ACM0002 - Grid-connected electricity generation from renewable sources	
Applicability Condition	**Justification**
This methodology is applicable to grid-connected renewable energy power generation project activities that: (a) Install a Greenfield power plant; (b) Involve a capacity addition to (an) existing plant(s); (c) Involve a retrofit of (an) existing operating plants/units; (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s)/unit(s).	Applicable and fulfilled. The project activity is installation of a new grid connected Wind power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield plant).
The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit.	Applicable and fulfilled. The proposed project activity is an installation of a new grid connected wind power plant/ unit.
In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects) the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.	Not applicable. The project does not involve any capacity additions, retrofits or replacements.
In case of hydro power plants, one of the following conditions shall apply: (a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or (b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density, calculated using equation (3), is greater than 4 W/m2; or (c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m2; or (d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (3), is lower than or equal to 4 W/m2, all of the following conditions shall apply: (i) The power density calculated using the total installed capacity of the integrated project, as per equation (4), is greater than 4 W/m2; (ii) Water flow between reservoirs is not used by	Not applicable. The proposed project activity is an installation of a new grid connected wind power plant/unit.

ACM0002 - Grid-connected electricity generation from renewable sources	
Applicability Condition	**Justification**
any other hydropower unit which is not a part of the project activity; (iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m2 shall be: a. Lower than or equal to 15 MW; and b. Less than 10 per cent of the total installed capacity of integrated hydro power project.	
In the case of integrated hydro power projects, project proponent shall: (a) Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or (b) Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore, this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.	Not applicable. The proposed project activity is an installation of a new grid connected wind power plant/ unit.
The methodology is not applicable to: (a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; (b) Biomass fired power plants/units.	Not applicable. The proposed project activity is an installation of a new grid connected wind power plant/ unit. It does not involve switching from fossil fuel to renewable energy and/or biomass of any kind.
In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance".	Not applicable. The proposed project activity is an installation of a new grid connected wind power plant/ unit. It does not involve retrofits, replacement or capacity additions.

TOOL07 - Tool to calculate the emission factor for an electricity system	
Applicability Condition	**Justification**
This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects).	Applicable and fulfilled. The project activity is installation of a new grid connected Wind power plant/ unit, thus substituting grid electricity that would be required otherwise without the project.
Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, two sub-options under the step 2 of the tool are available to the project participants, i.e. option IIa and option IIb. If option IIa is chosen, the conditions specified in "Appendix 1: Procedures related to off-grid power generation" should be met. Namely, the total capacity of off-grid power plants (in MW) should be at least 10 per cent of the total capacity of grid power plants in the electricity system; or the total electricity generation by off-grid power plants (in MWh) should be at least 10 per cent of the total electricity generation by grid power plants in the electricity system; and that factors which negatively affect the reliability and stability of the grid are primarily due to constraints in generation and not to other aspects such as transmission capacity.	Applicable and fulfilled. The project activity is installation of a new grid connected Wind power plant/ unit, thus substituting grid electricity that would be required otherwise without the project. The emission factor is being calculated for grid power plants only.
In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country.	Not applicable. The project activity is installation of a new grid connected Wind power plant/ unit in Egypt and does not involve locations in an annex I country.
Under this tool, the value applied to the CO_2 emission factor of biofuels is zero.	Applicable and fulfilled. The project activity is installation of a new grid connected Wind power plant/ unit, thus not involving any kind of biofuels. However, if any biofuel plant is involved in the emission factor calculation, the zero value for the emission factor will be applied.

Appendix 4. Further background information on ex ante calculation of emission reductions

GRID EMISSION FACTOR – OPERATION MARGIN CALCULATION DATA

Table: Net Electricity Production for the most recent 3 years including low-cost/must-run power plants

Net Electricity Production GWh			
Type:	**2014/2015**	**2015/2016**	**2016/2017**
Hydro	13,704	13,410	12,726
Generated Energy from Wind	1,391	2,031	2,173
Generated Energy Solar	-	168	580
Purchased Energy from IPPs	32	42	35
Thermal	140,350	152,106	156,574
Generated from private sector (BOOT)	13,479	12,496	11,383
Total Net electricity generated (excluding isolated units), (GWh)	**168,956**	**180,253**	**183,471**

Source: MOEE Annual Reports for the indicated year, Table performance statistics of power plants. website: http://www.moee.gov.eg/english_new/report.aspx

Table: Net Electricity Production for the most recent 3 years excluding low-cost/must-run power plants

Net Electricity Production GWh			
Type:	**2014/2015**	**2015/2016**	**2016/2017**
Thermal	140,350	152,106	156,574
Purchased Energy from IPPs	32	42	35
Generated from private sector (BOOT)	13,479	12,496	11,383
Total Net electricity generated (excluding isolated units) (GWh)	**153,861**	**164,644**	**167,992**

Source: MOEE Annual Reports for the indicated year, Table performance statistics of power plants. website: http://www.moee.gov.eg/english_new/report.aspx

Table: Fossil fuels amounts consumed in the project electricity system in the most recent 3 years

Fossil Fuels Consumption				
Fuel type	**Units**	**2014/2015**	**2015/2016**	**2016/2017**
HFO	Tonnes	8,627,000.00	8,958,000	7,281,000.00
NG	m^3	29,332,000,000	30,387,000,000	33,640,000,000
NG	Tonnes[18]	22,826,459	23,647,471	26,178,988
LFO	Tonnes	355,600	1,074,200	558,700[19]
Special LFO	Tonnes	128,400	121,500	-

[18] 1 ton of NG = 1,285 m^3. Source: Appendix 1, CER sheet "NCV, EF CO2 and other data: https://cdm.unfccc.int/Projects/DB/RWTUV1356213482.7/view

[19] This number represents the L.F.O and special L.F.O for year 2016/2017 since they were reported in the MOEE report in total and not separated.

GRID EMISSION FACTOR - BUILD MARGIN CALCULATION DATA

Table: The set of five power units, other than the power units registered as CDM project activities that started to supply electricity to the grid most recently ($SET_{5\ units}$)

Power Plant	No. of Units	Installed capacity (MW)	Fuel	Net[20] Electricity generated (GWh)	Commissioning Date	Most recent commissioning date	% of System Net Total
Burulls	6× 400	2400	N.G-L.F.O	1,387.4	2017	2017	0.8%
Beni Suef	6× 400	2400	N.G-L.F.O	3,225	2017	2017	1.8%
New Capital	2× 400	800	N.G-L.F.O	727.2	2017	2017	0.4%
Thermal Suez	1x 650	650	H.F.O-L.F.O	1,816.5	2017	2017	1.0%
El-Huraghda Ext	6x 48	288	N.G	435.2	2017	2017	0.2%
Total				**7591.3**	**4.1%**		

Source: MOEE Annual Reports for year 2016/2017, Table Installed Capacities of Power Plants: Website: http://www.moee.gov.eg/english_new/report.aspx

Table: The set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently

Power Plant	No. of Units	Installed capacity (MW)	Fuel	Net Electricity generated (GWh)[21]	Commissioning Date	Most recent commissioning date	% of System Net Total	CDM Project Yes/No[22]
Banha	2x 250 + 1x 250	750	N.G-L.F.O	4,780.7	2014-2015	2014-2015	2.6%	No
Ataka (fast track)	2x 156 + 2x 164	640	N.G-L.F.O	1,308.1	2016	2016	0.7%	No
West Damietta Ext	4x 125	500	N.G	1,022.3	2016	2016	0.6%	No
West Assiut	8x 125	1000	H.F.O-L.F.O	1,093.4	2016	2016	0.6%	No
Burulls	6× 400	2400	N.G-L.F.O	1,387.4	2017	2017	0.8%	No
Beni Suef	6× 400	2400	N.G-L.F.O	3,225	2017	2017	1.8%	No
New Capital	2× 400	800	N.G-L.F.O	727.2	2017	2017	0.4%	No
Thermal Suez	1x 650	650	H.F.O-L.F.O	1,816.5	2017	2017	1.0%	No
Giza North	6x 250 + 3x 250	2250	N.G-L.F.O	12,857.4	2014-2015-2016	2014-2015-2016	7.0%	No
06-Oct	8x 150	1200	N.G-L.F.O	2,583.5	2012-2015-2016	2012-2015-2016	1.4%	No
Ain Sokhna	2x 650	1300	N.G-H.F.O	5,963.5	2015	2015	3.3%	No
Sharm El-Sheikh Ext	6x 48	288	L.F.O	4	2016	2016	0.0%	No
El-Huraghda Ext	6x 48	288	N.G	435.2	2017	2017	0.2%	No
Port Said Ext	2x 43	84	L.F.O	5.5	2017	2017	0.0%	No
Cairo Mobile	2x 43	84	L.F.O	43	2017	2017	0.0%	No
New Mahmoudia	2x 168	336	N.G-L.F.O	38.9	2016	2016	0.0%	No
Upper Mobile	14x 25	350	L.F.O	198	2016	2016	0.1%	No
Total				**37,489.60**	**20.43%**			-

Source: MOEE Annual Reports for year 2016/2017, Table Installed Capacities of Power Plants: Website: http://www.moee.gov.eg/english_new/report.aspx

[20] Source: MOEE Annual Reports for year 2016/2017, Table Performance Statistics of Power Plants: Website: http://www.moee.gov.eg/english_new/report.aspx

[21] Source: MOEE Annual Reports for year 2016/2017, Table Performance Statistics of Power Plants: Website: http://www.moee.gov.eg/english_new/report.aspx

[22] Source: The list of Registered Egyptian CDM Projects (as of January 2018) can be found on: http://www.eeaa.gov.eg/portals/0/eeaaReports/N-CC/Update%20of%20registered%20CDM%20Projects%20January%202018.pdf

Table: CO_2 emissions from each power unit per MWh

Power Plant	Power Station type	Primary energy source	Net Electricity Generated (MWh)	Fuel energy cons. (ktoe) *	Fuel energy cons. (TJ)	tCO_2 (NG)	tCO_2 (L.F.O)	tCO_2 (H.F.O)	tCO_2/MWh
Banha	CC	N.G-L.F.O	4,780,700	802.4	33,540	1,821,239	-	-	0.381
Ataka	G	N.G-L.F.O	1,308,100	351	14,672	796,679	-	-	0.609
West Damietta Ext	G	N.G	1,022,300	284	11,871	644,606	-	-	0.631
West Assiut	G	H.F.O-L.F.O	1,093,400	317	13,251	-	961,993.56	-	0.880
Burulls	CC	N.G-L.F.O	1,387,400	338	14,128.4	767,172	-	-	0.553
Beni Suef	CC	N.G-L.F.O	3,225,000	796	33,272.8	1,806,713	-	-	0.560
New Capital	CC	N.G-L.F.O	727,200	167	6,980.6	379,047	-	-	0.521
Thermal Suez	-	H.F.O-L.F.O	1,816,500	415.9	17,384.62	-	1,262,123.41	-	0.695
Giza North	CC	N.G-L.F.O	12,857,400	2192.9	91,663.22	4,977,313	-	-	0.387
06-Oct	G	N.G-L.F.O	2,583,500	738.6	30,873.48	1,676,430	-	-	0.649
Ain Sokhna	St	N.G-H.F.O	5,963,500	1304.1	54,511.38	2,959,968	-	-	0.496
Sharm El-Sheikh Ext	G	L.F.O	4,000	1.5	62.7	-	4,552	-	1.138
El-Huraghda Ext	G	N.G	435,200	108	4,514.4	245,132	-	-	0.563
Port Said Ext	G	L.F.O	5,500	1.6	66.88	-	4,855	-	0.883
Cairo Mobile	G	L.F.O	43,000	11.5	480.7	-	34,899	-	0.812
New Mahmoudia	G	N.G-L.F.O	38,900	11.4	476.52	25,875	-	-	0.665
Upper Mobile	G	L.F.O	198,000	55	2,299	-	166,907	-	0.843

*1 Ktoe = 41.8 TJ

**For plants using N.G and L.F.O/H.F.O, it is assumed that 100% of the fuel used was Natural Gas for conservativeness (lower emission factor), since the amount of fuel from each type is not informed.

***For plants using L.F.O and H.F.O, it is assumed that 100% of the fuel used was LFO for conservativeness (lower emission factor), since the amount of fuel from each type is not informed.

Appendix 5. Further background information on monitoring plan

Not applicable.

Appendix 6. Summary report of comments received from local stakeholders

There are no comments received to date from local stakeholders forwarded by the Egyptian DNA. All comments mentioned below occurred during the CDM Local Stakeholders Public Meeting. Several of the comments received were either a generic question or a personal clarification to the attendee, not relating directly with this proposed project activity.

The main subjects from the comments raised relating to this proposed project activity were the following:

I. Project financial structure.

Summary of the answer: The proposed project activity already described all the publicly available information in the Investment Analysis.

II. Attendants from the meeting involving stakeholders from the surrounding area of the project activity (Ras Ghareb).

Summary of the answer: Main local stakeholders were invited and confirmed participation on the meeting.

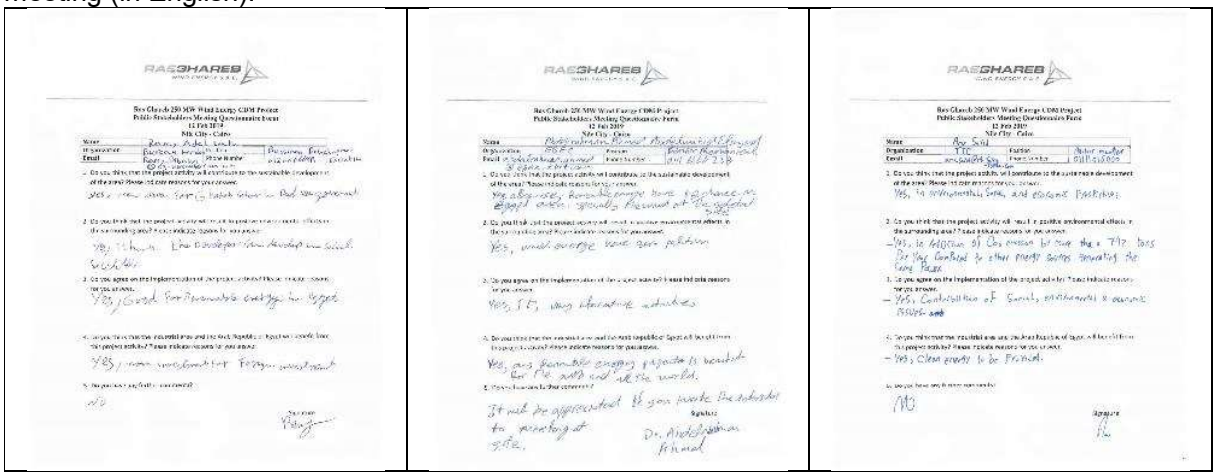
III. Availability of the feasibility study.

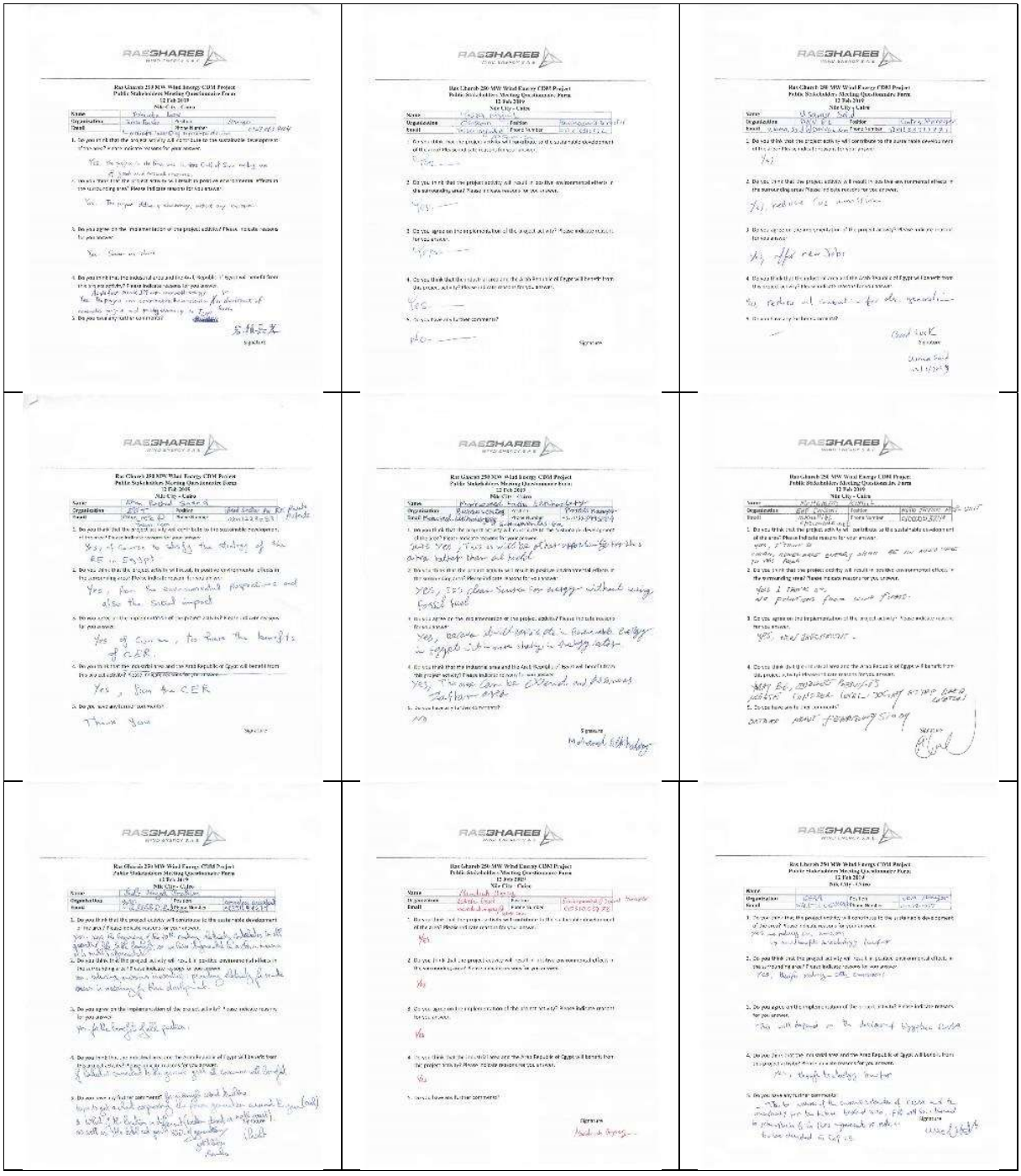
Summary of the answer: The feasibility study is already available in Project Developer website and the PDD already summarizes the main findings of this document.

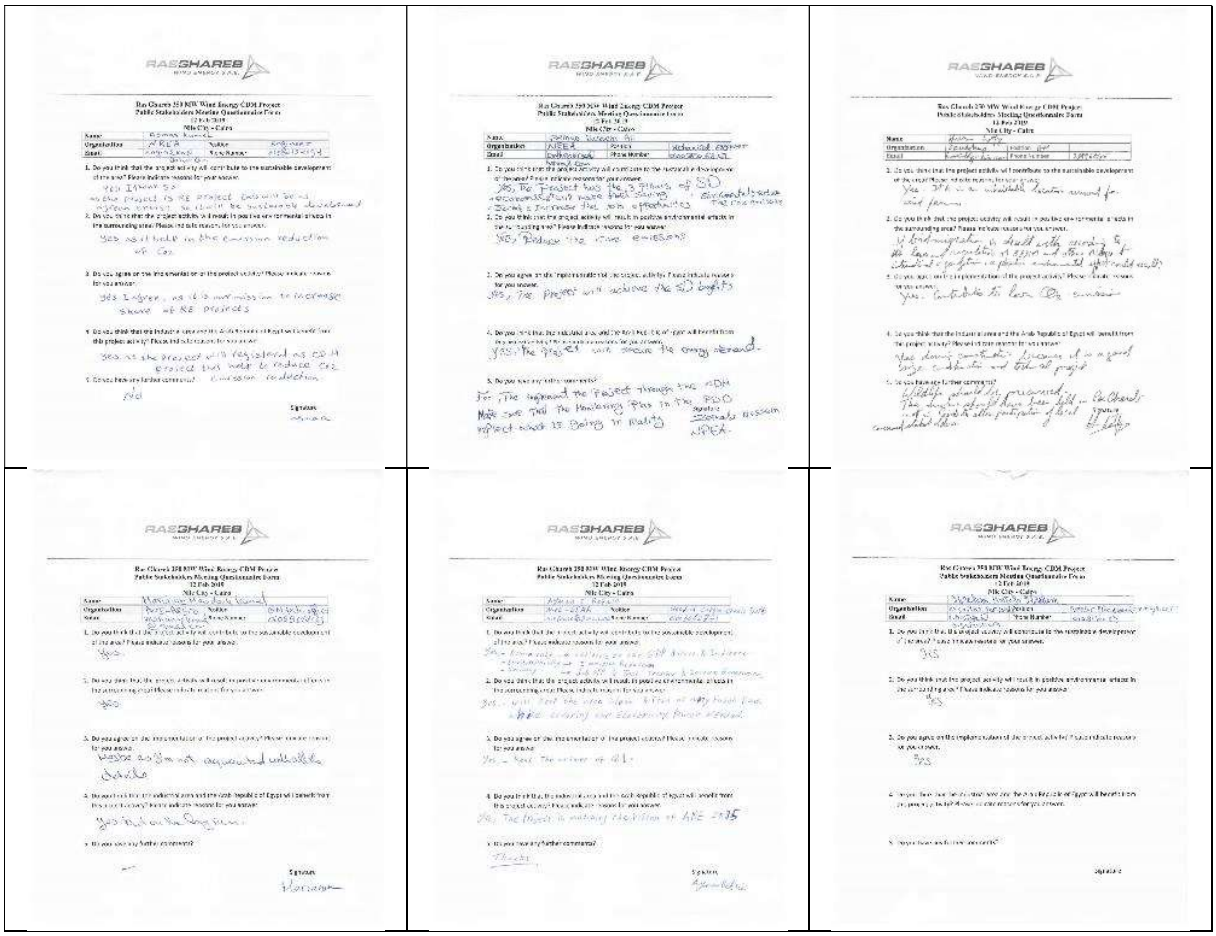
IV. EETC as an end user or participant of the project.

Summary of the answer: EETC is a project participant.

Please find below a copy of the forms filled in by some of the participants on the local stakeholders' meeting (in English).







Please find below a copy of the forms filled in by some of the participants on the local stakeholders' meeting (in Arabic).

Please find below a copy of the registration form (attendance sheet) for the local stakeholders' meeting.

RASGHAREB WIND ENERGY S.A.E.

Company	Name	Mobile	Email	Signature
Rebish General Contracting & Engineering Consultancy	Ashraf Zaghlol Ibrahim	[illegible]	[illegible]	
Rebish General Contracting & Engineering Consultancy	Ahmed Abd Elgawad Youssef	[illegible]	[illegible]	[signature]
Orascom	Yasser Naguib	1224511090	[illegible]	
Banque Misr	[illegible] Samir	1224929801	[illegible]	
Vision Morocco	Wael Fareed		[illegible]	[signature]
Bureau Veritas	Mohamed Fate Elkhodary	[illegible]	[illegible]	[signature]
Bureau Veritas	Mr. Akram Mortada		[illegible]	[signature]
Brisk Business Egypt	Bassma Tarek	1201201450	[illegible]	[signature]
Bureau Veritas Egypt LLC	Mr. Ramy B'bawi		[illegible]	
EHE Consult	Mohamed Khalil	[illegible]	[illegible]	[signature]
EHE Consult	Zeinab Hussein Ali	1022536847	[illegible]	Zeinab Hussein
DNV GL	Usama Said	[illegible]	[illegible]	[signature]
Central Environmental Impact Assessment (EIA)	Mohamed abdallah swed			
Central Environmental Impact Assessment (EIA)	Abo kasem mohamed elbashier			[signature]
Redwell	Mosaad Hegazy	1111112597		
MASTING NESBING & TRADING CO	Khaled Elsheikh	[illegible]		[signature]
New & Renewable Energy Authority	Asmaa Gamal		[illegible]	[signature]
aekela	Mamdouh Hegazy	[illegible]	[illegible]	[signature]
Egypt Misr Company	Ibrahim Moustafa	[illegible]	[illegible]	Ibrahim Mostafa
Egypt Misr Company	Karim Hisham	[illegible]	[illegible]	Karim Hesham
EETC	Eman Rashed	112 671 0599	[illegible]	[signature]
EETC	Hameeda El-Sayed	114 716 1738	[illegible]	[signature]
EETC	Doha Ahmed		[illegible]	
EETC	Amal Mohsen			[signature]
EEAA	Mr. Wael Farag	[illegible]	[illegible]	
New & Renewable Energy Authority	Mr. Ehab		[illegible]	
Arabian Company for Technical and Engineering Services	Osama Abd Elaziem Abdullah	1005038754	[illegible]	
	Ehab Elyeed	1551187127		[signature]
President of Ras Ghareb City Council	Yasser Shaaban			
General & Electromechanical Co	Gamal Reek	[illegible]	[illegible]	
RGWE	Mikhas Almasy	[illegible]	[illegible]	[signature]
RGWE	Mona Ayad	[illegible]	[illegible]	[signature]
Toyota Tsusho Corporation	Iwasa Yoshitaka		[illegible]	[signature]
Toyota Tsusho Corporation	Amr Sayed	1200595567	[illegible]	[signature]
Integral Consult	Ahmed Wafiq	[illegible]	[illegible]	[signature]
[illegible]		[illegible]	[illegible]	
Ahmed El Hekimi		[illegible]	[illegible]	[signature]
Ghada Kuzbari Orient		[illegible]	[illegible]	
EG-EC	Abdelrahman Ahmed	0111 6666 339	[illegible]	
Ayman Rafaie	MOE	[illegible]	[illegible]	
[illegible]	MOE	[illegible]		
Arab Renewable energy Co. Aoi	Marsanne Mamdouh	[illegible]	[illegible]	

Please find below a copy of the public invitation (journal ads) for the local stakeholders' meeting.

دعــوة

RASGHAREB WIND ENERGY S.A.E.

جلسة استماع مشروع آلية التنمية النظيفة

تتشرف شركة راس غارب لطاقة الرياح بدعوة كل من يهمه الامر للحضور والمشاركة بالرأى فى جلسة الاستماع المتعلقة بمشروع آلية التنمية النظيفة (CDM) بخصوص مشروع إنشاء محطة رياح جديدة بقدرة ٢٦٢,٥ ميجاوات فى راس غارب وذلك فى يوم الثلاثاء الموافق ١٢ فبراير فى ابراج نايل سيتى - البرج الجنوبى - الدور الرابع -غرفة ٤١٥ - ٢٠٠٥ أ - كورنيش النيل - القاهرة فى تمام الساعة ١٠:٠٠ صباحا.

يرجى تأكيد الحضور عن طريق الهاتف أو (٠١٢٠٠٧٠٧٤٧٠) أو عن طريق الموقع الالكترونى. للاطلاع على الملخص التنفيذى للدراسة، برجاء زيارة الموقع الالكترونى التالي:
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شركه رأس غارب لطاقة الرياح
الدور ١٤ – قطاع ١٤١٨
ابراج نايل سيتى - البرج الجنوبى

دعـوة

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جلسة استماع
مشروع آلية التنمية النظيفة
تتشرف شركة رأس غارب لطاقة الرياح
بدعوة كل من يهمه الأمر للحضور والمشاركة بالرأى
فى جلسة الاستماع المتعلقة
بمشروع آلية التنمية النظيفة (CDM)
بخصوص مشروع إنشاء محطة رياح جديدة
بقدرة ٢٦٢,٥ ميجا وات فى رأس غارب
وذلك فى يوم الثلاثاء الموافق ١٢ فبراير
فى أبراج نايل سيتى - البرج الجنوبى
الدور الرابع - غرفة ٤١٥ - ٢٠٠٥أ
كورنيش النيل - القاهرة فى تمام الساعه ١٠ صباحا
يرجى تأكيد الحضور عن طريق الهاتف
(٠١٢٠٠٧٠٧٤٧٠)
أو عن طريق الموقع الالكترونى
للإطلاع على الملخص التنفيذى للدراسة
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أبراج نايل سيتي البرج الجنوبي

RASGHAREB دعوة

جلسة استماع مشروع آلية التنمية النظيفة

تتشرف شركة راس غارب لطاقة الرياح بدعوة كل من يهمه الامر للحضور والمشاركة بالرأي في جلسة الاستماع المتعلقة بمشروع آلية التنمية النظيفة (CDM) بخصوص مشروع انشاء محطة رياح جديدة بقدرة ٢٦٢,٥ ميجاوات في راس غارب وذلك في يوم الثلاثاء الموافق ١٢ فبراير في ٢٠٠٥ أ كورنيش النيل - ابراج نايل سيتي - البرج الجنوبي - القاهرة الدور الرابع غرفة ٤١٥ في تمام الساعة ١٠:٠٠ صباحا.

يرجى تأكيد الحضور عن طريق الهاتف
(٠١٢٠٠٧٠٧٤٧٠)
أو عن طريق الموقع الالكتروني.

للإطلاع على الملخص التنفيذي للدراسة، برجاء زيارة الموقع الالكتروني التالي:
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نتطلع لمشاركتك وشكرا

شركه راس غارب لطاقة الرياح
الدور ١٤ – قطاع ١٤١٨
ابراج نايل سيتي - البرج الجنوبي

Please find below a copy of some private invitations for the local stakeholders' meeting.

CLIMATE LINK — RASGHAREB

To whom it May Concern

CDM Stakeholders Meeting Invitation

CLIMATE LINK — RASGHAREB

To whom it May Concern

CDM Stakeholders Meeting Invitation

CLIMATE LINK — RASGHAREB

Ras Ghareb Wind Energy SAE
Unit 1418, Floor 14
Nile City, Southern Tower
Ramlet Boulac, Cairo, Egypt

جلسة استماع مشروع آلية التنمية النظيفة

Appendix 7. Summary of post-registration changes

Not applicable.

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Document information

Version	*Date*	*Description*
11.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN); • Make editorial improvements.
10.1	28 June 2017	Revision to make editorial improvement.
10.0	7 June 2017	Revision to: • Improve consistency with the "CDM project standard for project activities" and with the PoA-DD and CPA-DD forms; • Make editorial improvement.
09.0	24 May 2017	Revision to: • Ensure consistency with the "CDM project standard for project activities" (CDM-EB93-A04-STAN) (version 01.0); • Incorporate the "Project design document form for small-scale CDM project activities" (CDM-SSC-PDD-FORM); • Make editorial improvement.
08.0	22 July 2016	EB 90, Annex 1 Revision to include provisions related to automatically additional project activities.
07.0	15 April 2016	Revision to ensure consistency with the "Standard: Applicability of sectoral scopes" (CDM-EB88-A04-STAN) (version 01.0).
06.0	9 March 2015	Revision to: • Include provisions related to statement on erroneous inclusion of a CPA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Provisions related to the Host Party; • Make editorial improvement.

Version	*Date*	*Description*
05.0	25 June 2014	Revision to: • Include the Attachment: Instructions for filling out the project design document form for CDM project activities (these instructions supersede the "Guidelines for completing the project design document form" (Version 01.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the project activity in B.7.4 and Appendix 1; • Change the reference number from F-CDM-PDD to CDM-PDD-FORM; • Make editorial improvement.
04.1	11 April 2012	Editorial revision to change version 02 line in history box from Annex 06 to Annex 06b.
04.0	13 March 2012	Revision required to ensure consistency with the “Guidelines for completing the project design document form for CDM project activities” (EB 66, Annex 8).
03.0	26 July 2006	EB 25, Annex 15
02.0	14 June 2004	EB 14, Annex 06b
01.0	03 August 2002	EB 05, Paragraph 12 Initial adoption.

Decision Class: Regulatory
Document Type: Form
Business Function: Registration
Keywords: project activities, project design document