

Arab Republic of Egypt  
Ministry of Electricity & Energy  
New & Renewable Energy  
Authority (NREA)



# Egyptian Renewable Energy Activities and Strategy

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**Director of Planning Division**  
**April 2013**



# Arab Republic of Egypt



**Capital : Cairo**



## General Information

- ❑ **Total Area**: 1,001,450 sq. km
- ❑ **Population**: 83,688,164 (July 2012 est.)country
- ❑ **Religions**: Muslim (mostly Sunni) 90%, Coptic 9%, other Christian 1%
- ❑ **Languages**: Arabic (official), English and French widely understood by educated classes
- ❑ **Climate**: desert; hot, dry summers with moderate winters
- ❑ **Natural resources**: petroleum, natural gas, iron ore, phosphates, manganese, limestone, gypsum, talc, asbestos, lead, rare earth elements, zinc

## Economy - overview

### ❑ GDP (purchasing power parity):

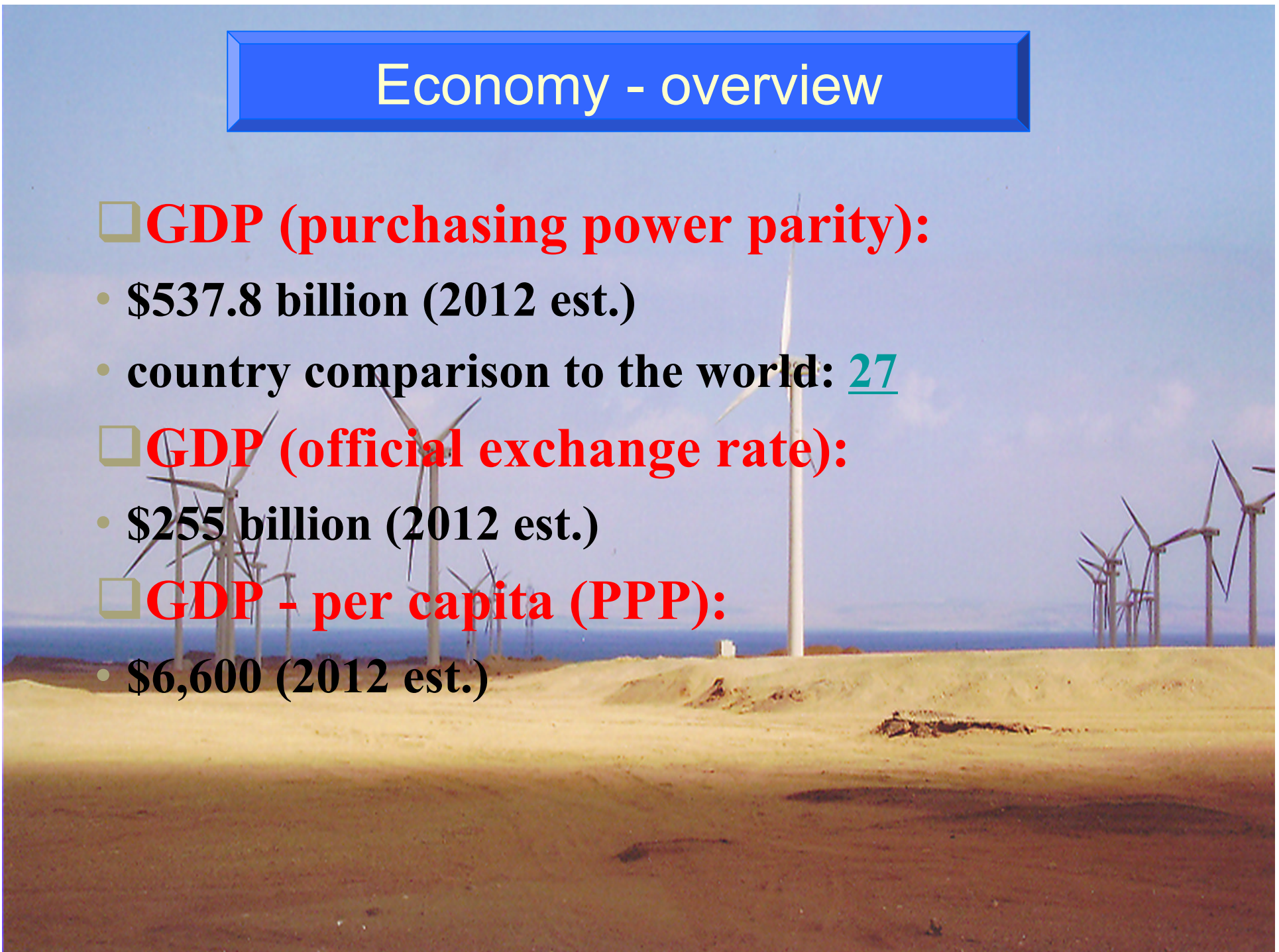
- \$537.8 billion (2012 est.)
- country comparison to the world: [27](#)

### ❑ GDP (official exchange rate):

- \$255 billion (2012 est.)

### ❑ GDP - per capita (PPP):

- \$6,600 (2012 est.)



# Electricity Sector in Egypt

Egypt is one of the countries that has more than 20 years of experience in using renewable energy for electricity generation.

The Ministry of Electricity and Energy plays a vital role in providing electricity on a sustainable basis.

**Access to Electricity more than 99%**

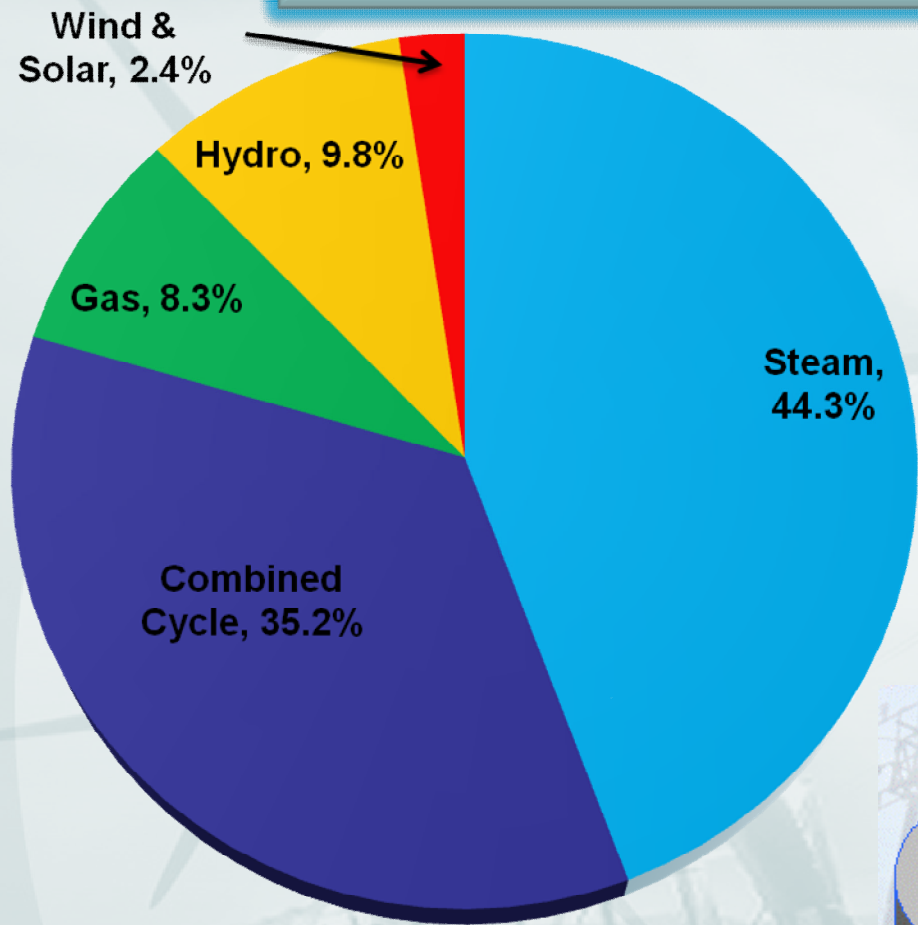
**Total Installed Capacity (MW)**

**31,090**

**Total Produced Energy (GWh)**

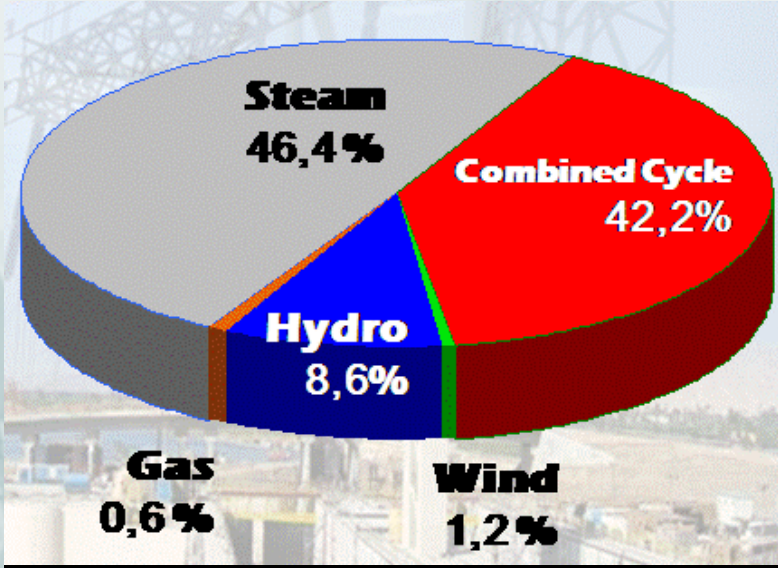
**157,445**

# Electricity Situation

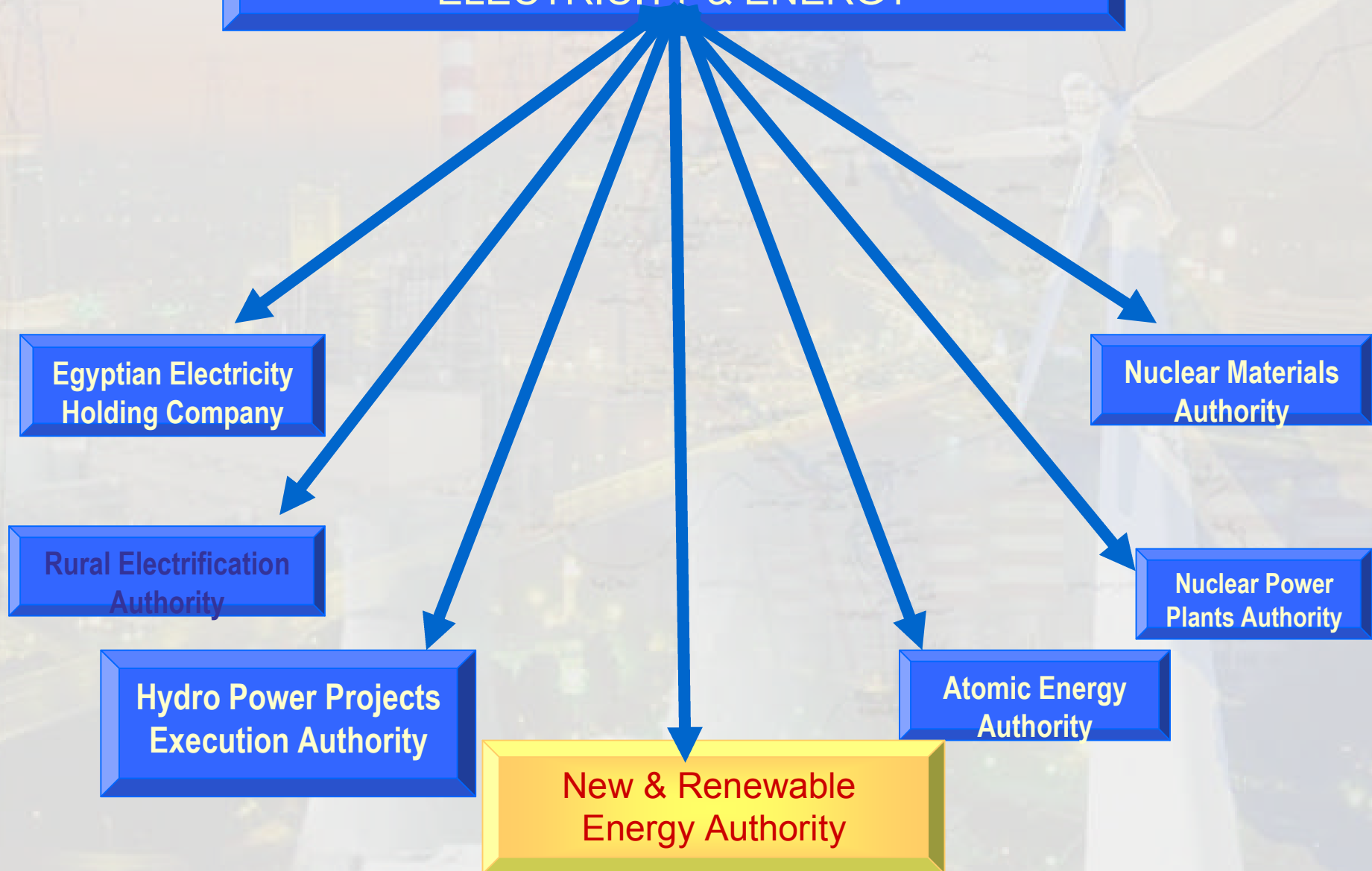


2012

2009



# ORGANIZATION CHART OF MINISTRY OF ELECTRICITY & ENERGY



**Institutional framework:  
Establishing NREA (1986)**



**The national focal point to develop and introduce renewable energy technologies to Egypt on a commercial scale together with implementation of related energy conservation programs**



## Areas of Activities

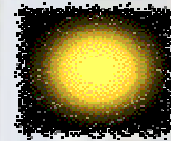
➤ The activities are concentrated into 4 areas:-

1- Wind Energy.

2- Solar Energy.

3- Testing & Certification.

4- Capacity Building.



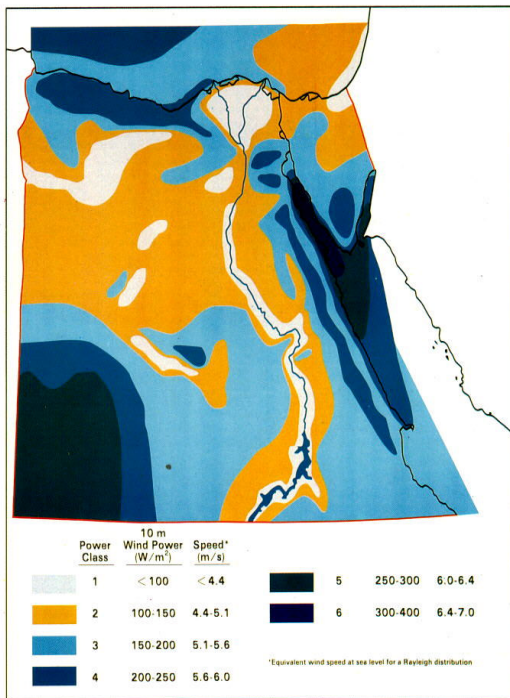
# Wind Energy



# Resource Assessment

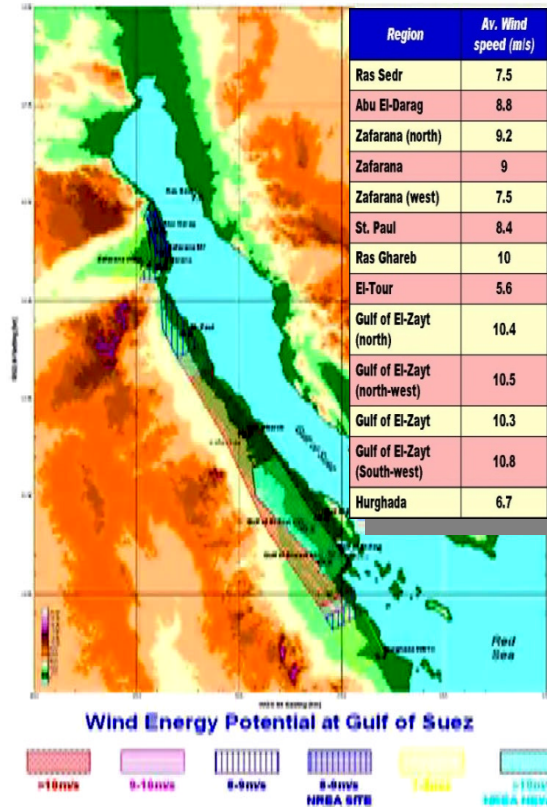
## Egypt Wind Map, 1987

Egypt Annual Average Wind Power Estimates



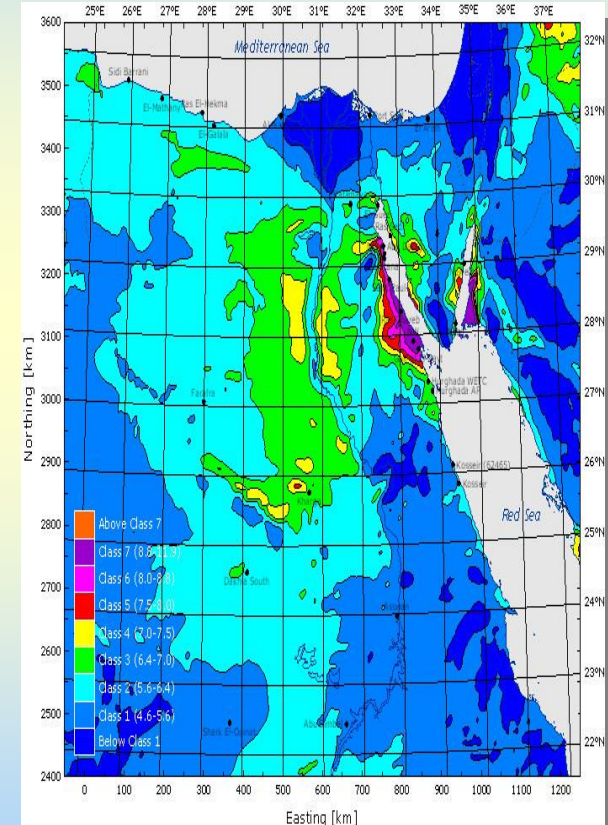
In cooperation with  
11 USAID

## Wind Atlas of Gulf of Suez, 1996 - 2003



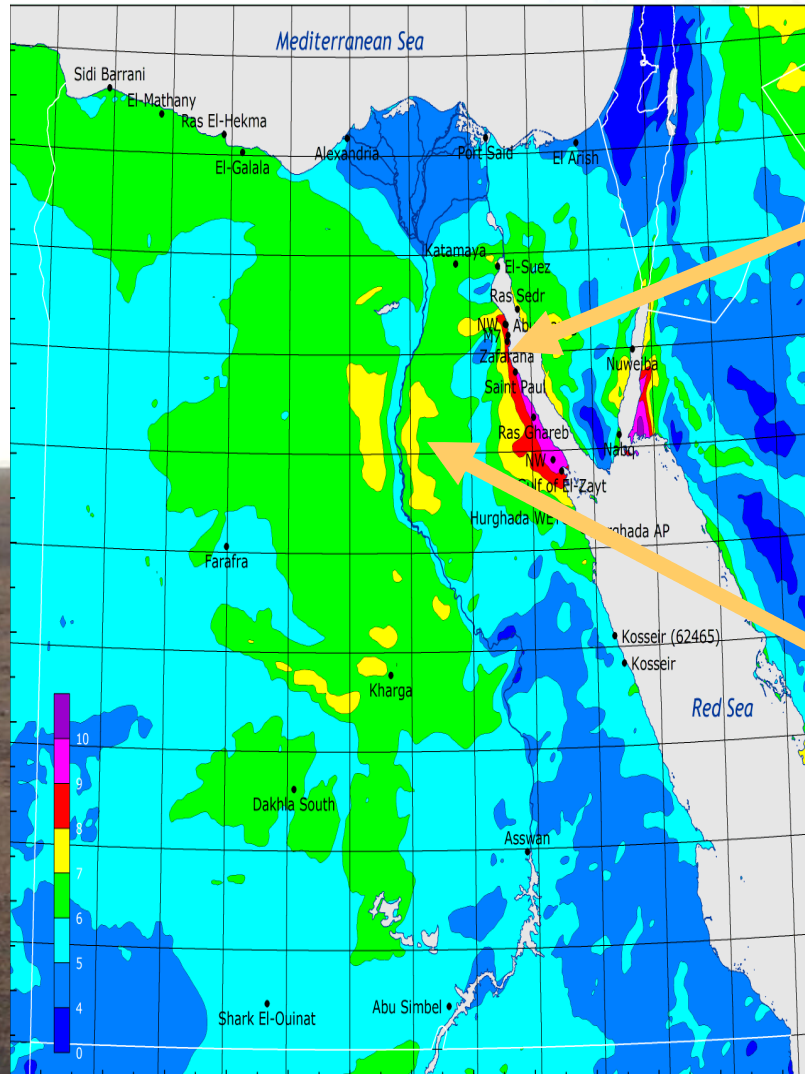
In cooperation with  
Risoe (Denmark) &  
EMA

## Wind Atlas of Egypt, 2005



In cooperation with  
Risoe (Denmark) &  
EMA

# Wind Atlas of Egypt, 2005



Egypt enjoys excellent wind regimes, particularly in the Suez Gulf where the average wind speed reaches 10.5 m/sec.

The wind energy resource is available in large regions on the Nile banks in the Eastern and Western Deserts and parts of Sinai.

# Large Scale Wind Farms

A large-scale wind farm in a desert landscape. In the foreground, a white wind turbine is partially visible, its blades extending towards the top left. The background shows a vast, flat, sandy desert under a clear blue sky, with a long line of many more wind turbines stretching into the distance.

- Since 2001, series of large scale wind farms were established with capacity of **550** MW in cooperation with Germany (KFW), Denmark (DANIDA), Spain and Japan (JICA) through soft loans.

- Key Indicators:

- **Generated Electricity:** ~ 8.6 Billion kWh,
- **Fuel Saving:** ~1.8 Million T.O.E.
- **Emissions Reduction:** ~4.7 Billion T.CO2.

A sunset over a field of wind turbines. The sun is low on the horizon, casting a warm orange glow across the sky. The wind turbines are silhouetted against the bright light of the setting sun. The sky is filled with soft, wispy clouds that catch the light of the sunset.

Renewable Energy  
Strategy  
20 x '20  
(20% by 2020)

## National Strategy up to 2020

• In February 2008, the Supreme Council of Energy approved an ambitious plan to:



**Satisfy 20% of the generated electricity by renewable energies by 2020, including:**

- **12% from wind energy**, i.e., reaching more than 7200 MW grid-connected wind farms.
- **6% from Hydro,**
- **2% from solar energy (CSP & PV)**

# Egyptian Solar Plan

✓ in July 2012 an Egyptian Solar Plan has been approved by the Cabinet which targeting to install **about 3500 MW by 2027** (**2800 MW CSP + 700 MW PV**)

✓ with private investment share of **67%** including enhancement of relevant local industry.





# Policies of Implementing RE Strategy



A policy to foster the increasing of wind energy contribution consists of **three phases**:

Phase 1: Competitive Bids approach through issuing tenders internationally requesting private sector to supply power from wind energy projects.

Phase 2: Feed-in-tariff system will be applied taking into consideration the prices achieved in phase 1.

Third Party Access: Investors are allowed to build & operate renewable energy power plants to satisfy their electricity needs or to sell electricity to other consumers through the national grid

# Polices of Implementing RE Strategy (Cont.)

## FINANCING MECHANISM FOR RE

**EETC is committed to purchase all the generated electricity**

**Governmental Project (1340 MW)**  
Funds and technical assistance were provided through mutual governmental agreements and in cooperation with development partners..

**Competitive Bids (750 MW)**  
Issuing tenders internationally requesting private sector to supply power from wind energy projects.

**Feed-in-tariff:**  
System will be applied taking into consideration the prices achieved in Competitive Bids

**The developers will sell the generated electricity directly to the consumers**

**IPP Project (720 MW)**  
The investor shall sell the electricity generated to his own consumers or feed his own loads

**NREA works as a facilitator and a supporting body for the private**

# Governmental projects

(1340 MW)



# Wind Energy Projects under implementation by NREA

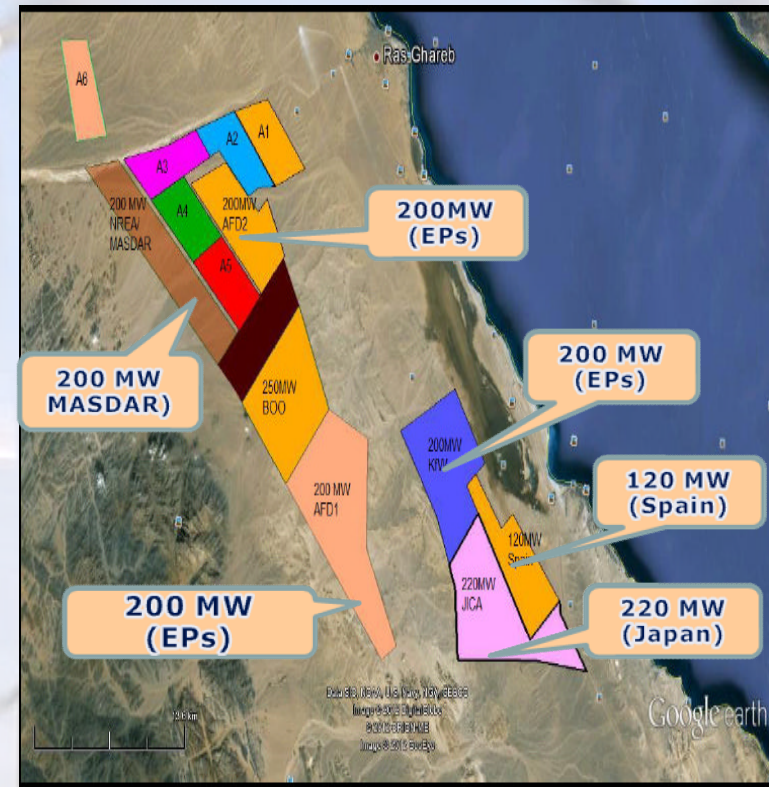
- **200 MW**, in Cooperation with **Germany & EU & EIB**

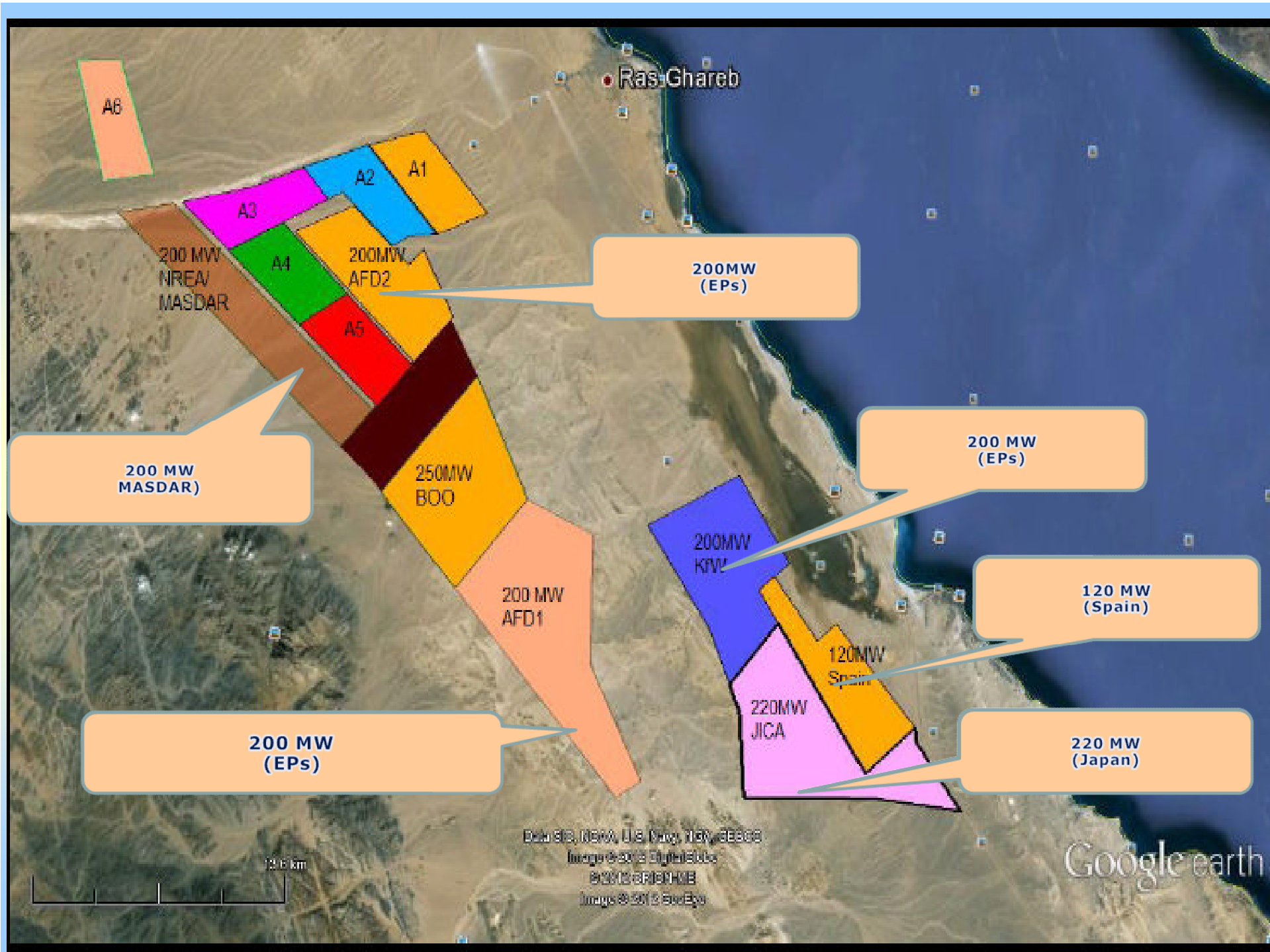
## Projects in the Pipeline

- **220 MW**, in Cooperation with **Japan (JICA)**
- **120 MW**, in cooperation with **Spain.**
- **200 MW**, with **MASDAR**

## Projects under preparation

- **200 MW**, in cooperation with **Germany, AFD, EIB, EU.**
- **200 MW**, in Cooperation with **Germany, AFD**
- **200 MW**, in Cooperation with **Japan (on the Nile Western Bank).**





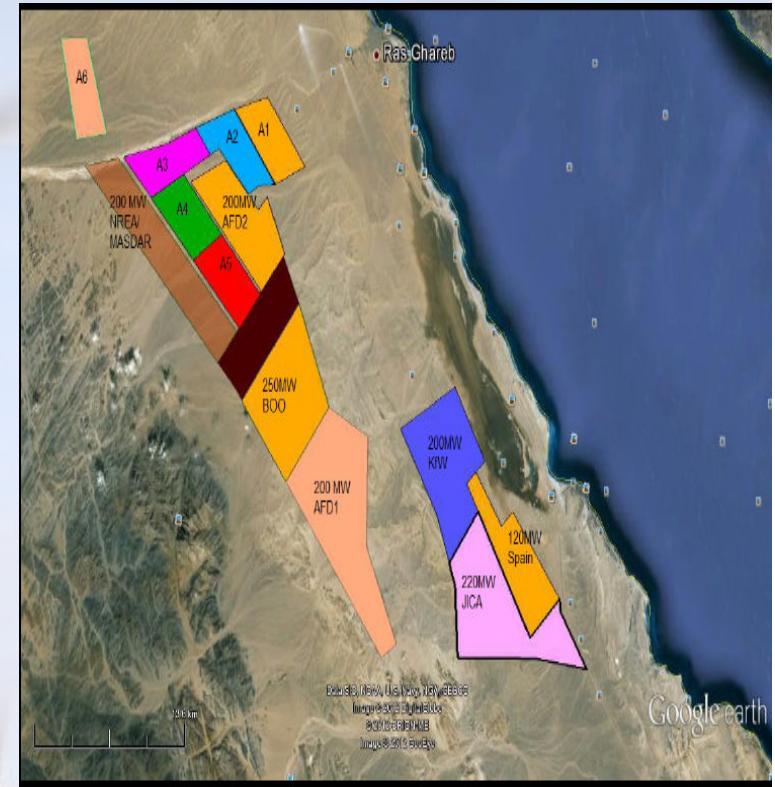
# Private Sector projects

(1470 MW)



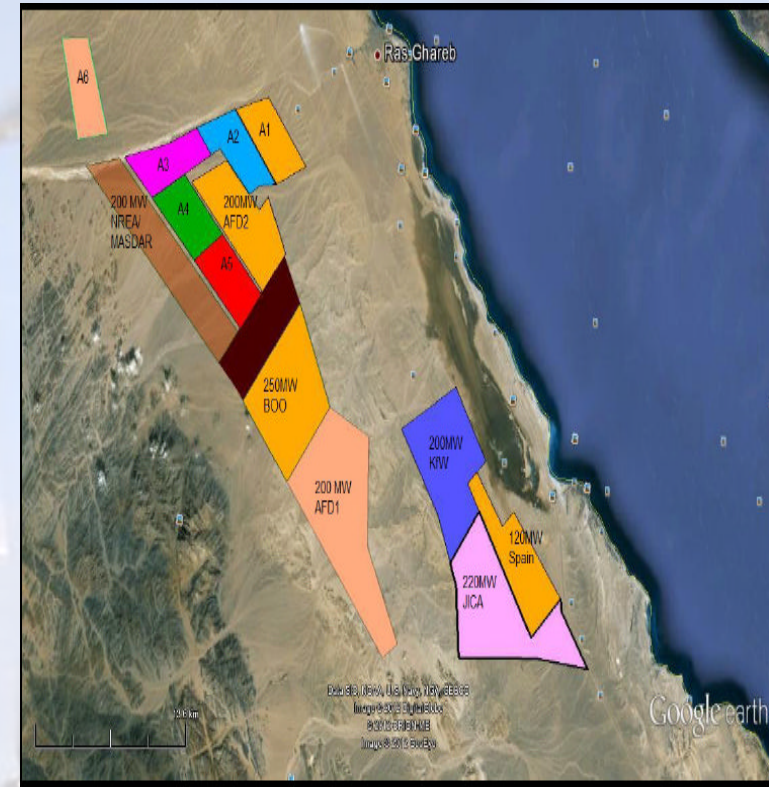
## Wind Energy Projects under implementation by the Private Sector

- **250 MW wind farm (private Sector) on a BOO basis in the Gulf of Suez:**
  - 10 developers were short listed in Dec., 2009.
  - The measurements campaign has been started and will be completed by mid 2013.
  - It is planned to operate the project by Mid of 2015.
- **500 MW wind farm (private Sector) on a BOO basis in the Gulf of Suez**
  - The prequalification documents for the 2nd competitive bid **for 500 MW** wind farm, in 2 phases (2x250 MW), will be announced during the next few months.



## Wind Energy Projects under implementation by the Private Sector

- **120 MW**, in cooperation with Italian Company to supply electricity for its owned factories in Egypt and it is under implantation.
- **600 MW wind farm in the Gulf of Suez:**
  - NREA announced for availing 6 pieces of land each one **15 km<sup>2</sup>** in Suez Gulf for establishing 100 MW wind farm project for each piece of land **based on auction system**, to build & operate wind power plants to satisfy their electricity needs or to sell electricity to other consumers though the national grid.
  - The land will be availed to the investor against **at least 2%** of the annual electricity generated or its value from the project.





**6 Pieces of Land**

A6

Ras Ghareb

**250 MW BOO**

200 MW NREA/MASDAR

A4

200MW AFD2

A5

250MW BOO

200 MW AFD1

200MW KFW

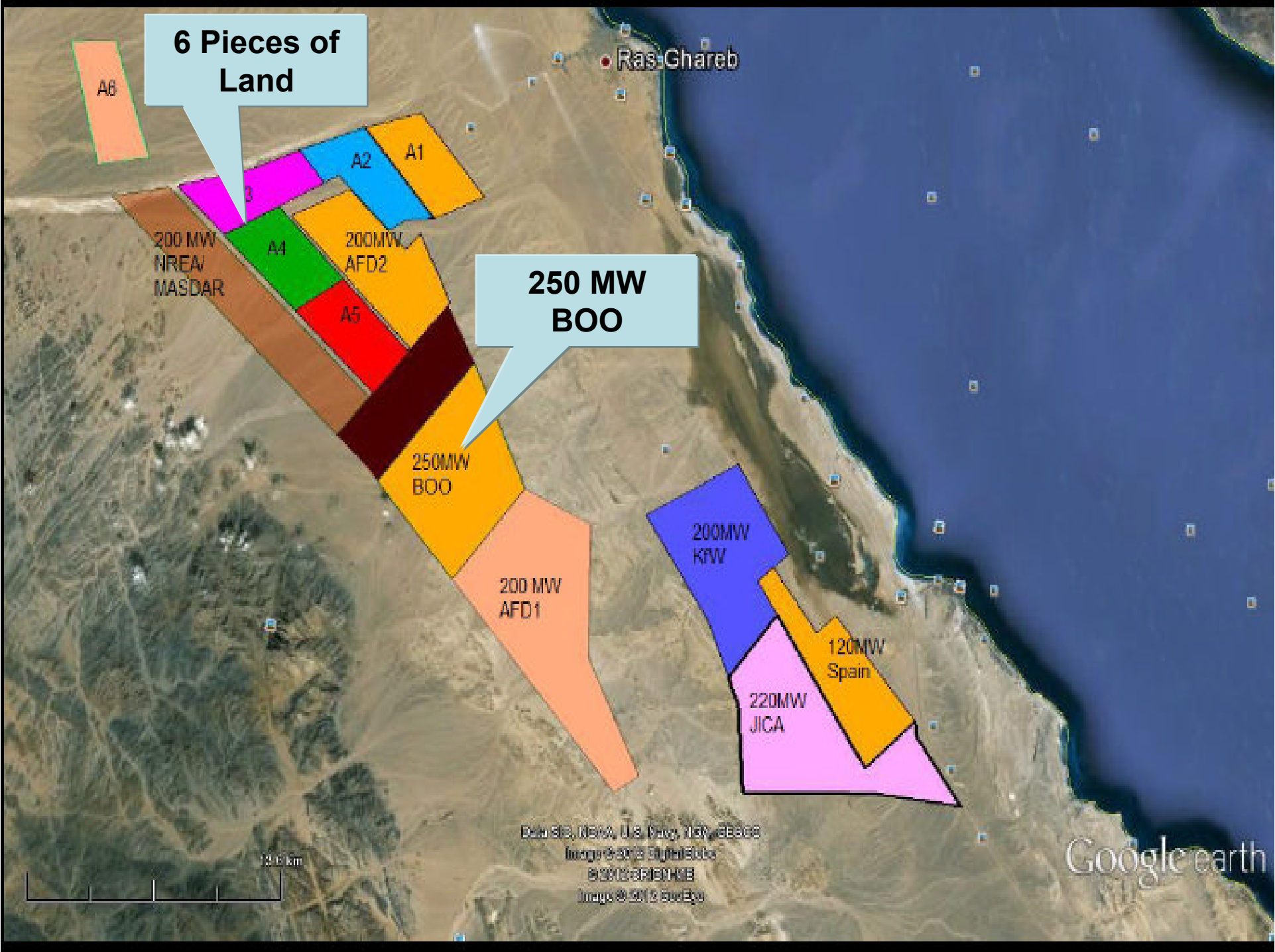
120MW Spain

220MW JICA

Data SRS, NREA, U.S. Navy, USGS, ESRI  
Imagery © 2013 Earthstar  
© 2013 Google Earth  
Imagery © 2013 GeoEye

Google earth

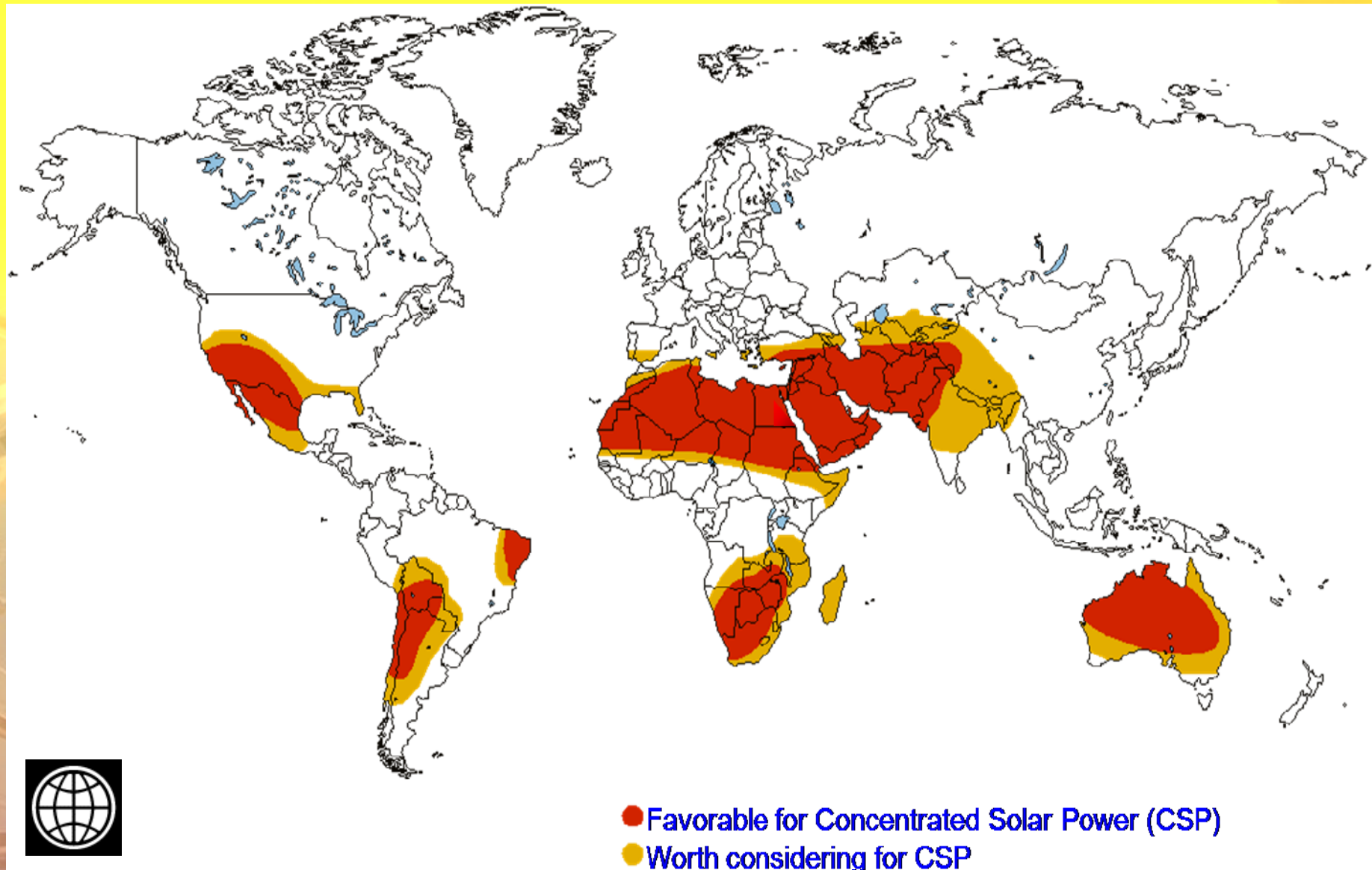
12.5 km



# Solar Energy



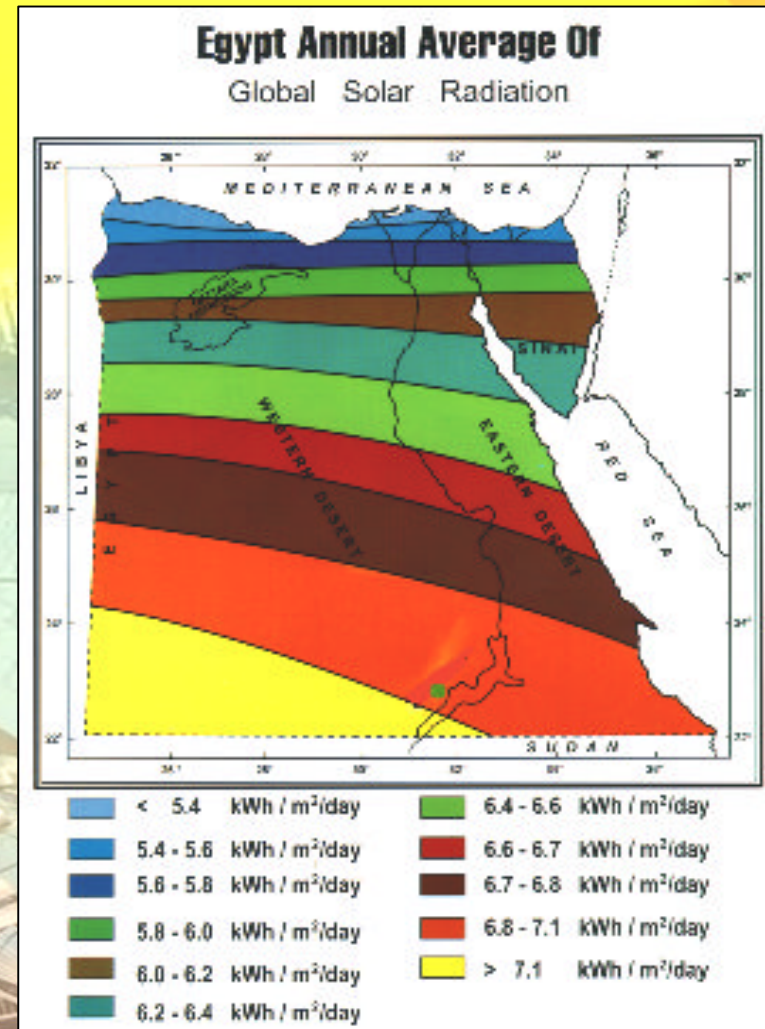
# MENA offers optimal physical resources



# Solar Atlas

The Solar Atlas was issued, and indicated that Egypt is considered as one of the sun belt countries where it is endowed with high intensity of direct solar radiation ranging between **2000 – 3200 kWh/m<sup>2</sup>/year** from North to South.

The sun shine duration ranges between **9-11 h/day** from North to South, with very few cloudy days.



# Photovoltaic (PV) Applications

**Most of PV applications were demonstrated and field tested:**

- Water pumping,
- Desalination,
- Refrigeration,
- Village electrification,
- Lighting, telecommunication, and other PV applications

**Some applications are all already commercialized :**

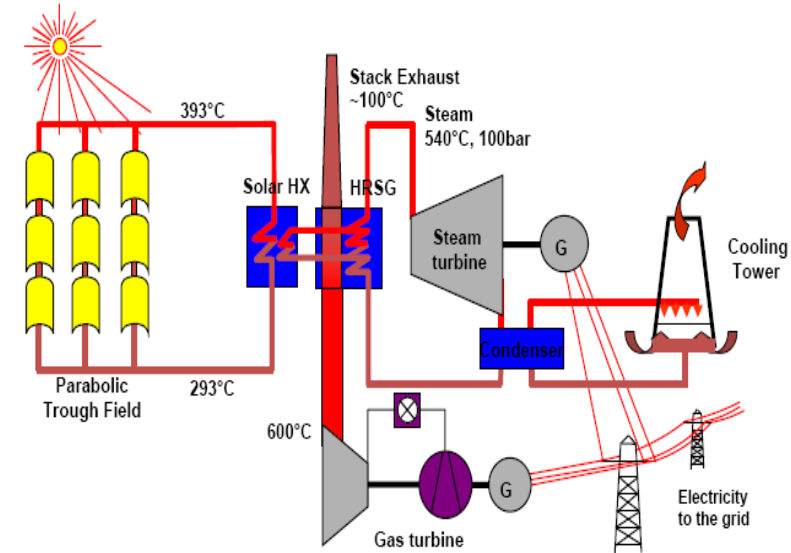
- Telecommunications
- Remote roads lighting and billboards lighting
- Remote desert small load
- A project for electrification of 2 remote settlements with PV systems in Matrouh Governorate by PV systems in cooperation with the Italian Ministry for Environment, Land & Sea has been completed & operated since Dec. 2010.



# Solar Thermal Electricity Generation

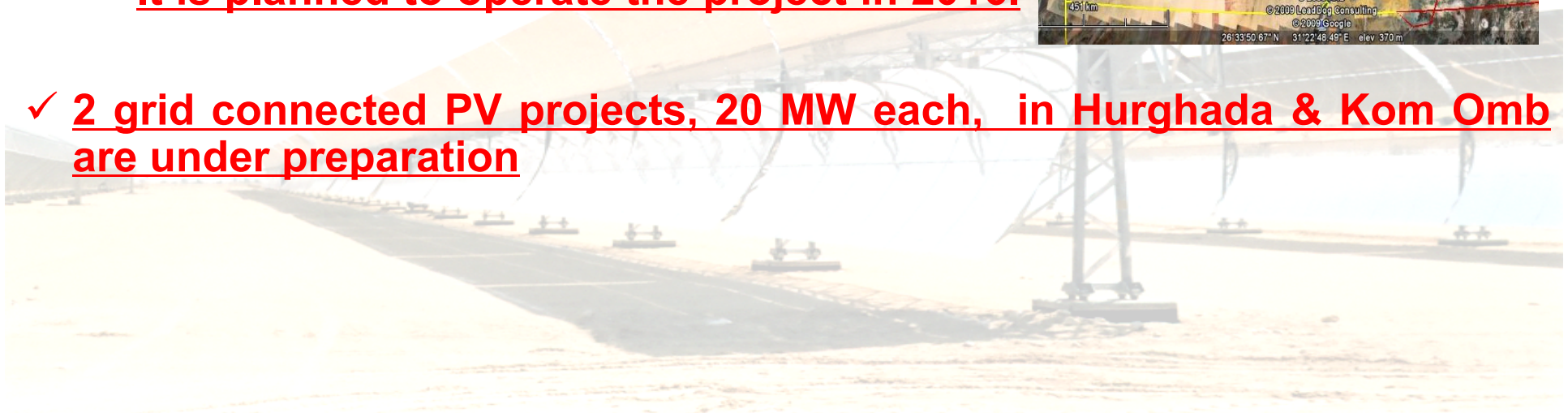
## 140 MW Solar thermal power plant

- The 1st CSP plant is 140 MW including solar field of 20 MWe based on parabolic trough technology.
- The total investment is about \$US 340 mil including about \$ 50 mil as a grant from GEF for the solar Island.
- The project has been operated **since July 2011.**



## Solar Energy Projects under implementation by NREA

- ✓ In cooperation with the European Union and KfW, developing renewable energy Master Plan (1<sup>st</sup> Priority for Wind, CSP&PV), including a feasibility study for 100 MW CSP grid connected at **Kom Ombo** site is under conducting and will be finalized in **Mid 2013** to provide a comprehensive plan for renewable energy development in Egypt.
  - ✓ A study of **EMPower** program recommended to select **Kom Ombo** site to host 100 MW grid connected CSP project.
  - ✓ It is planned to operate the project in 2016.
- ✓ 2 grid connected PV projects, 20 MW each, in Hurghada & Kom Omb are under preparation



# Financing Schemes For Governmental Projects in Egypt

## Grant Scheme

Grant scheme applied for the pioneer and demonstration wind projects erected in Hurghada, in co-operation with USA, Denmark, and Germany. In addition to the first commercial large scale wind farm at Zafarana, 30 MW in co-operation with DANIDA. In this scheme local works such as civil works, and local transportation had been financed by NREA.

## Self-Finance/Grant Scheme

In this scheme the maximum share of grants didn't exceed 25% of the total project investment. This regime has been applied for three large-scale wind farms in co-operation with DANIDA and KfW, with 110 MW total capacity.



# Financing Schemes For Governmental Projects in Egypt

## Self-Finance Scheme

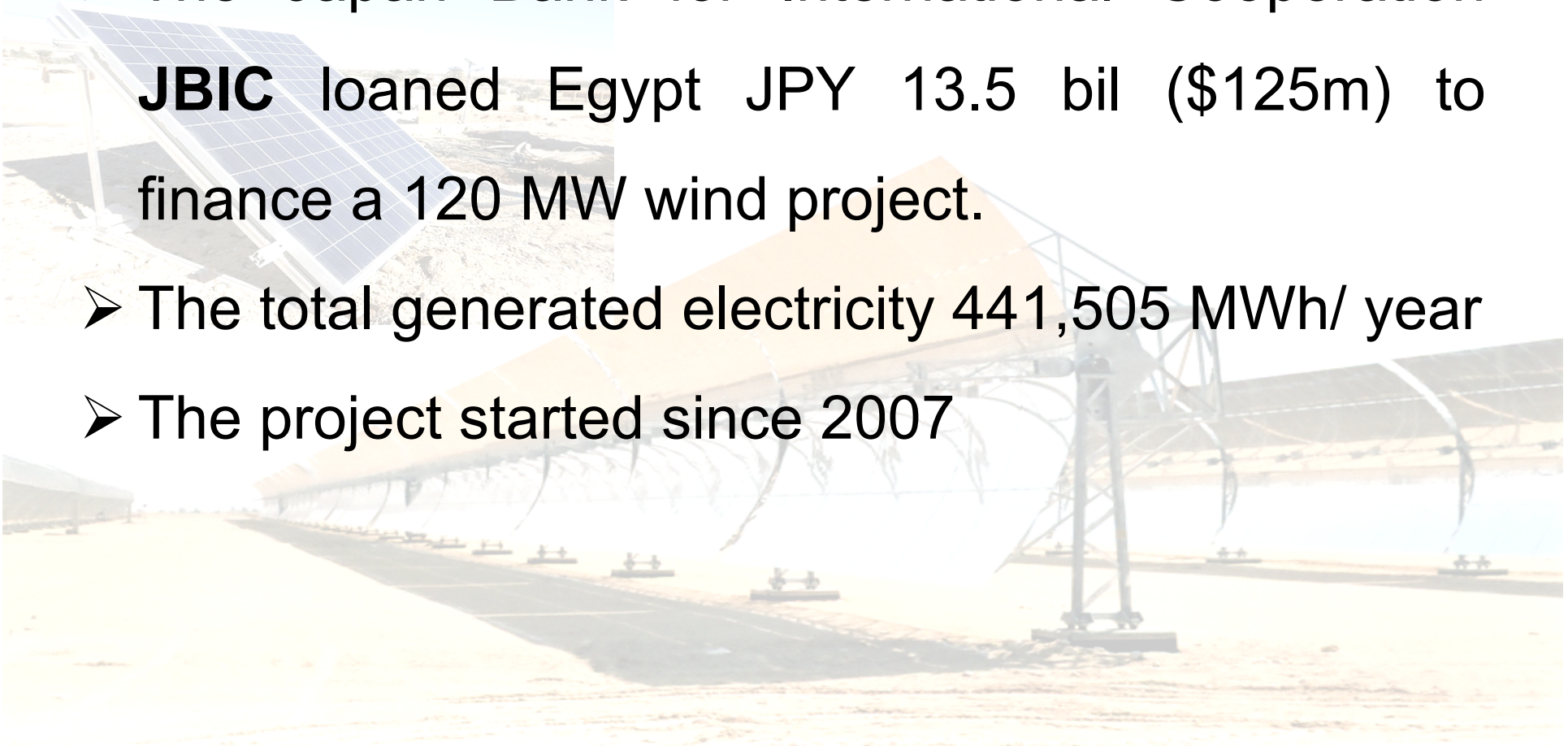
Self-Finance Scheme; has been applied for 120 MW in cooperation with Japan (JICA), 85 MW wind farm in cooperation with Spain.

Foreign loans applied for the second or the third financing schemes vary between soft, mixed credit, and commercial loans. Meanwhile, local loans offered from the Egyptian National Investment Bank, NIB, are commercial loans.

## Projects in Cooperation with Japan

### □ 120 Wind Power Plant Project in Zafarana

- The Japan Bank for International Cooperation **JBIC** loaned Egypt JPY 13.5 bil (\$125m) to finance a 120 MW wind project.
- The total generated electricity 441,505 MWh/ year
- The project started since 2007



## Projects in Cooperation with Japan

### Kuraymat 140 MW Integrated Solar Combined Cycle power plant

**GEF** a grant of 50 Million US\$ to cover a substantial part of the incremental cost in comparison to the least cost conventional alternative producing the same annual amount of the electric energy.

**JBIC** a soft loan to finance the thermal portion of the plant by about 13.6 Billion JPY.

**NREA** cover the local currency portion required for the project

## Projects in Cooperation with Japan

### □ **220 MW wind farm in Gabal El Zayt**

- A loan agreement between the Japanese Government & Egypt Government was signed in March 2010, in order to implement the project through soft loan with an amount of 38,864 Billion Japanese Yen.
- The environmental, bird migration, and feasibility studies of the Project has been finalized.
- The project's consultancy services contract has been signed on 1/7/2012 to prepare the tender documents.
- The prequalification documents was announced on 10/12/2012 to selected the short list bidders and the offers are under evaluation to implement the project.
- The bidders has submitted their proposals of the P.Q on 28/1/2013.
- The project is expected to be operated in 2015

# Projects in Cooperation with Japan

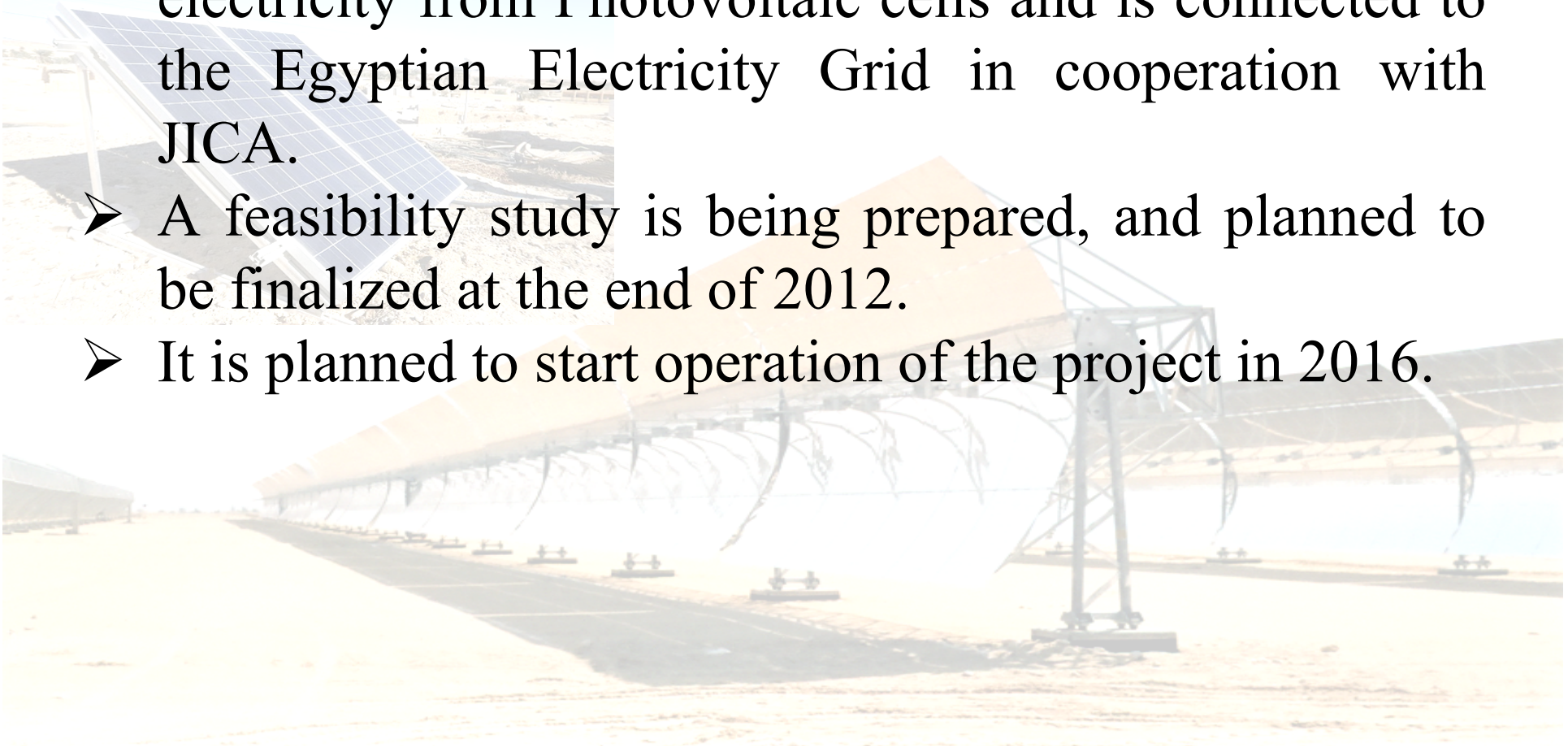
## □ 200 MW Wind Farm in West of the Nile

- In August 2010, the Japanese Government appointed the Japanese Consultant Office (Oriental) to execute the environmental & Economical study including bird migration study, wind speed measurement study and select the suitable site to establish wind farm 200 MW capacity the land allocated for NREA in West Nile about 4,242 km<sup>2</sup>.
- Currently the wind speed measurement study is being executed to the area, through 10 measuring stations (80 meters) have been installed.
- The studies will be finalized in July of 2013.
- The project is expected to be operated in 2017.

## Projects in Cooperation with Japan

### □ **20 MW solar power plant (PV) in Hurghada:**

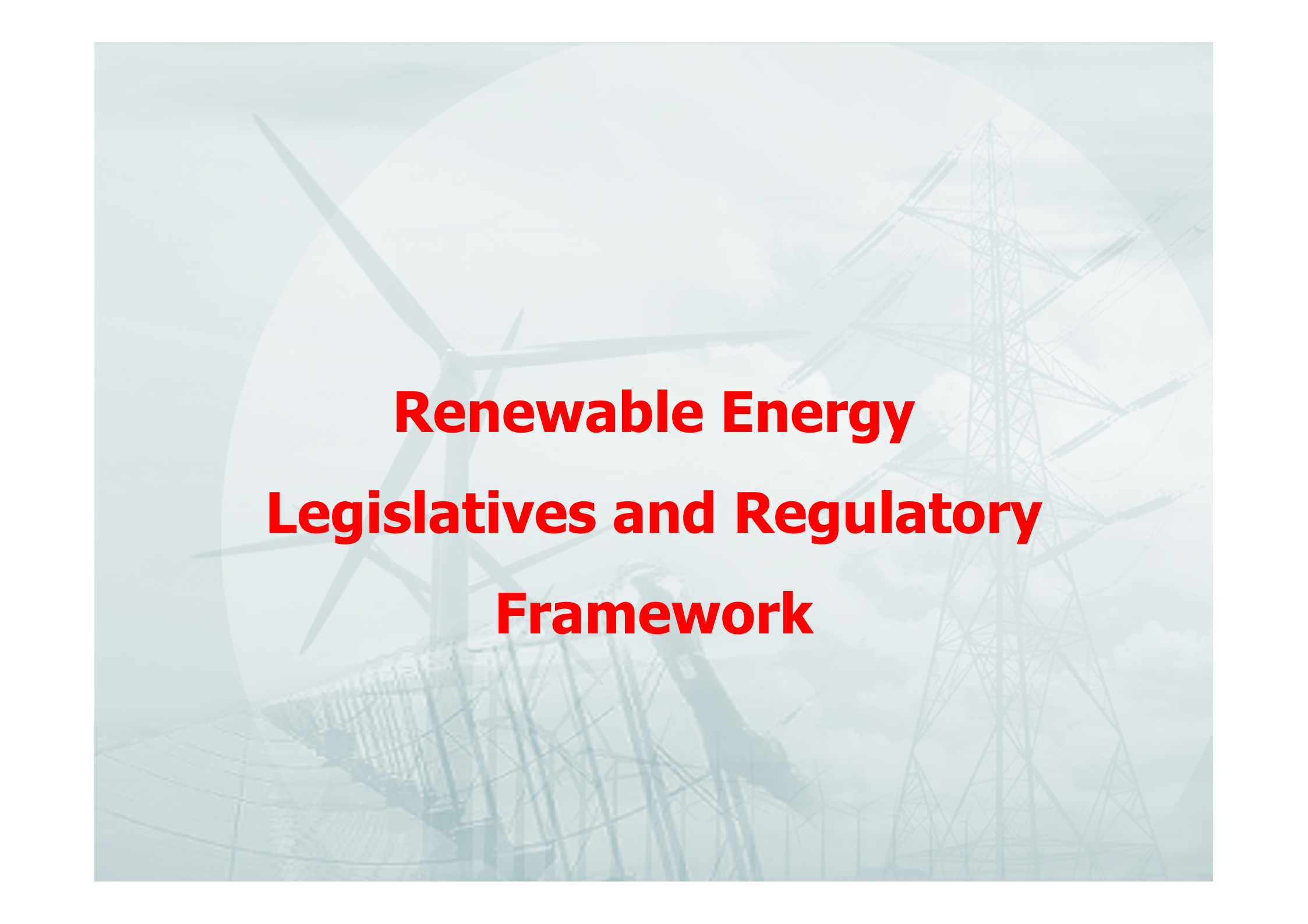
- This project is one of the largest projects to generate electricity from Photovoltaic cells and is connected to the Egyptian Electricity Grid in cooperation with JICA.
- A feasibility study is being prepared, and planned to be finalized at the end of 2012.
- It is planned to start operation of the project in 2016.



## Private Sector Successful Story

### **❑ 120 MW Wind Farm in cooperation with Italgren in Gulf of Suez :**

- ❑ Italgren company submitted offer to establish a wind farm to feed the factories owned by Suez Cement Company. NREA signed a Memorandum of Understanding with the company after obtaining the approval, of the Prime Minister of his project.
- ❑ Environmental study was finalized in April 2010 and approved by the Environmental Affairs Agency.
- ❑ In June 2012 the land usufruct agreement was signed between NREA and the Company.
- ❑ The Company is now completing the rest procedures for the implementation of the project.
- ❑ The project is planned to be operated in 2014.

The background of the slide is a light blue-tinted image. On the left, a large wind turbine is visible. In the center, there are rows of solar panels. On the right, a tall power transmission tower with multiple cross-arms is shown. The overall scene is a mix of renewable energy and traditional power infrastructure.

# **Renewable Energy Legislatives and Regulatory Framework**



# Support of Egyptian Government

## 1. Lands Availability:-

- More than 7,600 square kilometers of desert lands have been allocated for implementing future projects.
- All permits for land allocation are already obtained by NREA.
- EIA including Bird migration study has been prepared by NREA in cooperation with international consultant and financed by KfW.
- Signing land use agreement with the investor against payment equivalent to 2% of the annual energy generated from the project or its value.
- The project company shall get license for power generation from Egyptian Electricity Regulatory Agency.

## 2- Custom Duties:-

- Exempting all renewable energy equipment and spare parts from the customs duties.

## Support of Egyptian Government (Cont.)

### 3- Power Purchase Agreement :-

- Signing long term Power Purchase Agreement (PPA) ( 20-25) years .
- Central Bank of Egypt will guarantee all financial obligations of EETC under the PPA.

### 4- Carbon Credit:-

- The project will benefit from carbon credit .

### 5- Renewable Energy Fund:-

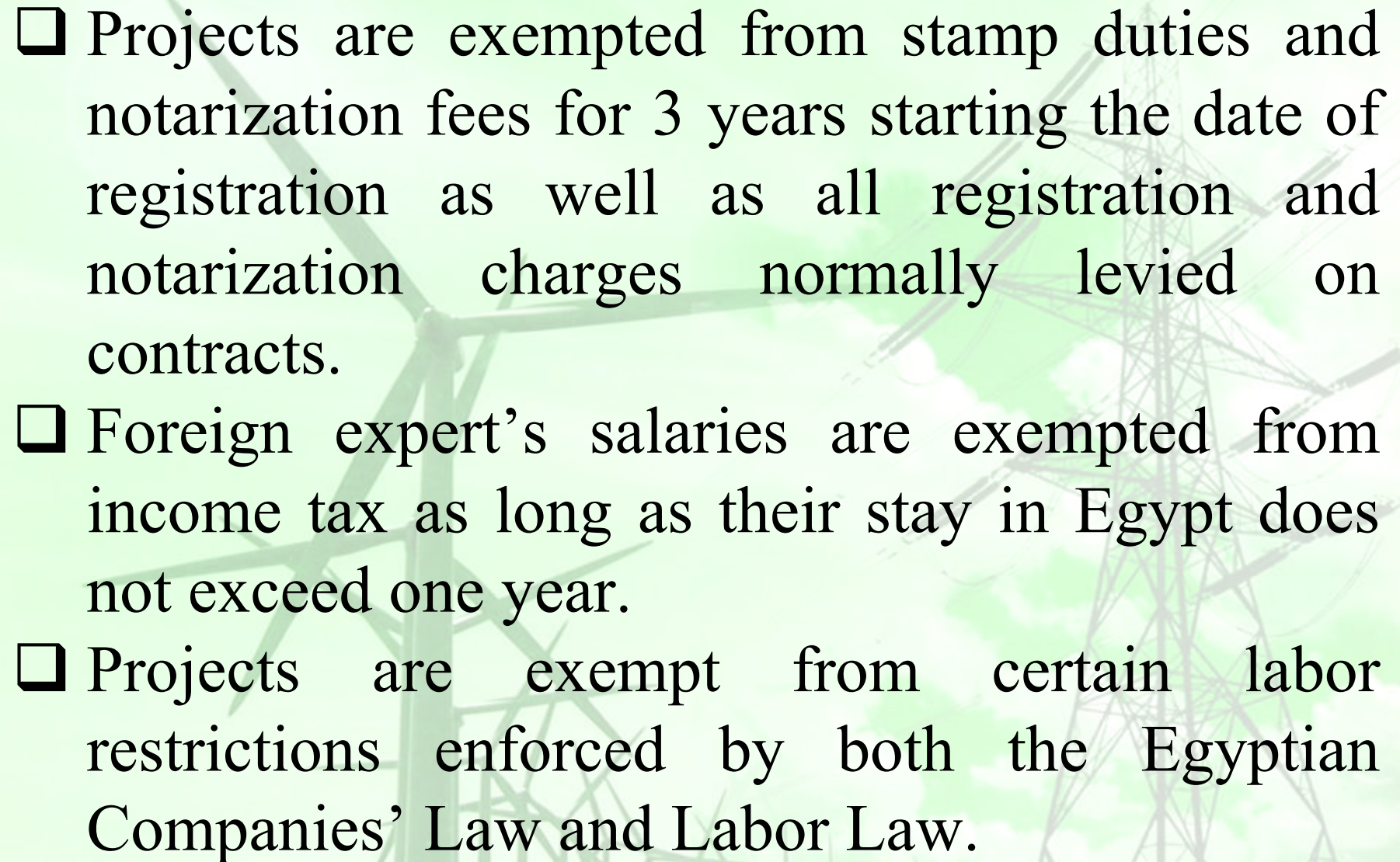
- Establishing a renewable energy fund that will help through:-
  - Bridging the gap between cost of electricity from conventional and renewable energies.
  - Addressing the risk of the Foreign currency exchange
  - Contributing in financing RE pilot projects.
  - Supporting R & D activities in renewable energy field.
  - Enhancing Local manufacturing of RE equipment.

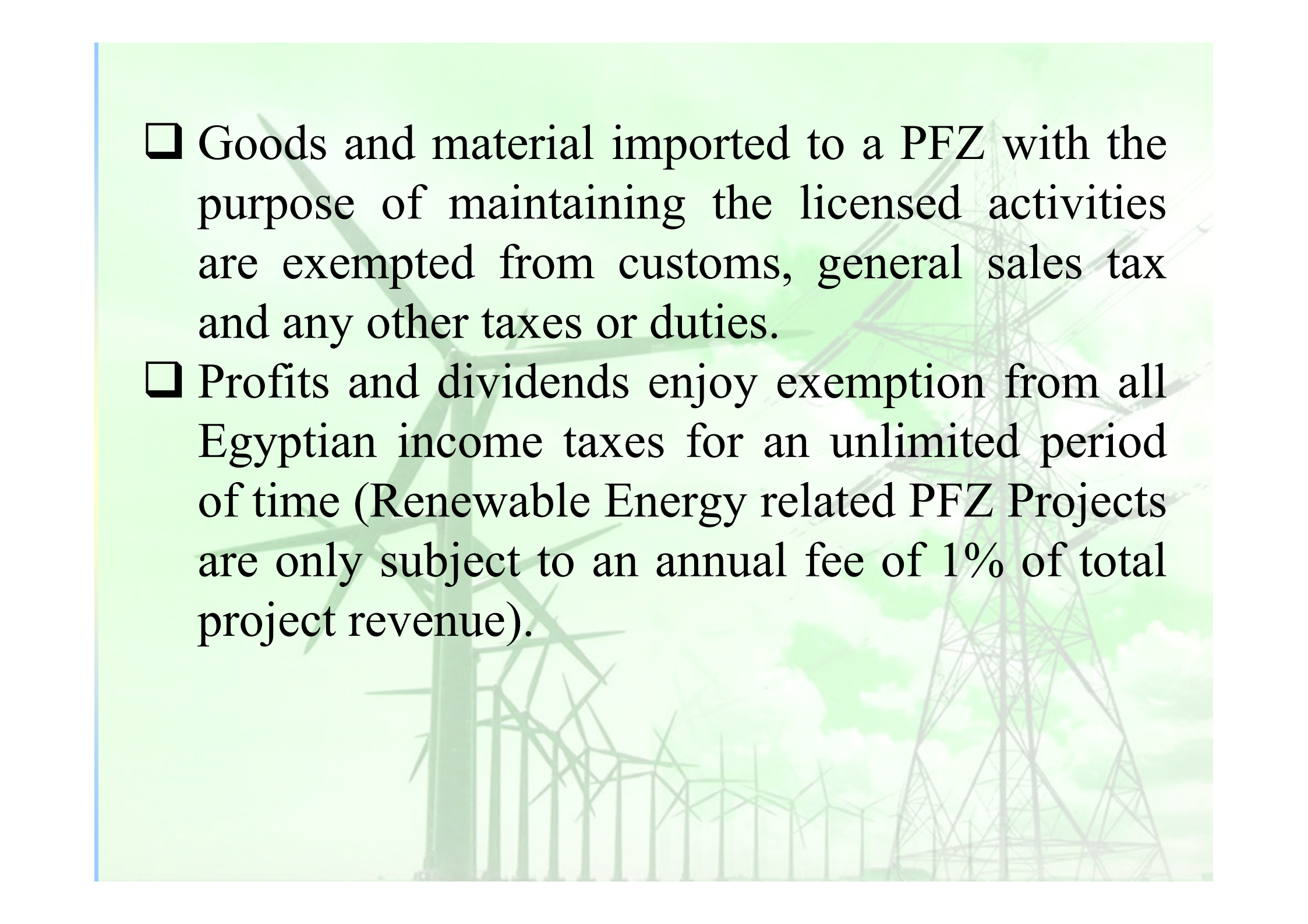
## General Investment Incentives for Private Free Zones (PFZ)

### ■ Investors interested to BOO wind energy in Egypt:

- Attractive investment incentive package for private free zones and enjoy
- Investor protection and guarantees.
- Companies registered holding a private free zone license for the wind farm projects from the General Authority for Investment (GAFI) can benefit through: entirely owned by foreigners, the right to develop real estate, maintain foreign currency bank accounts, exempted from stamp duties and notarization fees, exempt from certain labour restrictions.

- ❑ Projects/Companies may be entirely owned by foreigners with all members of the board being of foreign nationalities.
- ❑ Companies have the right to own and develop real estate as needed for implementing and expanding their activities regardless of the nationality or place of residence of partners and shareholders or the percentage of their shares.
- ❑ Projects are allowed to maintain foreign currency bank accounts and repatriate their capital and profits.

- 
- ❑ Projects are exempted from stamp duties and notarization fees for 3 years starting the date of registration as well as all registration and notarization charges normally levied on contracts.
  - ❑ Foreign expert's salaries are exempted from income tax as long as their stay in Egypt does not exceed one year.
  - ❑ Projects are exempt from certain labor restrictions enforced by both the Egyptian Companies' Law and Labor Law.

- 
- The background of the slide features a light green, semi-transparent image of a wind farm. Several wind turbines are visible, along with a tall electrical transmission tower. The overall aesthetic is clean and modern, with a focus on renewable energy.
- ❑ Goods and material imported to a PFZ with the purpose of maintaining the licensed activities are exempted from customs, general sales tax and any other taxes or duties.
  - ❑ Profits and dividends enjoy exemption from all Egyptian income taxes for an unlimited period of time (Renewable Energy related PFZ Projects are only subject to an annual fee of 1% of total project revenue).

## Protection and Guarantees

- ❑ Companies shall not be subject to confiscation or nationalization.
- ❑ Companies and their assets cannot be seized or expropriated by administrative order.
- ❑ Settling investment disputes may be carried out in accordance with the convention or agreement of the investor's choice (either existing bilateral conventions or Washington Convention or Law No. 27 of 1994).
- ❑ The above outlined investor incentive package is governed by and described in detail in the Investment Law No. 8 of 1997 and Companies Law No. 159 of 1981 and their respective executive regulations and amendments.

# Current Private Sector Opportunities

## 600 MW wind farm in the Gulf of Suez:

NREA announced for availing 6 pieces of land each one 15 km<sup>2</sup> in Suez Gulf for establishing 100 MW wind farm project for each piece of land **based on auction system**, to build & operate wind power plants to satisfy their electricity needs or to sell electricity to other consumers though the national grid.

The land will be availed to the investor against **at least 2%** of the annual electricity generated or its value from the project.

Arab Republic of Egypt  
Ministry of Electricity & Energy  
New and Renewable Energy Authority  
(NREA)  
**International Call for Tender No. (2012)**

NREA is announcing the availability of a 6 piece of land each one has an approximate area of (15 km<sup>2</sup>) in Gulf of Suez, based on Auction system, sufficient for establishing a 100 MW Wind Farm Project for each piece of land.

NREA shall avail the land to technically qualified investor(s) through Sealed Envelope's Auction and shall then sign a USUFRUCT Agreement with the winning investor(s).

The investor(s) shall use the land only for the purpose of establishing a Wind Farm Project, and hence selling the produced energy to himself or to his contracted customers.

The RFP will be available as a hard copy at NREA premises & by e-mail as electronic format starting from Monday 24<sup>th</sup> 2012, against fee of 500 Euro for each piece of land deposit on NREA's account as follows:

Bank Name: Arab African International Bank,  
Cairo,  
Swift Code: ARAIEG-CXXXX,  
A/C no. 6003364021  
BEN Bank Name: Central Bank of Egypt,  
Swift Code: CBELEG-CXXXX  
Beneficiary cust name: New & Renewable Energy  
Authority (NREA)  
A/C (EUR): 4082176165

The scanned banking transaction of the deposit must be sent via these e-mails addresses:

[nrel@idrc.net.eg](mailto:nrel@idrc.net.eg)  
[shab4768@gmail.com](mailto:shab4768@gmail.com)

Offers will be delivered into the 2 sealed separate envelopes:

1. Technical Envelop.
2. Financial Envelop.

A tender guarantee of Euro 200 000 (two hundred thousand Euro) for each piece of land, unconditional and endorsed by an Egyptian Bank shall be included in the Technical envelope.

Deadline for submission of offers on 24/5/2013 at 12:00 noon, Cairo time at New and Renewable Energy Authority (NREA) at the following address:-

Dr. Ibrahim Aboulnaga St., Ext. of Abas El-Akhd  
St. Hay El-Zohor- Naaz City, Cairo, Egypt  
Att.: General Director of Purchasing Dept.  
Fax: (202)2 2717173  
Phone: (202)2 2725891-2-3 / (4117)

- Late offers will be rejected.

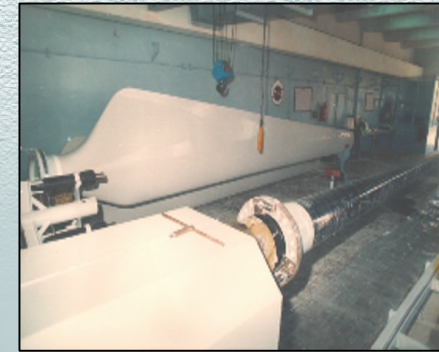




# Local Manufacturing

# Wind Energy Equipment :

- ◆ **30%** of the wind energy equipment are locally manufactured.
- There is a plan for the private sector participation to raise manufacturing of wind energy equipments to **70%** at the end of 2020.



# Solar Energy Equipment :

The local share in the **1<sup>st</sup>** solar thermal power plant project is **50%**



**The industrial base established in Egypt can be adapted to serve in building a robust the renewable energy industry and fulfill locally and regionally needs.**

# RE&EE Testing & Certification Center

## NREA Facilities in Cairo



## RE&EE Testing & Certification Center

- This center was established in cooperation with EU & Italy.
- The center includes a set of integrated advanced indoor and outdoor laboratories for testing and certification of renewable energy equipment (solar, wind & biomass)
- The Center is also entrusted to serve the Egyptian energy efficiency standards & labeling program through specialized laboratories for refrigerators, washing machines, air conditions and lighting units.
- It includes also supporting Labs (Aging – Chemicals & Physical – Optical – Electronic – Mechanical Pumping).

**The center is entrusted to carry out tests on performance, reliability, durability as well as environmental impact of renewable Energy and energy efficiency equipment, hence issue licensing certificates.**



# Capacity Building

## Due to :

- Gained experience in the field since 1986.
- Existence of equipped facilities.
- Available well trained staff.

## Accordingly,

- Since 2001, NREA has organized specialized training programs in wind & solar energies, PV applications, energy conservation,...etc for regional & local organizations for trainees from Nile Basin & Arab Countries.
- Other tailor made programs were held upon request from local entities or from Arab countries such as Libya and Syria, Syria, Jordan, Lebanon, Yemen, Oman, Saudi Arabia, Palestine and Kuwait.
- Regular summer course in RE is organized for Universities students.



# **Cooperation with Regional & International Organizations**

- Egypt is very keen to continue as an active player in supporting the widespread utilization of renewable energy.
- Egypt is one of the founding members of **IRENA**
- It works also in close cooperation with a group of European and Mediterranean partners through the **Regional Center for Renewable Energy and Energy Efficiency (RCREEE)** to support the development efforts to expand renewable energy applications.
- Egypt through the Union for Mediterranean is providing support to the ambitions **Mediterranean Solar Plan (MSP)**.
- We consider the emerging initiatives such as the **MSP**, the **DESERTEC** and other similar initiatives as catalysts to expand the cooperation across regions in terms of reducing the high upfront costs through improved R&D as well as transferring and localizing the technology



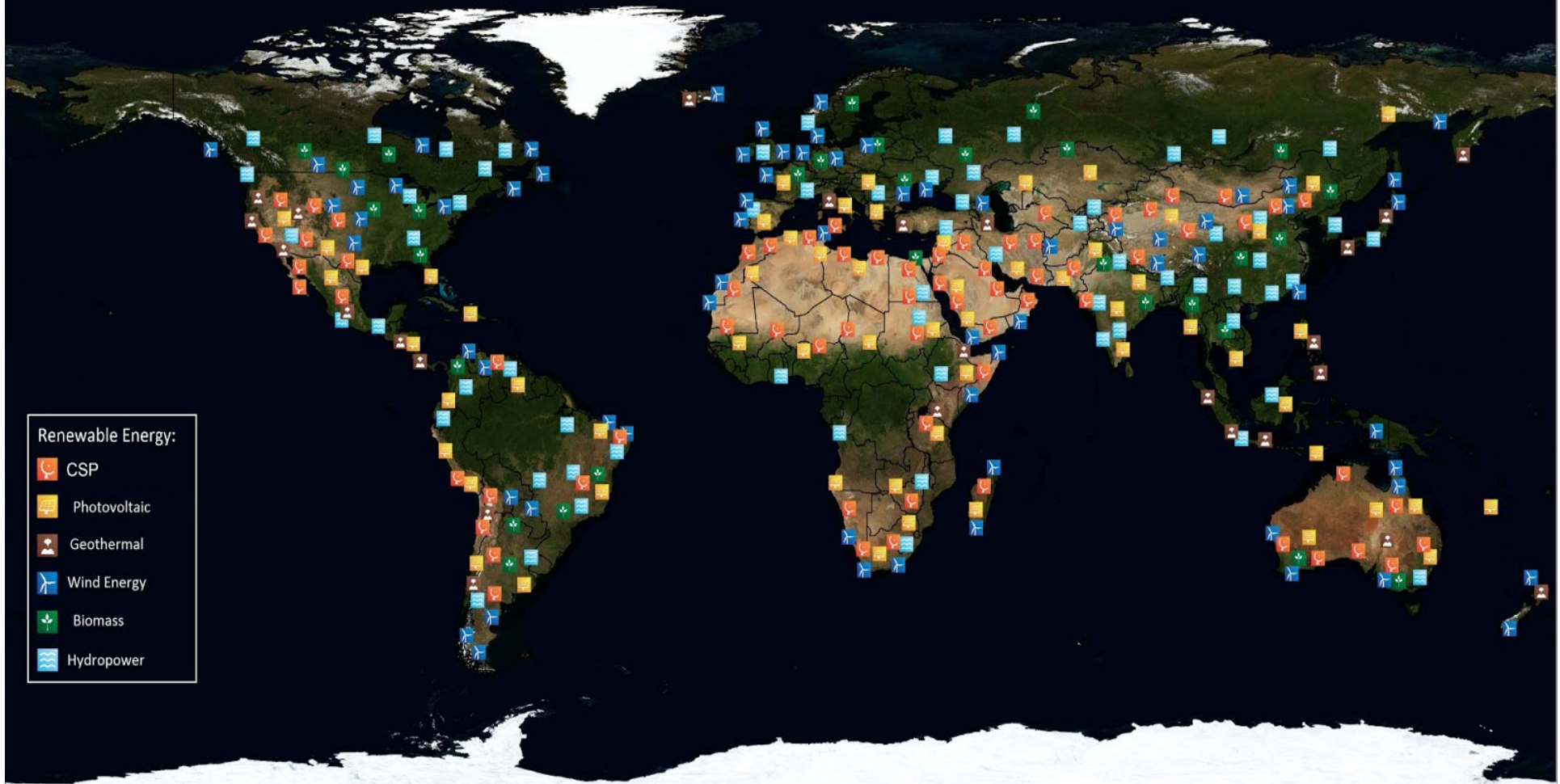
## DESERTEC INITIATIVE

- Desertec stands for the overall vision of supplying a large part of the world with sustainable power, by tapping the energy potential of the desert.
- Dii (Desertec Industrial Initiative) is a private industry consortium with partners from 16 countries working towards enabling this vision in Europe, the Middle East and North Africa (EUMENA) by the year 2050.
- This entails the investigation of appropriate technologies for energy production and transport.

## What can Dii contribute to realize the national RE-strategy/programme?

- Dii has a target to export a certain amount from these energy generated by renewable resources.
- Dii can facilitate creating a regional platform that pools available funding from various sources and acts as a region-wide off-taker for green electricity exports from MENA countries, including to Europe.
- Developing RE projects, which will be implemented through Dii, in sufficiently large numbers and on a sufficiently large scale will allow MENA countries to increase the quantity of fossil fuel resources they could export and/or use for economic purposes with a higher value added

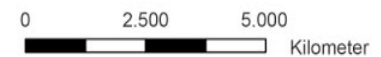
# Renewable Energies Worldwide



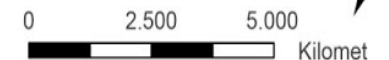
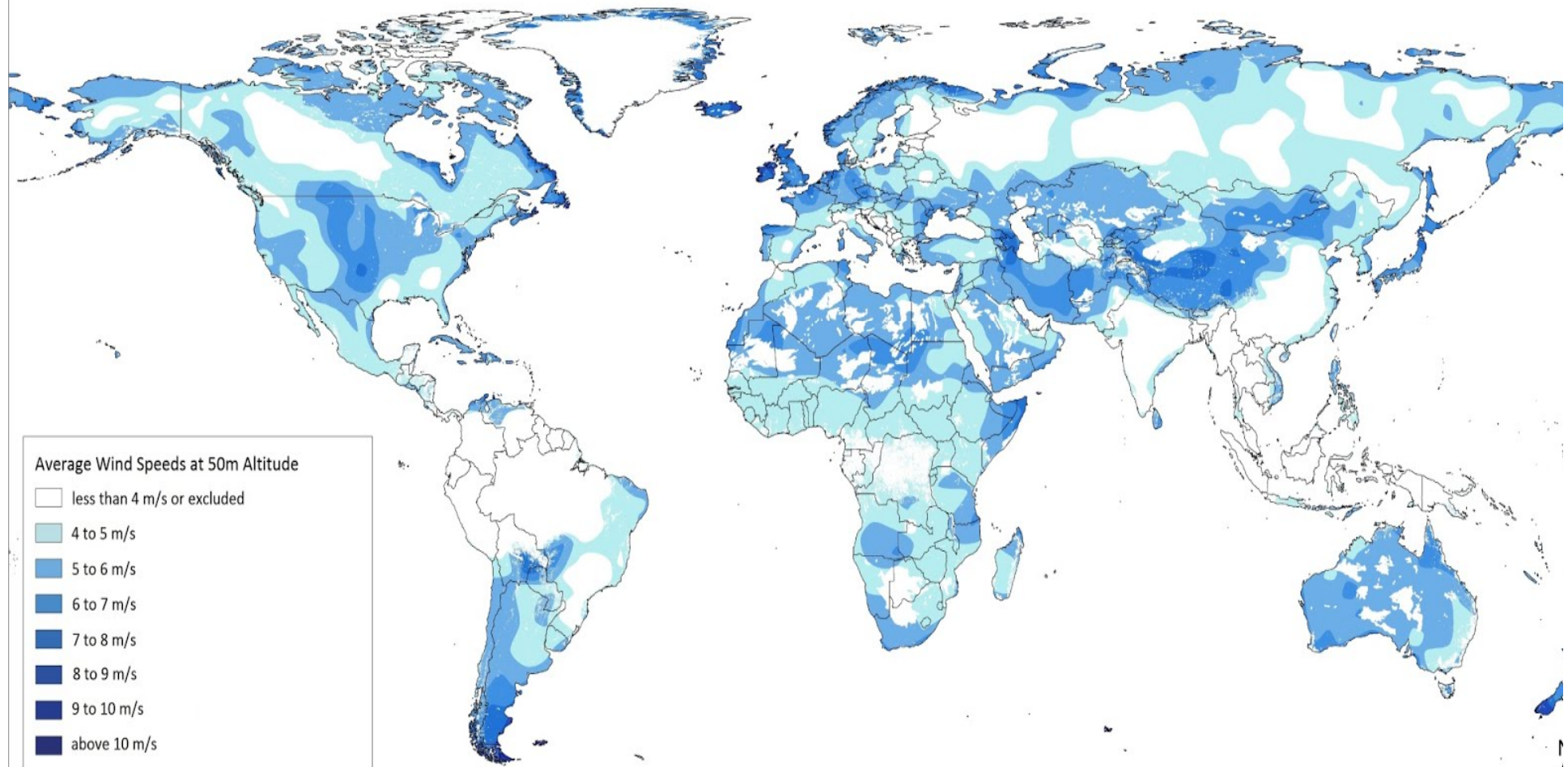
- Renewable Energy:
- CSP
  - Photovoltaic
  - Geothermal
  - Wind Energy
  - Biomass
  - Hydropower



Addition: This map shows the DESERTEC Vision of international usage of renewable energies in the places where they're most abundant. Besides showing already existing or planned hydro-, or geothermal power projects the map illustrates which geographic locations possess the optimal conditions for each technology. For design reasons the map doesn't show all renewable energies in some regions.



## Onshore Wind Energy Potential

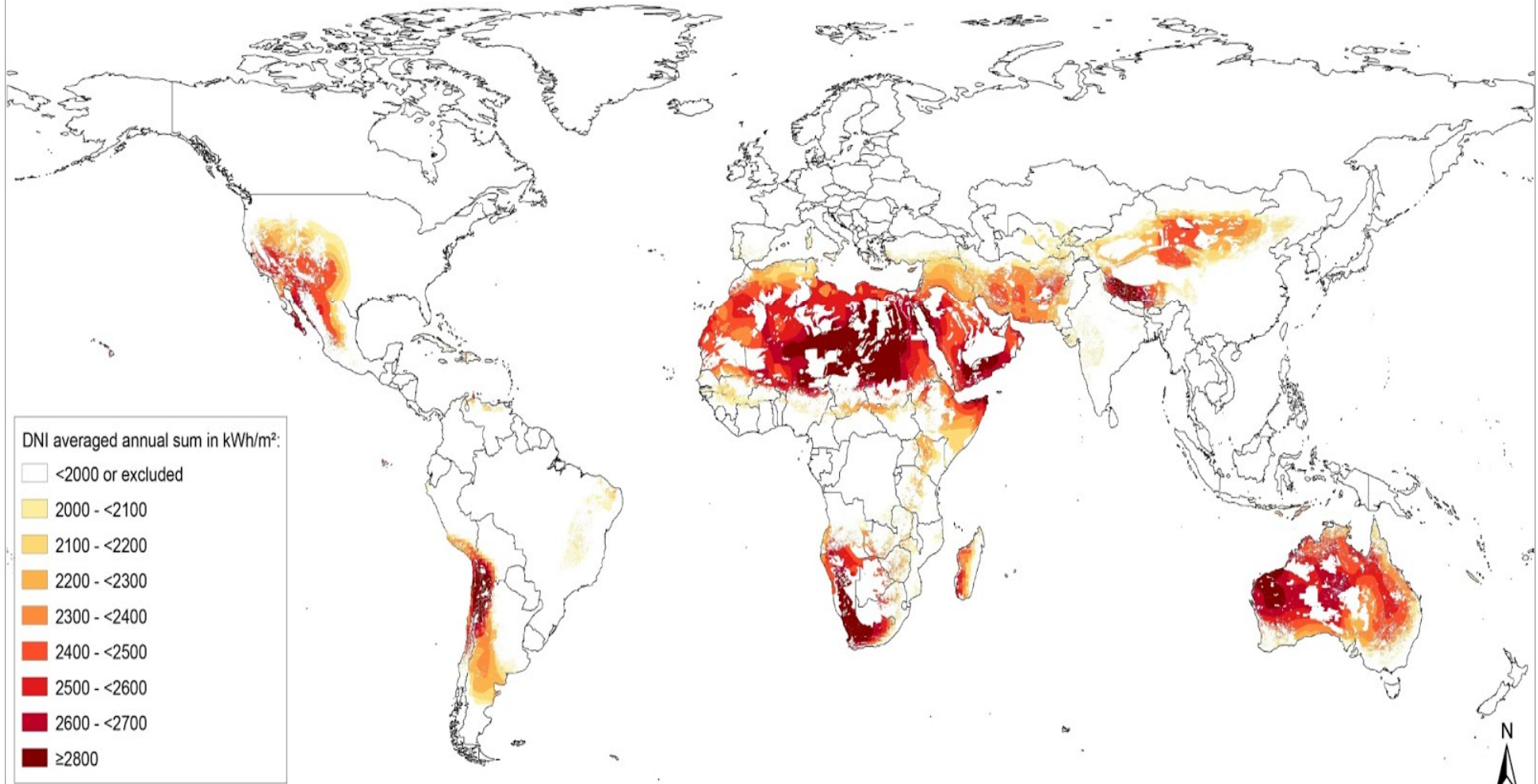


Exclusion areas: Tree cover, urban areas, water bodies, shifting sands, protected areas, permanent snow and ice, salt flats, regularly flooded cover, slopes >25%

Data: NASA SSE (2008), European Commission JRC (2003), USDA (2005), CGIAR (2008)

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# Global concentrating solar power potential

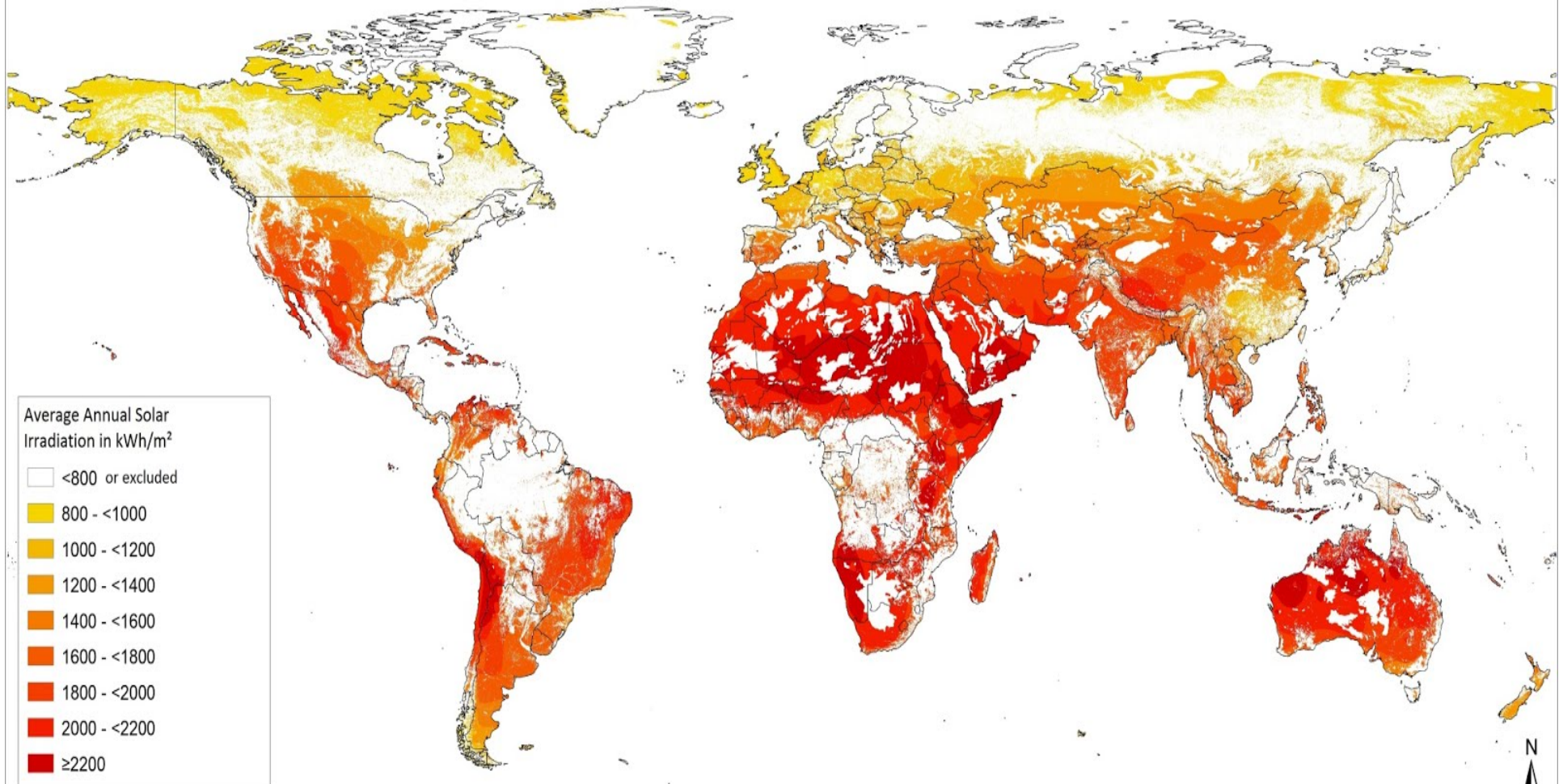


Exclusion areas: Tree cover, urban areas, water bodies, shifting sands, protected areas, permanent snow and ice, salt flats, regularly flooded cover, slopes >25%

Data: NASA SSE (2008), European Commission JRC (2003), USDA (2005), CGIAR (2008)

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# Global Potential for Photovoltaics



Exclusion areas: Tree cover, urban areas, water bodies, shifting sands, protected areas, permanent snow and ice, salt flats, regularly flooded cover, slopes >25%

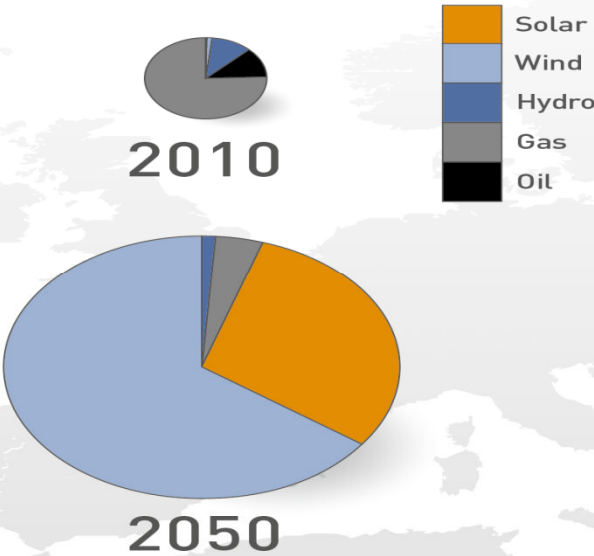
Data: NASA SSE (2008), European Commission JRC (2003), USDA (2005), CGIAR (2008)

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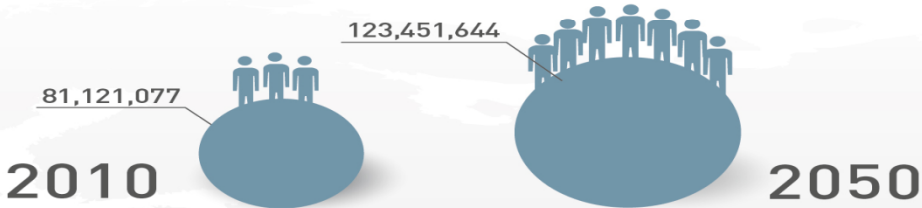


# DESERT POWER 2050 EGYPT

Installed Capacity



Population growth



Annual electricity demand  
in 1,000 GWh



## NREA Activities in DESERTEC INITIATIVE

- On January 30, 2013 in Berlin, memorandum of understanding has been signed between (NREA) and Dii to increase their collaboration
- support local institutions to create renewable energy (RE) capacities and accelerate the dissemination of RE projects.
- In the long term, their cooperation with stakeholders in Europe, the Middle East and North Africa (EUMENA) could provide an important impetus towards an integrated electricity market, with benefits for all actors involved.





**Thank You**

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