Zafarana Wind Power Plants
AS CDM Projects

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ORGANIZATION CHART OF MINISTRY OF ELECTRICITY & ENERGY

- Egyptian Electricity Holding Company
- Nuclear Materials Authority
- Nuclear Power Plants Authority
- Atomic Energy Authority
- Rural Electrification Authority
- Hydro Power Projects Execution Authority
- New & Renewable Energy Authority
Diversifying the energy resources generation

- Combined Cycle: 33%
- Wind: 1.8%
- Hydro Power: 12.2%
- Gas: 4%
- Steam: 49%

Total installed capacity: 22750 MW
The New & Renewable Energy Authority (NREA) was established in 1986 to act as the national focal point to introduce and promote renewable energy technologies in Egypt for different applications particularly electricity generation.

The previous preliminary studies and measurements have proven that Suez Gulf area is one of the best all over the world to produce wind electricity.

In March 2003, a Wind Atlas for Suez Gulf was issued to assess the available potentials in the area which indicated that it can host up to 20,000MW installed capacities of wind farms.
Resource Assessment


Wind Atlas of Egypt, 2005
## RE CDM Projects in Egypt

<table>
<thead>
<tr>
<th>Project Title/Project Type</th>
<th>Annual CERs (t CO$_2$e)</th>
<th>Project Location (City/Governorat e)</th>
<th>Project Proponent</th>
<th>Cooperating Donor Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zafarana 120MW Wind Power Plant</td>
<td>249,000</td>
<td>Zafarana/ Suez</td>
<td>NREA</td>
<td>JBIC / Japan</td>
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<tr>
<td>Zafarana 120MW Wind Power Plant</td>
<td>225,000</td>
<td>Zafarana/ Suez</td>
<td>NREA</td>
<td>DANIDA/ Denmark</td>
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<tr>
<td>Zafarana 85MW Wind Farm Plant</td>
<td>155,313</td>
<td>Zafarana/ Suez</td>
<td>NREA</td>
<td>Spain</td>
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<td>Zafarana 80MW Wind Power Plant</td>
<td>163,000</td>
<td>Zafarana/ Suez</td>
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<td>KfW/Germany</td>
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<tr>
<td>Zafarana 140MW Wind Power Plant</td>
<td>250,000</td>
<td>Zafarana/ Suez</td>
<td>NREA</td>
<td>DANIDA/ Denmark KfW/Germany</td>
</tr>
</tbody>
</table>
The CDM Project Cycle

- Develop the Project Idea Note (PIN).
- The DNA in the host country issues the Letter of No-Objection.
- Issue the Letter of Non-Diversion.
- Start to develop the Project Design Document (PDD).
- Singing Emission Reduction Purchase Agreement (ERPA) between the project participants.
- Choose a Designated Operational Entity (DOE) to validate the PDD.
- Request for registration at the EB.
- Project implementation and monitoring.
- Select a DOE to verify and certify the emission reductions.
- Issuance of the CERs.
PDD & Additionality

- No incentives for wind power generation.
- Wind is more capital intensive.
- Low price for natural gas.

Result:

Currently wind generated KWh cost cannot compete with thermal generated KWh cost.

Wind cannot be viewed as BAU leading to:
WIND NEED for CDM SUPPORT TO BE IMPLEMENTED.
Determining Operating Margin.

- Less than 20% generation comes from hydro.
- More than 80% from thermal Power Plants.
- Wind will replace thermal generation mix of Combined Cycle, Steam Turbines and Gas Turbines.

A conservative approach.
**Combined Margin**

The project will affect Operating margin and build margin.

\[
\text{Combined Margin} = \left\{ \text{Operating Margin} \times n \right\} + \left\{ \text{Build Margin} \times (1-n) \right\}
\]

✓ n has been chosen to be 0.75%.

✓ Again complying with the new CDM / EB directives.
Application of the CDM cycle:

1- Developed the Project Idea Note (PIN).
2- The Egyptian DNA issued the Letter of No-Objection.
3- Issued the Letter of Non-Diversion.
4- Singing Emission Reduction Purchase Agreement (ERPA) between the NREA & KFW.
5- Prepared the Project Design Document (PDD).
6- Chose a Designated Operational Entity (DOE) to validate the PDD.
Barriers and Lessons Learned

- Modifying the Baseline Methodology and as a result the need to update the PDD.

- OM & BM calculations and selection of power station is somewhat controversial.

- The Additionality tool has been changed to be with more demanding rules which need more documents and evidences to be proved.
Barriers and Lessons Learned (cont.)

- Difficulty in reconciliation of CDM rules with Egyptian regulations.

- Limited number of DOEs and consequent delays in finalizing validation and verification process.

- Multidisciplinary experience is needed in local CDM experts.
Conclusion

At 10 US$ per ton CO₂ & around 0.56kg CO₂ avoided emissions per KWh produced from thermal power stations -Wind produced KWh will have a bonus of around 3.2 piaster which cannot close the gap between wind and thermal generation.

CDM cannot solely make uncompetitive projects economically attractive.

Rather, CDM can make near economic projects feasible or more attractive.

CDM has so far contributed positively in assisting wind project development in Egypt & it is hoped to continue on supporting ambitious national RE projects.