I. Key development issues

1. For years, Tunisia has expressed its commitment with the international action to combat climate change. On October 2001, Tunisia’s first national communication for the United Nations Framework Convention on Climate Change described a prioritized set of GHG mitigation opportunities. Tunisia ratified the Kyoto Protocol in January 2003, and started to develop a strategy to engage in the Clean Development Mechanism (CDM) in 2005. The strategy focuses on GHG emission reductions in the energy and industrial sectors which account for more than 60% of the GHG emissions at national level. As part of the efforts to promote CDM in Tunisia, a portfolio of CDM projects in the energy and industrial sector was prepared and published in September 2008. The CDM portfolio identifies an important potential of emission reductions from renewable energy projects\(^1\), with about half of this potential in wind power.

2. The project sponsor, Société Tunisienne de l’Electricité et du Gaz (STEG) – the national electricity company – requested assistance from the World Bank Carbon Finance Unit to develop a CDM project for the Sidi Daoud Wind Farm. This is the first CDM project in renewable energy developed in Tunisia. The proposed project consists in the purchase of about 50,000 tCO2e annually of emission reductions (ERs) generated by a newly built wind farm through an Emissions Reduction Purchase Agreement (ERPA) under the Spanish Carbon Fund, a Trust Fund Managed by the World Bank. There is no IBRD lending involved in this project.

3. The World Bank is uniquely positioned to support this project because of its extensive experience in carbon finance projects. The World Bank has made significant efforts in the development of the carbon market and currently manages eleven funds acting as a trustee on behalf of public and private sector participants. The World Bank Carbon Finance Unit uses money contributed by governments and companies in OECD countries to purchase project-based  

\(^1\) 55% of the emission reduction potential in the energy and the industrial sector, excluding gas flaring projects. (Source: Portefeuille de projets MDP dans les secteurs de l’Energie et de l’Industrie -Task force MDP -Ministère de l’Industrie, de l’Energie et des petites et moyennes entreprises- Agence Nationale pour la Maitrise de l’Energie)
greenhouse gas emission reductions in developing countries and economies in transition under the Clean Development Mechanism (CDM) and Joint Implementation (JI) Mechanism in the framework of the Kyoto Protocol. At the end of 2008, contributions by participants in the World Bank's carbon funds and facilities reached US$ 2.3 billion. The emission reductions of the Sidi Daoud Wind Farm project are purchased through one of the eleven funds managed by the World Bank, the Spanish Carbon Fund, on behalf of the participants in the Fund.

4. The Spanish Carbon Fund is a public/private partnership administered by the World Bank on behalf of the Government of Spain, with the objective of purchasing greenhouse gas emission reductions from renewable energy, energy efficiency and other projects that contribute significantly to sustainable development in developing countries and countries with economies in transition. Spain has decided to achieve its greenhouse gas emissions reduction target through a combination of domestic reduction measures with the use of the Kyoto Protocol’s flexible mechanisms. The Fund is one of the initiatives implemented by the Spanish Government to achieve this goal.

5. The World Bank is a pioneer in carbon finance projects in Tunisia. It is currently providing support to the first two and only projects registered in the country: the Jebel Chekir solid waste carbon project and the Gas recovery and flaring project for nine bundled landfills. The proposed project will have a demonstration impact for further development of CDM projects in renewable energy in Tunisia.

6. During the past decade, electricity demand has steadily increased in Tunisia as the result of an average GDP growth of 4% per year. To meet the growing demand, power generation capacity increased by more than 30% over the same period and reached 3,314 MW at the end of 2007. Electricity generation in Tunisia relies mainly on natural gas and, to a lesser extent, fuel-oil. Steam turbines contribute to 45% of the total electricity generation, combined cycle power plants to 40% and gas turbines to 14%. Renewable energy, hydro and wind power, only account for 1% of the country’s electricity generation.

7. The growing demand for electricity has had an impact on Tunisia’s energy balance. Tunisia, which was a net energy exporter in the early 1980s, has become a net importer since 2000. In order to limit energy dependency and promote a lower carbon growth, Tunisia has adopted measures to scale-up investments in energy efficiency and renewable energy in its 11th development plan (2007-2011).

8. Along with solar, wind power is one of the major sources of renewable energy in Tunisia. On-shore wind resources have been estimated at 1,000 MW and the country also avails sizeable off-shore wind resources. In this context, the exploitation of Tunisia’s untapped wind power potential offers an interesting opportunity to achieve savings in fossil fuel consumption, introduce clean technologies for power generation and bring environmental benefits resulting from the reduction of greenhouse gas emissions.

9. However, there are significant barriers to the development of wind energy in Tunisia—among them, high capital investment costs and issues related to the integration of wind power into the electricity grid. Studies have established that the scaling-up of investment in energy
efficiency and renewable energy requires attractive financing mechanism. Additional revenues generated through carbon finance can contribute to alleviate such barriers.

Consistency with the UNFCCC and Kyoto Protocol

10. Electricity generation from wind power does not produce any greenhouse gas. This project is in compliance with the UNFCCC and the Kyoto Protocol. The emissions reductions (ERs) generated by saved GHG emissions will be sold to an industrialized country, Spain, through the Spanish Carbon Fund. The project will also contribute to sustainable development in Tunisia by promoting renewable energy in the country.

Consistency with relevant national criteria

11. The 11th Development Plan (2007-2011) calls for a scaling-up of investments in energy efficiency and renewable energy. More specifically, the four-year energy conservation program for the period 2008-2011 aims at increasing the contribution of renewables to 4% of primary energy demand over the same period.

12. In its 10th economic plan (2002-2006), the government set an objective of 100 MW installed capacity of wind power by 2006 and this objective was raised to 200 MW in the 11th Plan for the period 2007-2011. Different projects undertaken by the Société Tunisienne de l’Electricité et du Gaz (STEG), including the Sidi Daoud Wind Farm project contribute to meet this target. In 2000 and 2003, STEG deployed two pilot projects representing a total installed capacity of 19.28 MW. Wind generation capacity will increase to 53.6 MW in 2009 with the addition of this project.

13. The Sidi Daoud Wind Farm project fits perfectly within this framework by increasing renewable energy generation capacity and therefore reducing greenhouse gas emissions.

II. Rationale for Bank involvement

The main reasons that justify the Bank’s involvement in this project are detailed below.

Combat climate change through the promotion of carbon finance

14. Climate change has emerged as a key concern for the World Bank and its clients, especially after the 2005 G-8 Summit in Gleneagles. The Bank has been a leader in the field and incorporated these considerations into its development operations. Through the extensive experience with the carbon funds for which it acts as a trustee, the Bank is well-positioned to integrate and maximize the potential of carbon finance in the renewable energy sector.
Promote the development of a lower carbon option for Tunisia’s power generation

15. In a climate of volatile oil prices, the commissioning of additional power generation capacity is costly, while an insufficient electricity supply would be a significant obstacle to Tunisia’s economic growth. However, this project would support Tunisia’s strategy to increase substantially the share of renewables in the country’s energy supply.

How does this Project fits into the Carbon Finance Strategy of the Bank

16. Specifically, the project is in agreement with the following strategic objectives of the Bank’s Carbon Finance Unit (ENVCF):

- High-quality ERs to show how project-based GHG emission reduction transactions can promote and contribute to sustainable development and lower the cost of compliance with the Kyoto Protocol;

- Knowledge and dissemination to enable the Parties to the UNFCCC, the private sector, and other interested stakeholders to “learn by doing” in the development of policies, rules and business processes to achieve ERs under the CDM;

III. Proposed objective(s)

17. The development objective of this project (PDO) is to reduce greenhouse gas emissions by replacing electricity generated from fossil fuel-fired power plants by electricity from the Sidi Daoud wind farm. The objective of this stand alone carbon finance operation is the purchase of about 50,000 tCO2e annually of ERs generated by the newly built wind farm through an Emissions Reduction Purchase Agreement (ERPA) under the Bank-managed Spanish Carbon Fund. The emissions reduction will arise from the displacement of fossil fuel-based power generation by grid-connected electricity production from wind power. The project will contribute to reduce energy dependency and improve energy security in Tunisia. It is the first project of this size in Tunisia and the first to be connected to the national grid, thus paving the way to the scaling-up of wind power in the country. The project activities will generate Certificates of Emission Reductions (CERs) and revenues through the sale of CERs under the Clean Development Mechanism (CDM) of the Kyoto Protocol. The secured revenues obtained contribute to improve the profitability of the project and alleviate one of the barriers to investment in wind power in Tunisia.

IV. Preliminary Description

18. The project consists in the purchase of about 50,000 tCO2e annually of ERs through an Emissions Reduction Purchase Agreement (ERPA) under the Bank-managed Spanish Carbon Fund. The exact amount of ERs eligible for purchase will be subject to further study and CDM validation and verification process. There is no IBRD lending involved in this project. The Spanish Carbon Fund (SCF), administered by the IBRD as Trustee, will purchase ERs from the project and will make annual payments upon verification of the generated ERs by an independent entity (Designated Operational Entity, or DOE).
19. The emissions reduction will result from substitution of electricity generated by a newly built wind farm with an installed capacity of 34.32 MW for electricity generated by fossil fuel fired plants. The project sponsor is Société Tunisienne de l’Electricité et du Gaz (STEG), the national vertically integrated power utility in Tunisia. The equipment for the wind farm was financed with a concessional financing from the Spanish Government and the remaining project costs, related mainly to civil works, were financed by STEG’s own resources. STEG is the owner of the project, operates the project and dispatches the electricity produced by the wind farm into the national grid. STEG has a sound financial track record. STEG reported US$ 2.9 billion in assets and total revenues of US$ 1.1 billion in 2006. Moreover STEG has in-house expertise in the field of wind power project development and operations due to the first two pilot projects developed in Tunisia and located at the same site, a 10.56 MW pilot in operation since 2000, and 8.72 MW pilot in operation since 2003. Carbon Finance revenue streams generated by the sale of emission reductions will provide an additional source of financing, which was already taken into account by STEG at the time of the decision to invest in the wind farm. The wind farm operations started in February 2009. Testing of the wind farm will take place until November 2009, when commissioning is expected.

20. The wind farm is located in Sidi Daoud approximately 100 km North-East of Tunis, next to the previous two pilot projects. It comprises 26 wind turbines of 1,320 KW each and a transformation substation. A newly built 22.5 km high voltage transmission line allows the dispatching of the power generated by the wind farm to the Tunisian interconnected grid. The wind farm is expected to operate with a capacity factor of 33% and produce approximately 95,000 MWh.

21. The main alternatives available to STEG were: (i) a wind power plant with comparable electricity output but located in a different area; (ii) a power plant using other sources of renewable energy with comparable electricity output, such as solar, biomass or hydro, etc. The first alternative was not considered by STEG because wind records showed that the current location was the best choice. The second alternative, electricity from other renewable energy sources, was not attractive due to: a lack of sufficient potential (for hydro and geothermal projects), high costs (for solar PV and solar thermodynamic), or a lack of experience from pilot projects (for biomass).

22. The project is expected to have a strong demonstration impact to promote the development of future CDM wind power projects in Tunisia by STEG or other stakeholders identified in the national CDM portfolio prepared in 2008.

V. Safeguard Policies that might apply

23. Environmental Assessment: The project has been tentatively rated as Category B. STEG prepared an Environmental Impact Assessment (EIA) in May 2006 -before the project was considered by the Bank- and submitted it to the Bank. When the project was prepared, wind farm projects in Tunisia had to prepare an EIA as per Decree 91-362. At that time, the ANPE (National Environmental Protection Agency) cleared the EIA. The EIA has been reviewed by the team and has been considered insufficient to comply with Bank’s safeguard policies. The EIA is currently being completed and updated by STEG as requested by the team. As prescribed by OP
4.01, the Bank will review the Environmental Assessment (EA) to ensure its consistency with this policy and, if necessary, might require additional EA work, including public consultation and disclosure. A public consultation about the project was held on June 20, 2006. A stakeholder consultation for the CDM project was held on March 17, 2009.

24. **Involuntary Resettlement:** The project will not trigger OP 4.12. Based on documentation received by STEG, land for the project has been leased by STEG for 30 years on a voluntary basis with the relevant landowners. Those landowners who were not interested in leasing their land did not have to do so, and the project circumvented their specific plot. Through voluntary agreements, STEG acquired the rights of way from local landowners for the wind farm and transmission line.

This process was a result of consultations held between STEG, the local government, and the community for all three stages of the project. For each stage, the STEG conveyed the background and benefits of the project, and the community was able to express its questions and concerns openly. Most of the landowners were supportive of the project. Their concerns were mainly related to leasing their land at market value, price differentiation of irrigated and non-irrigated land, the hiring of local people for some of the works, ensuring that the land is not affected by the construction works, and having the new project road linked to the school for the disabled. STEG took into consideration all of their concerns; the price of land was mutually agreed upon by STEG and the landowners (with the price differentiation requested for irrigated and non irrigated land), the new access road was linked to the road on which there is a school for the disabled, and approximately 500 community members were involved in works during the construction phase. The land sites in question continue to be used for agricultural and grazing purposes by the community.

STEG has an office on the land site, which receives questions, complaints, etc. from anyone in the area. On the World Bank side, the safeguards specialist will continue to liaise with STEG to make sure they are fully aware of the Bank’s O.P. 4.12.

25. If it turns out that some remedial additional measures needs to be prepared and implemented in the context of land, this will be agreed between the Bank and STEG prior to Negotiations of the Emission Reduction Purchase Agreement.
<table>
<thead>
<tr>
<th>Safeguard Policies Triggered by the Project</th>
<th>Yes</th>
<th>No</th>
<th>TBD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Assessment (<a href="#">OP/BP 4.01</a>)</td>
<td>[X]</td>
<td>[ ]</td>
<td></td>
</tr>
<tr>
<td>Natural Habitats (<a href="#">OP/BP 4.04</a>)</td>
<td>[ ]</td>
<td>[X]</td>
<td></td>
</tr>
<tr>
<td>Pest Management (<a href="#">OP 4.09</a>)</td>
<td>[ ]</td>
<td>[X]</td>
<td></td>
</tr>
<tr>
<td>Physical Cultural Resources (<a href="#">OP/BP 4.11</a>)</td>
<td>[ ]</td>
<td>[X]</td>
<td></td>
</tr>
<tr>
<td>Involuntary Resettlement (<a href="#">OP/BP 4.12</a>)</td>
<td>[ ]</td>
<td>[X]</td>
<td></td>
</tr>
<tr>
<td>Indigenous Peoples (<a href="#">OP/BP 4.10</a>)</td>
<td>[ ]</td>
<td>[X]</td>
<td></td>
</tr>
<tr>
<td>Forests (<a href="#">OP/BP 4.36</a>)</td>
<td>[ ]</td>
<td>[X]</td>
<td></td>
</tr>
<tr>
<td>Safety of Dams (<a href="#">OP/BP 4.37</a>)</td>
<td>[ ]</td>
<td>[X]</td>
<td></td>
</tr>
<tr>
<td>Projects in Disputed Areas (<a href="#">OP/BP 7.60</a>)</td>
<td>[ ]</td>
<td>[X]</td>
<td></td>
</tr>
<tr>
<td>Projects on International Waterways (<a href="#">OP/BP 7.50</a>)</td>
<td>[ ]</td>
<td>[X]</td>
<td></td>
</tr>
<tr>
<td>Piloting the Use of Borrower Systems to Address Environmental and Social Issues in Bank-Supported Projects (<a href="#">OP/BP 4.00</a>)</td>
<td>[ ]</td>
<td>[X]</td>
<td></td>
</tr>
</tbody>
</table>

1. **Tentative financing**

Carbon Finance revenues = US$ 2.6 million

2. **Contact point**

Contact: Silvia Pariente-David  
Title: Senior Energy Specialist  
Tel: 202-473-0663  
Email: sparientedavid@worldbank.org  
Location: Washington DC

---

*By supporting the proposed project, the Bank does not intend to prejudice the final determination of the parties' claims on the disputed areas*