Fabio Borba
Lead Developer of the Cabeolica Wind Farm

Wind power comes to Cape Verde

The Cabeolica wind farm, set across four islands of the Cape Verde archipelago, has led the way in wind power generation in Africa. The wind farm is managed by a special purpose company, Cabeolica S.A., established by the founding partners in 2009. Lying across the trade winds belt, the archipelago has consistent wind speeds of up to 10m/s creating one of the best locations in the world for power generation. The farms' ability to directly supply energy to the individual power grids on each of the islands means a sizable reduction in the need to import fuel, diminishing the country's sensitivity to fluctuating commodity prices and reducing costs across the board.

Set over four islands; Sao Vicente, Santiago, Sal and Boa Vista the €60 million project comprises of 30 class I V52 turbines, four substations and 33.5km of power cable and has reached maximum wind penetration for the islands. Each island has varying power capacity from 4MW to 10MW producing collectively up to 100GWh/yr. Cabeolica S.A. will provide up to 26MW of wind power, resulting in Cape Verde reaching its renewable energy goals ahead of schedule.

Financing

Cabeolica S.A. is the first commercial-scale, privately financed, public private partnership (PPP) wind farm in Sub –Saharan Africa. The PPP is held between the Government of Cape Verde; Electra, the government owned utility company; and InfraCo, a publicly financed privately managed project development company.

The Cape Verde is one of the best locations in the world for wind power generation

The Cabeolica wind farm was not the country's first attempt at developing greater wind capacity. Between 1995 and 2004, with the assistance of the World Bank, the Cape Verdean Government attempted to secure bids from turbine suppliers through a tender process on two separate occasions. The first attempt was awarded to Gamesa but due to various factors, the contract later collapsed. The second tender, a replication of the first, never received any preferred bidders. The size of the project, only 7.5MW at the time, and gaps in the project development meant there was too much risk for potential suppliers and financiers, which resulted in their unwillingness to explore the opportunity.

InfraCo, the lead developer of the Cabeolica S.A. farm, was invited to participate in a new attempt to supply wind energy to the archipelago by the Government of Cape Verde in 2007. InfraCo is a facility of the Private Infrastructure Development Group (PIDG) which is funded by a number of European Governments, including the UK, Sweden and Germany, as well as the World Bank. Established in 2002, PIDG was set up as a donor-financed group to help overcome the obstacles to private sector involvement in infrastructure in developing countries. Its aim is to encourage the growth of sustainable infrastructure projects and remove the barriers of short-term debt and local currency investment.

InfraCo invest where others may find projects too risky, shouldering the direct costs and risks of early stage project development,

which are managed by private project development company eleQtra, whose expertise allows them to navigate and resolve technical, legal and regulatory issues that enable infrastructure to be built in high-risk markets.

When invited to participate in the project InfraCo worked with the Government of Cape Verde and the national utility company Electra to systematically study, quantify and mitigate all risks in relation to the project. InfraCo commissioned several studies including a dynamic grid analysis, an internationally acceptable Environmental Impact Assessment and legal and regulatory revision of the applicable laws in the country. The intent was to give comfort to all stakeholders including suppliers, investors and lenders, that the risk matrix of the project was well understood, quantified and no aspects of the project had been overlooked.

Such rigorous preparation and due diligence led to InfraCo securing additional investment from the FinnFund and the African Finance Cooperation for the commercial-scale project. Debt was supplied by the European Investment Bank (€30 million) and the African Development Bank (€15 million), bringing the total development cost to €60 million.

Development and overcoming mitigating factors

Cabeolica S.A. contracted Vestas to design, supply, install, construct and test the wind farms. They subcontracted Global Energy Services for the electrical works, equipment and assembly of the turbines. Other subcontractors included Isidoro, for the civil works on each of the islands and Laso and Burmester for the transport of parts from factories to site.

Vestas began work in October 2010, with two teams working simultaneously to construct two wind farms at a time, starting with Santiago and Sao Vincente and then moving onto Sal and Boa Vista. Due to the predominance of energy previously coming from imported fuel, the power systems had to be enhanced to deal with the more complex wind/thermal power system operations. On the island of Santiago, the transition cabling had to be buried under the city. To limit the disturbance caused to inhabitants, Vestas worked 24 hours a day and only opened up five metres of road at any one time. In June 2011, Vestas started to assemble the wind turbines, one island at a time, and the wind turbines on Santigago and Sao Vicente are now completed. Due to the shallow ports in Sal and Boa Vista inter-ship transportation was required to get the turbines to the islands. Once there, cranes and offload equipment had to be supplied because the ports were not equipped to deal with such loads. In Sal, due to the climate oscillations, offloading was only possible during four months of the year.

The project also required the approval of the Environmental Impact Assessment (EIA), consistent with local laws and stringent international environmental guidelines, such as the ones from the World Bank. On the island of Boa Vista, the EIA found a species of the Red-Billed Tropic bird and the Osprey. The Tarentola Caboverdeana Substituta, a subspecies of reptile, was only discovered in Sao Vicente due to the thorough study performed. A full study and several mitigation actions resulted from these findings, in order to protect the local wildlife.

On Boa Vista, a bird collision assessment was conducted and the location of the turbines was changed to minimise the impact on the birds. They decreased the light intensity on the turbines to avoid birds being attracted to the light. Under local law, Cabeolica S.A had to bury the transmission lines underground which also had the advantage of protecting the birds. On Sao Vicente, the reptiles were collected and

» Set over four islands; Sao Vicente, Santiago, Sal and Boa Vista the €60 million project comprises of 30 class I V52 turbines, four substations and 33.5km of power cable and has reached maximum wind penetration for the islands. «

» When invited to participate in the project InfraCo worked with the Government of Cape Verde and the national utility company Electra to systematically study, quantify and mitigate all risks in relation to the project. «

Vestas have been heavily involved with the project

relocated during the construction period and the farm has been designed to minimise any alterations to their habitat. Cabeolica S.A. will also regularly carry out population surveys and attach GPS tracking devises to the birds and reptiles to monitor their movements and ensure they remain unaffected by the farm.

At an environmental conference in Scotland, the Cabeolica wind farm was used as a case study to highlight the developers' willingness to accommodate environmental mitigating factors. Normally investors only need to abide by a country's environmental laws and these may not always cover the protection of birds or other species. InfraCo was willing to compromise a small degree of output in order to take the next step and followed not only Cape Verde's environmental laws but international laws as well.

The construction of the Cabeolica wind farm means that Cape Verde will benefit from the Clean Development Mechanism (CDM). CDM is a provision of the Kyoto Protocol that governs project-level carbon credit transactions between developed and developing countries and could lead to further Certified Emission Reduction (CER) projects in the country. The project will generate over 70,000 of CERs.

Conclusion

Wind energy was first introduced to Cape Verde in 1994, but prior to the Cabeolica wind farm provided only two per cent of the country's power needs. When completed, Cabeolica will provide 25 per cent of the country's energy. It will benefit around 95 per cent of the population and will result in a reduction in fuel imports of up to 20,000 tonnes of oil, saving the country €12 million per year. Although in its very early stages, due to second to none wind resources, Cabeolica S.A. expect one of the islands to produce a record high wind output within a year.

BIOGRAPHY

With over 10 years' experience in project finance in infrastructure industries including power generation, oil and gas and logistics, **Fabio Borba**, Vice President of eleQtra and CEO of Cabeolica wind farm is responsible for project development across sub-Saharan Africa. He has just finalised structuring the first PPP in the wind sector in sub-Saharan Africa. Before joining eleQtra, Fabio was a Developer at ABB Equity Ventures and then went on to be the Head of the Energy Department at Tenaris Group, taking him to experience project finance in North and South America, Africa, Asia and Australia.