

T@W Good Practice Form

Setting

Title: Construction of a wind power plant (WPP)
Country: Bulgaria
Location: Mogilishte Village, Kavarna region
Start date: October 2004
End date: May 2005
Technology keyword(s): Wind
Host sector: special purpose company to invest and construct WPP

General description

Summary: The overall project consists of mounting and operation of 3 wind turbines on the territory of Mogilishte Village. The present description concerns only one turbine construction and operation - type Nordtank 500/41 with 500 kW capacity.

Aims: The electricity generated by the wind plant is sold to National Electric Company thus providing economic benefits for owners and also decreasing the amount of electricity produced from fossil fuels in TPPs.

Summary of Results: Energy produced from RES thus leading to profit making for site-owners

Planning Time: -

Planning issues: The wind power plant is operational

Operation Time: 20 years

Feasibility Study: done

Technical details

Technical details: Wind speed and direction data have been used from Kaliakra meteorological station. The wind direction and speed, the energy density of air flow at different terrain points and at different levels were subject of numerical modelling with special software. The study shows prevailing wind direction from North and South.

One wind turbine is installed type Nordtank 500/41 with 500 kW capacity with the following operating data:

- Rating capacity 500 kW;
- Cut-in wind speed - 4,5 m/s;
- Cut-out wind speed - 25 m/s;
- Number of rotor blades - 3;
- Rotor diameter - 41 m;
- Swept area - 1320 m²;
- Hub heights - 50 m

The turbine operates at maximum capacity and reaches maximum power at 15 m/s wind speed. After 17 m/s the capacity decreases by 10 % and after wind speed of 25 m/s it stops functioning because of danger of mechanical damages.

A transformer station with one transformer on the site is built and connected to turbines to transform 690 V generated power to 20 kV necessary for the electricity distribution network. The system is connected to Varna electricity distribution company and a 0,69 kV/20kV distribution system is constructed.

Energy data

Energy data: The annual electricity production is 947,4 MWh and highest production is expected during January, February, December and November.

Energy generated: 947,4 MWh/year or 3408 GJ/year

Monitoring: -

Environmental data

Environmental data: For the period 2005-2012 calculations show that the project will generate CO₂ emissions savings amounting to 5 349 tons. Calculations are made for this period because the emissions factors used are valid till 2012, after this year new calculations should be made.

Project GHG-emissions: -

GHG-emission reductions: CO₂ emissions will be reduced by 5 349 tons for the period 2005-2012. SO₂ emissions will be reduced by 88 tons for the same period and NO_x - by 7 tons.

“EAU, CER, ERU, AAU”: A scenario for emissions trading was developed. The total quantities of ERU to be sold are 27 966 tons CO₂ equivalent at an average price 3,5 Euro/ton. As a result of this the project payback will be reduced to 4,58 years.

Methodology: The methodology for calculation of emissions reductions is that given in Operational Guidelines for Project design documents of JI Projects of Dutch Ministry of Economics as of May 2004.

Baseline -

Monitoring: Monitoring to be done by EnCon Services, validation to be done by ESBI

Contribution to Sustainable Development: By substitution of electricity generated from fossil fuels the project contributes to emission saving targets and environmental protection goals.

Economic data:

Economic data:	The project is financed through EBRD Bulgarian Energy Efficiency and Renewable Energy Credit Line (BEERECL) and as such received 20 % grant of the total capital costs after project completion. Part of capital costs is provided as a loan from Post bank (one of the banks operating the credit line in Bulgaria) and part is project host equity.
Financing:	79,94 % Post bank loan and 20,06 % own investors
equity	
Capital cost:	190 244 Euro
Operational Costs:	14 547 Euro
Payback:	4,75 years
Energy Production costs:	n.a.
Other savings:	No other savings are observed

Additional Information

Printed or electronic reports or other literature available:

Title:	"	Cost: -
Address for download of electronic document:		n.a.

Project Web site: n.a.

Photo Library

Pictures: Each one should have a caption. The provider must own the copyright (should be confirmed)

Contact information (to be duplicated for each contact for this project):

Type of Organisation: Consultancy Company, project management
(e.g. technology supplier, service provider, host company, financing body, project management)

Technology keyword(s) specific to this organisation:

Organisation / Agency: EnCon Services

Main contact Dimcho Linkov - Manager

Address: 3, Vassil Levski Blvd., 1000 Sofia

Tel: +359 2 987 1903

Fax: +359 2 987 1927

E-mail: dlinkov@enconservices.com

Web Site: www.enconservices.com; www.beerecl.com

Description of the Organisation for inclusion in the database of Technology and Service Providers: Consultancy company approved by EBRD to manage and operate the BEERECL

Other contacts:

#please only give full contact details (name, address, email, telephone) if you have confirmed that they are willing to respond to enquiries and want to be included in the database of Technology and Service Providers. These could for example be: host organisation, equipment manufacturers, financial organisations, etc.#

Please email filled out form (including pictures) to: GP@setatwork.eu

For each picture provided, please provide a caption including any acknowledgement or source and confirm that you own the copyright and/or permission is given for it to be published by T@W on the website and in T@W publications.

If possible please provide pictures at 300dpi so that they can be used in printed versions of the Good Practice.