Technology Fact Sheet for Mitigation
Sector: Energy.
Sub sector: Energy Supply
Technology: Wind Energy on-Shore Technology [i]

A.1 Introduction:

Wind energy is site specific technology depending mainly on local wind speeds. A large wind turbine primarily consists of a main supporting tower upon which sits a nacelle (the structure containing the mechanical to electrical conversion equipment). Extending from the nacelle is the large rotor (three blades attached to a central hub) that acts to turn a main shaft, which in turn drives a gearbox and subsequently an electrical generator

A.2 Technology characteristics

Sites in Sudan are grouped into classes based on the yearly average energy available ranging from 1 to 7; class 5-7 is classified as most suitable for electricity generation. However, only limited areas satisfy this condition namely at red sea cost, Doungla area- North Sudan and Nyla area- West Sudan. The primary perceived problem with wind energy is related to the intermittency of supply, the variability of wind on any given day, week or month means that the amount of power that is produced can change significantly accordingly and a stand by energy sources is thus required. Wind levels and thus power generation can be estimated or forecast from meteorological reports with a reasonable degree of accuracy. However, site readings with specific precautions and arrangement is required before final decision could be made.

A.3 Country specific / applicability

Sudan has wind potential for electricity generation in different parts of the country especially at red Sea coast and north Susan areas, as in Sudan wind atlas 2012.

A.4 Status of technology in country

Different academic and research institution had considered wind energy with some demonstration projects. Basic know how-how is available. Currently MED is erecting some wind energy projects with total of 120 MW: (Dongola 100MW& Nyala (west Sudan) 20MW) and other projects of 180 MW under study (Red sea).

A.5 Barriers

• Limited wind areas in Sudan
• High initial capital cost.
• Lack of skilled man power.
• Lack of private sector investment.

A.6 Benefits to economic / social and environmental development

Environmental

• Wind is zero air pollution systems however through study concerning effect on biodiversity and the ecological habitat in Sudan is not available
• Reduction of GHG; Dongola 100MW& Nyala 20MW wind farm can prevent the emission of approximately 76,500 & 15,300 tonnes of CO_2 per year with 29% plant factor and 0.301 t CO_2/ year Grid Emission Factor.

- Social

It will increase electricity production thus improving the services level, and enhance development.
Economic: Contribute to poverty reduction (provide jobs

A.7 Costs:
The capital cost of a MW of wind energy installation about 2, 130,000 USD /MW. The level cost of electricity from wind in 2009 (accounting for capital costs, lifetime O&M and typical financing costs) ranges between US$50 to 100/ MWh at good to excellent sites (IPCC, 2010).

[i] **This fact sheet has been extracted from TNA Report – Technology Needs Assessment for Climate Change Mitigation - Sudan. You can access the complete report from the TNA project website http://tech-action.org/**