

Wind Energy in Turkey

Dr. Tanay Sidki Uyar, Kocaeli University, Turkey
Jens Peter Molly, DEWI

1. Introduction

The demand of electricity in Turkey grows 8 per cent every year. Until the year 2020 the power capacity will be assumed to be five times higher than today, a really extreme development for the next 22 years. Already today Turkey must import electric energy from the neighbours to meet the actual demand. The existing power stations with their totally installed 22.000 MW are theoretically sufficient to generate enough energy, but especially the thermal power plants are often obsolete and therefore produce less than nominal power. To meet the future energy needs Turkey has to install additional 43.000 MW until 2010 and in the following ten years another 45.000 MW to reach the planned 110.000 MW in the year 2020. With the operator models BO and BOT the Turkish government hopes to attract private investors for the installation of the urgently needed power plants. Also wind energy makes part of the Turkish energy plan. With a contribution of 3 per cent of the electricity generation in the year 2020 or an power installation of approximately 7.000 MW Turkey will become one of the most promising wind energy countries of the future.

2. Present Situation

Today the initial steps are already done and Turkey is in the phase of improving its administrative and financial conditions for wind energy projects, facing the similar problems as other countries did, when they noticed that general laws, rules and requirements were settled long time ago without the need to think in conditions favourable for wind energy applications. From 12-14 June 1998 the Second International Sarigerme Wind Energy Workshop took place at the Iberhotel Sarigerme Park, Ortaca. Here representatives of Turkish ministries and municipalities informed about the actual activities concerning the improvement of the existing legal and administrative conditions. Besides this aspect, this event also was a very good opportunity to meet the actors involved in Turkey and to get informed of the newest developments in wind energy projects. Many interested manufacturers, consultancy companies and investors used this information chance and came to attend the meeting.

The present legislation in Turkey allows auto-producers of energy, that means operators who generate electricity and use them by their own. At the moment Wind measurements performed are for private projects under the Build Operate and Transfer model (BOT) regulated by law No. 3096. In order to promote the development of wind energy projects, the Ministry is preparing a draft law to allow certain renewable energy projects to be realised by the private sector under the Build Operate model (BO). The draft law includes also provisions to apply tax incentives to renewable energy projects realised under the BO model.

In Turkey wind energy projects of the BOT model have to be approved by governmental authorities. On base of a feasibility report the Ministry of Energy and Natural Resources approves a wind energy project and defines the reimbursement of the wind produced energy which will be purchased by the state owned utility. Several steps from the beginning on of a project until the final approval by the ministry have to be done. First of all an application report has to be accepted by the ministry. If the report is accepted, a six months wind measurement must be performed to give a first indication of the site energy potential. With a positive result for the energy potential the wind measurement must be continued until at least a whole year is covered. In this second half year the more detailed design of the project can be already started. With the theoretically calculated long term wind potential, achieved by comparing the one year measurements with the values of existing wind measurement stations, a final feasibility report has to be worked out and send to the ministry for evaluation and final approval of the project.

3. Wind Potential in Turkey

In 1989 around 20 meteorological stations have been validated as reference stations by using the European Wind Atlas Methodology. Today more than 100 private investors measure at their intended wind farm sites. Other measurements are done by EIEI (Electricity Works Survey Administration) at

various sites in Turkey. For the regions of high winds annual wind speed averages for 10m height above ground level derived from long term measurements of the State Meteorological Directorate are as follows:

Site	m/s	Site	m/s	Site	m/s	Site	m/s
Kumköy	5.3	Çanakkale	5.1	Bandırma	6.4	Sinop	5.2
Çesme	3.8	Datça	5.8	Antakya	4.7		

Tab. 1: Wind Speeds in Turkey at some sites measured by weather stations at 10m a.g.l.

As the experience in other countries show, measurements of weather stations must not be representative for the windy sites in the respective areas, because they are taken for other ends than for wind energy. The site wind speeds in Tab. 1 therefore are only first indications about the areas wind potential.

Based on these weather station values the estimated technical wind energy potential of Turkey is about twice as much as the current electricity consumption of Turkey. The above mentioned long term goal of 7000 MW power installation in wind turbines in Turkey therefore is possible and realistic.

4. Present Status of Wind Farm Planning in Turkey

The first 1.7 MW wind farm is operated by Demirer Holding since February 21, 1998 at Geminyan Village near Çesme is an initial signal of the large interest of private investors and developers to build wind farms and to sell energy to the state utility. Many wind measurements for private BOT projects are currently carried out to get the base for the required final feasibility reports. Divided into the different approval steps the following wind farm projects are at work:

Wind power plants with their contracts under negotiation:

7.2 MW, Çesme Alaçati

Wind power plants with the feasibility report in evaluation by the ministry:

2x25 MW, Kocadag

5 MW, Bozcaada

Wind power plants preparing feasibility/revised feasibility report:

30 MW, Çanakkale

15 MW, Yaylaköy

43,5 MW, Kocadagi

12 MW, Senköy

30 MW, Akhasir

12 MW, Çesme

Other wind power plants which are in the application phase (first year) are:

15 MW, Yalikavak

30 MW Datça

15 MW, Beyoba

15 - 50 MW Karabiga

15 MW, Lapseki

20-35 MW Kapidag

15 MW, Bandırma

5 - 7 MW Karabiga

22.5 MW Karaburun

20 - 30 MW Belen

15 MW Datça

12 MW Karabiga

186 MW Mazidagi

70 - 100 MW Yellica Belen

All this projects with together 750 MW show that a considerable interest of private capital exists to invest in independent power production through wind energy in Turkey.