

## Grid-connected electricity generation from wind turbines in Turkey



### Project summary

With the carbon offset programme “Kores Kocadağ 17.5 MW Wind Power Project”, myclimate and its local partner are making an active contribution to climate protection, improved local air quality, livelihoods and sustainable renewable energy industry development as well as Turkey’s energy autonomy.

The seven wind power turbines are located in the middle of the peninsula of Çeşme in the province of Izmir. Since December 2009, they have delivered renewable power to about 22,000 local people in the province of Izmir.

### Project summary

The programme has led to a reduction of CO<sub>2</sub> while making a contribution to sustainable development in the region:

- Reduction of greenhouse gas emissions and diversification of Turkey’s electricity generation mix
- Stimulation of the wind power industry locally and nationally, especially of larger grid-connected wind farms
- Recovery of non-renewable resources
- Overall reduction of pollutants resulting from business-as-usual power generation industry
- Creation of local employment during the construction and operation phase of the wind farm
- Reduction of Turkey’s increasing power import dependency



## Facts and figures on the carbon offset project

### Project location

Turkey, province of Izmir, peninsula of Çeşme

### Project name

Kores Kocadağ 17.5 MW Wind Power Project

### Project standard

Gold Standard VER

### Project type



Wind

### Emission reductions

268,564 t CO<sub>2</sub>e (over 7 years)

### Situation without project

Regional fuel mix

### Project start

December 2009

## The project country

Turkey is a large, middle-income country with relatively few natural resources. The country's main environmental issues are water pollution from the dumping of chemicals and detergents, air pollution in urban areas and the potential for spills from the 5,000 oil- and gas-carrying ships passing through the Bosphorus annually. Another main issue to focus on is land degradation, which is a critical agricultural problem, caused by inappropriate use of agricultural land and deforestation. Consequently, serious soil erosion has occurred in nearly 70 per cent of Turkey's land surface.

Turkey's economy is currently experiencing a transition from a high degree of self-reliance on agriculture and heavy industry to a more diversified economy. Turkey, with its young population and growing energy demands per person, its fast-growing urbanisation and its economic development, has been one of the power markets with the fastest growth worldwide for the last two decades. Renewable energy development is making good progress in Turkey. However, investments in wind power plants in Turkey still mean taking high risks, as experience is sparse and attractive financial incentives for electricity generation from renewable sources are lacking. Hence, most of the energy is still derived from fossil fuels. For this reason, the project will help Turkey to stimulate and commercialise the use of grid-connected renewable energy technologies and markets.



Map of Turkey: the red circle shows the project region.

Indicator	Turkey	Switzerland
Total area (in km <sup>2</sup> )	783,562	41,285
Population	79,749,461	7,870,134
GDP in USD per capita (2011)	14,600 USD	47,817 USD
Share of population living below the national poverty lines (2010)	16.9 %	6.9 %
Energy use per capita (kg of oil, 2010)	1,441 kg	3,361 kg
CO <sub>2</sub> emissions per capita (2008)	4.0 t	5.3 t
	Istanbul	Zurich
Min. working time to buy 1 kg of rice in min.	43	9
Min. working time to buy 1 kg of bread in min.	12	12

Turkey vs. Switzerland. (Source: CIA – The World Factbook, [www.cia.gov/library/publications/the-world-factbook](http://www.cia.gov/library/publications/the-world-factbook); World Development Indicators, [web.worldbank.org](http://web.worldbank.org); Bundesamt für Statistik [2010])



## The situation in the project region

Çeşme is the centre of the province of Izmir and has around 40,000 inhabitants. The name Çeşme, meaning fountain, probably derives from the many Ottoman fountains scattered across the city. The province of Izmir is located in western Anatolia on the Aegean coast. The province's traditional export products such as cotton, tobacco, grapes, figs and olives have been replaced by electronics, chemicals, beverages and vehicles in terms of volume of trade and thanks to industrialisation. Nevertheless, the province is still one of the most important regions in terms of food and agricultural products, ranking second after Konya in terms of agricultural production value. Besides export production, Izmir is one of the most popular tourism destinations in Turkey for domestic and foreign tourism.

As mentioned before, investments in wind turbines still mean taking high risks due to the intermittent nature of wind. However, on the peninsula of Çeşme the risk is acceptable as there is a lot of wind and the villages are spread wide apart.

## How the project is implemented

The licence for the 15 MW wind power plants was issued to the project owner Kores in June 2006. The first six turbines have been in operation since December 2009.

In order to inform local stakeholders as well as guarantee their acceptance and support for the project and to comply with the Gold Standard VER (Voluntary Emission Reduction), a local stakeholder meeting was held in September 2008. At this meeting, the public and the local stakeholders were informed about the project. No particularly sensitive indicators were identified and stakeholders have raised no concerns. When asked at the stakeholder meeting, what they like about the project, a local said: "I like the fact that it is renewable energy and also the decreasing external dependency." Mehmet Kutluay, another local, said: "I like its benefits to nature and the fact that it creates employment. There should be more projects of this kind."

## The power plant

The wind power plant consists of seven Nordex N90 wind turbines with an output of 2.5 MW, a diameter of 90 metres and a hub height of 80 metres. The wind turbines are connected to the wind farm substation through 34.5 kV underground cables. The voltage is raised to 154 kV, transferred to the electricity transformer station and then fed into the national power grid. The power plant produces around 56,000 MWh of electric power annually, which leads to annual emission reductions of about 36,000 tonnes of CO<sub>2</sub>.



Two of the seven turbines.



Subject for postcards: the turbines by night.



The hub height is 80 metres, the diameter 90 metres.



The electricity transformer station.



"Kores Kocadağ wind plant". The generated electricity is fed into the national power grid.



## The information centre

To meet the requirements of the Gold Standard, an information centre about the wind power plant was built to inform people about the plant and to sensitise them to the subject of climate change. Mostly pupils and students, but also members of civil associations and journalists from media companies, have visited the centre so far. A guide explains the mechanism of the wind turbines in a conference room first, before showing visitors around the plant. At the end, the visitors can write their opinions and comments on forms, which are hung afterwards on a board.

## Environmental aspects

Projects under the Gold Standard scheme, as compared to other schemes, have to fulfil strict criteria regarding the involvement of stakeholders in the project development process and on the documentation of environmental and socio economic impacts.

All potential environmental issues were discussed in detail at the stakeholder consultation in September 2008. The evaluation of environmental indicators regarding the project is based on the Sustainable Development Assessment Matrix provided in the Local Stakeholder Consultation Report as well as on common sense regarding the wind power plant technology. No negative or critical indicators were identified.

Besides a reduction of greenhouse gases, all other air pollutants such as SO<sub>x</sub> and NO<sub>x</sub>, particles and volatile organic compounds are avoided thanks to the wind power plants. The project does not lead to any significant changes or to harmful consequences for water quality and soil conditions in the project area. All bushes and trees cut were replaced by the Forestry Directorate and financed by the project partner, and access routes were changed to minimise the number of trees which had to be cut down. The waste excavated during the construction phase was used to reorganise the area and for landscaping work.

A concern often mentioned in relation to wind power plants is the noise caused by the turbines. Since the noise of the seven turbines' rotation cannot be heard further away than 200 metres from the turbines, and the closest settlements (Birgi and Zeytinler villages) are located 3.5 kilometres from the power plant, nobody is affected in any way by the noise of the turbines.

There isn't any endangered flora in the project area. The migration line of birds – a concern often voiced regarding wind projects – is not influenced by the wind farm.



Pupils arriving at the information centre.



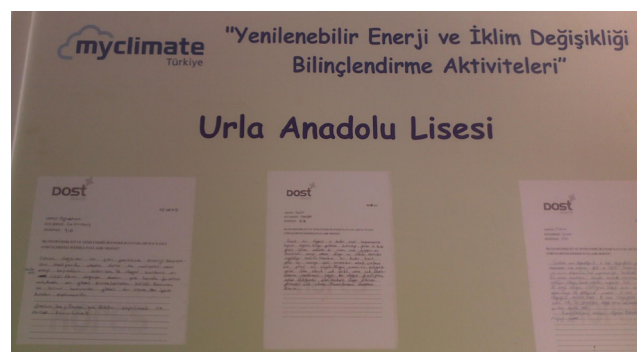
On top of the platform, it is usually very windy.



Pupils listening to a presentation.



The wind turbines are 80 metres high.



Students from the Anatolian High School in Urla commented on what they have seen and heard.

## Socio economic aspects

As mentioned earlier, Turkey still has high potential for investments in wind power plants. With this project, another step is being taken towards the designation and production of renewable energy technologies in Turkey. Accordingly, it is one of the main goals to encourage entrepreneurs to invest in wind power and to provide infrastructural investments in the areas around the project site.

Subsequently, the creation of employment is an important part of the project. To achieve this goal, materials for the foundations, cables and other auxiliary equipment are sourced locally whenever possible. As local employment is cheaper and more sustainable than moving or sending maintenance workers to Çeşme local workforce is preferred. "The project created part-time and full-time jobs during both the construction and the operation phases", says A. Emre Samsun, Investment Coordinator for the project partner. "Currently two persons from the neighbouring villages work as security staff at the plant from 8.00 a.m. to 6.00 p.m. They spend most of their time patrolling through the park and also in the watch box at the entrance to the park."

Health and safety as well as operation and maintenance training sessions were held to guarantee the security of employees as well as correct maintenance of the plant.

## Monitoring

The Clean Development Mechanism (CDM) baseline and monitoring methodology of the UNFCCC guarantees external monitoring. According to the CDM, the project activity satisfies the qualifying criteria for renewable energy projects and grid-connected renewable electricity generation. Hence, the choice of project category and methodology is justified.

Furthermore, the Gold Standard requires indicators to be included in the monitoring plan that are either crucial for an overall positive impact on sustainable development or particularly sensitive to changes in the framework conditions or where the public consultation has yielded concerns from stakeholders. The project's positive impact on sustainable development is the reduction of greenhouse gas emissions from electricity generation and the implementation of environmentally sound technology in Turkey.

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