

Wind energy is not the energy source that immediately comes to mind when thinking about renewable energy in cities. Few cities have enough space within their area to build large wind farms. You may rather find small wind turbines on suitable locations within the city's area or see cities doing feasibility studies on this subject. Besides the erection of wind turbines, there are many other ways that cities can promote this renewable energy source. These include applying procurement procedures that favour a certain technology or giving support to organisations that buy or run wind energy plants. The municipality of Dunkerque – member of Energie-Cités - has played an important role in installing the first wind turbine in France, and then in supporting the development of this technology in France.

GENERAL ASPECTS

The name Dunkirk comes from the Flemish words for 'Dune Church'. It has become the third largest commercial port in France, situated on the North Sea Coast. This is a city in which energy has always played an important role. Gravelines nuclear power station and the terminal for the gas pipeline from Norway lie in its territory, and the first wind turbines in France were erected here in the 1990s.

Climatic data:

Average wind speed: 6.5 m/s



CONTEXT

At the beginning of the 1990s no wind turbine existed in France. Wind energy was introduced in France at a late stage in comparison with other European countries despite very favourable climatic conditions. One of the most important obstacles has been the near monopoly of the production, distribution and supply of electricity held by Electricité de France (EDF).

At the start of the 1990s when other countries had already started a programme of wind energy production, neither the French government nor EDF seemed interested. At that time there were no regulations governing the sale of wind generated electricity to EDF or laws covering the installation of wind turbines.

Despite these difficulties the Municipality of Dunkerque succeeded in erecting one wind turbine, establishing an agreement with EDF and subsequently contributing to the development of an industry which had up to then been hardly known in France.

EXPERIENCE OF DUNKERQUE

The erection of the first wind turbine at Dunkirk: The first in France

At the start of 1989 the company Espace Eolien Développement had carried out an initial feasibility study for the erection of a wind turbine in the grounds of a hospital at Dunkirk and had submitted an application for aid to the European Commission. The feasibility study had shown that the site proposed was too close to local residents so the city set about finding another site for the turbine. In December 1989 the application for grant was accepted by the European Commission which offered 50% of the cost of erection of one 300kW turbine on the coast at Dunkerque. At this stage in the project, Espace Eolien Développement played a role as technical consultant to the Municipality who were the contracting authority. The Mayor gave full support to the project which was a major factor in its success.



A new site had been chosen by time the contract with the Commission was signed in September 1990. This lay on a coastal area belonging to the Municipality which lay only 300 m from a camp site. The officials in charge of the project were concerned that this choice could cause annoyance to the public. The choice of supplier was made in early 1991 and the work on the ground could then start. The wind turbine was erected and connected to the EDF network in July 1991. On connecting the turbine to the network it became necessary to negotiate the purchase price that EDF would pay for current. At that time there was no agreed tariff for wind energy, only for electricity generated by hydro-electric stations. An experimental tariff for the turbine was agreed at a rate of 0.04-0.05 Eur/kWh depending on the regularity of the production.

Technical and Financial Information on the Dunkerque Wind Turbine

Start of Work	July 1991
Height (to top of mast)	22.75 m
Rotor diameter	25 m
Manufacturer	HMZ Windmaster
Maximum wind speed	25 m/s
Annual production in 1992	410,674 kWh

Emissions avoided/yr.	
SO ₂	2.3t
NO _x	1.4t
CO ₂	350t
Total Investment	300,000 Eur
Grants:	60,000 Eur Ademe & Nord-Pas-De-Calais
	150,000 Eur EU (THERMIE)

The officers had tried to gain public support by placing an information board at the foot of the turbine. From the start the reaction of the population proved better than the city officers had expected and over the years a certain local pride in the turbine has even developed. In the beginning the maintenance was carried out by the technical service of the municipality of Dunkerque. However this solution did not always prove the best option and the municipality has since given a contract for this task to a company specialised in this field. The erection of this turbine has created a trend in the region and the municipality has since been involved in two further wind farms constructed onshore and an offshore proposal.

The Dunkerque Wind Farm

In later projects the Municipality did not erect the turbines itself, but played a vital role in promoting the project. In particular it: selected and made available the site for the first wind farm participated in the financing encouraged the Regional Council to participate in the project

The first wind farm was constructed in the port area of Dunkirk and entered service in 1996. The Regional Council of Nord-Pas-De-Calais set up a joint venture company called "Eoliennes Nord-Pas-De-Calais" whose sole objective was to construct and manage wind farm projects in the Nord-Pas-De-Calais region.



The shareholders are:

- Regional Council of Nord-Pas-De-Calais: 53.0%
- Communauté Urbaine de Dunkerque: 4.0%
- CHARTH (Subsidiary of EDF): 24.0%
- Windmaster Netherlands: 14.0%
- Espace Eolien Développement: 4.0%
- Agence Régionale de l'Energie: 0.7%
- Verhaeghe Industries: 0.3%

This wind farm consists of 9 wind turbines of 300kW (Total capacity 2.7MW) which produce about 7,000,000 kWh per year. It was financed with aid from Ademe, the Nord-Pas de Calais Regional Council, EDF and the European Commission's Structural Funds. Electricity is sold to EDF at a tariff of nearly 0.08 Eur during the winter months and 0.02 Eur during the five summer months. This tariff produces an average tariff of nearly 0.05 Eur per kWh produced.

EVALUATION AND PERSPECTIVES

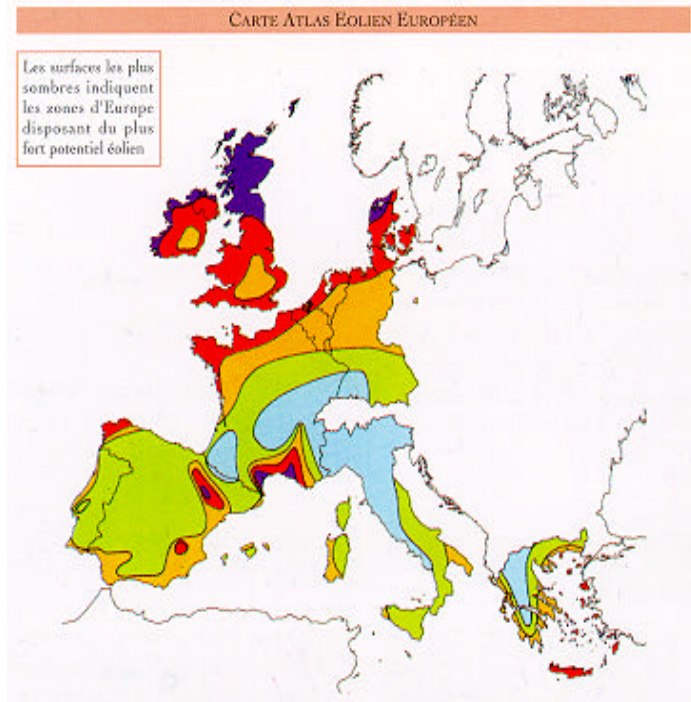
Since June 1999 the first turbine has been erected in a second Wind Farm at Widehem at 80 km. from Dunkerque. In its final stage the farm will have 6 French constructed turbines with a maximum power of 750kW each. These turbines have been developed by Jeumont Industries, a subsidiary of Framatome, well known in the nuclear industry. They are using a new technology for a low speed generator which allows one to avoid the need for a gearbox system and to operate at variable speed. This should enable the turbine to produce more

electricity and also produce a reduction in maintenance costs. The wind farm will cost 500,000 Eur in total and will be totally financed by a loan and without grants. Eoliennes Pas de Calais has also financed a feasibility study of the potential for wind energy offshore. This demonstrates that there is a potential of 3,375MW of usable capacity, equivalent to an annual production of 12,800 GWh. This would be sufficient to cover the needs of the residential and tertiary sectors in the region. Eoliennes Nord-Pas-De-Calais is currently preparing the first French proposal for an offshore wind farm which it will present to EOLE 2005 in 1999.

In recent months the municipality has been involved in negotiations with EDF about possible trials of a electricity tariff for "green" energy.

The approach of Dunkerque shows that the commitment of a municipality can be a determining factor in promoting projects, not only in the region, but also in setting a trend at national level.

The erection of the turbines at Dunkerque has accelerated the development of an industry that was neither established in the region nor in France generally. Furthermore the foresight of the Officials at Dunkerque led to the establishment of changes in the legal regulations, e.g. the changes to the tariffs for purchasing electricity and the planning laws. In the end the sceptical attitude concerning wind energy and its establishment in France could no longer be justified.



FOR FURTHER INFORMATION

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