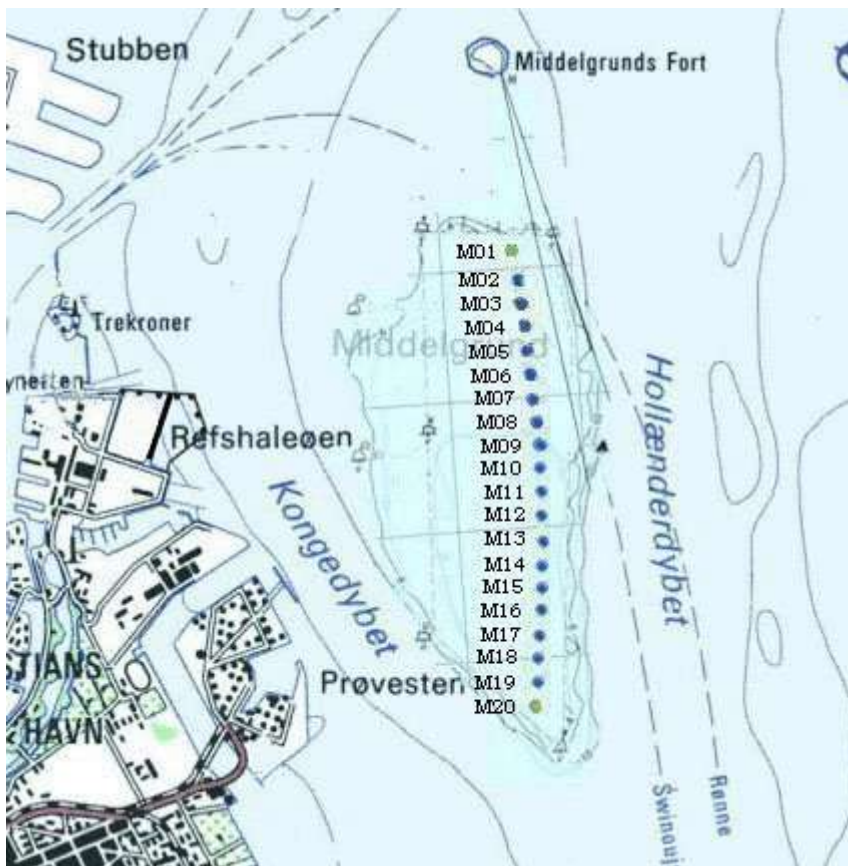


Organisation of wind power in Copenhagen

The Middelgrunden off-shore project



Summary

The current status, the planning process and some of the obstacles encountered with the project are highlighted in this paper. Keywords are, local involvement, public hearing, delay because of lack of

regulations, and the importance of co-operation between the wind energy co-operative Middelgrunden Vindmøllelaug I/S, Copenhagen Electricity Company, and the municipality of Copenhagen.

Key facts

The "Middelgrunden" wind farm is being build with a rated power capacity of 40 MW. It will consist of 20 wind turbines at 2 MW each and will be ready for production in december 2000. The wind farm will be situated just 2 km outside the Copenhagen harbour on shallow water (4-5 meter depth). The use of the area is restricted due to its former use as a dump site for harbour sludge. The site is close to an industrial area. 10 windturbines (half the project) is owned by the windcooperative who has 8300 members.

The wind energy co-operative: Middelgrunden Vindmøllelaug

In 1996, the Copenhagen Environment and Energy Office (CEEEO) took the initiative to propose and organise the project. After mapping the wind potentials in the area of Copenhagen the CEEEO organised a working group. Citizens from the area who were interested in wind energy formed the working group. Different personal and educational backgrounds were represented with a common belief that the project was going to be a succes. CEEEO was a part of the working group in the beginning and now serves as a consultant for the wind energy co-operative Middelgrunden Vindmøllelaug I/S (partnership). Hereafter referred to as the co-operative. By now, 8300 persons in the local area have joined the co-operative.

The wind farm is developed and owned fifty/fifty by the wind energy co-operative and the local utility, Copenhagen Electricity Company. The co-operative's part will consist of approximately. 40,500 shares (=10 x 2 MW turbines). One share yields 1,000 kWh/year and costs 4250 DKr. By 19 july is 95% of the private shares reserved.

Middelgrunden Vindmøllelaug will become both the worlds' largest co-operative and the largest wind farm based on dual ownership.

During the last 8 years several projects have been developed in co-operation between the utilities and private wind co-operatives in the Copenhagen area. Avedøre Windpower I/S in 1993 with 12 x 300 kW and Lynetten Windpower in 1996 with 7 x 600 kW. Again 50% of the turbines are owned by utilities. 1500 persons are involved in these two projects.

Today more than 100,000 families are members of wind energy co-operatives, and they have installed 80% of all danish wind turbines. Until some years ago, the co-operatives were a very important and dominant factor in the development of the Danish wind energy sector. Since then, single person ownership has by far superceded the importance of the co-operatives. It is our hope though, that this project will be able to revitalise the concept of the co-operatives and bring back some of the positive (and partly forgotten) aspects inherent in them.

Copenhagen Electricity Company and the Municipality of Copenhagen

Copenhagen Electricity Company (CEC) is owned by the Municipality of Copenhagen. In the beginning of the process there was competition between the co-operative and the utility regarding the ownership of the project. After 2 years of negotiation and overcoming political differences we have made a contract between the partners, co-operative and utility. The contract addresses central issues, such as how to cooperate, planning approval, wind turbines, contractor work, financial agreement, and a 25 year agreement on cooperation.

It is my evaluation that both parties have gained from the co-operation. CEC possesses the big organisation for questions about technique, contractor work etc. The wind co-operative has the knowledge from the private wind sector, enthusiasm and commitment as well as a better contact with the public and the press.

More about the project

The project has gone through a "publicity phase" where the public and all relevant authorities have been involved. As a response to subsequent objections, the project was reduced from 27 to 20 turbines.

It has been very important to engage in a dialogue with shareholders and interest groups who have a positive attitude towards wind power in general, but are reluctant regarding projects in their own

backyard. There has been positive progress, and a number of former opponents have changed their attitude.

Right from the start of the project 4 years ago, there was a huge need for investigations particularly of the **visual and environmental** impact, due to the site's proximity to Copenhagen.

Fortunately the CEEO and the co-operative was granted 5.2 million DKK (699,000 EUR) from the Ministry of Environment and Energy. The purpose of the grant was to investigate technical and environmental matters concerning shallow water wind power development, as well as to prove the feasibility, organisationally and economically, of co-operatively owned off-shore wind farms.

Present status is that the investigations concerning environmental and technical matters have been fulfilled. So far, the most important technical part has been to develop and choose the right foundation. Through the optimisations it has been possible to gain substantial savings. With respect to the environmental impact, the following subjects have been investigated by independent consultants: the visual impact, risk of leaking debris and heavy metal contamination, the influence on the free flow of water in Øresund, the risk of collisions with vessels, the impact on flora and fauna, conflicts with other interests etc. Several reports and brochures about the visual impact have been published in Danish.

The planning process has been long and delayed because of the discussions of the liberalisation of the electricity market. Other factors have also created problems; no single authority has planning authorization, no planning procedures existed, no rules or regulation on private off-shore wind-turbines are in force (on land Denmark has law and regulations on the field).

Lessons learned

Locally based commitment and co-operation between the co-operative, the local utilities CEC, and the municipality of Copenhagen has been a significant precondition for the development of the project so far.

This co-operation has provided credibility to the project in relation to politicians, the public etc. The municipality's role in the project has mostly been political, through the local parliament's commitment to the project as such and through the preparation of the terms of collaboration between the utilities CEC and the co-operation.

The co-operation, with its 8300 members, has through a dialogue with all kinds of interest groups, generated a widespread understanding and acceptance for the chosen location and layout of the park.

The ministerial considerations and the approval of the project, have been delayed by the preparation of the new liberalised electricity law.

The chosen off-shore site is situated outside the frames of municipal and regional planning. Instead, The Danish Energy Agency held a direct hearing including authorities and interest groups.

The computerised visualisation of the project has been a very important part of the process so far.

Jens H. Larsen

Copenhagen, April 1999 (updated July 2000).

Appendix about Copenhagen Environment and Energy Office (CEEEO)

We are a local association that provides free, impartial information and guidance on energy conservation, and the utilisation of renewable energy sources. We have more than 1500 enquiries about these subjects every year. We are a non-governmental member organisation and are a part of a network with 22 offices in Denmark. We have worked to promote ecologically sustainable development in Denmark for more than 20 years. Since 1987 we have initiated energy and environment activities and urban ecology projects in Greater Copenhagen. We receive financial assistance from the Danish Energy Agency based on the national programmes on renewable energy.