Husum

1.1. GEOGRAPHICAL SITUATION, ORIGIN AND CONTEXT OF THE PROJECT

Geographical situation:

Wind Farm Husum / Simonsberg

Turbine typ	: ENERCON E-40
Rated power	: 500 kW
Hub height	: 42 m
Number of installed turbines	: 11
Installed capacity	: 5.5 MW
Commissioning	: Oct. 1993
Total investment	: 7,139,500 €
Yearly energy production	: 14,300 MWh
Specific investment coefficient	:0.50 € / (kWh a)
Number of shareholders	: 3

The Husum Wind farm Simonsberg has an installed capacity of 5.5 MW and is one of the earliest installations of the German market in October 1993. The project consisting of 11 wind turbines of ENERCON E-40 at each 500 kW rated power is sited near Husum. The wind farm is **owned by 3 private partners** and is one of typical examples of **private initiated and owned wind farms in the early 90ties**.

In January of 1991 the Renewable Energy Feed-In Tariff was set into force in Germany.

Farmers at the windiest sites in Germany along the coast of the North Sea became into favour to use their land for wind energy application. Limits of self-supply, which were restricting the use of wind turbines in the 80ties, were overcome. Feeding the produced electricity into the electrical grid was more economically than self-supply. This circumstance made a change in the size of the wind turbines and in the size of the projects. Applying for a building permission was not a question of self-supply any more but of private investment.

1.2. LEGAL FRAME AND INVESTMENT SCHEMES

1.2.1. Legal Frame

To establish the project Simonsberg a private company (GbR) was founded. Due to the fact of a small group of owners a GbR is an adequate legal frame. No minimum equity is needed and no inscription into the trade register is necessary. So the administrative cost for founding and operating of the company can be reduced to a minimum. On the other hand every shareholder is covering the total risk by his personal properties. Wins and losses are charged to the individual income tax declaration of each shareholder.

1.2.2. Economy

In case of private planning, like in Simonsberg, planning costs can be reduced to a minimum. There are no costs for administration and for shareholder organisation. The investment was discussed with a locally based bank. ***Table 3*** gives an overview about the total investment.

Table 3: The total investment costs of the project Simonsberg

Investment costs		
Wind turbines (11 ENERCON E-40)	80.6 %	5,753,000 €
Foundations	5.9 %	418,000 €
Transmission station	0.7 %	50,000 €
Grid connection, incl. tranformer station	8.6 %	615,000 €
Streets	1.1 %	78,000 €
Planning and building supervising	1.8 %	130,000 €
Company founding, tax consulting, legal advising	0.4 %	25,000 €
Environmental impact payment	1.0 %	70,500 €
Total investment costs	**100 %**	**7,139,500 €**
Specific investment costs		**1,298 € / kW**

1.2.3. Financing

Table 4: The financing of the project

Financing		
Equity (from private investors)	10 %	700,000 €
Subsidy (investment grant from Schleswig-Holstein)	2 %	150,000 €
ERP-loan	50 %	3,569,500 €
DtA-loan	24 %	1,720,000 €
Bank loan	14 %	1,000,000 €
Total financing	**100 %**	**7,139,500 €**

The economy of the wind farm Simonsberg is based on the German fixed price tariff system. In the first years of operation the tariff was regulated by the Renewable Energy Feed-In law (REFIT). Prices per kWh were defined as 90 % of average end consumer prices all over the country. Feed in tariffs fluctuated therefore from commissioning in 1993 until 2000 in the range of 0.082 € to 0.088 €. Since April 2000 the Renewable Energy Sources Act (EEG) substitutes the old REFIT. Prices now are defined independently of general electricity price level. For the Simonsberg wind farm a minimum of 4 years until April of 2004 the high tariff of 0.091 € is to be paid. For the rest of the lifetime until 2013 the low tariff of 0.062 € is fixed. As an average for the first 10 years of operation 0.087 € can be calculated. For the whole lifetime average is approximately 0.076 €.

The favourable wind conditions at the site in Simonsberg lead to a yearly energy yield of 14,300 MWh which includes already all losses of technical availability, grid availability and wind farm efficiency. The yearly income, considering an average tariff of 0.087 € for the first 10 years, of 1,244,100 € is resulting (see ***table 5***).

Table 5: Yearly income of wind energy project Simonsberg

Energy generation per year	14,300 MWh
Refunding	0.087 €/kWh
Yearly income	1,244,100 €

Table 6 gives an overview about yearly expenses. Most of the yearly income has to be paid during the period of ten years loan for pay back and interests. After 10 years payments to the bank are done. In the case of Simonsberg wind farm operation and maintenance costs (O & M) are dominated by maintenance because there is a full service package contracted with the manufacturer of the wind turbines. This package (ENERCON Partner Concept) covers all maintenance and services including spare parts and main insurances. Therefore the share of additional insurance is lower than typically and there are no reserves for spare parts necessary during the first decade. It is assumed that O& M costs nearly double in the second decade caused by necessary change of components (rotor blades, bearings, etc.).

Table 6: Yearly expenses of wind energy project Simonsberg

Yearly expenses	
Maintenance	161,260 €
Insurance	4,400 €
Land lease	35,000 €
Electricity and telephone	8,000 €
Management	10,000 €
Total yearly O & M costs	**218,660 €**
Specific yearly O & M costs (first 10 years)	0.015 € / kWh
Specific yearly O & M costs (second 10 years)	0.030 € / kWh
Capital costs (average first 10 years)	943,272 €
Total yearly expenses	**1,161,872 €**

The production price per kWh electricity can be estimated as follows (see ***table 7***): Assuming a 20 years life time period the specific investment costs run to 0.025 € / kWh. O & M costs are estimated to double in the second decade (see above) and total interests cumulate to 2,517,718 € during the pay back period of the loans. Electricity production costs of 0.0565 € / kWh are resulting.

Table 7: Key figures after budget

Specific investment costs for 20 years	0.0250 € / kWh
Specific O & M costs (20 years average)	0.0225 € / kWh
Average capital costs for interests of bank loans	0.0090 € / kWh
Electricity production costs	**0.0565 € / kWh**

1.3. CONSULTATION PROCESS

No formal consultation process was running at the Simonsberg wind park. Direct neighbourhood and individual discussions among the shareholders guaranteed the success of the planning process. The project was stated more or less as a pilot project for the site. No obstacles or public restrictions had to be discussed by the developers.

1.4. DIFFICULTIES ENCOUNTERED

In this early phase of wind energy development in Germany most of the difficulties were caused by the unknown technology. One of the tasks for the investors was to convince local authorities, financial institutes and local people about the ecological and economical sense of such a project. It was less a matter of obstacles against the project than overcoming the lack of basic information.

1.5. SOLUTION IDENTIFIED

References of wind energy projects were already existing. Even if wind park Simonsberg was a new experience for the region, decision-makers could be convinced by experiences from Denmark and other region in northern Germany. Basic knowledge had to be provided by the initiators of the project.