

Danish Wind Energy

By Flemming Tranaes, Former Chairman, Danish Wind Turbine Owners' Association

Three quarters of the 900 megawatts of wind power capacity in Denmark is privately owned, half by individuals, half by wind energy cooperatives. Although central Government and Parliament has largely been favourable to wind power, it has not been an easy task to establish private ownership of wind turbines. This paper describes, how the Danish Wind Turbine Owners' Association has been through tough struggles, particularly with the traditional monopolies represented by the Danish electrical power companies.

Per Aspera Ad Astra

After the first energy crisis in 1973 Denmark developed an interest in producing electricity independent of oil and avoiding dependence on supplies of raw materials from outside the country.

History Before 1900

Denmark has a centuries-old tradition of using wind energy. On high hills around the country windmills of the so-called Dutch type have been built, and for generations they have been milling grain for flour.

At the end of the 19th century and the beginning of the 20th century the classic multi-blade windmill or "wind rose" appeared, which is the windmill that you always see on a lonely farm in a cowboy film in 19th century America. It eventually outstripped the "klapsejler", a windmill with adjustable narrow vanes, which was a further development of the Dutch windmill.

Instead of canvas sails there was rows of wooden sheets, which had to be adjusted. In this way it was possible to control the effect of the wind. The multi-blade windmill as well as the "klapsejler" were used to power agricultural machinery, grinding mills, threshing machines, grinding wheels, etc. and also to pump water often up to huge containers standing on high ground, providing water reservoirs for dry periods. In 1931 there was about 30.000 such windmills in Denmark.

Poul la Cour

Within the field of electricity producing windmills there is traditions to be proud of. Poul la Cour, who was a teacher at the Folk High School Askov in the south of Jutland, started a series of experiments in 1891 with the purpose of carrying out a rational utilisation of wind power for the production of electricity. He took a great interest in blades and wings, and he was the first person in the world to carry out systematic experiments with artificial air currents in a wind tunnel. He drew some fundamental conclusions concerning the elementary laws of aerodynamics, and he developed a number of windmills and blades, which marked a great advance in the design of windmills.

At that time there was no grid to collect and distribute the electricity. Instead he used electrolysis and produced oxygen and hydrogen, which were used for many years to provide the lightning for the High School and for the houses of the village nearby.

The development of the electricity producing wind turbine advanced during periods of crisis, especially during the two world wars. The Danes continued the development at the end of the 1920s and early 1930s. As a natural consequence some stable and productive wind turbines appeared, particularly towards the end of the Second World War. When coal and oil began to be imported to Denmark in considerable quantities, interest dropped dramatically, and the electricity producing wind turbines disappeared almost completely.

Gedser Turbine 1957

A splendid exception is the "Gedser Turbine". Building on the strong memory of experiences during the war a lot of work was done with different experimental turbines, and finally an experimental wind turbine was built by the electricity boards with support from the state at Gedser in the south of Falster. It was in operation until 1967 and produced some exceptional results. Its now classic dimensions were: 24 meter high, a rotor diameter of 24 meters and a generator of 200 kW. It produced 400,000 kWh per year.

However, when the result was evaluated, there was only one parameter: Economics. No one considered the environment. In 1962 the price per kWh produced by the wind turbine was double that of a kWh produced by a power station run on oil. Therefore, the experiment was stopped, and the wind turbine was left to fall into disrepair. In 1996 a subscription was raised aimed at getting money to renovate the Gedser wind turbine in order to become a working museum and a dignified memory of a contribution towards future perspectives.

Oil Crisis

Through the 1960s and right up to the first energy crisis in 1973, when we wallowed in cheap oil, and no one thought that it would end one day, a kind of collective loss of memory set in. All experience from the past seemed to be forgotten until suddenly in 1973, when we were short of energy. Some proposed wind power. It was "hopeless", some said; "It had already been tried and was completely insufficient - it was unreliable, the wind was not blowing all the time. Now nuclear power was the solution, the final solution to the energy problem and our dependence on foreign countries." But, as often happens, some individuals did not allow suppression of public opinion.

Riisager Turbine

A carpenter from west Jutland, Christian Riisager, had made up his mind to make a new type of electricity producing wind turbine. He experimented with a 22 kW machine with a 12-meter high tower and blades made of glass fibre. After several attempts and some accidents he succeeded in creating a prototype, which he asked the local electricity distribution company to approve for connection to the grid. Christian Riisager and his wife, Boe, started a company, which marketed the turbine.

The turbine was purchased by a number of idealistic visionaries from a broad section of the Danish population. In the spring of 1978 the number of electricity producing wind turbines of the Riisager type installed all over the country had grown to 30 - plus a number of electricity producing "wind roses". These typically had a power rating of 10 kW.

Foundation of Danish Wind Power Stations

An Association for Wind Turbine Owners was formed on the 4 May 1978 and given the rather grandiose name: Danske Vindkraftvaerker (Danish Wind Power Stations). Due to the mistrust and resistance they had met, it was not by chance they chose the 4th of May as the day of foundation, as it was on the 4th of May 1945 that Denmark was liberated from German occupation.

Ideology

The ideology behind the Association was clearly expressed on the first general meeting the year after. It took place at the same time as the accident at the nuclear power station on Three Mile Island in Pennsylvania, USA. Among other things the first chairman said: "Knowing that our energy stocks of coal, oil, gas and uranium are limited, we are surprised that since the first energy crisis in 1973 nothing really effective has been done to initiate relevant research and to sort out legislation related to renewable energy ... It puzzles me that the state energetically talks about and

plans energy only related to coal, oil, gas and uranium. Only in passing remarks is the energy from the wind and sun mentioned, well knowing that the first mentioned energy sources are limited, whereas the wind and sun are inexhaustible. It also surprises me that the energy planners, when talking about coal, oil, gas and uranium, minimise the irreparable pollution connected to the use of these materials. I am thinking of the dangers in connection with carbon dioxide, sulphur, lead, and radiation. Is disaster necessary to open our eyes to the fact that these substances firstly are a health hazard, and that secondly their availability is very limited?" In the first articles a double goal was formulated, and it has been unchanged in the contents ever since.

Main Tasks

Firstly, the mutual interest of the turbine owners in relation to electricity boards, authorities, manufacturers etc. were to be taken care of.

Secondly, more serious information about the possibilities of wind power should be worked out. There was enough to get cracking on in both areas.

The wind turbine owners had related incredible incidents with electricity distribution companies and authorities doing what they could - due to resistance, resentment or just total lack of interest - to jeopardise the erection of wind turbines.

It also proved necessary to establish contact with the very few manufacturers in order to have quality, service and warranty improvements - and after a while, proper insurance contracts.

Information Strategy

The second main goal of the Association was to contribute to serious information about the possibilities and limitations of wind power based on the viewpoint that the advantages should of course be brought into the light, but nobody - not even people who identified themselves with the cause of wind power - could be interested in wind turbines being positioned badly, where there was too little wind. It was also important to give serious information on the operating and maintenance cost as well as the risks.

There was an evident demand for spreading practical, reliable information on wind turbines at a time, when the public did not take the matter particularly seriously or attached much importance to wind power. It was done in two ways:

1. Through approaches to newspapers, written contributions such as a letter to the editor on the subject

2. Through publishing a member's magazine, which could be the mouthpiece of Danish Wind Power Stations (DV) and spread information on wind power in general. The magazine was named "Natural Energy" (Naturlig Energi). It has still got the same name and still performs the same tasks. For several years it has been sent each month to editorial offices, MPs working with energy issues, and to the Ministry of Energy. All these groups have been regularly informed about the views of the Association and about developments in wind energy.

The Wind Turbine Guilds and their Cultural Background

In 1980 the first Wind Turbine Guild was established in Ny Solbjerg near Aarhus in Jutland, and it quickly proved to be the pioneer model for future development. Just as there is a historical explanation for the fact that Danes establish an association as soon as 3 or 4 people have the same interest; in the same way there is a historical explanation for the initial establishment of Wind Turbine Guilds. The ideology behind it relates to the great Danish poet, author, historian, vicar, MP and social critic, NFS Grundtvig.

His thoughts that all peoples can and must do things themselves in close accordance with their very own background and history, had a breakthrough in the middle of the 19th century, and people were inspired to build Folk High Schools all over the country. There, the young farmers, farm hands and girls "went back to school" and listened to stories and lectures. The story telling, which was the central pedagogical facility, was used to interpret tales, myths, legends and history. They were also read aloud to and taught about national literature and poetry. Finally they heard lectures on other nations, travels to foreign countries and also on professional farming subjects - but these were not the most important. According to Grundtvig's conception the point was to arouse their national consciousness and feeling of identity and through that increase their confidence so that they were able to change their own conditions of life.

Learned people and specialists were not expected to come along with their finished conclusions, but instead to be at the disposal of those attending the lectures wishing to put forward their questions. The intention was to start a dialogue between the learned society and the people, on the people's own terms. Things should grow from the grass roots' level!

This appeared to be the start signal to a fantastic evolution, first within agriculture and later the industries connected with it.

Changes coming from outside had the result that Danish agriculture was going to reorganise the production from grain to refined agricultural products, primarily with a view to the British market. With inspiration from Grundtvig and the Folk High School the farmers chose the cooperative movement as a means to do it.

The Origins of Co-operatives

The idea of the cooperative movement started in Rochdale, north of Manchester, where a coop was opened in 1844. The first coop in Denmark was opened in 1866, but not until the world's first cooperative dairy was started in Hjedding in West Jutland did the development really take off. Once the small farmers in the cooperative dairies found out, how to make a product that not only could compete with the products from the big estates but also could compete on the world market, the movement spread fast around the country.

Later followed cooperative slaughterhouses, cooperative feedstuff wholesale societies and soon coops were established in every village. It became one of the greatest commercial revolutions in the history of Denmark.

The idea behind it all was simply making production companies/shops, where "voting took place according to heads, not according to livestock or other property", i.e., one man had one vote, irrespective of how many cows a person, or how much a person produced or bought.

It is my intention to show through the historical links, how the Danes gained a valuable historic experience, which has been pronounced in national life ever since. The lesson is that if you are going to solve big problems, it is necessary that you join hands - all for one, and one for all - and receive returns according to contribution/deposit, but that everyone - big and small - has the equal right to decide.

The Revival of the Community Spirit

In the 1970s many cooperative undertakings disappeared from the villages of Denmark. There are and were still cooperative undertakings, but they have been amalgamated into large units, which often were placed in small provincial towns or in the railway towns. In many villages people missed the popular sense of community, which had existed in the many small cooperatives - they missed something meaningful like being together with a common purpose. Here wind power filled the vacuum. The subject was positive: To strive for renewable energy, to strive for a better environment

and to revive the joint problem solving community spirit. The problems did indeed appear to be far too big for individuals to solve, for economic as well as social reasons.

Organisation and Taxation

On that basis the wind turbine "guilds" were formed. They are partnerships, which in daily practice function as cooperatives. For legal reasons they were forced to make formal partnerships due to the fact that in Denmark the interest on the loan for the wind turbine is tax deductible from the private income of the individuals in a partnership, not in a cooperative. DV tried for years to have the law changed on this point, but did not succeed. The consequences would be too large in other areas.

Even though individually owned wind turbines continued to be erected, the "guild" turbines were the ones having influence on development, and they still have. The turbine "guilds" from all over the country were the grass roots activists, who worked hard to get permission to have their turbines erected, supported by the board of DV. This board had, of course, its origin in the turbine guilds.

I shall explain in the following, how there was a liberal need for a sense of community and solidarity in the guilds and also of DV's possibility of solving centrally the long series of problems in order to make it possible to utilise wind power in Denmark.

The Wind Turbine Owners, Parliament (Folketing) and the Public Authorities

A majority in the Danish Parliament consisting of the "Left Wing Socialists" and the centre parties supported the development of wind power. Otherwise it could not have been done. In addition to their interest in the environment they realised that there was a potential for job creation and export possibilities, which would bring foreign exchange to the country.

One could believe that once the legislative assembly of a country had given the "green light", then one could just get going, helped on the way by public authorities and administrations. But it would never be like that in Denmark.

The Woodland and Nature Administration of the Ministry of the Environment are looking after their own interests - it often means that they throw obstacles in the way of the development of wind power, but that does not seem to worry them.

The Customs and Tax Administrations maintains their rules severely with the consequence that it is difficult, or even impossible, to adjust to something new like wind turbines - but that does not seem to worry them either.

County Councils and Borough Councils, which have the decisive word in the planning process, effectively determine politically, whether a majority does like wind turbines or not and do not care, whether it creates obstacles for the development of wind power.

The Nature Conservation Board, which is the highest authority to which citizens can appeal, only represents attitudes, which safeguard provisions for animal life and the value of "delightfulness".

The result is that the wind turbines are doomed almost every time, and they do not care.

In short, not a single public authority will lift a finger to support the development of wind power. They only do, what they are being pressed to do by the so-called "green majority" in Parliament. They have not been able to stop the development, but they have delayed it, and they have made it a tough fight for DV and the turbine owners to get the turbines up and running.

Planning - A Two-Edged Sword

The resistance has not diminished over the years, and within the last few years a new effective weapon against the wind turbines has been introduced: Planning.

You simply make a tight plan of the whole country borough after borough. You involve everyone who in any way might have anything against wind turbines: nature conservation people,

ornithologists, sportsmen like hunters and anglers etc. All point out areas, where they feel that there should be no wind turbines.

The Woodland and Nature Administration demands a free zone of 3 km. from all coastlines. (Denmark has a 7.000 km. coastline, which will have the effect of deducting 21.000 square kilometres from the total area of Denmark of 44.000 square kilometres)

When you in addition to that deduct towns, woodlands, lakes and preservation areas, then everyone can see that there will not be many areas left, where you can put up wind turbines.

Restriction on Ownership

Due to the resistance towards the establishment of wind turbines, which has always existed in the public administration, not least within power stations companies and in part of the local population, the Parliament and Ministers of Energy have over the years felt forced to tighten the conditions.

Residency Criterion

In the late 1970s, when the development started, it was possible to erect turbines, as big as you wanted to or were able to. The only limitation was that all members of the guild should live within the same electricity supply area - taking into consideration the accounts are control, all members had to live within a distance of no more than 3 km. from the turbine. This was called "the criterion of residence". The idea was - according to the theory - that it was right that if anyone in the local area suffered any inconvenience, they should also be the ones having the advantages.

Well-to-do people of the cities should not be allowed to invest in wind turbines and have the advantage of receiving cheaper electricity without being affected by the problems at the wind turbine sites. It also fits well into the ideology of the cooperative idea, where you establish your enterprise in the area, where you live and among the people with whom you share your daily life for good or bad.

Consumption Criterion

In the middle of the 1980s the rule was adapted so that guild members now should live within the same borough + 10 km (There are from 3-4 to 15-20 boroughs in an area of electricity supply). At the same time a consumption criterion was introduced. Every guild members could only have shares in the wind turbine production corresponding to his own consumption + 35 per cent; however, always with a minimum of 6.000 kWh. This was introduced after pressure from the power utilities, which wanted to prevent individual, often well-off people, from buying big wind turbines and becoming private electricity producers.

The power station people wanted central management of the electricity production and were against the public support of the wind turbines. DV could accept the principle representing individual persons and guilds, which want to make their own electricity, free from pollution.

In principle DV could accept the criterion of residence as well as the criterion of consumption, we just found them too narrow. We therefore started to work politically in order to have them modified.

This was partly achieved in connection with the new Law for Wind Turbines, which was passed in 1992. Here the criterion of residence was extended so that guild members could live in the same borough or in the neighbouring borough. This was a good thing! It meant that guild members could be collected from 3-5 boroughs.

In the Law for Wind Turbines the criterion of consumption was also extended so that you could subscribe for electricity from a turbine corresponding to your own consumption + 50 per cent and always 9,000 kWh, irrespective of consumption.

The wind turbine owners' proposal was that you should have the right to a number of kWh, which corresponded to the entire energy consumption of the house (heating and hot water included) - but the changes were acceptable as a step in the right direction.

Latest News

In November 1996 new rules came into force, which means that every person now is allowed to have shares in a wind turbine corresponding to 30,000 kWh, and that there will be some slackening in the criterion of residence. The result is that a person, who works in a firm or owns a house or real estate in a borough, has a right to take part in a wind turbine project there, even if he lives elsewhere.

The Power Companies

The political price for the consumption criterion was that the electrical power utilities had to accept that they would also have to put up wind turbines. It was agreed with the Minister of Energy that the power stations from 1986-1990 should erect 100 megawatts of wind generating capacity. Later in 1990 this was increased by a further 100 megawatt up to 1994.

The power stations and the electricity supply companies have been a decisive factor in the development of wind power. Before I was involved in wind power I once thought that the supply of electricity was an institution, which took care of providing the citizens with a good and secure supply of electricity and nothing else.

Learning about the Politicising Power Companies

I have since learned that the first part was quite right.

The suppliers are interested in providing a good and safe supply of electricity, but with the thought that electricity should be as cheap as possible without considering for instance, where they bought the coal, and what effect coal had on the environment.

The second part: that they do not take interest in anything else was wrong: They are deeply involved in politics.

Little by little, I have come to the conclusion that they are energy merchants. They have been chosen for it. They should not be directed to other duties, the safest possible supply of electricity at the cheapest possible price. This only requires that the political system is aware of this and gives a clear definition of the limits within which the electricity supply can function. If there are political reasons for not buying coal in, for instance, South Africa, then the politicians can agree that it is not allowed to buy coal there. In the same way the electricity suppliers ought to have instructions to carry through energy saving campaigns to build wind turbines and arrange for proper connection conditions for wind turbines etc. It has taken quite some time for this attitude to penetrate the political system.

1992: The Final Breakthrough

The turning point was the Law for Wind Turbines, which came in the summer of 1992. It was a watershed year in the short history of wind power. The story behind it is as follows:

The power station companies were involved very early in the development of wind power. They participated in developing the now famous Gedser Turbine, which, as mentioned earlier, was inaugurated in 1957 and operated successfully until 1967, when it was stopped in spite of an annual production of 400.000 kWh per year.

The conclusion was that it was too expensive to produce electricity with wind turbines. Coal and oil were much cheaper, so it was not as profitable. Wind power got on its feet again in the middle of the 1970s, which was promoted by some very enthusiastic and fiery souls, who were just mad enough to break through the massive scepticism and general resistance.

The resistance of the utilities was apparently nourished by the fact that they were opponents to everything preventing them from using nuclear power for electricity production. It was nirvana for most electricity people, and it still is for many. Luckily, a broad public debate and a political debate came along, and the result was a decisive NO to nuclear power in Denmark, and this was so convincing that the debate stopped completely.

Harassment from Power Companies

The countdown towards the Law for Wind Turbines had already started at the beginning of the 1980s. Various electricity suppliers harassed the turbine owners in many different ways. For instance a supply company introduced a surcharge fee for wind turbines in their area.

It was a duty normally imposed on large electricity consuming installations, and it was clearly unreasonable on installations like wind turbines, which supplied the grid with electricity. DV brought an action before the Committee for Electricity prices, and their views were accepted. The utility was ordered to cease collecting the surcharge fee. The company refused to do so. Not less than two energy ministers (one after the other) had to urge them to comply with the decision of the Committee, before they did so.

Other companies deducted 10 per cent from the normal payment for the electricity produced by a wind turbine, or they considered wind turbines as electricity consuming apparatus with subsequent extra duties. DV appealed both cases and won.

A particularly clever company made up and collected some unreasonably high connection contributions for wind turbines. DV also brought them before the Committee. However they found that they could not intervene - no matter how high the price might be - because it was considered an internal matter.

The Importance of Public Relations

It went on in this way for some years. DV took care of providing as much press coverage as possible (especially through our association's magazine "Natural Energy") of the different cases, which also were brought before the energy minister holding office. Gradually the politicians as well as the public opened their eyes to the fact that the electricity companies used their self-appointed right of determination to carry through their own energy policy apart from government and parliament.

Hard pressed by the political situation and fearing legislation, the worst that could happen from the point of view of the electricity world, the umbrella organisation for all power stations and electricity supply companies in the country DEF agreed to negotiate a national agreement about connection conditions and settling prices with DV and FDV (the Danish Wind Industry Association).

Grid Connection and Tariff Conditions: A Voluntary Agreement - at First

After long and tough negotiations, and under a direct threat of political intervention, the parties - DEF on one side and DV and FDV on the other - entered into a 10 year agreement about conditions for grid connection and settlements. The main points of the agreement were:

1. The costs of connection to the grid should be shared, with 1/3 being covered by the State, 1/3 from the turbine owners and 1/3 from the power companies (when the State's support for wind turbine projects was dropped a short time later, the payment from the state disappeared, and after that the turbine owners paid 2/3 and the power stations 1/3).

2. The price paid for the turbine electricity was at the rate of 85 per cent of the electricity price paid by the larger power users (they paid a slightly lower price than the ordinary users), and at the rate of 70 per cent of this price to turbine owners with turbines in their own installation.

(The reason for the lower price to individual turbine owners was that having your own turbine, you had a bigger chance of using your own electricity, and the utility was meant only to be available as purchaser of surplus electricity, but it had to be the supplier of total consumption, if the wind was not blowing).

The 15 per cent reduction in price paid to the turbine guilds was payment for use of the public grid. A cooperation committee was formed between the 3 associations, where complaints and problems with interpretation were dealt with. There were a number of cases, some which could not be resolved, but on the whole it all went well.

Not until this decade did the uncertainty start to spread. DEF clearly expressed that when the agreement expired, the wind turbines would have to manage on market conditions.

Many were nervous of going into new projects, when they did not know, what would happen after 1994. When the development almost came to a standstill, the energy minister stated: "The parties should negotiate a new agreement, which should remain in force right into the next century."

The negotiations were protracted. The electricity companies demanded that the connection costs should be doubled and the settling prices reduced to a fixed, but lower, amount. DV and FDV were prepared to accept an idea along these lines, but not that far. To the best of our understanding this would mean that the development of wind power would come to a halt. Encouraged by the energy minister and others DEF stuck to their ideas - and DV and FDV on the other hand, broke off negotiations because of the wind power people, it was everything or nothing.

Legislation Replaces Agreement

During some hectic political negotiations where, among other things, the right to build 2 new coal power stations was on the agenda, the energy minister was forced by the green majority to introduce a bill for wind turbines, which said: "In the future the power companies should pay all expenses for reinforcement of the grid in connection with the erection of wind turbines, whereas the expenses for the grid connection all the way to the public grid should be carried by the turbine owners ... In the future there should be only one tariff for electricity from wind turbines, i.e., 85 per cent of the price paid by the larger power users." The 70 per cent settlement disappeared. DV produced the proposal to let the electricity supply companies be responsible for and pay for the reinforcement of the grid at the eleventh hour taking into consideration that this was the only solution, which could prevent eternal disagreement or negotiations.

In connection with the Law for Wind Turbines something quite new in the Danish history of electricity was established, i.e. that the utilities are under an obligation in the future not only to distribute electricity, but also to collect electricity from decentralised power stations and renewable energy plants.

This was as far as the electricity companies were forced to go and a dent in their political credibility.

I think that they "had ordered the music themselves". But they were frustrated and disappointed in the circle of power stations.

At their general meeting in 1992, when the bill was a fact, the chairman of DEF said: "It has created a certain bitterness in electricity companies quarters that the collective electricity consumers still have to be punished economically for the wind turbines of the individualists!"

I do not believe that the fight is over yet, but it may be carried on at another level.

The Wind Turbine Industry

Today the relationship with the wind turbine industry is good, and we have been able to negotiate together over the past 10 years. This, of course, is due to the fact that from a responsible viewpoint we do have the same interests, and that is the continuous development of wind power:

WE

- Because we want to promote the utilisation of energy, which is free pollution.

THEY

- Because they want to produce and sell wind turbines both domestically and also to foreign countries. An important basis for export is that, as in many other areas, a good and stable home market makes it possible to continuously have one's products tested. In this respect many Danish wind turbine owners have participated with an interest and a commitment, which of course is of benefit to themselves and also to the manufacturers.

Until we came that far, there had, however, been a number of confrontations between DV and some of the first manufacturers on the market. Some wanted to make money quickly, others had products that were simply not good enough. We had many negotiations especially with some small manufacturers in order to make them improve the quality, but not always with success. In 2 cases we had to expose them publicly in "Naturlig Energi" and in both cases with the result that they shortly after had to cease trading.

The Consumers' Best Weapon: Information

But the most effective means we started to use very early and which contributed decisively to better the conditions was simply information.

Each month "Naturlig Energi" had a list of all turbines with an indication of, what they produced, and which technical problems there had been. This definitely had a positive effect on development. The turbine owners themselves then had the opportunity to explain, how well or how badly their turbines produced. The manufacturers discovered that their own turbines quickly became either a good or a bad advertisement for their business.

The statistics of production helped to remove the turbine sales people, who promised people wonders without the background of a good product placed on a good windy site. In the process of development the statistics also showed the importance of good siting.

Future turbine owners were not the least in importance - in the statistics they could find the information necessary to make the decision on, which turbine they would want to buy.

The public obtained serious information about the potential of wind power. To a high degree this contributed to exploding many of the myths telling how little energy there was to obtain from the wind turbines. Also statistics have clearly reflected the developments, which has taken place in the purely technical area.

The statistics have continued through the years and now appear monthly from over 2,400 wind turbines.

If we ignore the trifles and a few rough patches, then the cooperation between the manufacturers and the wind turbine owners is definitely one of the good stories about wind power.

Insurance

It is possible today that at the same time you buy a wind turbine, you can have it insured, not only against damage and consequential losses, but also against the risk of the manufacturer going bust within the period of warranty.

The question of insurance was one of the reasons, why DV (later Danish Wind Turbine Owners' Association) was formed. Within the insurance business wind turbines were a new and unknown phenomenon, which either the manufacturers, the turbine owners or the insurance companies knew how to deal with the matter.

The first and biggest insurance event happened shortly after establishment of the association, when one of the biggest wind turbine manufacturers went bankrupt. Approximately 20 turbine owners had bought a turbine from this company. They were all insured with one of the biggest insurance companies in the country, but they refused any help to the turbine owners - referring to the policy, which said that the insurance did not come into force until after the expiration of the period of warranty - typically 2 years.

During the period of warranty it was the responsibility of the manufacturer, but he had gone bankrupt. DV was not of the opinion that it could be the responsibility of the turbine owners, as the insurance had been made between the manufacturer and the insurance company.

This came to court, and the association pleaded the case for one of the owners as a matter of principle. The case took 5 years and was conducted in 2 courts, and it was so expensive that DV had to raise the subscription in order to be able to pay the costs.

Unfortunately, the association lost the case. The court found that neither the insurance company nor the wind turbine owners had the responsibility. The manufacturers had, but as he was bankrupt the wind turbine owners were left with a problem. The basis of this was that the insurance had been taken out between the manufacturer and the insurance company.

An old Danish proverb says: "A loss makes you rarely rich, but often wise" (like the English one – "Once bitten, twice shy".)

So now, after dearly bought experience and concentrated work in the insurance committee of the association, we did eventually succeed in establishing some insurance, which - cleared of most pitfalls - did live up to the needs of the turbine owners.

Through the years, while insurance premiums went up and down and created much insecurity among the turbine owners, the thought emerged that it might be a good idea to establish the turbine owners' own insurance company. The idea caught on, and in the association we worked on the problem from the beginning of the 1980s, but there were many legal and economic barriers, so for a time it looked hopeless.

However following a renewed appeal from the General Meeting of DV in 1991 "Denmark Wind Turbine Insurance" was established. It is a completely independent company, owned and run by the turbine owners, who have taken out insurance.

DV participated in this stage of establishment, but has now resigned and has only a representative on the board.

In my view it is one of the really big victories for people power in Danish wind power, and I hope that the company will grow quickly. Until now, interest has been good.

While it is not growing very quickly, this is surely related to the fact that money has to be invested simultaneously within the taking out of insurance. The share capital will be built up over some years by the policyholders.

Statistics on Danish Wind Turbine Owners' Association

September 1996 - DV has a membership of 2,150 wind turbines. The turbine guilds have 54,844 members. It is a condition for being a member that the turbine is enrolled in the association, and you pay for it according to certain rules. On the other hand the guild itself decides, how many members the guild will accept. However, there must be at least one personal membership for each turbine no matter the ownership.

Subscription paying members of the association:
Co-operative turbine members/guild members: 8,876
Individual turbine owners: 429
Members without a turbine 456: Total 9,761.

Our association has gone through impressive developments during the 18 years of its existence. From being a small handful of pioneers it has developed into the only consumer organisation within this field with office and technical as well as administrative personnel, who carries out a comprehensive guidance and counselling service for the members, and that is indeed necessary. However I feel that the association and its members are facing a special problem, i.e. that the idealists as a percentage are becoming fewer and fewer. In many new established guilds the engagement in the environmental aspects of wind power is of less importance and is no longer the principal interest. To a higher degree it is the prospect of a good investment and a reasonable rate of return, which today makes people gravitate towards wind turbine projects. I am afraid that according to the same scale as the interest for the environment, as the interest in working in a popular co-operative in your local community is decreasing, so will the power of influence and penetration of DV decrease. Judging it politically one can nevertheless be very satisfied that so many ordinary citizens have succeeded in investing money and time in the accomplishment of a task which contains a very high degree of ordinary public interest and importance.