# Development of wind power
## Vendor and Customer changes

The wind energy business has faced an incredible growth between 20 and 30% each year during the last 25 years. In this time the size of turbines has grown from less than 100 kW to 5-6 MW of the recent offshore wind turbines. 10 MW turbines are already in the early stages of design.

This growth did not only influence the technique of wind turbines. Also the relationship between manufacturers the vendors and customer has faced tremendous changes. These changes can be summarized in three steps.

### Step 1:, single locally owned turbines

The first turbines with a size of less than 500 kW have been mainly purchased by farmers, small companies and especially in Denmark by locally owned co-operations. The wind turbine companies at that time have been either small start-ups like Enercon, Lagerwey or Südwind or investments of family owned companies into a new, promising business like GE, former Tacke or Siemens, former Bonus or Vestas. The biggest market in Europe was Denmark, while Germany began its rise. The size of an average project was one turbine and the investment was usually not higher than 500,000 €.

The acceptance of these wind turbines was usually high especially in Denmark because 10,000 of families benefited directly from their energy yield. Although their visibility was low due to their hub height of usually not more than 30 m.

Also of interest was the transparency regarding the quality and the price of wind turbines. Engaged engineers in Germany and Denmark published on a monthly basis the production, the failures and the availability of all turbines. The price was published in a market oversight.

### Step2: small wind farms planned by developers

After the introduction of the german feed-in law in 1990 the german market was the driving market in the world during almost a decade. The size of wind turbines rose to 1,5 to 2 MW in the second half of the nineties. This size made it impossible for farmers and small co-operatives to purchase wind turbines any more. Usually their financial capability is not higher than 1 mio €, an average value of a medium size farm. On the other hand the first utilities started wind energy projects mainly to gather some knowledge about this new technology.

New wind energy professionals, the developers, mainly german companies, took over the business. Their leaders often having their roots in the anti-nuclear or “green” movements created a model of installing wind turbines on a high professional level. While on the one hand they collected money from interested persons like i.e. dentists and lawyers thus saving taxes, they rented on the other hand land from farmers and started to build the first small wind farms. The average size of these wind farms grew

up to 20 wind turbines while some farms were even bigger. This model was and still is highly successful.

In several years the german market amounted to more than 50% of the world market. The Danish market was down while Spain and India started.

On the manufacturer´s side the first adjustments took place. Some companies went bankrupt and disappeared for ever others merged.

The acceptance of wind turbines diminished slightly. It was acknowledged that wind turbines are ecological friendly but also they began to be dominant parts of the landscape, especially on the coasts in Germany.

Even the quality of the statistics diminished. The number of turbines increased and the manufacturers began to publish their statistics “én bloc”, thus controlling it. The prices were still published in the market oversight, but it was known that these prices were only the first price for negotiations.

## **Step 3**: The utilities step in and Offshore is on the rise

By the beginning of this century the first multi-megawatt turbines appeared. on the markets. Also offshore wind energy began. The first near shore projects in Denmark have been installed.

Despite the fact that even in Germany the offshore wind energy prolonged its introduction and most of the projects were developed by wind energy developers it became more and more obvious that these giant wind projects needed new sources of money. The only group of investors now being able to invest at least 500 Mio. € into a single project of 80 wind turbines and dozens of millions into installation ships are the European utilities, like e.on, RWE, edf and others.

On the manufacturer´s side the consolidation continued with some interesting details. While all Danish manufacturers except of Bonus/Siemens became part of Vestas, Enercon moved on completely independent, owned by one person with no ambitions to move offshore. The old and traditional manufacturers of power stations Siemens and GE bought Bonus, respectively Enron, former Tacke thus installing the old manufacturer-customer relationship between them and the utilities.

Today, 2011, the biggest turbines available have a size of 6 MW, onshore only Enercon. Offshore 4 manufacturers are established, Siemens, Vestas, Bard and Repower. Other manufacturers try to follow them.

The know-how of wind power has spread widely. Wind power is not a technology with a very specific high know-how. And always have there been initiatives to spread this know-how effectively. Some independent design companies, mainly from Germany like aerodyn sell complete designs to manufacturers, now mainly to China.

The Chinese market and manufacturers are in 2010 no longer neglictible. However still they are mainly active on their national market, even offshore.

The installations onshore have not yet dimininished. However the time of small and medium projects is gone. Enercon is installing a huge project in northern Sweden with 1101 wind turbines and in the US and Canada the utilities and investors install projects of hundreds of turbines.

The national energy policy in the UK has focussed primary onto offshore wind power and, with the selection of “round 3” bidders, onto big traditional energy companies like EdF, RWE and E.ON. So, after more than 30 years of modern wind energy the energy establishment is the driving force in this field and offshore wind power is synonymous for the use of renewable energy and CO2-reduction.

However, looking onto the figures offshore wind power is one of the most expensive renewable energy sources today. The costs of the wind turbine amount to only 25 to 33% of the total investment while onshore the costs of the wind turbine are more than 80% of the total investment. This cannot be compensated by the higher energy yield offshore due to higher wind speeds.

Therefore the question arises why is offshore wind power so popular? It is popular because the traditional energy sector sees its chance to monopolise the electricity supply chain again. Only these companies are able to invest 1 bn € or more into a single project which is the average size of an offshore wind farm with 80 turbines of 5 MW.

Is this the end of decentral renewable energy and local value creation as it was in the first phase of wind energy?

It might but it must not be. It is not possible and senseful to roll back in the size of windturbines but it is definetly necessary to develop new structures for the participation of citizens and normal, not rich, people in wind energy.

One and the most promising method is that communities, small towns or local utilities like german “Stadtwerke” go into wind energy. They are able to invest into projects of phase 2 meaning about some 10 mio.€. Also these institutions can offer a direct participation of their citizens in these projects.

These wind farms should be installed locally. The benefit for the people is that the institutions earn money with wind energy thus enhancing their opportunities for social welfare or new roads and schools.

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