



## Danish Wind Power 2001

### Record Growth Once Again

The sales from the Danish wind industry broke all previous records in 2001. The Danish wind turbine manufacturers sold 3,452 MW (including sales from foreign subsidiaries) - equal to an increase of approx. 60% compared to the year before. The actual increase was slightly less; however, (57%) as 40 MW delivered to the Danish market in 2000 are included in the 3,452 MW. In 2001, the Danish manufacturers sold twice as much wind energy capacity as the global sales of new nuclear capacity of approx. 1,700 MW.

The huge increase in sales is largely due to an explosive growth on the US market caused by the expiration of a favourable production tax credit (PTC) scheme at the end of 2001. This resulted in a last-minute panic and a subsequent buying spree. The PTC was extended for two more years in March 2002, effective from 1 January 2002. A significant decline in sales on the US market is still expected in 2002, however, as it normally takes at least a year to plan a new wind farm. 2003 is expected to be another busy year on the US market.

Due to these fluctuations, the Danish Wind Industry Association predicts a significantly reduced growth of approx. 10% in 2002. The Danish manufacturers have experienced an average annual growth of 37% in wind turbine sales over the last five years.

### 3 Billion EUR Sales and 20,000 Jobs

The total turnover of the Danish wind turbine manufacturers rose from DKK 13 billion in 2000 to more than DKK 20.5 billion (EUR 3 billion) in 2001 - DKK 19.5 billion came from sales on foreign markets. Furthermore, wind turbine components worth DKK 1-2 billion were exported from Danish suppliers to foreign wind turbine manufacturers.

20,000 Danes were employed in the Danish wind industry in 2001, 14,500 of these worked for Danish component suppliers. This is significantly more than total employment in the Danish electricity sector including distribution, transmission, and production.

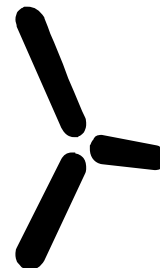
The average direct employment in the Danish wind turbine factories was 5,500 in 2001. The direct employment figure grew by approx. 1,200 people in 2001 - equal to a 30% increase.

### Half the World Market

Once again, the Danish wind turbine manufacturers maintained a world market share of 50% in 2001. If the manufacturers' foreign joint ventures are added, the market share was approx. 60%. The foreign joint ventures sold approx. 664 MW in Spain and India in 2001 and brought the total sales of Danish wind turbine technology to 4,116 MW.

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Germany and the US were by far the largest markets for the Danish manufacturers, and 65% of the Danish wind turbines were sold here in 2001. In Germany, the sales increased by approx. 70% from 710 MW to almost 1,200 MW, in the US it increased by almost 900% from 105 MW to 1,037 MW. Other important markets for the Danish manufacturers were Spain (255 MW), Italy (162 MW) and Japan (142 MW).

### Larger Wind Turbines

The average size of the wind turbines sold by Danish manufacturers rose from 861 kW in 2000 to 944 kW in 2001. A typical 1 MW wind turbine has a rotor diameter of 50-55 m.

The wind turbine market is divided into two segments: The »small« onshore wind turbines of 750 kW-1.3 MW, and the multi-megawatt turbines which are designed for offshore use, but also installed onshore.

### Danish Nosedive

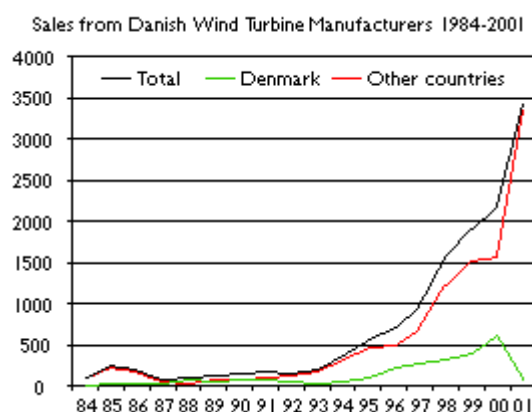
Several foreign markets saw a boom in wind turbine installations in 2001 but Denmark experienced the first decline in installations since 1993. The wind power capacity sold in Denmark dropped to a pre-1995 level - only 117 MW was sold in 2001 compared to 566 MW in 2000. The actual sales were only 77 MW in 2001 as 40 MW in reality was delivered at the end of 2000.

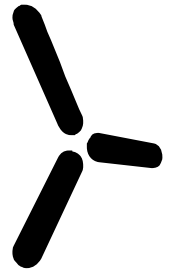
The huge drop on the Danish market was expected. In 1999, the Danish Parliament decided to introduce a green certificate market. The result was a sudden uncertainty of future payment conditions and this caused a boom in wind turbine sales in 1999 and 2000 before the old payment system expired. At the end of 2001, almost 6,500 wind turbines were installed in Denmark with a total capacity of approx. 2,500 MW - an excess of 1,000 MW compared to the goal of 1,500 MW by 2005 set in the Danish energy plan Energy 21. Therefore only few wind turbines sites are still available in the regional plans made by the local authorities. Furthermore, a new Danish payment system still needs to be introduced and the continued uncertainty of future payment conditions makes it difficult for potential wind turbines investors to finance new wind turbines.

In the future, Danish wind turbine installations are mainly expected to take place offshore and by replacing small, old turbines with big, modern ones.

### Towards 21% Wind Power

With only 80% of the wind energy content of an average wind year, 2001 was an unusually poor wind year in Denmark. The Danish wind turbines produced 4.3 TWh (4.3 billion kWh) electricity in 2001 - equal to approx. 13% of Danish electricity consumption or the electricity consumption of one million Danish households. If the





energy content in the wind had been average, wind power would have produced more than 16%.

In 2001, 86% of the wind turbine electricity came from privately owned turbines and 14% from utility owned turbines. This picture will change somewhat in 2002 and 2003 with the construction of the two 160 MW utility owned offshore wind farms Horns Rev and Rodsand.

The two large offshore wind farms will boost the share of wind power in the Danish electricity consumption. In 2002, wind power is expected to cover approx. 18-19% of the Danish electricity consumption and approx. 21% in 2003.

In 2001, the wind turbines in Denmark saved the environment from the emission of 3.5 million tonnes of CO<sub>2</sub>, 6,450 tonnes of sulphur dioxide, 6,000 tonnes of nitric oxides and 223,000 tonnes of cinder and fly ash.

**The graphics have been corrected as follows: 330 MW exports have been moved from 1998 to 1999. 40 MW for the Danish market has been moved from 2001 to 2000. These corrections are due to the fact that some manufacturers have reported their data in accordance with their accounting principles rather than actual deliveries (shipments).**