

## Vestas gives high priority to the environment



*Vestas considers it natural to show consideration to the environment and occupational health and safety. This is why Vestas is working to ensure that its subsidiaries and other parts of the Group receive environmental and occupational health and safety certification in line with the Danish sites under Vestas Wind Systems A/S, which have been awarded certification according to the ISO 14001 and OHSAS 18001 standards.*

– both globally and locally



# Environmental Statement

Vestas considers it natural to show concern for both the environment and occupational health and safety, and is therefore keen to document its initiatives in these areas in connection with the annual environmental statement. 2001 was an eventful year for Vestas. This also applies to the area of the environment, where a range of activities were initiated. Many of these have already been completed, while others are to continue in 2002. The most important of these activities are described on the following pages. In the same way as last year, this environmental statement applies only to Danish sites under Vestas Wind Systems A/S. However, the long-term intention is to extend the report to cover subsidiaries as well. The next environmental statement will be published in March 2003.

## OHSAS certification

On 13 August 2001, the Danish sites under Vestas Wind Systems A/S were presented with a certificate documenting the fact that the occupational health and safety system implemented has been certified in accordance with the British standard OHSAS 18001.

The OHSAS certification of the occupational health and safety system indicates that Vestas prioritises occupational health and safety at the same level as the external environment, which was correspondingly certified to the international environmental standard ISO 14001 by Germanischer Lloyd Certification GmbH in August 2000.

With the certification of the company's occupational health and safety system, Vestas has

increased its focus on the safety and well-being of its employees. The following pages contain descriptions of some of the initiatives implemented by Vestas to ensure that employees at all levels within the company enjoy a good working environment.

## EMAS registration in sight

Vestas' long-term target is to achieve EMAS registration, which is why Vestas' environmental statement has been drawn up in line with EMAS requirements. Subsidiaries and other parts of the Group have not yet received certification in accordance with the ISO 14001 and OHSAS 18001 standards, but Vestas is naturally very aware of the influences on the environmental and occupational health and safety aspects in these parts of the Group. Vestas therefore considers it natural to work towards ensuring that subsidiaries and other parts of the Vestas Group achieve certification in accordance with both ISO 14001 and OHSAS 18001. The section entitled "Status and future – external environment" on page 68 contains a report on the projects that have been implemented in relation to this statement of intent.

Finally, please note that at the back of this environmental statement, there is a page listing glossary, conversion factors and a number of definitions.



*The open landscapes in Canada are ideal for establishing wind farms. One of the areas where Vestas has already erected wind turbines is Pincher Creek in Alberta.*

# Environment included from start to finish

In order to be as well prepared as possible for the expected growth in the market for wind energy, Vestas strives ceaselessly to find appropriate locations for new sites both in Denmark and abroad. In this regard, and in line with Vestas' policy on the environment and occupational health and safety, the company's intent is to incorporate consideration for employees and surroundings in the planning and implementation of its activities. In order to fulfil these requirements, the technology transfer department and the production development department work closely with the company's environmental department.

## At the cutting edge of development

In the concept phase of projects concerning the establishment of new production facilities and the alteration of existing facilities, aspects relating to the external environment and occupational health and safety are accorded the same weight as other activities. This is partly to ensure that Vestas remains at the cutting edge of development, and partly to avoid the risk of having to make changes at a later date as a result of requirements from the authorities – and the increase in costs this would entail.

By way of an example, Vestas Wind Systems A/S involves both environmental and occupational health and safety authorities as early as the concept phase so as to open a constructive dialogue. This is intended to ensure that the company complies with both local and national legislation pertaining to the environment and occupational health and safety, as well as to set up a positive working relationship with the relevant authorities.

In connection with technology transfer and the development of both materials and production equipment, consideration is given to the environmental and occupational health and safety aspects via interdisciplinary collaboration between Vestas' environmental department and the other departments involved in the project. This collaboration ensures the supply of the necessary knowledge – for example emission measurements, expert evaluations, etc. – to make sure that the Vestas management has the best possible basis for making decisions.

## Same level of knowledge

When new sites are to be established at overseas subsidiaries, the intention is to make sure that, as a minimum, these live up to the same levels of consideration vis-à-vis the environment and occupational health and safety as the Danish factories, and that they subsequently implement environmental and occupational health and safety

management in line with the ISO 14001 and OHSAS 18001 standards.

To ensure continuous and corresponding development in the areas of the environment and occupational health and safety, an environmental employee from Vestas Wind Systems A/S is linked to all new sites. This should be interpreted as an expression of Vestas' wish to ensure that all factories both in Denmark and abroad have the same level of knowledge and the very latest experience in the area of the environment. At the same time, a network of this kind reinforces communication and the exchange of new initiatives and new knowledge between Vestas Wind Systems A/S and its subsidiaries.

Vestas' policy for the Environment and Occupational Health and Safety is:

- to ensure continuous improvement in the areas of the environment and occupational health and safety
- to take the necessary care in relation to the environment and occupational health and safety during development, manufacture and service procedures
- to include consideration for employees and surroundings in the planning and performance of Vestas' activities
- to ensure open and honest communication with employees and interested parties
- to optimise the exploitation of materials, energy and other resources
- to measure and document Vestas' influences on employees and surrounding
- to ensure that, as a minimum, Vestas' activities comply with national legislation concerning environment and occupational health and safety.

Vestas implements this policy by:

- establishing targets for the environment and occupational health and safety
- preparing and carrying out programmes for protecting the environment and improving occupational health and safety
- maintaining a certifiable management system in relation to the environment and occupational health and safety
- communicating knowledge about the environment and occupational health and safety to employees and interested parties through education and information
- including consideration for the environment and occupational health and safety in the development of products and processes
- systematising data collection and reporting
- continuously monitoring and providing information about legislation concerning the environment and occupational health and safety.

## Fixed criteria for prioritisation

As a minimum, environmental mapping is carried out every second year. This involves a thorough study of the environmental and occupational health and safety aspects at Vestas, and the results of the study are used as a tool for prioritisation.

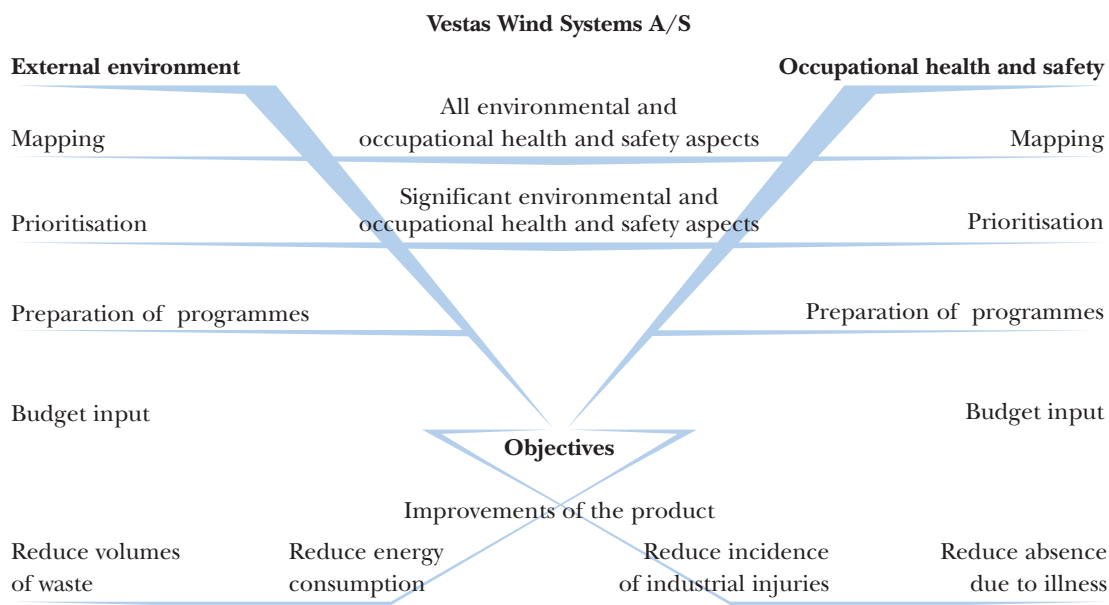
An important part of Vestas' work in the areas of the environment and occupational health and safety involves identifying the most significant environmental and occupational health and safety aspects. Vestas prioritises importance on the basis of the following fixed criteria:

- Are the environment and occupational health and safety aspects in line with legislation?
- Is Vestas' own policy on the environment and occupational health and safety being followed?
- Are all internal rules – both written and unwritten – being followed?
- Have there been any industrial injuries or environmental accidents over the past two years?

The most significant environmental and occupational health and safety aspects are identified for Vestas at three organisational management levels. At the operational level, employee representatives participate along with the foremen

of the separate departments. At the tactical level, the factory managers participate along with the appointed representatives for the individual sites, while representatives from senior management are involved to ensure the identification of the most significant environmental and occupational health and safety aspects for all activities run by Vestas Wind Systems A/S in Denmark.

Representatives from the environmental department participate in all meetings to act as catalysts for the process and as sources of information. At Vestas, the most significant environmental and occupational health and safety aspects are consciously incorporated in the environmental and occupational health and safety objectives for the activities of Vestas Wind Systems A/S in Denmark. The separate sites have subsequently set up concrete measurable targets in accordance with these objectives so that Vestas is able to document its ongoing improvements at all times. The way in which the targets are achieved is described in the associated programmes, which are available via the Vestas intranet.



*The figure illustrates the principal stages of the environmental and occupational health and safety management system used by Vestas Wind Systems A/S. The figure should be seen as a cycle that is followed to identify the most significant environmental and occupational health and safety aspects. The result of each cycle is used to evaluate and establish objectives for work concerning the environment and occupational health and safety. Concrete targets for each of these objectives are set up for each site. The targets are listed on pages 74 - 80.*

# The environment and occupational health and safety in black and white

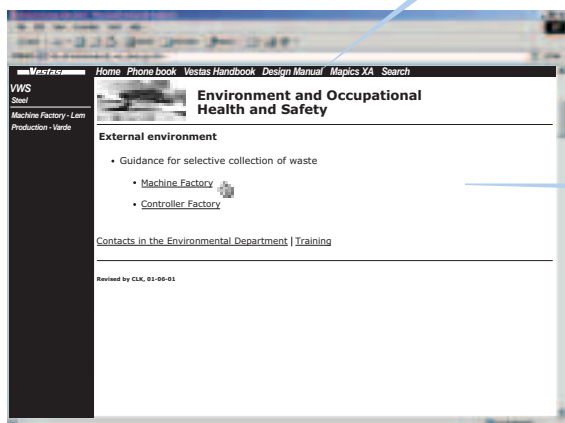
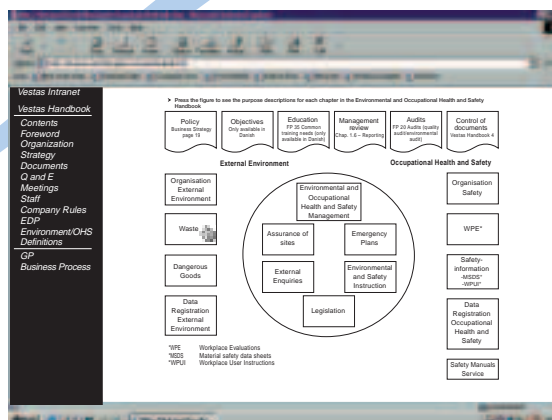
The Environmental and Occupational Health and Safety Handbook at Vestas is one of the tools that can be used by employees at all levels if questions to do with the environment should arise. The handbook has been written with the purpose of providing a shared platform for everyone employed at the Group's Danish sites who may need information about the environment and/or occupational health and safety.

The layout of the handbook reflects the fact that management is a central element in work relating to the environment and occupational health and safety, and the contents of this handbook are

primarily built up on Vestas' own requirements, Danish legislation in the area, and the requirements of the ISO 14001 and OHSAS 18001 standards.

The handbook is available via the Vestas intranet in both English and Danish, which means that all employees have the opportunity to search for information.

Instead of starting the handbook with a conventional table of contents, the first page contains a diagram that allows the user to navigate quickly to the pages that deal with the matter in hand (see the figure below).



The figures above show the principles Vestas uses to deal with matters concerning the environment and occupational health and safety. If, for example, an employee is unsure of how to deal with special types of waste in accordance with the Vestas system of pre-separation at source, he contacts his foreman. If the foreman is unsure, he can refer to the environment and occupational health and safety handbook, which is published on the company intranet. The case illustrated above refers to a special type of glue that must be disposed of as chemical waste.

# Status and future – external environment

In 2001, Tech-wise A/S, the Danish company of consultant engineers, joined forces with Vestas to prepare a life cycle assessment (LCA) for a Vestas V80-2.0 MW turbine for offshore use. Vestas considers this report to be an improvement on the previous LCA which referred to a 600 kW turbine and was published by Tech-wise A/S *et al* in 2000. The reason why this report is considered better is that the previous report was drawn up on the basis of components from various suppliers to the wind turbine industry, whereas the new report is based exclusively on a Vestas wind turbine.

The results of the new LCA show that the environmental impact from electricity generated by wind turbines is very low compared to the impacts associated with electricity generated from a combined solution – as is the norm for ordinary Danish electricity consumption.

The comparison of the impacts on the environment involves the use of what are known as “person equivalents”, which express the average environmental impact made by a person in Denmark. This is illustrated in the figure at the bottom of this page.

However, the results should only be considered indicative, as during the work it was established that there is still considerable scope for improvement of the tools used to prepare life cycle assessments.

At present, Vestas is working on a similar LCA for a V80-2.0 MW turbine for onshore use, and here, one of the goals is to compare the two LCAs to

establish whether there are any differences between the environmental impacts caused by on-shore and offshore turbines.

Vestas considers the work with these two life cycle assessments to be a step towards being able to prepare an actual environmental product declaration for every new model of wind turbine manufactured by Vestas.

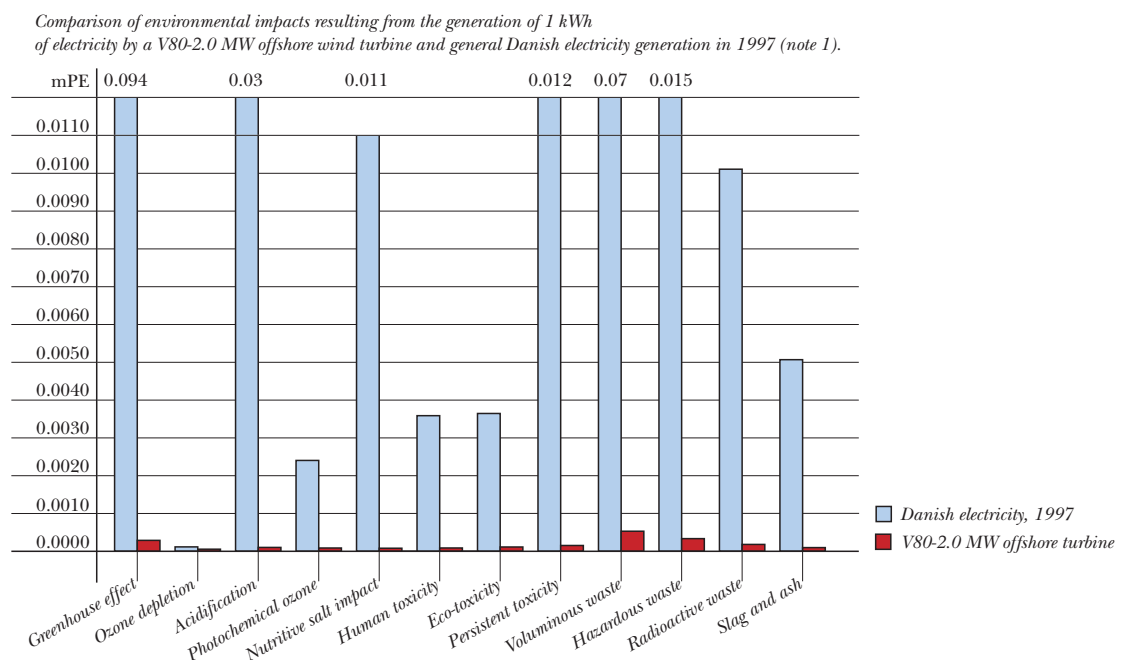
Vestas also considers the work to be yet another step towards a model that can be used in the product development of future Vestas turbines, such that the basis for making decisions with regard to the choice of materials is optimised in relation to the environmental impacts.

## Subsidiaries on their way to ISO 14001 certification

Vestas considers it natural to certify its subsidiaries according to the ISO 14001 and OHSAS 18001 standards in line with Vestas Wind Systems A/S. The first step has already been taken in Sweden, where the Swedish subsidiary Vestasvind Svenska AB received ISO 14001 certification in December 2001.

The Italian subsidiary IWT - Italian Wind Technology, S.r.l. has completed a preliminary study and is currently working hard on a project, which is expected to result in ISO 14001 certification in 2002.

In addition, the three Danish sales subsidiaries –



The figure shows the results of a life cycle assessment performed by Tech-wise A/S in collaboration with Vestas. The assessment compares the environmental impact resulting from 1 kWh of electricity generated by a Vestas V80-2.0 MW offshore turbine and 1 kWh of electricity supplied to consumers in Denmark in 1997.

Note 1: Explanatory comments on the life cycle assessment and a detailed explanation of the individual environmental impacts are listed in report no. 01-488 “Livscyklusvurdering af vindmøller” (Life cycle assessment of wind turbines) published by Tech-wise A/S in 2001.

Vestas - Scandinavian Wind Technology A/S, Vestas - Danish Wind Technology A/S and Vestas - International Wind Technology A/S – started work in 2001 to achieve certification in accordance with the ISO 14001 and OHSAS 18001 standards.

## Purchase of CO<sub>2</sub>-neutral energy

In 2002, to the extent permitted by legislation, Vestas has once again entered into a contract for the purchase of electricity generated from sustainable sources of energy. In the same way as in the previous year, the contract covers the purchases made by the Danish sites of what is known as non-prioritised electricity. The report for 2001 shows that approximately 69 per cent of the total electricity consumption of the Danish sites stemmed from sustainable sources of energy.

## Supplier evaluation

Environmental and occupational health and safety aspects are included as an integral part of the evaluation of suppliers to Vestas Wind Systems A/S. Evaluations are used to divide suppliers into the following three main groups:

- The proactive group – i.e. suppliers who are at the cutting edge of development. The members

of this group typically use an environmental management system that can be documented (such as ISO 14001).

- The neutral group – i.e. suppliers who maintain an environmentally acceptable level (this means that they work actively to comply with applicable legislation concerning the environment and occupational health and safety).
- The risk group – i.e. suppliers who have not provided sufficient information for the evaluation to be carried out, or who have provided information about aspects that Vestas considers to be questionable.

At present, Vestas does not demand that its suppliers are environmentally certified, but, in the evaluation as a whole, the company will look favourably upon suppliers who are proactive.



*In 2001, Vestas V47-660 kW wind turbines were installed in countries all over the world. The picture shows the Castle River Wind Farm in Canada.*



## Status and future – occupational health and safety

The certification of the occupational health and safety system in place at Vestas Wind Systems A/S' Danish factories clearly demonstrates that Vestas gives high priority to the safety and well-being of its employees. As a direct consequence of the OHSAS 18001 certification, Vestas Wind Systems A/S is obliged to implement improvements in the area of occupational health and safety continuously, in the same way as ISO 14001 certification obliges the company to implement continuous improvements in the field of the external environment. In addition, the OHSAS certification has meant that the existing occupational health and safety system has been improved in a number of areas. One important aspect that has been introduced is the registration of "near misses". Highlighting "near misses" is considered an important part of future work to reduce the incidence of injuries. The registrations allow Vestas to spot events and tendencies at an early stage, thus making the preventative work of the safety organisation more efficient. Another important aspect is the fact that the emergency response system in connection with accidents and injuries has been optimised. In this regard, a number of employees have completed courses in first aid and fire fighting, for example, so as to improve skills in these areas.

In 2001, the company has focused on reducing the incidence of injuries and absence due to illness. In connection with the OHSAS project, a new and more transparent system for the registration of absence has been introduced, and, at the same time, the company has started to run well-being interviews, which are intended to clarify the reasons for absence.

The interest in absence due to illness should not merely be considered a control measure. It is just as much an expression of Vestas' willingness to help its employees in the event that absence is caused by personal problems.

In addition, it should be noted that there are no outstanding issues between any of Vestas' sites and the Danish Directorate of Labour Inspection or other supervisory authorities.

### CAF project to be completed in 2002

Since autumn 1999, Vestas has been participating in a three-year research project in collaboration with the Working Environment and Change Management Centre (CAF) at the Industrial Medical Clinic in Herning, Denmark. The background for Vestas' participation in this

project is that, as a result of working with epoxy products, there is a risk that employees may develop over-sensitivity to epoxy. The primary aim of this project is thus to map the causes of epoxy-eczema so as to make it possible to optimise prevention of this condition.

The project basically consisted of three phases, the first two of which have been completed. The mapping and examination phase consisted of analysing the attitude of the organisation to safety, observing the performance of tasks, carrying out questionnaire surveys and, finally, performing an allergy study of the employees at the blade factory in Lem. One of the results of this phase is that it has proved possible to identify the specific products that are the primary cause of allergy among Vestas employees.

The second phase, which, as mentioned above, has also been completed, was the solution phase. During this phase, alterations were made to instructions in the use of protective media as well as to a number of technical conditions concerning a range of tools and equipment used at the company. The final phase, which is ongoing, involves implementing the pool of experience and initiatives into the organisation.

Vestas is pleased to note that the project has already produced positive results in that the number of incidences of epoxy allergy has fallen.

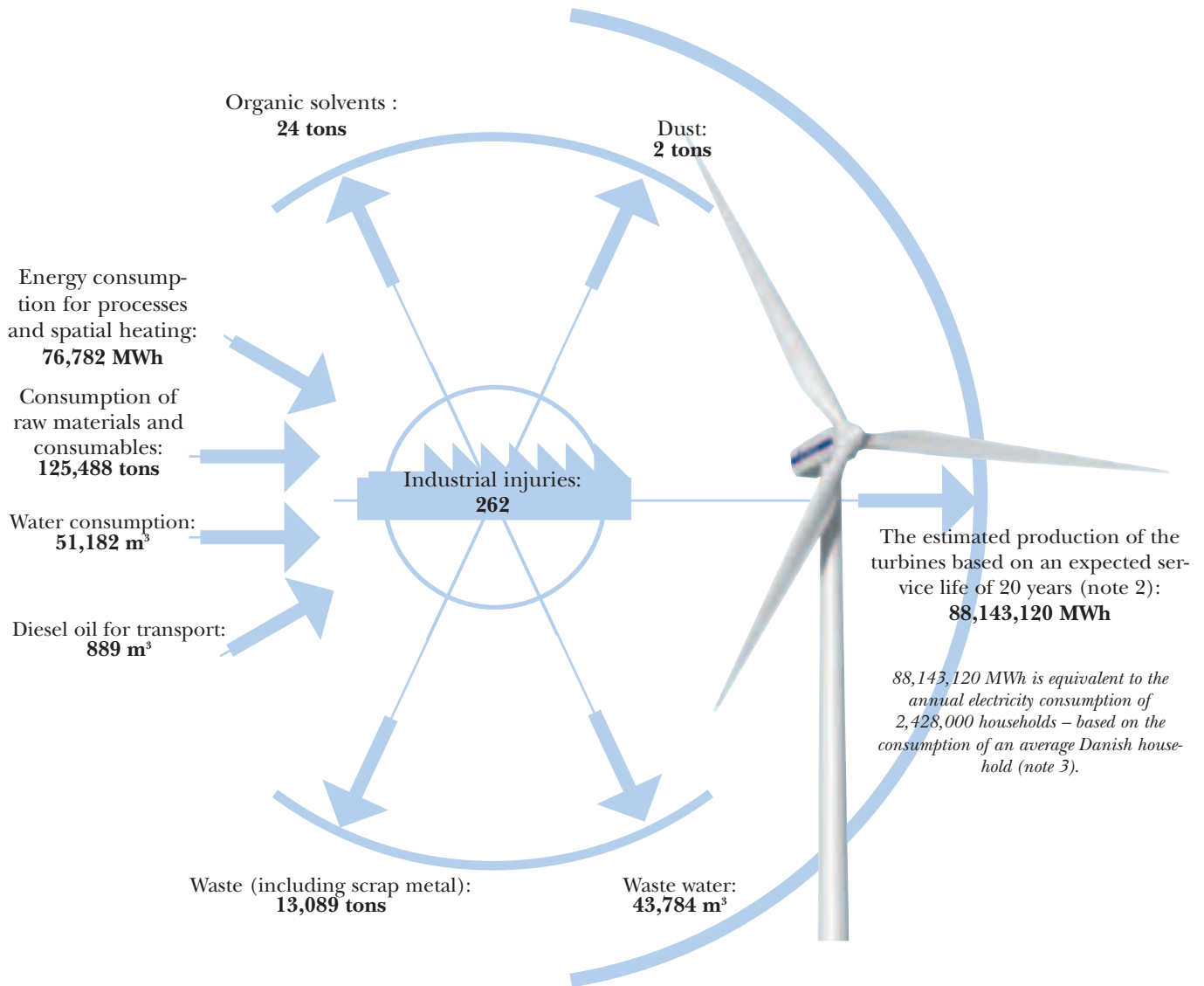
Before the project is completed in the middle of 2002, Vestas expects to have established a new induction course concerning safety aspects of working with epoxy. Moreover, Vestas is already using the results of the allergy study as the basis for replacing the substances and materials that have been proved to provoke allergy symptoms among employees.

# Input/output

Vestas considers the reporting of environmentally relevant data to be a very important aspect of the environmental and occupational health and safety system. Statements concerning waste, energy, industrial injuries and absence due to illness are published on the Vestas intranet so that decision-makers can remain up to date on the status of the set targets. The figure below illustrates the overall input and

output for Vestas Wind Systems A/S in Denmark. The output is shown as the total energy production of the turbines produced during their expected service life of 20 years. The data basis for the figure is detailed in the notes on pages 82 - 86, where totals for 2000 are also provided for comparison purposes. The development in both absolute and relative figures is presented on the following pages.

*This figure shows the general environmental input and output for Vestas. The figure is not a life cycle assessment, it is only a model showing input and output in connection with the production activities of Vestas Wind Systems A/S in Denmark. Supplementary environmental data are listed in the notes on pages 82 - 86.*



Note 2: This figure should be considered approximate, as it is based on a capacity factor of 30% and an expected service life of 20 years. The figure has been calculated on the basis of nacelles manufactured in Denmark and Germany (Husum). The reason why nacelles assembled in Husum have been included is that the greater part of the environmental impact of these turbines is generated at Danish sites (including production of blades and towers).  
 Note 3: Energistatistik 2000 (Energy Statistics 2000), which is published by the Danish Energy Agency, defines an average Danish household as consisting of four people living in a 120 m<sup>2</sup> residence. Consumption for 2000 is listed as 3,630 kWh per year.

# Vestas' environmental and occupational health and safety index

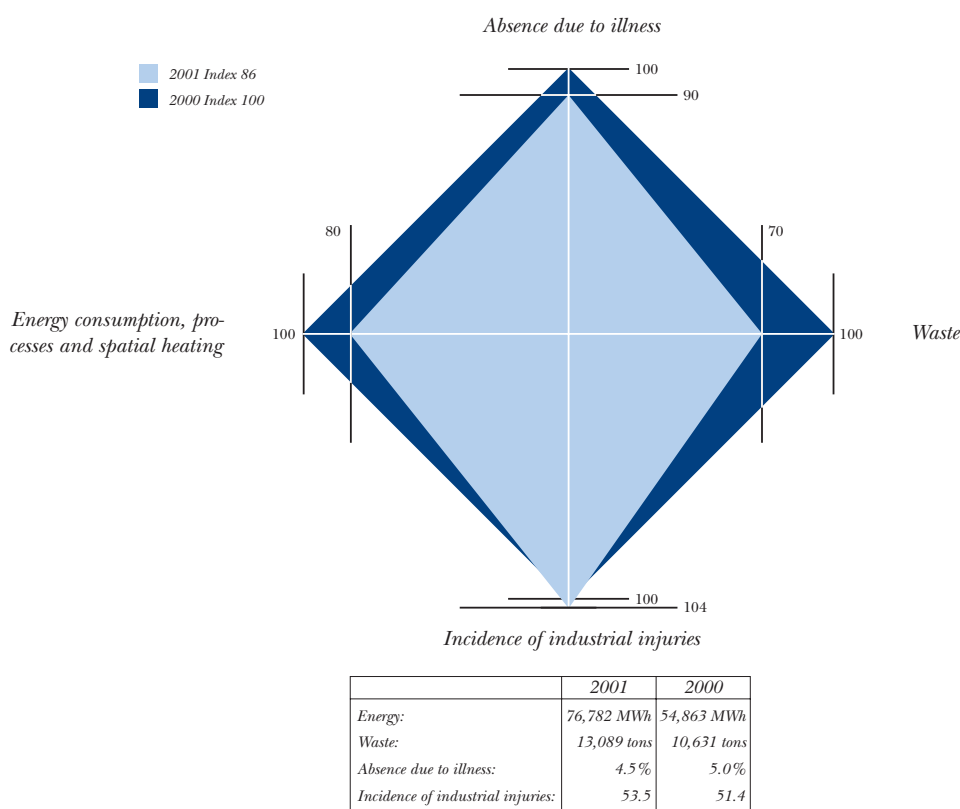
For the Danish sites, an overall environmental index has been introduced as a new initiative intended to clarify the net development in environmental and occupational health and safety aspects. The new index highlights the changes in the most important aspects in these areas.

In the figure below, the environmental index is illustrated as a parallelogram with 2000 constituting the base year.

Each corner of the figure symbolises one of the significant environmental and occupational health and safety aspects, and the length of the stated axes is defined by the individual index figures for energy, waste, industrial injuries and absence due to illness. Deterioration of any one aspect will thus

be represented as an extension of the relevant axis, while conversely, improvement will result in the index figure for the aspect in question will be moved closer to the centre of the coordinate system.

As mentioned previously, Vestas also considers product improvements to be one of the most significant environmental aspects. Improvements are reflected in the efficiency of the turbines and, as a result, in the estimated production of the turbines manufactured (see the output level in the figure on page 71). As the latter is used as a key figure in the indexing of volumes of energy and waste, improvements in the product are thus shown indirectly in the figure.



The figure shows the development of Vestas' environmental and occupational health and safety index. The estimated production of the turbines (the output total from the figure on page 71) and the number of working hours have been included as index numbers to correct for fluctuations in production. The associated table shows the development in the absolute figures for the individual parameters that are included in Vestas' environmental and occupational health and safety index. Supplementary data are listed in the notes on pages 82 – 86.

## Development in relation to 2000

As illustrated in the figure above, Vestas' overall environmental and occupational health and safety index for the most significant aspects has been reduced in relation to 2000. The individual index figures for other environmental aspects are also falling. Vestas therefore considers the overall development trend to be positive. However, the

results concerning the incidence of industrial injuries is not satisfactory, as these have increased by 4 per cent despite a high level of focus on this area. As a result, concerted efforts will be made in 2002 to reverse this trend.

The growth that Vestas has experienced is naturally also reflected in the development of the absolute figures for the various environmental aspects, in that these have generally risen. The fall in the index figures for the different environmental aspects is therefore attributable to improved

performance of the wind turbines manufactured, and to better exploitation of capacity and resources. The key figure that represents the expected production of the wind turbines manufactured has thus increased by as much as 75 per cent, which exceeds the increase in the absolute figures for the separate environmental aspects. The fall in absence due to illness is principally attributable to the attention that has been devoted to this area. For example, a new and improved method of registration was introduced over the past year. The results of these initiatives appear as a positive development in relation to the employees' sense of responsibility.

The rise in energy consumption for processes is mainly due to the growth at the blade factories in Lem and Nakskov, as blade production is, relatively speaking, the most energy intensive process at Vestas. The rise in energy consumption for heating rooms and water is attributable to extensions to buildings at the Lem, Nakskov, Ringkøbing and Viborg sites.

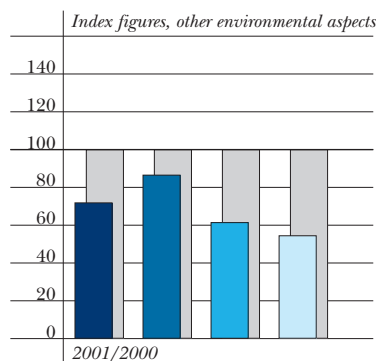
The sites' 2001 target of increasing the reusable proportion of waste is similarly reflected in the overall results in that the reusable proportion (excluding scrap metal and wood sold to employees) has risen from 8 to 11 per cent. Over the past year, the blade factories have experienced difficulties in disposing of specific types of combustible waste (including prepreg waste), in that it has not proved possible to break the waste down to sizes suitable for incineration. It has therefore been necessary to use this waste for landfill or to store it pending subsequent disposal. The landfill proportion has therefore risen in 2001.

In 2001, the manufacture of cabins was outsourced to sub-contractors. As a result, the emission of solvents from this source is no longer included in Vestas' data statements. The fact that the figure for such emissions remains almost unchanged is attributable to the repair programme at the Skjern department, where blades are coated.

The increase in the number of employees is the primary cause of the rise in water consumption. However, a part of this figure can also be attributed to the introduction of an air humidification system at the blade factories. The water used for this purpose is not disposed of as waste water, which is why – in contrast to last year – the volume of waste water is not directly proportional to water consumption.

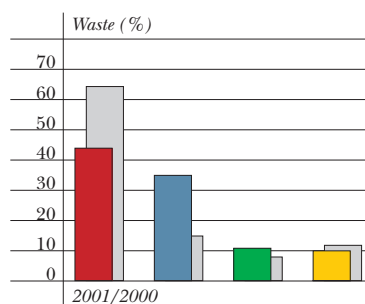
The development of the most significant environmental and occupational health and safety aspects for the individual sites is described on pages 74 - 80. In addition, the notes on pages 82 - 86 provide detailed information about relevant environmental aspects, including data con-

cerning resource consumption, emissions and volumes of waste. The information is presented to the extent to which it can be considered characteristic of the activities of the individual sites.



	2001	2000
Waste water:	43,784 m <sup>3</sup>	34,236 m <sup>3</sup>
Water consumption:	51,182 m <sup>3</sup>	34,236 m <sup>3</sup>
Diesel oil for transport:	889 m <sup>3</sup>	825 m <sup>3</sup>
Emissions into the air:	26 tons	29 tons

The figure shows the development in waste water volumes, water consumption, emissions into the air and consumption of diesel oil for transport. The estimated production of the turbines (the output total from the figure on page 71) has been included as index number to correct for fluctuations in production. The associated table shows the development in the absolute figures.



	2001	2000
Combustible:	2,463 tons	2,575 tons
Landfill:	1,921 tons	589 tons
Recycling:	624 tons	312 tons
Hazardous waste:	527 tons	488 tons

The figure illustrates the development of the percentage composition of volumes of waste generated by Vestas Wind Systems A/S. The associated table shows absolute figures. Supplementary data are listed in the notes on pages 82 - 86. The figures are exclusive of scrap metal and wood sold to employees.

# Company sites



## The Tower Factory in Varde

A wide range of changes were implemented at the tower factory in Varde in 2001. For reasons of logistics, the CNC processing of metal units has been moved to the machine factory in Lem, and the space created has been used for additional welding cabins. In addition, a new canteen has been built at the site.

Following the latest changes, the activities at the tower factory encompass the sawing, flame cutting, rolling and welding of metal units, primarily in connection with the manufacture of wind turbine towers.

interviews are to be used in an attempt to reverse the trend in 2002. The target of reducing the incidence of industrial injuries by 10 per cent was not achieved despite a year of strong focus on this area. For example, a comprehensive project has been carried out in collaboration with the Danish employee's health service with the intention of raising employee awareness of this area.

## Targets 2002

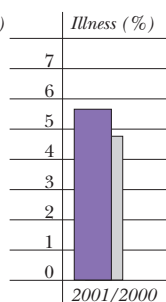
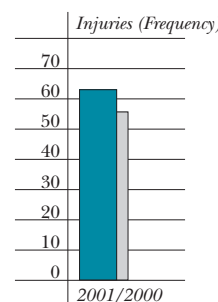
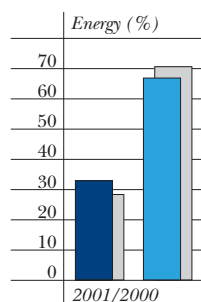
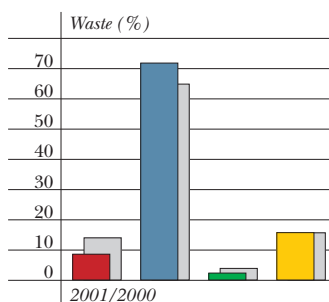
- Energy:** Reduce energy consumption for extraction from the work tables by 40%. Reduce energy consumption for cleaning work table filters by 30% (measured in relation to the number of operating hours).
- Noise:** Reduce external noise to the levels laid down in the environmental approval applicable from August 2002.
- Industrial injuries:** Reduce the incidence of industrial injuries by 15%.
- Absence:** Reduce absence due to illness by 15%.

<b>Address</b>
Engdraget 20 DK-6800 Varde
<b>Cadastral number</b>
No. 14 <sup>o</sup> Varde Købstads Markjorder
<b>Approvals from the authorities</b>
<ul style="list-style-type: none"> <li>• Environmental approval in accordance with paragraph 36, chapter 5 of the Environmental Protection Act, confirmed on 31 August 2000</li> <li>• Waste water permit in accordance with chapter 4 of the Environmental Protection Act, confirmed on 31 August 2000</li> <li>• Acceptance from the authorities of the most recent report received on 25 January 2001</li> </ul>
<b>Supervisory authorities</b>
External environment: The Municipality of Varde Occupational health and safety: The Directorate of Labour Inspection, County of Ribe
<b>Company type</b>
A11, cf. the Ministry of the Environment's statutory order no. 646 of 29 June 2001
<b>Result of company-specific survey</b>
Level 2 (cf. 2000 survey)
<b>Number of employees</b>
357 on 31 December 2001
<b>Person responsible for the site</b>
Keld Thomsen, Factory Manager

## Status 2001

During the past year, targets were established for four different areas at the tower factory. In the area of energy, the target of reducing energy consumption for compressed air by 25 per cent was not quite achieved, as a new compressor could not be installed until the end of the year. This saving in energy will therefore come into full effect in 2002. The site has also initiated a project intended to introduce energy management in relation to the requirements of Danish Standard – DS 2403. It is expected that this project will be completed towards the end of 2002. The work to reduce noise in the area ran according to plan, as almost all gas and diesel powered trucks have been replaced with electric trucks. Initiatives to reduce noise levels from the site will continue in 2002 in line with the agreed programmes. The proportion of waste used as landfill has risen as the volume of slag from powder-welding has increased on account of the rise in production. As regards occupational health and safety, particular focus has been placed on absence due to illness and the incidence of industrial injuries. The target of reducing absence due to illness by 10 per cent was not achieved, in that the result was actually an increase in relation to 2000. New initiatives such as the holding of well-being

	2001	2000
■ Combustible:	37 tons	54 tons
■ Landfill:	332 tons	245 tons
■ Recycling:	15 tons	14 tons
■ Hazardous waste:	75 tons	62 tons
■ Spatial heating:	2,757 MWh	2,315 MWh
■ Processes:	5,596 MWh	5,552 MWh
■ Industrial injuries:	27	24
■ Absence due to illness:	5.7%	4.8%



The figures and the associated table show developments concerning waste, energy, industrial injuries and absence due to illness for the tower factory in Varde. The figures for waste are exclusive of scrap metal and wood sold to employees. Supplementary environmental data for this site are listed in the notes on pages 82 - 86.

# Company sites

## The Machine and Controller Factory in Lem

As a result of the growth of the company, 2001 was the year when Vestas separated the activities of the machine and controller factory, creating two units, each with its own factory manager. The machine factory primarily carries out CNC processing, but also includes a section that manufactures spars for turbine blades. The controller factory exclusively manufactures electrical control systems for Vestas' wind turbines. Other important changes in 2001 included the transfer of CNC tasks from Varde to the machine factory, and the transfer of the steel workshop under the production development department to the Videbæk site.

### Status 2001

Within the field of energy, the target to introduce control of energy-consuming installations with a view to cutting energy consumption was only partially achieved, in that the project, which has to do with the establishment of a Central Situation Control and Management (CTS) system, is not expected to be completed until the middle of 2002. The target for the area of waste – increasing the proportion of reusable waste by 5 per cent – was almost achieved, as the figure reached was 4.3 per cent. In spite of the increase in activity, the volume of hazardous waste actually fell by more than 30 per cent (measured in absolute figures). This is primarily attributable to the optimisation of the use of cooling and lubrication agents in connection with CNC processes. In addition, it should be noted that the use of prepreg has been optimised in the cutting process as endless rolls are now used. This means that the amount of prepreg disposed of as waste has been reduced. As mentioned previously, prepreg waste is included in the landfill fraction for 2001, which is why this figure has risen.

Unfortunately, it was not possible to maintain the same low incidence of industrial injuries, so the

target for this area was not achieved. As a part of the efforts to achieve improvements, the site has implemented what are known as safety audits, which involve safety teams investigating each others' departments. The target of reducing absence due to illness by 10 per cent was achieved. This is primarily attributable to the introduction of well-being interviews, as these have generated increased interest in the area.

### Targets 2002

#### The controller factory:

**Energy:** Reduce energy consumption for ventilation in halls 3a and 3b by 25%.

**Waste:** Introduce an environmentally friendly alternative for the protection of control units during storage and transport.

**Industrial injuries:** Reduce the incidence of industrial injuries by 5%.

**Absence:** Reduce absence due to illness by 5%.

#### The machine factory:

**Energy:** Reduce the hourly energy consumption for machine extraction by 15%.

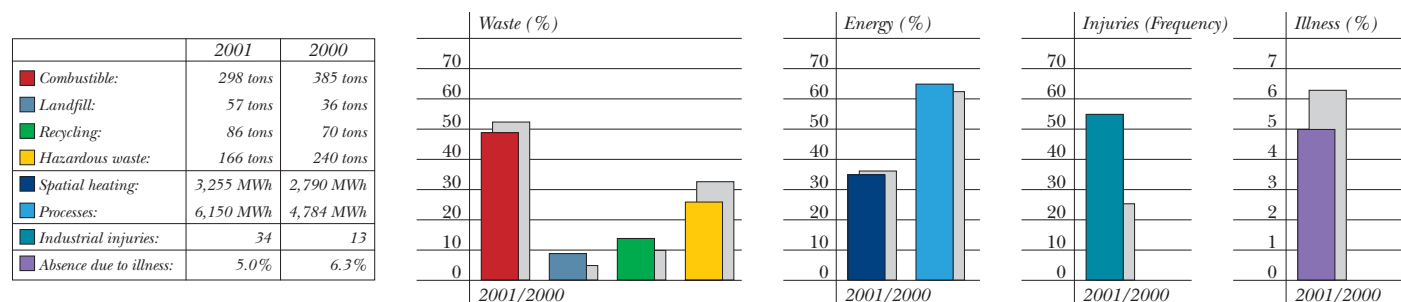
**Waste:** Reduce the waste fraction of "oil emulsions" by 15% (excluding the emptying and cleaning of the central installation).

**Industrial injuries:** Reduce the incidence of industrial injuries by 35%.

**Absence:** Reduce absence due to illness by 10%.



<b>Address</b>	Smed Hansens Vej 27/ Nylandsvej 35 DK-6940 Lem
<b>Cadastral number</b>	No. 38 <sup>o</sup> , 38 <sup>o</sup> , 124 <sup>o</sup> , 124 <sup>o</sup> , 164 (Smed Hansens Vej 27) No. 38 <sup>o</sup> (Nylandsvej 35) Øster Lem by, Sdr. Lem
<b>Approvals from the authorities</b>	The machine factory: • Environmental approval in accordance with paragraph 36, chapter 5 of the Environmental Protection Act, received on 6 December 1996 • Waste water permit in accordance with chapter 4 of the Environmental Protection Act, received on 6 December 1996 • Acceptance from the authorities of the most recent report received on 21 April 2001 The controller factory: • Acceptance from the authorities of the most recent report received on 21 June 2000
<b>Supervisory authorities</b>	External environment: The Municipality of Ringkøbing Occupational health and safety: The Directorate of Labour Inspection, County of Ringkøbing
<b>Company type</b>	The machine factory: A11, cf. the Ministry of the Environment's statutory order no. 646 of 29 June 2001 The controller factory: A54, cf. the Ministry of the Environment's statutory order no. 367 of 10 May 1992
<b>Result of company-specific survey</b>	Company-specific survey not yet performed
<b>Number of employees</b>	473 on 31 December 2001
<b>Persons responsible for the site</b>	The machine factory: Jens Karkov Jakobsen, Factory Manager The controller factory: Jesper Vonge Jensen, Factory Manager



The figures and the associated table show developments concerning waste, energy, industrial injuries and absence due to illness for the machine and controller factory in Lem. The figures for waste are exclusive of scrap metal and wood sold to employees. Supplementary environmental data for this site are listed in the notes on pages 82 - 86.

# Company sites



## The Assembly Factory in Viborg

Work at this site is exclusively devoted to the assembly of nacelles for the Vestas V47-660 kW and Vestas V52-850 kW wind turbines, as Vestas chose to outsource cabin production activities in 2001 on account of a need to expand the assembly department. This expansion of the assembly department led to an extension of the storage facilities.

### Status 2001

Previously, oil consumption for spatial heating at the site was high, but by converting to district heating it proved possible to reduce oil consumption by around 33 per cent. As such, the target of a 50 per cent reduction was not achieved. Total energy consumption for spatial heating has increased on account of the extension to the buildings.

The target for the area of waste – which was to increase the reusable fraction by 10 per cent – was not achieved. The reason for this is that the fibreglass department, which has now been closed, previously sent large volumes of cardboard and plastic to recycling facilities. On a more positive note, the system of pre-separation of waste at source has been accorded high priority, and this system functions well at the site. This is also the reason why it nevertheless proved possible to increase the proportion of reusable waste. The volume of waste used as landfill has increased, as some construction waste has been included in this category.

Another consequence of the closure of the fibreglass department is that the emission of organic solvents from the factory has been greatly reduced. In order to improve the control and monitoring of processes involving electricity and heat, the site has set up a CTS (Central Situation Control and Management) system. Experience shows that a system of this kind can produce energy savings of up to 10 per cent of the total consumption.

The site is located in the immediate vicinity of a private residential area, and high priority has therefore been given to resolving issues concerning traffic and noise.

As regards occupational health and safety, high emphasis on following up on industrial injuries made it possible to reduce the incidence of such by 8 per cent. The target for 2001 – a 10 per cent reduction – was thus almost achieved.

Similarly, the holding of well-being interviews and the introduction of a new and improved method for registering absence helped to reduce absence due to illness by 7 per cent.

In 2001, the Danish Directorate of Labour Inspection carried out a company-specific survey, which resulted in the assembly factory being classed as a Level 1 company.

### Targets 2002

**Energy:** Reduce electricity consumption for the dehumidification of nacelles by around one third (per nacelle).

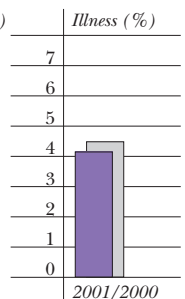
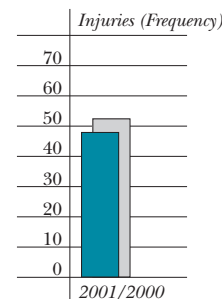
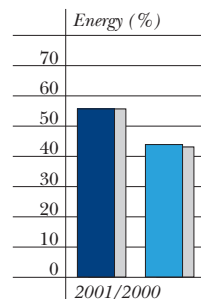
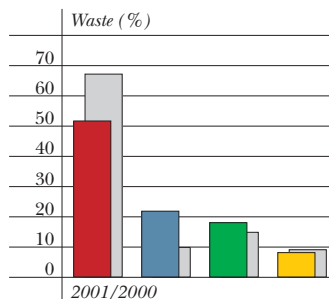
**Waste:** Establish an environmental building for processing waste.

**Industrial injuries:** Reduce the incidence of industrial injuries by 10%.

**Absence:** Reduce absence due to illness by 5%.

<b>Address</b>	
Marsk Stigs Vej 4 DK-8800 Viborg	
<b>Cadastral number</b>	
No. 65 and 119* Viborg Markjorder	
<b>Approvals from the authorities</b>	
• Environmental approval in accordance with paragraph 36, chapter 5 of the Environmental Protection Act, received on 14 March 2001	
<b>Supervisory authorities</b>	
External environment: The Municipality of Viborg Occupational health and safety: The Directorate of Labour Inspection, County of Viborg	
<b>Company type</b>	
A53, cf. the Ministry of the Environment's statutory order no. 367 of 10 May 1992 (the company is approved as type D9, cf. the Ministry of the Environment's statutory order no. 807 of 25 October 1999)	
<b>Result of company-specific survey</b>	
Level 1 (cf. 2001 survey)	
<b>Number of employees</b>	
264 on 31 December 2001	
<b>Person responsible for the site</b>	
Ole Staal, Factory Manager	

	2001	2000
■ Combustible:	142 tons	105 tons
■ Landfill:	59 tons	16 tons
■ Recycling:	50 tons	23 tons
■ Hazardous waste:	23 tons	14 tons
■ Spatial heating:	2,798 MWh	1,961 MWh
■ Processes:	2,185 MWh	1,569 MWh
■ Industrial injuries:	17	10
■ Absence due to illness:	4.2%	4.5%



The figures and the associated table show developments concerning waste, energy, industrial injuries and absence due to illness for the assembly factory in Viborg. The figures for waste are exclusive of scrap metal and wood sold to employees. Supplementary environmental data for this site are listed in the notes on pages 82 - 86.

# Company sites

## The Assembly Factory in Ringkøbing

Activity at this site consists primarily of assembling nacelles for MW class wind turbines. In 2001, on account of the increased growth of Vestas, a new 5,400 m<sup>2</sup> assembly hall was constructed. It was also in 2001 that the Vestas research and development department and sales subsidiaries moved from Lem to new offices in Ringkøbing.

### Status 2001

In 2001, special focus was devoted to energy consumption and waste processing. The target in the field of energy was to reduce natural gas consumption in the newly constructed assembly hall by 25 per cent. This was achieved by installing radiated heat instead of heating the hall in a conventional manner. The increase in total energy consumption at the site is attributable to the physical extension of the buildings and increases in production. The target of increasing the reusable proportion of waste by 5 per cent was not achieved. This is exclusively attributable to the fact that, in contrast to previous years, the household waste from the canteen has been included in the figure for 2001. If the waste from the canteen had not been included in the statement, the reusable proportion of waste would have increased by 9 per cent.

This is primarily attributable to the fact that the employees worked very hard to ensure the pre-separation of plastic, paper, cardboard and other reusable materials.

As regards occupational health and safety, it proved possible to reduce absence due to illness by 27 per cent, which meant that the target was easily achieved. This fall is primarily due to the increased focus on the area. Initiatives in this area included the introduction of well-being interviews. These are used to identify the reason for the individual employees' absence. At the same time, the system is a good tool for implementing

measures aimed at helping employees to return to the workplace following illness. One example of this is that foremen now evaluate the need for temporarily assigning the employee to a different job.

Another 2001 target was to reduce the incidence of industrial injuries by 10 per cent. This, too, was achieved in that the final result was, in fact, a 32 per cent reduction. On every possible occasion, employees have been reminded that safety is to have the highest priority. The safety teams have worked very hard to analyse the injuries that have occurred. This has resulted in a highlighting of the preventative work.



### Targets 2002

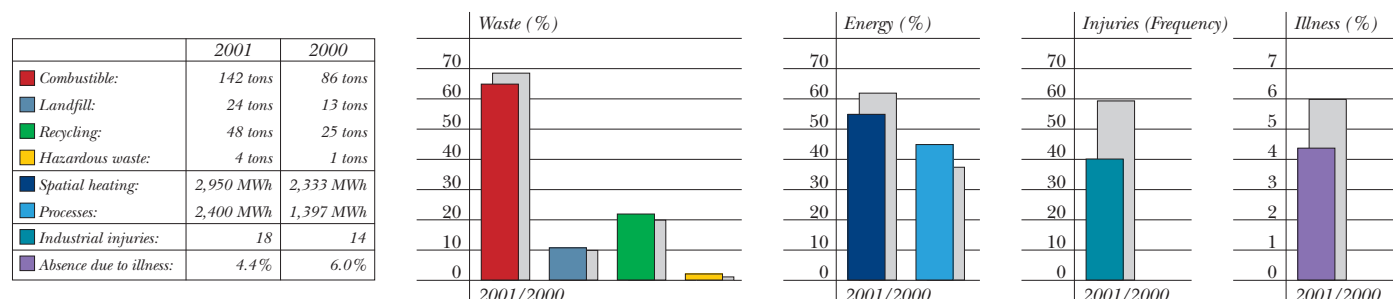
**Energy:** Reduce natural gas consumption in the production halls by 5%.

**Waste:** Introduce an environmentally friendly alternative for the protection of control units during storage and transport.

**Industrial injuries:** Reduce the incidence of industrial injuries by 10%.

**Absence:** Reduce absence due to illness by 10%.

<b>Address</b>
Smed Sørensens Vej 5 DK-6950 Ringkøbing
<b>Cadastral number</b>
No. 275 <sup>b</sup> , 275 <sup>c</sup> , 275 <sup>d</sup> , 275 <sup>e</sup> , 275 <sup>f</sup> , 275 <sup>g</sup> , 275 <sup>h</sup> , 275 <sup>i</sup> and part of 275 <sup>j</sup> , Ringkøbing Bygrunde
<b>Approvals from the authorities</b>
• Acceptance from the authorities of the most recent report received on 5 July 2001 • Waste water permit received 17 May 2001
<b>Supervisory authorities</b>
External environment: The Municipality of Ringkøbing Occupational health and safety: The Directorate of Labour Inspection, County of Ringkøbing
<b>Company type</b>
A53, cf. the Ministry of the Environment's statutory order no. 367 of 10 May 1992
<b>Result of company-specific survey</b>
Company-specific survey not yet performed.
<b>Number of employees</b>
428 on 31 December 2001
<b>Person responsible for the site</b>
Jan Didriksen, Factory Manager



The figures and the associated table show developments concerning waste, energy, industrial injuries and absence due to illness for the assembly factory in Ringkøbing. The figures for waste are exclusive of scrap metal and wood sold to employees. Supplementary environmental data for this site are listed in the notes on pages 82 - 86.



# Company sites



## Blade Factories I and II in Lem

In 2001, the organisation of the blade factory in Lem was divided in two, so there are now two facilities: blade factories I and II. Blade factory I manufactures spars and assembly fittings, and assembles blade shells for the 23 and 25-metre blades, while blade factory II is responsible for finishing, storage and the repair department in Skjern.

Repairs, which were carried out in Spjald in 2000, have now been transferred to new premises in Tim. In connection with the establishment of blade factory I, a factory area has been remodelled and is now used for a new manufacturing method for assembly fittings.

industrial injuries in 2001. Absence due to illness was, however, reduced by 22 per cent. This was primarily attributable to increased focus on the area, including the introduction of more transparent absence statistics, which were followed-up by well-being interviews. The target of a 10 per cent reduction was thus achieved.

### Targets 2002

**Energy:** Map energy consumption for the hardening of 23 and 25-metre blade shells and spars with a view to optimising kiln control.

**Waste:** Increase the reusable fraction to 14%.

**Industrial injuries:** Reduce the incidence of industrial injuries by 10% at each of the blade factories.

**Absence:** Reduce absence due to illness by 10% at each of the blade factories.

### Status 2001

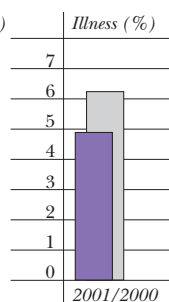
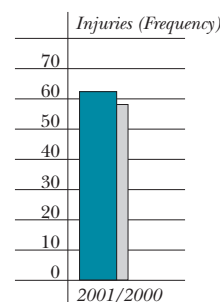
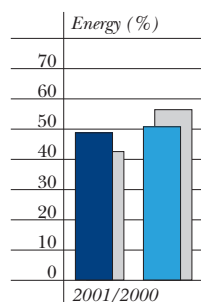
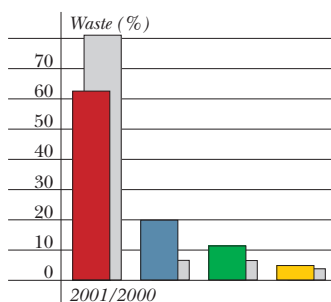
The target of reducing electricity consumption for compressed air by 10 per cent was achieved by optimising the settings of the compressor. This made it possible to lower the average working pressure. Energy consumption at the blade factories has increased on account of increased production and the extensions of the buildings. The target of increasing the reusable proportion of waste by 4 per cent was achieved, primarily on account of the employees' concerted efforts to optimise the pre-separation of waste at source. As mentioned previously, the landfill fraction increased as prepreg waste has been included in this category in 2001.

In 2001, it also proved possible to find water-based replacements for a range of mould preparation agents that contain organic solvents.

In connection with the new construction on the site, Vestas has removed polluted soil from the company premises. This pollution stemmed from the activities of the previous owner of the site. Despite great efforts, including the involvement of the Industrial Medical Clinic in Herning, it did not prove possible to reduce the incidence of

<b>Address</b>	
Smed Hansens Vej 9 - 23 DK-6940 Lem Industrivej 20 DK-6900 Skjern	
<b>Cadastral number</b>	
No. 125, 127, 134, 135, 136 and 138 Øster Lem By, Sdr. Lem 5 <sup>a</sup> Engsig, Skjern jorde	
<b>Approvals from the authorities</b>	
<ul style="list-style-type: none"> <li>• Environmental approval in accordance with paragraph 36, chapter 5 of the Environmental Protection Act, received on 29 October 1999 for the factories in Lem, and on 17 August 2001 for the department in Skjern.</li> <li>• Waste water permit in accordance with chapter 4 of the Environmental Protection Act, received on 29 October 1999</li> <li>• Acceptance from the authorities of the most recent report received on 26 October 2001</li> </ul>	
<b>Supervisory authorities</b>	
External environment: The Municipalities of Ringkøbing and Skjern Occupational health and safety: The Directorate of Labour Inspection, County of Ringkøbing	
<b>Company type</b>	
D9 (Lem) and D12 (Skjern), cf. the Ministry of the Environment's statutory order no. 646 of 29 June 2001	
<b>Result of company-specific survey</b>	
Level 1 (cf. 1999 survey). No company-specific survey has been carried out in Skjern.	
<b>Number of employees</b>	
973 on 31 December 2001	
<b>Persons responsible for the site</b>	
Blade factory I: Bjarne Sandager Nielsen, Factory Manager Blade factory II (including the department in Skjern): Torben Ting Madsen, Factory Manager	

	2001	2000
■ Combustible:	1,419 tons	1,372 tons
■ Landfill:	448 tons	119 tons
■ Recycling:	264 tons	124 tons
■ Hazardous waste:	104 tons	65 tons
■ Spatial heating:	12,277 MWh	6,602 MWh
■ Processes:	12,723 MWh	8,716 MWh
■ Industrial injuries:	94	63
■ Absence due to illness:	4.9%	6.3%



The figures and the associated table show developments concerning waste, energy, industrial injuries and absence due to illness for the blade factories in Lem. The figures for waste are exclusive of scrap metal and wood sold to employees. Supplementary environmental data for this site are listed in the notes on pages 82 - 86.

# Company sites

## The Blade Factory in Nakskov

The blade factory in Nakskov manufactures 32 and 39-metre blades for the MW class wind turbines. In spring 2001, a 4,000 m<sup>2</sup> extension to the production hall was opened. As a result, Vestas now has around 26,000 m<sup>2</sup> of buildings in Nakskov.

### Status 2001

The blade factory in Nakskov experienced appreciable growth in 2001. Therefore, resource consumption and waste generation have both risen. As regards energy, the target for 2001 was to complete an energy mapping process, and this target has been achieved. The energy mapping is to be used to identify special areas of initiative to allow reductions in energy consumption.

In the area of waste, the target of full implementation of the system for pre-separating waste at source has been achieved. In the future, the primary task will be to ensure that the system is maintained – which will involve ensuring that all new employees complete special training in this area. During 2001, acetone and the turpentine-based polishing paste were replaced with water-based systems. This constitutes an improvement in both environmental and occupational health and safety aspects, as emissions into the workplace and the surrounding areas have thus been reduced. The main reason why the landfill fraction has increased is that the Municipality of Nakskov – on account of problems with the breakdown of combustible waste – has been obliged to redirect a proportion of such waste to landfill sites.

The introduction of protective gloves and increased emphasis on the use of protective goggles made a major contribution to the 6 per cent decrease in the incidence of industrial injuries. However, the target was to achieve a reduction of 30 per cent. Work in this direction is therefore to continue. Although the incidence of industrial injuries has fallen, absence due to illness has unfortunately risen compared to last year. As a part of the work

to reduce absence due to illness, Vestas will carry out well-being interviews with the employees and use regular information meetings to attempt to influence employee attitudes. These initiatives are to be seen as a part of the work to reinforce the employees' feeling of responsibility and to raise the level of information at the site.

In 2001, the Danish Directorate of Labour Inspection carried out a company-specific survey, which resulted in the blade factory being classed as a Level 1 company.

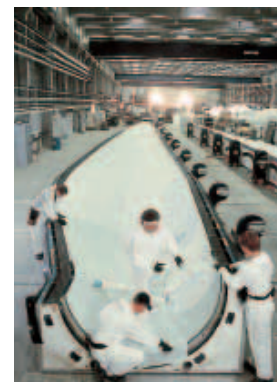
### Targets 2002

**Energy:** Reduce electricity consumption for cooling facilities by at least 20%.

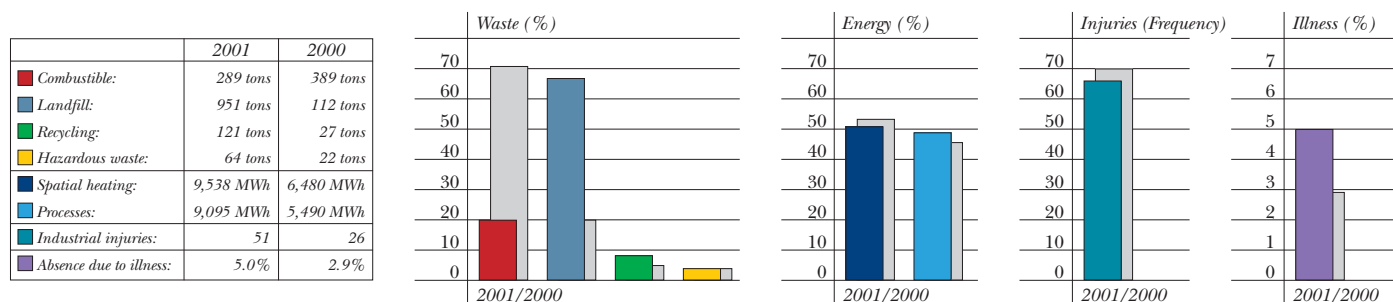
**Waste:** Reduce the share of waste deposited as landfill by 25%.

**Industrial injuries:** Reduce the incidence of industrial injuries by 15%.

**Absence:** Reduce absence due to illness by 10%.



<b>Address</b>	Vingevej 1 DK-4900 Nakskov
<b>Cadastral number</b>	No. 875 <sup>o</sup> and 876 Nakskov Bygrunde, and 1 <sup>o</sup> Stensø, Skt. Nikolaj
<b>Approvals from the authorities</b>	<ul style="list-style-type: none"> <li>• Environmental approval in accordance with paragraph 36, chapter 5 of the Environmental Protection Act, received on 21 October 1999</li> <li>• Waste water permit in accordance with chapter 4 of the Environmental Protection Act, received on 21 October 1999</li> <li>• Acceptance from the authorities of the most recent report received on 19 July 2001</li> </ul>
<b>Supervisory authorities</b>	External environment: The Municipality of Nakskov Occupational health and safety: The Directorate of Labour Inspection, County of Storstrøm
<b>Company type</b>	D9, cf. the Ministry of the Environment's statutory order no. 794 of 9 December 1991
<b>Result of company-specific survey</b>	Level 1 (cf. 2001 survey)
<b>Number of employees</b>	573 on 31 December 2001
<b>Person responsible for the site</b>	Hans Jespersen, Factory Manager



The figures and the associated table show developments concerning waste, energy, industrial injuries and absence due to illness for the blade factory in Nakskov. The figures for waste are exclusive of scrap metal and wood sold to employees. Supplementary environmental data for this site are listed in the notes on pages 82 - 86.

# Company sites



## The Service, Steel and Composite Workshop in Videbæk

The service department deals with the erection and servicing of Vestas wind turbines. The site also houses the steel and composite workshop, which is a part of the production development department in Lem. The steel and composite workshop primarily manufactures tools used in Vestas' blade production.

In 2001, the steel workshop was moved from Lem to Videbæk in connection with a thorough renovation of the building on the site. In addition, an extension to an existing building has provided the composite workshop with extra space.

### Status 2001

The target of reducing oil consumption by 25 per cent was not achieved, as the conversion to natural gas will not be completed until 2002.

Over the past year, a project was initiated for the structuring of waste management in connection with the repair and maintenance of turbines. The project was not completed in 2001 as the project manager was ill. The target for the project will therefore finally be achieved in 2002. The incidence of industrial injuries in the service department was reduced by 37 per cent, and by as much as 43 per cent in the steel and composite workshop. As such, the target for 2001 was achieved. However, Vestas is of the opinion that the incidence of industrial injuries in the steel and composite workshop is still too high. Therefore, all employees paid by the hour in the production development department have completed a training course that focused on industrial injuries. The target of reducing absence due to illness in the service department to less than 2 per cent was not achieved as a number of employees are on extended sick leave. However, as in 2000, such absence remains at a very low level.

No specific targets were set up for absence due to illness from the steel and composite workshop for 2001, but the department did succeed in reducing such absence by 25 per cent. Work continues at the site on the project to replace acetone with more environmentally friendly cleaning agents. It has already proved possible to phase out the use of acetone in the composite workshop production rooms.

### Targets 2002

**Energy:** Reduce energy consumption for vacuum pumps in the composite workshop by at least 25% (measured in relation to the surface area of the blade moulds produced).

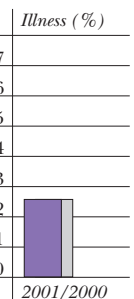
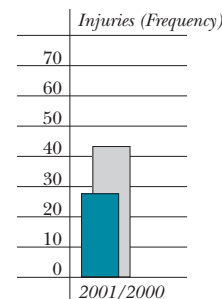
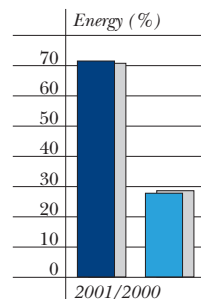
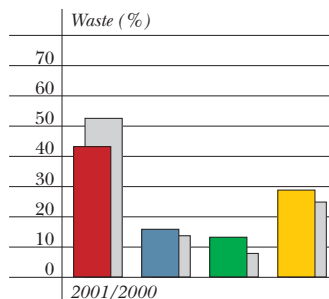
**Waste:** Reduce the volume of epoxy waste from the composite workshop by at least 25% (measured in relation to the consumption of epoxy resin and hardener).

**Industrial injuries:** Reduce the incidence of industrial injuries by 3% in the service department and by 30% in the steel and composite workshop.

**Absence:** Reduce absence due to illness to less than 2% in the service department and by 10% in the steel and composite workshop.

<b>Address</b>	
Lyngvej 6 DK-6920 Videbæk	
<b>Cadastral number</b>	
No. 5- Videbæk by, Videbæk	
<b>Approvals from the authorities</b>	
<ul style="list-style-type: none"> <li>Environmental approval in accordance with paragraph 36, chapter 5 of the Environmental Protection Act, received on 21 May 2001</li> <li>Acceptance from the authorities of the most recent report received on 3 October 2001</li> </ul>	
<b>Supervisory authorities</b>	
External environment: The Municipality of Videbæk Occupational health and safety: The Directorate of Labour Inspection, County of Ringkjøbing	
<b>Company type</b>	
D9, cf. the Ministry of the Environment's statutory order no. 646 of 29 June 2001	
<b>Result of company-specific survey</b>	
Company-specific survey not yet performed.	
<b>Number of employees</b>	
548 on 31 December 2001	
<b>Person responsible for the site</b>	
Knud Bjarne Hansen, Group Project and Service Manager	

	2001	2000
■ Combustible:	136 tons	184 tons
■ Landfill:	50 tons	47 tons
■ Recycling:	40 tons	28 tons
■ Hazardous waste:	91 tons	85 tons
■ Spatial heating:	3,619 MWh	3,460 MWh
■ Processes:	1,439 MWh	1,414 MWh
■ Industrial injuries:	21	23
■ Absence due to illness:	2.6%	2.6%



The figures and the associated table show developments concerning waste, energy, industrial injuries and absence due to illness for the service, steel and composite workshop in Videbæk. The figures for waste are exclusive of scrap metal and wood sold to employees. Supplementary environmental data for this site are listed in the notes on pages 82 - 86.

In December 2001, Vestas tested the erection method that is to be used to install the offshore wind turbines at Horns Rev.



# Environmental notes

## Raw materials and consumables

Vestas considers the raw materials and consumables listed below to be the most significant as they are distinctive of the activities at the sites from the perspectives of both resources and occupational

health and safety. The nature of the environmental impacts is more indirect, as the emissions associated with the extraction of raw materials, for example, contribute to the greenhouse effect.

Environmentally important raw materials and consumables per site	The tower factory in Varde							2001	2000		
	The machine and controller factory in Lem		The assembly factory in Viborg		The assembly factory in Ringkøbing		Blade factories I and II in Lem <sup>1)</sup>		The blade factory in Nakskov		The service, steel and composite workshop in Videbæk
Iron/steel (t)	90,406 <sup>7)</sup>	3,064	59	101	-	-	-	93,630	57,499		
Cast iron (t)	25	15,104	-	-	-	-	-	15,129	9,161		
Aluminium (t)	20	706	11	4	-	-	2	743	1,054		
Brass (t)	< 1	-	-	-	-	-	-	< 1	20		
Copper (t)	181	-	-	-	-	-	-	181	210		
Cables (t)	-	52	1 <sup>5)</sup>	919	36	14	< 1	1,022	872		
Welding wire (t)	242	1	-	-	-	-	1	244	212		
Powder for powder welding (t)	217	-	-	-	-	-	-	217	131		
Oil products (1,000 litres) <sup>2)</sup>	51	40	343	148	1	-	< 1	583	359		
Prepreg (t)	-	686	-	-	4,819	2,670	13	8,188	5,617		
Adhesive and coating products (t) (epoxy and PUR)	-	5	< 1	-	1,717 <sup>6a)</sup>	487	23	2,232	1,026		
Fibreglass (t)	-	34	-	-	2,076	155	13	2,278	888		
Polymer materials (t) <sup>3)</sup>	-	39	1	-	586	321	4	951	549		
Mould preparation agents (t) <sup>4)</sup>	-	< 1	-	-	2	1	< 1	3	3		
Polyester raw materials (coat, base and hardener) (t)	-	-	35	-	-	-	-	35	182		
Paint products (for coating blades) (t)	-	-	-	-	36 <sup>6b)</sup>	-	-	36	6		
Acetone and thinner (t)	-	1	2	-	13 <sup>6c)</sup>	-	-	16	27		
Total (t)	91,142	19,732	452	1,172	9,286	3,648	56	125,488	77,816		

<sup>1)</sup> Including the departments in Tim and Skjern.

<sup>2)</sup> This category comprises: gear oil, hydraulic oil, coolants and lubricants, lubricating oil and grease and oil-based anti-corrosion agents. See also the accounting principles used.

<sup>3)</sup> This category comprises: absorbent chips, peel-ply, vacuum foil, separating foil, PMI and PVC foam.

<sup>4)</sup> This category comprises: release agents, cleaning agents and sealants.

<sup>5)</sup> The cutting of cables used in Viborg is carried out at the assembly factory in Ringkøbing.

<sup>6)</sup> Of which, the volumes from the department in Skjern are: <sup>a)</sup> 2 tons, <sup>b)</sup> 31 tons, <sup>c)</sup> 7 tons.

<sup>7)</sup> Of which, 18,968 tons is processed by sub-contractors.

### The environmental accounting principles used to calculate consumption of significant raw materials and consumables:

Raw materials are stated in the statement on the basis of consumption drawings from stocks to manufacturing in the first phase of manufacture as recorded in the company's ordinary registration systems and consumption calculated according to inventories used for the manufacture of moulds.

Consumption is stated in the statement on the basis of supplier statements and own lists of quantities delivered in the financial year collected decentrally per site respectively.

Materiality is fixed on the basis of approvals by the authorities and the authorities' confirming statements concerning the environmental relevance of actual types of environmental data followed by a selection in relation to material quantities consumed compared with the activities carried out on the sites.

# Environmental notes

## Energy and water consumption

Vestas considers energy consumption to be one of the most significant environmental aspects, as the indirect environmental impacts from non-renewable sources of energy (such as fossil fuels) contribute

to the greenhouse effect (on account of CO<sub>2</sub> emissions) and acid rain (on account of emissions of SO<sub>2</sub> and NO<sub>x</sub>).

Consumption of energy and water	The tower factory in Varde								2001		2000		
	The machine and controller factory in Lem				The assembly factory in Viborg		The assembly factory in Ringkøbing		Blade factories I and II in Lem <sup>1)</sup>		The blade factory in Nakskov		The service, steel and composite workshop in Videbæk
<b>● Process energy</b>													
Electricity (MWh)	5,457	6,150	2,185	2,400	12,723 <sup>6a)</sup>	9,095	1,439	39,449	28,830				
Gas (MWh)	139	-	-	-	-	-	-	139	92				
Total process energy (MWh)	5,596	6,150	2,185	2,400	12,723	9,095	1,439	39,588	28,922				
<b>● Energy for heating rooms and water</b>													
Electricity (MWh) <sup>2)</sup>	166	389	20	147	1,560 <sup>6b)</sup>	335	151	2,768	1,925				
Gas (MWh) <sup>3)</sup>	2,503	-	-	1,805	1,403 <sup>6c)</sup>	-	-	5,711	4,237				
District Heating (MWh)	88	2,866	2,347	776	9,202	8,487	-	23,766	15,551				
Oil (MWh) <sup>4)</sup>	-	-	431	222	112	716	3,468	4,949	4,228				
Total energy for heating rooms and water (MWh)	2,757	3,255	2,798	2,950	12,277	9,538	3,619	37,194	25,941				
Total (MWh)	8,353	9,405	4,983	5,350	25,000	18,633	5,058	76,782	54,863				
<b>Diesel oil (m<sup>3</sup>)<sup>5)</sup></b>	44	33	30	119	153 <sup>6d)</sup>	47	463	889	825				
<b>Water (m<sup>3</sup>)</b>	6,829	7,755	2,736	5,418	14,511 <sup>6e)</sup>	11,933	2,000	51,182	34,236				

<sup>1)</sup> Including the departments in Tim and Skjern.

<sup>2)</sup> Calculated on the basis of the model used by the Danish Tax Authorities.

<sup>3)</sup> Calculated on the basis of the ratio: 1 Nm<sup>3</sup> = 11 kWh.

<sup>4)</sup> Calculated on the basis of the ratio: 1 litre = 9.89 kWh.

<sup>5)</sup> Diesel oil for service vehicles and internal transport.

<sup>6)</sup> Of which, the volumes from the department in Skjern are: <sup>a)</sup> 741 MWh, <sup>b)</sup> 26 MWh, <sup>c)</sup> 128 MWh, <sup>d)</sup> 7 m<sup>3</sup>, <sup>e)</sup> 415 m<sup>3</sup>.

### The environmental accounting principles used to calculate consumption of energy and water:

Electricity, gas, district heating and water are stated in the statement on the basis of quantities consumed according to direct meter readings relating to the activities per site with related administration.

The consumption of electricity comprises both electricity purchased externally and consumption of production from own wind turbines.

Oil for heating has been stated in the statement on the basis of external purchases adjusted for stocks at the beginning and at the end. Diesel oil for transport has been stated on the basis of supplier statements.

# Environmental notes

## Waste and scrap

Vestas considers waste to be a very significant environmental aspect due to both the high tonnage and the environmental risks inherent in the waste

itself. Incineration and landfill involve the risk of emissions of environmentally hazardous substances into the soil, the water and the air.

Types of waste	The tower factory in Varde							2001		2000	
● Combustible (t)	37	290	142	142	1,419 <sup>5)</sup>	289	136	2,455	2,575		
● Wood (t)	64	28	0	287	173	0	0	552	363		
● Landfill (t)	332	57	59	24	448 <sup>6)</sup>	951 <sup>7)</sup>	50	1,921	589		
● Paper and cardboard (t)	14	76	36	41	147	116	24	454	256		
● Plastic (t)	1	10	14	3	117	0	6	151	53		
● Glass (t)	0	0	0	1	0	5	0	6	- <sup>2)</sup>		
● Electronic scrap (t)	0	0	0	3	0	0	10	13	3		
● Scrap metal (t) <sup>3)</sup>	4,281	2,160	92	113	116	70	178	7,010	6,304		
● Epoxy waste (t)	0	1	0	0	68	57	3	129	74		
● Polyester waste (t)	0	0	0	0	1	0	0	1	4		
● Isocyanate waste (t)	0	0	0	0	17	6	0	23	10		
● Acetone waste (t)	0	1	2	0	3	0	1	7	13		
● Oil emulsions (t)	72	147	12	1	0	0	18	250	296		
● Oil products (t)	0	13	1	1	0	0	12	27	26		
● Waste oil (t)	2	3	5	1	0	1	54	66	59		
● Other types of hazardous waste (t) <sup>4)</sup>	1	1	3	1	15	0	3	24	7		
<b>Totals, divided up into the four categories per site (tons):</b>											
● Combustible (t)	101	318	142	429	1,592 <sup>8a)</sup>	289	136	3,007	2,938		
● Landfill (t)	332	57	59	24	448 <sup>8b)</sup>	951	50	1,921	589		
● Waste for recycling (t)	4,296	2,246	142	161	380 <sup>8c)</sup>	191	218	7,634	6,616		
● Hazardous waste (t)	75	166	23	4	104 <sup>8d)</sup>	64	91	527	488		
<b>Total (t)</b>	<b>4,804</b>	<b>2,787</b>	<b>366</b>	<b>618</b>	<b>2,524</b>	<b>1,495</b>	<b>495</b>	<b>13,089</b>	<b>10,631</b>		

<sup>1)</sup> Including the departments in Tim and Skjern.

<sup>2)</sup> Volume not registered in 2000.

<sup>3)</sup> This category comprises scrap iron, aluminium, cables, copper and brass.

<sup>4)</sup> This category consists of lights, brake pads, waste paint, spray cans, waste coolant, collected waste oil etc.

<sup>5)</sup> 69 tons of this is prepreg waste.

<sup>6)</sup> Of this 338 tons is prepreg waste. (The total volume of prepreg waste from the site is 407 tons)

<sup>7)</sup> 287 tons of this is prepreg waste.

<sup>8)</sup> Of which, the volumes from the department in Skjern are: <sup>a)</sup> 22 tons <sup>b)</sup> 3 tons <sup>c)</sup> 16 tons <sup>d)</sup> 6 tons.

### The environmental accounting principles used to calculate volumes of waste and scrap metal:

Waste is stated in the statement on the basis of weight slips received from the waste recipients for deliveries effected in the financial period, apart from a few types of waste which are assessed on the basis of subscription arrangement and load.

Materiality has been fixed on the basis of approvals from the authorities and confirming statements from supervising authorities concerning the environmental relevance of exact types of waste, followed by a selection in relation to material quantities delivered compared with the ordinary operating activities carried through on the sites.

In the statement waste according to types and quantities has been allocated to the sites on which the waste has been generated.

In the statement scrap is stated on the basis of weight slips from the scrap dealers collected decentrally per site.

# Environmental notes

## Emissions into the air

The most significant emissions have been identified on the basis of the conditions laid down in the environmental approvals. VOC and dust can affect both occupational health and safety and the external environment. Excessively high concentra-

tions within the working environment may result in problems with the airways and memory loss. As regards the external environment, VOC can also contribute to the greenhouse effect.

Emission to the air	The tower factory in Varde							2001		2000	
Organic solvents (t)	-	< 1	1	-	22 <sup>3)</sup>	< 1	< 1	24	27		
Dust (t) <sup>2)</sup>	1	< 1	-	-	-	-	-	2	2		
<b>Total (t)</b>	<b>1</b>	<b>&lt; 1</b>	<b>1</b>	<b>-</b>	<b>22</b>	<b>&lt; 1</b>	<b>&lt; 1</b>	<b>26</b>	<b>29</b>		

<sup>1)</sup> Including the departments in Tim and Skjern.

<sup>2)</sup> Defined as other dust in line with the Danish Environmental Protection Agency's guideline no. 2, 2001.

<sup>3)</sup> Of which, the volume from the department in Skjern is 17 tons.

## Waste water

Waste water from the Danish sites under Vestas Wind Systems A/S consists primarily of sanitary waste water. There are no continuous emissions of industrial waste water, as waste water of this kind stems exclusively from the washing areas and from the washing of blades during final preparation and finishing. As a minimum, measurements for environmentally hazardous substances have been

taken to the extent that the authorities have wished to check the observance of the relevant conditions. The nature of the environmentally hazardous substances is stated in the notes to the chart below. This chart also shows that none of the sites has noted breaches of waste water conditions in 2001.

Status for waste water measurements	The tower factory in Varde							2001		2000	
Volume of waste water (m <sup>3</sup> )	6,829	7,755	2,736	5,418	13,606 <sup>6)</sup>	5,440	2,000	43,784	34,236		
Requirements met	Yes <sup>1)</sup>	Yes <sup>2)</sup>	Yes <sup>2)</sup>	Yes <sup>3)</sup>	Yes <sup>4)</sup>	Yes <sup>5)</sup>	Yes <sup>4)</sup>				

<sup>1)</sup> Measurements performed for oil/grease, Ni, Cr, Zn and pH level.

<sup>2)</sup> Measurements performed for oil/grease.

<sup>3)</sup> Functional requirements. There are no requirements for measurements.

<sup>4)</sup> Measurements performed for suspended matter and pH level. In addition, functional requirements have been fulfilled.

<sup>5)</sup> Measurements have been taken of oil/grease, suspended matter and pH level.

<sup>6)</sup> Of which the volume from the department in Skjern is 415 m<sup>3</sup>.

### The environmental accounting principles used to calculate emissions into the atmosphere:

Emissions from organic solvents have been calculated on the basis of quantities of mould preparation media, coating materials and acetone purchased as well as information from suppliers concerning evaporation during use in processes.

Emission of dust is based on the discharge determined by the authorities which is to be included in the total dust emission calculations, estimated operating times of the individual plant and information from the suppliers as regards dimensions and filter efficiency.

Waste water is stated as water consumption reduced by utilised measured water for air humidification.

Materiality is determined on the basis of regulatory approvals.



# Environmental notes

## Noise

At the end of 2000, noise-reduction measures were initiated at blade factory I in Lem. The desired result was achieved, as measurements in 2001 verified that the conditions for the site with regard to noise were observed. As a result, no breaches of noise regulations were recorded over

the past year at the Danish sites under Vestas Wind Systems A/S.

The programme to reduce noise levels at the tower factory in Varde is progressing according to schedule, and is expected to reach completion no later than August 2002.

## Occupational health and safety

Industrial injuries and absence due to illness	The tower factory in Varde										2001		2000	
	The machine and controller factory in Lem													
	The assembly factory in Viborg													
	The assembly factory in Ringkøbing													
	Blade factories I and II in Lem <sup>1)</sup>													
	The blade factory in Nakskov													
	The service department in Videbæk													
	The production development department <sup>2)</sup>													
	Other departments <sup>3)</sup>													
<b>Length of absence due to industrial injuries</b>														
1 - 3 days	10	16	8	6	47	27	2	3	0		119	75		
4 - 14 days	12	12	7	5	29	17	4	7	0		93	73		
> 14 days	3	4	1	3	10	5	1	0	0		27	15		
> 5 weeks	2	2	1	4	8	2	4	0	0		23	11		
Long term	0	0	0	0	0	0	0	0	0		0	0		
Fatality	0	0	0	0	0	0	0	0	0		0	0		
Total	27	34	17	18	94	51	11	10	0		262	174		
Incidence of injuries <sup>4)</sup>	63.3	55.0	48.1	40.4	62.6	66.2	17.6	87.9	0.0		53.5	51.4		
Absence due to injuries <sup>5)</sup>	7.9	3.6	1.2	4.6	6.2	6.3	1.8	3.3	0.0		4.9	5.5		
Absence due to illness <sup>6)</sup>	5.7	5.0	4.2	4.4	4.9	5.0	2.2	4.6	1.1		4.5	5.0		
<b>Figures for the sector</b>														
Incidence of injuries <sup>7)</sup>	47.9	47.9	47.9	47.9	47.9	47.9	47.9	47.9	47.9		47.9	53.5		
Absence due to injuries <sup>7)</sup>	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.2		
Absence due to illness <sup>8)</sup>	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.1		

<sup>1)</sup> Including the departments in Tim and Skjern and the blade factories' activities at the machine factory in Lem.

<sup>2)</sup> Including the steel and composite workshop in Videbæk.

<sup>3)</sup> Other departments – refers to employees paid by the hour employed in various staff functions.

<sup>4)</sup> Incidence of injuries expresses the number of reportable industrial injuries per 1,000,000 working hours.

<sup>5)</sup> Absence due to injuries refers to the number of hours of absence due to injuries per 1,000 working hours. Absence due to non-reportable industrial injuries is also included in these figures.

<sup>6)</sup> Absence due to illness is defined as the number of hours of absence due to illness per 100 working hours. The figures only refer to employees paid by the hour.

<sup>7)</sup> Source for figures for the sector: – "Industrial injuries 2000" – published by The Danish Employers' Confederation – average for the iron and metal industry.

<sup>8)</sup> Source for the figures for the sector for absence due to illness: average for workers in the iron and metal industry (2000), published by The Danish Employers' Confederation.

### The environmental accounting principles used to evaluate occupational health and safety:

Occupational health and safety has been stated for all activities under the administrative structure and comprises employees categorised as employees paid by the hour.

The number of industrial injuries and classification of time of absence have been stated in the statement on the basis of reports to the Danish Directorate of Labour Inspection made decentrally per site.

Absence due to illness has been defined as hours absent due to illness, exclusive of absence caused by industrial injuries, maternity leave and child's first day of illness.

Number of working hours and absence frequency due to industrial injuries and illness respectively have been calculated on the basis of time sheets registered in the payroll systems.

# Auditors' report

## Basis

Vestas Wind Systems A/S has entered into an agreement with PricewaterhouseCoopers for the submission of an auditors' report on the voluntary Environmental Report for 2001 with the overall objective of verifying the reliability of the data stated and the information provided in the Environmental Report.

The management of Vestas Wind Systems A/S is responsible for the Environmental Report. It is our responsibility, based on our work, to express an opinion on the Environmental Report.

The objective and scope of the Environmental Report as well as the priority of environmental issues have been determined by the management of Vestas Wind Systems A/S and described on pages 64 and 66 of the Environmental Report.

## Objective and Scope

We have planned and performed our work in accordance with generally accepted international auditing standards with the agreed objective of

- verifying that the data stated on pages 64 - 86 of the Environmental Report for 2001 are consistent with the activities of the sites for the accounting period and have been documented and stated in accordance with the guidelines described under environmental accounting policies;
- assessing whether the internal control system, including monitoring and reporting procedures, has been structured in an appropriate manner to support reliable information in the Environmental Report for 2001.

Our work has included, based on an assessment of materiality and risk, accounting analyses, inquiries, testing of data and underlying documentation, including verification of compliance with the selected accounting policies and consistency with the entity's activities for the period.

Furthermore, we have tested the internal control system with a view to establishing its appropriateness with focus on the efficiency of the monitoring and reporting procedures applied to support the achievement of the targets established for 2001 in 2000.

We believe that the work performed provides a reasonable basis for the following opinion.

## Opinion

Based on the work performed, in our opinion, the data stated on pages 64 - 86 of the Environmental Report for 2001 are consistent with the activities of the sites for the accounting period and have been documented and stated in accordance with the guidelines described under environmental accounting policies.

Furthermore, in our opinion, the internal control system, including monitoring and reporting procedures, has generally been structured in an appropriate manner to support reliable information in the Environmental Report for 2001.

Herning, 13 March 2002

### PricewaterhouseCoopers

Niels Jørgen Lodahl  
*State Authorised  
Public Accountant*

Birgitte Mogensen  
*State Authorised  
Public Accountant*

# Conversion factors, definitions and glossary

## Conversion factors

1 GW	1000 MW
1 MWh	1000 kWh
1 Nm <sup>3</sup> natural gas	11 kWh
1 litre of fuel oil	9.89 kWh

## Comments on the targets for 2002

### Target for waste:

Neither scrap metal nor wood (which is sold off to employees) is included in the calculation of the percentages, which are stated with the targets for the blade factories in Lem and Nakskov.

### Target for industrial injuries:

The rate of industrial injuries is defined as the number of industrial injuries (resulting in absence of more than one working day) per 1,000,000 working hours.

### Target for energy:

The percentage reductions should be viewed in relation to consumption in 2001, and are based on an unchanged level of activity (unless stated otherwise).

### Target for absence due to illness:

The absentee rate is defined as the number of absentee hours per 100 working hours. The targets for 2002 only deal with absence due to illness among employees paid by the hour.

## Glossary

### Assembly fitting:

The "root" end of the blade (made of prepreg).

### Capacity factor:

An expression for the number of hours that the turbine operates at full capacity during a year.

### CNC processing:

Computer Numerical Control. An expression used for computer controlled processing.

### CO<sub>2</sub>-neutral energy:

Energy generated without causing net emissions of CO<sub>2</sub>.

### Emit:

Discharge into the immediate surroundings.

### Environmental improvements of the product:

Relates to the product in the form of more energy-efficient turbines and environmental evaluation of the substances and materials that the product contains. In this context, Life Cycle Assessment (LCA) will be included as a tool.

### Level 1 company:

A Level 1 company is a company that has been awarded the highest classification by the Danish Directorate of Labour Inspection.

### LCA:

An LCA (Life Cycle Assessment) is a report on the environmental impact generated by a specific product throughout its lifetime (the cradle to grave principle). The life cycle assessment for the Vestas V80-2.0 MW turbine has been prepared using the UMIP method (UMIP = development of environmentally friendly industrial products), which is based on ISO 14040. The life cycle assessment mentioned above has not been verified by a third party.

### Mould preparation agents:

Umbrella term for the following groups of auxiliary agents: mould cleaning agents, mould sealants and release agents.

### MPE:

MPE stands for Mili-Person Equivalent (= 1/1000 of a person equivalent). A person equivalent is an expression for the average environmental impact generated by a person in Denmark.

### Nacelle:

The turbine housing at the top of the tower.

### Non-prioritised electricity:

Also known as market electricity or the "free share". This concept refers to the volume of electricity which, in line with the guidelines for the liberalisation of the electricity market, can be purchased on the open market.

### OHSAS 18001:

Standard for Occupational Health and Safety management (OHSAS = Occupational Health & Safety Assessment Series).

### Prepreg:

Epoxy laminate consisting of fibreglass impregnated with epoxy (the material is hardened and is therefore classed as a dry material).

### Sanitary waste water:

Waste water from baths, kitchen use, ordinary cleaning, etc.

### Spar:

Blade component that determines the strength and rigidity of the blade (made of prepreg).

### Suspended matter:

An expression for the volume of particles (dry matter) contained in the liquid phase.

### The EMAS regulation:

The EU regulation for environmental management and environmental audits (EMAS = Eco Management and Audit Scheme).

### Unwritten internal rules:

Within Vestas, considered to mean business procedures and framework agreements generally known to all employees, thus obviating the need for written procedures.

### VOC:

Expression relating to organic solvents (Volatile Organic Compounds).