



Vestas expects suppliers to abide by existing legislation and to act in an environmentally responsible manner.

Management's environmental statement

The purpose of the environmental statement is to report and document environmental and occupational health and safety aspects at Vestas Wind Systems A/S and selected subsidiaries. The environmental statement describes the overriding aims of Vestas' environmental and occupational health and safety work, and details data statements, results achieved and expectations for the future. In addition, it contains a number of articles about Vestas.

Environmental and occupational health and safety management to be established worldwide

Vestas manufactures wind power systems that generate sustainable energy for customers all over the world. In 2003, Vestas supplied 1,812 MW. Over the course of their design service lives of 20 years, these turbines will help to generate about 95,241,000 MWh of sustainable energy. Seen in relation to the average volume of electricity generated in Europe, this corresponds to a saving of about 52,164,000 tons of $\mathrm{CO_2^{10}}$, as electricity generation in Europe emits, on average, 548 grammes $\mathrm{CO_2/kWh}$.

Vestas' aim is to ensure that all employees work with and according to the same management systems. Through this approach, the Group can make sure that the environment and occupational health and safety are included in all parts of the process, from development, manufacture, sale and installation to the subsequent servicing of the wind power systems. The established environmental and occupational health and safety policy thus applies to all activities within the Vestas Group. By introducing environmen-

tal and occupational health and safety management worldwide, Vestas will be in a position to create improvements for the benefit of customers, shareholders, employees, other stakeholders and the environment.

In addition to ensuring that all employees work according to the same management systems, Vestas' goal is to obtain ISO 14001 and OHSAS 18001 certification for all sites where more than 10 people are employed. In line with this goal, it is encouraging to note that 71 per cent of those employed by the Vestas Group work at sites certified according to the ISO 14001 environmental management standard, and 64 per cent are employed at sites certified according to the OHSAS 18001 occupational health and safety standard, cf. figure 1 on page 89. Vestas will work to continue the expansion of the environmental and occupational health and safety system.

Vestas continues to work towards its goal of an annual environmental statement that covers all the sites controlled by the Group, cf. figure 2 on page 89. The environmental statement for 2002 was the first to cover sites outside Denmark with the inclusion of Vestasvind Svenska AB. It is satisfactory to note that the expansion in scope has continued, with the result that the environmental statement for 2003 includes Vestas' subsidiaries in the Netherlands and Italy – Vestas - Nederland Windtechnologie B.V. and IWT - Italian Wind Technology S.r.l. – as well as the electronics factory in Århus, Denmark.

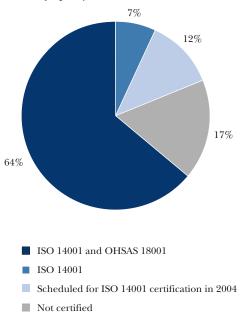
The following sites are thus covered by the 2003 environmental statement:

- The Tower Factory Varde, Denmark
- The Machining Factory Lem, Denmark
- The Controller Factory Lem, Denmark
- The Electronics Factory Århus, Denmark

¹⁾ The calculation is based on "Opdatering af UMIP-databasen" (Updating the UMIP database), work report from the Danish Environmental Protection Agency, no. 27, 2002.

Figure 1:

Percentage of Vestas certified (measured in relation to the number of employees)



The figure reflects the current status of the Group.

- The Assembly Factory Viborg, Denmark
- The Assembly Factory Ringkøbing, Denmark²⁾
- IWT Italian Wind Technology S.r.l., Italy
- The Blade Factory Lem, Denmark
- The Repair Department Skjern, Denmark
- \bullet The Blade Factory Nakskov, Denmark
- The Service and Mould Construction Departments Videbæk, Denmark
- Vestasvind Svenska AB, Sweden
- Vestas Nederland Windtechnologie B.V., the Netherlands

Objectives

Vestas has highlighted waste, energy, absence due to illness, industrial injuries and environmental improvements of the product as the most significant aspects as regards the environment and occupational health and safety.

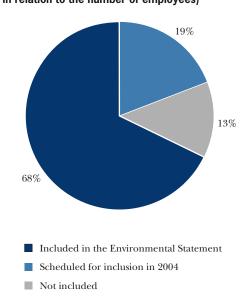
On account of the quantitative scope of the volume of waste and energy consumption, these are considered the most significant environmental aspects at Vestas.

Objectives have therefore been set for the reduction of both energy consumption and the volume of waste generated. At all relevant sites, concrete improvement targets have been set up for these environmental areas.

The emphasis placed on absence due to illness and industrial injuries highlights the fact that Vestas considers employees to be the most important factor in the company's work to maintain its position as the leading manufacturer of wind power systems in the world. In the same way as for the environmental areas – waste and energy – all the relevant sites involved have set concrete targets for the

Figure 2:

Percentage of Vestas included in the Environmental Statement (measured in relation to the number of employees)



The figure reflects the current status of the Group.

reduction of absence due to illness and industrial injuries.

Environmental improvement of the product should be seen as a long-term desire to reduce impact on the external environment and to improve the working environment. Vestas wishes to reach this objective by continuously developing more efficient wind turbines and by incorporating environmental and occupational health and safety considerations in the development of the turbines themselves.

If a wind turbine is viewed from a life cycle perspective, the environmental impact that takes place at Vestas is minimal, while the environmental impact of the extraction of raw materials, on the other hand, is considerable. In particular, the consumption of steel and other metals is of significance to the environmental impact as a whole. The challenge in the area of product development is thus to improve the energy production of the wind turbines without significantly increasing the consumption of materials. This is the case for Vestas' latest product – the V90-3.0 MW turbine – which weighs approximately the same as a Vestas V80-2.0 MW model but has vastly improved performance

Employee involvement

Employees are the Group's most important asset and are therefore involved in all phases of the environmental and occupational health and safety work. Employee involvement is thus an important part of everything from the identification of environmental and occupational health and safety aspects to the preparation of action plans and the establishment of goals.

²⁾ The subsidiaries Vestas - Scandinavian Wind Technology A/S, Vestas - Danish Wind Technology A/S and Vestas - International Wind Technology A/S are all included in the data statement for the Ringkøbing site.

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

- to ensure continuous improvements within the fields of the environment and occupational health and safety
- to devote the necessary care in relation to the environment and occupational health and safety as regards development, manufacture, service procedures and disposal
- to include consideration for employees and surroundings in the planning and performance of Vestas' activities
- to ensure open-minded and honest communication with the employees and interested parties
- to optimise the utilisation of resources
- to exert influence on suppliers so that they deliver environmentally safe products and service activities
- to ensure that, as a minimum, Vestas' activities comply with national legislation concerning environment and occupational health and safety.

Vestas implements this policy by:

- maintaining certifiable management systems in relation to the environment and occupational health and safety
- including consideration for the environment and occupational health and safety in the development of products and processes
- communicating knowledge about the environment, occupational health and safety and improvement of health to the employees and interested parties through training and information
- preparing an annual environmental statement
- measuring and documenting Vestas' influence on employees and the surroundings
- focusing on raw material management, substitution and optimisation of processes.

Suppliers

As Vestas makes high demands on environmental and occupational health and safety aspects within the Group, it is only natural that the company should consider environmental aspects on an equal footing with cost and quality when selecting suppliers for the Group. Therefore, Vestas expects suppliers to abide by existing legislation and to act in an environmentally responsible manner. At the same time, it should be stressed that Vestas recommends that suppliers obtain certification according to recognised standards for quality, the environment and occupational health and safety.

Results in 2003

One of the more impressive results in the field of occupational health and safety in 2003 is the reduction in the incidence of industrial injuries. Thanks to a programme of closely targeted initiatives, the company succeeded in cutting the incidence of such injuries by as much as 19 per cent. Please turn to page 94 for details.

In 2003, Vestas took over Windcast Group AS. In connection with this take-over, Vestas mapped a range of environmental and occupational health and safety aspects, and this work will continue in 2004. As expected, Vestas has discovered pollution of the soil and water table in a number of Windcast areas. In this regard, the Windcast facility in Kristiansand, Norway, is obliged to monitor the levels of soil and groundwater pollution. One initiative that has been implemented involves the recirculation of metal shavings and scrap metal from the Vestas factory for the production of new cast items. This naturally results in a rise in the degree of reuse of these cast items.

In 2003, Vestas participated in a project that focused on making use of hardened composite materials – particular-

ly in connection with ex-service turbine blades. The result of this work means that it is now possible to use the energy in the composite materials at a CHP station, while simultaneously considerably reducing the volume disposed of as landfill. Previously, landfill was the only option.

The work to extend the environmental and occupational health and safety management system to all parts of the Vestas Group resulted in a number of sites receiving certification in 2003. The subsidiary Vestas - Nederland Windtechnologie B.V. and the electronics factory in Århus, Denmark, were thus certified according to the ISO 14001 and OHSAS 18001 standards in 2003.

Environmental and occupational health and safety management

The environmental and occupational health and safety activities are organised in decentralised Quality, Safety & Environment functions (QSE) in the individual business units and in a Group QSE function.

The tasks of the decentralised QSE functions concern everyday operations, including the optimisation and development of detailed procedures and instructions within the various business units. The Group QSE function develops and optimises the overriding environmental and occupational health and safety management system, and plans and deploys the progressive overall strategic development. This approach ensures that everybody is working according to the same principles.

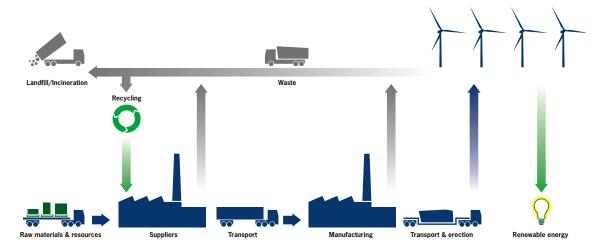
By implementing this division in an organisation that continues to grow, Vestas is ensuring that the relevant competencies are at hand where the decisions are made. Focus on individual business units makes sure that specialist competence is build up within each separate unit.

Performance

During 2003, Vestas completed a range of principal activities. These activities are stated in the table below which

furthermore includes the principal activities, which Vestas expects to complete in the immediate future. The principal activities are divided up into three categories: system, the environment and occupational health and safety.

Principal Activities 2003	Achieved	Ongoing/Future tasks
System		System
Certification of Vestas - Nederland Windtechnologie B.V. and the electronics factory in Århus, Denmark according to the ISO 14001 and OHSAS 18001 standards In 2003, Vestas' sales and service company in the Netherlands – Vestas - Nederland Windtechnologie B.V. – and Vestas' electronics factory in Århus, Denmark, were certified to both ISO 14001 and OHSAS 18001 standards. Material blacklist for Vestas In 2003, Vestas prepared lists of banned and unwanted substances to ensure that banned substances and materials are not used, and that the use of unwanted substances and materials is kept to a minimum. These lists have completed a trial period in the R&D department and are now ready for implementation throughout the organisation.	✓	Certification of selected departments according to the ISO 14001 and OHSAS 18001 standards. In 2004, work will continue to implement certified environmental and occupational health and safety management systems in Vestas Wind Systems A/S' departments. Expansion of Vestas' environmental statement to cover more departments In the immediate future, work will continue on the ongoing expansion of Vestas' environmental statement.
The Environment		The Environment
Recycling options for waste In 2003, Vestas has worked to find recycling options for waste. One of the recycling options identified had to do with the PE film used to protect the raw material "prepreg". Previously, this film was disposed of by incineration. In all, it will be possible to recycle approximately 150 tons of PE foil a year with production at 2003 levels. Minimum environmental standard for turbine sites worldwide In order to ensure that turbine projects are carried out to a uniform environmental standard and to make clear to customers what activities are always carried out at turbine sites, work was to be done in 2003 on the preparation of a minimum environmental standard for turbine sites throughout the world. At present, a draft minimum standard has been completed.	~	LCA for the V90-3.0 MW turbine In 2004, Vestas will implement a life cycle assessment of a V90-3.0 MW turbine. This assessment will be used not only to include environmental considerations in the product development process, but also to provide information to customers and other stakeholders about the environmental performance of the V90-3.0 MW model. The assessment will include the preparation of an energy balance. Minimum environmental standard for turbine sites worldwide In 2004, work will continue on the preparation of a minimum environmental standard. In addition, a good deal of work will be done to implement the completed standard. The phasing out of lead in soldering processes and electronics products In 2004, Vestas will map out an imminent switch to the use of lead-free soldering and lead-free components. In 2005, the conditions identified will be implemented so that as from 1 January 2006, lead will no longer be used in the production of Vestas electronics – to the benefit of both occupational health and safety and the external environment.
Occupational health and safety		Occupational health and safety
Analysis of industrial injuries at the machining factory in Lem, Denmark Since the middle of 2001 and in collaboration with the local Industrial Medical Clinic, the machining factory has been working on a project intended to optimise the registration of accidents and near misses and to improve safety culture. On the basis of a questionnaire survey covering all employees at the factory, the attitudes of the employees to the causes of accidents, lack of communication and information within the safety organisation and lack of employee involvement were highlighted as areas of initiative. Subsequently, the machining factory has worked actively on these issues and as a result, the incidence of industrial injuries has been significantly reduced – from 101.1 in 2001 to 22.9 in 2003. Continued application of CAF results within Vestas Wind Systems A/S The CAF project was completed in 2003 and the blade factories have reaped a rich harvest of experience. In concrete terms, the frequency of epoxy allergy cases has fallen by 80 per cent at the blade factory in Lem since the initiation of the project.	~	Analysis of industrial injuries at the machining factory in Lem The project will be concluded in the middle of 2004 with a question- naire-based evaluation of the safety work at the machining factory. The evaluation will put the machining factory in a position to deter- mine how the attitude of the organisation to safety has changed, and to identify the areas of initiative which require more work in the future to ensure continued progress. Transfer of experience from CAF to overseas blade factories In 2004, Vestas will make sure that the invaluable experience gained from the CAF project is implemented at the company's blade fac- tories in Germany and Italy.



The figure presents an overview of the activities that make up the life cycle of a wind turbine from the extraction of raw materials and resources to final disposal.

The environmental impact of a wind turbine from cradle to grave

In 2003, Vestas joined forces with Elsam Engineering A/S to carry out a life cycle assessment of a wind turbine – an onshore and offshore model of the V80-2.0 MW turbine. 3)

The life cycle assessment is both a mapping and an evaluation of the potential impact of the wind turbine on the external environment throughout its life cycle.

The evaluation presents a qualified estimate of where the most significant environmental impacts are positioned within the individual phases of the total life cycle.

In order to compare two products appropriately, a common basis for comparison is essential. In a life cycle assessment, this is known as the functional unit. For this life cycle assessment, the functional unit is 1 kWh of electricity generated. This unit makes it possible to compare the electricity generated by a conventional power station with that generated by a wind turbine – in this case, a Vestas V80-2.0 MW wind turbine.

Environmental impact during the life cycle.

The life cycle assessment for the onshore and offshore versions of the V80-2.0 MW model is divided into four phases:

- The production phase, which covers the period from obtaining the raw materials to the completion of the turbine.
- Transport to the site and erection at the site.
- Operation and maintenance during the service life of the turbine.
- Disposal of the turbine.

Production, which covers the extraction of the raw materials, as well as production by suppliers and Vestas itself, is

the phase that generates the greatest impact on the external environment. The environment is affected particularly by the extraction of iron ore for the production of steel components.

Epoxy materials used in blade production are made using crude oil, and this is another aspect of the production phase that generates environmental impact.

From an environmental perspective, the consumption of iron ore and crude oil involves drawing on limited resources. As such, the challenge is to minimise the volumes withdrawn.

Taking the life cycle as a whole, the transport and erection phase is of only minor importance. During this phase, the greatest environmental impact is attributable to energy consumption. This refers primarily to the fuel used to transport components to the site and the consumption of fuel by the cranes, for example, during the erection of the turbine itself.

During the operational phase, the environmental impact generated is also minor in relation to the life cycle of the turbine as a whole. The impact that is generated here stems from energy consumption in connection with the transport of personnel to and from the turbine. This can take the form of fuel for vehicles, boats, helicopters and the like. At the same time, there is some impact connected to service procedures such as oil changes.

Along with the production phase, the disposal phase accounts for the greatest part of the environmental impact generated. However, in contrast to the production phase, disposal makes a positive contribution to the total environmental impact of the wind turbine, in that approximately 88 per cent by weight of a V80-2.0 MW onshore turbine mounted on a 100-metre tower can be reused. This means that the environment is spared extra extraction of non-renewable resources. In fact, the environmental impact generated by a wind turbine would be approximately twice as great if none of the material could be reused.

³ Life cycle assessment carried out by Elsam Engineering A/S in collaboration with Vestas in 2003. Explanatory comments and explanations are published in report no. 12063 "Life cycle analysis of sea and land-based wind farms," prepared by Elsam Engineering A/S.



Nacelles and towers for the Vision Quest project were transported by ship from Århus in Denmark to the Port of Long View in Portland, USA.

Figure 3:

MWh	Energy balance – consumption versus production – for a Vestas turbine from cradle to grave	
160,000		
140,000		
120,000		
100,000		
80,000		
60,000		
40,000		
20,000		
0		
- 20,000	V	ear
	5 10 15 20	ar

The figure shows the energy balance for a V80-2.0 MW offshore wind turbine at the Horns Reef site in the North Sea.

Naturally, there is also some negative environmental impact linked to turbine disposal although this is of little significance and primarily takes the form of waste and energy used to break down the turbine. This energy is consumed, for example, by cranes, lorries and ships used to remove the turbine from the site. At the same time, viable recycling options are still not in place for all materials and products.

Conclusions

One of the most significant conclusions of the Vestas life cycle assessment is that the relationship between consumption of materials for the production of a wind turbine and the energy subsequently generated by the turbine is crucial to the environmental impact of the wind turbine. In addition, it is clear that work must be done to increase the proportion of the material that can be recycled. The greater the level of recycling, the lower the environmental impact. At the same time, the assessment is a good tool for Vestas to use to evaluate which of the components generate the greatest environmental impact – and thus to establish where an extra effort must be made in future development projects.

If the life cycle assessment is used to compare a Vestas V80-2.0 MW offshore turbine with a conventional coal-fired power station, the results will show that the wind turbine produces approximately 8 grammes of CO₂ when generating 1 kWh of electricity, while the corresponding figure for the coal-fired power station is approximately 826 grammes.⁶ This comparison makes it clear how environmentally superior a wind turbine is when viewed from the perspective of a complete life cycle. In comparison with the energy production of a coal-fired power station, a V80-2.0 MW offshore wind turbine at the Horns Reef site in the North Sea will, in 20 years of operation, generate approximately net 156,000 MWh, thus saving the environment from approximately 129,000 tons of CO₂.⁵⁰

^{4) &}quot;Global Emission Model for Integrated Systems – version 4.14", published by the Öko-institut (Institute of applied ecology), Germany, September 2002.

^{5) &}quot;Global Emission Model for Integrated Systems – version 4.14", published by the Öko-institut (Institute of applied ecology), Germany, September 2002. Calculation: 826 grammes of CO./kWh × 155,000,000 kWh = 129,000 tons.



At Vestas, one of the overriding goals of the work with occupational health and safety has always been to provide a safe and secure workplace for employees.

Another important result from the life cycle assessment is the preparation of an "energy balance". In this context, an "energy balance" is taken as an expression of the relationship between the energy consumed by a wind turbine during its life cycle and the energy generated by the turbine during its 20-year service life. For a V80-2.0 MW onshore wind turbine, the energy balance is 7.7 months, while the figure for a corresponding offshore wind turbine is 9.0 months cf. figure 3 on page 93.

Choosing wind turbines for energy production thus contributes to sustainable development.

The life cycle assessment is published on the Vestas Web site (www.vestas.com) under "Environment" along with a detailed presentation of the energy balance for the V80-2.0 MW turbine, including a comparison with the previous energy balance, made by the Wind Power Industry and published in Windpower Note no. 16, 1997.

Initiatives against industrial injuries pay dividends

At Vestas, one of the overriding goals for occupational health and safety has always been to provide a safe, secure workplace where emphasis on planning, preparation, teaching and information are important aspects in creating a place where industrial injuries can be avoided.

In 2001, the first Vestas sites were certified according to the OHSAS 18001 standard for occupational health and safety,

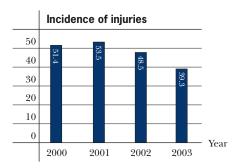
and at present 64 per cent of Vestas employees are covered by OHSAS 18001 certification.

The systematic work of the past few years to process and prevent industrial injuries is now beginning to produce significant results. As shown in figure 4 on page 95, Vestas has reduced the incidence of industrial injuries from 51.4 in 2000 to 39.3 in 2003. Assuming that Vestas had maintained a frequency of industrial injuries of 51.4 (the level for 2000), there would have been 64 more industrial injuries in 2003.

All areas of Vestas have worked very hard to reduce the number of industrial injuries. For example, the systematic registration and processing of injuries, near misses and preventative measures, the introduction of emergency drills, safety audits and the prioritisation of "Safety above all" have been instrumental in the achievement of results. In addition, charts for goal follow-up, which show the development of industrial injuries and the introduction of the "Safety Ranger", which presents an outline of the latest injury and shows how much time has elapsed since the most recent industrial injury, have both helped to raise awareness about industrial injuries.

In fact, Vestas has made such good progress in reducing the number of injuries that some sites no longer have a statistical foundation on which to base future initiatives. As a result, greater emphasis is now being placed on the area of near misses.

Figure 4:



The figure shows the development in the incidence of industrial injuries.

Mould construction in Videbæk, Denmark

One of the sites where the incidence of industrial injuries was previously high is the mould construction department in Videbæk, Denmark. In 2000, the incidence of industrial injuries was 153.5. This figure fell to 87.9 in 2001 and then to 58.6 in 2002. At the end of 2003, the incidence of industrial injuries had been reduced to 0 as there have been no industrial injuries at the mould construction department for 428 days.

This low incidence is proof that the general attitude to safety and employee involvement in safety improvements in recent years are now beginning to generate the anticipated results.

Employee involvement is an important weapon in the battle against industrial injuries. In connection with the introduction of new work routines, the safety organisation was heavily involved in the decision-making process. This resulted in higher motivation and a greater sense of responsibility for ensuring that the highest priority was accorded to safety.

Increased focus on the safety committee and its work in the mould construction department has raised awareness among employees about the importance of their own safety, as well as that of their colleagues.

The controller factory in Lem, Denmark

On 10 November 2003, the controller factory could celebrate a whole year without industrial injuries. At the end of the year, the factory had not had an industrial injury for 407 days. The positive result is due in large part to the fact that employee involvement and a common attitude to safety are paying dividends.

In 2002 the controller factory started a project to set up line production and introduce participatory groups. This process was based largely on employee involvement, and high emphasis was placed on creating a workplace that focused more heavily on employee safety and well-being.

Vestasvind Svenska AB, Sweden

The Swedish subsidiary Vestasvind Svenska AB was the third site to make it through 2003 without a single industrial injury.

This result is largely due to the fact that the employees who work there are very conscious of the risks inherent in working with wind turbines.

A range of activities were carried out to increase consciousness, including courses in fire fighting and evacuation from wind turbines.

The goal for 2004 is to hold courses in safety in connection with work involving electricity for all employees of the service department. These courses will contribute to additional improvements in safety and further reductions in the risk of industrial injuries.

The machining factory in Lem, Denmark

The machining factory in Lem, Denmark is another site where the incidence of industrial injuries has decreased dramatically in recent years. In 2001, the incidence of industrial injuries was 101.1. In 2002, this figure was cut to 46.7, and in 2003 it fell even further to 22.9 per cent.

The positive results are largely attributable to placing emphasis on safety throughout the organisation. The tools used to highlight safety are the training of new employees, safety audits, thorough registration of near misses and minor injuries, and drills to test emergency response procedures. Together, these four tools form an efficient system of registration, monitoring and testing that provides essential input for an active safety committee to which much of the credit for reducing the incidence of industrial injuries at the machining factory is due.

Analyses of near misses and minor injuries provide a good basis for introducing preventative initiatives in precisely those areas where the risk of a serious industrial injury is greatest. At the machining factory, the analysis work has resulted in particular focus on falls, eye injuries, cuts and crushing injuries.

The involvement of employees in safety audits is similarly one of the initiatives that have helped to make a difference. This approach ensures that both new and more experienced employees receive thorough training in the performance of a safety audit.

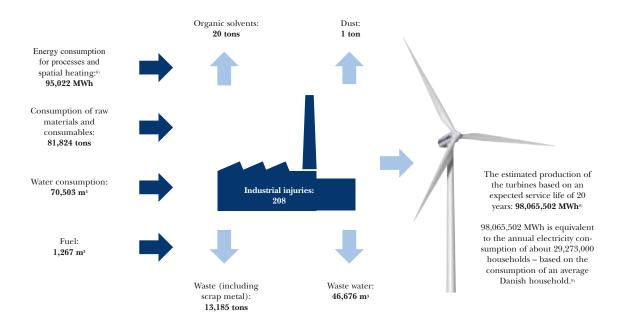
The aim is to make sure that all four tools are constantly applied to maintain and extend the ability of the organisation to predict and prevent potential accidents.



The actual potential of the wind is enormous. With the technology available today, the total electricity consumption of the world could be covered many times over.

Input/output 2003

The figures below illustrate the overall input and output for the sites included in the 2003 environmental statement. The output is shown as the total energy production of the turbines produced during their expected service life of 20 years. Detailed data about the sites are published online at www.vestas.com – under the heading "Environment". They are also available as hard copy data sheets



Indirect impact

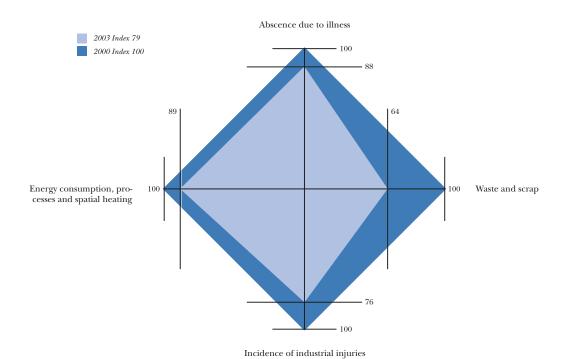
Production processes at Vestas produce some indirect environmental impact. The table below lists the most important types of impact and explains the effects these can cause. It also details the positive effects wind turbines help to generate.

Indirect impact	Type of impact
Emission – Consumption of energy, diesel oil and organic solvents results in emissions, primarily of CO ₂ , SO ₂ and VOC. Emissions from suppliers of raw materials likewise contribute to indirect impact.	These emissions primarily contribute to the greenhouse effect (${\rm CO_2}$ and VOC) and to acid rain (${\rm SO_2}$).
Waste – Results from the manufacture of wind turbines and the activities of suppliers.	The generation of high-volume waste takes up landscape resources as a result of landfill. Hazardous waste is waste that must receive special treatment.
Waste water – Waste water from Vestas sites is primarily sanitary waste water. Emissions from suppliers in the product chain are similarly considered an indirect impact.	Emissions of waste water cause nutrient salt load and eco-toxicity, for example.
Sustainable energy – On the positive side, wind turbines generate sustainable energy for customers throughout the world. The wind turbines manufactured thus contribute to reducing impact and load stemming from conventional sources of energy such as coal-fired power. The environmental advantages far outweigh the effects arising from both direct and indirect environmental impact. 7)	Efficient and competitive options to conventional energy production will help to reduce emissions that contribute to the greenhouse effect and acid rain. In addition, sustainable energy will help to reduce the creation of radioactive waste from the production of electricity.

- 6) CO₂-neutral energy accounts for 69% of electricity consumption.
- 7) Life cycle assessment carried out by Tech-wise A/S in collaboration with Vestas in 2001. Explanatory comments on the life cycle assessment are listed in report no. 01-488 "Livscyklusvurdering af vindmøller" (Life cycle assessment of wind turbines) published by Tech-wise A/S.
- 8) The figure should be considered a guideline only, as it is an estimate calculated on the basis of the production in Denmark, Italy 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).
- 9 "Energistatistik 2003" (Energy Statistics 2002), which is published by the Danish Energy Agency, defines an average Danish household as consisting of four people living in a 120 m² residence. Consumption for 2002 is listed as 3,350 kWh per year.

Vestas' environmental and occupational health and safety index

In order to illustrate the development in environmental and occupational health and safety issues, the most important aspects are indexed. In the figure below, the environmental index is illustrated as a quadrangle with 2000 as the index year.



	2000 (100)	2001 (86)	2002 (84)	2003 (79)
Energy	54,863 MWh (100)	76,782 MWh (80)	87,514 MWh (86)	95,022 MWh (89)
Waste and scrap	10,631 tons (100)	13,089 tons (70)	12,826 tons (65)	13,185 tons (64)
Absence due to illness	5.0% (100)	4.5% (90)	4.5% (90)	4.4% (88)
Incidence of industrial injuries	51.4 (100)	53.5 (104)	48.5 (94)	39.3 (76)

Each corner of the quadrangle symbolises one of the important environmental and occupational health and safety aspects, and the length of the axes is defined by the individual index figures for energy, waste, industrial injuries and absence due to illness among employees paid by the hour.

If an aspect develops negatively, this will be illustrated as the lengthening of an axis, while, conversely, improvement of any of the aspects will result in the relevant index figure moving closer to the centre of the co-ordinate system.

As mentioned previously, Vestas also considers product improvements to be one of the most important environmental aspects. Improvements are reflected, for example, in the efficiency of the turbines and, as a result, in the estimated production of the turbines manufactured (the output figure in the figure on page 97).

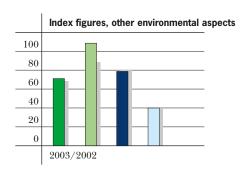
As the latter is used as a key figure in the indexing of volumes of energy and waste, improvements in the product are thus shown indirectly in the figure. In addition, using the estimated energy production of the finished turbines makes it possible to take changes in production into account.

Development in relation to 2002

All in all, Vestas' environmental and occupational health and safety index fell in 2003. This is primarily due to a positive development in the incidence of industrial injuries and to a reduction in the index figures for waste and absence due to illness among employees paid by the hour. However, it should be noted that the fall in the index figure for waste is not exclusively attributable to improvements. Part of the reduction stems from the decision to outsource a number of flame-cutting activities from the tower factory in Varde.

In 2003, Vestas has included environmental and occupational health and safety data from three additional sites: IWT - Italian Wind Technology S.r.l., Italy, Vestas - Nederland Windtechnologie B.V., the Netherlands, and the electronics factory in Århus, Denmark. The specific environmental and occupational health and safety data for these sites are listed in the appropriate site descriptions. The extension of the environmental statement means an increase in the precision of Vestas' overall environmental and occupational health and safety index, as the index figures can now be based on environmental and occupational health and safety data from a larger proportion of the Vestas Group.

As mentioned previously in the environmental statement, the incidence of industrial injuries fell significantly in 2003. In total, the incidence of injuries has decreased by 19 per cent in relation to 2002. This positive development is due in part to the fact that in 2003 there were no industrial injuries that required reporting at the following sites: the controller factory in Lem, and the mould construction



	2003	2002
Waste water	72	69
Water consumption	109	89
Fuel	79	80
Emissions into the air	40	40

The figure shows the development in index figures for other environmental aspects. The development in absolute figures is presented in the table on page 100.

department in Videbæk - both in Denmark - and Vestasvind Svenska AB, Sweden. In addition, two sites in Denmark - the tower factory in Varde and the machining factory in Lem - succeeded in cutting the number of industrial injuries by more than 50 per cent. Absence due to illness also fell slightly in 2003. The reduction is primarily attributable to the inclusion of IWT - Italian Wind Technology S.r.l., Italy and Vestas - Nederland Windtechnologie B.V., the Netherlands in the environmental statement, as both these companies returned very satisfactory figures in this area. Moreover, two sites in Denmark showed a satisfactory development: the assembly factory in Viborg and the controller factory in Lem. Although reductions have already been achieved in the incidence of industrial injuries and absence due to illness, Vestas will continue to work hard in 2004 to maintain this trend.

The index figure for energy rose in 2003. This is principally due to the fact that the 2003 environmental statement includes IWT - Italian Wind Technology S.r.l., Italy and the electronics factory in Århus, Denmark for the first time. Furthermore, energy consumption at the assembly factory in Viborg, Denmark has increased appreciably after new storage facilities covering approximately 15,500 m² were opened at the plant at the end of 2002. Measured in absolute figures, energy consumption has fallen at the following sites in Denmark: the tower factory in Varde, the machining factory in Lem, the blade factory in Nakskov, the repair department in Skjern and the service and mould construction departments in Videbæk.

Other aspects

The index figure for water has risen considerably in 2003. This rise is primarily due to the inclusion of IWT - Italian Wind Technology S.r.l., Italy in the report, as this facility uses large volumes of water. This water is principally used to water stretches of grass.

The index figure for emissions is the same as in 2002. At the repair department in Skjern, Denmark, emissions of organic solvents have fallen significantly because the volume of repair work on blades and spinners – which involves recoating – has decreased. However, this was cancelled out by the inclusion of IWT - Italian Wind Technology S.r.l., Italy in the report, as the Italian facility generates emissions of organic solvents through use of polyester in the production of blades, nacelle cabins and other components. At Vestas' other blade factories, prepreg is used instead of polyester in the blade production processes.

Data statement 2003

The statements below present the most significant environmental and accupational health and safety data that are systematically collected by Vestas Wind Systems A/S.

Enviroment	Total 2002	Total 2003 Previously included sites ⁸⁾	Total 2003
Raw materials and consumables (t)	77,7289	81,022	81,824
· Metals	61,113	66,088	66,093
· Oil products	803	895	961
· Composite materials	15,2689	13,560	14,157
· Other products	544	479	613
Energy (MWh)	87,514	87,471	95,022
· Electricity	49,172	46,715	50,3891)
· Gas	6,342	9,963	13,413
· District heating	27,703	30,410	30,837
· Oil	4,297	383	383
Fuel (m ³)	1,232	1,028	1,267
Water (m ³)	54,500	52,253	70,503
Waste and scrap (t)	12,826	12,608	13,185
· Combustion	3,538	3,063	3,189
· Landfill	2,371	2,153	2,512
· Recycling	6,917	7,392	7,484
Waste water (m³)	42,446	38,035	46,676
Emissions of dust (t)	1	1	1
Emissions of organic solvents (t)	20	15	20
Volume of flue gases (normal 1,000 m ³) ²⁾	9,816	8,994	12,048
Neighbour complaints (number)	4	0	0
Breaches of internal inspection conditions	0	13)	13)
Environmental accidents (number)	1	0	0

Occupational health and safety	Industry figures4)	Total 2002	Total 2003 Previously included sites ⁸⁾	Total 2003
Injuries (number) ⁵⁾	N/A	275	179	208
Incidence of injuries ⁶⁾	41.8	48.5	37.6	39.3
Absence due to injuries ⁷⁾	3.7	5.9	4.8	4.8
Absence due to illness, employees paid by the hour (%)	5.3	4.5	4.5	4.4
Absence due to illness, salaried employees (%)	2.2	1.7	1.1	1.4

 $^{^{\}scriptscriptstyle 1)}$ CO_z-neutral energy accounts for 69% of electricity consumption.

²⁾ Flue gases are generated by gas and oil-fired installations that are primarily used for spatial heating.

³⁾ Details of environmental accidents and neighbour complaints – along with the corrective actions implemented – are listed under the descriptions of the separate sites.

⁴⁾ The sector figures relate to the iron and metal industry and are drawn from reports prepared by Dansk Arbejdsgiverforening (The Danish Association of Employers), 2002.

⁵⁾ The statement covers industrial injuries that result in absence of more than one day in addition to the day on which the injury occurred.

⁶ The incidence of injuries is defined as the number of industrial injuries per 1,000,000 working hours.

⁷⁾ Absence from injuries is defined as the number of hours' absence on account of injuries per 1,000 working hours.

[§] The term "Previously included sites" refers to the sites that were included in the Environmental Statement for 2002.

⁹ The volume has been corrected in relation to the Environmental Statement for 2002 on account of a correction to the blade factory in Lem.

Accounting policies

Accounting policies and measurement and statement methods applied are unchanged from 2002, except for emissions of dust and waste water, where the precision of the accounting policies has been increased through the inclusion of new sites. Adjustments made to comparative data are disclosed in notes if they have influence on the achievement of targets or involve a significant change of the total environmental impact.

Raw materials and consumables

Raw materials are recognised in the statement on the basis of consumption drawings from stocks to manufacturing in the first phase of manufacture and to servicing of wind turbines, respectively, as recorded in the company's ordinary registration systems.

Consumables are recognised in the statement on the basis of supplier statements and own lists, respectively, of quantities delivered in the financial year collected decentrally per site.

Relevance has been determined on the basis of approvals by the authorities followed by a selection in relation to material quantities consumed compared with the activities carried out on the sites.

Energy and water consumption

Electricity, gas, district heating and water are recognised in the statement on the basis of quantities consumed according to direct meter readings 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 is recognised in the statement on the basis of external purchases adjusted for stocks at the beginning and at the end of the period. Fuel for transport has been recognised on the basis of supplier statements.

Waste and scrap

Waste is recognised 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 estimated on the basis of subscription arrangement and load. Scrap is recognised in the statement on the basis of weight slips from the scrap dealers collected decentrally per site.

Emission to air and waste water

Emissions of organic solvents have been calculated on the basis of quantities of mould preparation agents, 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 plants and measurements or information from the suppliers as regards dimensions and filter efficiency.

Waste water is recognised as water consumption reduced by utilised water, which does not end as waste water e.g. water humidification, green areas or other processes where the consumption is documented through measurement.

Materiality is determined on the basis of regulatory approvals and conditions.

The total volume of flue gases from incineration processes has been calculated based on the consumption of fuel oil and natural gas as well as measured or estimated oxygen percentage.

Neighbour complaints

Neighbour complaints are recognised in the statement as the number of complaints received resulting in operating or layout changes.

Internal inspection conditions exceeded

Internal inspection conditions exceeded are recognised in the statement as the conditions for which there is a measurement requirement and the measurement has shown the conditions being exceeded.

Environmental accidents

Environmental accidents are recognised in the statement as the accidents occurred which should be or have been reported to the authorities.

Occupational health and safety

Occupational health and safety are recognised for all activities under the organisational structure.

Industrial injuries are recognised in the statement on the basis of records of injuries resulting in more than one day of absence in addition to the day on which the injury has happened.

Absence due to injuries is defined as hours absent due to industrial injuries. The number of working hours and absence frequency due to injuries have been calculated on the basis of daily time cards registered in the payroll system.

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

To the Shareholders of Vestas Wind Systems A/S

Fundamentals

Vestas Wind Systems A/S has entered into an agreement with PricewaterhouseCoopers for submission of a statement on its Environmental Report with the overall objective of verifying the reliability of the data presented and the information provided in the Environmental Report.

The Environmental Report is the responsibility of Vestas Wind Systems A/S Management. Our responsibility is to submit a statement on the Report based on our work.

The scope and objectives of the Report as well as the priority of environmental and health & safety issues have been determined by Vestas Wind Systems A/S Management and described on pages 88-90 of the Environmental Report.

Basis of Conclusion

We have planned and performed our work in accordance with international auditing standards (ISA 100) with the agreed objectives of:

- checking with a high level of assurance whether the data stated on pages 88-101 of the Environmental Report for 2003 correlate with the activities of the sites for the accounting period and have been documented and stated in accordance with the guidelines described in Vestas' accounting policies and measurement and computation methods applied;
- assessing whether the internal control system relating to reporting and registration procedures has been planned appropriately to support reliable information in the Environmental Report for 2003.

Our work has included, based on an assessment of materiality and risk, accounting analyses, inquiries, testing of systems, data and underlying documentation, including

verification of compliance with the accounting policies described and of correlation with the activities of the site for the period.

Furthermore, we have, at inspection visits, assessed the internal control system with a view to its propriety, focusing on the efficiency of the reporting and registration procedures applied to support a harmonised and uniform international basis of registration of and reporting on environmental and health & safety issues.

In our opinion, the work performed provides an adequate basis for the following conclusion.

Conclusion

Based on the work performed by us, we hereby state that, in our opinion, the data stated on pages 88-101 of the Environmental Report for 2003 correlate with the activities of the site for the accounting period and have been documented and stated in accordance with the guidelines described in Vestas' accounting policies and measurement and computation methods applied.

Furthermore, in our opinion, the internal control system relating to reporting and registration procedures has been planned appropriately to support reliable information in the Environmental Report for 2003.

Herning, 17 March 2004

PricewaterhouseCoopers

Statsautoriseret Revisionsinteressentskab

Niels Jørgen Lodahl Birgitte Mogensen
State Authorised State Authorised
Public Accountant Public Accountant

Conversion factors

1 GW	1,000 MW
1 MWh	1,000 kWh
1 Nm³ natural gas	11 kWh
1 litre of fuel oil	

Glossary

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.

Assembly fitting:

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

Average consumption of a Danish household:

Energistatistik 2003 (Energy Statistics 2003), which is published by the Danish Energy Agency, defines an average Danish household as consisting of four people living in a 120 m² residence. Consumption for 2002 is listed as 3,350 kWh per year.

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.

CO₂-neutral energy:

Energy generated without causing net emissions of ${\rm CO}_2$.

Emit:

Discharge into the immediate surroundings.

Energy balance:

The energy balance of a wind turbine is an expression of how long the turbine has to operate before it has produced sufficient energy to cover the volume of energy consumed in its entire life cycle, from extraction of the raw materials to final disposal.

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 Assessement (LCA) will be included as a tool.

Estimated turbine production:

The value is calculated on the basis of an expected service life of 20 years and a capacity factor of 30%. The figure should be considered a guideline only, as it is an estimate calculated on the basis of the production in Denmark, Italy 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).

Flue gas:

Combustion gas from gas and oil-fired installations.

Internal inspection conditions:

Conditions laid down by the supervisory authority for the measurement of noise, odours, waste water and emissions into the air.

ISO 14001:

International environmental management standard.

LCA:

An LCA (Life Cycle Assessment) is a report on the environmental impact generated by a specific product through-out 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.

Nacelle:

The turbine housing at the top of the tower.

Near misses:

An incident that occurs suddenly and unexpectedly, which does not result in personal injury, but may have caused material damage and could conceivably have led to personal injury.

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).

Safety audit:

Systematic examination of a department or machine with the purpose of constantly checking for and repairing any errors and defects that may affect safety.

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).

Unwanted substances and materials:

Substances and materials covered by Effektlisten 2000 ("Effect List 2000" – guideline no. 6/2000 from the Danish Environmental Protection Agency) and Listen over uønskede stoffer ("List of unwanted substances" – guideline no. 9/2000 from the Danish Environmental Protection Agency) as well as substances and materials that Vestas unilaterally wishes to stop using on account of their potential impact on the environment and/or occupational health and safety.

VOC:

Expression relating to organic solvents (Volatile Organic Compounds).



 ${\it In~2003, Vestas~transported~both~blades~and~nacelles~by~train~to~a~range~of~sites~in~the~United~States.}$



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