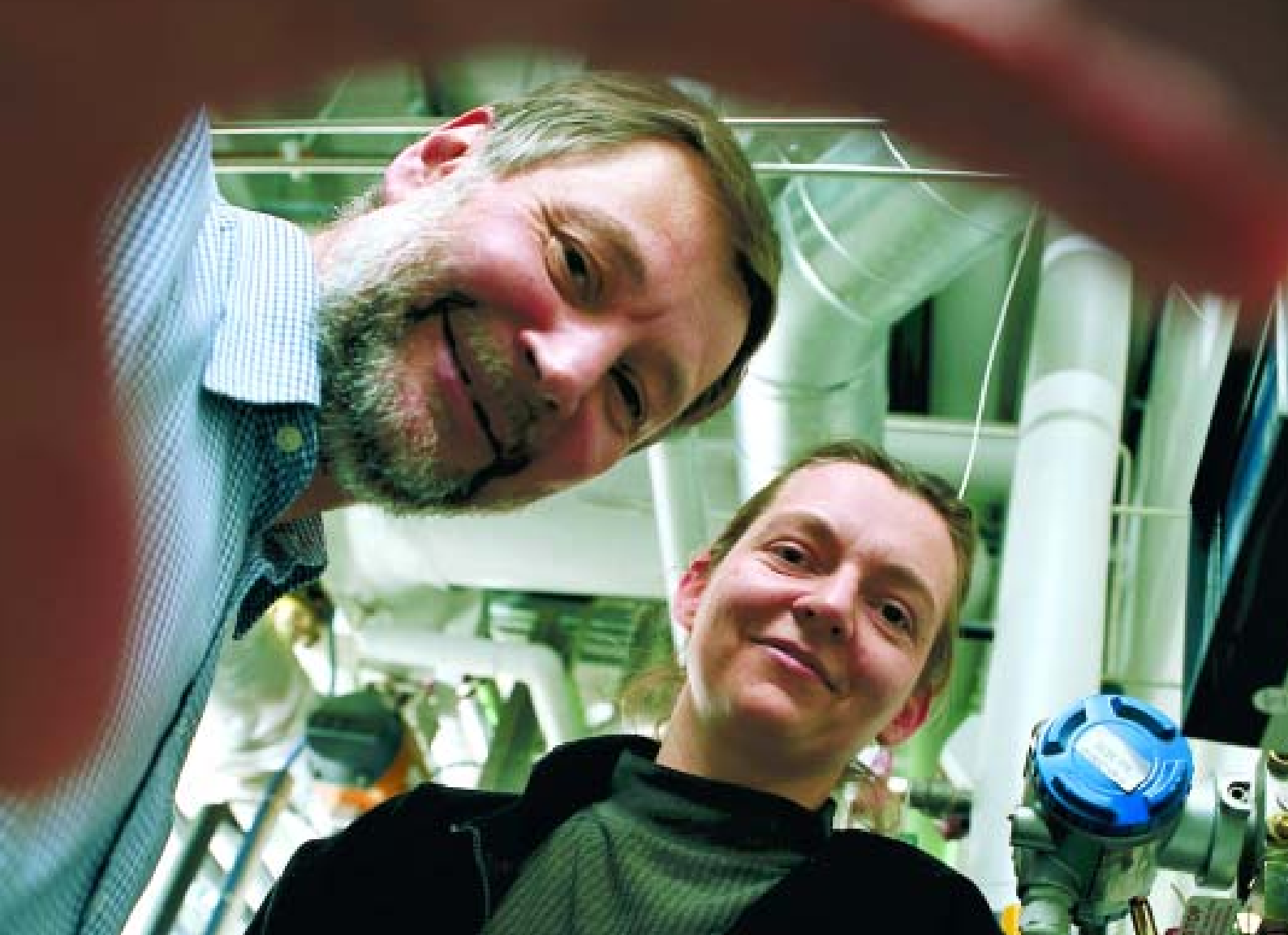



Environmental and Social Report Bagsværd 2003



# Headquarters with both development and production

**Novo Nordisk's operations in Bagsværd are situated in an industrial area bordering private housing, recreational areas, other industry, and the town of Bagsværd itself. The company occupies a total area in Bagsværd of about 180,000 m<sup>2</sup>. The site also houses the headquarters of Novo Nordisk A/S and the affiliates NNE A/S, NNS A/S and NNIT A/S. At the end of 2003 we had 3,745 employees in Bagsværd.**

 Our main operations in Bagsværd consist of developing and manufacturing insulin products for treating people with diabetes. We also have pilot plants for other treatment areas, and minor production of hormone tablets for hormone replacement therapy. In 2003 our production activities were organised into three main areas:

- Production Development (PDev): which comprises pilot plants (for the fermentation, recovery and formulation of insulin and other pharmaceutical proteins) and laboratories. We use genetically modified microorganisms that are harmless to humans and nature.
- Insulin Purification, Diabetes Bulk Production (DBP): which purifies insulin that is fermented and recovered at our production site in Kalundborg.
- Finished Goods, Diabetes Pharmaceutical (DP): which formulates, fills and packs insulin products. We also make caps for sealing insulin cartridges, and print labels and packaging.

Additionally, we have pilot plants for the development of other pharmaceutical products based on chemical synthesis and cell culture using animal cells.

Bagsværd is also home to a range of other operations such as purchasing, raw material and product warehouses, control laboratories, maintenance workshops, power plants for the production of heat, steam and electricity, a waste centre for sorting waste, administrative departments, and corporate functions.

Novo Nordisk in Bagsværd uses relatively large amounts of water and energy as well as a range of raw materials and auxiliaries. The main impacts on the environment are from wastewater (which is piped to Lundtofte Wastewater Treatment Plant), solid waste (which is sent for recycling, incineration, landfill, or destruction at Kommunekemi), and air emissions

from energy production and in the form of organic solvents from our insulin plants and, to a lesser extent, our pilot plants. From the point of view of our neighbours, noise is the main environmental impact.

Bagsværd's insulin plants, pilot plants and hormone production, together with their associated administration and quality control, have an Environmental Management System that is certified according to the ISO 14001 standard.

All development and production activities in Bagsværd are approved and regulated in accordance with the Danish Environmental Protection Act. The use of genetically modified organisms is approved and regulated in accordance with the Danish Act on the Environment and Genetic Engineering (production) or the Ministry of Labour order on genetic engineering and health & safety (laboratories and pilot plants).

The authorities that approve and/or monitor our environmental status are Gladsaxe Municipality (wastewater for public sewage and waste disposal), the Danish Forest and Nature Agency (genetically modified organisms in production facilities), the Working Environment Service (genetically modified organisms in laboratories and pilot plants), and Copenhagen County (other environmental issues).

### Contact:

Henrik Friese  
Vice President, DP  
hefr@novonordisk.com  
+45 4442 7779

Henrik Kim Nielsen  
Vice President, PDev  
hkn@novonordisk.com  
+45 4442 6298



We are making great efforts to create good, safe working conditions for our employees. Finished Goods in Bagsværd has become the sponsor site for our new Brazilian production site and will help them to familiarise themselves with Novo Nordisk's methods and routines. In this regard, Marcello Zuculin (below right) from Site Montes Claros in Brazil has been stationed in Bagsværd.



# Good results for both employees and the environment

**Among the main themes of our work at Novo Nordisk in Bagsværd in 2003 were cooperation with new colleagues in Brazil, the integration of employees from Novo Nordisk Servicepartner, and continued improvements in our Environmental Management System.**

In this report we discuss our social and environmental performance in 2003, which is of major importance for our employees and for relations with our suppliers, our neighbours, the local community, and the environmental authorities. In the social area we focused on issues that concern our employees' health, well-being and development, and on the targets that we had set for 2003. In the environmental area we focused on documenting that we are meeting the environmental requirements laid down by the authorities and in Novo Nordisk's own Environmental Policy, and on the targets that we had set for 2003.

Novo Nordisk's Environmental Policy obliges us to promote environmental awareness, prevent and limit pollution, satisfy our official environmental requirements, and continuously improve our environmental performance. We carry out environmental assessments of all changes and new activities, and set targets relating to our main environmental issues. Since 2002 we have also been systematically assessing the environmental and social performance of our suppliers. This assessment is based on questionnaires, and in 2004 the replies will form part of our auditing of selected suppliers.

Employees are involved in environmental work in various ways, and in 2003 we sought to make the system part of our everyday working life. Each organisational area has an environmental coordinator and an environmental group to ensure co-ordination and implementation of agreed environmental initiatives and follow-up on environmental targets in the individual departments. Employees are involved in local environmental projects, and there are ongoing training and promotional activities so that everyone is aware of the main environmental impacts of their work and how they can help to limit these impacts.

### **Annual targets for water and energy**

In 2003 all areas set targets for water and energy consumption measured in relation to the number of units produced and re-

leased. For Novo Nordisk as a whole, the targets for 2003 were to improve utilisation of water and energy by 5% and 2% respectively compared to 2002. Overall, the production plants in Bagsværd achieved these targets.

### **Breaches, releases and complaints**

In 2003 we recorded 65 breaches of regulatory limit values. This was a huge increase compared to 2002. The breaches all related to wastewater discharge from our insulin purification plant, and mainly resulted from our continuous measuring of pH and temperature, which accounted for 61 of the breaches. The increase was due to difficulties in controlling the neutralisation of the wastewater, and to increased focus on our wastewater control. We submitted a report to Gladsaxe Municipality, and expect to resolve the problems in 2004.

We had six accidental releases from our production and pilot plants. These comprised three releases into the sewage system (two minor releases of ethanol and one of sulphur-containing wastewater) and three releases of coolant into the atmosphere. The authorities were informed of the releases, and in all cases we took corrective actions to reduce the risk of repeats.

We received four complaints about nuisances from our operations, three relating to odour and one to noise. The noise nuisance was due to a ventilator that has since been noise-dampened. The odour nuisances were caused by hydrogen sulphide in the sewage system resulting from a high content of sulphate in the wastewater from our insulin purification plant. In conjunction with Gladsaxe Municipality, we took action to limit the sulphate content, and this seems to have resolved the problem.

### **Environmental management in Bagsværd**

The introduction of environmental management in accordance with ISO 14001 was a major focus for two years in our production and pilot plants. The work was completed with the environmental certification of Production Development in March



The management team in Bagsværd: Henrik Friese (left) and Henrik Kim Nielsen.

2003. The Environmental Management System has given us a tool for more systematic handling of our environmental issues. Employees are directly involved in the work and are challenged to come up with environment-improving ideas. We have also acquired tools for identifying and assessing key environmental issues relating to projects and investments.

Among other things in 2003 we improved our waste management, mapped our water and energy consumption, and carried out a number of other initiatives that have generally helped us to be an aware and responsible company in the area of environment. We are especially proud of the establishment of a new waste concept because in one stroke it has solved a number of problems that we had as well as being economically sound. We are also extremely satisfied with the result of our initiative to limit emissions of ethanol from Insulin Purification. Based on an action plan approved by Copenhagen County, we have carried out a number of measures that look set to reduce the site's ethanol emissions by around 30%. The result of this initiative will be reported to Copenhagen County in the first quarter of 2004.

#### **Annual targets for social responsibility**

We achieved all the corporate targets that were set in the social area for 2003. Instead of the target that 80% of employees should discuss the results of DAWN – a survey of the psychosocial aspects of diabetes – or other relevant studies with patients, our target was to create greater customer understanding through events focusing on customer complaints.

An important theme in 2003 was the integration of former employees of Novo Nordisk Servicepartner. This Novo Nordisk affiliate had to reduce its staff due to a cutback in the company's operations, and we undertook to offer them new jobs. This required a major effort by our new colleagues and their team leaders to settle into their work duties, but they coped brilliantly.

Bagsværd enjoys close cooperation with Novo Nordisk's new insulin plant in Montes Claros in Brazil. Finished Goods guides

our Brazilian colleagues in the planning and construction of new production plants. This cooperation involves a large group of employees in Bagsværd – hourly-paid workers, salaried employees and management – who all have contact with colleagues on the other side of the world.

#### **New approaches to health & safety**

Our continued focus on reducing the frequency of occupational injuries produced good results last year in the form of a huge reduction in the number of injuries with absence – from 93 in 2002 to 26 in 2003.

In 2003 Finished Goods and Production Development both worked on health & safety in new ways. Finished Goods did so well that it received Novo Nordisk's new Working Environment Award in spring 2003. We worked more systematically on target-setting, planning and target achievement. We also trained our health & safety representatives so that they are as well equipped for the task as possible. Production Development focused in particular on strengthening the integration between environmental and health & safety work.

#### **The future**

2004 and beyond will see even more activities in environmental and social work at Novo Nordisk in Bagsværd. In 2004 there will continue to be a major focus on optimising energy and water consumption.

For Production Development 2004 will be a year of focusing on reducing the consumption of paper and water. Insulin Purification will also focus on water and energy savings, and the site will continue to work purposefully to resolve the problem of breaches and to study the possibility of phasing out bactericides and algicides for the cooling towers. Finished Goods will be working in particular on making better use of the Environmental Management System and strengthening the correlation between targets and initiatives.

# Diversity in work produces many good results

**Our work relating to social responsibility in 2003 was wide-ranging and inventive: lectures and meetings on equal opportunities; new health & safety initiatives; mapping of competences; and internal training activities.**

**T**hroughout Novo Nordisk we counteract health & safety risks associated with pollutant substances, dust and noise by including health & safety considerations when fitting out our production plants and by focusing on near-misses. All our production sites have been classified as Level 1 by the Danish Working Environment Service, which means that the company is efficiently managing its working environment and meeting the requirements of the Danish Working Environment Act. In 2003 Site Bagsværd enjoyed excellent health & safety results, with a huge reduction in the number of occupational injuries with absence: there were just 26. The previous year the figure had been 93, and although 55 of these were caused by a single incident at a social event, the result for 2003 still represented a significant drop from earlier years, when the number of injuries with absence was 42 in 2000 and 47 in 2001.

Finished Goods has always had a high frequency of occupational injuries. In 2003 we set the target of reducing the frequency to 16 injuries for every one million working hours, and we achieved this. Our efforts were rewarded: Finished Goods was the recipient of the first ever Novo Nordisk Working Environment Award. The excellent results were due to the fact that we are working in a more focused way on health & safety than before. In 2003 the health & safety representatives were better equipped to do their work. They were given a digital camera to make it easier for them to describe potential hazard situations, a tool for analysing occupational injuries, and a course programme that we prepared with the Occupational Health Service (OHS). And then of course we are carrying out the annual workplace assessments (WAs) in all departments.

Production Development focused on work-related stress. Among other things, we held a themed meeting on stress at which, as well as experts, we also heard one of our own colleagues talk about experiences of stress and stress-related sick

leave. This has made us more aware of stress signals in our colleagues. Insulin Purification also took up the theme, i.a. through a video in which our employees were interviewed on the subject of stress. The video was shown on a big screen at a quarterly meeting.

A common target at Novo Nordisk in 2003 was to carry out the eVoice electronic employee survey. Another common target was that 80% of all managers, on a scale of 1 to 5, should achieve a score of 3.0 or above in the survey's questions on winning culture. Both targets were achieved by most departments in Bagsværd, and the results of the survey were generally positive.

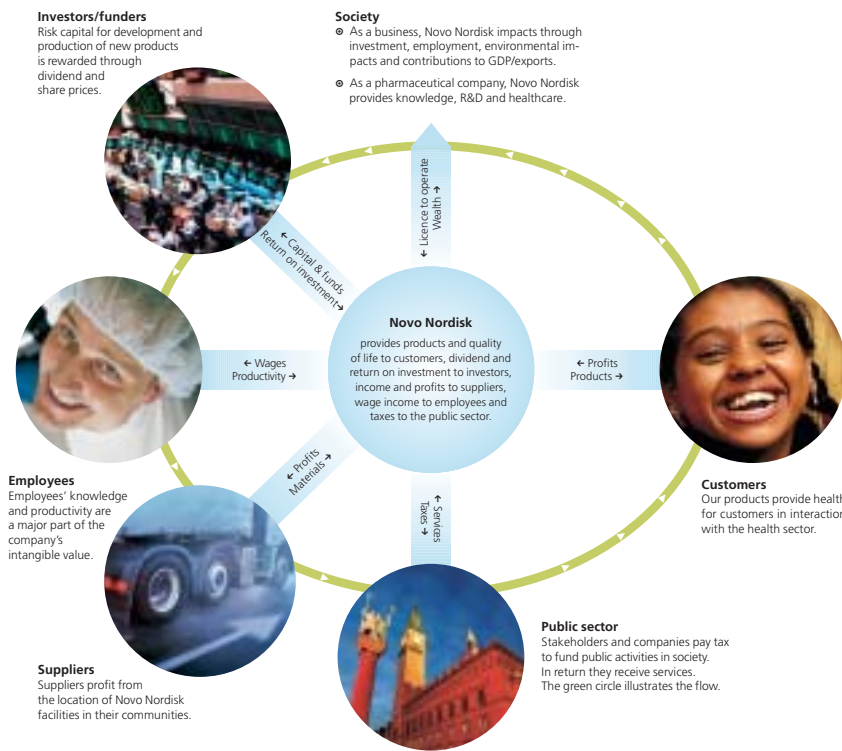
### **Employees share their knowledge**

Although we had to cut back on the training budget in 2003, our activities went ahead at full steam. We focused on learning to use each other better and share our knowledge internally. Often the most relevant learning and development take place on internal courses, on job swaps, or through more informal learning – development groups, project work, learning from colleagues, or by being given new tasks.

One example is our 'chemist-teaches-chemist-course' in Finished Goods, where employees from various departments teach one another. This supplements the Novo Nordisk Pharmaceutical Process Academy (PPA) course, which can only cater for a few employees. Our seven-day course – PPA Light – aims to give chemists an overview of the whole production chain and to build up the participants' personal network in the organisation. In 2003, PPA Light ran twice with a total of 40 participants. In addition to this, in 2003 Novo Nordisk launched several company-wide courses in which our employees also took part. These included SMA (Supply Managers Academy) and STA (Supply Teamleaders Academy). The courses are aimed at managers and middle managers with the purpose of developing their management competences in a number of different areas. →

## Socio-economic contribution

Novo Nordisk's operations in Bagsværd create jobs for our employees, at suppliers, shopkeepers and in the public sector. In 2002, our overall socio-economic contribution in Greater Copenhagen can be set at 7,620 jobs<sup>1)</sup>. The chart below provides an overview of the interaction between key stakeholders, with detailed focus on employees, suppliers and the public sector.



### Employees

Novo Nordisk employees (3,928 in 2002) account for around 19% of Gladsaxe Municipality's jobs. 793 of Novo Nordisk's employees live in Gladsaxe Municipality, 433 of whom work for Novo Nordisk in Bagsværd. Employees pay around DKK 245m in tax to the municipalities in which they live, of which DKK 49m is income tax to Gladsaxe Municipality<sup>1)</sup>. Their private consumption contributes to some 1,396 further jobs in the region, 37 of these in Gladsaxe Municipality. They also contribute property taxes etc, and the remainder of their income tax that goes to the state.

### Suppliers

Novo Nordisk in Bagsværd is estimated to create the basis for 298 jobs locally, and 2,296 jobs overall in Greater Copenhagen. These jobs are estimated to contribute municipal income tax of around DKK 51m in the region<sup>1)</sup>, of which DKK 7m is to Gladsaxe Municipality. Additionally, income tax is paid to the state.

### The public sector

The company, our own employees and local suppliers' employees pay taxes to the municipality<sup>1)</sup> totalling around DKK 173m. However, the contribution to the municipality is only DKK 119m because equalisation systems would compensate for the lower tax revenue if these citizens and companies did not live or carry on business in the municipality. Novo Nordisk pays around 13% of the company tax to the municipalities, and DKK 14m in energy and environmental taxes to the state (86%) and municipality (14%).

1) The socio-economic contributions of jobs and taxes are based on assumptions for local purchase habits and multipliers for Greater Copenhagen. Income and tax payments are reduced by the income and taxes that these persons would otherwise have; calculated here as unemployment benefit. All data are from 2002.

### REQUIREMENTS IMPACT SUPPLIERS

Claudia Cordera, customer service, Forma vitrum de México

In 2002 Novo Nordisk launched a programme to carry out social and environmental evaluation of its suppliers. We made an audit visit to Forma vitrum de México, S.A. de C.V. to help with the development of the programme. Forma vitrum de México has been assessed on social and environmental issues since the beginning of the programme.

Forma vitrum is a supplier of glass for Penfill® production in Bagsværd.

"In the beginning we were surprised to be asked such questions by a client. They are dealing with issues which we are usually asked about by authorities, not clients. Getting the information to

complete the questionnaire involved looking into local legislation and translating this information, not only into English, but also to make it fit the questions in the questionnaire.

"After the team from Novo Nordisk visited us, we took some steps to improve the working environment, for instance with regard to minimising the temperature and noise inside the production areas. We also started working on our ISO 14001 Environmental Management System. As part of this we now pose questions to our own suppliers regarding risk and datasheets for solvents and waste handling etc.

"So far we have not requested social performance data from our suppliers, since these are audited by the government authorities.

"We would like to get summary information about what Novo Nordisk is doing to address these issues. We know that we are working in different business areas and have different processes, but we could use the information for inspiration, and as guidance as to where they would like us to develop further.

"Having replied to this questionnaire and been rated satisfactory by Novo Nordisk may prove to be an asset for us and provide added value in a competitive situation. When you take care of the company as a whole, eg your employees, you get better results; it helps improve the quality of our products and the relationships with our customers," Claudia Cordera concludes.

→ Finally, in Finished Goods we spent a good portion of our 2003 training budget on industrial operator training and PC training for our hourly-paid workers.

### Mapping competences and knowledge

In 2003 Production Development carried out mapping of competences and future competence needs for our chemists and ran a similar pilot project for laboratory technicians and admin workers that will be run in all departments in 2004. The results of this are a much better overview of the overall competence stock compared to our needs, and an improved understanding of individual employees' competences and needs to the benefit of development interviews. Generally speaking, this tool makes it possible for us to target our training activities and new appointments directly at the 'competence gaps' that have been identified.

Another area that we focused on in 2003 was the strengthening of knowledge sharing in and between development and support projects. A lot of knowledge remains within a department or project and does not benefit others in situations where it could be relevant. This means that many bright ideas are occurring in parallel. An increase in knowledge sharing will streamline project work. We are trying to make projects and their content more visible, to improve employee networks across projects, and to store knowledge from each project so that it can be used by other projects. In 2004 we will continue to work on knowledge management.

### Equal opportunities

In Production Development's action plan for equal opportunities we decided in 2003 to focus on recruitment. We decided that all relevant chemist positions – and as a minimum one position per department – would be posted in English and advertised on international websites. We also set a target that if for a vacant position there are qualified applicants with a non-

Danish background, at least one would be called for interview. In the eVoice Working Climate Survey, all employees expressed the view that equal opportunities has a major impact on our ability to achieve good business results.

Among other things, in Finished Goods we discussed the theme at a quarterly meeting and also looked at our recruitment procedures so that we can help to ensure equal opportunities for job applicants.

### New colleagues from NNS

When Novo Nordisk's affiliate Novo Nordisk Servicepartner had to lay off a large number of employees due to a cutback in the company's operations, Novo Nordisk undertook as part of its social responsibility to offer those employees the opportunity to work in Novo Nordisk's production. This was a massive task, not least because most of these employees had performed completely different types of work to those encountered in production. It is to the credit of the team leaders in particular that this task was carried out satisfactorily. At the same time, our new employees must also be praised for their courage in throwing themselves into new challenges.

### Social targets 2004

- Identify critical competences for the introduction of an improvement culture for all employee groups in relevant areas.
- At least 80% of employees to attend a presentation on marketing of our products.
- All employees to take part in a climate survey in which they are questioned on the winning culture, and at least 80% to score above 3.
- All areas to have a plan for their work on equal opportunities and to implement 90% of the actions in the plan.
- Reduce the number of occupational injuries per 1 million working hours compared to 2003.

Social data						
Our employees	2000	2001	2002	2003	Development in % 2002-2003	
Total number of employees	3,622	3,855	3,928	3,745	-5	
Number of full-time employees	3,193	3,381	3,485	3,342	-4	
Number of part-time employees	429	474	443	403	-9	
Average age distribution (years)	39.6	39.5	39.9	40.4	1	
Average years of service	8.0	7.7	8.0	8.4	5	
Rate of employee turnover (%)	6.7	6.3	6.6	7.9		
Job functions and gender representation	Number of employees			2003		
Administration <sup>1)</sup>				1,047	43%	57%
Research and Development				982	60%	40%
Production <sup>1)</sup>				1,628	48%	52%
Sales and Marketing				88	36%	64%
<i>Of the total number of employees:</i>						
Vice presidents/senior principal scientists				80	20%	80%
Managers/principal scientists				381	31%	69%
Occupational injuries	1999	2000	2001	2002	2003	Development in % 2002-2003
Frequency of occupational injuries		7.2	7.6	14.8	4.3	-71
Number of occupational injuries with absence		42	47	93	26	-72

1) In 2003 administration in production is included in production and not in administration as in previous years.



Thomas Hansen and Marianne Badstue were delighted and overwhelmed by the result of DP's TakeAction! project.

**TAKEACTION!**

Large and small projects help Tanzania

The Logistics Department in Diabetes Pharmaceutical rose to the challenge to make Novo Nordisk's values come alive. So a project was launched to collect clothes, shoes, linen and towels, toys, test strips for measuring glucose in urine, office equipment, wheeled chairs, walking aids and much more, all of which was

then sent to a diabetes clinic in Tanzania. A total of nine tons of donations was made by employees in Bagsværd, who also helped to pack the collected items. Our cooperation partners were also involved – P.O. Nielsen, Berendsen and Danzas provided two containers, linen, towels, overalls, etc, as well as the transport to Tanzania.

In Production Development, Diabetes Injectable Support held a family day for around 100 participants at which we

raised money for the diabetes clinic in Tanzania by selling pizzas, soft drinks, coffee and cakes. The participants also paid a token amount for attending some of the day's activities. As well as increasing awareness of access to health, we raised DKK 3,100 for the World Diabetes Foundation. The money will go towards the Foundation's work in setting up diabetes centres in the rural districts of Tanzania, which will cost around DKK 35,000 each.

**LESS DRIVING AROUND**

Car park eases traffic and reduces nuisance

In 2003 a new car park was built in Bagsværd to expand and improve the facilities for employees and external cooperation partners: it has been difficult to find a place to park for a long time. The new car park also means less nuisance for our neighbours as there is less traffic in the area, with employees and others no longer needing to drive around the area looking for somewhere to park.



# Environmental innovation with a bonus

**The environment year in Bagsværd was very exciting. With great enthusiasm and skill, employees at all levels took the initiative to get our activities carried out with regard for the environment. There are many good results to discuss from 2003.**

In 2003 Production Development obtained its well-earned ISO 14001 certification of the Environmental Management System. Among other things, we established a new waste concept for parts of the organisation, limited emissions of ethanol from Insulin Purification, improved our supplier control significantly, and took part in the development of a tool for environmental assessment of development projects. Unfortunately it also brought a number of breaches of regulatory limits, accidental releases, complaints, and cases of soil pollution – all of which had to be tackled.

The Environmental Management Systems have given us a more systematic approach to environmental work. We now have tools for identifying and assessing key environmental issues, projects and investments. Employees are directly involved in the environmental work and are challenged to come up with environment-improving ideas that will help ensure continuous improvements in relation to key environmental issues. For example, there have been suggestions relating to recycling packaging for internal transport of samples, use of environment-friendly cleaning agents, purchasing of rechargeable batteries, savings on water and electricity, and reduction in paper consumption.

In Production Development, our main target last year was to obtain environmental certification, and we succeeded on time in March 2003. The environmental group has been deeply committed, and this has produced results. The first external audit gave rise to just a few not particularly serious observations, which indicates that we have done well. The value of the Environmental Management System was clear to us when we had our environmental inspection by Copenhagen County in November. Prior to certification, the preparations for an inspection took up to three days. This time they took just three hours because all the information was immediately accessible and up to date.

### Water and energy

We use relatively large amounts of water and energy in our operations. Water is supplied by Gladsaxe Municipality as drinking-quality groundwater. Electricity is supplied by NESAs. Approximately 30% of the electricity is generated from environ-

mentally friendly energy sources such as wind and natural gas, while the remaining 70% is generated mainly from fossil fuels such as coal and oil. Steam and heat are produced and supplied by our central boiler plant and heat power station in Bagsværd using natural gas.

In 2003 we used 216,000 m<sup>3</sup> of water and 492,000 GJ of energy. Water consumption fell slightly, while energy consumption increased by ca 3% compared to 2002.

As an integrated part of our environmental work, we are working continuously to improve our utilisation of water and energy. For Novo Nordisk as a whole, the targets for 2003 were to improve utilisation of water and energy by 5% and 2% respectively compared to 2002. Insulin Purification and Finished Goods met their respective targets, but Hormone Production was unable to meet its targets due in part to lower tablet production and greater energy consumption on room heating. In all, however, the production plants in Bagsværd met their targets for water and energy.

### Raw materials and packaging

In 2003 we used a total of 2,814 tons of raw materials and auxiliaries and 1,365 tons of packaging for our operations. In the case of raw materials, this was an increase of 15% compared to 2002. Less than 1% of the total raw materials consumption was in the form of materials that are harmful to the environment or health. In the case of packaging, there was an increase of 5% compared to 2002.

### Waste

All waste from Novo Nordisk in Bagsværd is gathered, sorted, transported and disposed of in accordance with Gladsaxe Municipality's waste regulations. The waste is sorted with a view to maximum possible recycling. Non-recyclable waste is sent for incineration at I/S Vestforbrænding incineration plant in Glostrup or for disposal at an approved landfill site. Chemical waste is sent for destruction at Kommunekemi or for recycling at specially approved treatment plants.

In 2003, Novo Nordisk in Bagsværd generated a total of →



→ 3,852 tons of waste, which was a drop of 11% compared to 2002. This was mainly due to a fall in the amount of organic solvents from a production process that ceased in 2003.

### Wastewater

Wastewater consists of process wastewater and cleaning water from production and pilot plants, general sanitary wastewater, and rainwater from outdoor areas impervious to water. Wastewater from pilot fermentation and cell culture is heat-treated to inactivate the genetically modified organisms before drainage into the sewage system. Wastewater with acid or alkaline pH is neutralised before discharge into the sewage system. Wastewater from production, pilot plants and sanitation is discharged via the public wastewater system to Lundtofte Wastewater Treatment Plant, from where the treated water is discharged into the Sound. Rainwater from outdoor areas impervious to water is discharged to Smørmosen Marshes in Bagsværd.

The total discharge of wastewater in 2003 was 197,000 m<sup>3</sup>, which was the same as in 2002.

### Air emissions

The main air emissions are emissions of CO<sub>2</sub>, and NO<sub>x</sub> from the production of heat and steam in our own plants, and emissions of ethanol (spirit) and acetone from insulin purification and the pilot plants. All air streams containing dust pass through effective filters, and the plants only have a minor dust impact on the environment.

For some years we have been working to limit emissions of ethanol from our insulin purification plant. In 2003 we drew up an action plan, which was accepted by Copenhagen County. Changes in the exhaust etc, for various tanks have led to a drastic fall in the ethanol concentration in the exit air from these tanks. In 2004 we will be measuring the overall effect, but based on the measurements to date we estimate that the changes have reduced the plant's ethanol emissions by around 30%. The implemented measures have meant that the plant's ethanol emissions have been reduced from around 75 tons in 2002 to around 62 tons in 2003. It appears that previous problems with transgressing the limit value of 300 mg/m<sup>3</sup> have now been solved.

### Noise

The main sources of external noise in Bagsværd are ventilation outlets, cooling towers, and traffic to and from the area. In 2003 we implemented the final stage of the three-year noise dampening project that was agreed with Copenhagen County, covering both Novo Nordisk and Novozymes. The aim is to reduce the overall noise contribution to the environment from the two companies so that we are not a nuisance to our neighbours and, wherever possible, observe the Danish Environmental Protection Agency's guideline noise limits.

The noise dampening has resulted in the following noise contributions at the agreed reference points, given in dB(A):

Reference points	R1	R2	R3	R4
Novo Nordisk	32.0	28.8	36.6	31.2
Novozymes + Novo Nordisk	33.3	33.2	39.1	36.2
Combined target 2003	34.0	34.6	38.7	36.7

It can be seen that the targets were achieved for R1, R2 and R4, but for R3 the total noise contribution was 0.4 dB outside the target for 2003, although still within the uncertainty of the calculations, which is 2–3 dB(A).

### Breaches of regulatory limit values

We are continuously taking a range of random measurements at our pilot and production plants to document compliance with the discharge requirements of our environmental approvals and wastewater permits. This involves measuring wastewater discharges, air emissions, and noise.

In 2003 we recorded 65 breaches of regulatory limit values, all relating to wastewater from our insulin purification plant. The majority of the breaches concern pH and temperature, which are continuously measured. The limit for pH was exceeded 39 times, which was due to the fact that the wastewater's low buffer capacity makes it difficult to control the neutralisation process. In the first half of 2004 we will be drawing up an action plan to resolve this problem.

We also had 22 minor breaches of the temperature requirement of 35°C. The highest temperature was measured at 43°C, which does not constitute any risk to humans or the environment, and we have therefore requested that Gladsaxe Municipality increase the limit value to 50°C, which the Environmental Protection Agency's wastewater guideline allows us.

Finally, there were four breaches of the limit for maximum wastewater quantity. In 2001 we applied for a permit to increase the wastewater quantity from the insulin plant.

### Spills and releases

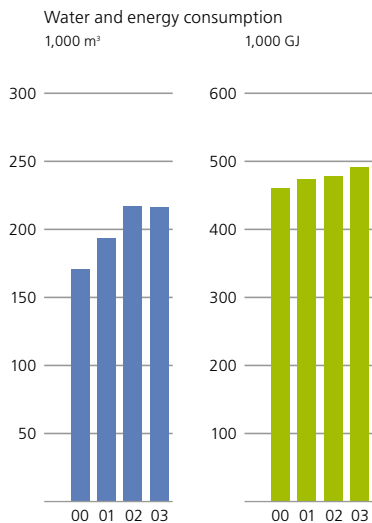
We have taken a number of precautions to minimise the risk of spills and accidental releases into the environment, including those to prevent releases into Smørmosen Marshes. For example, all the grills in our rainwater systems are painted red to make it clear that chemicals or other pollutants must not be poured into them. Furthermore, at critical points we have installed sliding gates in the rainwater system to prevent any spills reaching Smørmosen.

However, in 2003 we had six cases of accidental releases into the environment. These included a spill of 25 litres of phosphoric acid into the rainwater system, in which case our emergency system acted as intended. All cases were reported to the environmental authorities, who took note of the reports and the corrective actions.

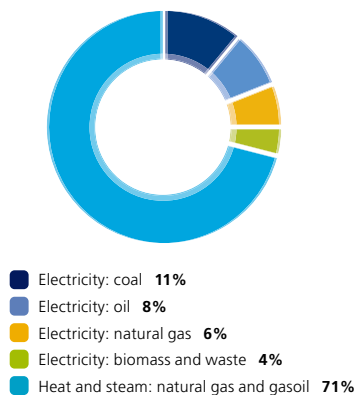
Production Development had two ethanol releases into the wastewater system of 1,000 and 500 litres respectively. The cause of these releases was a defective level meter on an indoor tank. We installed a sensor so that the pump on the tank stops if the sensor registers spirit vapour. We also instigated extra safety measures to ensure that the pump stops if the level in the tank gets too high.

Insulin Purification had an accidental release into the wastewater system of a waste stream with a high content of ammonium sulphate, which formed hydrogen sulphide and resulted in complaints about odour. Initiatives were taken to ensure that this is not repeated.

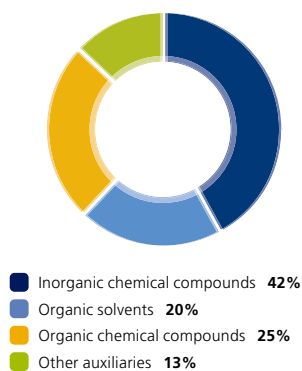
Finally, we had three releases of the coolant HCFC22 from the cooling plant in Packing with a total release of 122 kg of →



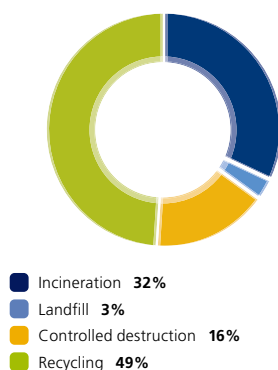
Breakdown of energy sources 2003



Breakdown of raw materials 2003



Waste disposal 2003



#### WASTE MANAGEMENT

### New system improves all three bottom lines

In 2003 Finished Goods established a new waste management system that we expect to have a major effect from 2004. We have replaced the numerous waste containers that were situated around the site with a central waste park with a compactor. The old scheme required around 8,500 emptyings a year – collected by several daily runs with large lorries. The new waste system will reduce the number of emptyings to 75–85 a year. This will reduce both the noise nuisance for our neighbours and the environmental impact from lorry transport. At the same time, we will have better source sorting and management of waste by

the individual departments, which will also have a better basis for carrying out their environmental mapping.

The waste project has also meant a major improvement in the working environment of employees since we now have small containers for collecting the waste using a hydraulic lifting device, as opposed to previously when employees carried it round in sacks and boxes that were unloaded into cages and containers. This will mean a reduction in the number of lifts of several tons a year for employees that handle the waste.

Finally, the project is also economical. The investment in the new waste concept has been recouped in less than a year and will subsequently mean savings of up to 60% a year compared to previously.

#### POLICY PUT INTO ACTION

### Environmental assessment of process changes

In BioProcess Support within Production Development, ISO 14001 certification has increased focus on the environmental effects of the process changes that the department is carrying out in production. In 2003 we documented the environmental effect of a process change in which the concentration of nutrient (glucose) in the fermentation broth is increased. The environmental effect was assessed on the basis of some key parameters: water consumption, nitrogen discharge, and phosphate discharge. The result showed that the increase in glucose concentration would mean wa-

ter consumption falling by 15%, phosphate discharge by 65%, and nitrogen discharge by 3% per produced unit. On the basis of this work, BioProcess Support is taking part in the development of a method for environmental assessment of process changes and development projects. This method will ensure that environmental aspects are included from the start of the development cycle so that we can better predict and limit the environmental impact of our future production processes and products. The department is thus contributing to realising Novo Nordisk's Environmental Policy, which among other things obliges us to develop environmentally appropriate products and processes. The work is continuing in 2004.

→ this ozone-depleting substance. The plants were subsequently sealed and refilled. We are aware of the rules for phasing out HCFC compounds, but it is not possible to use another, more environmentally friendly coolant in the plants in question. Cooling plants with HCFC22 will be included in Novo Nordisk's plan for phasing out ozone-depleting coolants.

### Complaints about odour and noise

In 2003 we received three complaints about hydrogen sulphide odour. An investigation showed that the cause of the odour was a high sulphate content in the insulin purification plant's wastewater. By agreement with Gladsaxe Municipality, we initiated measures that have significantly reduced the sulphate content in the wastewater and thus reduced the risk of the formation of hydrogen sulphide. Subsequently we have not received any complaints about odour.

We also received a complaint about noise from a roof ventilator. The ventilator has been noise-dampened and fitted with a timer control so that it only operates during the daytime from Monday to Friday. A measurement has shown that the ventilator's noise level is now so low that it is no longer a nuisance.

### Soil pollution

Between 1996 and 2001 we found three cases of soil pollution in Bagsværd and carried out drillings and preventive measures where necessary. The implemented measures were approved by Copenhagen County. In 1996 we found a case of soil pollution with acetone and 2-propanol from a leaky storage tank at the insulin purification plant. Preventive pumping began in 1997, and measurements from 2003 show that the County's stop criterion has now been met. The preventive pumping is therefore expected to end in 2004.

The second case was of soil pollution with ethanol from a leaky tank at the pilot plant in Production Development, which was discovered in 2001. Measurements in 2002 and 2003 showed that there was local pollution with ethanol and other pollutants, and that locally there was rapid degradation of the substances. New control measurements will be carried out in 2004 to follow further development.

The third case concerns soil pollution with tetrahydrofuran (THF) and methyl T-butyl ether (MTBE) from a leaky drain shaft. The source was wastewater from a synthesis plant that has now been shut and converted to a pilot plant for chemical synthesis. The pollution was discovered in 2000, and the drain shaft was identified as the source of the pollution in 2002, following which it was sealed. We mapped the extent of the pollution and submitted a report to the County in 2003 recommending preventive and control measures. Pumping of polluted groundwater has begun, and a control programme was initiated to monitor the development of the pollution.

### Environmental targets 2004

- Reduce water and energy consumption per produced unit compared to 2003 and in accordance with the general targets for Novo Nordisk.
- Avoid neighbour-related complaints.
- Reduce water consumption in PDev by 2,500 m<sup>3</sup> compared to 2003 through recycling in the cooling towers.
- Reduce paper consumption in PDev by 5% per employee compared to 2003.
- Resolve problems relating to compliance with the regulatory limits for wastewater from Insulin Purification.
- Introduce the new waste system for all users in DP.

## Statement by the authorities on the green accounts for 2003 for Novo Nordisk A/S in Bagsværd

In accordance with Ministry of the Environment Statutory Order on green accounts, Copenhagen County takes its position on the basis of the following information contained in Novo Nordisk A/S' Environmental and Social Report 2003 (with annex), which also constitutes the green accounts for the company:

- Basic information (§5)
- Management statement (§6)
- Information on environmental issues (§§7–8)
- Summary of self-monitoring (§9)
- Presentation of information (§§10–11)

### Basic information

The County assesses that the information provided satisfies the requirements of the statutory order.

### Management statement

The County assesses that the statement satisfies the requirements of the statutory order.

### Information on environmental issues

The environmental information corresponds to the County's information on Novo Nordisk. However, the County would like to see the information on consumption of raw materials and auxiliaries – and especially of substances that are harmful to the environment and health – expanded in the future. The County is not aware of other major environmental issues that should have been included in the report.

The County is pleased to note that Novo Nordisk's three-year noise action plan was completed on time and with good results.

### Summary of self-monitoring

The report's information on self-monitoring corresponds with the County's information. However, in future the County would like to see more information included, e.g. on the control of discharge filters (HEPA).

### Presentation of information

The report is assessed to be easily accessible.

## Environmental data for Novo Nordisk in Bagsværd 2000–2003

	Method	Unit	2000	2001	2002	2003
<b>Water</b>						
Drinking water	M	1,000 m <sup>3</sup>	171	194	217	216
<b>Energy</b>						
Energy (total)	M	1,000 GJ	461	473	479	492
External (electricity)	M	1,000 GJ	125	131	133	144
Internal (heat and steam)	M	1,000 GJ	336	342	346	348
Gasoil	M	1,000 GJ	17	0.4	0.2	0
Natural gas	M	1,000 GJ	319	342	346	348
<b>Materials</b>						
Materials (total)	M	tons	4,113	4,261	3,753	4,179
Raw materials	M	tons	2,810	3,064	2,447	2,814
Packaging materials	M	tons	1,303	1,197	1,306	1,365
<b>Wastewater</b>						
Volume	B	1,000 m <sup>3</sup>	133	174	197	197
Suspended solids	B	tons	48	65	61	66
COD	B	tons	331	377	448	430
Nitrogen	B	tons	21	24	33	31
Phosphorus	B	tons	5	7	7	8
<b>Waste fractions for NovoGro® scheme<sup>1)</sup></b>						
Kieselguhr, volume	M	m <sup>3</sup>	0	477	594	621
Column residue, volume	M	m <sup>3</sup>	4,050	4,727	5,796	6,491
Column residue, dry matter	A	tons	252	294	361	465
Column residue, nitrogen	A	tons	20	23	28	33
Column residue, phosphorus	A	tons	0.06	0.07	0.09	0.77
<b>Waste</b>						
Waste (total)	M	tons	4,515	6,717	4,327	3,852
Incineration	M	tons	866	1,146	1,161	1,222
Landfill	M	tons	42	91	38	129
Controlled destruction	M	tons	619	1,005	594	612
Recycling	M	tons	2,988	4,475	2,534	1,889
Construction waste	M	tons	13	0	47	56
Electronic equipment <sup>2)</sup>	M	tons	15	38	28	45
Glass	M	tons	50	36	43	66
Chemicals	M	tons	–	–	1	6
Kieselguhr	M	tons	152	0	0	0
Food	M	tons	47	96	106	102
Metal	M	tons	116	117	101	134
Mineral oil	M	tons	3	3	5	2
Organic solvents	M	tons	2,072	3,432	1,344	566
Paper and cardboard	M	tons	501	621	697	701
Plastic	M	tons	19	22	6	1
Bulk waste (furniture etc)	M	tons	–	–	–	29
Wood	M	tons	0	110	156	181
<b>Emissions to air</b>						
Organic solvents (ethanol and acetone) <sup>3)</sup>	A	tons	27	27	81	69
Ozone-depleting substances (total)	A	kg	1,358	494	533	225
CFC	A	kg	115	0	0	0
HCFC	A	kg	1,243	494	533	225
Carbon dioxide (CO <sub>2</sub> ) from energy production	A	1,000 tons	37.9	43.0	41.8	41.7
CO <sub>2</sub> from external production	A	1,000 tons	18.5	23.0	22.0	21.9
CO <sub>2</sub> from internal production	B	1,000 tons	19.4	20.0	19.8	19.8
Sulphur dioxide (SO <sub>2</sub> ) from energy production	A	tons	42	45	19	17
SO <sub>2</sub> from external production	A	tons	40	45	19	17
SO <sub>2</sub> from internal production	B	tons	2	0	0	0
Nitrogen oxides (NO <sub>x</sub> ) from energy production	A	tons	70	40	52	52
NO <sub>x</sub> from external production	A	tons	37	23	35	34
NO <sub>x</sub> from internal production	A	tons	33	17	17	18
<b>Environmental Impact Potentials</b>						
Global warming	A	1,000 tons CO <sub>2</sub> -eqv.	41	44	43	42
Ozone layer depletion	A	kg CFC <sub>11</sub> -eqv.	144	20	21	10
Acidification	A	tons SO <sub>2</sub> -eqv.	91	73	55	53
Eutrophication	A	tons NO <sub>3</sub> -eqv.	342	374	431	459
<b>Compliance and complaints</b>						
Breaches of regulatory limits	M		0	8	12	65
Regulatory limits with repeated breaches	M		0	1	2	3
Accidental releases	M		0	2	2	6
Complaints	M		0	4	4	4
<b>Stockpile of Ozone Layer-degrading Substances</b>						
CFC	A	kg	217	217	211	186
HCFC	A	kg	3,596	3,661	3,397	2,654
Methyl bromide	A	kg	8.9	8.9	8.9	8.9

1) Waste fractions for the NovoGro® scheme include distillation residue and kieselguhr slurry from the insulin recovery plant. Data for 2001 and 2002 have been corrected in accordance with the 2002 report.

2) Data for electronic equipment waste for 2000–2002 have been corrected in accordance with the 2002 report. The quantities now include waste, which is managed by NNIT with a view to recycling.

3) Air emissions of organic solvents mainly originate from our plants for insulin recovery and filling. The figures for 2000–2002 have been corrected in accordance with the 2002 report, with emissions from the insulin filling plant being added.

In the 'Method' column, the following categories are used in accordance with the Danish Environmental Protection Agency's guideline on green accounts: Measured (M), Calculated (B) and Estimated (A).

Novo Nordisk is an international biotechnological and pharmaceutical company. We offer a wide range of insulin products, as well as products for growth disorders, hormone replacement therapy and haemostasis management. We are headquartered in Bagsværd, Denmark, and have production facilities in Denmark, France, the US, Brazil, South Africa, Japan and China. We have around 19,000 employees and are part of the holding company Novo A/S, which is also headquartered in Bagsværd. We are committed to the integration of sustainable development into the management of our company. This is being done on the basis of the 'Charter' for companies in the Novo Group. The Charter sets out our Values, Commitments and Fundamentals, as well as the Novo Nordisk Way of Management, which includes the company's Vision and Policies. We aim to be sustainable not only financially but also in terms of social and environmental responsibility. This report (including the annex) also constitutes the company's green accounts for 2003.



Novo Nordisk A/S  
Novo Allé  
2880 Bagsværd  
Denmark

Tel. +45 4444 8888  
Fax +45 4449 0555

CVR no. 24256790  
P no. 1.006.455.042

[novonordisk.com](http://novonordisk.com)

