

# Quality, Safety & Environment Report, 2005



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## 1. Structure of the Quality, Safety and Environment Report

This report covers areas where DONG's activities have had significant effects on quality, safety or the environment in 2005. The report focuses mainly on activities where DONG as operator has had direct responsibility and the possibility to initiate improvements.

The report consists of a section of text (chapters 1 - 4), describing significant events and company performance during the year, followed by the environmental account for the Group accompanied by the external auditor's declaration (chapters 5 - 6). At various points in the text there are boxes with supplementary information, expanding on some of the topics mentioned in the main text.

A number of data sheets have been produced which present the environmental accounts of the Group as a whole and of important component companies or activities. These are available from links on DONG's website [www.dong.dk](http://www.dong.dk) (select "About DONG" then "QHSE").

The report covers all activities under DONG ownership on January 1, 2005. The activities within the five companies which will merge with DONG in 2006 (ELSAM, Energi E2, NESA, Københavns Energi, Frederiksberg Elforsyning), are not included. These companies will produce reports for 2005 corresponding to previous years.

In addition to this report, DONG also produces statutory environmental accounts for the gas storage facilities at Stenlille og Lille Torup, the Nybro gas treatment plant, and Fredericia crude oil terminal. These reports may also be found on DONG's website [www.dong.dk](http://www.dong.dk).



*A Wind turbine under installation at Barrow Offshore Windfarm, DONG's biggest development in 2005.*

## 2. Management Report

### 2.1 Main events of the year

2005 was a very special year for DONG, in which the major agreements about ownership within the Danish energy sector fell into place, giving DONG the principal role in building up a new Danish energy company.

While these events were unfolding, DONG's daily business was carried on without disturbance. DONG has always laid great emphasis on high standards of safety and security in all its activities.

As this report will show, DONG has again maintained its position in 2005 as an energy supplier with high standards of security of supply, human safety, and respect for the environment. For example, the accident rate showed an improvement with only 8 lost time accidents amongst employees and contractors working at DONG-controlled sites, i forhold til 14 i 2004.

### **DONG's policy for quality, safety and the environment**

DONG finds, produces, distributes and trades energy in accordance with the needs of its customers. DONG operates responsibly and competently to benefit its customers, its employees, society in general and the environment.

DONG will work to:

- develop a strong and integrated culture of care for quality, safety and environment
- improve the quality of our products and services
- minimize resource consumption and environmental impacts
- minimize safety risks and risks to the environment
- improve our working environment
- improve our work processes and management systems for quality, safety and environment
- co-operate with suppliers and consultants who subscribe to similar policies

#### 2.1.1 Distribution and Storage (DONG D&L)

Activities in 2005 were dominated by an efficiency campaign, which aimed at changing the work philosophy, improving productivity and finding economies and synergies.

At the same time the transfer of the Control Centre from Vejen to Nybro was planned and carried out. The new Centre, which monitors all DONG's oil and gas pipelines, came into action in December 2005.

6 numbers of D&L's Safety Newspaper were produced in 2005. In 2006 a satisfaction survey will

be made amongst its readers. The newspaper supports the planned safety initiatives and campaigns, and in 2005 it also focused on use of the new incident reporting system, Synergi. The increased focus on safety has contributed to a fall in the accident frequency in 2005 compared with 2004 (see section 3.3.1).

## 2.1.2 Exploration and Production (DONG E&P)

Following the purchase of a large stake in the Ormen Lange gas project in 2004, DONG has further expanded its concession portfolio in 2005, being allocated new licenses in Norway and the UK. When allocating licenses the authorities evaluate a number of parameters, including the QHSE competence of the applicants. Here DONG has been well-placed relative to other applicant companies.

Drilling activity was lower in 2005 following the completion of drilling campaigns at the Nini-Cecilie-Stine and Syd Arne fields, and from May to December 2005 no drilling rigs were working for DONG.

A decline in oil production from the Danish fields was balanced by an increase in production from the Norwegian fields. There were fewer emissions arising from production in both countries, but discharges to the sea increased.

After a period of major modifications and enlargements at the Siri platform, there was a break in development projects in 2005. The breathing space has been used to optimise working procedures supporting the operation and maintenance of the platform.

In autumn 2005, DONG E&P opened its own offshore base in Esbjerg. "DONG Offshore Base" (DOB) will handle all the logistics for DONG's installations in the Danish sector of the North Sea.





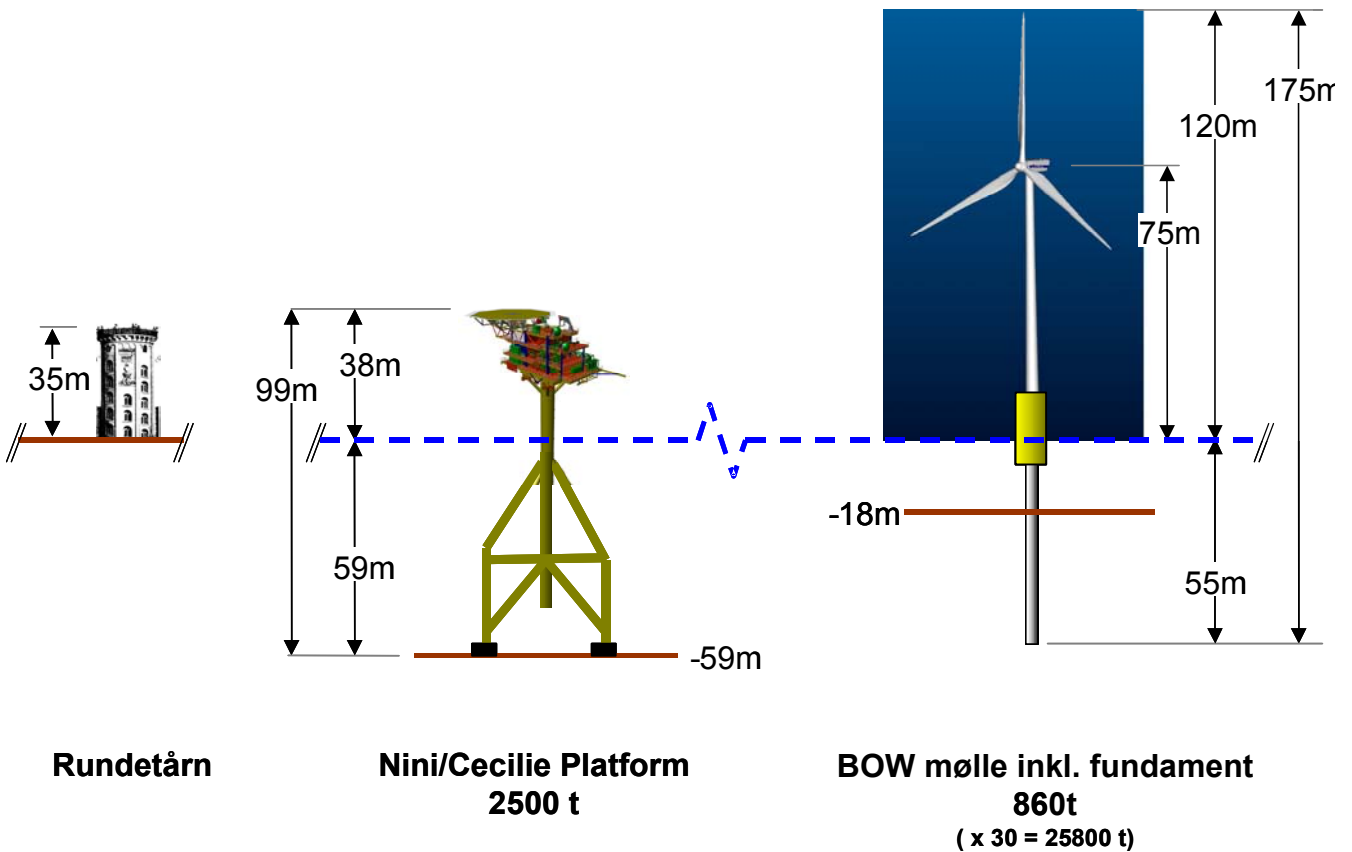
### 2.1.3 Sustainable Energy (DONG VE)

DONG's interests in CO<sub>2</sub>-neutral energy sources are developing as planned. With regard to wind energy, DONG's new Barrow Offshore Windfarm Windfarm (BOW) is now taking shape. At the close of 2005, all foundations and the transformer station were complete, and the first 4 wind turbines installed. BOW will be complete and in full production in the first half of 2006. The expected annual electricity production will be 305 GWh, corresponding to the consumption of about 65.000 households. The park is planned to have a production lifetime of at least 20 years. When production comes to an end, the park will be removed in accordance with the rules in place at that time.

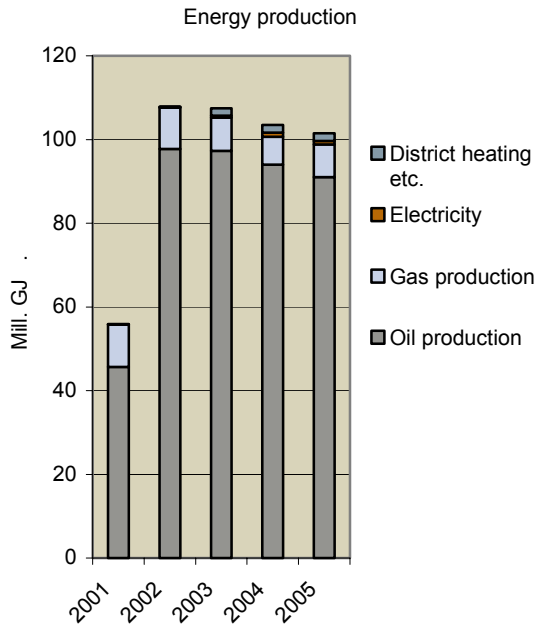
Throughout the development of the park there has

been emphasis on quality, safety and environmental considerations, and this has so far resulted in construction and installation phases without any major accidents or environmental damage (see later in the report).

The geothermal plant at Margretheholm (Copenhagen) has been put into production after a satisfactory test period. It produces a CO<sub>2</sub>-saving, expected to amount to about 10.000 tons per year relative to heat provided by a coal-fired combined heat- and power plant (CHP).

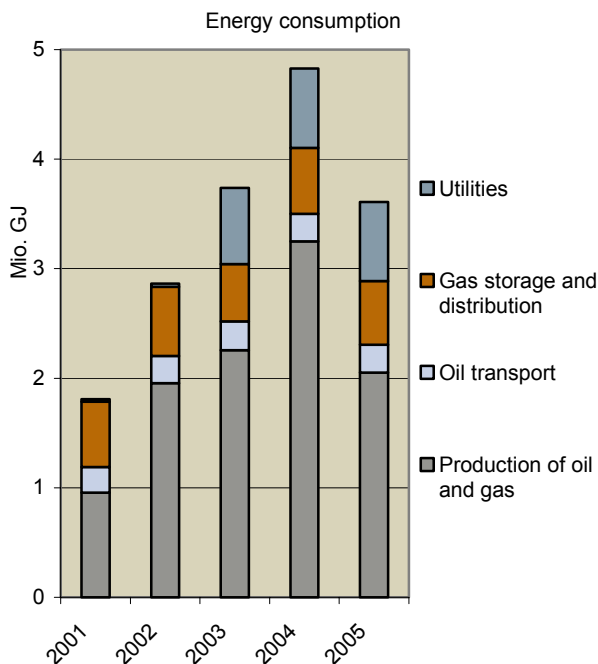


## 2.2 Activity in 2005

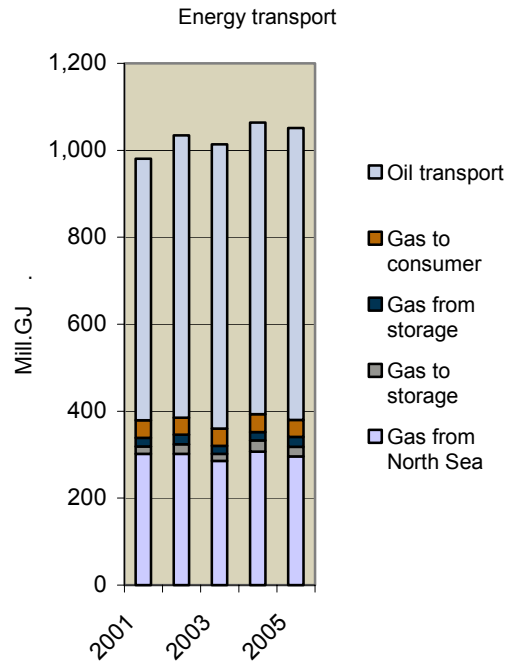


The figure shows DONG's energy production in terms of energy type. Oil production is largest by far, followed by natural gas. DONG's production of environmentally friendly types of energy (electricity from wind turbines, geothermal energy and district heating from biogas and waste incineration) is small but growing.

DONG's activities use energy. Total consumption fell in 2005 relative to 2004, primarily because of



DONG's energy transport and storage systems carry oil and natural gas from producers in the North Sea to customers in Denmark. Some of the natural gas is exported onwards to Sweden and Germany. The natural gas storage facilities help to maintain the balance between production in the North Sea and the minute-to-minute demand.



reduced consumption in connection with oil production.

The biggest energy consumer is production of oil and natural gas (60 %), which includes operation of platforms and production plant, and power for injection of lift gas and injection water etc. Oil transport and storage consumes relatively little energy. Energy consumption under "Utilities" includes fuel consumption by the Jutland Energy Group (EGJ) to produce district heating etc.

A large part of DONG's energy production is powered by natural gas, which creates emissions of greenhouse gasses. DONG's own production of renewable energy corresponded in 2005 to about 25% of DONG's total energy consumption.

### 3. Focus on Quality, Safety and Environment in DONG in 2005

DONG's operations are carried out with due respect to consumers, authorities, employees, partners, neighbours, special interest groups, and the environment. DONG strives continuously to improve quality, safety and the environment.

Quality, safety and environment are regarded as one common field of effort within the DONG

group. Responsibility for planning and execution lies with each individual business unit, supported by the joint Group policy, strategy and management tools.

The following sections give more information about the activities within each of the areas Quality, Safety, and Environment.



#### 3.1 Quality

In 2005 the revision of the QHSE procedures and guidelines for business units was continued. The procedures require each unit to have an integrated QHSE system which is process oriented and focuses on customers and other stakeholders. The Group QHSE requirements are reviewed continuously to ensure that they are adapted to the business reality. Group Purchase dept. has carried out a significant task in developing a process-oriented system.

In April 2005 the folder "Quality, Safety and Environment in DONG" was revised. It is handed out to all new employees etc.

#### Internal audits in 2005:

The audit strategy, distinguishing between audits at Group and business unit levels, was introduced in 2004 and fully implemented in 2005. It has resulted in a greater number of internal audits in 2005 than in previous years. The majority of the internal audits were performed in Exploration & Production, but this was also due to stricter authority requirements in 2005.

#### Certification

All DONG-operated offshore production activities and onshore technical facilities are now certified in



accordance with the quality assurance standard ISO9001. The certifying authority, Dansk Standard (DS) has performed two follow-up audits, each of about 1 week's duration. This means that in the course of the year DS has visited all localities covered by the certificate, The visits resulted in improvement proposals and recorded deviations, both of which can be utilised in the continued development of the quality management system. As a result, in 2006 special weight will be given to improvement of procedures for information management and documentation.

The next follow-up visit in mid-2006 will include the DONG Offshore Base in Esbjerg, which was

established in autumn 2005, in order to extend the certificate to cover DONG's activities in Esbjerg.

In February 2005 DONG's offshore production facilities achieved certification in accordance with the environmental management standard, ISO 14001. This means that all technical oil and gas activities are now covered by our ISO 14001 certificate.

Work to establish a certifiable quality management system under the ISO 9001 standard in the Renewable Energy division continued in 2005, but due to the impending fusion plans, the work has now been put on standby.

### **Integrated QHSE management in a project team: Barrow Offshore Windfarm**

DONG has made quality, safety and environment a priority in its biggest ongoing development project in 2005: Barrow Offshore Windfarm (BOW). DONG has worked to be highly visible and proactive on issues relating to quality, safety and environment. Focus, physical presence and visibility are critical if a developer wants to ensure high levels of achievement.

The framework for this is laid down in the BOW QHSE Plan, which amongst other things sets out the policies, strategies, objectives, and specific requirements for planning and execution of the tasks. All initiatives within the project have included safety and environmental considerations. This has led amongst other things to development of joint QHSE plans and joint QHSE meetings for all contractors and service companies, including joint kick-off meetings at the worksites.

The QHSE Plan has underpinned the entire construction phase of the windfarm. BOW's QHSE requirements were included in the licitation documents. All suppliers and important sub-suppliers were evaluated before awarding contracts, and they were submitted to a rigorous audit program to ensure that the requirements were taken aboard and fulfilled. In addition, numerous HSE Fora were held, where risk evaluations and methodologies were described and discussed.

Throughout the construction period, BOW's and Vestas-KBR's QHSE management has held weekly QHSE meetings. These meetings were held at the worksites, partly in order to keep an eye on the ongoing work, but mainly to ensure visibility and to demonstrate that the developer gave high priority to QHSE issues. These meetings, together with the presence of developer representatives throughout the process, have helped to produce marked improvements in environmental and safety aspects at the worksites. Since project start until the end of 2005 the project has had 8 accidents requiring first aid or minor medical attention, but no accidents leading to absence from work.

### 3.2 Health

To create a good and safe workplace we need to eliminate unhealthy elements that can lead to sickness and absence from work. Furthermore we wish to promote a healthy lifestyle in our employees. Through DONG's employee association we therefore support a number of health-promoting initiatives: training facilities, gymnastics, badminton and cycling. Massage and solarium facilities and advice from an occupational therapist are also available.

DONG has a smoking policy which protects

employees from unwanted exposure to tobacco smoke.

#### Absence from work

DONG strives to create a working environment that reduces absence from work to the lowest possible level. In 2005 the incidence of absence from work at DONG amounted to 1,9 % (2004: 1,9 %). The Danish Employers' Confederation estimated the incidence for Denmark as a whole to be 3,5% in 2004.

### 3.3 Safety

#### 3.3.1 Accident rates

A number of new safety initiatives were launched in 2005, and DONG completed the year with an overall accident rate for employees and service company employees at DONG worksites of 3,4 per million working hours. This is a very satisfactory result; the corresponding figure in 2004 was 4,6. The total number of hours worked was 2,3 million.

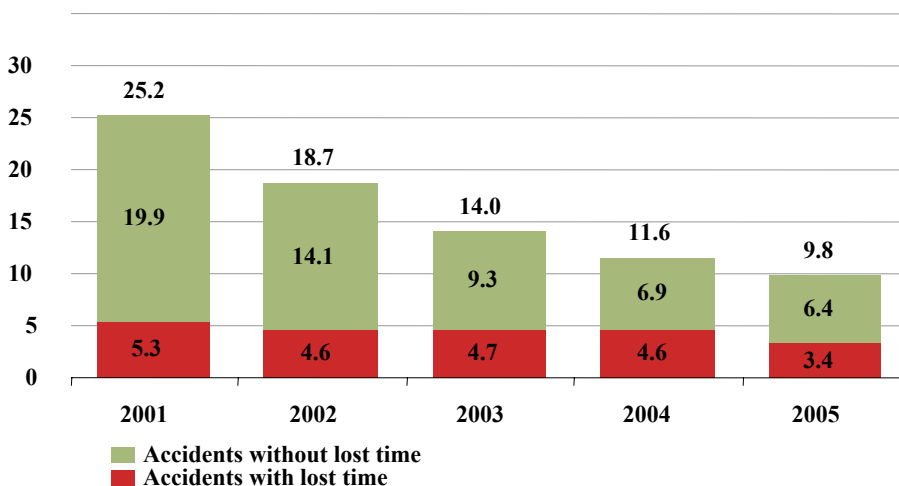
For the Danish labour market as a whole, the Danish Employers' Confederation and the Danish Industrial Confederation calculated a national average accident rate of 28 in 2004.

At DONG's facilities on land, proactive marketing of safety messages through frequent safety campaigns and a safety magazine has borne fruit. Reorganisation of the safety organisation has also led to shorter decision pathways and improved efficiency.

In addition, a number of safety groups have received training in safety behaviour, which improves their ability to spot unsafe acts by colleagues and to take constructive steps to improve the situation.

#### Lost time accident frequency for DONG and subcontractors

Accidents per million working hours



### 3.3.2 "Synergi"

At the close of 2004 a new electronic system called "Synergi" was introduced for reporting unwanted events. The system collects together all reports about unwanted events with an environmental, safety or quality dimension. This simplifies administration, and gives better picture, permitting rapid intervention if unwanted trends begin to emerge.

Synergi will be an important tool in future initiatives to improve the safety culture and ensure safer behaviour. One target for 2006 will be to build up the reporting frequency, both of actual events and also of "near miss" situations.

#### Safety films in DONG

All flights out to DONG-operated installations in the Danish North Sea depart from Esbjerg Airport. Normally, a short safety video is played for the crews before they depart. It demonstrates the use of the safety belt and survival suit, and the procedures to be followed if the helicopter makes an emergency landing. In January 2005 another film had its premiere. This told the story of a crane accident on the South Arne platform a few years previously. The film gives the helicopter passengers something to think about during their flight out to the North Sea: Have I had a similar experience? How would I react in that situation?

Four safety films have now been produced in cooperation with Amerada Hess, operator of the South Arne platform. The films describe true events that have taken place at South Arne. People who experienced them at first hand tell the story and reflect about what took place. DONG and Amerada Hess are attempting to use "old accidents" to transmit some of the experience that the accident investigations produced to the crews that will be working offshore in the future. Additional safety films are planned for 2006.

#### Risk Factor Potential, RFP

An accident at work is evaluated by DONG both with respect to the actual event that occurred, and with respect to the full potential of the event. This evaluation is made on the basis of a matrix which is built into the "Synergi" system. The matrix combines the expected frequency of an event of this type with the potential seriousness of the consequences, giving a score ranging from 0 to 375 points. This is an internationally used scale, making it possible to compare results from company to company. The scale is divided into three levels of concern (green, yellow, red).

This system standardises a method of exchange of experience, which is an important element in safety work. The system makes it possible to transmit events and their analysis, based on pre-set criteria.

At Group level the decision was taken in 2005 to set a target for the risk factor potential of all events in operational departments. The RFP target for events involving personal injuries was set at 20. A score of 20 lies on the border between the lowest level of concern (green) and the intermediate level (yellow) (see below).

RFP Matrix:

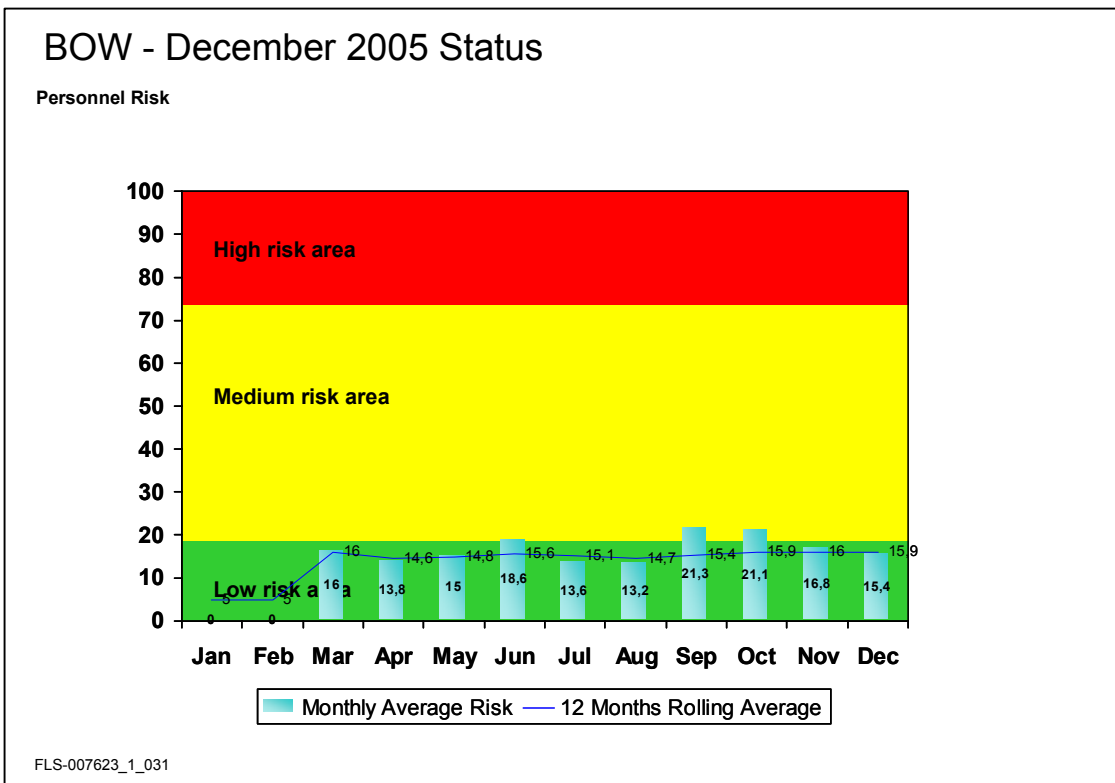
Category	Environment E*	Assets A	Personnel P	Severity Value	Risk Value				
					> 5 years	1 – 5 years	6 months – 1 year	14 days – 6 months	0-14 days
5	> 100 m <sup>2</sup>	> 5 mio. DDK	Fatality	75	75	150	225	300	375
4	< 100 m <sup>2</sup>	> 1 mio. DDK	Possibly Disabling Injury	25	25	50	75	100	125
3	> 10 m <sup>2</sup>	> 250.000 DDK	Lost Time Injury	10	10	20	30	40	50
2	< 10 m <sup>2</sup>	> 50.000 DDK	Medical Treatment Case	5	5	10	15	20	25
1	Minor spill < 1 m <sup>2</sup>	< 50.000 DDK	First Aid Case	1	1	2	3	4	5
<b>Frequency of operation</b>					> 5 years	1 – 5 years	6 months – 1 year	14 days – 6 months	0-14 days

The diagram below shows a practical example from the Barrow Offshore Windfarm project. The actual development work started in March 2005. For the year as a whole, the average risk factor for events with personal injuries was lower than 20. This means that BOW achieved the target - even though some individual events scored right up into the red zone, and one or two months had an average result in the yellow zone.

The DONG group as a whole also reached the target, with a combined average RFP of 13,6.

**New modules for Synergi**

During the first half of 2005, a deviations module and an audit module were added to Synergi. These modules make it easier to work on improvements to procedures and to follow up any actions arising as a result of audits.



### 3.3.3 Special safety initiatives in 2005

#### Joint safety campaigns in DONG

Visibility is an important aspect of safety initiatives, and campaigns are one element used by DONG. Amongst the various business units there is always a campaign in progress. In parallel with these campaigns, a joint safety poster exhibition was launched in June 2005, covering the entire Group.

The safety posters were borrowed from a number of energy companies and partner companies, and their visual styles and content differ widely. The

posters are intended for many different types of workplace, and they have widely varying origins, from winners of school poster competitions to the products of professional advertising companies. The purpose of the exhibition was to show DONG's employees how other companies work with safety and occupational health.



*Safety messages can be transmitted in many ways - -*

#### Focus on networks

Throughout 2005 there has been a focus on exchange of safety experience with other Danish companies. DONG has participated in a number of fora, some of them maintained by the Danish Industrial Federation (DI), and in this way a net-

work has been built up. One result has been that DI has decided to coordinate and run a campaign database containing materials that member companies can use in their safety and occupational health initiatives.

### **Focus on safety in wind energy projects**

Four worksites were established during the construction of Barrow Offshore Windfarm (BOW). For all four sites, specific plans were developed for promoting safety and environment. In cooperation with the main contractor, Vestas-KBR, DONG held Health, Safety and Environment kick-off meetings to ensure that everyone working at the sites was familiar with DONG's safety and environment requirements and was prepared to follow them. At every site a project owner representative was appointed to participate in worksite evaluations, risk evaluations, development of working procedures, and the weekly safety meetings and safety inspections.

Everyone working at the sites took part in "Safety Behaviour" course, developed by BOW. The course had a theoretical part about occupational health, and a practical part where the participants worked in teams to carry out a safety inspection of the worksite. Observations and actions were entered in the Unwanted Events Reporting system, Synergi. The Health & Safety Kick-off meetings and Safety Behaviour courses created a sound basic knowledge of QHSE requirements, authority guidelines and requirements, and a joint understanding and respect for quality, safety and environmental considerations.

Every month a Safety Award of £ 1.000 was given to a subcontractor or work-team who had shown special initiative concerning safety, quality or environmental protection. The purpose of the Award was to reward and highlight examples of particularly good planning, execution or follow-up with respect to occupational health and the environment.

### **3.3.4 Contingency Planning**

#### **Planning**

DONG's Distribution activities fall within the scope of Energinet.dk's requirements for Contingency Planning. These include planning for terrorist activities such as threats or intrusion onto company sites. DONG has decided to include these plans in the existing contingency plans.

Strategically, the terrorist contingency plan for DONG is implemented at the Group and business unit levels. At Group level, the general framework is defined, including communication channels and the use of three alarm levels (green, yellow, red).

The Business Units are required to define the actual measures to be taken at each alarm level. During 2005, all of DONG's locations have been studied to find any weaknesses with regard to terrorist acts. Following this analysis, any potential weaknesses have been remedied. This has

typically taken the form of improving control of physical access to the locations.

#### **Exercise**

In mid-november 2005 the communication channels and evacuation procedures were tested during an exercise at Agern Alle. In cooperation with the Birkerød Emergency Centre and Helsingør Police the exercise was based on a hypothetical bomb threat at Agern Alle.

The exercise went well, with the authorities demonstrating a rapid response time, and the evacuation of the Agern Alle buildings proceeding speedily. A number of improvement points were noted concerning physical access, communications and familiarisation of procedures.



### 3.3.5 Safety for customers and neighbours

#### Digging damage to pipelines

Accidental severing of gas pipelines can pose a threat to safety of supply, and escaping gas can be a safety risk.. To reduce the number of incidents of digging damage, the Danish gas companies planned a big information campaign, particularly aimed at building contractors. The campaign was launched in December 2004 and continued into 2005. In addition to this campaign, DONG Distribution set a target for 2005 to achieve a rapid response time when damage occurred.

There were 92 incidents of digging damage leading to gas leakage in 2005, and 22 incidents without leakage. Distribution's target in 2005 was to achieve a specific response time in at least 92% of the incidents, and this target was met.

Despite the joint information campaign, in which all regional gas companies participated, the number of digging damage cases increased by 30 % relative to 2004. Analysis of the figures reveals a much higher level of digging activity, due to the laying of fibre cable networks and sewer renovation campaigns in a number of major cities. 81% of the incidents were caused by contractors, 14 % were caused by private individuals, and 5 % were caused by municipal workmen.

65 % of the perpetrators had not studied pipeline information prior to starting work, and only 11 % had included pipeline information in their construction plans. In 85 % of cases the damage was caused between the hours of 08 og 16. The lost gas amounted to about 13000 Nm<sup>3</sup>.

All the digging damage was made on the distribution network and service pipelines to consumers. These are plastic pipelines. No damage to the transmission network (which consists of steel pipes) was recorded.

#### Gas detection

Observation of a smell of gas led in 2005 to 285 calls to the control centre with subsequent mobilisation of a gas technician. This was a fall of 23% relative to the number in 2004.

28% of the calls related to actual gas leaks, usually caused by defective ring collars or loose test nipples. For 48% of the calls no leaks or other causes of gas smell could be discovered. For 23% of the calls no leaks were found, but other probable causes of smell were noted, usually smells from dry drains, presence of other smelly substances nearby, or poor gas combustion leading to accumulation of gas smell.

The target for 2005 was a response time of less than 1 hour for at least 92% of cases. The figure achieved was 91% .

#### Improved maintenance efficiency on the Siri platform

Since January 1, 2005, maintenance on the Siri platform has been carried out by a so-called campaign team based in Esbjerg. The team consists of electricians, mechanics and other specialists in the platform equipment. Emphasis is placed on preventive maintenance, i.e. on testing equipment for defects or deficiencies before failure occurs. Previously there was a large backlog of maintenance tasks, but this has now been cleared.

The permanent staff on the platform get more time for optimising the daily operations now that they do not need to plan and perform the many maintenance tasks.

Parallel with this development, all equipment on Siri has been analysed to determine the extent of the preventive maintenance needed. A so-called RCM-analysis ("Reliability Centered Maintenance") has been performed. This is a technique developed for maintenance of passenger aircraft, but which has now been adopted by other industries. The new routines have been placed in a computer system (SAP), used to organise all the maintenance activities on SIRI.

### 3.3.6 Safety at facilities

DONG's technical activities in 2005 were carried on without significant accidents or material damage. However, a number of potentially serious events were recorded which gave rise to corrective actions.

#### Updated safety reports for installations

The safety reports for the four land facilities regulated under the rules for high-risk activities contain an evaluation of the risks posed at each facility and an evaluation of measures that can reduce these risks to an acceptable level. All the reports have now been updated and approved by the authorities. At Nybro Gas Treatment Facility the mitigatory measures specified in the report have been initiated in 2005.

#### New safety regulations for offshore installations

In 2005 DONG participated - through the Energy Agency Coordination committee - in the drafting of the new Offshore Safety Bill (now Law no.1424 of December 16, 2005), which will enter into force on July 1, 2006. The Law supersedes the Marine Installations Act of 1981, and places increased

responsibility on the operators. Instead of detailed sets of rules, the operators are expected to create management systems which proved for the manning, operation and maintenance of offshore installations at a satisfactory level of performance. The authorities check the performance level by regular inspections.

The basic principles underpinning the new system are risk evaluation, risk reduction, workplace assessment and the introduction of international standards.

One result of the new legislation is that all existing executive orders and guidelines based on the old Marine Installation Act will need revision. DONG is actively participating in the working groups carrying out this task. The aim is to influence future developments and to create rules which make it easier for DONG to operate internationally.

The "old" rules will remain in place for another 6 months. In accordance with these, the Safety Case for Siri, Nini og Cecilie platforms, submitted to the Danish Energy Authority in 2004, received approval in August 2005.

#### Gas leak on SIRI

On Thursday, February 10, 2005 at 23:31 hours, a gas leak was registered by several detectors on the Siri platform. The central control system immediately initiated an automatic shutdown of oil production, blow-down (depressurising) of all vessels and pipelines, and activation of the general alarm. The control room operator followed up with an announcement over the PA system, mobilising the emergency teams and mustering all other personnel at the lifeboats.

Simultaneously, the DONG onshore organisation, the Naval Control Centre (SOK), and the Siri guard vessel, Esvagt Gamma, were alerted in accordance with procedures.

Blowdown of vessels and pipelines quickly led to a fall in the gas concentration, so the ignition risk was eliminated. A firefighting team was sent out to inspect the area around the leakage, and after about an hour the general alarm could be called off.

The cause of the gas leak was investigated by a team of experts from DONG, with the Danish Energy Agency (DEA) as observer. The leak was found to be due to a valve failure. Normally the valve in question would be part of a sealed system, but because of ongoing repair work to the pipes at the valve location the gas was able to escape.

The investigation team found several deviations from DONG's procedures, and a number of corrective actions were proposed. The report concluded in a 28-point action plan. Until the plan had been implemented, the DEA required DONG to perform additional safety inspections at SIRI. This was implemented through an increased audit frequency. In autumn 2005 the DEA concluded that DONG had satisfactorily implemented the action plan and there was no longer any need for additional inspections.

### 3.4 Environment

DONG affects the environment through a number of activities. The environmentally most important impacts are considered to arise from DONG's oil and gas production activities and crude oil transportation, and include:

- emission of CO<sub>2</sub> and other greenhouse gasses
- discharge of chemicals in connection with drilling and production offshore
- discharge of oily produced water and ballast water in connection with offshore production.

DONG's activities (energy production and energy transport) maintained a more or less unchanged level in 2005 compared to 2004. Most of the environmental impacts from our activities have declined - for example, the emission of greenhouse gases, calculated as CO<sub>2</sub> -equivalents - but there was an increase in some marine discharges. The results are reviewed below.



*Jackup barge "Mayflower Resolution", which installs the wind turbine at Barrow Offshore Windfarm.*

### 3.4.1 Emissions of CO<sub>2</sub> and other greenhouse gases

Obligations to security of supply, energy demands, and environmental considerations will impose growing challenges on DONG and Danish society in the coming years. DONG has often argued for the common sense in economising with national energy reserves and exploiting them in an environmentally sound way. It is therefore to be welcomed, that in 2005 a start was made on the discussion over what is to be done when the Kyoto Protocol expires in 2012.

The Kyoto agreement was the first global attempt to commit nations to a gradual reduction in emissions of greenhouse gases. Acceptance of the reality of climate change is gradually spreading, together with the realisation that reductions are necessary. In this light, the limitations of the Kyoto agreement become less important and the work of creating a better and more effective successor even more important.

DONG wishes to help to reduce the greenhouse effect, and until now has worked in several ways to promote this:

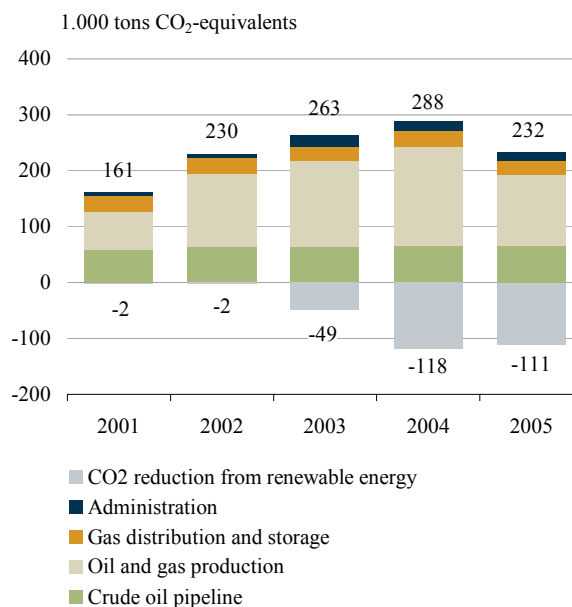
- by reducing our own greenhouse gas emissions
- by promoting the use of natural gas instead of coal and oil
- by promoting CO<sub>2</sub>-neutral energy production, especially wind and geothermal energy and biofuels.

#### CO<sub>2</sub> emissions

DONG's emissions of CO<sub>2</sub> and other greenhouse gasses (calculated as CO<sub>2</sub>-equivalents) are shown in the accompanying figure, covering DONG's main activities during the last 5 years.

DONG produces and sells some renewable energy, primarily from wind turbines, but also district heating from geothermal energy, biogas and waste incineration. This energy replaces a corresponding amount which would otherwise have been produced using fossil fuels, and therefore represents a reduction in CO<sub>2</sub> emissions.

Discharge of CO<sub>2</sub> and other greenhouse gases



#### Production facilities:

DONG's emissions of CO<sub>2</sub> relative to oil & gas production were temporarily higher in 2004, but after improvements to the gas reinjection system on the Siri platform, emissions in 2005 fell by over one third.

#### CO<sub>2</sub> quotas

From January 1, 2005, some of DONG's CO<sub>2</sub>-emissions have been covered by the CO<sub>2</sub> quota system introduced in Denmark to fulfil EU-legislation implementing the Kyoto agreement on reduction of emissions of greenhouse gases. The system covers large energy installations, but not DONG's natural gas and crude oil storage facilities.

Quotas have now been allocated for the first 3-year period (2005-7). The combined allocation for each installation has been subdivided by the authorities into a 40% allocation in 2005, with 30% in each of the subsequent years. This gives the system a "soft start" in 2005 with a subsequent tightening of the screw.

The following DONG facilities are covered by the system:

Facility	Quota, 2005 (rounded figures)	Consumption, 2005
Siri platform	124.000	128.000
Nybro Gas Treatment Plant	29.000	21.040
EGJ District Heating Centres	6.600	3.220

### All figures are tons CO<sub>2</sub>, (rounded)

(Consumption in 2005 is the preliminary figure. **Figures are for the facility as a whole, not the DONG equity share of facility quota and consumption**)

The consumption figure for 2005 must be verified by an independent and approved assessor before the final figure is submitted to the authority at the end of March 2006. If the emission exceeds the quota for the year, additional quotas must be purchased on the free market before the account for the year is closed. Otherwise a fine must be paid and the shortfall is also deducted from the next year's allocation. DONG has established a monitoring system which tracks consumption on a continuous basis and forms the basis for trading quotas on the free market.

### VOC emissions

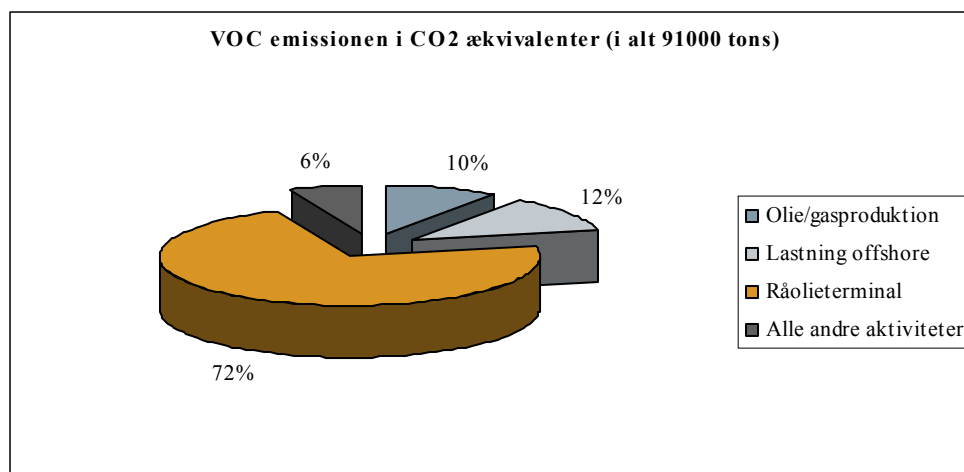
VOC (volatile organic compounds) can harm the local environment and contribute to the greenhouse effect. Almost two-thirds of DONG's VOC-emissions arise from the crude oil terminal at Fredericia, and approximately one-third arise from production and loading of crude oil offshore.

The remainder arises from diffuse sources in connection with releases of natural gas and combustion of oil products or natural gas. Total emission in 2005 was approx. 91.000 tons CO<sub>2</sub>-equivalents, compared with 96000 tons i 2004.

DONG has developed a project for reducing VOC emissions from the crude oil terminal at Fredericia. After approval by the authorities in 2005, the project is now under tender. It is expected to be implemented in 2006. The chosen solution stabilises (de-gasses) the crude oil on arrival at the oil terminal, before distribution to the storage tanks. This reduces subsequent evaporation of volatile components from the crude while it is stored at the terminal.

The result - based on the current level of activity - is expected to be a reduction in emissions from the terminal of up to 95%, corresponding to more than 60.000 tons CO<sub>2</sub>-equivalents per year. The stabilising process may also reduce VOC emissions during subsequent loading of the crude from the terminal to export tankers.

In order to reduce VOC-emissions in connection with loading of crude oil offshore, DONG E&P took a new tanker, the "Siri Knutsen", into operation in autumn 2004. The ship is specially designed in order to reduce VOC emissions during loading and transport. Preliminary experience indicates that the emissions are at least 50% lower than previously. This is not quite up to expectations, and studies are in progress to see whether the result can be improved.







### NOx emissions

Emissions of nitrogen oxides (NOx) contribute to the "acid rain" effect, producing rainfall with increasingly acid characteristics. Nitrogen oxides arise during combustion processes where air is present, and the high temperatures allow the atmospheric nitrogen to react chemically. This happens in furnaces, combustion engines, and turbines, for example.

International agreements have been drawn up to reduce Nox emissions, and Denmark is working to fulfil its commitments in this respect. This will result in the introduction in 2006 of stricter emission limits for combustion engines and turbines at land-based facilities. As a result of these stricter emission limits, the combined heat and power (CHP) turbine at Nybro Gas Treatment Plant has been replaced with a so-called Lo-NOx model. This will comply with the new emission limits and is expected to halve the NOx emissions. This may however have an adverse effect on the combustion efficiency, which will give increased fuel consumption and thus a higher emission of CO<sub>2</sub>.

The CHP turbine supplies Nybro Gas Treatment Plant with process heat and electricity, and a surplus of this environmentally friendly electricity is supplied to the national power network.

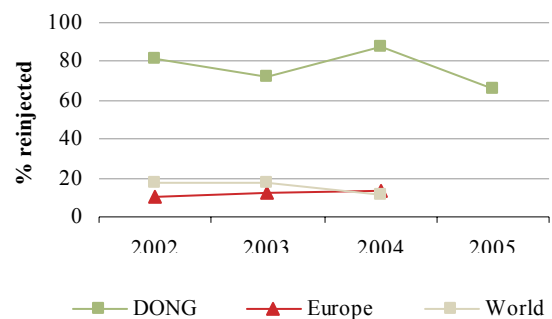
### 3.4.2 Other environmental impacts

DONG also affects the environment through discharge of oil and chemicals to the marine environment in connection with offshore oil and gas production and related drilling activities, through emission of dioxins, NO<sub>x</sub> og SO<sub>2</sub> from waste incineration, and through disposal of fly ash and clinker arising from waste incineration.

### Discharge of oil and chemicals in produced water

During production of oil and gas, oily water also follows the hydrocarbons up from the reservoir. This "produced water" is separated and cleaned, but still contains residual oil and chemicals. A large proportion of the produced water is reinjected into the reservoir and the rest discharged to the sea. At DONG's Siri platform the amount reinjected increased from 72% in 2003 to 88% in 2004 after improvements to the facility. In 2005, difficult production circumstances meant that this high figure could not be maintained, and the result for the year fell to 66%. New measures are being planned to overcome the production problems and increase the reinjection percentage again. The target for 2006 is 90%. The European offshore industry as a whole had an average reinjection percentage of only 14 in 2004.

Produced water reinjected in percent

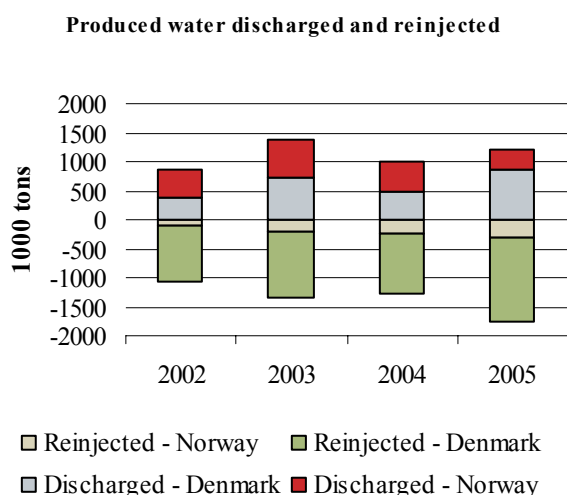


For DONG's total production from all platforms in Denmark and Norway in which DONG owns a share, there has also been a positive development with more water being reinjected and less discharged.

Chemicals are used on offshore installations amongst other things to prevent deposition of wax in seabed pipelines, and to ensure a good separation of the oil and gas from the produced water in the process system. Chemical consumption at Siri has increased after start-up of the Nini, Cecilie and Stine fields.

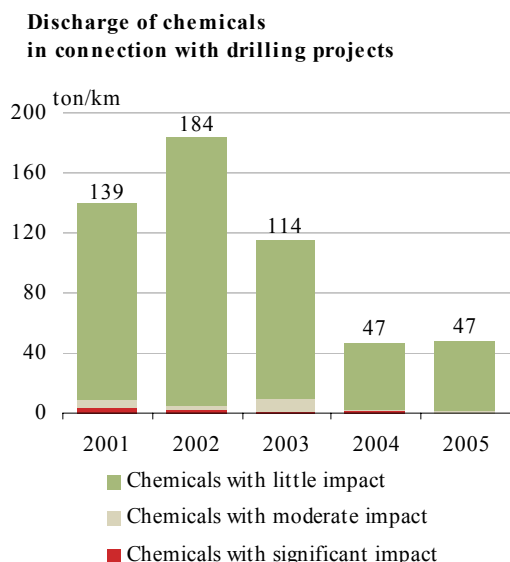


The chemicals follow the oil or the produced water, depending on their solubility. The smaller the produced water discharge, the smaller the discharge of chemicals to the sea. Because of the lower reinjection percentage, more water, oil and chemicals were discharged from the Siri platform in 2005 relative to 2004. The figure shows the development in discharge and reinjection of chemicals and oil from DONG's production platform in the North Sea.



### Discharge of chemicals in connection with offshore drilling operations

DONG also discharges chemicals during offshore drilling operations. There is continuous focus on reducing these discharges and the environmental impact arising from them – for example through use of more environmentally benign chemicals and reuse of drilling mud. The figure shows the



chemicals discharges for the last five years, relative to the number of kilometers drilled each year.

Over the years a reduction has been achieved in the amounts of environmentally harmful chemicals used and discharged ("black", "red" or "yellow" products). Discharges of red chemicals (in tons per km drilled) were 27 % lower in 2005 than in 2004. The target was to achieve a 10 % reduction. The figure does not show the "black" products since these were phased out long ago.

DONG's Well Construction division initiated a number of projects in 2004 to eliminate use or discharge of the remaining red chemicals. The projects continued into 2005, and have been successful in finding alternative products or reducing discharges.

### Other environmental impacts

#### Dioxin from waste incineration

Through its part ownership of EnergiGruppen Jylland, DONG is co-owner of the Knudmose waste incineration plant in Herning. Waste incineration causes formation of dioxins in the flue gas. The legal emission limit value for dioxin in flue gas was reduced by a factor 50 from January 1, 2005. Improved flue gas treatment equipment was therefore brought into operation on this date, and measurements in February 2005 showed that emissions were below the new limits.

#### 3.4.3 Energy production with low environmental impact

DONG is working to develop new, competitive energy sources and has had renewable energy on its work programme for the last 20 years.

#### Wind turbines

The greatest environmental impact from wind turbines comes from the solid waste arising when they are scrapped. The glass fibre from the wings is a special problem. Energy and materials are needed in the construction phase, but there is very little environmental impact during operation. Over the lifetime of the wind turbine (construction, erection, operation and decommissioning) there is a large net energy surplus. There are no emis-

sions of CO<sub>2</sub> or other greenhouse gases from this type of energy production.

Electricity production in a gas-fired combined heat and power plant (CHP plant) emits 550 g CO<sub>2</sub> per KWh on average (DONG's calculations). Coal-fired power plants emit even more - around 700 g CO<sub>2</sub>/KWh.

DONG's production of 201 GWh of electricity from wind turbines in 2005 thus corresponds to an "avoided" emission of about 110.000 tons CO<sub>2</sub> from CHP plants or coal-fired power plants.

DONG is operator of two large offshore wind farms in the UK. One of these is now under construction and the other is at the planning and consent stage.

### **Environment: Barrow Offshore Windfarm**

A construction permit was granted for Barrow Offshore Wind Farm after approval of BOW's comprehensive Environmental Impact Statement. The permit and associated environmental consents laid down a number of environmental protection requirements. These included measurements and studies to be made before, during and after construction.

The environmental guidelines for the construction phase were set out in an Environmental Management Plan, which includes descriptions of standard procedures such as disposal of contaminated soil, containment and clean-up of spills and waste disposal. The environmental plan ensures that the consent requirements are fulfilled during the construction phase.



The environmental studies during the construction phase have revealed, amongst other things, that there are not as many Common Scoter within the park area as expected. This meant that some of the seasonal restrictions on construction work, applied to protect the Common Scoter from disturbance, could be lifted.

Work onshore was required to respect populations of the rare Great Crested Newt in ponds near the intended cable route. Amongst other things, fencing was put up along parts of the route, workers were shown how to recognise the Great Crested Newt, and an authorised Newt Handler was attached to the project as consultant.

The consents for BOW also included noise restrictions. The noisiest activity during construction of wind farms is the construction of the turbine foundations. These consist of 50 m long steel tubes, 5 m in diameter, which are rammed into the sea bed. Because of the difficulty of predicting noise levels onshore during installation of foundations 5 miles out to sea, BOW decided to carry out noise measurements while the first 5 foundations were installed. It was discovered that the noise from this activity could not be distinguished from the general background. Even so, BOW received 3 noise complaints on August 31, 2005. All three related to installation of foundation no. 22.

BOW and Vestas-KBR immediately made arrangements for new noise measurements, and the contractor was instructed to stop work if permitted noise levels were exceeded. The measurements showed once again that the noise of the installation operation was indistinguishable from background noise levels. Together with the authorities it was concluded that special weather conditions must have applied on August 31. The remaining 9 foundations were installed without new complaints.

## Geothermal energy

The basic principle in geothermal energy is that warm water is brought up from underground and its heat transferred via a heat exchanger to an ordinary district heating system. The cooled water is then returned underground.

DONG helped to construct and is still co-owner of Denmark's first geothermal plant at Thisted (N. Jutland) which started operations in 1984. DONG is also operator and partner in the Metropolitan Geothermal Alliance, which has constructed a geothermal plant at the Amager Power Station in Greater Copenhagen.

The plant commenced pilot operations in the first half of 2005, and went into normal operations in August. Initially, operations have been hindered by high particle concentrations in the water, which requires frequent filter changes and reduces capacity. The particle count is expected to decline over the next few months and the plant is expected to be working at full capacity from spring 2006.

The plant is expected to give an emissions saving of over 10.000 tons CO<sub>2</sub> per year, compared to the production of the same quantity of heat in a coal-fired power plant.

### Toxic foam eliminated

DONG decided in 2005 on immediate removal of some fire-fighting foams on its Siri platform after it was discovered that they contain toxic fluor compounds, PFOS (PerFluoroOctaneSulfonate). This arose from a warning letter sent by the Danish Nature Protection Association, which had identified this toxicity problem in some types of firefighting foam. The concern proved to be justified in the case of Siri, and DONG chose to replace the foam immediately. This was completed within 3 months.

The Danish Nature Protection Association was responding to a Norwegian campaign attempting to ban these foams in Norway. According to the Norwegian Nature Protection Association, up to 80 tons of foams have been discharged from North Sea platforms since 1980 in connection with firefighting exercises.

DONG normally evaluates the environmental acceptability of chemical products before starting to use them, but in this case there has not previously been any concern about these fluoro-compounds. This is partly because the foams are not used as production chemicals and are therefore not subject to the strict testing requirements for offshore chemicals, the so-called eco-tox evaluation. There are no current restrictions on these substances in Norway or Denmark, but the Danish Environmental Protection Agency supports a proposal for an EU-wide ban.

### 3.4.4 Environmental incidents

In 2005 there were 4 environmental incidents miljøheld with significant release to the surrounding environment:

- A defective actuator at Stenlille Gas Storage Facility on June 7, 2005, led to a spill of about 80 liters of hydraulic oil, which because of the high pressure in the system was sprayed out over a considerable area. The fire service was called and dealt with the initial spill. All the oil-soaked soil was then removed and sent for disposal.
- During grouting of foundations at Barrow Offshore Windfarm, liquid cement was discharged to the sea through a defective seal. The cement contained only low-toxic components - which dispersed in the seawater - and insoluble minerals (sand).
- On the Siri platform, 50 liters of oil were washed out of a container during high-pressure cleaning.

Due to the rapid flow through the drain system, this oil escaped to the sea. The incident was reported to the authorities as an oil spill.

- On the unmanned Nini platform about 3,5 m<sup>3</sup> of diesel fuel were spilled over a duration of about 3 months due to a leaking pipe to the diesel generator. The leakage occurred only while the generator was running and was only discovered when the fuel consumption was found to be abnormally high. The incident was reported to the authorities as an oil spill.

In addition, there have been 17 cases of minor spills, i.e. inadvertent releases in which the quantity was insignificant or was retained by secondary containment. 13 of the 17 cases were spills of oil or oil products, and 4 were spills of other materials.

### 3.5 Stakeholders in Environment and Safety

#### 3.5.1 Authorities

DONG's relationship with the authorities is characterised by the fact that many of DONG's activities require official permits which need regular review and updating. Events can also occur which lead to DONG receiving improvement orders or infringing permit conditions.

DONG's participation in the law revision initiative at the Danish Energy Agency has already been mentioned (section 3.3.6)

#### Environmental approval of facilities

In 2005 DONG submitted applications to the Danish Environmental Protection Agency for renewal of the environmental approval for DONG's Gas Storage facility at Little Torup. Similar applications

have been prepared for the Gas Treatment facility at Nybro and for Stenlille Gas Storage facility, and these will be submitted early in 2006.

#### Improvement Orders or Infringements

The Danish Energy Agency ordered DONG E&P to carry out more frequent inspections of the Siri platform after a gas release in February 2005 (see section 3.3.6).

The Fredericia Crude Oil Terminal ran into wastewater treatment problems in summer 2005 due to bacterial growth in the crude oil storage tanks. The problem was solved in an ongoing dialogue with the authorities (see text box below).

#### **Bacteria create problems at the Crude Oil Terminal**

During a 3 month period the wastewater from DONG's crude oil terminal in Fredericia had a sulphide concentration above the permitted limit. The reason was quickly found to be a growth of sulphate-reducing bacteria in the crude oil tanks. Biocide treatment was proposed to solve the problem, but action could not be taken before Fredericia City Council had approved it.

The Council wanted an advance analysis and test of the biocide to ensure that it would not harm the municipal wastewater treatment plant. This took almost a month. Once treatment had started the bacterial growth fell to acceptable levels within 14 days.

As long as the bacteria were present, the terminal's treatment plant performed poorly because of the deposits that built up. This caused the discharge levels of suspended solids and oil content to exceed the permitted limits.

During the whole period, the authorities were informed continuously about the discharge levels, the reasons for them, and the planned measures to be taken. The authorities accepted the excess levels until the problem was solved.

### 3.5.2 Customers

#### Energy saving advice

The Danish Natural gas Supply Act requires DONG Distribution to offer energy saving advice to customers within its statutory supply areas. During 2005 this duty was discharged in close cooperation with the local electricity supply companies, giving customers an all-round counselling covering both electricity and gas.

In 2005, 103 enterprises and institutions within the statutory area received counselling. This resulted in recommendations representing a saving of approx. 1,7 mill. m<sup>3</sup> of natural gas per year. During 2005 the customers had already realised a large part of the savings, corresponding to almost 1,4 mill. m<sup>3</sup> of natural gas per year.

For domestic customers, a number of initiatives were started up in 2005 to reduce energy consumption and CO<sub>2</sub> emissions. Within the statutory supply area the following results were achieved:

- 657 households have switched from oil-fired to gas-fired central heating
- 174 households have switched from electric heating to gas-fired central heating
- More than 3.500 households have replaced their old gas-fired boiler with a modern one.

Altogether, these changes have resulted in a CO<sub>2</sub>-emissions reduction of 8.882 tons CO<sub>2</sub> per year. The target for the year was 7.000 tons.

### 3.5.3 Lokalmiljøet

Stenlille gas storage facility was visited by approx. 200 guests during 2005, and an "open house" was also held in February 2005. Little Torup gas storage facility also held an Open Day, and was visited by approx. 150 guests during the year. Nybro gas treatment facility was visited by 293 guests.

During 2006 a change will take place in DONG Distribution's activities and the requirements for carrying out energy savings counselling. This is due to the political agreement on energy savings of June 10, 2005, and the subsequent agreement between the Minister for Energy and the supply and distribution companies.

The new agreements will permit DONG to carry out all-round counselling alone, because in future the supply companies will not be restricted to their own specific energy product and area of supply. This has led to DONG Distribution dropping its cooperation with local electricity companies, effective January 1, 2006.

At the same time the focus in energy saving counselling has been switched from CO<sub>2</sub>-reductions to actual energy savings. This means that targets in future will be set in megawatt-hours (MWh) rather than tons of CO<sub>2</sub>. The new agreements require DONG Distribution's counselling to lead to energy savings amounting to 42.900 MWh per year.



The Little Torup gas storage facility received a complaint from a neighbour about noise from a vessel blowdown prior to an authority inspection. The blowdown tempo was immediately reduced.

## **4. Target-setting and achievements**

### **4.1 Targets for 2005 og 2006**

Every year, DONG sets a number of QSE targets, established by the individual business units, who are also responsible for fulfilling them. The table (next page) shows the most important targets for 2005, with an indication of the results achieved. Of 22 targets, 16 were achieved and 6 were missed. Some of these have been included in the targets for 2006.

As in previous years, the business units have set a number of HSE-related targets for 2006. The most important are shown in the table below. The individual business units are responsible for reaching their own targets.



## Targets for 2005

Business area	Topic	Target for 2005	Indicator	Remarks
All	Safety	Low risk of accidents in all activities	Average risk level < 20 (running 12-month average)	13
QHSE: Quality, health, safety and environment		Establish Synergi as Unwanted Event Reporting system	Training courses available High reporting frequency Produce statistics of reported events	Achieved Achieved Published in the monthly report
		Further develop and optimise the QHSE management system	Development Group procedures Group "Safety Day"	Achieved
D&L: Distribution and Storage	Safety		Execute Distribution's Safety Action Plan	Achieved
	Safety		Execute Storage's Safety Action Plan	Achieved
	Environment	CO <sub>2</sub> reductions via energy counselling	Statutory energy counselling to deliver CO <sub>2</sub> reductions of 7 mill. kg. in recommended economies and fuel conversions	Delivered 8,9 mill. kg.
	Quality, Safety, Environment	Rapid response and minimisation of loss of supply in gas odour cases and pipeline damage cases (including digging damage) in 92 % of all incidents.	Response time for gas odour reports and digging damage to pipelines to be ≤ 1 hour Gas supply to be restored within 3 hours in 92 % of cases.	Gas odours : 91,1 % Digging damage: > 92 % Achieved
	Quality, Environment	Reduce number of false gas leak alarms at the facilities	Max. 2 false alarms per facility per year	Missed: target carried over to 2006
E&P: Exploration and Production	Safety		"Stop card" and Synergi-systems to be integrated to form basis for incidents statistics (Development Dept.) Monthly safety initiatives (Development Dept.)	Test led to decision allow contractors to use own systems, which DONG will audit. Achieved (during the period with rig activities)
	Occupational health	Achieve OHSAS 18001 certification	(Development Dept.): - (PTO): Carry out workplace evaluations within 6 months	Achieved

**Renewable Energy**

Safety	Prevent accidents	Production Operations: Personnel training in accident causation analysis.	Nøglepersoner har gennemført
Safety	Reduce "red" incidents by 50% (PTO)	Carry out risk evaluations of work processes offshore	Achieved
		Ensure 100% error-free emergency response organisation	Achieved
Safety	Reduce "yellow" events by 30% (PTO)	Carry out 2 safety campaigns based on analysis of all "yellow" incidents in 2004	Achieved
		Include Unwanted Event statistics (incl. colour category) in monthly reports	Achieved
Environment	Reduce discharges of environmentally harmful ("red") chemicals (Well Construction)	Carry out project to phase in a "green" rig-wash product on all rigs	Achieved. Discharge of red chemicals reduced by 27%
	Reduce discharges of environmentally harmful ("red") products and materials (Production Operations)	Reinjection of 90% of all produced water	Reinjection 66%
		Oil content in discharged produced water to be below 30 mg/l	Achieved
Quality	Achieve ISO 9001 certification of projects and installations		Target dropped because of the planned fusion: awaiting management decision in 2006.

## Targets for 2006

Business area	Topic	Target for 2006	Indicator	Remarks
All	Safety	Low risk of accidents in all activities	Average risk level < 20 (running 12-month average)	As in 2005
QHSE	Quality, Safety, Environment	Further development of Synergi as reporting and management tool	Wider use of Synergi Increased reporting frequency of quality and environmental incidents in business areas	
QHSE	Quality, Safety, Environment Quality, Environment Safety Environment	Further development of corporate procedures and reporting systems Chemicals Contingency arrangements Establish 5 year action plan for corporate environmental activities	- Increased knowledge/use of management system and tools - Specification of reporting systems - Implementation of corporate procedures for acquisition, use, substitution and disposal of chemicals - 2 exercises held - training of employees - deployment on Intranet development of principal corporate environmental targets	
D&L: Distribution	Quality	High reliability and safety	Response time for gas odour and digging damage less than 1 hour in over 95 % of cases	
D&L: Distribution	Environment	Efficiency and optimisation of operations	Reduce gas consumption at M/R station boilers by 25 % relative to 2004	
D&L: Distribution	Environment	Efficiency and optimisation of operations	Achieve energy savings of at least 37 GWh	
D&L: Distribution	Safety	Værdiskabende adfærd	LTI Frequency < 5 pr. mill. working hours	
D&L: Storage	Quality	High reliability and safety	Max. 2 false alarm responses per facility (Little Torup, Stenlille, Nybro)	
D&L: Storage	Quality	Efficiency and optimisation of operations	Minimum 95% of preventive maintenance carried out on time (Little Torup, Stenlille, Nybro, Filsø, Mainland Pipeline)	
D&L: Storage	Safety	High reliability and safety	LTI Frequency = 0	
D&L: Storage	Safety	High reliability and safety	Adherence to contingency plan at the Nybro Gas Control Centre Adherence to response time in the Alert program.	

### Selected QHSE-relevant targets for DONG E&P

Business area	Topic	Target for 2006	Indicator	Remarks
E&P: Siri AA	Safety	High reliability and safety	Max. 2 high-risk ("red"), max. 30 medium risk ("yellow") incidents, og max. 1 lost time accident	For all targets there is a fixed objective with a relaxed and a stretched target below and above, respectively. This table shows the relaxed target, i.e. the least acceptable performance standard.
E&P: Siri AA	Environment	Efficiency and optimisation of operations	Flare gas < 16500 Sm <sup>3</sup> /d CO <sub>2</sub> quota consumption < 120700 tons (for whole year)	
E&P: Siri AA	Environment	Efficiency and optimisation of operations	Reinjection of produced water > 85%; oil content of discharged produced water < 30 mg/l	
E&P: Siri AA	Environment	Efficiency and optimisation of operations	Max. 4 "red" products in discharged produced water at year end	
E&P: Well Construction	Safety	High reliability and safety	Max. 1 high-risk ("red") and 65 medium risk ("yellow") incidents per mill. working hours.	
E&P: Well Construction	Environment	Efficiency and optimisation of operations	Reduce discharge of red products by more than 10% in relation to 2005	

## 5. Environmental account for the DONG Group

The consolidated environmental account for the DONG Group is presented on the following pages.

### 5.1 Data

The report aims to cover all activities in Denmark and elsewhere in which DONG participates and which are considered to have a significant environmental effect. Thus, sales offices in Germany and Holland, and the DONG Norge A/S administration in Stavanger are not included, nor are minority shares in indirectly owned companies. As a rule, DONG's contributions to environmental impacts are calculated on a pro rata basis according to ownership share in the activity in question. Transport of products, materials and personnel to and from DONG's installations and facilities is not included in the accounts.

DONG's construction projects, including drilling operations, are presented in a separate environmental account on DONG's home page [www.dong.dk](http://www.dong.dk). The variation in the number of projects, and in the size of the different projects, would make meaningful year-on-year comparisons difficult if they were included in the main environmental account.

Most of the data for the accounts are collected through DONG's existing data systems for financial control and materials maintenance, and are transferred automatically or through a few manual operations into the central environmental database. Data which can not be transferred in this way are entered manually into the database by experienced reporters. Data are collated and checked in the Group QHSE department.

Data for non-operated exploration and production activities in which DONG is partner are received from the operating company. As a rule, only data relating directly to the activity in question is included; data for administrative activities onshore are for example not included.

All figures are rounded off to the nearest whole number, or (for figures less than 10) to the nearest tenth.

## Differences between accounts presented in 2005 and 2004

Minor adjustments have been made to figures for 2004 relative to the figures presented in Quality, Health, Safety and Environmental Report 2004.

### Comments to specific data items

To facilitate comparisons with other published environmental accounts, the following notes explain the derivation of some of the items in the accounts.

**Transported quantities** of natural gas and oil are derived from records kept at Energi.dk and DONG. The transported quantity of natural gas is the quantity received at Nybro Gas Treatment Facility from the North Sea pipelines: no gas was received from other sources in 2005. The transported quantity of crude oil corresponds to the quantity pumped to shore from the Gorm E platform, minus the water removed at the crude oil facility at Fredericia.

**Energy production for sale** includes:

- electricity from DONG's shares in Nysted Offshore Wind Park and Overgaard Wind Park and from the wind turbines at Rødby and Nybro
- geothermal energy from the Thisted plant
- electricity from the CHP plant at Nybro gas treatment facility, which produces electricity together with process steam for the gas treatment plant
- energy production at EnergiGruppen Jylland, which supplies district heating and biogas.

Energy production is metered in all the above cases and this forms the basis for reporting.

**Natural gas consumption** in energy production, flaring, venting, and leakage is measured by metering at the relevant technical installations, or on the basis of reports from the operations carried out. The reports may be operation-specific or (for operational activities) produced on a monthly or yearly basis.

**Electricity and water consumption** are based on meter readings at year end or on running invoices and settlements. Electricity consumption does not include electricity generated and consumed at offshore installations.

**Fuel consumption** at EnergiGruppen Jylland (timber, woodchips, straw, industrial waste, animal slurry, landfill gas and biogas) is measured on the basis of invoices from suppliers.

**Consumption of diesel** (process fuel and transportation), petrol and other consumables (mainly chemical products) and waste quantities are measured on the basis of invoices in the current financial year. Consumption is allocated to specific activities on the basis of the accounting structure in the financial control system. However, quantities of incinerator waste and waste paper are assessed on the basis of the number of container loads despatched and the estimated container capacity. Analytical chemicals used in very small quantities in DONG's laboratories are not included in the accounts. In connection with drilling projects, fuel and consumables consumptions are the quantities reported to the authorities.

DONG's atmospheric emissions are estimated from measurements of fuel quantities, applying internationally accepted emission factors (references 1, 2 and 3).

Reference 1: 'Methods for Estimating Atmospheric Emissions from E&P Operations', The Oil Industry International Exploration and Production Forum, 1994'.

Reference 2: 'Denmark's Second National Communication on Climate Change', DMU, Miljøstyrelsen, 1997'.

Reference 3: 'Miljø 2003 – Petroleumssektoren i Norge', Olie- og Energidepartementet 2003. (<http://www.dep.no/archive/oedvedlegg/01/04/Miljo051.pdf>)

Calculations of CO<sub>2</sub> quotas (section 3.4.2) are carried out as laid down in the Law on CO<sub>2</sub>-quotas. These rules differ in some respects from the standard calculation methods used by DONG.



**VOC-emissions** from Fredericia crude oil terminal in 2002-5 are based on measurements made in 2002, corrected for the actually transported quantities in the year in question. VOC-emissions from crude oil loading offshore have also been included in the account, calculated according to reference 4.

Ref. 4: 'Operatørernes Landsforening (OLF): 'Common guidelines for reporting of emissions and discharges from the petroleum activities''.

**Discharges of wastewater** are measured by flow metering or taken from invoices from the wastewater treatment enterprise during the relevant year. Quantities of substances in the wastewater are calculated from the wastewater quantities and measured or assumed concentrations of the substance in question.

**Discharges to sea and reinjected quantities** of produced water from offshore operations are calculated from operator data. The accounts do not include data for chemicals consumption and discharge from offshore installations, because this data was not available within the timeframe for preparation of this report for all platforms where DONG has equity shares.

The figure "Discharge of oil and production chemicals to the North Sea" shows the total discharge from the Siri platform, rather than the DONG equity share. This is because DONG has operator responsibility for all discharges at the Siri platform.

**Discharges of drilling chemicals** to sea are not included in the Group account, but are published in a separate data sheet for drilling projects alone. This covers all drilling projects concluded during the accounting period. DONG assigns the chemicals to three classes (red, yellow, green) on the basis of the environmental evaluation prescribed by the OSPAR environmental authorities. Calculation of quantities of chemicals discharged per kilometre drilled covers offshore drilling operations only - onshore operations do not discharge to the sea.

**Accident frequencies** are calculated per million working hours. All accidents leading to absence from work on the day after the accident are included.



## Environmental account for the DONG Group

	Hazard class	Data source	Note	Units	2005	2004
<b>Production</b>						
Electricity, wind turbines		m	1	GWh	201	215
Electricity, co-gen unit		m	2	GWh	18	22
Electricity CHP		m		GWh	31	33
District heating (from fuel)		m		GWh	434	445
District heating (geothermal) (Thisted)		m		GWh	18	23
Biogas		m		mio. Nm <sup>3</sup>	6	7
Oil production		m		mio. m <sup>3</sup>	2,5	2,5
Natural gas production		m	3	mio. Nm <sup>3</sup>	194	167
Drinking water		m		mio. m <sup>3</sup>	2	2
<b>Transport</b>						
Crude oil (North Sea pipeline)		m		mio.m <sup>3</sup>	18	18
Natural gas transmitted		m		mio. Nm <sup>3</sup>	7.131	7.387
Natural gas to end user		m		mio. Nm <sup>3</sup>	939	984
Gas injected to storage		m		mio. Nm <sup>3</sup>	530	633
Gas removed from storage		m		mio. Nm <sup>3</sup>	555	451
<b>Consumption</b>						
<b>Energy</b>						
Gas consumption		m/b	4	mio. Nm <sup>3</sup>	63	78
District heating		m		GWh	7	7
Electricity		m		GWh	107	110
Biogas		m/b		mio. Nm <sup>3</sup>	6	7
Timber / woodchips		m		ton	4.017	3.750
Straw		m		ton	371	364
Landfill gas		m/b		mio. Nm <sup>3</sup>	1	1
Residual waste incinerated		m		ton	9.030	8.697
Industrial waste incinerated		m		ton	15.623	17.116
Industrial waste to biogas		m		ton	16.968	14.613
Animal slurry to biogas		m		ton	100.662	107.583
<b>Propellants</b>						
Petrol for vehicles		m	5	m <sup>3</sup>	89	237
Diesel for vehicles		m	5	m <sup>3</sup>	248	471
Diesel - marine		m	6	m <sup>3</sup>	0	882
Aviation fuel		m		m <sup>3</sup>	5	6
<b>Vand</b> - drinking water		m	7	m <sup>3</sup>	62.909	53.370
- recycled feedwater		m		m <sup>3</sup>	5.863	9.937
<b>Consumables</b>						
<b>Gas treatment:</b>						
Triethylene glycol - TEG		m		ton	93	117
Activated carbon		m	8	ton	22	0
Freon (gas cooling)		m	9	ton	2	0
<b>Crude oil treatment:</b>						
Drag reducer - DRA	Xi	m		ton	3.385	3.765
<b>Water treatment:</b>						
Demulsifier	Xn	m		ton	530	503
Ferric chloride – FeCl <sub>3</sub>	C	m		ton	582	685
Sodium hydroxide - NaOH	C	m	10	ton	162	42
Polyelectrolyte		m		ton	3	3
<b>Pesticides:</b>						

	Hazard class	Data source	Note	Units	2005	2004
Bactericides – Biocides	T*	m		ton	6	12
<b>Surface treatment:</b>						
Lubricants/hydraulic oils	Xn	m		ton	15	15
Paints	Xn	m		ton	4	4
Primers	F	m		Kg	2	0
<b>Gasses for operational use:</b>						
LPG	Fx	m		ton	0	1
Oxygen, helium, argon etc.		m		m <sup>3</sup>	304	361
Nitrogen - N <sub>2</sub>		m		ton	131	137
<b>Fire protection:</b>						
Firefighting foam		m		ton	0	1
<b>Miscellaneous:</b>						
Road salt		m		ton	4	9
Lime		m	11	ton	223	130
TMT 15 (heavy metal treatment)		m		ton	2	2
<b>Discharges</b>						
<b>To atmosphere</b>						
			12			
Carbon dioxide - CO <sub>2</sub>		m/b		ton	149.101	191.604
Nitrogen oxides – NO <sub>x</sub>		m/b		ton	336	369
Sulphur dioxide – SO <sub>2</sub>		m/b		ton	24	50
Methane - CH <sub>4</sub>		m/b		ton	2.629	3.266
VOC NM		m/b		ton	4.632	4.833
<b>To wastewater treatment</b>						
Industrial wastewater		m/b	13	m <sup>3</sup>	364.377	498.224
- COD		m/b		ton	1.425	1.829
- Sulphide		m/b		ton	1	1
- Suspended substances		m/b		ton	63	28
- Hydrocarbons		m/b		ton	8	4
Rinsing water		m/b		m <sup>3</sup>	71.273	73.948
<b>To the sea</b>						
Produced water		m		ton	1.223.513	1.014.221
Ballast water		m		ton	1.559.316	1.989.186
Oil in produced water and ballast water		m	14	ton	30	22
<b>To soil</b>						
Surface runoff and pumped groundwater		m		m <sup>3</sup>	147.160	187.811
<b>To reinjection</b>						
Produced water		m/b	15	ton	1.746.044	1.263.303
Gas (Offshore)	4	m/b		mio. Nm <sup>3</sup>	90	73
<b>Waste</b>						
Oil and chemical waste		m/a		ton	545	575
Incinerated waste		m/a		ton	1.855	2.197
Recycled waste		m/a		ton	5.321	5.345
Disposable waste to land-fill		m/a	16	ton	2.554	890
Disposable waste to controlled landfill		m/a		ton	727	665

## Hazard classification of substances and materials

Tx	Very toxic
T	Toxic
Xn	Harmful
C	Corrosive
Xi	Irritant
E	Explosive
Fx	Extremely flammable
F	Highly flammable
O	Oxidizing

N Dangerous for the environment

\* The group includes some products with this hazard classification \*

## Explanation of data origins

m	Measured
b	Calculated
a	Estimated

## 5.2 Notes to the Group accounts

### Note 1: Electricity from wind turbines

2005 was a poorer wind year in Denmark than 2004, and DONG has not brought new turbines into production, so overall production has declined slightly.

### Note 2: Electricity from Co-gen anlæg

The Co-gen plant at Nybro is a gasturbine supplying power and heating water. The plant was closed for some months for replacement of the turbine, so production in 2005 has been lower.

### Note 3: Natural gas production

Production increased in 2005 due to increased production from the Gyda field (Norway).

### Note 4: Gas consumption

Gas consumption due to flaring offshore in connection with oil and gas production fell steeply in 2005. This was due to improvements in gas reinjection capacity. Gas consumption in Distribution declined too.

### Note 5: Petrol and diesel for vehicles

Figures for 2004 and 2005 are not comparable. In 2005 only service vehicles are included. Personal transport vehicles are not included, since they are now covered by a leasing contract for which figures for fuel consumption cannot be provided.

### Note 6: Diesel consumption (marine)

There have been no seismic studies or other ship-based activities in 2005.

### Note 7: Drinking water

The increased consumption in 2005 is partly due to refilling of the water in the fire-fighting pond at Nybro Gas Treatment facility during a clean-up.

### Note 8: Activated carbon

Activated carbon was replaced in 2005 in the filter system at Little Torup Gas Storage facility.

### Note 9: Freon

In 2005 it became necessary to top up the gas chiller at Nybro Gas Treatment facility with Freon (HCFC-22). Recycled freon was used in accordance with current legislation.

### Note 10: Sodium hydroxide

Consumption increased in 2005 due to the problems caused by bacterial growth in the wastewater treatment plant at Fredericia Crude Oil Terminal.

### Note 11: Lime

At the beginning of 2005, the flue gas treatment system at EGJ's Knudsmose Incineration plant was upgraded. This has led to increased lime consumption..

### Note 12: Discharges to atmosphere

Discharges to the atmosphere fell in 2005, due to the lower consumption of fuel gas.

### Note 13: Industrial wastewater

Industrial wastewater comes mainly from the Crude Oil Terminal at Fredericia, where residual water is removed from the incoming crude oil. Better crude quality in 2005 resulted in lower water quantities.

### Note 14: Oil in produced water and ballast water

Discharged oil quantities have risen as a consequence of larger amounts of discharged produced water and a slightly higher oil concentration in the discharged water. See also Note 15.

**Note 15: Reinjected produced water**

Larger quantities of produced water were reinjected in 2005 from Norwegian and Danish operations. Despite this, the quantities discharged also increased - see Note 15. The fields produce more water every year.

**Note 16: Disposable waste to landfill**

The large increase in 2005 was due to 1920 m<sup>3</sup> surplus soil arising from service road construction at Stenlille Gas Storage facility. Technically, surplus soil belongs to this waste category.



## 6. Auditors' statement

### 6.1 To readers of DONG's Quality, Safety and Environment Report 2005

By agreement with DONG's management we have reviewed the Quality, Safety and Environment Report for 2005. This statement refers to the pdf-edition of the report available at [www.dong.dk](http://www.dong.dk).

Company Management is responsible for the Quality, Safety and Environment Report for 2005. Our responsibility is to make a conclusion about the report on the basis of our review.

The purpose of the review is to evaluate whether the information in the report has a reliable basis, including:

- whether the consolidated data are documented and supported by data from DONG's internal reporting systems and calculated in accordance with the described procedures
- whether the data and other information has a factual basis in DONG's activities during the period covered by the report.

Another purpose of the review has been to evaluate DONG's new electronic system for reporting unwanted incidents (Synergi), and to check the consistency between reports of unwanted incidents in DONG's published environmental accounts, and the reports recorded in Synergi.

### 6.2 Work performed

We have carried out our task in accordance with the Danish auditing standard RS 3000 with a view to giving a conclusion based on a moderate degree of assurance.

During our review we have checked the basis and documentation for the data with due consideration to relevance and precision. Such a review is limited primarily to questioning management and staff and analysing the consistency in the numerical data in DONG's reporting systems with spot checks of the supporting documentation and . We have also inspected DONG's facility at Little Torup and evaluated the accounting practises used. We have used auditing and environmental specialists to carry out these tasks.

DONG has also produced statutory environmental accounts for four of its facilities. Data and information from these four accounts are also included in this Quality, Safety and Environment

Report 2004. We have reviewed these four statutory environmental accounts and appended an auditors' statement to each.

It is our opinion that the work performed is a sufficient basis for our conclusions.

### 6.3 Conclusions after reviewing the Quality, Safety and Environment Report

We can declare that our review did not reveal anything to indicate that DONG's Quality, Safety and Environment Report 2005 is not satisfactorily documented and supported by the data in DONG's internal reporting systems, in agreement with the described information basis and with a factual basis in DONG's business activities in this period.

### 6.4 Evaluation of DONG's electronic system (Synergi) for reporting unwanted incidents relevant for environment, safety and quality

In 2004 DONG implemented a new electronic tool – Synergi. Synergi is used for reporting and analysing unwanted incidents and to identify the need for corrective or preventive actions.

Synergi can be used by all employees to report unwanted incidents. Reports distinguish between actual incidents, "near miss" incidents, and observations. The report is sent to a superintendent who classifies and analyses the incident, evaluates the risk factor potential, and proposes actions for reducing the probability of similar incidents recurring in the future.

We conclude that Synergi is constructed in such a way that it facilitates unwanted incident reporting and facilitates the subsequent analysis and follow-up by corrective/preventive actions.

It is also our conclusion that Synergi contributes to achieving DONG's corporate target in 2005 of achieving a risk factor potential below 20. The electronic reporting system makes it possible to follow continuously the trends in numbers and ty-

pes of incidents, their risk factor potential, and the need for preventive actions.

In order to test the way Synergi is used, a review was made of the relationship between unwanted incidents reported by DONG in its published environmental accounts, and the unwanted incidents reported in the Synergi system. For the 4 facilities publishing independent environmental accounts –

Little Torup and Stenlille Gas Storage facilities, DONG's Crude Oil terminal in Fredericia, and Nybro Gas Treatment plant - the correspondence between reported unwanted incidents in the published reports and DONG's internal reporting of unwanted incidents in Synergi was examined.

**Copenhagen, 16 March 2006**

KPMG C.Jespersen

Statsautoriseret Revisionsinteressentskab

Flemming Brokhattingen  
*statsaut. revisor*

Jens Frederiksen  
*statsaut. revisor*

## 6.5 Changes following from last year's review

KPMG also reviewed the Quality, Safety and Environment Report 2004, which resulted in the following improvement proposals:

Improvement proposal	DONG's comment
<p>DONG's Corporate targets should include an objective aiming at maintaining or improving DONG's high environmental profile. An objective of this nature would ensure that all of DONG's business areas would be run and developed with due consideration to maintaining DONG's good environmental traditions.</p>	<p>The proposal has been taken into consideration in the development of policies, principles and requirements in the new energy company which is expected to be created in summer 2006. Because of the planned fusion in 2006 it has been decided not to set up Corporate targets for DONG in 2006, but to continue working with the same targets as in 2005.</p>
<p>That proposals for business units' environmental objectives should be prepared and discussed in a dialogue with DONG's central QHSE department. The auditors believe that the business units' plans for environmental objectives and understanding of possible courses of action that would support the corporate QHSE policy would be improved by a mutual exchange of ideas in a wider forum.</p>	<p>The proposal has been followed informally in 2005-6 by arranging meetings with D&amp;L og E&amp;P. Formalised implementation is expected to take place in connection with the development of the policies, principles and requirements in the new energy company that is expected to be created in the summer of 2006.</p>





## 7. Glossary

### **Acid rain.**

NO<sub>x</sub> and SO<sub>2</sub> in the atmosphere make the rainfall slightly acid. This can damage forests, water-courses and buildings.

### **Biocide.**

Chemical which stops bacterial growth, for example in oil pipelines.

### **BOD. Biological Oxygen Demand.**

The amount of oxygen required during biological (microbial) breakdown of a substance in water.

### **Calorific value.**

An expression for the amount of energy in natural gas: measured in KWh/Nm<sup>3</sup>

### **CH<sub>4</sub>. Methane.**

Methane or marsh gas is the simplest and lightest member of the hydrocarbon family. A methane molecule consists of one carbon atom and four hydrogen atoms. Natural gas from the Danish sector of the North Sea contains almost 87 per cent methane. Methane contributes to the greenhouse effect with an effect almost 25 times stronger than the same weight of CO<sub>2</sub>.

### **CO<sub>2</sub>. Carbon dioxide.**

A gas formed during the combustion of fossil fuels such as natural gas, oil and coal. CO<sub>2</sub> contributes to the greenhouse effect.

### **CO<sub>2</sub>-equivalent.**

Emissions of gasses such as CO<sub>2</sub>, CH<sub>4</sub> og VOC NM can be expressed in terms of CO<sub>2</sub>-equivalents, which indicates their greenhouse gas effect: 1 ton CO<sub>2</sub>-equivalent corresponds to the greenhouse effect of 1 ton of CO<sub>2</sub>.

### **COD. Chemical Oxygen Demand.**

The amount of oxygen required for complete (chemical) breakdown of a substance in water.

### **Corrosion inhibitor.**

Additive used in pipelines and production vessels to prevent corrosion.

### **Demulsifier.**

Demulsifiers are used for example at the crude oil terminal in Fredericia to separate oil and water.

### **Distribution.**

Supply of natural gas to end-users such as homes and small businesses, using plastic or steel pipes at pressures of 0,1-4 bar and 16-40 bar respectively.

### **DRA. Drag Reducing Additive.**

DRA is added to crude oil in the transport pipeline to reduce the energy needed to pump the oil. It consists of high molecular weight hydrocarbons which reduce the internal friction in the oil.

### **EIA. Environmental Impact Assessment**

An Environmental Impact Assessment must be made for all large construction projects. The project owner is responsible for performing the assessment, which can then be approved by the authorities after a public hearing. The aim is to en-

sure that environmental considerations are taken into account at an early stage of the project.

### **Emission.**

Discharge to the atmosphere, for example of CO<sub>2</sub> during combustion of fossil fuels.

### **Flaring.**

Burning off of surplus oil or natural gas without utilizing the heat that is released.

### **Fossil fuels.**

Fuels formed millions of years ago from organic materials. Includes natural gas, oil, coal and peat.

### **GJ. Gigajoule.**

One thousand million joules. Joule is a unit of energy, and 4,186 joule = 1 calory. 1 GJ corresponds to the energy content of about 25 Nm<sup>3</sup> of natural gas or about 27 liters of crude oil.

### **Greenhouse effect.**

The greenhouse effect arises when certain gases, amongst them CO<sub>2</sub> and CH<sub>4</sub>, are emitted to the atmosphere. They prevent heat radiation from escaping from the earth's atmosphere but do not prevent the sun's heat radiation from entering. This leads to an increase in temperatures, which can cause climate changes and (in the long term) a rise in sea level due to melting of the polar ice-caps.

### **HCFC-22. Freon.**

Chlorodifluoromethane. This chemical has an ozone depleting effect of about 0,04 relative to CFC-11 and a greenhouse effect of about 1.700 relative to CO<sub>2</sub>.

### **Hydrocarbons.**

A collective term for chemicals consisting of various combinations of carbon and hydrogen atoms. For example: methane (CH<sub>4</sub>) contains one carbon atom (C) and four hydrogen atoms (H).

### **Life cycle.**

A term covering the history of a product from creation to final disposal – "from cradle to grave".

### **Line valve station.**

Valves placed at intervals along oil and gas pipelines to allow the isolation of sections of the pipeline for maintenance or damage control.

### **LPG. Liquefied Petroleum Gas.**

Liquefied or bottled gas under pressure, produced as a by-product during oil refining. Liquefied gas consists mainly of propane and butane and in gaseous form is heavier than air. LPG does not contain carbon monoxide and so, like natural gas, it is not toxic.

### **m<sup>3</sup>. Cubic meter**

A measure of volume. 1 m<sup>3</sup> crude oil = 6,29 barrels = 0,86 tons crude oil.

### **Methane.**

See CH<sub>4</sub> above.



**M/R-station. Measuring & regulating station.**

M/R-stations deliver natural gas from the high pressure transmission system to the regional gas companies' low pressure systems, at the same time measuring the quantity of gas supplied, reducing the pressure, and adding an odorant, THT. M/R-stations are unmanned.

**MWh. MegaWatt-hour.**

A unit for electrical energy: one million Watt-hours or one thousand kilowatt-hours (kWh). 1MWh corresponds to the energy in 90,909 Nm<sup>3</sup> natural gas or 0,098 m<sup>3</sup> crude oil.

**Nm<sup>3</sup>. Normal cubic meter.**

Nm<sup>3</sup> is a unit used in operational and engineering calculations about natural gas, and expresses the volume of a gas measured at "normal temperature and pressure" i.e. 0°C and 1 atmosphere (1 bar).

**NO<sub>x</sub>. Nitrogen oxides.**

Oxides of nitrogen are produced for example when fossil fuels are burned in air. They are formed partly from oxidation of nitrogen compounds in the fuel and partly from oxidation of the nitrogen in the air (approx. 79% of air is nitrogen and 20% is oxygen).

**Odorant.**

For safety reasons a powerful odorant (THT or Scentinel E) is added to natural gas before delivery to the end user.

**Offshore activities.**

Activities taking place at sea, e.g. the North Sea.

**Onshore activities.**

Activities taking place on land.

**ppm. parts per million.**

1 ppm = 0,0001 per cent.

**Reinjected water/gas.**

Water/gas brought up from the reservoir and subsequently pumped back into the reservoir again.

**Smog.**

Pollution of the lower atmosphere by emissions of gases such as CO<sub>2</sub>, CH<sub>4</sub> and VOC NM.

**SO<sub>2</sub>. Sulphur dioxide.**

Produced by combustion of sulphur-containing fuels such as coal and oil, but not natural gas.

**TEG. Triethyleneglycol.**

Used as a coolant and to hinder icing-up in pipelines and vessels when natural gas is produced from storage. It is also used to dry the gas.

**Venting.**

Controlled release of gas to the atmosphere without combustion (flaring).

**VOC. Volatile Organic Compounds.**

Organic chemicals which are gases or which evaporate at room temperature: includes many hydrocarbons, alcohols, other solvents, paint thinners etc. Some are formed naturally but a large proportion arises from human activities.

**VOC NM. Volatile Organic Compounds, Non Methane.**

VOCs (see above), but specifically excluding methane.

