Annual Report 2008

SINTEF

Technology for a better society

The best way to predict the future
is to create it

Contents

The SINTEF year in brief

■ SINTEF contributed expert knowledge to the Norwegian government's climate agreement.

■ SINTEF, NTNU and the Aker Clean Carbon company signed a contract to collaborate on the eight-year SOLVit R & D programme. One of the largest of its sort, the programme has a total budget of NOK 317 million and aims to develop more cost-effective CO_2 capture and storage technology.

■ SINTEF and Helly Hansen were nominated for a Norwegian Design Award for their "intelligent" survival suit for offshore workers who travel by helicopter to and from the Norwegian continental shelf.

■ Our scientists design the world's first cavern complex for power stations, water reservoirs, port warehouses and waste-combustion plant. The underground complex will give more space to Singapore's inhabitants, who currently have to share only 693 square kilometres of solid land.

■ SINTEF and NTNU were given the responsibility for coordinating the development of 15 joint European laboratories for CO_2 capture and storage. Five of the laboratories are to be built in Trondheim. They will generate new knowledge about the capture, storage and transport of CO_2 from coal- and gas-fuelled power stations and industrial plant.

■ The SINTEF spin-off company Ecowar AS was awarded Innovator 08's Innovation Prize for the best business idea in the environmental field. The company is dedicated to providing the world with fresh water.

■ The Austrian authorities adopted a science teaching programme developed by SINTEF. The model is called "teaching linked to practice", and is the result of collaboration with the local authorities of Fjell, Sund and Øygarden.

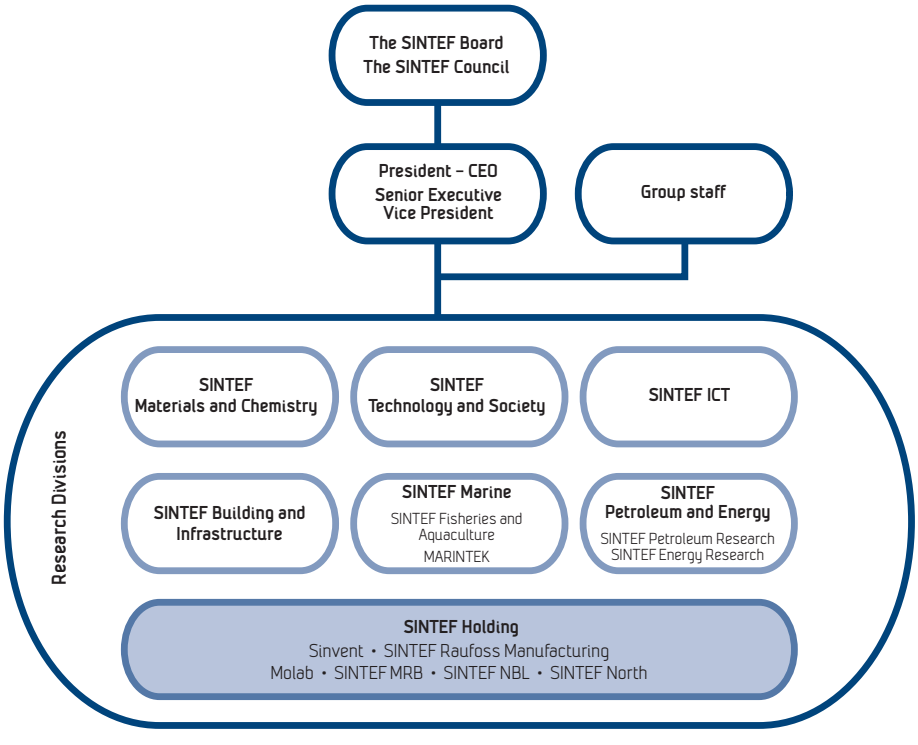
■ Unni Steinsmo, President of SINTEF, was elected to the European Commission's European Research Area Board (ERAB).

■ Supermarket chain REMA became more environmentally friendly thanks to biodegradable plastic from Nor-X Industry AS and SINTEF, which is now being used in REMA's plastic bags.

■ The SINTEF/NTNU "i-Nord" report outlines potential solutions for the use of ICT technology for surveillance of the vulnerable Arctic region. The project was commissioned by the Ministry of Fisheries and Coastal Affairs and the Foreign Ministry.

■ SINTEF divisions Technology and Society and Health Research were merged to form a new SINTEF Technology and Society.

Our organisation



SINTEF Technology and Society
is a multidisciplinary research institute that operates in the fields of science and technology and the social sciences. SINTEF Technology and Society contributes to solutions in health and welfare, the environment and security.

SINTEF ICT
delivers integrated research-based knowledge thanks to its access to a wide range of ICT expertise and technology.

SINTEF Materials and Chemistry
can boast of expertise in the fields of materials technology, applied chemistry and applied biology. The division works closely with industry in the development of advanced materials, products, processes and tools.

SINTEF Building and Infrastructure
is the third largest building research institute in Europe. It was established in 2006 following a merger with the Norwegian Building Research Institute (NBI).

SINTEF Marine
comprises MARINTEK and SINTEF Fisheries and Aquaculture AS, and performs research related to utilisation of the ocean and its resources.

SINTEF Petroleum and Energy
consists of SINTEF Petroleum Research and SINTEF Energy Research, and performs research that spans the entire value chain for petroleum products and sustainable energy systems.

SINTEF Holding
is concerned with strategic ownership and the establishment of new companies. The company was set up in order to separate SINTEF's commercial activities from its core areas of interest.

This is SINTEF

SINTEF creates value through knowledge and innovation, and develops solutions and technologies that are widely adopted for practical use.

SINTEF is a broadly based, multidisciplinary research concern with international top-level expertise in technology, medicine and the social sciences. Our aim is to become the most renowned research institution in Europe.

The SINTEF Group comprises the SINTEF Foundation, plus four limited companies and SINTEF Holding. We are a competitive research group with significant potential to make a positive contribution to the development of society at regional, national and international level.

SINTEF is a non-commercial organisation. The profits of our contract research projects are invested in new research, scientific equipment and competence development.

Key figures

At the turn of the year, the SINTEF Group had 2145 employees, who come from 64 different countries and who generated new knowledge worth NOK 2.6 billion in the course of 2008.

Contracts for industry and the private sector and project funding provided by the Research Council of Norway account for more than 90% of our income. Around eight percent takes the form of basic grants from the Research Council.

Partners in cooperation

SINTEF operates in partnership with the Norwegian University of Science and Technology (NTNU) in Trondheim, and collaborates with the University of Oslo (UiO). NTNU personnel work on SINTEF projects, while many SINTEF staff teach at NTNU. Our collaboration involves the extensive joint use of laboratories and equipment, and more than 500 people are employed by both NTNU and SINTEF.

International activity

In 2008, 13 percent of our turnover was derived from international contracts. About one third of our international turnover comes from the EU's research programmes. We give these high priority, because we believe that it is important to participate in multinational knowledge-generation efforts, and because such projects give us access to interesting networks.

The remainder of our international turnover comes from contract research projects performed on behalf of overseas clients. Our ambition is to grow in the international R & D market, and for this reason we are investing in areas in which we are particularly strong: oil and gas, energy and the environment, materials technology and marine technology.

Commercial spin-offs

SINTEF also acts as an incubator for new industrial companies. In 2008, we were involved in the commercialisation of ten different SINTEF technologies, through licensing agreements and the establishment of new companies. We are actively involved owners of our start-up companies, and we help them to continue to develop. Selling our shareholdings in successful spin-offs realises liquid assets that we subsequently invest in the generation of new knowledge. Nevertheless, the most important part of our work is the development of existing industrial activity. Every year, SINTEF supports the ongoing development of some 2000 Norwegian and foreign companies through its research and development activities.

Group management

Unni M. Steinsmo	President CEO
Reidar Bye	Senior Executive Vice President
Ernst H. Kristiansen	Executive Vice President, SINTEF Building and Infrastucture (acting)
Tonje Hamar	Executive Vice President, SINTEF Technology and Society
Aage J. Thunem	Executive Vice President, SINTEF ICT
Torstein Haarberg	Executive Vice President, SINTEF Materials and Chemistry
Oddvar Eide	President, MARINTEK (acting)
Sverre Aam	President, SINTEF Energy Research
Karl A. Almås	President, SINTEF Fisheries and Aquaculture
May Britt Myhr	President, SINTEF Petroleum Research
Anders Lian	President, Sinvent
Ingeborg Lund	Vice President, Human Resources
Petter Haugan	Vice President, Corporate Communications

Knowledge put to good use

Our era will be marked by the financial, environmental and economic crises that have brought global challenges and struggles over resources. But they have also brought new possibilities.

Norway is a rich country, but this is not first and foremost because we have important petroleum resources. We are rich because we have chosen to put our efforts into research and development, which have enabled us to exploit these huge sources of energy. Ever since the start of our petroleum age, we have chosen to invest in education, in major laboratories that are first-class in international terms and in daring long-term research projects. Norway's petroleum era has been a matter of making good use of knowledge. This has created international leading-edge expertise in the petroleum sector and a competitive supplier industry, not to mention impressive social wealth.

We still need to make major efforts in petroleum research. Fossil carbon is essential if we are to maintain our standard of living and life-style for at least another fifty years – as a source of energy, raw material for production, fuel and as a material in its own right. Oil and gas production in the future will become even more challenging, the risks involved are high and major environmental conflicts are on the horizon. It is vital for us to balance various considerations, and to ensure that political decisions regarding petroleum exploration in new areas are based on facts and knowledge.

So it is a paradox that for the past twenty or thirty years we have been incapable of investing in research at the level that society needs. Our research laboratories are worn out. In SINTEF alone, a realistic analysis shows that we need to invest more than a million kroner in laboratories. I am pleased that in 2008, the government set up a fund for research infrastructure, but there is a need for much greater investments than the funds that have been set aside for this purpose. We need internationally recognised laboratories if we are to deliver on the major challenges facing society.

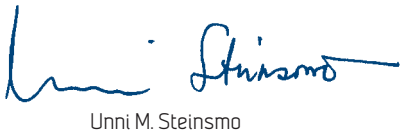
The energy and environmental crisis will not be solved by climate quotas. The solution lies in both the development of new technology and in new knowledge of the cultural conditions for social development and in economics.

We possess international leading-edge expertise in renewable energy and energy efficiency measures. In the course of 25 or 30 years, SINTEF, in collaboration with NTNU and industrial partners, has built up its competence in solar and wind power, environmentally-friendly buildings, bioenergy and CO_2 capture and storage. We possess knowledge of how climate change will affect houses, harbours, roads and bridges. We do high-quality research in the fields of nanotechnology, biotechnology and ICT.

We have built up this competence by investing our own funds, but first and foremost by doing contract research for national and international clients. Much of it has been financed through the EU.

Our efforts in renewable energy have created unique possibilities for industrial development and new jobs in the future. The competence and infrastructure to be found in industry are quite decisive for realising the ambitions set out in the parliamentary climate agreement. The situation is now quite different from the one that we faced when we were building up our petroleum industry. The technology is expensive and not very efficient. There is still not a sufficiently large market for renewable energy. And there is an economic crisis. All this means that our political leaders will have to think and act in different ways than they have done until now.

The time factor and the interactions that take place among different players in the game are more important than ever. The entire value chain, including industrial pilot plants and market incentives, must be dealt with. What we need is an integrated industrial policy that covers investment in research, incentives for technology development, industrial demonstration plants, appropriate regulation and market measures. Norway's technology research institutes are the most exposed to competition anywhere in Europe. It is of decisive importance for both the research sector and for Norwegian industry that the authorities should invest heavily in industrially oriented research in the future. We need a crisis package of measures aimed at research and industrial development. We need this in order to guarantee jobs, create value, meet the challenges facing us and encourage the talented young people who are currently entering a challenging labour market. The potential is there.



Unni M. Steinsmo
President of SINTEF

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SINTEF's vision is that of "Technology for a better society". Through first-rate solution-oriented research and knowledge generation, SINTEF creates significant value for its Norwegian and international clients, for the public sector and for society as a whole.

SINTEF partners and shares a strategy with NTNU in Trondheim and collaborates closely with the University of Oslo. These partnerships contribute to the high scientific quality of our work and to our strong international position.

2008 was a good year for SINTEF in both financial and scientific terms. Our operations went well and produced a good profit, enabling SINTEF to invest in laboratories and scientific equipment and to increase its degree of self-financing in certain special areas of research.

Technology for a better society

In spring 2008, a large majority in the Norwegian Parliament voted for a climate agreement that will form the basis of Norwegian climate policy in the future. The agreement lays significant emphasis on R & D on competitive technology for improving energy efficiency, renewable energy and CO_2 capture and storage. In the wake of the climate agreement, the Research Council of Norway and the Ministry of Petroleum and Energy have set up eight Centres for Environment-friendly Energy Research (CEER). The research centres will operate for up to eight years and will make concentrated, focused and long-term efforts at a high international level in order to deal with central challenges in the field of energy and the environment.

SINTEF and NTNU are participating in six of the eight centres; these deal with offshore wind power, CO_2 capture and storage, energy efficiency of buildings, bioenergy, solar cell technology, and integrated solutions for renewable energy generation. All of the centres will involve close cooperation among several research groups and industry. Research groups from all divisions of SINTEF will be involved in the centres.

The Board believes that the CEER centres will reinforce the strong international position of SINTEF and NTNU in this area, while they also demonstrate our ability to build multidisciplinary teams in collaboration with industry and other research centres. The ability of industry and strong national and international research groups to cooperate will be decisive for our ability to develop solutions to climate change and other important challenges facing our society.

The pharmacy sector has undergone a wide-ranging series of changes in the course of the past few years, and the aim of the AUTOMED project has been to develop concepts for the automatic supply of medicines – from manufacture to the end-user visiting the pharmacy. SINTEF Technology and Society has been the executive research partner, together with pharmacies and pharmaceutical companies. The results of the project include an integrated steering concept in which information and sales in pharmacies trigger signals that lead to production, product selection in the warehouse and transport to the point of sale. This reduces the costs of companies and raises their levels of service, while customers will find that pharmacies are better able to supply the right products, in the right place, at the right time and at a competitive price. The project came to an end in April 2008, and was financed by the participating companies and the Research Council of Norway.

Oil well safety is at the focus of growing interest in Norway and elsewhere in the world. Reports of well leakages with the loss of pressure barriers are on the increase, and such incidents involve both HSE risks and loss of production. SINTEF Petroleum Research has set up a multidisciplinary well integrity team that performs contract research projects for industry and the authorities. Multiuse wells and CO_2 injection offer special challenges. A Strategic Institute Programme (SIP) is focusing on prolonging the lifetime of oil wells in mature areas, subsea field development and operations in arctic and other environmentally sensitive regions.

Based on specifications provided by the Norwegian Oil Industry Association, Helly Hansen Pro and SINTEF Health Research have joined forces to develop a completely new survival suit called SeaAir. The new suit satisfies all the requirements for helicopter transport in the North Sea, including the use of active temperature-regulating materials. The most important function of SeaAir is to save lives in a disaster situation, and the design of the suit is a direct expression of this requirement. The tests were carried out in SINTEF's Work Physiology Laboratory, and consisted of standardised survival suit tests using human subjects in a climate chamber and cold-water basin; they demonstrated that the suits offered better thermal comfort in helicopters and improved maintenance of body temperature in cold water.

International shipping is responsible for about three percent of the world's total CO_2 emissions, but shipping emissions are not regulated by the Kyoto Agreement. While emissions from sources on land are

mapped in detail every year, the only official source of information about emissions from international shipping has been the UN's IMO study published in 2000. The study was led by MARINTEK, which in 2008 delivered a new updated IMO study that covers the volume of emissions, political measures and the significance of shipping for the climate. The study is an international reference document that will be of great importance for future efforts to reduce emissions of greenhouse gases from ships.

Technology transfer and the establishment of new companies are important aspects of SINTEF's activities, and these are dealt with by Sinvent. An evaluation of the public-sector FORNY programme has shown that Sinvent is the most productive, as well as one of the best, Norwegian centres of technology transfer, in terms of both quality and efficiency. Funds from FORNY are of great importance for SINTEF's activities, because they make a significant contribution during the difficult transition to the seed capital phase when new companies are being established.

Along much of the Norwegian coast, populations of the tubularian species Ectopleura larynx have begun to grow strongly and rapidly on fish-farm nets. If these tiny animals are not removed often enough, they can hinder water exchange in seacages. This has imposed an expensive new cleaning operation on the aquaculture industry, and this is becoming a serious problem. Scientists at SINTEF Fisheries and Aquaculture are studying the causes of the fouling in order to help fish famers to deal with the problem.

In 2008, the new national Opera House was opened in Oslo, a building that has won much international praise. SINTEF Building and Infrastructure played an active role in the project, both as a special consultant for Statsbygg and for the Snøhetta architecture group that designed the building. SINTEF's work included drawing up requirement specifications, technical documentation of suitable types of stone, the development of a draining mortar for the external natural stone cladding and control of the construction technology involved.

SINTEF has established a concept for an integrated system for surveillance and management of resources in the Arctic. The concept was chosen by the Ministry of Foreign Affairs and the Ministry of Fisheries and Coastal Affairs when they wished to establish an integrated surveillance and alert system for arctic marine areas. SINTEF was asked to suggest the basis for a main project and draw up plans for it. The aim is to position Norway as a leader in surveillance and alert systems in the Arctic. SINTEF invited a number of partners into the project, and in February 2009 presented its plans for a main project to be known as I-Nord.

Customers

SINTEF creates possibilities for its customers and contributes to their creation of value and to the positive development of society. Doing so is one of our most important contributions to society. In 2008, SINTEF performed a total of 7844 projects for 2329 clients. This means that our relationship with our customers and our understanding of their needs is of great importance. We therefore carry out systematic measurements of customer satisfaction, and the results are used to improve our ability to perform research contracts to the satisfaction of our customers.

Our customer concept also embraces Norwegian society as a whole. In line with our vision, we place great stress on transferring our knowledge and evaluations of important social questions, both to the general public and to the political and public authorities.

Internationalisation is an integral part of SINTEF's activities. The concept covers the establishing and strengthening of academic networks, participation in the EU's Framework Programme for research and development, and establishing a presence in other countries. Our international turnover in 2008 was MNOK 348, as against MNOK 324 in 2007, which is equivalent to 13 percent of SINTEF's total turnover. EU projects make up around one third of our international activities. In an international market, quality is of decisive importance, and the fact that SINTEF is competitive in this market demonstrates that we have been able to develop internationally recognised expertise. This is essential for SINTEF's ability to play its role in society.

Science

SINTEF's ambition is to be acknowledged as the leading independent contract research group in Europe. This means being the world leader in certain areas of research. This in turn demands the conscious development of research groups and of individual scientists, and it requires that our results are published and exposed to the scrutiny of the international research community.

Our efforts to strengthen SINTEF's profile as a research group have continued in 2008, with an emphasis on international publication. We published 1,608 articles in international peer-reviewed journals. From 2009 on, publication activity to this standard will be taken into account by the Research Council of Norway in its allocation of basic grants to research institutions.

In 2005, SINTEF launched its first Group-wide efforts; large-scale long-term programmes in which several groups collaborate to produce next-generation technology. SINTEF pays for these projects itself at an annual cost of NOK 15–20 million. In

2008, we launched three more of these programmes: SiSaS – SINTEF Software as a Service, X-ray Detectors of the Future and Ocean Space Surveillance – OSS. Each of these programmes is based on a high level of international expertise and will contribute to turning SINTEF's vision into reality.

Strategic cooperation with the universities is of decisive importance for SINTEF's scientific quality. At the level of scientific groups, this is manifested via our Gemini Centres, in which university and SINTEF researchers collaborate in teaching, research and laboratory operation. To date, 22 of these centres have been established, 19 of them together with NTNU, two with the University of Oslo and one with St. Olav's University Hospital in Trondheim. In 2008, we opened the IDAM Centre (Integrated Design and Additive Manufacturing), which specialises in new manufacturing technology that will strengthen Norwegian industrial manufacture.

SINTEF's strategic cooperation with NTNU is of great importance. This cooperative effort helps to locate SINTEF's applied research at the international leading edge, and ensures that NTNU's research is oriented towards the practical solutions needed by industry and society as a whole. In 2008, a total of 181 NTNU academic staff acted as consultants to SINTEF projects, while 43 engineers and technicians made contributions to SINTEF projects. Twenty-nine SINTEF staff were involved in teaching and research at NTNU, a further 13 at the University of Oslo and nine at other seats of learning.

People

SINTEF aims to be an attractive workplace that offers unique prospects for personal development to people who "can and will". The fact that SINTEF is perceived in this light is confirmed every two years by our work environment survey. This survey was last carried out in the winter of 2008, and it documented SINTEF's solid qualities as a workplace. The overall results were good for the whole Group, although some variations and challenges were revealed. Thorough analyses have since been carried out in order to identify where there is room for improvement. Efforts to utilise the results of the survey to make SINTEF an even better place to work are well under way.

Management is important in this connection, and SINTEF makes systematic efforts to develop its individual and team management resources. In 2008 we adopted a set of common management principles for the entire SINTEF Group, based on SINTEF's activities and special character. The principles were adopted in the wake of a process that involved the entire organisation. This has created an excellent basis for transforming the management principles into good practice, and will guide our future development.

SINTEF is succeeding in the struggle to recruit highly competent staff in a global market. We place a great deal of emphasis on looking after and developing the people we already have, while we make efforts to ensure that recruitment will go well in the future by developing our "brand" and via national and international profiling efforts. According to the Universum Survey, SINTEF is among the most attractive workplaces in Norway for students from our most important subject areas.

In 2008, the number of staff at SINTEF rose by 104 to a total of 2145 on December 31. Of this number, 1316 were SINTEF Foundation employees. We engaged 179 new academic personnel (13%), while 116 (8%) left us. Research staff who leave SINTEF make important contributions to the development of competence in industry and the public sector.

Forty-three percent of SINTEF's researchers hold a doctorate. 286 of our employees in 2008 come from a total of 64 countries other than Norway, which demonstrates both that SINTEF is attractive to international scientists and that we help to recruit highly qualified workers to this country. An international staff also gives SINTEF access to valuable scientific and cultural competence.

Equal opportunities and family policy

One of the aims of SINTEF is to increase the proportion of female researchers and managers. This means that SINTEF attempts to recruit women to new appointments and to develop female managers from its own ranks. In the context of recruitment, we lay stress on promoting SINTEF as an attractive workplace for women. SINTEF's 2008 work environment survey revealed no significant differences between women and men in how they perceive their work situation at SINTEF.

SINTEF will continue to develop goal-oriented measures to ensure that we will be an attractive workplace for women. The gender distribution within the Foundation is shown in the following table. The President of SINTEF is a woman.

Gender distribution (percent):

Men	Women
Board	
56%	44%
Group management	
73%	27%
Managers	
68%	32%
Research staff	
73%	27%
SINTEF Foundation	
63%	37%

SINTEF intends to be an organisation that has room for well-integrated people, and we offer a wide range of social attractions to our employees. We also wish to be an attractive workplace for parents of young children. We therefore strive to create conditions that will meet individual needs for flexibility, and we support kindergartens in Trondheim and Oslo.

Health, safety and the environment (HSE)

In SINTEF, the safety of our staff is our absolutely highest priority. Management is responsible for HSE, and in this it is supported by local coordinators and staff. SINTEF's governance system makes this clear.

We have adopted a system for reporting undesirable incidents and hazardous conditions that will strengthen our follow-up of deviances. Group staff carried out four HSE audits in the course of the past year. In 2008, four injuries led to sick-leave being taken (H1 1.8 as against 2.1 in 2007). Nine members of staff suffered injuries that required medical treatment beyond first-aid (H2 3.5 as against 4.5 in 2007). Sick-leave was 3.4 percent in 2008 as against 3.6 percent in 2007). Work-related sick-leave was 0.6 percent.

SINTEF needs to make further efforts to achieve its goal of a zero rate of personnel injuries. The agreements on inclusive work-life were renewed in 2008. An important milestone in our HSE cooperation with NTNU was the publication of a joint laboratory handbook. A requirement regarding country analyses is intended to improve staff safety when travelling or working in other countries.

The work environment committee held four meetings in 2008. The safety representatives represent the interests of our staff in work environment issues and ensure that HSE has been evaluated in all our planning and for all operative functions.

External environment

SINTEF performs, and is involved in, activities that impact the environment. Such activities concern travel, energy consumption, laboratory operation and participation in projects on our clients' premises. SINTEF's environmental policy has been adopted by the Board, and ensures that both our research and the operation of our own activities take the external environment into account. We are committed to making systematic efforts to reduce emissions of greenhouse gases, reduce our energy consumption and avoid hazardous emissions to the atmosphere and water in the course of our activities. We strive to establish national and international R & D programmes to develop environmentally-friendly technology, and we actively contribute to this goal with high-level expertise.

SINTEF did not suffer any accidents that led to damage to the physical environment in 2008. We stress consideration for the external environment when projects are being planned. Construction of the new Multiphase flow and CO_2 Laboratories at Tiller lays great weight on environmentally friendly energy technology: water-borne heating, heat exchange with the River Nidelv and the possibility of capturing CO_2 from the generation of heat.

It has been decided to introduce environmental control in accordance with the ISO 14001 environmental standard. We have launched a systematic survey of environmental aspects of SINTEF's activities, and measures aimed at reducing our environmental impact are being introduced on an ongoing basis.

SINTEF has drawn up and implemented requirements regarding the external environment for its suppliers. These have been incorporated in our standard contracts.

SINTEF's environmental profile is communicated externally via our research and expertise in the environmental field, and we have set up a site on the Internet to our research on climate and the environment.

Ethics

SINTEF accepts its responsibilities vis-à-vis society, and intends to maintain a high standard of ethics throughout its range of activities. Following up our ethical guidelines is a responsibility of line management, in addition to which SINTEF has appointed an ethics council and an ethics representative to reinforce our efforts in this field. The ethics representative supports our staff in questions of ethics, and in 2008 took part in discussions with a number of management groups and departments. The representative has also provided NTNU with support in connection with specific cases and has given several presentations and external talks. The ethics representative system means that SINTEF satisfies the requirements of the Work Environment Act regarding the need for an internal alert channel.

SINTEF is a member of Transparency International, which works to prevent corruption at national and international level. In January 2009, SINTEF was accepted as a member of UN Global Compact. This involves a commitment to observe ten principles regarding human rights, work standards, the environment and combating corruption, as well as submitting annual reports on progress in these areas. This will be incorporated in SINTEF's reports from 2009 onwards.

Economic freedom of manoeuvre

In 2008, the SINTEF Group made an operating profit of NOK 102.7 million, which was a fall of MNOK 29.9 over the figure for 2007 and MNOK67.7 better than in 2006. The result before tax for the year was

MNOK 145.3 as against MNOK 223 in 2007 and MNOK 92 in 2006. In 2007, sales of shares in Nacre AS and Reslab AS, as well as accounting procedures related to pensions, produced a particularly high annual result.

There was a positive growth in turnover in 2008, in a market that remained good throughout the year. The peak was reached early in 2008, and we are carefully following the potential consequences of the shrinkage in the global economy. We need to pay close attention to good operating practices in order to ensure that our results continue to be good in a market which we can expect to be weaker in 2009 and 2010.

On 31.12.2008, the equity capital of the SINTEF Group was MNOK 1397, which is equivalent to 55 percent of total capital. The corresponding figures for the SINTEF Foundation are an equity capital of MNOK 1231, or 65 percent of total capital.

SINTEF has established a system for reporting risk. Risk-reduction measures are defined and implemented on an ongoing basis. At the end of 2008, our liquidity was good. SINTEF has established a group-wide scheme for placing our liquid reserves. The portfolio is placed in accordance with the "Regulations for financial management in SINTEF" of June 2008. Our low-risk profile helped us to avoid portfolio losses in a turbulent financial market. SINTEF is exposed to exchange rate fluctuations, since project revenues are in foreign currencies, while all or parts of our project costs are in Norwegian kroner. Most of our exposure is vis-à-vis the Euro and the US dollar. In order to limit this risk we utilise futures contracts.

Our equity capital and operating conditions, combined with growth in revenue, cost-saving measures and a satisfactory order reserve, provide a good basis for continued operation. The boards of our subsidiary companies have performed similar analyses, and all have concluded that continued operation is justified.

To the best of the knowledge of the Board, since the closing of the annual accounts there have been no developments of significance for the evaluation of the Foundation or the Group. The Foundation's annual profit for 2008 comes to MNOK 120.7, all of which has been transferred to other equity.

In January 2008, SINTEF lost a tax case against the Norwegian state, which means that SINTEF's research has been made liable to tax since 2001. SINTEF and other research institutions are worried about how this judgement might affect their status as idealistic institutions, for example with respect to research financed by the EU, and how it might affect the central role played by the institute sector in Norway's research and innovation system. The Board is pleased to note that in December 2007 the Storting resolved that the Taxation Act should exempt research institutes from wealth tax from 2008 onwards. The Board is of the opinion that the Storting should amend the Taxation Act to make it clear that research institutions will also be exempt from income tax.

Governance structures

SINTEF performs most of its activities in Trondheim and Oslo, and has its headquarters in Trondheim. The Foundation and our subsidiaries operate businesses on behalf of SINTEF in several cities in Norway and abroad.

SINTEF wishes to be professional in its governance and management and to combine this with the ability to be creative and innovative on the foundations of an unbureaucratic decision-making structure.

SINTEF's central management bodies are its Council and Board. Day-to-day management is in the hands of the Group's President. The Board is the ultimate governance organ of the Foundation, while the Council provides advice to the Board, based on the authority set out in the Foundations Act and revised statutes.

The Council ensures that the objectives of the Foundation are pursued in accordance with its statutes, elects the Board, sets the fees to be paid to the members of the board and appoints an auditor. The Council is chaired by the Rector of NTNU, and consists of 28 members, including representatives of NTNU, the University of Oslo, the Research Council of Norway, industry, and employee and employer organisations.

The Board of the SINTEF Foundation is also the Board of the SINTEF Group. The activities of the four research companies are regulated by their statutes, shareholder agreements and group agreements. Principles for group governance and for co-ordination with related organisations have been adopted in accordance with SINTEF's overarching objectives and strategy.

The Board consists of nine persons, two of whom are primarily employed by NTNU, four are from industry or the public sector and three are tenured employees of the SINTEF Foundation. The Board has responsibility and authority in all matters that are not assigned to the Council. The Board acts in accordance with SINTEF's statutes, the Foundations Act, and those provisions of the Limited Companies Act that apply to foundations. The Board appoints the President of SINTEF and sets her salary and other conditions of employment, as

well as the framework and principles of remuneration of the Group's management team. The Board held nine meetings in 2008, in addition to a joint meeting with the Senate of NTNU.

The SINTEF Group's management team is responsible for strategic management of the overall business of the Group. The President of SINTEF is responsible for the day-to-day running of the company in accordance with the statutes of the SINTEF Foundation, group agreements and the Companies Act. The President has the authority to act on behalf of the Foundation, with the exception of the purchase, sale and mortgaging of property and the purchase and sale of companies. Either the President or Vice-president of SINTEF chairs the boards of all of SINTEF's research companies.

In 2006, SINTEF introduced a quarterly risk reporting system. The risk situation for each of the Group's divisions and companies is discussed by the management team, as well as by Group management and the Board of the Group. Risk-reduction measures are defined and implemented on an ongoing basis.

SINTEF's quality assurance system is qualified to be certified according to ISO 9001:2000, which covers the implementation of a common system for dealing with accident reports, undesirable incidents, other deviances and suggestions for improvements. SINTEF is also registered in Achilles, which is a joint qualification system for suppliers to the petroleum industry.

Prospects and challenges for the future

Its many groups of highly qualified researchers enable SINTEF to make an active contribution to the efforts of the authorities to meet their goals in areas of importance to society.

New technology is of great importance for the development of solutions to central challenges facing society, such as providing the world with pure water, healthy food and clean energy, and exploiting the resources of a vulnerable natural world in a responsible manner.

Energy and the environment are important topics at global level. On the background of the Storting's broadly based climate agreement, more research resources will be channelled into the fields of climate technology, renewable energy, energy efficiency and CO_2 capture and storage in the future. SINTEF has built up internationally leading-edge research groups in CO_2 treatment, renewable energy and construction technology, and will give high priority to increased research efforts in these areas in the future.

The intention of the authorities to develop the Arctic has great potential. With its broad knowledge base, SINTEF can help to realise national ambitions for the Arctic, and balance the interests of industrial development, long-term resource management and the environment. SINTEF intends to give this task high priority in the future. In 2008, we established SINTEF Nord AS, with headquarters in Tromsø.

The EU's 7th Framework Programme will form a core element of SINTEF's work in the coming period. Participation in the Framework Programme involves competing with research institutes that benefit from much higher basic grants than does SINTEF. We are worried that the underlying conditions for EU research will become worse as a result of increasing pressure on the part of the EU's auditors on SINTEF and other major research institutes. This pressure could lead to a lower proportion of the costs of our projects being met. In the long term, this represents a challenge to our possibility of exploiting the EU's research programmes.

It is of decisive importance that Norway should be able to renew its national laboratory and scientific equipment infrastructure to make it competitive in an international arena. Upgrading our technology infrastructure requires a national effort. The establishment of a NOK 4.5 billion infrastructure fund in the National Budget for 2009 is the first step in the right direction, and a positive signal of our ambition to make a joint effort in the future.

The international financial crisis is a fact, and we can already perceive a reduction in the amount of research being done by industry. The Board regards it as a positive sign that the authorities have already launched countermeasures in research and development. It is vital that the political authorities keep a close eye on developments, so that our competence and ability to innovate are maintained in this difficult economic situation.

Good results are produced by the efforts of many people, both our own employees and our business partners. The Board wishes to thank everyone for their good work and spirit of cooperation during the past year.

Trondheim, 19 March, 2009

Kathrine Skretting
Vice Chairman

Jon Erik Korssjøen
Chairman

Elin Grimstad

Rasmus Sunde

Ingunn Geving

Gorm Johansen

Jon Kleppe

Terje J. K. Andersen

Ellen Cathrine Rasmussen

Unni M. Steinsmo
President – CEO

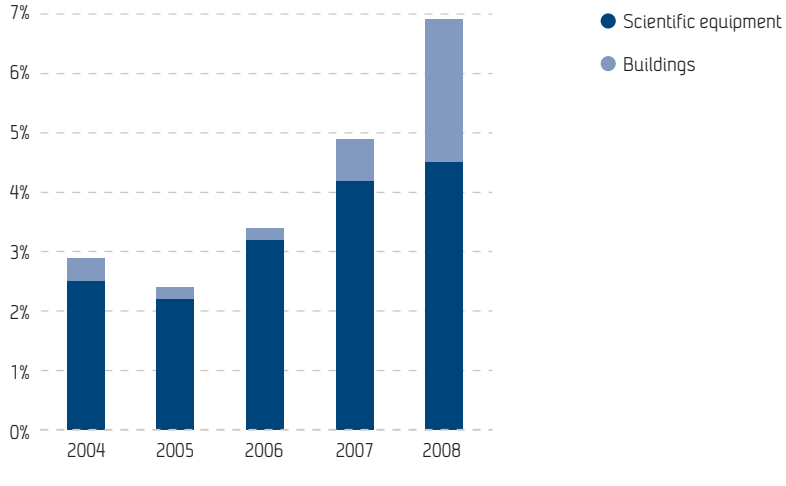
Key financial figures

MNOK	2004	2005	2006	2007	2008
Result					
Gross operating revenue	1 692	1 785	1 959	2 271	2 592
Net operating revenue	1 332	1 448	1 566	1 846	2 100
Operating result	**-30**	**24**	**35**	**133**	**103**
Annual result	**-26**	**59**	**92**	**254**	**137**
Balance					
Fixed assets	463	511	510	654	719
Liquid assets	1 157	1 181	1 426	1 599	1 821
Sum assets	**1 620**	**1 692**	**1 936**	**2 253**	**2 540**
Equity capital	838	897	988	1 259	1 397
Debt	782	795	948	994	1 144
Sum equity capital and debt	**1 620**	**1 692**	**1 936**	**2 253**	**2 540**
Profitability					
Operating margin %	-2.2	1.7	2.2	7.2	4.9
Total profitability %	-0.7	4.2	5.2	11.3	4.7
Profit on equity %	-3.1	6.9	9.3	19.9	10.3
Liquidity					
Net cash flow from operations	57	64	179	300	89
Degree of liquidity	1.6	1.6	1.6	1.7	1.7
Solidity					
Equity capital in %	52	53	51	56	55
Operating working capital	353	322	397	508	616

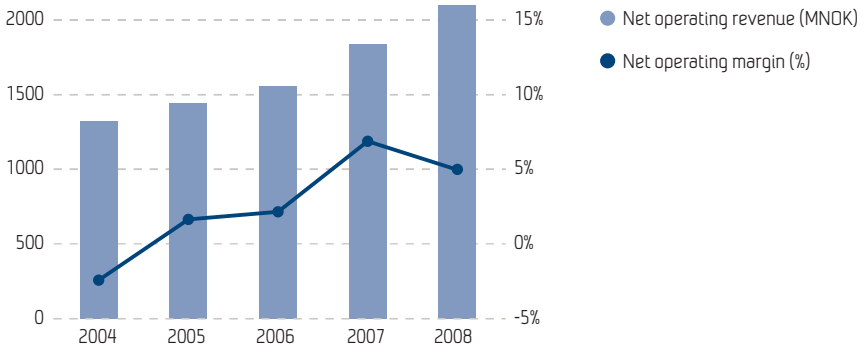
Sources of finance (% of gross operating revenue)

- RCN basic grant 3.2%
- RCN strategic programmes 4.4%
- RCN project support 13%
- Public sector 11.7%
- Industry and commerce 45%
- International contracts 14.2%
- Other sources of income 8.4%

Investments (% of net operating revenues)



Finances



Employees

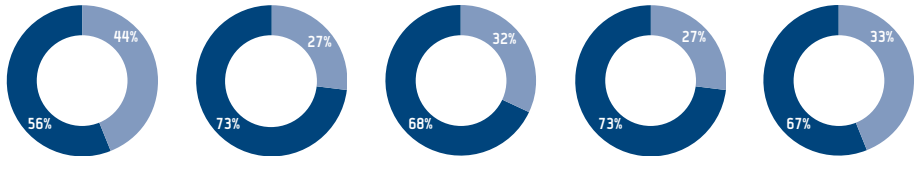
- Administration (250)
- Engineers (175)
- Technical personnel (109)
- Researchers (1420)*

* Of whom 622 hold doctorates

Publishing and communication

- Refereed scientific journals, articles and conference papers (554)
- Reports (1794)
- Popular science articles and talks (530)
- Scientific talks and posters (1024)
- Textbooks (18)

Equal opportunity



When vacant positions are advertised within research groups where women are under-represented, we actively encourage women to apply. SINTEF conducts systematic working environment surveys throughout the organisation in order to identify gender-related inequalities. The results of the 2008 working environment survey revealed no significant gender-related inequalities.

Income statement

Figures in NOK thousand

SINTEF				SINTEF Foundation	
2007	**2008**	**Notes**		**2008**	**2007**
			OPERATING INCOME AND EXPENSES		
1 769 896	2 100 659		External project revenues	1 185 429	1 040 236
385 964	352 441		Projects funded by the Research Council of Norway	289 478	249 701
64 077	75 300		Grants from the Research Council of Norway	49 900	40 600
51 231	64 008		Other revenues	90 618	96 280
2 271 168	**2 592 407**	**4**	**Gross revenue**	**1 615 426**	**1 426 817**
425 589	492 270		Direct project expenses	355 229	314 637
1 845 579	**2 100 137**		**Net operating income**	**1 260 197**	**1 112 180**
1 241 662	1 482 654	6,7	Salaries and social security	882 202	724 917
74 376	85 885	8	Amortization	54 308	44 352
	943		Depreciation of goodwill		
396 924	427 954	6	Other operating expenses	258 291	235 154
1 712 961	**1 997 435**		**Operating expenses**	**1 194 801**	**1 004 422**
132 617	**102 702**		**OPERATING RESULT**	**65 396**	**107 757**
			FINANCIAL INCOME AND EXPENSES		
22 521	33 787		Interest received	19 516	12 220
81 386	18 552		Other financial revenue	4 259	15 929
2 070	2 304		Interest paid	509	1 089
11 387	7 393		Other financial costs	544	2 425
90 450	**42 642**	**3**	**Net financial income**	**22 721**	**24 635**
223 067	**145 344**		**Result after financial items**	**88 118**	**132 392**
		9	Share of results of subsidiaries	38 436	85 514
223 067	**145 344**		**Results before extraordinary items**	**126 553**	**217 906**
223 067	**145 344**		**Results before tax**	**126 553**	**217 906**
-30 560	8 843	19	Taxes	5 871	-14 590
253 627	**136 501**		**ANNUAL RESULT**	**120 683**	**232 496**
21 131	15 818		Minority interests' share of annual result		
232 496	120 683		Majority interests' share of annual result	120 683	232 496
			Dispositions:		
			Transferred to other equity	120 683	232 496
			Total dispositions	**120 683**	**232 496**

Balance sheet as of 31 December

Figures in NOK thousand

SINTEF				SINTEF Foundation	
2007	**2008**	**Notes**		**2008**	**2007**
			ASSETS		
			Long-term assets		
44 505	38 509	19	Deferred tax advantage	15 000	19 090
4 968	4 373	8	Goodwill		
49 473	**42 882**		**Intangible assets**	**15 000**	**19 090**
397 958	388 390	8	Real estate, buildings and other fixed assets	350 875	356 573
	37 631	8	Buildings under construction	15 109	
103 241	129 319	8	Scientific equipment	61 849	54 343
30 589	31 929	8,14	Other equipment, fixtures, etc.	16 373	16 875
531 787	**587 268**		**Long-term operating assets**	**444 206**	**427 790**
1 377		9	Investments in subsidiaries	480 144	386 658
19 015	32 146	10	Shares in other companies	48	48
		11	Consolidated long-term receivables	29 771	67 448
43 300	47 149	7	Pension funds	21 979	23 615
8 593	9 875	6, 11	Other long-term receivables	2 425	1 980
72 284	**89 170**		**Financial long-term assets**	**534 366**	**479 748**
653 544	**719 321**		**Total long-term assets**	**993 572**	**926 628**
			Liquid assets		
6 648	6 257		Inventory of finished goods	4 947	5 338
155 482	233 271	5	Work in progress	128 474	108 860
162 130	**239 527**		**Goods**	**133 421**	**114 198**
510 643	541 585	14	Accounts receivable	292 208	256 036
		14	Consolidated current receivables	23 345	29 567
19 532	37 536	14	Other current receivables	5 395	12 844
530 175	**579 121**		**Receivables**	**320 948**	**298 447**
11 832	7 041	10	Shares		
278 753	443 063	2, 12	Bonds and other securities	173 408	122 909
290 585	**450 104**		**Investments**	**173 408**	**122 909**
616 596	552 166	15	Cash, bank deposits	281 230	285 271
616 596	**552 166**		**Cash, bank deposits**	**281 230**	**285 271**
1 599 485	**1 820 918**		**Total liquid assets**	**909 007**	**820 825**
2 253 030	**2 540 239**		**TOTAL ASSETS**	**1 902 579**	**1 747 452**

Balance sheet as of 31 December

Figures in NOK thousand

SINTEF				SINTEF Foundation	
2007	**2008**	**Notes**		**2008**	**2007**
			EQUITY AND LIABILITIES		
			Equity		
69 300	69 300		Foundation's equity	69 300	69 300
69 300	**69 300**		**Paid-up equity**	**69 300**	**69 300**
1 039 109	1 162 098		Other equity	1 162 098	1 039 109
1 039 109	**1 162 098**		**Total earned equity**	**1 162 098**	**1 039 109**
150 293	165 245		Minority interests		
1 258 702	**1 396 644**	**17**	**Total equity**	**1 231 398**	**1 108 409**
			Liabilities		
33 661	52 519	7	Pension liabilities	9 331	
33 661	**52 519**		**Long-term liabilities**	**9 331**	
4 114	2 257	14	Mortgages		
5 778	5 269	14	Other long-term liabilities	1 581	2 478
9 892	**7 526**		**Other long-term liabilities**	**1 581**	**2 478**
126 871	129 411		Accounts payable	61 198	76 009
5 482	7 713		Credit line		
5 198	2 043	19	Tax due	1 000	4 500
168 690	178 143		VAT, tax deductions, social security	104 209	96 626
403 856	402 324		Advance payments from customers	271 254	275 760
			Consolidated current liabilities	12 438	10 710
957			Proposed dividend		
239 723	363 915	18	Other current liabilities	210 169	172 961
950 776	**1 083 549**		**Current liabilities**	**660 269**	**636 565**
994 329	**1 143 595**		**Total liabilities**	**671 181**	**639 043**
2 253 030	**2 540 239**		**TOTAL EQUITY AND LIABILITIES**	**1 902 579**	**1 747 452**

Trondheim, 19 March, 2009

Kathrine Skretting
Vice Chairman

Jan Erik Korssjøen
Chairman

Elin Grimstad

Rasmus Sunde

Terje J. K. Andersen

Ingunn Geving

Jon Kleppe

Ellen Cathrine Rasmussen

Gorm Johansen

Unni M. Steinsmo
President – CEO

Cash flow analysis as of 31.12.

Figures in NOK thousand

SINTEF			SINTEF Foundation	
2007	**2008**		**2008**	**2007**
		Cash flow from operations		
223 067	145 344	Result before tax	126 553	217 906
		Percentage of profit from subsidiaries/associated companies	-38 436	-85 514
74 376	86 828	Ordinary depreciations/write-downs	54 308	44 352
	-202	Profit/loss on sales of fixed assets		3 643
-30 873	274	Profit/loss on sales of shares in fixed assets		
-5 242	-159 519	Change in investments (current assets)	-50 499	-3 695
-11 832	-77 789	Change in work in progress	-19 614	-8 122
-3 770	391	Change in stock holdings	391	-3 832
-15 492	-30 942	Change in accounts receivable	-36 172	5 544
27 320	2 540	Change in accounts payable	-14 811	9 095
94 897	111 933	Change in other items in balance sheet	92 917	65 833
-4 950	-5 198	Tax paid	-5 281	-4 950
-47 766	15 009	Change in pension obligations	10 967	-45 374
299 735	**88 669**	**Net cash flow from operations (A)**	**120 324**	**194 885**
		Cash flow from investments		
-102 285	-142 354	Purchases of long-term operating assets	-70 723	-57 792
-11 006	-14 031	Investments in financial assets	-55 050	
1 048	1 340	Sales of long-term operating assets		
59 087	1 596	Sales of other financial assets		
-53 156	**-153 449**	**Net cash flow from investment activities (B)**	**-125 773**	**-57 792**
		Cash flow from financial activities		
2 176	2 231	Change in overdraft facility		
-54 393	-2 366	Liquidation of long-term debt	-896	-41 935
-3 040	-957	Dividends paid		
-2 492	1 442	Changes charged directly to equity capital	2 306	
-57 749	**350**	**Net cash flow from financial activities (C)**	**1 410**	**-41 935**
188 830	-64 430	Net change in cash holdings (A+B+C)	-4 040	95 159
427 767	616 596	Cash balance as of 01.01.	285 271	190 113
616 597	**552 166**	**Cash balance as of 31.12.**	**281 231**	**285 271**

1. Accounting principles

General
The annual accounts have been prepared in compliance with the Norwegian Accounting Act of 17 July 1998, and in accordance with Norwegian accounting standards and guidelines for good accounting practice.

Principles of consolidation
The consolidated accounts indicate the overall financial result and position of the parent organisation defined as the SINTEF Group together with its ownership interests in other companies presented as a single financial unit. The consolidated accounts include the profit and loss accounts of all companies in which SINTEF owns more than 50% of the share capital or in which it has a determining influence. Subsidiary companies whose accounts have no bearing on an assessment of the standing and profit and loss accounts of the Group are not included in the consolidated accounts.

In addition to the SINTEF Foundation, the consolidated accounts include results for:
SINTEF Petroleum Research
SINTEF Energy Research
SINTEF Fisheries and Aquaculture
MARINTEK – Norwegian Marine Technology Research Institute (Group)
SINTEF Holding (Group)
SINTEF Building and Infrastructure
SINTEF Polska SP.Z.O.O.

The SINTEF Group is hereinafter referred to as SINTEF. Please refer also to note 9 concerning subsidiaries.

All significant transactions and inter-company accounts which form part of the consolidated accounts, together with unrealised intra-Group earnings, have been eliminated. The minority interests' share of the profit and loss accounts is incorporated in the Group's accounts, and the minority interests' share of equity forms part of the Group's equity.

Shares in subsidiaries affiliated to SINTEF Holding have been eliminated from the consolidated accounts in accordance with the acquisition method. This means that the acquired company's assets and liabilities are entered at their true value on the date of acquisition, and that any value in excess of this is classified as goodwill. In the case of partly-owned subsidiaries, only SINTEF Holding's share of the goodwill is included in the balance sheet.

With effect from 1 January 2007, the Norwegian Building Research Institute (NBI) was merged with the SINTEF Foundation..

Principles employed in entering revenue
Income from projects is entered as current revenue, i.e. on an ongoing basis and as a percentage reflecting the amount of project work completed, such that it is the completed share of the total anticipated earnings from a project which are entered as income. The degree of completion is defined based on what has actually been produced.

Where projects are expected to result in a loss, the entire anticipated loss is entered as costs.

Public sector funding in the form of research council grants etc., is entered in accordance with the basic principles for the accounting of income and costs, i.e. such funding is entered at the same time as the income it is intended to generate or the expenditure it is intended to reduce. Contingent funding is not entered as income until it is considered likely that the relevant terms and conditions have been, or will be, met.

Investments and funding items are entered as net amounts. Investment grants are deducted from the historical cost of the investment item. Licence revenues are entered pro rata over the term of the licence.

Classification
Current assets are entered as items linked to project activity or receivables due within a one year period, together with other assets not intended for permanent ownership or use by SINTEF. Other assets are classified as non-current assets. The distinction between short-term and long-term liabilities is made based on a due date of one year.

Shares in subsidiaries and other shareholdings of strategic or "non-financial" character are classified as long-term shareholdings. Other shares are classified as current assets.

Asset value evaluation
Current assets are assessed at acquisition cost or actual value, whichever is the lower. Non-current assets are assessed at acquisition cost. If the actual value of non-current assets is less than their book value, and the drop in value is not expected to be temporary, their value is written down to the actual value.

Shares in subsidiary companies
Investments in consolidated subsidiaries are entered in accordance with the equity method in the SINTEF Foundation's accounts. This means that the investment is assessed at the value of the SINTEF Foundation's share in the equity capital of the subsidiary in question, with the financial result of the share entered either as revenue or as costs.

Other long-term shareholdings and ownership interests
Long-term shareholdings in companies in which SINTEF does not have a significant influence are entered in the balance sheet at acquisition cost. Investments are written down to their actual value if their fall in value is not temporary. Dividends and other profit sharing revenues received from the companies are entered as "Other financial income".

Shares in other companies (short-term share investments)
Shares that form part of the business portfolio are assessed at their actual value on balancing day. Other short-term share investments are assessed at their mean acquisition cost or actual value on balancing day, whichever is the lower.

Foreign currency
Foreign currency items are entered according to the exchange rate on balancing day. Incoming and outgoing foreign exchange rate risks are reduced by means of futures contracts linked directly to the projects in question. Unsecured foreign currency revenues are used to cover current expenditure incurred in foreign currencies.

Receivables
Accounts receivable and other receivables are entered at their nominal value, with deductions for anticipated losses. Provision for loss is made on the basis of an individual assessment of the receivable in question.

Work in progress
This item includes work performed, but not invoiced. Accrued hours are assessed at invoiceable rates and relative to the degree of completion of the project in question, with deductions for anticipated losses.

Intangible assets
Expenditure related to intangible assets, including research and development, are entered in their entirety as costs.

Fixed assets
Newly-acquired fixed assets costing more than NOK 15,000, and with an anticipated economic lifetime of three years or more, are capitalised and depreciated. The assets are depreciated linearly at the following rates: 33% for scientific equipment, office equipment, furniture and vehicles, 2–5% for buildings.

Tax
The SINTEF Foundation and its subsidiaries SINTEF Energy Research, SINTEF Fisheries and Aquaculture, SINTEF Petroleum Research and MARINTEK lost their case against the State, represented by the Sør-Trøndelag County Tax Office, in the Frostating Court of Appeal, regarding the introduction of general tax liability from and including the revenue year 2001. The SINTEF Foundation and the four subsidiaries appealed the decision to the Norwegian Supreme Court on 12 November 2007. The Appeal Committee of the Supreme Court pronounced its decision on 23 January 2008, in which they refused to pass the case to the Supreme Court. This decision is not subject to appeal, and consequently the judgement of the Frostating Court of Appeal stands.

There is broad political support for our position arguing that research institutes should be exempt from general tax liability. Up to now this has resulted in a change in legislation which exempts research foundations from capital and wealth taxation from and including the revenue year 2008. The SINTEF Foundation has asked for remission of the tax on capital imposed for the period 2001 – 2007, but to date has not received a reply as to whether compensation will be granted for this. SINTEF is continuing to work for a change in the law that will mean research insttitutes being exempted from paying income tax.

Since the SINTEF Foundation lost its tax case and is thus liable for income tax, the accounts show that a deferred tax benefit increases the values of the financial result, ownership interests and equity, respectively. On the basis of the accounts as of 31 December 2008, the deferred tax benefit could in theory amount to approx. MNOK 262.5, assuming that the total basis for reversible temporary tax differences can be utilised. Because of the likelihood for changes to the tax legislation, we presume that this benefit will not apply beyond 2008.

Estimated tax expenditure for the SINTEF Foundation for 2008 amounts to MNOK 5.9. Of this amount, the wealth tax payable amounts to approx. MNOK 1.8, while the remainder represents changes in deferred tax.

Pensions
The SINTEF Group and all its consolidated companies are legally required to provide a public sector service pension, and have schemes in place that meet the necessary requirements.

Pension expenditure is entered in the accounts in compliance with the provisions of the Norwegian Standard for Pension Cost Accounting (NRS6). Net pension expenditure consists of the present value of pensions accrued during the course of the year plus the cost of interest on pension obligations, less the anticipated yield of the pension funds, and corrected for the distributed effects of changes in the pension plan, estimates and deviations. Net pension expenditure is entered under "Salaries and Social Costs".

The Norwegian Accounting Standard states that a company's pension scheme is to be treated as a compensation plan, as part of which future pension payments are based on the number of years during which contributions were paid and the salary at retirement age. The value of the pension funds is based on an assessment made at the end of each accounting year. This estimated value is adjusted annually in accordance with the statement provided by the life insurance company regarding the transferable value of the pension funds.

Assessments of accumulated pension liabilities are based on estimated liability at the end of the accounting year. This estimated value is adjusted annually in accordance with the statement provided by the life-insurance company regarding accumulated pension liability. Actuarial estimates are made every year by the insurance company on the basis of information provided by SINTEF.

Differences between estimated and actual values that are due to changes in financial or actuarial assumptions are regarded as changes in accounting estimates. The Accounting Standard permits a specific equalising method of dealing with such differences. Differences of up to 10% of the larger of the pension liabilities and pension funds may be excluded from the figures entered in the profit and loss accounts. Differences that exceed the 10% limit must be entered in the profit and loss account over the remaining pension qualification period. Differences that are the result of changes in the pension plan are distributed systematically over the average remaining qualification period.

Early negotiated pension plans (the AFP scheme) are covered by the Standard for Pension Cost Accounting.

The SINTEF Group has established a collective pension plan with an insurance company for all its employees. Liability covers 1256 employees of the SINTEF Foundation and 304 pensioners. In addition, pensions are paid to three former employees as part of our operating expenditure. Contributions made by employees towards the partial financing of the pension scheme are treated as a reduction in salary expenditure and do not affect pension expenditure for the period in question. One of the subsidiary companies affiliated to SINTEF Holding operates with a collective contributory pension scheme agreement. The annual pension expenditure is equivalent to the contributions paid in.

2. Financial market risks

SINTEF is vulnerable to exchange rate fluctuations in that some of its project revenues are in other currencies than those utilised for the whole or parts of its expenditure. This vulnerability is primarily related to EUR and USD, and in order to reduce the risks involved foreign exchange futures contracts are employed in the currencies in question.

SINTEF has a considerable liquidity reserve, and its portfolio is invested in accordance with the "Regulations for Financial Management" of June 2008. With the aim of reducing the risk resulting from the financial crisis, part of SINTEF's liquidity reserve was distributed among a number of banks and state certificates in autumn 2008.

SINTEF's portfolio as of 31 December 2008 had a market value of MNOK 278.8. The SINTEF Foundation's share was 44% of this amount.

The portfolio largely consists of interest-bearing funds, and per 31.12. 2008 it had a duration of 0.8. A 1% change in the rate of interest would have an effect of MNOK 1.7 on the result for the whole portfolio. The SINTEF Foundation's share of this risk is MNOK 0.7. The remainder of the portfolio consists of liquid assets and investments in moderately risky funds. All investments in foreign funds have been insured against exchanges rate losses.

3. Financial items

Figures in NOK thousand

SINTEF			SINTEF Foundation	
2007	**2008**		**2008**	**2007**
22 521	33 787	Interest received	19 516	12 220
5 713	15 112	Profit on exchange transactions	4 228	1 193
8 240	70	Yield from capital placements	31	3 695
62 725	878	Gains on sales of shares		10 886
4 708	2 492	Other financial revenues		155
103 907	**52 339**	**Total financial revenues**	**23 775**	**28 149**
2 070	2 304	Interest costs	509	1 089
86	204	Interest on late payments	135	76
219	532	Bank costs and fee	404	181
7 636	4 643	Currency exchange losses	6	1 266
2 000		Depreciation of financial liquid assets		
1 445	2 014	Other financial expenses		902
13 457	**9 697**	**Total financial expenses**	**1 054**	**3 513**
90 450	**42 642**	**Sum financial items**	**22 721**	**24 635**

4. Sales revenues

Figures in NOK thousand

By division	2008	2007
SINTEF Building and Infrastructure	263 694	248 037
SINTEF Health Research	116 928	103 112
SINTEF ICT	324 477	310 761
SINTEF Materials and Chemistry	558 550	458 350
SINTEF Technology and Society	239 819	237 796
Service exchanges within the Group	111 958	68 761
SINTEF Foundation	**1 615 426**	**1 426 817**
MARINTEK	292 337	270 682
SINTEF Fisheries and Aquaculture	116 682	102 206
SINTEF Marine	**409 019**	**372 888**
SINTEF Petroleum Research	196 088	165 956
SINTEF Energy Research	298 610	261 692
SINTEF Petroleum and Energy	**494 698**	**427 648**
SINTEF Holding	203 161	197 055
Eliminated internal turnover	-129 897	-153 240
SINTEF	**2 592 407**	**2 271 168**

SINTEF Foundation

Geographical distribution	2008	2007
Norway	1 442 811	1 259 313
EU	72 725	68 955
Rest of the world	99 890	98 549
Total	**1 615 426**	**1 426 817**

SINTEF

Geographical distribution	2008	2007
Norway	2 244 568	1 947 528
EU	122 514	124 272
Rest of the world	225 325	199 368
Total	**2 592 407**	**2 271 168**

5. Work in progress

In addition to individual evaluations, a 3% depreciation of the value of the companies' average monthly production during the past 12 months has been implemented.

6. Salary costs, number of employees, fees, loans to employees, etc.

Figures in NOK thousand

SINTEF			SINTEF Foundation	
2007	**2008**	**Wages and salaries**	**2008**	**2007**
985 783	1 105 827	Salaries	658 580	592 917
143 754	173 332	Employers' national insurance contributions	106 850	84 006
92 229	168 010	Pension costs	97 238	39 671
19 895	35 485	Other benefits	19 533	8 322
1 241 662	**1 482 654**	**Total salary costs**	**882 202**	**724 917**
1 866	**1 949**	**Man-years**	**1 187**	**1 142**

SINTEF's Group management has been incorporated in the joint pension scheme, with contributory payments as a supplementary scheme. The President of SINTEF has an additional right to early retirement at her own request, with a pension that covers 66% of her full salary from the age of 60 until she is 67. The President has a period of mutual notice of six months in addition to a scheme that entitles her to 12 months post-employment salary if the board should wish to terminate her employment. This will be reduced by any other income received during this period.

In 2008, the President's total remuneration package amounted to MNOK 2.7, of which MNOK 1.8 was salary, MNOK 0.2 bonus from 2007 and MNOK 0.5 pension contribution. The value of taxable benefits came to a further MNOK 0.2.

The Board has established guidelines for a bonus scheme for the President and the group management team. Any payments are made by results and are limited to maximum two months' pay.

Remuneration to the SINTEF Foundation's Board in 2008 amounted to MNOK 1.03. No payments have been made to the SINTEF Foundation's Council.

Figures in NOK thousand

SINTEF			SINTEF Foundation	
2007	**2008**	**Fees paid to auditors and cooperating companies**	**2008**	**2007**
1 297	1 020	Audit required by law	419	386
754	538	Other certification duties	250	398
1 540	678	Legal assistance; tax case	668	1 524
814	294	Other non-audit services	278	776
4 405	**2 530**	**Total**	**1 614**	**3 084**

The law firm Deloitte Advokatfirma DA collaborates with Deloitte AS.

Loans to employees
Total loans to employees of the Group came to MNOK 0.7 of which MNOK 0.5 were within the SINTEF Foundation.

7. Group pensions

Pension costs
Figures in NOK thousand

SINTEF			SINTEF Foundation	
2007	**2008**		**2008**	**2007**
92 353	103 283	Present value of pensions earned in the course of the year	52 180	43 847
68 714	81 957	Cost of interest on pension obligations	51 636	45 248
-63 792	-69 264	Yield on pension funds	-44 710	-40 046
34 852	49 418	Gains/losses on estimates entered in accounts	42 383	29 209
-40 200	7 406	Share of pension plan alterations entered in the profit and loss account	1 125	-40 506
10 134	9 845	Interim employee tax paid	8 334	7 513
102 061	**182 646**	**Net costs of pensions after employer tax**	**110 949**	**45 265**

Pension obligations and funds
Figures in NOK thousand

SINTEF	Insured (group)	Uninsured (AFP)	Uninsured (AFP)	Sum
Accrued pension obligations	2 066 195	21 986	17 989	2 106 170
Pension funds (at market value)	-1 355 570			-1 355 570
Non-entered effects of difference from estimates	-643 167	-2 867	-12 719	-658 753
Non-booked effects of changes in plan	-133 071			-133 071
Accrued employment tax	42 253	1 805	2 536	46 595
Net pension obligations, including	**-23 360**	**20 924**	**7 806**	**5 370**
Underfinanced pension commitments				52 519
Overfinanced pension commitments				47 149

SINTEF Foundation	Insured (group)	Uninsured (AFP)	Uninsured (AFP)	Sum
Accrued pension obligations	1 281 086	3 049	17 989	1 302 124
Pension funds (at market value)	-902 059			-902 059
Non-entered effects of difference from estimates	-426 544	-4 165	-12 719	-443 428
Non-booked effects of changes in plan	-5 902			-5 902
Accrued employment tax	33 651	430	2 536	36 618
Net pension obligations, including	**-19 768**	**-686**	**7 806**	**-12 648**
Underfinanced pension commitments				9 331
Overfinanced pension commitments				21 979

The following parameters have been used in the Group estimates:

Economic assumptions	2008	2007
Discounting rate	3,80%	4,50%
Anticipated salary adjustments	4,00%	4,50%
Anticipated pension adjustments	3,75%	4,20%
Anticipated adjustment of national insurance base rate (G)	3,50%	4,20%
Anticipated yield on pension funds	5,80%	5,40%
Actuarial assumptions		
Mortality table utilised	K2005	K63/T84/K2005
Disability tariff utilised	K2005/K63	K63/T84
Anticipated outtake frequency AFP	0–50%	0–50%
Voluntary resignation (all ages)	0–15%	0–15%

For 2008, the SINTEF Foundation has based its pension accounting for the 2008 accounting year on the updated version of NRS 6. In the 2007 accounting year the SINTEF Foundation changed its pension pledge in the current wage agreement, and the changes were taken into account in the Profit and Loss Sheet in the same year. This produced a reduction of some MNOK 40 in the cost of pensions in the accounts.

In compliance with the guidelines set out in NRS 6, selected assumptions regarding annual growth, discount interest rates, and anticipated rate of return have been used as the basis of the risked assessment calculations of pension obligations.

8. Tangible fixed assets – scientific equipment, fixtures, fittings and buildings

Figures in NOK thousand

SINTEF 2008	Buildings	Buildings under construction	Scientific equipm.	Office equipment, inventory and vehicles	Sum
Historical cost as of 01.01.	855 518	2 427	532 811	172 928	1 563 684
Acquisitions during the year	15 011	35 204	95 333	17 094	162 642
Divestiture at acquisition cost			-982	-391	-1 373
Investment grant			-20 288		-20 288
Historical cost as of 31.12.	870 529	37 631	606 874	189 632	1 704 665
Total ordinary depreciation	482 140		477 555	157 703	1 117 399
Book value as of 31.12.	**388 390**	**37 631**	**129 319**	**31 929**	**587 268**
Annual ordinary depreciation	**22 698**		**48 168**	**15 021**	**85 885**
Economic lifetime	10–50 years		3 years	3 years	
Depreciation plan	Linear		Linear	Linear	
Annual rental costs of operating assets not entered in Balance Sheet	56 068				56 068
Purchases in 2008 <15 000			**8 344**	**6 756**	**15 100**

SINTEF 2008	Goodwill
Historical cost as of 01.01.	9 524
Acquisitions in 2008	
Divestiture at acquisition cost	
Historical cost as of 31.12.	9 524
Total ordinary depreciation	5 151
Total depreciation	
Book value as of 31.12.	**4 374**
Annual ordinary depreciation	**943**
Economic lifetime	5–10 years
Depreciation plan	Linear

Goodwill from the purchase of SINTEF MRB will be written off linearly over ten years on the basis of anticipated cash flows.

Figures in NOK thousand

SINTEF Foundation 2008	Buildings	Buildings under construction	Scientific equipm.	Office equipment, inventory and vehicles	Sum
Historical cost as of 01.01. Acquisitions during the year Divestiture at acquisition cost	770 948 12 262	 15 109	305 771 34 047	132 263 9 306	1 208 982 70 723
Historical cost as of 31.12.	783 209	15 109	339 818	141 569	1 279 705
Total ordinary depreciation	432 335		277 969	125 196	835 500
Book value as of 31.12.	**350 875**	**15 109**	**61 849**	**16 373**	**444 206**
Annual ordinary depreciation	**18 504**		**26 541**	**9 263**	**54 308**
Economic lifetime Depreciation plan Annual rental costs of operating assets not entered in Balance Sheet	10–50 years Linear 34 847		3 years Linear	3 years Linear	 34 847
Purchases in 2008 ‹15.000			**8 339**	**5 506**	**13 845**

In 2008, the SINTEF Foundation leased 29 166 m² from NTNU. In addition, SINTEF Energy Research leased 4 282 m² and MARINTEK 23 580 m² from NTNU. NTNU leased 15 592 m² from the SINTEF Foundation, and 296 m² of SINTEF Energy Research's premises.

9. Subsidiaries

SINTEF Foundation's subsidiaries	Date of acquisition	Registered office	Ownership share
MARINTEK – Norwegian Marine Technology Research Institute	19.12.1984	Trondheim	56%
SINTEF Petroleum Research	01.01.1985	Trondheim	100%
SINTEF Energy Research	16.12.1985	Trondheim	61%
SINTEF Holding (previously Sinvent)	01.01.1988	Trondheim	100%
SINTEF Fisheries and Aquaculture	01.01.1999	Trondheim	96.9%
SINTEF Polska SP.Z.O.O	01.07.2005	Warszaw	100%
SINTEF Building and Infrastructure	01.12.2005	Oslo	100%

Shareholdings and voting rights are identical. The companies' accounting procedures follow the equity method; please see the following table.

Figures in NOK thousand	MARINTEK	SINTEF Petroleum Research	SINTEF Energy Research	SINTEF Holding	SINTEF Fisheries and Aquaculture	SINTEF Polska	SINTEF Building and Infrastructure	Sum
Historical cost = equity capital in Balance Sheet at time of purchase	6 500	9 000	4 600	6 670	11 219			26 770
Balance as of 01.01.08	**73 609**	**145 620**	**119 654**	**25 210**	**23 761**	**-3 141**	**1 943**	**386 658**
Share of result for 2008 Increase in capital Items entered directly against equity capital	4 515	17 142	17 942	-2 304 52 744 1 717	1 140 591			38 436 52 744 2 308
Balance as of 31.12.08	**78 124**	**162 763**	**137 597**	**77 368**	**25 492**	**-3 141**	**1 943**	**480 144**

Share of the annual result of MNOK 38.4, with the addition of items carried directly over equity capital MNOK 2.3, is transferred to other equity capital.

SINTEF Holding's subsidiaries / associated companies	Date of acquisition	Registered office	Voting and ownership share
SINTEF NBL (Norwegian Fire Research Laboratory)	31.12.2000	Trondheim	100%
Sinvent	24.11.2004	Trondheim	100%
SINTEF MRB	01.11.2004	Ålesund	100%
Link ftr	28.11.2007	Trondheim	72%
SINTEF Venture II	21.08.2006	Trondheim	65%
SINTEF Venture III	28.11.2006	Trondheim	64%
Molab	01.01.1990	Mo i Rana	60%
SINTEF Raufoss Manufacturing	09.02.2004	Raufoss	50.07%
NATMIG	26.03.2008	Oslo	100%
SINTEF North	07.05.2008	Tromsø	70%

Shareholdings and voting rights are identical. The companies' accounting procedures follow the equity capital method; please see table next page.

Figures in NOK thousand	SINTEF NBL	Sin-vent	SINTEF MRB	Link ftr	SINTEF Vent II	Molab	SINTEF Raufoss	NAT-MIG	SINTEF North	Sum
Historical cost	1 300	10 000	7 600	2 880	16 000	1 000	6 991	100	700	45 771
EC in Balance Sheet at time of purchase	1 300	10 000	2 246	1 285	16 000	1 500	4 078	100	700	36 409
Goodwill			5 354	1 595			2 923			9 872
Balance as of 01.01.08	**2 491**	**31 472**	**8 070**	**2 855**	**26 433**	**12 576**	**5 342**			**89 239**
Cost of acquisition of share issue								100	700	800
Capital reduction		-2 500								-2 500
Share of result for 2008	-102	1 757	908	-24	-1 534	1 458	628	3	-414	2680
Depreciation of goodwill			-535	-319			-89			-943
Gain derived from fusion		362								362
Dividends		-3 500								-3 500
Balance as of 31.12.08	**2 389**	**27 590**	**8 442**	**2 512**	**24 899**	**14 034**	**5 882**	**103**	**286**	**86 137**

SINTEF Holding and its subsidiaries are wholly consolidated in SINTEF.

10. SINTEF's shares and holdings in other companies

Figures in NOK thousand

SINTEF	Owner in SINTEF	Holding	Book value
Fixed assets			
ConMotion AS Subsidiary	SINTEF Fisheries and Aquaculture	100.0%	1 350
CarriTech Subsidiary	SINTEF Fisheries and Aquaculture	100.0%	27
AquaCulture Engineering AS Subsidiary	SINTEF Fisheries and Aquaculture	65.2%	2 405
MonAqua AS Associated company	SINTEF Fisheries and Aquaculture	33.3%	317
AVS Chile SA Associated company	SINTEF Fisheries and Aquaculture	33.3%	546
TraceTracker Innovation AS	SINTEF Fisheries and Aquaculture	1.8%	2 199
Oi! Tøndersk Mat og Drikke AS	SINTEF Fisheries and Aquaculture	1.0%	20
Powel ASA	SINTEF Energy Research	1.3%	244
Mo Industripark	Molab	2.0%	3 000
MoTest AS	Molab	49.0%	201
Leiv Eriksson AS	SINTEF Holding	3.6%	
MedTech AS	SINTEF Holding	19.4%	19
Forskningsparken AS	SINTEF Holding	0.9%	30
Spin Out Venture I	SINTEF Holding	25.0%	8 990
SINTEF Venture III AS	SINTEF Holding	100.0%	10 520
Mison AS	SINTEF Holding	2.6%	
SolSilc AS	SINTEF		22
Other shares	SINTEF		26
Reclassification of minority shares			2 230
Total long-term assets			**32 146**
Liquid assets			
CFD Norway AS	MARINTEK	30.6%	293
LogIT Systems AS	MARINTEK	4.8%	3 920
Offshore Simulator Center	MARINTEK	25.0%	910
Alcon Gruppen AS	SINTEF Holding	22.5%	980
DAT AS	SINTEF Holding	4.9%	575
Simula Research Lab. AS	SINTEF Holding	10.0%	150
Säkorninvest Midt-Norge AS	SINTEF Holding	11.9%	7 500
Spider Solution AS	SINTEF Holding	92.9%	
Trøndelag Forskning og Utvikling AS	SINTEF Holding	10.0%	500
ProVenture Speed AS	SINTEF Holding	3.0%	371
RFID Innovasjonssenter AS	SINTEF Holding	27.5%	110
AmbieSense AS	SINTEF Holding	37.0%	
Other minor shareholdings		<10.0%	679
Adjustments in value*			-8 948
Sum total other share			**7 041**
SINTEF Foundation		**Holding**	**Book value**
Long-term assets			
SolSilc AS			22
Other minor shareholdings			26

*Adjustments in value increased from -8 248 in 2007 to -8948 in 2008.

11. Receivables with due

Figures in NOK thousand

SINTEF			SINTEF Foundation	
2007	**2008**		**2008**	**2007**
8 593	9 875	Long-term receivables from companies within the Group Other long-term receivables	29 771 2 425	67 448 1 980
8 593	**9 875**	**Sum long-term accounts receivable**	**32 196**	**69 428**

The SINTEF Foundation has converted MNOK 37.7 of long-term debt to share capital in 2008.

12. Bonds and other securities

Figures in NOK thousand	SINTEF				SINTEF Foundation's share 44 %
Portfolio distributed as follows:	**Historical cost**	**Currency**	**Book value**	**Market value**	
Bank deposits and derivates	**62 789**	**NOK**	**62 789**	**62 789**	**27 685**
Interest bearing securities					
State/state guaranteed and municipalities		NOK			
Commercial and saving banks	82 316	NOK	84 909	84 909	37 438
Finance and credit companies	16 112	NOK	15 806	15 806	6 969
Interest-bearing funds	103 956	NOK	106 383	106 383	46 907
Total interest-bearing securities	**202 385**		**207 099**	**207 099**	**91 314**
Other placements					
Indexed bonds		NOK			
Scandinavian unit trusts		NOK			
Foreign unit trusts		NOK			
Foreign high-yield or hedge funds	8 307	NOK	8 936	8 936	3 940
Total other investments	**8 307**		**8 936**	**8 936**	**3 940**
Total investments for distribution	**273 481**		**278 824**	**278 824**	**122 940**
Extraordinary bank deposits via SINTEF's joint capital placement.	164 239		164 239	164 239	50 468
Sum capital placements	**437 719**		**443 063**	**443 063**	**173 408**

13. Foreign exchange

SINTEF hedges the value of revenues in other currencies by means of future exchange contracts with the bank. These future exchange contracts are entered into either for individual projects, or form part of block guarantees with quarterly maturity dates.

In the table below, the line "Revenues 2009 – 2012" is the sum of contracts entered into that are insured against exchange rate fluctuations at their market value on 31.12.2008. "Futures contracts" are the net position (buy-sell) due for payment on 31.12.2088 measured in NOK at their due date.

Figures in NOK thousand

SINTEF

Currencies	**EUR**	**USD**	**GBP**	**DKK**	**SEK**	**Other**	**SUM**
Bank deposits	20 014	3 834	-179	-1 056	-1 692	-224	20 696
Customer receivables	3 942	5 660	35		405	298	10 340
Accounts payable	-2 395	-1 571	-1 291	-276	-545		-6 078
Income 2009–2012	141 434	28 300		1 045	9 179	655	180 613
Futures contracts	-197 228	-38 008		-1 593	-8 162	-61	-245 053
Net exposure	**-34 234**	**-1 786**	**-1 436**	**-1 879**	**-815**	**668**	**-39 482**

SINTEF Foundation

Currencies	**EUR**	**USD**	**GBP**	**DKK**	**SEK**	**Other**	**SUM**
Bank deposits*	18 368	2 389	-179	-1 056	-1 692	-287	17 542
Customer receivables	3 594	5 350	35		405	293	9 677
Accounts payable	-2 341	-920	-1 285		-438		-4 984
Income 2009–2012	141 434	28 300		1 045	9 179	655	180 613
Futures contracts	-188 500	-37 044		-1 593	-8 162		-235 300
Net exposure	**-27 446**	**-1 926**	**-1 429**	**-1 604**	**-707**	**661**	**-32 451**

*"Bank deposits" are exclusive of EU coordinator projects.

14. Other long-term debt

Figures in NOK thousand

SINTEF	**2008**	**2007**
Mortgages	2 257	4 114
Other long-term debts owed to credit institutions	1 581	2 478
Other long-term debt	3 688	3 300
Total long-term debt	**7 526**	**9 892**
None of the debt has a due date longer than five years.		
Book value of assets posted as collateral for reported debt:		
Machinery etc.	8 400	8 830
Customer receivables	23 292	24 964
Other debts	6 671	5 537
Sum book value of assets posted as collateral for reported debt	**38 362**	**39 331**

15. Mortgages and guarantees, etc.

SINTEF has entered into an agreement with Fokus Bank to establish a joint technical account system for the administration of its current accounts. Fokus Bank is entitled to carry out offsets between accounts which SINTEF has both within and outside the Group's account system, independent of account type and currency, for any demand which the bank may have against the Group account holder and/or participant. This also includes obligations to the bank which are the result of agreements regarding currency and interest hedging instruments.

Grants from the EU, together with tax withholdings, are kept in separate accounts outside the Group account system.

The SINTEF Foundation undertakes to provide adequate security in the form of real property for the investment of funds from capital accounts under joint, active management.

SINTEF Energy Research AS has a guarantee commitment of MNOK 7 on two EU projects. MARINTEK has offered guarantee commitments of MNOK 2 on EU and other projects. SINTEF Fisheries and Aquaculture has issued sureties for its own debts to DnB NOR for up to MNOK 0.67 regarding loans to AVS Chile SA.

The SINTEF Foundation is involved in individual litigations resulting from its ordinary business activities. The SINTEF Foundation judges that any obligations in this regard will not greatly affect the profit and loss account of the SINTEF Foundation, its liquidity or financial standing.

16. Offsets between companies within the Group

Internal transactions within the group amonted to MNOK 133 ex. VAT.
Intra-group receivables and debts are shown as a line on the Balance Sheet.

17. Equity capital

Figures in NOK thousand

SINTEF	Paid-up equity	Earned equity	Total equity
Equity capital as of 01.01.	69 300	1 189 402	1 258 702
Annual result of Group		136 501	136 501
Equity-related adjustments		1 442	1 442
Equity capital as of 31.12	**69 300**	**1 327 345**	**1 396 645**
SINTEF Foundation	**Paid-up equity**	**Earned equity**	**Total equity**
Equity capital as of 01.01.	69 300	1 039 109	1 108 409
Annual result of Foundation		120 683	120 683
Items entered directly against EC		2 306	2 306
Equity capital as of 31.12.	**69 300**	**1 162 098**	**1 231 398**

18. Other current liabilities

The item "Other current liabilities" in the account for SINTEF includes provisions for accrued vacations, holiday pay and overtime, provisions for early retirement, bonuses and restructuring, investments in IT systems, obligations regarding invoices entered but unpaid and transiting EU funds.

19. Taxes

Figures in NOK thousand

SINTEF		
The annual tax expenditure is presented as follows:	**2008**	**2007**
Tax due	2 847	5 236
Changes in deferred tax	5 996	-35 796
Tax cost of ordinary result	**8 843**	**-30 560**
Current tax obligations in the balance sheet are presented as follows:	**2008**	**2007**
Tax payable for the year	2 043	5 198
Tax payable on Balance Sheet	**2 043**	5 198
Adjustment from nominal to actual tax rate :	**2008**	**2007**
Ordinary result before tax	145 344	223 067
Annual result before tax	145 344	223 067
Anticipated income tax according to nominal tax rate (28%)	40 696	62 459
Tax effect of following items:		
Non-deductible costs	3 162	4 229
Non-taxable income	-1 095	-20 229
Financial gains/losses within the exemption method	-242	322
Changes in the valuation of deferred tax benefit	-36 118	-81 958
Changes in non-balanced deferred tax advantage	280	
Insufficient tax provision from previous years	781	
Other items	379	117
Calculated wealth tax	1 000	4 500
Tax costs	**8 843**	**-30 560**
Effective tax rate	6%	-14%

Specification of the tax effect of temporary differences and losses to be carried forward.

	2008		2007	
	Advantage	**Obligation**	**Advantage**	**Obligation**
Operating assets	1 239 813		1 149 185	
Goods		176	62	193
Receivables	71 915		47 450	
Gains and losses account		1 365		1 706
Financial allocations	53 149		53 259	
Pension commitments	1 663		29 970	
Pension funds		41 107		41 889
Unutilised allowances	1 220		1 220	
Loss to be carried forward	87 660		302 044	
Total	**1 455 420**	**42 648**	**1 583 190**	**43 789**
Deferred tax benefit	480 541		509 634	
Non-balanced deferred tax advantage	442 032		465 130	
Net advantage/obligations on deferred tax in Balance Sheet	**38 509**		**44 505**	

Deferred tax advantage is entered on the basis of future revenue.

SINTEF Foundation

The annual tax expenditure is presented as follows:	**2008**	**2007**
Wealth tax payable	1 781	4 500
Changes in deferred tax	4 090	-19 090
Tax cost of ordinary result	**5 871**	**-14 590**
Current tax obligations in the balance sheet are presented as follows:	**2008**	**2007**
Annual payable wealth tax	1 000	4 500
Tax payable on Balance Sheet	**1 000**	**4 500**
Adjustment from nominal to actual tax rate:	**2008**	**2007**
Ordinary result before tax	126 553	217 906
Annual result before tax	126 553	217 906
Anticipated income tax according to nominal tax rate (28%)	35 435	61 014
Tax effect of following items:		
Non-deductible costs	1 341	1 505
Non-taxable income	-140	-1 035
Debt cancellation		-253
Share of result derived from subsidiary companies	-10 762	-23 944
Re-evaluation of deferred tax benefit	-21 784	-56 377
Insufficient tax provision from previous years	781	
Calculated wealth tax	1 000	4 500
Tax costs	**5 871**	**-14 590**
Effective tax rate	5%	-7%

Specification of the tax effect of temporary differences and losses to be carried forward:

	2008		2007	
	Advantage	**Obligation**	**Advantage**	**Obligation**
Operating assets	936 014		828 974	
Receivables	52 509		32 081	
Gains and losses account		709		886
Financial allocations	48 783		50 360	
Pension commitments	9 331			
Pension funds		21 979		23 615
Unutilised allowances	386		386	
Loss to be carried forward	30 038		217 870	
Total	**1 077 061**	**22 688**	**1 129 671**	**24 501**
Deferred tax benefit*	295 224		309 448	
Non-balanced deferred tax advantage	280 224		290 358	
Net advantage/obligations on deferred tax in Balance Sheet	**15 000**		**19 090**	

Deferred tax advantage is entered on the basis of future revenue.

*On the basis of figures on 31.12.2008, the deferred tax advantage could theoretically be worth about MNOK 262.5. The taxable value of land and buildings that will never be realised amounts to MNOK 32.7.

Auditor's report

Deloitte.

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7485 Trondheim

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Translation from the original Norwegian version

To the Board of Directors of SINTEF Foundation

AUDITOR'S REPORT FOR 2008

We have audited the annual financial statements of SINTEF Foundation as of 31 December 2008, showing a profit of NOK 120,683,000,- for the parent company and a profit of NOK 136.501.000,- for the Group. We have also audited the information in the Board of Directors' report concerning the financial statements and the going concern assumption, and the proposal in the financial statements for the allocation of the profit. The annual financial statements comprise the parent company's financial statements and the group accounts. The parent company's financial statements comprise the balance sheet, the statements of income and cash flows, and the accompanying notes. The group accounts comprise the balance sheet, the statements of income and cash flows, and the accompanying notes. The rules of the Norwegian Accounting Act and generally accepted accounting practice in Norway have been applied to prepare the financial statements. These financial statements are the responsibility of the Company's Board of Directors and Managing Director. Our responsibility is to express an opinion on these financial statements and on other information according to the requirements of the Norwegian Act on Auditing and Auditors.

We have conducted our audit in accordance with the Norwegian Act on Auditing and Auditors and generally accepted auditing practice in Norway, including standards on auditing adopted by The Norwegian Institute of Public Accountants. These auditing standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. To the extent required by law and generally accepted auditing practice an audit also comprises a review of the management of the Company's financial affairs and its accounting and internal control systems. We believe that our audit provides a reasonable basis for our opinion.

In our opinion,

- the financial statements are prepared in accordance with law and regulations and give a true and fair view of the financial position of the Company and of the Group as of 31.12.2008, and the results of its operations and its cash flows for the year then ended, in accordance with generally accepted accounting practice in Norway
- the Company's management has fulfilled its duty to see to proper and well arranged recording and documentation of accounting information in accordance with law and generally accepted bookkeeping practice in Norway
- the information in the Board of Directors' report concerning the financial statements and the going concern assumption, and the proposal in the financial statements for the allocation of the profit is consistent with the financial statements and complies with laws and regulations.

Trondheim, 19 March, 2009
Deloitte AS

Mette Estenstad (signed)
State Authorised Public Accountant (Norway)

"We use the Building Research series regularly here, particularly when we are building something with which we are not so familiar."

Stian Ervik, project engineer

Armed with knowledge

The largest independent research organisation in Scandinavia has a lot in common with the Norwegian building sector: the series of Building Research reports, for example.

"I had never been involved in building a turf roof before, but it wasn't a problem. An Internet search, and I had access to the principles involved," says project engineer Stian Ervik.

As a rule, Ervik does his engineering at his drawing board in his Leangen office in Trondheim. This is where, for example, he prepares working drawings when customers of Nordbohus Systembygg AS wish to make changes in the home designs they have just bought. He designs detached houses or entire housing schemes. For the time being, however, he has decided to swing a hammer himself, building cabins in the Oppdal mountains.

"I like to take part in the practical aspects of my trade; to be outside. In any case, it is good to see that what I am doing actually turns into something," says Ervik.

On his office shelves stand rows of folders of professional literature and project descriptions: "Building humidity", "Insulating against outdoor noise", and so on. But the book that he uses the most is not on the shelf. It is digital, and it is the Building Research report series.

Calling this publication a textbook is perhaps rather modest: it is quite simply a digital building encyclopaedia. Stian Ervik got to know it when he was still a student, for SINTEF Building Research, which is responsible for the series, has published a special training edition of the work for Norway's coming generations of building professionals. Ervik has continued to use it since he graduated.

"We use the Building Research series regularly here, particularly when we are building something that we are not so familiar with. We can find everything here from how a regulation plan should be drawn up to descriptions of advanced roofing structures."

The last time that the project engineer needed to look up something in the series was when he had to document that sufficient daylight was entering the project he was working on.

"The Building Research series offers us useful guidance about how we can calculate things like this, so that sort of thing can be fixed as well," says Ervik.

The solutions that are described in the series are known as "pre-accepted" solutions. This means that it has been documented that they work properly. Another aspect is that much emphasis has been placed on good communication, which has made the series popular.

"At present, we have more than 5000 subscribers, including joiners, builders, building managers, consultants; you name it. This is research dissemination in practice," says Kim Robert Lisø in SINTEF Building Research.

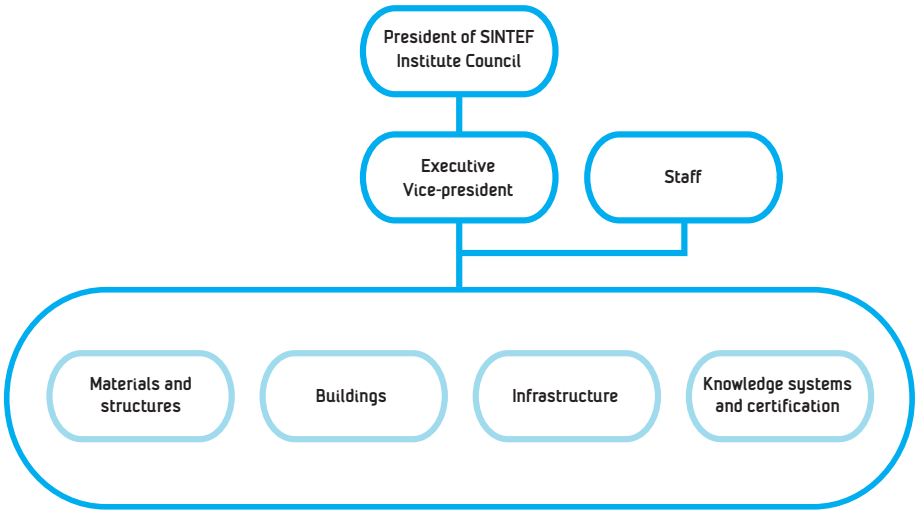
Lisø is a chief scientist, and he believes that the series has helped to form Norwegian building practices and raise the quality of Norwegian housing. He is quite right: the Building Research reports series is the SINTEF Group's biggest project ever, and its main objective since day one has been to disseminate research results.

The story of the series started in 1949, when the Royal Norwegian Council of Scientific and Industrial Research (NTNF) put forward a proposal to encourage building research in Norway. The intention was that the results of Norwegian building research should be brought into practical use by as many people as possible.

"Few other research institutes have managed to live up to their aims as well as SINTEF Building Research," says Lisø forthrightly.

And the story is by no means finished. SINTEF Building Research still publishes new or revised recommendations eight times a year, all of them based on research and experience. In the light of climate change, financial and energy crises, the reports may well be more important than ever. So SINTEF Building Research will need to continue to keep building engineer Stian Ervik up-to-date in the future as well.

Organisation of SINTEF Building and Infrastructure



This is SINTEF Building and Infrastructure

SINTEF Building Research is an internationally leading research institute.

We solve problems related to the entire construction process. The institute offers top-level expertise in areas ranging from architecture and building physics to management, operation and maintenance of buildings, water supply and other infrastructure. We create value for our clients and for society through research and development, research-based specialist consulting services and dissemination of knowledge. An important aim for us is to contribute to sustainable development in this sector.

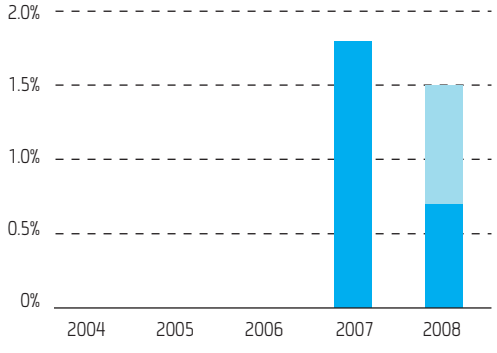
SINTEF Building Research is Norway's leading communicator of research-based knowledge. Via our knowledge systems, our publishing company and SINTEF Certification we have built up a unique platform for disseminating knowledge to a large part of the construction industry. The close dialogue with the sector has given us a good understanding of our customers' current and future needs. Wide-ranging cooperation with NTNU, leading industrial companies and other national and international partners in research, in addition to a well-utilised laboratory infrastructure, are fundamental aspects of our activities.

Through COIN (Concrete Innovation Centre), our Centre for Research-based innovation, we are developing new types of concrete, construction techniques and building solutions for this formable material. Concrete can be used both as a heat store and a cold reservoir, and can thus bring us closer to our vision of zero-energy houses. In the course of a long series of other projects, we have developed methods and technical solutions for energy-efficient buildings as well as buildings and infrastructure that are already adapted to the climatic challenges of the future. In collaboration with Enova and Norwegian industry, we have completed a number of demonstration projects aimed at achieving our goal of energy-efficient and environmentally-friendly buildings. Today, we can already build houses that are self-sufficient in terms of energy.

Sources of finance (% of gross operating revenue)

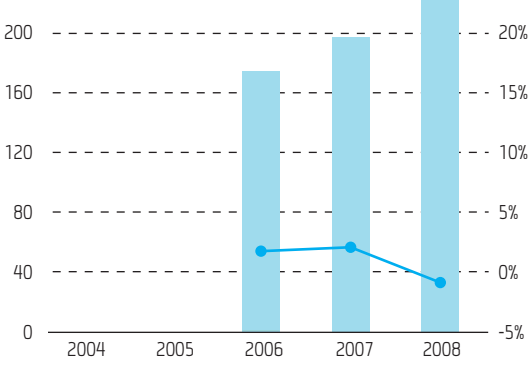
- RCN basic grant 3.7%
- RCN strategic programmes 10.8%
- RCN project support 4.5%
- Public sector 9.9%
- Industry and commerce 39.6%
- International contracts 13.6%
- Other sources of income 17.8%

Investments (% of net operating revenues)



- Scientific equipment
- Buildings

Economy



- Net operating revenue (MNOK)
- Net operating margin (%)

Employees

- Administration (38)
- Technical personnel (12)
- Engineers (34)
- Researchers (161)*

* Of whom 48 hold doctorates

Publishing and communication

- Refereed scientific journals, articles and conference papers (33)
- Scientific talks and posters (272)
- Reports (1169)
- Popular science articles and talks (146)
- Textbooks (6)

"Nothing is done by hand. Which, when we are speaking of something that is one hundredth of the diameter of a hair, is perhaps understandable."

SINTEF scientist Sigurd Moe

Technology reaches for the sky

A new Norwegian pressure sensor will make aircraft autopilot systems even safer.

The little sensor located in the cockpit dashboard makes its measurements faithfully as the aircraft move through warm and cold air, mist and rain, sunny and stormy weather. No matter what happens, it makes sure that the plane stays at the correct altitude so that there is no risk of collision with aircraft in other corridors. And when the time comes to lower the wheels as the runway approaches, the altimeter is essential. In Dubai, for example, the temperature can range from minus 60 degrees in the air to plus 50 degrees on the ground. This makes life hard for aircraft electronics systems, but our key component is stable and does its job.

The sensor is manufactured by a company in Horten called Memscap. For more than 20 years, Memscap has been producing high-precision pressure sensors for jumbo jets, Airbus and Boeing planes, and during the past few years, SINTEF has also been involved. Two major EU projects on aircraft safety have intensified the collaborative efforts.

International air traffic is steadily on the increase, and when take-offs are becoming more and more tightly spaced and ever more planes are circling airports as they wait to land, the likelihood of accidents also rises. In 2001, an SAS aircraft on the way to Copenhagen collided with a Cessna on the runway in Milan. The following year two planes collided in the air near Lake Constance in the South of Germany. These disasters led the EU to put money into projects aimed at improving safety in the air.

The project that involved the Norwegian scientists was to develop the next generation of pressure sensors for better aircraft altitude measurement. Memscap realised that this would be a research-intensive project that would require new advanced equipment. With that, SINTEF's Micro and Nanolaboratory was brought in. This special laboratory, in which a single grain of dust can destroy several days' work, lies in Gaustadbekkdalen in Oslo. Between the SINTEF building and the Department of Physics in Blindern, a handful of researchers have been working for three years on the pressure sensor.

Led by SINTEF scientist Sigurd Moe, we enter the bright and airy laboratories on the third floor. The air is filtered through holes in the floor, and demagnetisable white mats lie on each side of every door. The robot-like white suits, special shoes, masks and gloves create a certain science-fiction impression in the laboratories.

"Our contribution has been to improve the sensor and make it more stable," says Moe, who is careful to use a cloth whenever he grasps a door-handle. "Aircraft manufacturers say that an altimeter should last out the whole life of a plane, but the usual practice is to remove the box containing the sensor for calibration after only a year. Keeping a plane on the ground while its equipment is calibrated is expensive."

Moe holds a little silicon wafer up to the light. Its hundreds of tightly spaced tiny sensors glitter in shades of lilac and green. Three of these tiny components are mounted by Memscap in the sensor package that will ensure that autopilot systems in aircraft all over the world function properly.

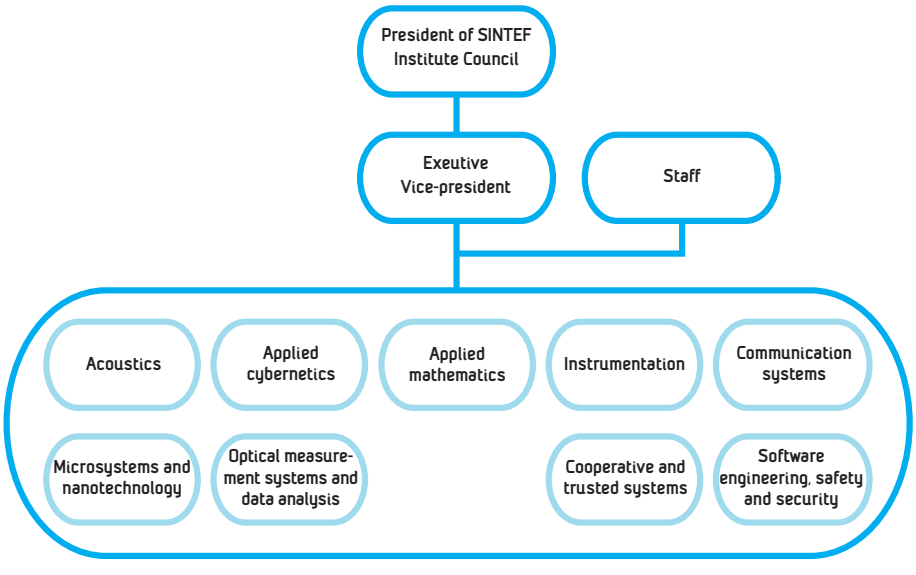
"Fascinating?"
"Absolutely. A great deal of mathematical simulations and calculations lie behind this design."

"How do you put together something as small as this?"
"Nothing is done by hand. Which, when we are speaking of something that is one hundredth of the diameter of a hair, is perhaps understandable. Production takes place with the aid of microsystem technology (MEMS) and photolithography, which means that we can make a very large number of sensors at once."

The partners have finished their first project. The sensor elements from SINTEF have been thoroughly tested by Memscap with positive results, and everything is ready for production.

And the collaboration among the partners in research is continuing. The next project will develop sensors to measure aircraft speed, cabin pressure and air-conditioning pressure. In 2012, the design will be installed in new aircraft, making sure that air travel in the future will be even safer.

Organisation of SINTEF ICT



This is SINTEF ICT

SINTEF ICT delivers research-based expertise and technology in the following three areas of technology: Micro- and sensor systems; Monitoring and information systems; and Calculation-oriented software.

In close cooperation with our partners and customers, we develop integrated solutions, products and services for a wide range of applications in a number of different national and international market segments.

SINTEF ICT collaborates at strategic level with several departments of NTNU and with the University of Oslo.

SINTEF ICT operates an ultra-modern micro/nano laboratory (MiNaLab), which is a world leader in the development and small-scale manufacture of radiation sensors. MiNaLab was established with the particular aim of carrying out research and development on complex products and processes, while offering its customers the possibility of small-scale production. MiNaLab is ISO certified.

In the field of safety-critical systems, SINTEF ICT has been appointed as technical control body for railway certification, and its certification programmes are carried out in accordance with the relevant EU directives.

In SINTEF ICT, we focus on creating value for our customers and for SINTEF by delivering innovative solutions and results within agreed deadlines and budgets.

We do this by putting conscious efforts into developing competence and technology that are capable of forming the basis of value creation in existing industry, and the establishment of new companies.

Technology, patents and intellectual property from SINTEF ICT have formed the basis of a number of Norwegian innovations and spin-off companies during the past few years; these include Nacre AS and Ocas AS. It is worth mentioning, for example, that advanced optical solutions from SINTEF ICT have played a decisive role in the development of AS Tomra's packaging recycling products, while our efforts in micro-optics are currently offering similar possibilities.

SINTEF ICT is a major participant in the EU's Framework Programme. We have gained this position by making conscious efforts vis-à-vis the EU in the course of several years.

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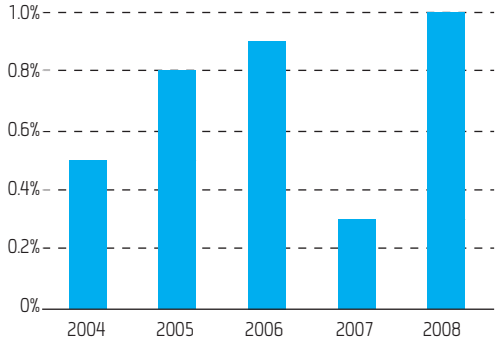
Participation in EU Technology Platforms (ETP) in the field of ICT means that we are playing an active role in the design of the Strategic Research Agenda (SRA) which is used as a baseline for the design of a wide range of working programmes.

Sources of finance (% of gross operating revenue)

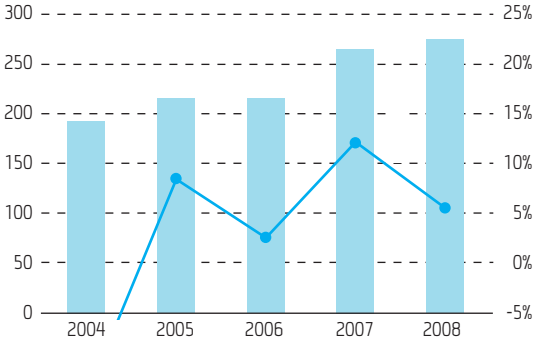
- RCN basic grant 3.3%
- RCN strategic programmes 8.9%
- RCN project support 14.4%
- Public sector 5.7%
- Industry and commerce 36.1%
- International contracts 17.3%
- Other sources of income 14.3%

Investments (% of net operating revenues)



- Scientific equipment
- Buildings

Economy



- Net operating revenue (MNOK)
- Net operating margin (%)

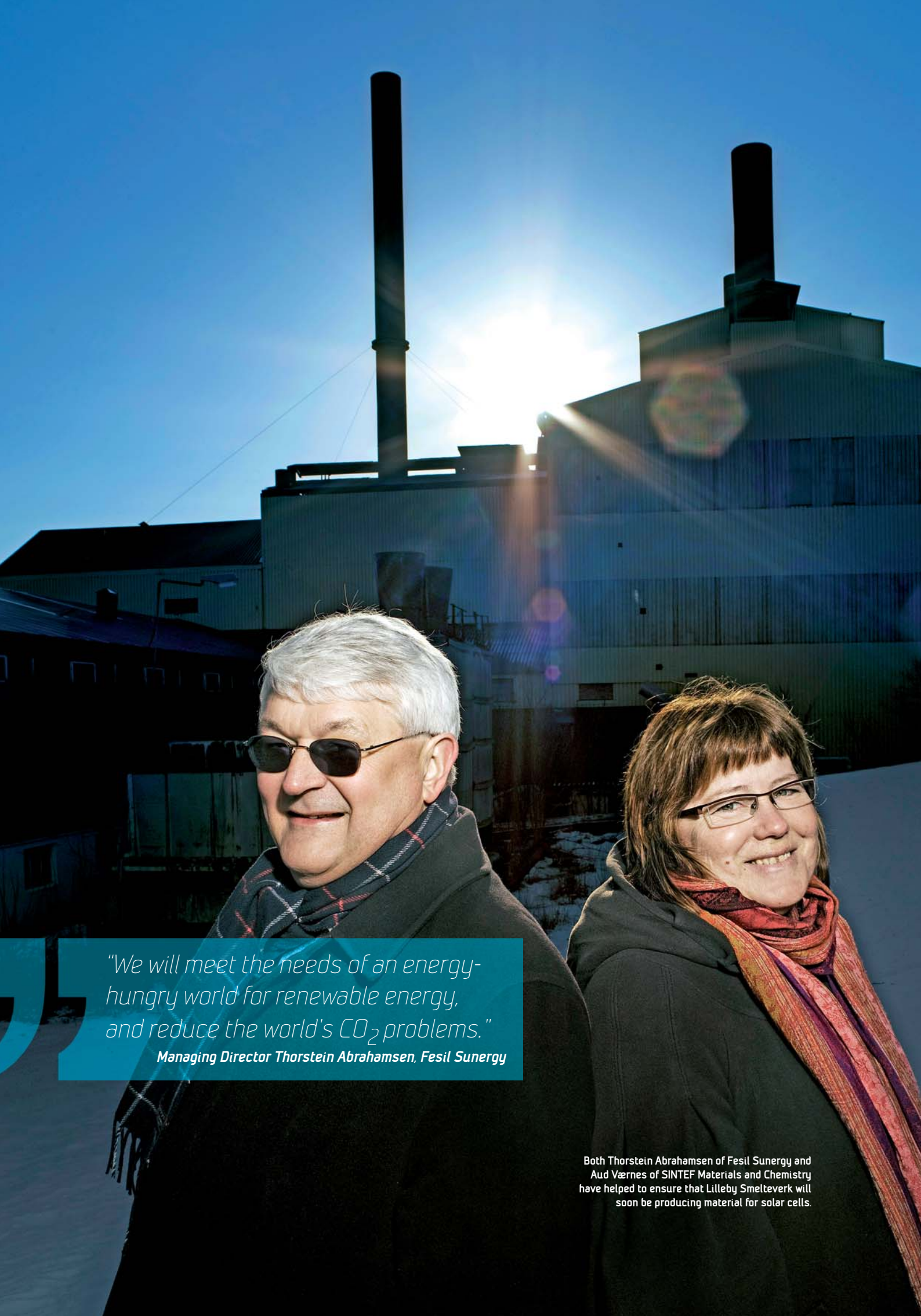
Employees

- Administration (19)
- Technical personnel (4)
- Engineers (16)
- Researchers (236)*

* Of whom 99 hold doctorates

Publishing and communication

- Refereed scientific journals, articles and conference papers (148)
- Scientific talks and posters (176)
- Reports (122)
- Popular science articles and talks (89)
- Textbooks (4)
- Scientific monographs (6)



"We will meet the needs of an energy-hungry world for renewable energy, and reduce the world's CO_2 problems."

Managing Director Thorstein Abrahamsen, Fesil Sunergy

Both Thorstein Abrahamsen of Fesil Sunergy and Aud Værnes of SINTEF Materials and Chemistry have helped to ensure that Lilleby Smelteverk will soon be producing material for solar cells.

Metallurgical sunrise

When Thorstein Abrahamsen was young, the people who wanted to find energy for the world looked to the oil field Ekofisk. Now, as the years add up, he puts his confidence in the sun.

Norwegian materials scientists and manufacturers have turned winter-dark Norway into a lighthouse for the development and production of solar cell metal. Thorstein Abrahamsen, (60), head of Fesil Sunergy AS, a company based on SINTEF research, is the closest person to obtaining royal status in Mid-Norway's part of the new empire of the sun.

But then, he grew up in the golden midnight sun of Northern Norway. The farmer's son from Kvænangen in the County of Troms became an engineer long before the term "climatic crisis" entered the dictionary. That was in 1972. The Ekofisk field had just turned Norway into an oil nation when Thorstein joined industry with a degree in electrochemical technology.

The materials specialist was soon promoted to management and helped clients on the continental shelf with corrosion protection problems and supplies of stainless steel. Solar cell panels were something that only astronauts thought about.

Today, the solar cell industry is the fastest growing sector in the world. The office building in Trondheim where Abrahamsen receives us is the "command centre" of a young spin-off company in this sector.

The veteran manager has run Fesil Sunergy since August 2008. The company wishes to invest around a billion kroner in a unique factory for solar cell silicon production. The whole scheme is based on technology from a ten-year joint effort by SINTEF, the Dutch energy institute ECN, the Dutch energy and investment company Sunergy Investco, the ScanArc industrial company from Sweden and the Norwegian silicon metal producer Fesil.

The first stage of building will create 200 jobs, and a year's production of solar cell metal which, once installed in solar cells, will supply almost as much electricity as the forthcoming gas-fuelled power station at Mongstad.

The plan is to raise the plant in Orkanger. This will provide the world with badly needed solar cell-quality silicon via metallurgical processes – at a rate of energy consumption that will be 70 – 75 percent lower than the classical chemical method.

During the last few years before he became a soldier in the service of the sun, Abrahamsen was a company adviser and occasional hired top-level manager and reorganiser in a number of well-known companies. He regards his move to Fesil Sunergy as a particularly meaningful step.

"We will meet the needs of an energy-hungry world for renewable energy, and reduce the world's CO_2 problems. We can tick off every imaginable box at one go," says Abrahamsen, as we sit over a cup of coffee. We are sitting in a worn-out office building in the shadow of a huge corn-coloured factory. Six rusty chimneys point skywards just outside. This is Lilleby Smelteverk, established in 1927 and once famous for producing the purest ferrosilicon in the world, until it closed in 2002. Now the plant can draw a final, but vital, breath before it is demolished.

This is where, if all goes according to plan, Fesil Sunergy will start small-scale test production of its silicon material in 2010. SINTEF and NTNU on Gløshaugen will be neighbours.

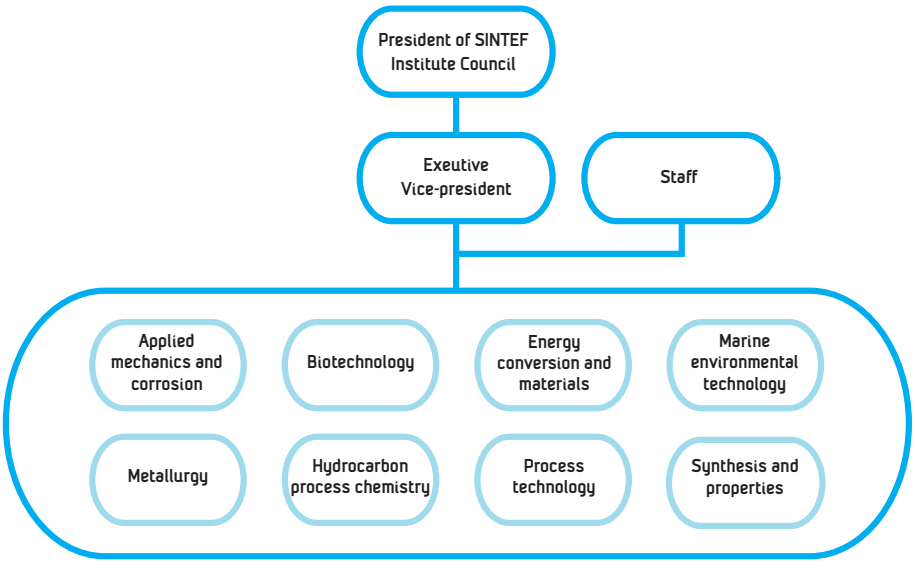
Gløshaugen was also where Aud Værnes was leading a project in which SINTEF collaborated with Kværner when she received a telephone call in autumn 1997. The two companies had developed a process that breaks natural gas down into hydrogen and ultrapure carbon.

Kværner's Steinar Lynum was on the line. He had just met Benno Wiersma, a Dutch businessman with a feeling for renewable energy. Both men knew that silicon smelter kilns need carbon in order to convert quartz into silicon metal, which is the most important component of most solar cells. They wanted to know if SINTEF's pure carbon could provide the key to smelters that would produce silicon that was pure enough to be turned into solar cells.

The conversation was the starting point of several EU-funded research projects. The result, the "Solsilc" process, in turn triggered the formation of Fesil Sunergy. Wærnes led the project during its first years, and she shares Abrahamsen's enthusiasm.

"The are few telephone calls that will come to mean so much for the climate and for everyone's access to energy as the one I got all those years ago," she says, happy as the sun.

Organisation of SINTEF Materials and Chemistry



This is SINTEF Materials and Chemistry

SINTEF Materials and Chemistry is a contract research institute with top-level expertise in materials technology, applied chemistry and applied biology. Our most important customers include process industry, including the oil and gas sector, refining, the Research Council of Norway, the EU and international industrial companies. The research institute consists of eight scientific departments, which cover the following core areas of research:

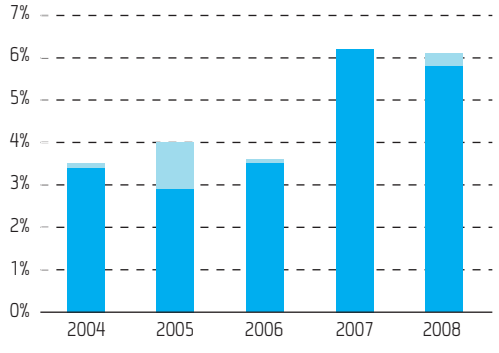
- Advanced characterisation and analysis
- Biotechnology
- Chemical technology and process chemistry
- Energy conversion
- Environmental engineering
- Flow technology
- Functional materials and nanotechnology
- Application properties of materials
- Production and recycling of materials
- Modelling and simulation
- Processing and manufacture
- Synthesis and testing

The institute is in a phase of significant growth, and employs a significant number of highly competent new staff with overseas backgrounds. The proportion of our research staff who hold doctorates is rising, and currently lies at around 60 percent. We concentrate on four main business areas: materials, energy, oil and gas, and life and bio-sciences. We work closely with industry in the development of advanced materials, products, processes and tools. New, renewable energy sources, gas-power with CO_2 capture and storage, biotechnology, marine environmental engineering, and hydrogen technology are among the future-oriented topics on which we are working, and which are making sustainable development one of the main aspects of everyday life for our staff.

Sources of finance (% of gross operating revenue)

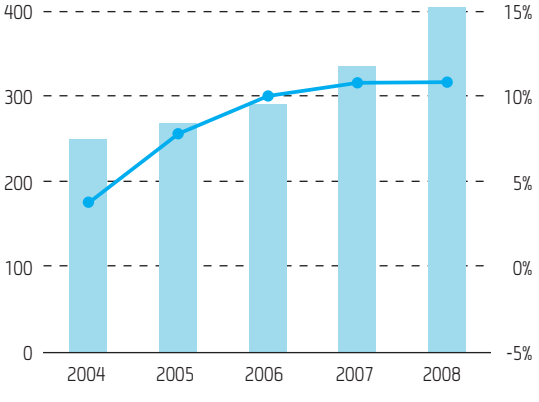
- RCN basic grant 2.2%
- RCN strategic programmes 2.8%
- RCN project support 18.7%
- Public sector 4.0%
- Industry and commerce 60.9%
- International contracts 11.4%
- Other sources of income 0.0%

Investments (% of net operating revenues)



- Scientific equipment
- Buildings

Economy



- Net operating revenue (MNOK)
- Net operating margin (%)

Employees

- Administration (36)
- Technical personnel (21)
- Engineers (69)
- Researchers (280)*

* Of whom 179 hold doctorates

Publishing and communication

- Refereed scientific journals, articles and conference papers (131)
- Scientific talks and posters (144)
- Reports (404)
- Popular science articles and talks (38)
- Scientific monographs (1)

"We can ring the specialists and get help, which gives us the chance to follow up patients even more thoroughly. In practice, it means that hospital admissions can often be avoided."

Home-care nurse Kristin Murvold

Both home-care nurse Kristin Murvold (left) and researcher Kristine Holbø of SINTEF Technology and Society play important roles in combatting COLD.

Combatting COLD in the field

Some 300,000 Norwegians suffer from chronic obstructive lung disease (COLD), and every year, 2000 people die of this disease. Now the fight against COLD has moved to the patient's home.

The walls of research scientist Kristine Holbø's workroom are plastered with yellow, pink and green Post-it slips and sketches. "Coping", "Social", "Info" and "Treatment" are scribbled on the little slips with a marker pen.

Although her work appears to be extremely theoretical, it actually has a very practical orientation. Holbø works in what is called "user-guided innovation in the health sector", which involves creating new products based on patients' needs. This research project is being run on behalf of InnoMed, which is the Norwegian Directorate of Health's arm for need-driven innovation.

And there are good reasons to be doing research on what COLD patients need: according to a study carried out by SINTEF Health Research, the living conditions of COLD patients are poorer than those of many other patient groups. On a standard of living index that ranges from zero to one, people with COLD score significantly lower than patients with other chronic diseases. One of the problems with which many COLD patients struggle is that they have to be repeatedly admitted to hospital, which is a major stress factor for both the patients themselves and for hospitals.

The study is based on wide-ranging cooperation with the project owners, which are the City of Trondheim and St. Olav's Hospital. One of the aspects that interests the researchers at the present time is a system that will enable home-care nurses to check the general physical and psychological state of their patients.

From the sofa, they can measure pulse, respiration frequency, oxygen uptake and lung capacity. If the nurse has a problem, she can ring a COLD support team for immediate advice and help.

Nurse Kristin Murvold is among those who are very satisfied with the COLD Centre; she herself has been given special training in treating this disease. "We can ring the specialists and get help, which gives us the chance to follow up patients even more thoroughly. In practice, it means that hospital admissions can often be avoided," says Murvold.

In the project, Kristine Holbø and her colleagues are developing a technological communications platform that will allow the dialogue between doctor and patient, and no less important, between the home-care nurse and COLD experts, to take place without a hitch, even when they are not physically in the same place.

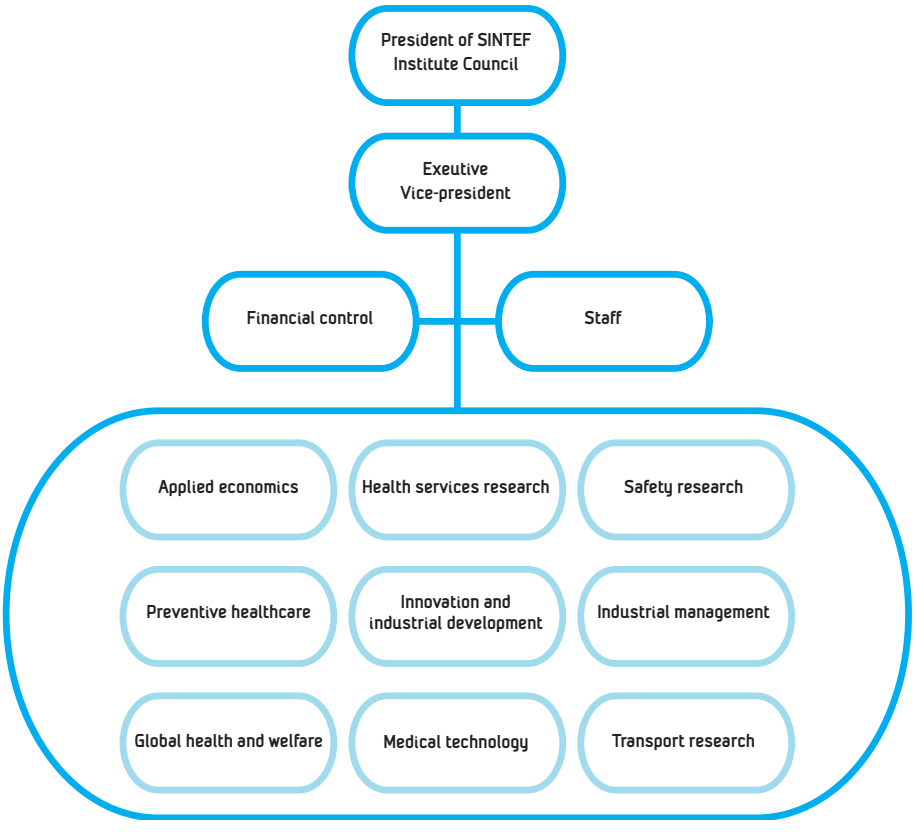
"One possibility is to use the TV as a technology platform. COLD patients often belong to an age group that may not be familiar with computers. The TV and the remote control are things they are familiar with, and which they do not perceive as a barrier," explains the researcher.

The only thing that needs to be done in the home is to connect the TV to a little PC which in turn is connected to the Internet. This solution could be of great importance for patients who live far from the hospital in counties that extend over long distances. At the same time, it opens up the possibility of giving the patients themselves access to the COLD Centre. But not least, it will make it easier for them to stay in contact with their families and friends.

However, the team is not stopping at the sofa. Another clearly expressed need of COLD patients is to increase their possibilities of getting out of the house. The trouble is that they are often dependent on heavy medical equipment that supplies them with essential oxygen. This is why Kristine Holbø and her colleagues are developing equipment that will make it easier for patients to venture out, and which will be less obtrusive than what is available today.

One thing that is on the list is a new nose catheter that will not be as visible as the old ones, and small, light-weight oxygen cylinders that can be attached to the patient's thigh.

Organisation of SINTEF Technology and Society



This is SINTEF Technology and Society

SINTEF Technology and Society is a multidisciplinary research institute that operates in the fields of science and technology, and the social sciences. In addition to being a powerful supplier of technology to commerce and industry, we also provide solutions to social challenges in the health, welfare, environmental and safety sectors.

We develop technology and generate knowledge aimed at promoting value creation throughout society. Our holistic understanding of society, technology, organisation and economics provides us with generic competence in all branches of manufacturing and service industry. At the same time, we have particular expertise in the transportation sector. SINTEF Technology and Society is engaged in a wide range of international cooperative projects, both in EU programmes and elsewhere around the world.

Our three main areas of health, transport and technology management are covered by all nine of our research departments.

In the field of technology management we carry out research and development projects for industry and the public sector. Our research groups are multidisciplinary and focus on interactions among technology, human resources, organisation and society. Technology management's research and development are aimed at increasing wealth creation while maintaining a concern for safety and the environment.

In the field of transport we do research on the transport systems of the future. Our multidisciplinary approach enables us to adapt technology to the needs of human beings, industry and society in general.

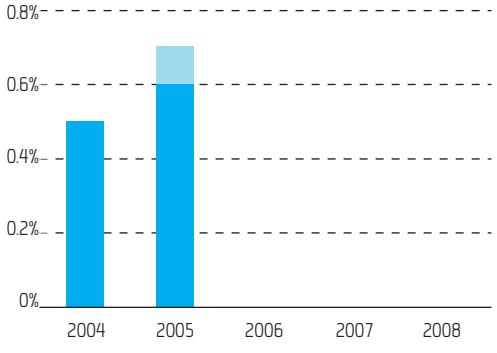
Our health-related research focuses on medical technology, health services, preventive healthcare and global health issues. In collaboration with research groups both in SINTEF and elsewhere we generate new knowledge that will improve both health and the quality of life.

Our multidisciplinary approach enables us to make contributions to value adding in traditional manufacturing industry and cross-sector service provision. Research on innovation is also a key aspect of improving competitiveness.

Sources of finance (% of gross operating revenue)

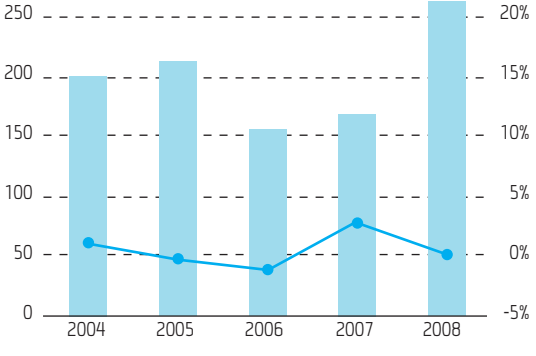
- RCN basic grant 4.2%
- RCN strategic programmes 3.5%
- RCN project support 11.2%
- Public sector 43.7%
- Industry and commerce 30.4%
- International contracts 4.7%
- Other sources of income 2.4%

Investments (% of net operating revenues)



- Scientific equipment
- Buildings

Economy



- Net operating revenue (MNOK)
- Net operating margin (%)

Employees

- Administration (33)
- Technical personnel (2)
- Engineers (9)
- Researchers (280)*

* Of whom 91 hold doctorates

Publishing and communication

- Refereed scientific journals, articles and conference papers (67)
- Scientific talks and posters (160)
- Reports (125)
- Popular science articles and talks (48)
- Textbooks (4)
- Scientific monographs (1)

On 01.01.2009, SINTEF Technology and Society was merged with SINTEF Health Research. The figures for 2008 are the total for the two former divisions.

"For us, this was simply a set of calculations based on measurements, but the results have become a nice bit of environmental technology."

Researcher Edvard Karlsvik, SINTEF

Researcher Edvard Karlsvik of SINTEF Energy Research gets a warm feeling from his own work in the living room of the Gylland family house in Melhus near Trondheim. The family are very happy with their new stove.

Hot newcomer

Imagine a wood-burning oven that utilises 97 percent of the energy in the wood without producing airborne particulate matter. An oven that is fire-safe and that will heat your house for two days at a time without needing more fuel.

"This is not some sort of version for the future; this is reality," says Kurt Brun at Bionordic AS. At the foot of the Jostedal Glacier, he has developed what may be the most advanced pellets oven in the world.

Wood shavings and timber waste that would otherwise have been discarded are turned into high-quality heating resources with the help of industrial waste heat.

"The oven is also thermostatically controlled, can be ignited by telephone, is fire-safe, energy-efficient and gives you cheaper heating than electricity. It also regulates itself according to the draught in your house. Our oven thinks for itself," says Brun.

A SINTEF report confirms that he is not just boasting. Today, the advanced pellets oven is on sales throughout Norway, and it has become a regular fixture for demonstrations in the research institute's heating technology laboratory. The Myrvold Hageby housing association near Lillestrøm recently decided to install the oven in 14 of its newly built houses, and nearly 300 house-owners throughout Norway have done the same. Demand for the wood-firing system of the future is on the rise, not least because the latest generation of pellets-fuelled ovens is much more efficient, and are capable of providing heat at NOK 0.35 per kWh.

The oven's history dates back to 2003 in the same idyllic spot, when David Brun became the proud owner of a new house already fitted out for a water-borne heating system. The problem was to find the right heat source. Brun thought about it, and decided to go in for biopellets, a solution that was both practical and environmentally friendly.

"The first oven I bought didn't deliver. The heat it supplied was simply hopeless. There was an excess of air passing through the system, which meant that I was 'sending heat to the crows'," says Brun.

With a good dose of curiosity and drive to succeed, the self-taught inventor started to experiment with heating technology himself, together with a colleague, Geir Arne Moseng. After a while, Brun got in touch with SINTEF, which soon showed its interest in the little company.

Research scientist Edvard Karlsvik, wood-firing enthusiast and combustion expert, made a trip to Jostedalen, where he went through Brun's sketches and suggested new solutions and dimensions for individual elements of the system.

"The creativity in the solutions that Brun showed me was impressive. I was very keen to see how the first prototype would come through the laboratory tests," says Karlsvik.

When the first measurement were made, the researchers could scarcely believe their own eyes. The efficiency of the oven was more than 95 percent.

The typical measure for ovens of this sort is up to 85 percent. Brun had developed a unique solution, but SINTEF scientist Karlsvik believed that he could help the inventor to get even further, with the aid of theoretical calculations and experiments. He also wished to document the fuel efficiency properties of the oven.

"Today, we have managed to perfectly balance air consumption, so that the temperature of the flue gas is as low as it can be: in other words, this oven is not simply heating up the outside air."

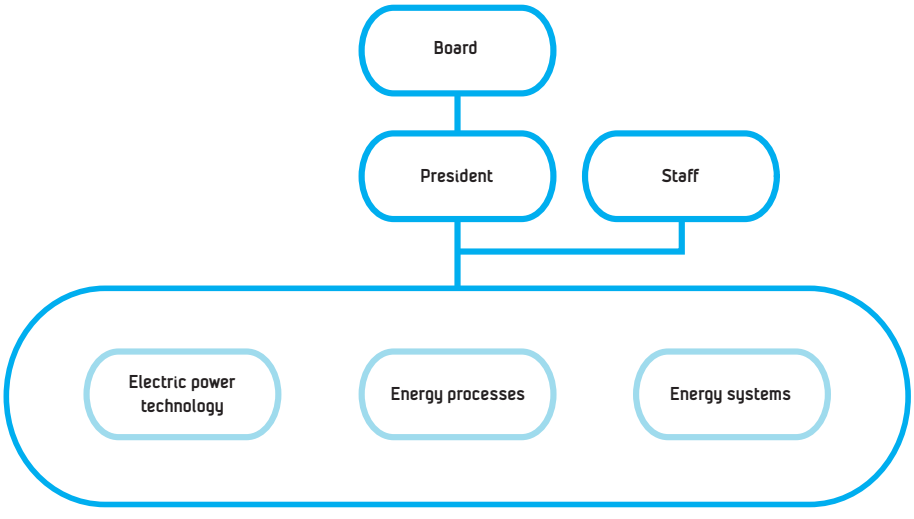
Among the reasons for this is that the oven loads its pellets through a feed systems based on the revolver principle. A slowly rotating barrel with several chambers picks up the pellets and delivers them to the combustion chamber, while the seal between the two units is completely tight. This means better fire-worthiness and lower air consumption in the combustion process. SINTEF has also designed the oven's heating surfaces to release the maximum heat possible. The result is an efficiency of no less than 97 percent. The high temperature also means that the oven itself burns up particle pollutants that would otherwise have ended up as airborne particles.

In some of the trials, the oven burned so cleanly that the pollution levels lay below what the instruments were capable of measuring.

"For us, this was simply a set of calculations based on measurements, but the results have become a nice bit of environmental technology," says Karlsvik.

The inventor and the scientist are now hoping that the oven will meet a good reception throughout Europe. The EU has resolved that 20 percent of our energy consumption is to come from renewable resources by 2020. Today, only ten percent of European energy consumption is derived from renewable resources.

Organisation of SINTEF Energy Research



This is SINTEF Energy Research

SINTEF Energy Research develops solutions related to power generation and conversion, transmission and distribution, and end-use of energy both onshore and offshore/subsea. We deal with everything from indoor climate and energy use in buildings to gas technology, combustion, bioenergy, environmental impacts, refrigeration technology and thermal processing of foodstuffs. The institute has three research departments: Electric Power Technology, Energy Processes and Energy Systems. Together with NTNU, the institute has 7000 square metres of laboratory space with advanced equipment for research, teaching and development at its disposition.

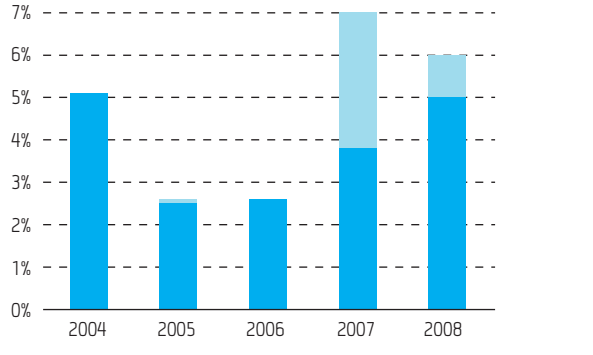
Main financial figures for SINTEF Energy Research

MNOK	2004	2005	2006	2007	2008
Result					
Gross operating revenue	203	211	246	262	299
Net operating revenue	158	165	186	195	214
Operating result	**6**	**4**	**13**	**15**	**21**
Annual result	**9**	**17**	**28**	**27**	**30**
Balance					
Fixed assets	39	56	50	61	70
Liquid assets	148	169	237	255	724
Sum assets	**187**	**225**	**287**	**316**	**394**
Equity capital	129	146	174	196	225
Debt	58	79	113	120	169
Sum equity capital and debt	**187**	**225**	**287**	**316**	**394**
Profitability					
Operating margin %	3.8	2.6	7.0	7.5	9.8
Total profitability %	4.9	8.3	11.0	7.8	8.6
Profit on equity %	7.6	12.3	17.5	14.7	14.4
Liquidity					
Net cash flow from operations	6	-9	53	35	22
Degree of liquidity	2.6	2.8	2.5	2.6	2.2
Solidity					
Equity capital in %	69.2	65.0	60.7	62.1	57.1
Operating working capital	87.8	89.0	122.5	147.5	177.1

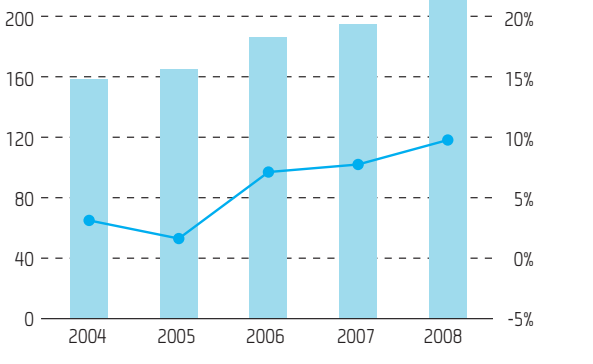
Sources of finance (% of gross operating revenue)

- RCN basic grant 2.5%
- RCN strategic programmes 2.3%
- RCN project support 26.1%
- Public sector 6.5%
- Industry and commerce 50.2%
- International contracts 12.4%

Investments (% of net operating revenues)



Economy



Employees

- Administration (32)
- Technical personnel (9)
- Engineers (11)
- Researchers (148)*

* Of whom 66 hold doctorates

Publishing and communication

- Refereed scientific journals, articles and conference papers (60)
- Scientific talks and posters (33)
- Reports (164)
- Popular science articles and talks (88)

"If there is a difference between the theoretical picture and the real one, the system sounds the alarm."

Rolv Rommetveit,
General Manager, e-Drilling Solutions

They develop computer tools for oil drilling operations. Sven Inge Ødegård (left) and Rolv Rommetveit, formerly chief scientist at SINTEF Petroleum Research, lead SINTEF spin-off eDrilling Solutions.

Window on the well-hole

The big screens in the offshore industry can look forward to a premiere: the SINTEF spin-off eDrilling Solutions is offering "live" 3D visualisations from the depths – plus important cost reductions in drilling operations.

"Imagine a dentist sitting on the 20th floor with a flexible drill cable between his fingers," says Rolf Rommetveit, previously a chief scientist in SINTEF Petroleum Research.

"From there he has to treat a patient sitting in the cellar, and find the right tooth with his drill," supplements his companion Sven Inge Ødegård, himself a former business development manager in the Stavanger company Hitec Products Drilling AS (HPD).

These two make up the management team in eDrilling Solutions AS, a spin-off company that SINTEF and HPD set up in 2008. The target group that they aim to help, and which they describe so graphically, is the petroleum industry specialists who perform and monitor the drilling of oil and gas wells.

"When our product has been sufficiently developed, the 'dentist' will be able to sit anywhere relative to the 'patient'," says Rommetveit.

In 2004, none of this was more than a vision, but it lay at the forefront of the thinking of Rolf Rommetveit and Sven Inge Ødegård.

One day in the run-up to Christmas that year, the two strode into Reception in ConocoPhillips Norge AS. The two had long been envisaging a data system that would monitor drilling operations and sound the alarm automatically when something began to go wrong downhole. They were thinking of savings in the hundred million kroner class – per hole! – when they arrived at the huge Norwegian headquarters of the oil company.

The biggest foreign operator on the Norwegian continental shelf had invited suppliers and researchers to a "thinking aloud" day dedicated to the company's technology requirements. From the podium, the hosts mentioned integrated operations, decision-support tools, remote monitoring and remote control of operations.

In this way, the vision of the two guests from SINTEF fused with the desires of the company, resulting in a three-year, NOK 25 million project, which was also supported by the Research Council of Norway.

In the course of the project, SINTEF Petroleum Research, HPD and Aker Solutions (First Interactive and AKER MH) developed the eDrilling computer tool – the basis of the company eDrilling Solutions, which was founded in November 2008.

The market to be served by the company consists of a branch of the petroleum industry that uses computer calculations as a basis for steering and controlling drilling and well operations.

"At the same time, the sensors send enormous amounts of data about what is going on down in the well-hole. Until now, this information has been interpreted manually by the engineers who monitor the drilling process.

With eDrilling, the computer takes over the job of interpretation. The system monitors and performs 3D visualisation of drilling and well operations in real time, which is to says that it provides up-to-date information while the operation is taking place. Behind it all lie computer simulations that show how the operation should be taking place under normal conditions.

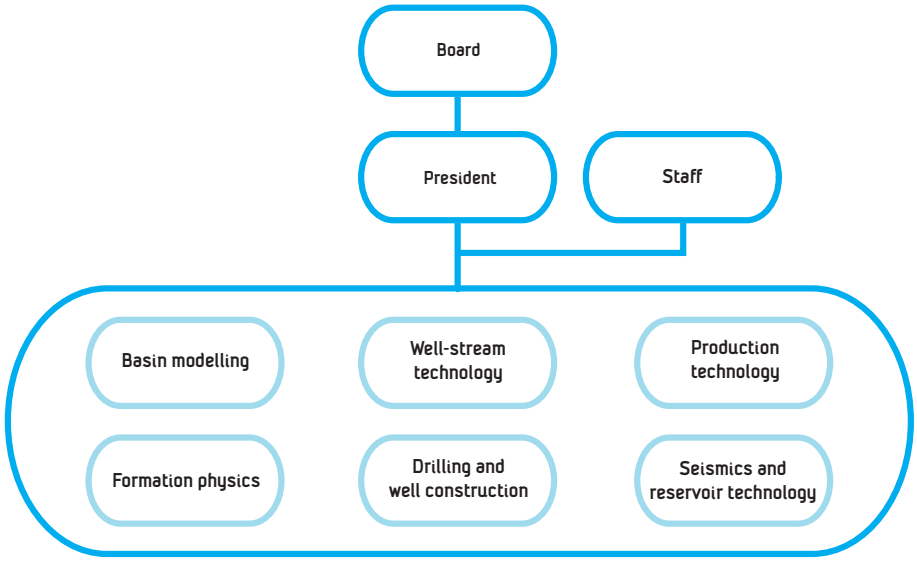
"To this reflection of reality, we have coupled information from the sensors about what is actually happening in the well-hole. If there are differences between the theoretical picture and the real one, the system sounds the alarm," explains Rommetveit.

Now the task is to finish developing eDrilling in a new MNOK 32 R & D project. According to current plans, the system will be out on the market some time in 2009, and the young company has a staff of ten hard at work.

ConocoPhillips is one of the project's pilot customers, and Mike Herbert, the company's consultant on integrated operations, has followed the development of eDrilling right from the start. He claims that the new system offers the prospect of significantly increasing productive time during drilling, although he says it is still difficult to quantify its potential.

"Non-productive time in a drilling operation can occasionally fall to as low as 10–15 percent. At other times, on the Norwegian shelf it can be as high as 100 percent, because a hole has to be abandoned. Compared to other sectors, the petroleum industry is actually quite inefficient, which is why we have such great expectations of tools like eDrilling," says the veteran petroleum expert.

Organisation of SINTEF Petroleum Research



This is SINTEF Petroleum Research

SINTEF Petroleum Research aims to improve the mapping and recovery of national and international oil and gas reserves in a profitable, environmentally-friendly and safe manner. Almost 40 years of experience in petroleum research have enabled us to make significant contributions to Norwegian exploration and production technology. We currently have customers and partners from all over the world. The institute collaborates with other research institutes and several universities, and enjoys particularly close collaboration with NTNU. We are located in Trondheim, Stavanger and Bergen, and also have a sales office in the USA. Our laboratories provide an important foundation for much of our research and development. An example of this is the Multiphase Laboratory, which is currently being upgraded in order to enable it to perform tests under constant temperature conditions throughout the year.

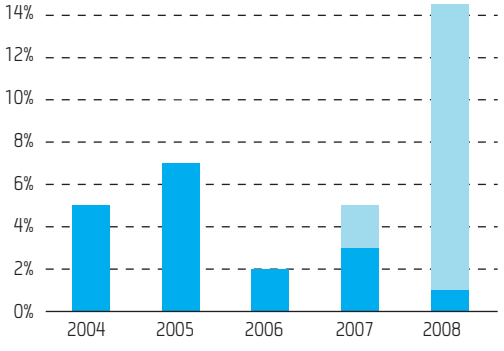
Main financial figures for SINTEF Petroleum Research

MNOK	2004	2005	2006	2007	2008
Result					
Gross operating revenue	115	130	144	166	196
Net operating revenue	89	100	108	123	145
Operating result	**0**	**-7**	**8**	**13**	**12**
Annual result	**2**	**-4**	**10**	**50**	**17**
Balance					
Fixed assets	9	33	33	26	39
Liquid assets	125	114	139	193	210
Sum assets	**134**	**147**	**171**	**219**	**249**
Equity capital	89	85	96	146	163
Debt	45	62	76	73	87
Sum equity capital and debt	**134**	**147**	**171**	**219**	**249**
Profitability					
Operating margin %	-0.4	-7.3	7.5	10.3	8.4
Total profitability %	2.2	-2.6	7.9	24.4	7.7
Profit on equity %	2.8	-4.5	11.5	41.6	11.1
Liquidity					
Net cash flow from operations	6	-1	13	40	30
Degree of liquidity	2.8	1.9	1.8	2.6	2.7
Solidity					
Equity capital in %	66	58	56	67	65
Operating working capital	74	47	62	118	114

Sources of finance (% of gross operating revenue)

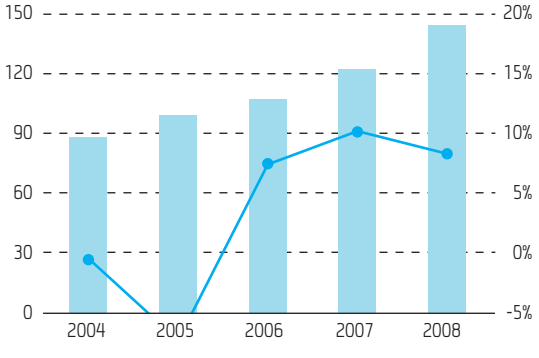
- RCN basic grant 2.8%
- RCN strategic programmes 4.1%
- RCN project support 6.6%
- Public sector 2.3%
- Industry and commerce 72.8%
- International contracts 9.9%
- Other sources of income 1.5%

Investments (% of net operating revenues)



- Scientific equipment
- Buildings

Economy



- Net operating revenue (MNOK)
- Net operating margin (%)

Employees

- Administration (12)
- Technical personnel (5)
- Engineers (8)
- Researchers (92)*

* Of whom 61 hold doctorates

Publishing and communication

- Refereed scientific journals, articles and conference papers (50)
- Scientific talks and posters (94)
- Reports (90)
- Popular science articles and talks (35)
- Textbooks (1)
- Scientific monographs (1)

"Norway's coastline, if we include all its islands, is twice as long as the Equator. In other words, we have enormous areas that are suitable for seaweed cultivation.

Senior Scientist Jorunn Skjermo, SINTEF

Seaweed on the mind

The Norwegian continental shelf in a few years: Pensioned-off oil platforms are surrounded by huge seaweed farms. On deck, process plant that converts the seaweed to biofuel. A utopian vision?

"No, it is by no means impossible that the loading buoys on the continental shelf could be filling tankers with environmentally-friendly seaweed-based bioethanol instead of petroleum in the future," says senior scientist Jorunn Skjermo of SINTEF Fisheries and Aquaculture, although as she is quick to add: "It is along the coast that production will take off first, if energy and research groups in Norway manage to make seaweed-based fuel production profitable. And we both hope and believe that this can be a viable industry."

Together with her colleague Kjell Inge Reitan, Skjersmo has already begun to take this new path to the global fuel market. The two SINTEF scientists are working on three research projects on seaweed cultivation. Behind them, they have the Research Council of Norway and StatoilHydro.

If Norway manages to produce fuel from underwater fields of billowing brown seaweed plants, the country will be given a completely green exhibition window. The two scientists point out that seaweed cultivation would give us biofuel that does not use food plants as its raw material, and that neither cultivable soil nor freshwater resources would be needed.

At SINTEF Sealab, SINTEF's marine laboratories in Trondheim harbour, tiny, young seaweed seed plants are being grown on ropes, which will later be set out in the sea near Tjeldbergodden. The researchers are following the seaweed closely in these simple cultivation facilities in order to see how much the plants grow and how much biomass they will be able to harvest to make fuel.

Some of the experiments will show which species of seaweed are most suitable for cultivating in northern waters. At the same time, data on the use of seaweed for energy production will be collected and studied by SINTEF Fisheries and Aquaculture. This material will be used as the basis of financial and energy-related calculations.

It is already clear that microorganisms will be important "workers" if we hope to extract energy from seaweed, which contains a high proportion of carbohydrates. Microorganisms such as yeasts can transform carbohydrates into ethanol, or alcohol, just as when corn or potatoes are turned into spirits. In many parts of the world, cars are fitted with engines adapted to run on a fuel mixture that consists of 85 percent ethanol and 15 percent petrol (E85, as it is known). Microorganisms can also convert seaweed into butanol fuel and other valuable chemical products.

The simplest procedure is to utilise bacteria of species similar to those found in the digestive systems of cattle and pigs, which will break the seaweed down into methane, which can be then used for heating or fuel in heavy vehicles and ships.

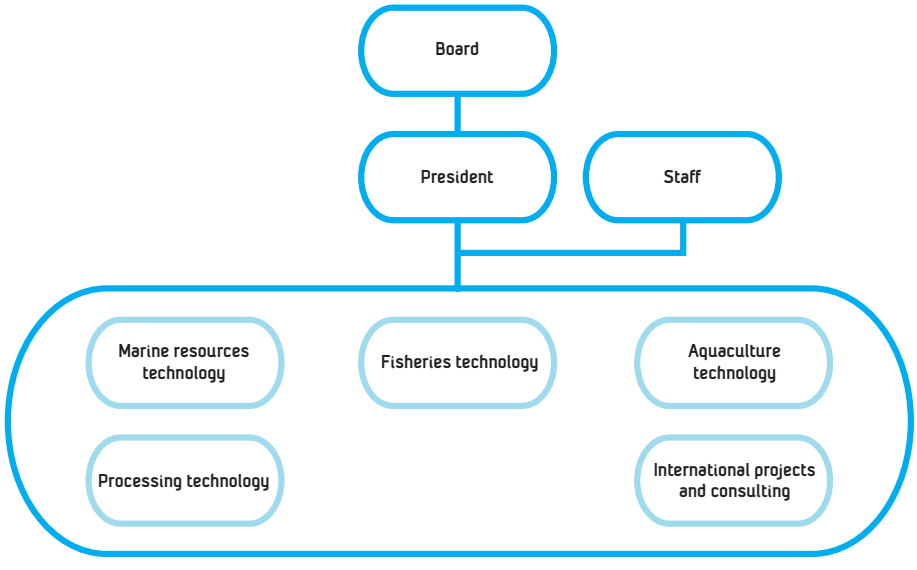
All this can be done without increasing the greenhouse gas effect. Seaweed absorbs CO_2 dissolved in seawater, which is released when the gas is burned. When we factor in the process of cultivation the result is a zero-sum game, whether we are talking about seaweed or timber as the source of fuel. At the same time, global CO_2 emissions will be reduced, the more we replace fossil fuels with biofuels.

However, liquid biofuels still face a good deal of opposition. This is because current bioethanol and biodiesel production is largely based on vegetable products that could have been used for food or that are produced on land that could have been used to grow food. Many countries, including Norway, have warned against this trend.

With this as a backcloth, SINTEF Fisheries and Aquaculture points to the natural advantages that Norway enjoys for cultivating seaweed as a raw material for biofuels.

"Norway's coastline, include all its islands, is twice as long as the Equator, while our economic zone is twice as big as the land area of Sweden. In other words, we have enormous areas that are suitable for seaweed cultivation. That is why it is particularly good to know that StatoilHydro wishes to look more closely at the potential for producing bioethanol from seaweed to replace fossil fuels," says Jorunn Skjermo.

Organisation of SINTEF Fisheries and Aquaculture



This is SINTEF Fisheries and Aquaculture

SINTEF Fisheries and Aquaculture is Europe's leading technology research centre in the fisheries and aquaculture sectors. We perform technological research and development in all parts of the marine value chain. Our most important clients come from the Norwegian fisheries and aquaculture industry. The institute is co-located with NTNU at SINTEF Sealab on Brattøra Quay in Trondheim, where the institutions have gathered their marine activities under one roof. SINTEF Sealab comprises a modern process hotel for processing marine raw materials and a process laboratory for the production of marine fry. The institute also has a flow tank for testing fishing gear in Hirtshals in Denmark. We maintain full-time project offices in Ålesund and in Vietnam, and a subsidiary company in Chile. We cooperate with universities and research institutes at home and abroad, and are the host institution for the Innovation in Aquaculture Technology Centre for Research-based Innovation (CREATE).

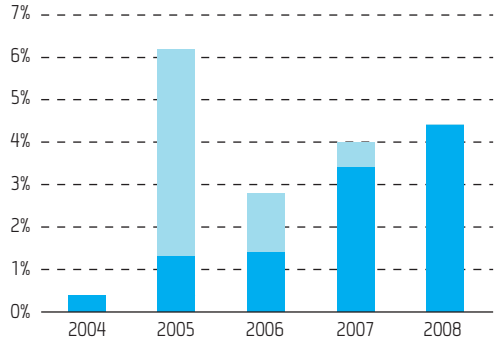
Main financial figures for SINTEF Fisheries and Aquaculture

MNOK	2004	2005	2006	2007	2008
Result					
Gross operating revenue	82	83	88	102	117
Net operating revenue	60	61	66	81	89
Operating result	**0**	**2**	**3**	**4**	**2**
Annual result	**1**	**2**	**3**	**5**	**1**
Balance					
Fixed assets	3	11	12	18	23
Liquid assets	41	30	30	41	48
Sum assets	**44**	**41**	**42**	**59**	**71**
Equity capital	10	12	15	25	26
Debt	34	29	27	35	44
Sum equity capital and debt	**44**	**41**	**42**	**59**	**71**
Profitability					
Operating margin %	0.4	3.6	4.0	5.5	1.7
Total profitability %	0.5	5.2	6.3	8.8	2.4
Profit on equity %	7.5	21.6	20.8	25.8	5.3
Liquidity					
Net cash flow from operations	7	5	1	5	7
Degree of liquidity	1.4	1.3	1.4	1.4	1.3
Solidity					
Equity capital in %	22	30	35	42	37
Operating working capital	12	7	8	12	10

Sources of finance (% of gross operating revenue)

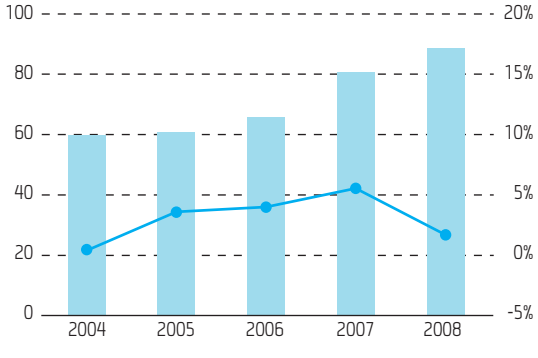
- RCN basic grant 4.4%
- RCN strategic programmes 16.1%
- RCN project support 20.4%
- Public sector 10.4%
- Industry and commerce 36.3%
- International contracts 12.1%
- Other sources of income 0.3%

Investments (% of net operating revenues)



- Scientific equipment
- Buildings

Economy



- Net operating revenue (MNOK)
- Net operating margin (%)

Employees

- Administration (14)
- Technical personnel (3)
- Engineers (4)
- Researchers (77)*

* Of whom 37 hold doctorates

Publishing and communication

- Refereed scientific journals, articles and conference papers (46)
- Scientific talks and posters (45)
- Reports (2)
- Popular science articles and talks (5)
- Textbooks (1)
- Scientific monographs (1)

"At the technical level, there is a lot that can be done with existing technology, but that won't be done because it would be unprofitable for the shipping companies. We are going to change that."

SINTEF scientist Øyvind Buhaug, on his way to join StatoilHydro

Our man at the UN

168 shipping nations. A single goal. One project manager. Øyvind Buhaug has been hard at work lately.

"Just imagine Germany not facing a single demand from the international community that it should reduce its greenhouse gas emissions. Or the UK, for that matter," says Øyvind Buhaug.

"It wouldn't have been very likely, would it?"
"No! But in the shipping sector, that is actually the situation. If we compare CO_2 emissions from shipping with those of individual countries, shipping would have come sixth on the list, ahead of Germany and the UK," says Buhaug.

In Europe, only Russia emits more CO_2. But while many countries have signed up to the Kyoto Agreement and committed themselves to reducing their emissions, there is still no such compulsory requirement where shipping is concerned. But Buhaug intends to do something about this, through his job as consultant and "diplomat" at the IMO.

For the uninitiated, IMO is the International Maritime Organization and, in brief, it is the UN's organ for world shipping. It is a forum where 186 countries and three associated member organisations meet to agree on rules and regulations that concern shipping.

"As a researcher and an adviser to a body of this sort, you are playing international politics in a way?"
"Yes, that's basically true. And that is very motivating. Sometimes so much so that it can be difficult to put my job behind me. So far, we have managed to make serious reductions in emissions of hazardous substances such as sulphur oxides, nitrogen oxides, volatile organic compounds and particles. And not least important, heavy oil will soon be banned as a fuel for ships.

"A ban on heavy oil?"
"In practice, yes. Strictly speaking there will not be a direct ban, but the stringent standards regarding sulphur that will be introduced by 2020 are expected to mean that heavy oil will disappear as a fuel. This has been an important political goal for Norway."

"How have SINTEF and MARINTEK managed to drive this aim through in this important forum?"
"We are a knowledgeable player with very special expertise, as well as being an independent organisation. This is not very common in the context of the IMO. We are quite simply regarded as credible and knowledgeable, and that is what we are." Now it is greenhouse gases that take up the Norwegian adviser's time. For a whole year he has been leading his own hand-picked research team, which has members from ten different countries. The result has been a climate report that sets the premises for coming climate policy measures in the IMO.

"What are the conclusions of the report?"
"Among other things, it demonstrates that if we carry on as we have been doing, emissions from shipping will increase, even if vessels continue to become more efficient. The growth of the world fleet is simply too great. At the same time, we know that global CO_2 emissions must be reduced in the future if the climate is to be stabilised at 2 degrees above the current temperature. Figures from the study indicate that in 2050, emissions from shipping will be 15 to 18 percent of the world total if global emissions are kept to the 2 degree goal. This is simply unthinkable, so something will have to be done."

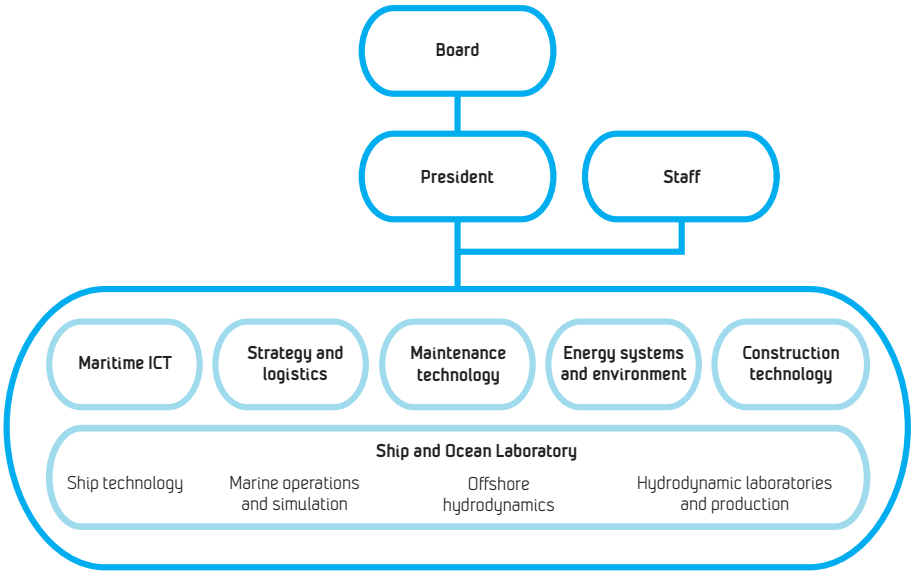
"What can we do about this situation?"
"At the technical level, there is a lot that can be done with existing technology, but that won't be done because it would be unprofitable for the shipping companies. We are going to change that. In the first place, we are working on minimum requirements for shipping transport efficiency."

On a longer time-scale, market-based solutions such as quota trading are also being studied, but these will involve a much greater effort for the IMO. On the other hand, the EU has already decided that air transport will have to join its quota system, and if the IMO does not come up with an acceptable solution, the EU will implement measures against shipping as well. MARINTEK is also involved in this activity, and is setting out premises via a contract with the European Commission for a study of how this could be implemented in practice.

Recently, however, Buhaug has taken leave of absence from his "political" position with SINTEF in order to help StatoilHydro with its environmental policy. The IMO baton has now passed to his colleague Håkon Lindstad.

"Can you ask for leave of absence from such an important job with a clear conscience?"
"Well, yes and no. The IMO job can be all-consuming, but it also involves personal development and is intellectually enriching. I am sure that I will miss the tempo, the people and the feeling that I am taking part in a historical process. But I am quite certain that the IMO will still be in good hands."

Organisation of MARINTEK



This is MARINTEK

SINTEF's subsidiary company MARINTEK performs research and development for industry and the public sector. We operate in an international market, developing new technological solutions in floating petroleum production, subsea pipelines for oil and gas transportation, renewable energy from the ocean, vessel development, the shipbuilding and marine equipment industries, shipping and logistics. MARINTEK is among the most respected and widely profiled maritime research institutes in the world, and is the preferred partner for many of the world's most demanding clients in the petroleum and shipping markets. Important reasons for this include MARINTEK's long history, our unique laboratory facility, the world-class quality of our research staff and our cooperation with NTNU and with our clients.

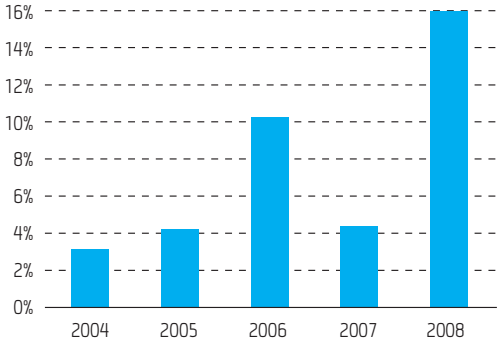
Main financial figures for MARINTEK

MNOK	2004	2005	2006	2007	2008
Result					
Gross operating revenue	189	199	232	271	292
Net operating revenue	152	165	194	228	246
Operating result	**0**	**7**	**12**	**15**	**4**
Annual result	**0**	**8**	**12**	**18**	**8**
Balance					
Fixed assets	27	28	36	38	46
Liquid assets	149	173	169	219	223
Sum assets	**177**	**201**	**205**	**257**	**269**
Equity capital	95	103	116	131	139
Debt	81	98	89	126	130
Sum equity capital and debt	**177**	**201**	**205**	**257**	**269**
Profitability					
Operating margin %	-0.2	4.5	6.3	6.6	1,5
Total profitability %	-0.1	1.9	3.0	3.2	0.7
Profit on equity %	0.0	3.9	5.6	7.4	3.3
Liquidity					
Net cash flow from operations	10	10	16	41	-3
Degree of liquidity	1.8	1.8	1.9	1.7	1.7
Solidity					
Equity capital in %	54	51	56	51	52
Operating working capital	71	80	90	103	109

Sources of finance (% of gross operating revenue)

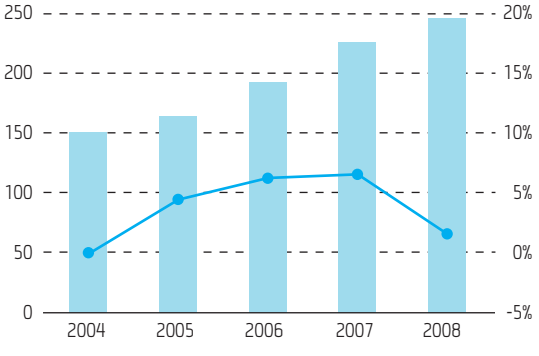
- RCN basic grant 2.5%
- RCN strategic programmes 2.0%
- RCN project support 3.0%
- Public sector 3.7%
- Industry and commerce 58.4%
- International contracts 30.3%
- Other sources of income 0.0%

Investments (% of net operating revenues)



- Scientific equipment
- Buildings

Economy



- Net operating revenue (MNOK)
- Net operating margin (%)

Employees

- Administration (18)
- Technical personnel (35)
- Engineers (24)
- Researchers (122)*

* Of whom 41 hold doctorates

Publishing and communication

- Refereed scientific journals, articles and conference papers (26)
- Scientific talks and posters (40)
- Reports (3)
- Popular science articles and talks (3)

"The oil companies have good HSE standards. Now, we are introducing safe job analysis in SINTEF; a methodology that we have adopted from them."

HSE/Quality Manager Karl Haugen, MARINTEK

MARINTEK HSE/Quality manager Karl Haugen surrounded by his personnel. From the left: mechanical engineer Tone Sandvik, research scientist Chittiappa Muthanna, photographer Birger Myhr and diver Thomas Bentsen.

Greater awareness

HSE/Quality Manager Karl Haugen intends to make sure that engineers, joiners, photographers and divers learn to assess the risks involved in their work.

MARINTEK's Ocean Laboratory is one of the biggest in the world. A length of 80 m and a depth of 10 m certainly leave an impression. Long traverse cranes hang under the ceiling, and huge models of ships and oil platforms bob in the water. A 260 metre-long towing tank lies just beside the basin, and both installations are surrounded by workshops and other laboratories.

"The basins may make us a little special, but there are other parts of SINTEF that are more dangerous than us," says HSE/Quality Manager Karl Haugen. Nevertheless, it was MARINTEK that led the injury statistics in 2008, when seven injuries were reported. Three persons were off work for long periods of time. Haugen says this is three too many.

"People should be healthy when they get home after work," he says.

"These injuries happened early in the year, and by Easter you had already implemented preventive measures. What did they consist of?"
"One was to run courses in observation techniques for our laboratory personnel. These are engineers, joiners, painters, divers and people who deal with instrumentation and video production."

"Why? Do they have poor vision?"
"Well yes, you might put it like that. If you have worked in the same place for several years, it can be difficult to perceive potential hazards. Resetting oneself to zero in order to see what is really happening requires good awareness. The course was based on sharpening this sort of consciousness."

"Another measure was for the Managing Director to go round the workshops and laboratories once a month. Will that help?"
"I think so. If awareness comes from the top, it sends a signal down through the organisation that health, safety and environment are to be taken seriously."

"I have heard that you are learning a lot from the offshore sector."
"Yes, the oil companies have good HSE standards. Now, we are introducing safe job analysis in SINTEF; a methodology that we have adopted from them. This means that risk evaluation must take place in the working situation and not as a desk exercise. A chief scientist cannot simply order this – it needs to be a reflex action of everyone who works at operational level. Now we have brought this methodology into use at the edge of the Ocean Basin every time that we are about to start a hazardous operation."

"But there can't be anything wrong with evaluations being made and implemented from behind a desk?"
"No, that is true, but conditions do change, and the unexpected can create hazardous situations. For example, Pedersen, who is supposed to lead the operation, may be replaced by Olsen, while not so far from our test, Endresen suddenly starts a maintenance job. Things like that mean that we need to check what information has been given, and whether there are any potential conflicts.

Karl Haugen takes us out to the Ocean Basin. This is the work environment of the eight divers who work in MARINTEK. They connect up, install and adjust equipment used in connection with experiments, and both communication and air supply take place via cables and hoses from the surface.

"Sometimes the divers need to perform maintenance operations and repairs beneath the bottom of the Ocean Basin, which can be raised and lowered in order to simulate different depths. In such operations, the cable could get caught," says Haugen.

"What do you do then?"
"A depth of ten metres might not sound like much, but it can be critical and demanding if an unconscious man in full diving gear has to be brought up from the bottom. So the procedure is that three men always work as a team. One diver does the practical work and communicates with the dive leader, while a stand-by diver is ready in case of emergency."

"That sounds pretty reassuring."
"Yes, but in spite of safety regulations, things can take place in the midst of an operation. If something happens, we have to stop immediately and carry out a new safety evaluation."

MARINTEK is about to start a major job for BP. Before they begin, the company insists that the divers should carry out an emergency exercise in which they will think through various scenarios that visualise what could go wrong, and train in dealing them. "That's what I call good HSE," says Karl Haugen.

HSE accounts for 2008

1 HSE policy

HSE is given highest priority at SINTEF – the safety of our staff is more important than any other consideration.

HSE is a management responsibility and forms part of our day-to-day routine. Our employees are obliged to participate in these efforts.

SINTEF has a clear vision that aims for zero rates of accidents, injuries and losses. We will do our utmost to avoid accidents and work-related illnesses among our employees and those with whom we collaborate.

SINTEF intends to maintain a good and healthy work environment. Our management will be clear, inclusive and inspiring. Our staff can expect to enjoy personal development and recognition via coordinated activity and team spirit. Everyone in SINTEF will be treated with respect and dignity.

On the background of our vision of "Technology for a better society", all aspects of SINTEF's activities will be based on the concept of sustainable development, a concept that is based on good management practices, social responsibility and respect for the environment.

SINTEF's environmental policy is intended to ensure that both our research and the manner in which we ourselves operate respect the external environment. It should also ensure that our own environmental performance continues to improve.

2 Summary

We hereby provide a status report on SINTEF's efforts in health, safety and environment. The report demonstrates that good progress has been made towards the goals that we set for 2008.

SINTEF's HSE policy and overarching HSE goals were revised in 2008. The report describes the status of the action plan for 2008 and the results of our overarching HSE goals.

SINTEF's HSE steering system is an integral aspect of the Group's overall steering system. All our research divisions are listed in Achilles, which is a database for the prequalification of deliveries to the petroleum sector.

3 Status of action plan 2008

GOAL: "SINTEF will maintain a good work environment that promotes good health"

Measures	Status
Follow up the results of the work environment survey 2008.	• Group management has clearly committed the organisation to following up the results. • Follow-up has been carried out according to plan. • Units facing work environment challenges have asked for support for their own development to a greater extent than before.
Further improve management by establishing common management principles throughout SINTEF.	• A comprehensive process has been implemented throughout the organisation. • Group management and the board have adopted common management principles for the whole Group. • These efforts have laid the foundations for successful implementation in 2009.

GOAL: "SINTEF will have a zero rate of work-related sick-leave"

Measures	Status
Follow up especially the evolution of work-related sick-leave in the Group.	• A mechanism for registering and monitoring the proportion of sick-leave due to work-related illness has been implemented. • It has been made clear that following up sick-leave is a management responsibility.
Follow-up of staff who report sick is a topic for the 2008 internal audit.	• Audits have been performed in two divisions. • Improvement efforts have been ensured via follow-up by the Personnel Department and the HSE Forum.
Follow up results of work environment survey concerning this topic, and implement necessary development measures.	• Analysis carried out and advice published in guidelines to all institute and department managers. • Goal-oriented follow-up and development measures initiated at local level.

GOAL: "SINTEF will have zero injuries, accidents or losses"

Measures	Status
Implement programme to reinforce SINTEF's safety culture.	• Country analyses developed as risk assessment tool, as an aspect of project activities in other countries. • Revised training programme for HSE. Safety culture included as a separate topic in compulsory module "The HSE Platform". • Focus on awareness of own behaviour and responsibility to avoid accidents and personal injury via "Ice-spikes and reflector jacket action 2008".
Implement safe job analysis.	• Approved for implementation. • Final form of action being decided.
Continue collaboration with NTNU on training and joint laboratory handbook.	• Joint lab. handbook written and implemented throughout the organisation. • Joint modular training programme revised and implemented. • Continued good systematisation via coordination agreements. • Regular management meetings held.

GOAL: "SINTEF will be a company with a clear environmental profile"

Measures	Status
Introduce environmental steering in accordance with ISO 14001.	• Being introduced in all divisions.
Disseminate our environmental profile externally.	• Environmental profile published on external web-pages.
Update steering system.	• Procedures have been drawn up. To be published when new structure is ready.
Hold environmental days in all units.	• Not prioritised; will not be organised.
Survey all environmental aspects of our activities.	• Carried out in three divisions and planned for implementation in the others.
Set out improvement goals for important environmental aspects.	• Carried out in three divisions and planned for implementation in the others.
Establish environmental programmes for each unit and for the Group.	• Carried out in three divisions and planned for implementation in the others.

4 Results

4.1.1 Perceived work environment

4.1 GOAL: "SINTEF will maintain a good work environment that promotes good health"

Every two years, SINTEF carries out a work environment survey in order to find out how SINTEF's employees perceive their work environment. The survey covers all aspects of the concept and provides a solid basis for the development of the SINTEF organisation.

The latest work environment survey was carried out in 2008 and had a response rate of no less than 91 percent. Group management has clearly committed the organisation to follow up the results of the survey. One aspect of this is that all managers at institute and department level have been issued with guidelines as an aid in analysing the results of follow-up efforts.

The overall results for SINTEF were very good, although they show that there are still differences among units, and that some groups face significant work environment challenges. The units will be the focus of special follow-up efforts. Once again, the survey has been a useful driving force for change within our organisation.

HSE indicators of perception of work environment

Scale from 0 (strongly disagree; negative score) to 100 (strongly agree; positive score)

Our colleagues experience a high degree of motivation and pleasure in their work. Eighty-nine percent of them look forward to going to work, while 86 percent are satisfied with their jobs and 90 percent are proud to work in SINTEF. Team spirit still rates a high score.

SINTEF's managers are given high ratings, and we can see that being a manager is an attractive position. This is good, as our HSE policy makes heavy demands of managers. Good management has taken a more prominent position on the agenda in 2008, through the Management Principles in SINTEF project. Manager development takes the form of special processes for management groups and through participation in the course "Good Management in SINTEF". We can see that this is producing results and is making a contribution to positive developments in our work environment.

The work environment survey shows that we can be better at offering guidance and training within our own unit. Our staff would also like greater efforts to be made in competence development at departmental level, in order to meet the needs of the future. We can raise the quality of our efforts to evaluate projects and ask critical questions about the way we work.

We know that bullying and harassment[1] are serious social problems in working life. For this reason, SINTEF wishes to survey this topic in the work environment survey. Somewhat less than four percent of SINTEF's employees feel that they are being bullied. SINTEF has a zero incidence vision here too. As part of the survey follow-up process, managers in the units implicated have followed up this topic in staff conversations and in meetings with employees.

[1]Definition: Negative actions such as pestering or insulting someone, excluding them socially or influencing someone's work duties in a negative way. The action must have taken place repeatedly and regularly over a certain period of time.

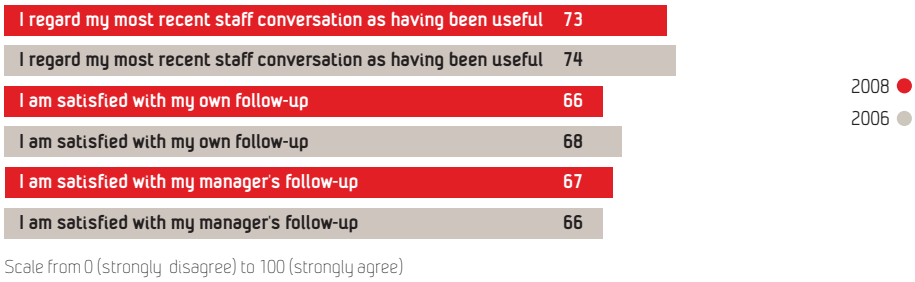
4.1.2 Staff conversations

Staff conversations are planned annual conversations between managers and staff. Topics that are taken up include tasks and aims, work environment and development. Each conversation should conclude by drawing up a personal action plan. SINTEF has a good degree of implementation of staff conversations, but we can see a slight decrease since 2007. We will keep an eye on future trends.

Staff conversations in the SINTEF Group

Benefits and follow-up

SINTEF's work environment survey also asked employees how they perceived the usefulness of staff conversations and whether they are followed up. We could be better at following up after the conversation.



Scale from 0 (strongly disagree) to 100 (strongly agree)

The survey shows that foreign employees who have lived in Norway for less than three years appear to benefit less from staff conversations. This is an aspect of which we must be particularly conscious.

4.2 GOAL: "SINTEF will have a zero rate of work-related sick leave"

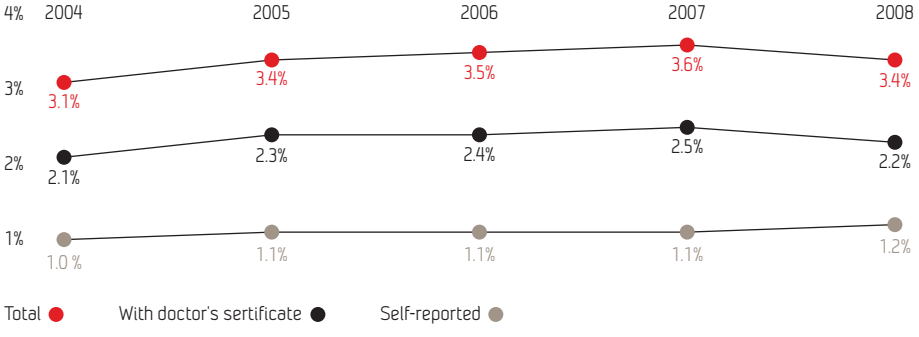
4.2.1 Sick leave

In 2008, the SINTEF Foundation, MARINTEK and SINTEF Fisheries and Aquaculture renewed the agreement for a more inclusive working life, which focuses on following up sick leave and adaptation of the work place for employees with special requirements. In 2008, sick leave at SINTEF was low, on a level with Statistics Norway's figures for academic professions. Total sick leave was essentially stable between 2005 and 2008, but somewhat higher than in 2004, the lowest year recorded. Self-reported sick leave continued to increase slightly in 2008 over previous years' figures. Sick leave accompanied by a doctor's certificate, on the other hand, fell slightly from 2007. The number of cases of disability was low, in line with the low rate of sick leave.

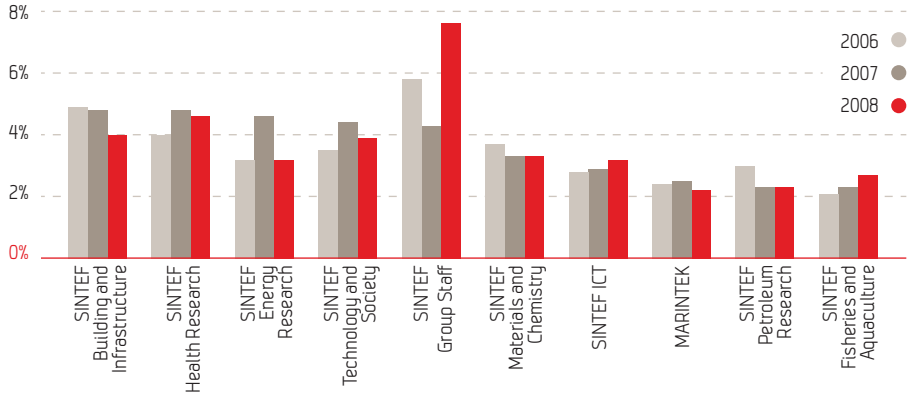
Since 2008, SINTEF employees themselves have registered whether sick leave was related to their workplace, and in 2008, 0.6 percent of sick leave was registered as being work-related.

Sick leave (percent of total time excluding vacation and overtime)

Trends in sick-leave 2004–2008; with doctor's certificate and self-reported



Total sick leave; internal distribution, 2006–2008



4.2.2 Work-related health problems

One of SINTEF's aims is that its employees should not find that their work leads to them taking sick leave or suffering from health problems that reduce their pleasure, quality of life or performance. This can only be achieved via continuous, systematic efforts.

The work environment surveys are an important means of identifying health problems that occur in the workplace. One of the main findings of the 2008 survey was that our employees reported that their workplace and general state of health were good, which is in line with the sick leave statistics reported above. However, certain departments do face challenges in terms of both stress-related problems and problems of ergonomics and indoor climate. Employees also report a certain pressure to appear at work when their state of health suggests that they ought to stay at home. There also appears to be a relationship between the general work environment score and the incidence of health problems. Good personnel management is needed to create a good psychosocial environment. The Group's efforts in "Good Management in SINTEF" ought to bring results in the course of time.

The company health service accepts referrals related to work-related problems, primarily in the areas of the skeleto-muscular system and psychosocial conditions. Measures are being adopted to prevent problems of these types, through training, guidance and consulting services in ergonomics, the physical work environment and psychosocial conditions. Individual case follow-up is also offered through an agreement with external psychology services. The number of referrals to the company health service is stable, but varies from one division to another. There has been a certain rise in the number of referrals by management personnel. These often concern a desire for help in solving complex problems. This can be seen as a result of growing awareness on the part of managers of their own responsibility.

4.3.1 Personal injuries

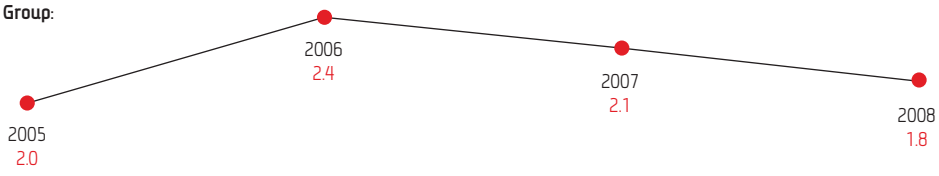
4.3 GOAL: "SINTEF will have zero injuries, accidents or losses"

One of SINTEF's aims is that our activities should not lead to injury. A total of six injuries resulted in sick leave being taken in 2008. The longest period of sick leave taken was 10 days. In 2008, SINTEF had an F value of 13.1, as against 11.2 in 2007.

SINTEF has not reached a satisfactory level in the prevention of personal injuries, but we are making progress. SINTEF has a strong conviction that a long-term focus on strengthening our HSE culture will bring results in the course of time.

Frequency of injury leading to sick leave (H1 value) (number of injuries per million working hours)

Group:



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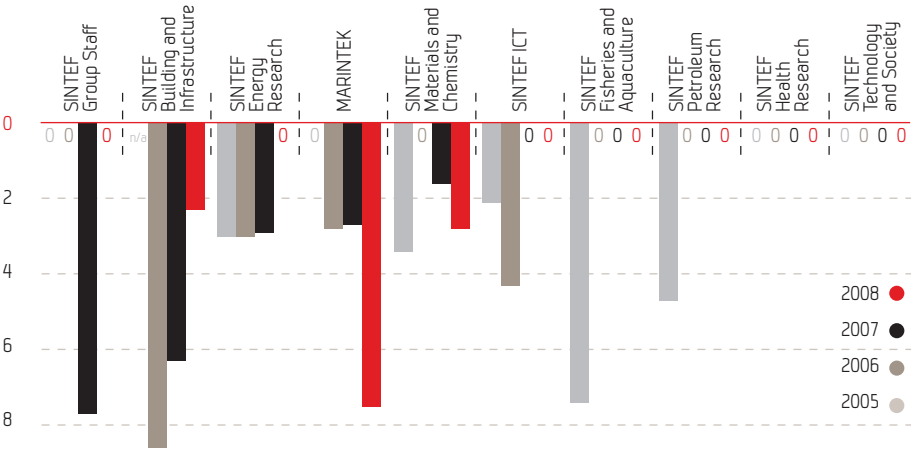
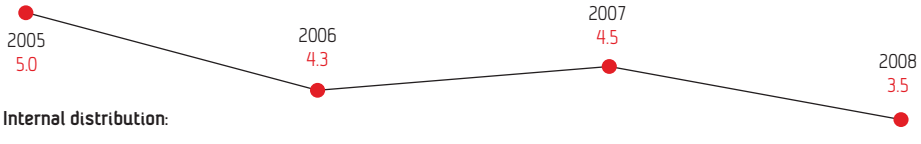


Frequency of personal injuries (H2 value)

(Sum of number of injuries leading to sick leave and other personal injuries, excluding injuries requiring first aid, per million working hours)

Group:



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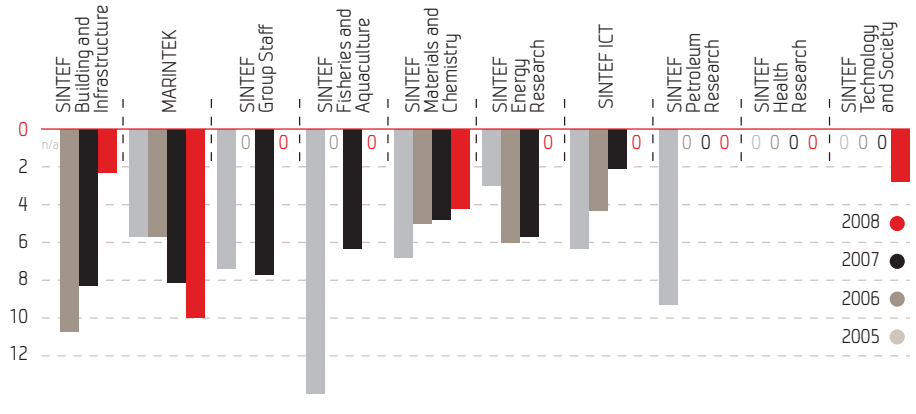
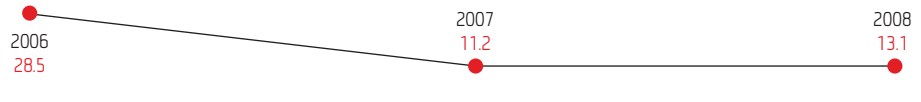


Frequency of sick leave (F value)

(The F value measures sick-leave taken due to work-place injuries, per million working hours. This value tells us something about the seriousness of the sick-leave taken).



4.3.2 HSE reports

If SINTEF is to achieve its goal of zero injuries, it is essential that we identify potential hazards and implement preventive measures before a near-accident occurs. The introduction of Synergi as our new deviation handling system in February 2007 and a conscious focus on this topic on the part of management have contributed to a positive trend in the number of accidents and near-accidents in SINTEF. Nevertheless, we believe that we still have a long way to go where reporting hazardous conditions and observations to carry out optimal preventive efforts are concerned.

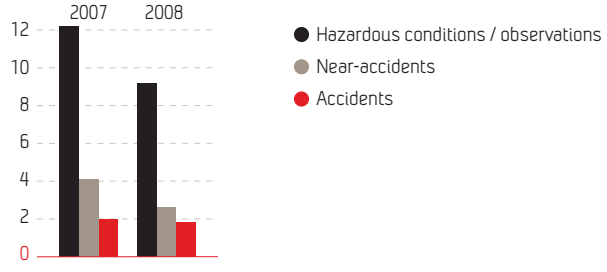
The following definitions are employed in reporting HSE events:

Accidents: Occurrences that have led to personal injury (including first-aid injuries), illness and/or damage to or loss of property, damage to the environment or injury to a third party.

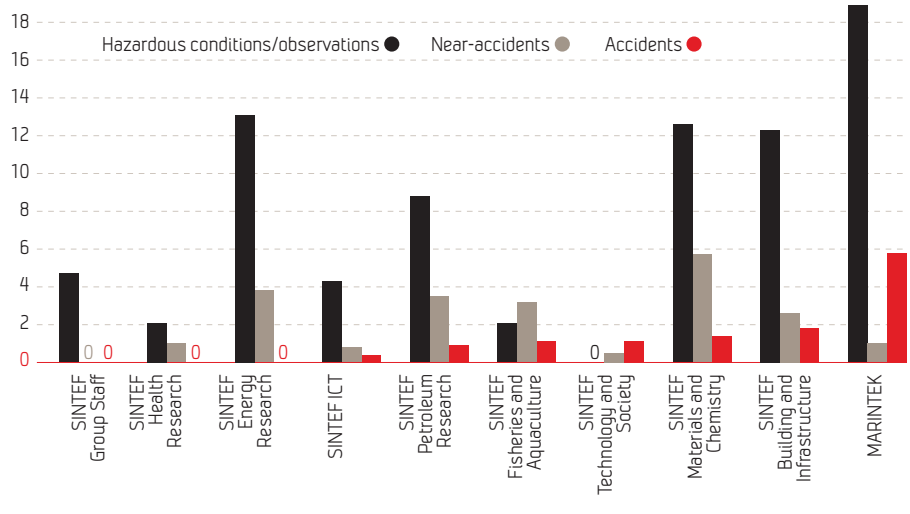
Near-accidents: Occurrences that under slightly difference circumstances could have led to personal injury, illness and/or damage to or loss of property, damage to the environment or injury to a third party.

Hazardous conditions: Circumstances or conditions that could potentially lead to personal injury, illness and/or damage to or loss of property, damage to the environment or injury to a third party.

HSE reports per 100 person-years of work in 2008



HSE reports – distribution by institute per 100 person-years of work in 2008



Degree of seriousness of undesirable events (personal injury, accidents and near-accidents)

All accidents and near-accidents in SINTEF are evaluated in terms of the risks of potential consequences (worst-case) for persons, the environment and material values. Risk assessments are performed and followed up by responsible units within the Group.

		Probability				
		Very low	Low	Medium	High	Very high
Consequences	Very critical	1				
	Critical	2	1	1		
	Moderate	4	11	6		
	Low	11	11	2		
	Very low	17	10	2		
	Sum	35	33	11	0	0

Risk range	
Critical range	3
Serious range	25
Less serious range	52
Sum	80

In the risk evaluation, the following three undesirable incidents were classified as having potentially critical consequences:

- Trapped in lift during evacuation due to gas alarm
- Drilling through concrete roof into high-tension sub-station
- Boat model damaged after capsizing during tests

4.4 GOAL: "SINTEF will be a company with a clear environmental profile"

4.4.1 External environment

In 2008, SINTEF launched a significant effort that will lay the foundations of our emergence with a clearly defined environmental profile in the future. We are not there yet, but all of our divisions have now begun the process of adopting environmental steering in accordance with the ISO 14001 environmental standard. Two divisions have established environmental programmes, and the remainder will do so in 2009. These efforts are being run by SINTEF's Quality Forum, in which all divisions are represented.

Concrete measures that have already been implemented in much of the Group include:

- Reducing paper use by making double-side copying and printing a standard practice
- Following up advice from "Green IT" by renewing SINTEF's servers, thus significantly cutting electricity consumption and cooling requirements
- Introducing a system for handling hazardous waste that will be incorporated in our environmental accounts in the future
- System for sorting at source and returning paper
- Reducing the cost of travel through the use of video conferences and telephone meetings
- Evaluating suppliers with respect to their consideration for the physical environment
- Summer cycling campaign

Potential effects on the physical environment are stressed when projects are being planned. The external environment is a facet of the risk evaluation method employed before project launch. This also includes the substitution obligation – i.e. the requirement to replace substances that are hazardous to health and the environment with alternatives that carry less risk.

SINTEF had no accidents that led to contamination of the physical environment in 2008.

During the construction of the new Multiphase and CO_2 laboratories at Tiller, great stress is being laid on environmentally-friendly energy technologies, including water-borne heating systems, heat exchange with the River Nidelven and the potential for laboratory capture of CO_2 from the production of heat used to heat the buildings.

In 2008, SINTEF's energy consumption was 308 kWh per square metre, which included both electric power and district heating. In 2009, we will implement new measures to reduce energy consumption in our buildings.

5 Other companies

SINTEF has strategic shareholdings in five Norwegian companies: SINTEF Raufoss Manufacturing, Molab, SINTEF NBL, SINTEF MRB, and SINTEF Nord.

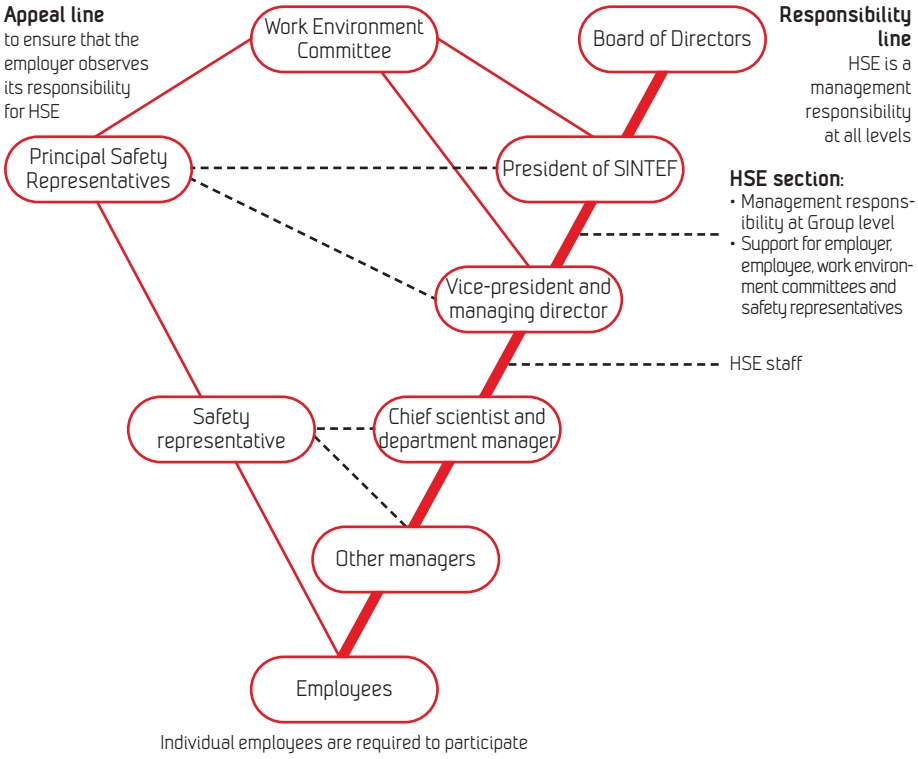
SINTEF requires its associated companies to maintain at least the same level of systematic HSE as SINTEF. Responsibility for follow-up remains within the boards of the individual companies concerned.

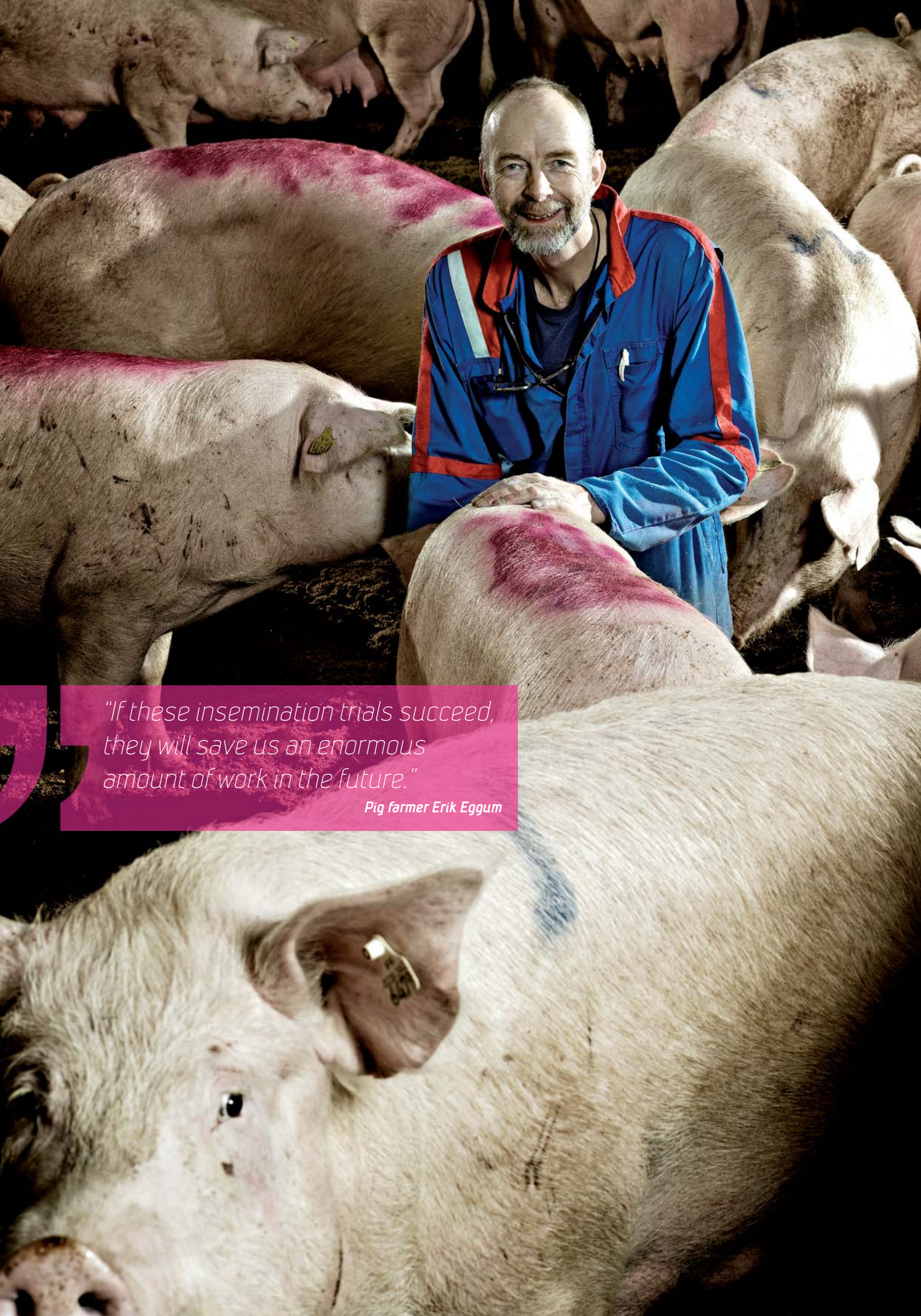
Company	Number of personal injuries leading to sick leave	Number of personal injuries not leading to sick leave	Near-accidents	Hazardous situations/ observations	Sick leave	Staff conversations held
SINTEF NBL	1 (4 days)	0	1	3	2.5%	100%
SINTEF Raufoss Manufacturing	0	0	5	2	3.2%	28%
Molab	0	6	2	11	6.6%	100%
SINTEF MRB	0	0	0	0	3.4%	100%

6 The SINTEF Group's HSE plan 2009

Objective	Measures
SINTEF will have a good work environment that promotes good health	• Continued follow-up of the results of the work environment survey. • Implement common management principles for SINTEF. • Establish principles for the implications of the health-promoting work environment ambition. • Prevent bullying through increased awareness on the part of management.
SINTEF will have zero rates of injury, accidents and losses	• Implement Phase 1 of the Risk and Sensitivity Analysis, an overarching risk evaluation procedure for SINTEF. • Field-work as a topic for HSE audits. • Implement "Safe job analysis" as a method throughout the Group. • Continue to press for reporting of HSE situations and increase experience education for the organisation. • Continue to cooperate with the universities.
SINTEF will have zero work-related sick leave	• Monitor trends in work-related sick leave in certain parts of the organisation. • Establish support procedures for management in cases of work-related sick leave. • Continue the work of the Good Management in SINTEF programme as a facet of preventive efforts.
SINTEF will be a company with a clear environmental profile	• Complete and document the implementation of environmental steering in accordance with the ISO 14001 environmental standard.

7 Responsibilities and roles in SINTEF's HSE efforts





"If these insemination trials succeed, they will save us an enormous amount of work in the future."

Pig farmer Erik Eggum

A seminal story

Surrounded by his pigs, Erik Eggum sits in his Vormsund pigsty. For the past few weeks, he has been inseminating his own and others' livestock with semen embedded in alginate.

Director Nils Spidsø in SINTEF's commercialisation company Sinvent was satisfied when he left the meeting that established SpermVital AS as a company on 12 December, 2008. He had already helped to secure joint ownership in the new company's technology, and established that there would be equality between the partners in the question of patents. The three partners were Norsvin, Geno and SINTEF, who had long wanted to form a company. With paperwork behind them, they had reached their goal.

This concept was based on new technology for the production and use of semen from pigs and cattle. The market consists of breeding companies all over the world. And there is a good story behind the whole business.

In the early 90s, NTNU Professor Ingvald Strømmen and his SINTEF colleague Ivar Storrø were eagerly involved in dehydrating bacteria and enzymes. They managed to achieve high survival rates – almost 100 percent, in fact. On a plane one day, Strømmen found himself sitting next to an acquaintance who lives and breathes dog breeding, and the question naturally arose: why not transfer this success to animal breeding? This became the next task for the scientists. They carried out some trials of dehydrating semen and encapsulating it in alginate, but this was followed by a long period of inactivity.

Ten years later, Elisabeth Kommisrud in Geno in Hamar was thinking that it was about time to do something about conserving bull semen. The nationwide organisation breeds cattle and carries out some 500,000 inseminations a year all over Norway, but employs a technology that has changed little since the sixties. Surely there must be something that could prolong the survival of sperm and make insemination more efficient? Perhaps SINTEF could help? Kommisrud contacted a scientist with a doctorate in alginates, who knew what had been going on previously in this field. A few telephone calls and conversations later, a small group of researchers from SINTEF were on the train to Hamar.

"We immediately brought our sister organisation Norsvin on board as the third member of the project group," says Elisabeth Kommisrud. While Geno deals with semen for cattle, Norsvin sends pig semen to Norwegian inseminators who visit farmers who ring them when they want their pigs to become pregnant.

"What challenges were involved when you started?"
"The most important task was to prolong the period during which insemination could take place. The time window for "hitting the target" was only one day. If you missed, the money was wasted. Norsvin also had a problem. Since they send out the semen in a diluted solution, it lasts for only a few days. In Geno, on the other hand, we have always distributed frozen bull semen in small tubes that are thawed for use when they reach the farm."

"What sort of results did you get?"
"We have managed to prolong the survival time of the semen inside the animals after they have been inseminated. The solution was to embed the semen in an alginate gel so that the tail movements of the individual sperm cells became locked, thus prolonging their useful life." Kommisrud says that Geno can easily adopt the technique, since they have found a method of coupling the alginate to the little tube "straws" of frozen sperm, and can thus keep using their traditional production techniques.

"It is different with pigs. It is possible that a completely novel production line will have to be developed," she says. We will have to find out what pays off. It may be that we let alginated semen become a niche product."

After more hard work, the project group received good news last spring: the Research Council of Norway was ready to fund the project from its Renewal programme. This was a decisive factor in setting up the company.

Now, large-scale systematic insemination trials are being planned at a number of farms around Hamar, and the money will go to documenting these efforts.

Elisabeth Kommisrud believes that in a few months both calves and piglets will be running around in barns as a sign of the success of the project.

"All the same, I had to change the name of the company," she says.

"Why was that?"
"The other members of the group were thinking of calling the company "Spermal", which sounded more like a spermicide. SpermVital is a much more optimistic name for a company!"


We make
an impression

In February 2009, the Norwegian Ministry of Petroleum and Energy announced that it was setting up eight Centres for Environment-friendly Energy Research. The research centres will develop technology that will help to deal with the climate crisis. SINTEF and NTNU are participating in six of the eight centres in close cooperation with other research groups and industry, thus confirming our position as international leaders in environmental technology and environmentally-friendly energy.

We are proud to occupy this position.

Read more about our environmental work at
www.sintef.com/Home/Environment

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