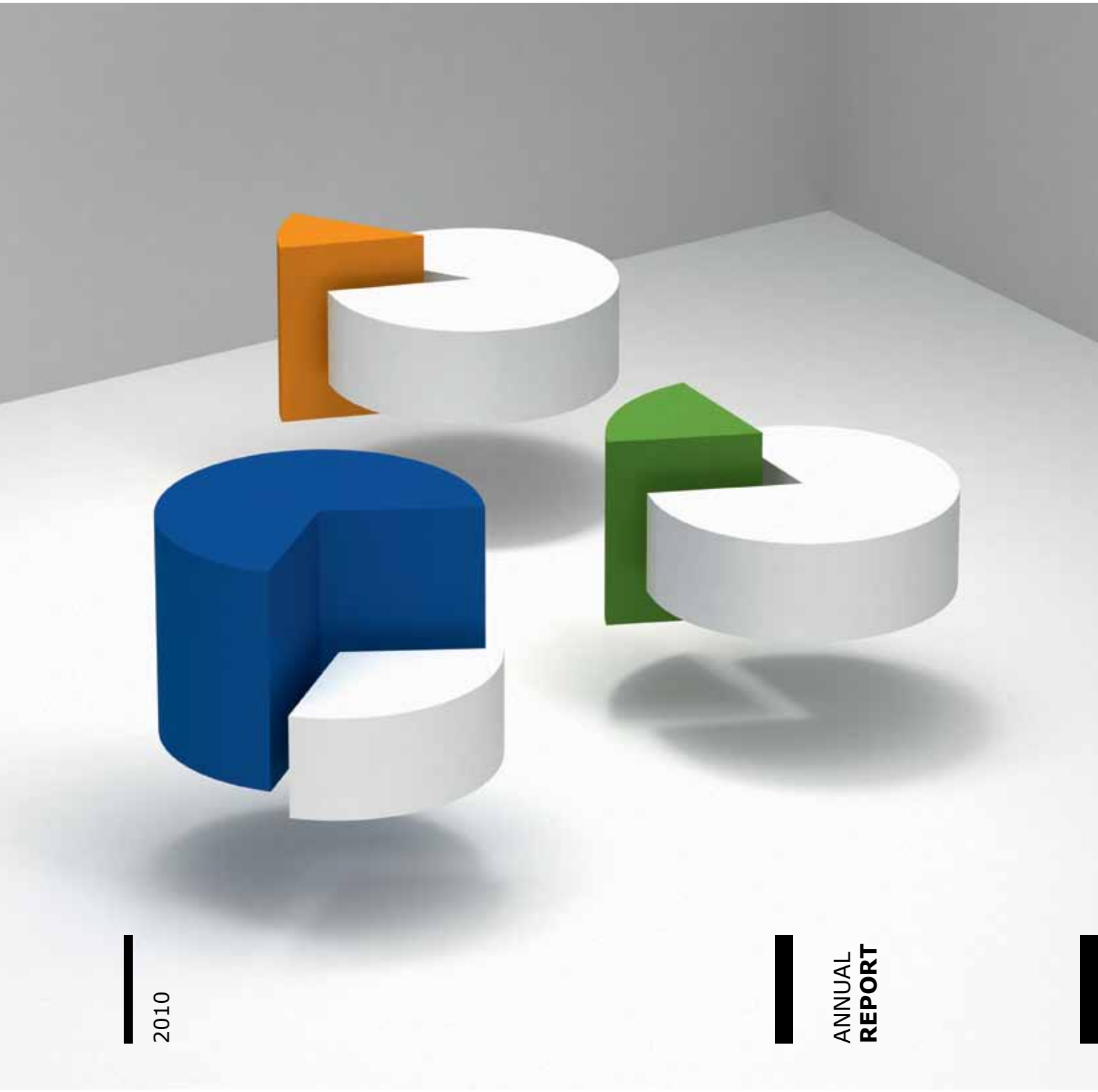
DANISH
TECHNOLOGICAL
INSTITUTE



2010

ANNUAL
REPORT

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Innovation and rethinking as a dynamo for growth

The Danish Technological Institute steered smoothly through 2010 despite turbulent conditions that continue to set the agenda for business activities in both the Danish and foreign market. The positive development put us in good stead for helping to solve many of the significant challenges facing the Danish business sector and Danish society.

The continuing economic downturn has put Danish productivity at a standstill, and our competitiveness is under pressure. The fact is Denmark has experienced five years of zero growth in innovation, and about 60% of Danish businesses are not innovative. The Danish business sector needs to get back on the growth track! However, this progress does not come of itself. It requires the inflow of new knowledge and hard work in the individual workplace.

The Danish Technological Institute sets ambitious goals for our future business. We consider it our prime task to assist in creating new progress, growth and optimism in Denmark by introducing new technology and knowledge in companies. This takes an unwavering focus on innovation, rethinking and staff skills as well as the courage and will to think along new lines. We also need comprehensive knowledge of the practical conditions in Danish workplaces and in-depth professional insight into the newest technologies that can be translated into commercial advances and raise Danish business competitiveness to new heights.

The Danish Technological Institute also strives to perform the difficult task of creating new progress and growth – every day all year round – by taking good ideas and turning them into something that creates value for our customers and society. To achieve this, we acquire new knowledge and engage in dialogue with leading Danish and international partners. That is why we constantly rethink our business. That is also why we invest heavily in new laboratories and risky research and development projects. Looking forward, taking chances and changing our own products and services maximise our chances of helping the Danish business sector increase productivity and open the door to new markets. Our objective is to give Danish businesses the creativity and level of innovation that make them globally competitive and thus ensure the welfare of our society and the financing of that welfare in future.

Since Gunnar Gregersen founded the Danish Technological Institute in 1906, we have bolstered our broad technological knowledge and competences as reflected in the various types of tasks we perform. In keeping with tradition, we will use the 2010 annual report to recount the Institute's activities during the past year, describing a number of completed customer tasks and ongoing research and development projects. Each story is an example of how we can unite in finding new solutions to the challenges of today and tomorrow and emerge from the crisis stronger.

We look forward to continuing our ambitious research and development work in 2011 in close cooperation with our customers and partners in Denmark and abroad. The trick is to keep our sights on the future by focusing clearly on the options that exist here and now in turbulent times and will sustain Denmark in the future.

Enjoy our Annual Report.

Clas Nylandsted Andersen
Chairman

Søren Stjernqvist
President

Danish Technological Institute – knowledge that works

KNOWLEDGE DEVELOPMENT

The Danish Technological Institute, working jointly with Danish and foreign research institutions and companies, develops new knowledge through research and development activities. Developing new knowledge and technologies is the cornerstone of the services the Institute provides.

KNOWLEDGE APPLICATION

New knowledge gives the Danish Technological Institute a basis for providing Danish companies with the assistance they need to meet the challenges of global competition. The Institute applies the newest technologies to develop technological services such as laboratory testing, sampling, calibration and certification.

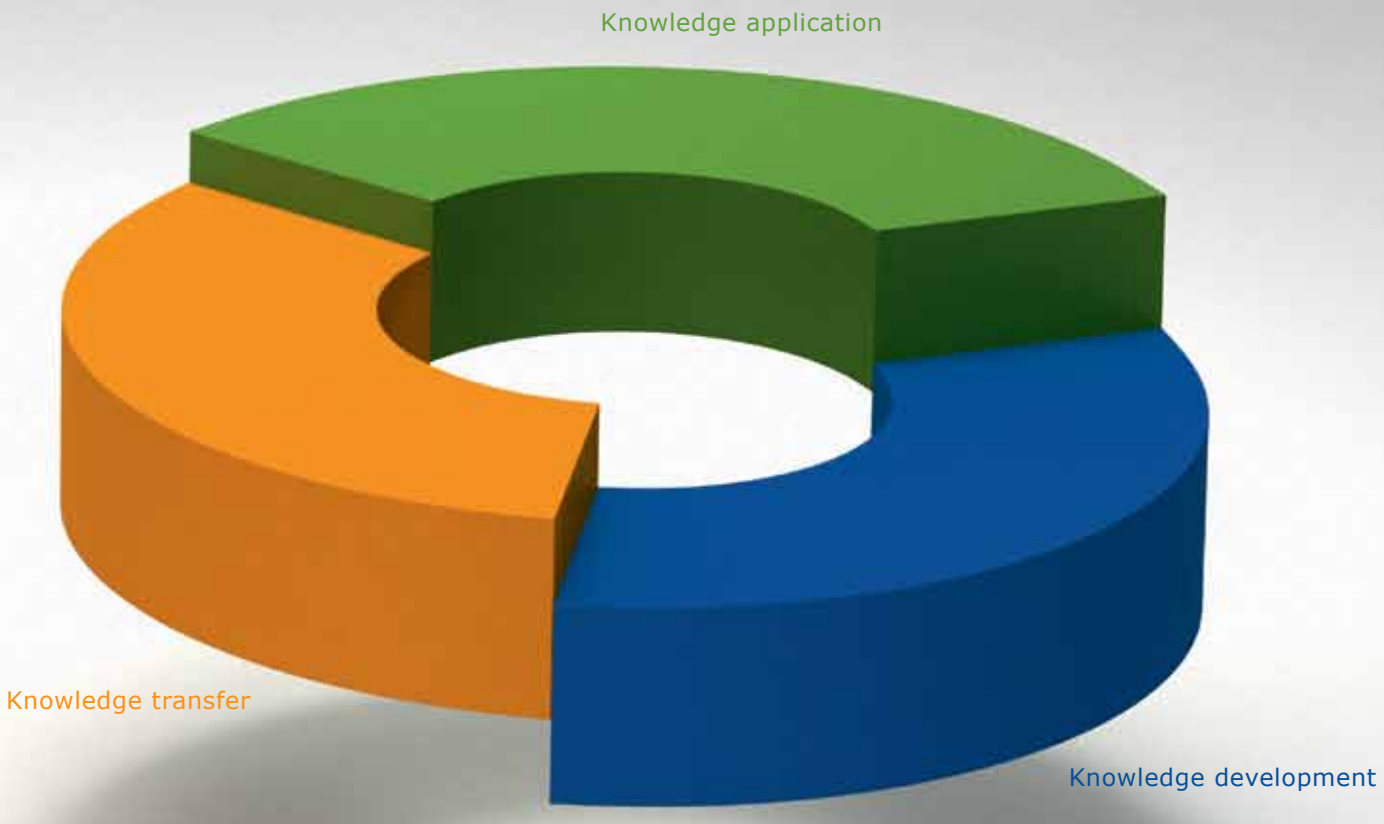
KNOWLEDGE TRANSFER

One of the Danish Technological Institute's key tasks is to facilitate efficient knowledge transfer. In its interaction with private companies, organisations and public customers, the Institute transfers knowledge through consultancy, training and networking activities. The Institute's activities cover a multitude of areas ranging from courses, secretarial services and operational tasks to unique, custom-built advisory services.

TRUE RENEWAL, REAL INNOVATION

Technology must always serve humanity, enhancing job satisfaction and energising individuals as well as progress and growth in society. The Danish Technological Institute's founder Gunnar Gregersen held this attitude, a panoptic perspective that still characterises the Institute's work.

Implementing new technologies in existing and new products demanded by tomorrow's market and applying known technologies in novel ways – that constitutes true renewal and real innovation.



The Danish business sector is losing momentum

The Danish business sector is losing momentum in its competitiveness, productivity and innovation. Many Danish businesses and the Danish welfare society are under pressure for several reasons, including the financial crisis and mounting competition from abroad. Relocation of workplaces abroad. The demographic trend entailing a diminishing number of working age Danes to look after and care for an increasing number of older people. Increases in lifestyle-related diseases. The pressure on natural resources and the environment that ensues from explosive population growth and generally increasing welfare, particularly in China and Asia. How do we handle this development?

Danish businesses are generally too small to be at the fore of technology. However, despite global competition and the financial crisis, most Danish businesses stand a good chance of boosting growth.

We are certain to generate progress for Danish society when we as an institute run the risk of investing many resources on initiatives such as EU research programmes and cooperating with leading global knowledge communities. We have to cooperate with the best in the world, which is why we remain in constant dialogue with the foremost Danish and international partners.

We acquire and implement new knowledge about high-technology solutions that may pave the way for applying new "green" fuels and exporting new Danish energy technologies. For instance, we have joined Novozymes and Haldor Topsøe in the EU project EuroBioRef, which works to exploit biomass for bioproducts, chemical synthesis and air fuel through a flexible, modular approach that involves testing various technologies to find the optimum application of various biomass fractions. Together with the City of Copenhagen, we are also participating in the major EU project Green eMotion, aimed at supporting mass deployment of electrical cars in Europe.

We must have the requisite global perspective if we really want to address the immense challenges facing our small nation.

Søren Stjernqvist

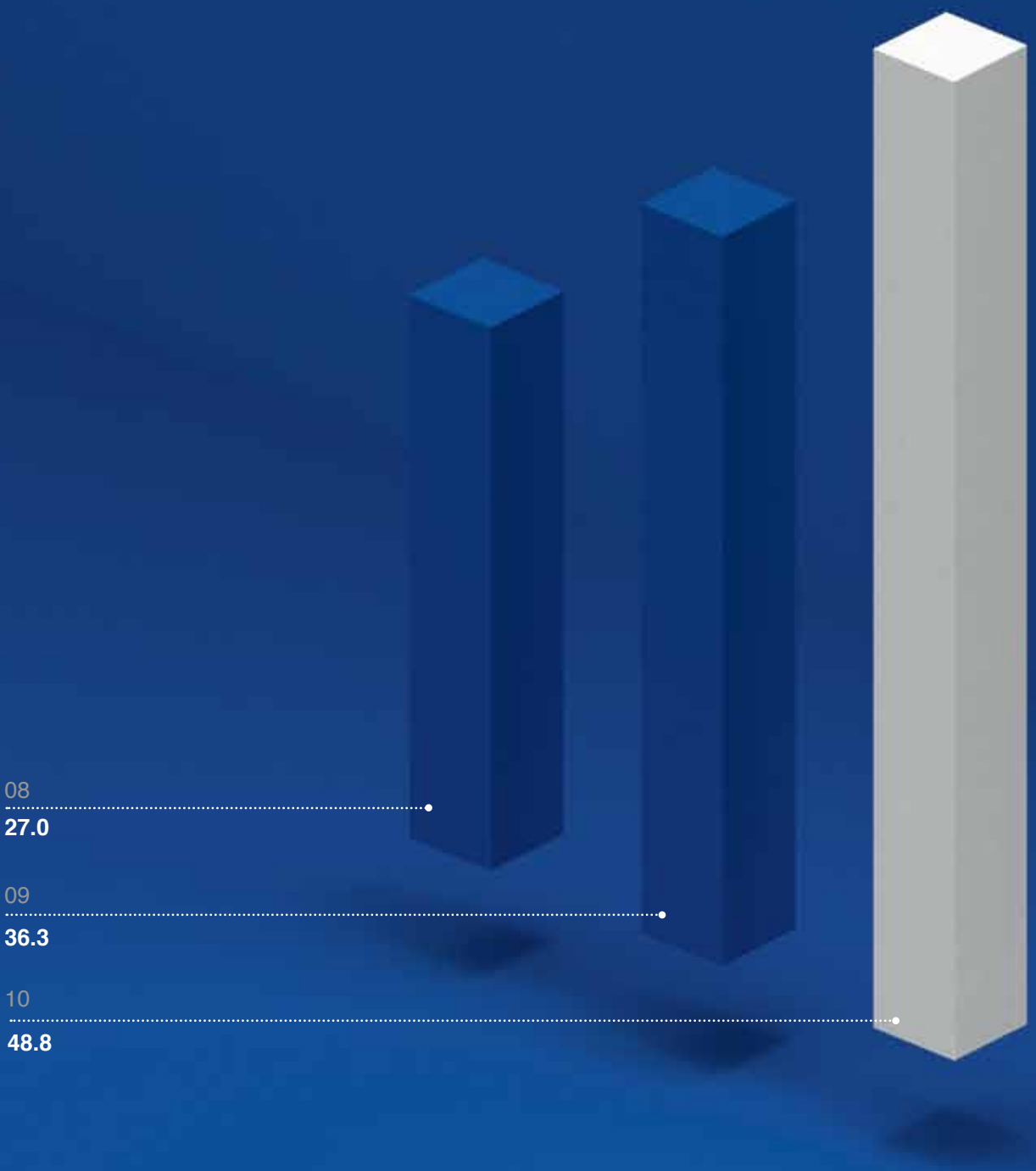
President

Cases

2010

Danish Technological Institute focuses on knowledge development. Using a targeted approach, the Institute increased its knowledge development by 80% compared with 2008.

80%



Building Technology

We challenge the innovative processes of construction companies!

We help develop the construction sector by challenging its companies' innovative processes.

We are constantly launching projects with new production methods, components and materials, and tailor these projects to impel high-technology development just enough ahead of the market without being out of reach.

Our role requires knowledge and experience with technology and the market. This is a difficult role, but we have been doing it for years and have, in all modesty, mastered it quite well.

Mette Glavind

Director

Case

01

Danish Technological Institute joins Denmark's largest construction project in Fehmarnbelt

The Danish Technological Institute's latest knowledge and strong competencies in the concrete area are wanted for Denmark's largest construction project, the Danish link across Fehmarnbelt.

The Danish Technological Institute has concluded a nine-year contract with the client Femern A/S. The agreement makes the Institute the external house laboratory and knowledge centre of choice during the preparations and coming establishment of the 19-kilometer fixed link from Rødbyhavn in Denmark to Puttgarden in Germany. The contract involves preparing technology memos and design, establishing and operating a field exposure site and conducting regular analyses and tests.

Technology memos are state-of-the-art reports that Femern A/S is required to use in preparing the project concrete specifications. These reports concern curing technology, self-compacting concrete and methods for assessing the compliance of the systems that ensure the quality of the products used.

Fifteen concrete blocks tested

The biggest task has involved establishing an exposure site next to Rødbyhavn. Fifteen large walls of various types of concrete have been installed and partially submerged in Fehmarnbelt, the purpose being to observe how the concrete develops in and reacts to the local environment. All concrete blocks have been made on the full-scale mixing facility at the Danish Technology Institute's high-technology concrete centre, and some have been fitted with various sensors that provide regular data about some of the properties crucial to durability. Each concrete wall represents possible concrete recipes that can be used in the coming bridge or tunnel across Fehmarnbelt.

– These types of concrete and subsequent analyses will form a unique set of data that'll provide us with valuable knowledge for the Fehmarn project when it comes to the erection and operation of the construction, says Ulf Jönsson from Femern A/S. Ulf Jönsson adds that these data will be useful as input for future infrastructure projects:

– From the beginning, staff from the Danish Technological Institute have taken an innovative approach to technical challenges, and they're happy to give a hand and understand our needs. This gives us a fantastic starting point for creating good results together in the years ahead.

Case

02

Robots in the building industry create fantastic architecture

After three years' intense development work, the Danish Technological Institute has helped create a technological breakthrough in the building sector by introducing robot technology in the concrete industry. The result may be fantastic concrete architecture in the buildings of tomorrow.

By exploiting the mouldability of concrete, the Unikabeton project challenges the general perception of concrete as a heavy and soulless material.

The project has focused on production of the mould – the one that gives the concrete its look and final shape. Previous mould production for special concrete constructions has been manual and highly expensive. As a result, concrete was often cast in cheaper standard moulds that ensured uniform and rectangular elements.

However, the advent of robot technology in the concrete industry has made meeting the requirements for tomorrow's digital architecture financially viable. For instance, as part of the project, researchers at the Danish Technological Institute's high-technology concrete centre have developed a new method with robots making concrete moulds – directly from the architect's drawings – in an industrialised and automated process.

Mould material of the future

A major challenge was to find a mould material of the future both suitable to be handled by robots and financially attractive. A long series of tests identified sand, wax and styrene as the most interesting options.

A large, organic concrete structure was erected to demonstrate the new method for producing concrete structures. The unusual and challenging design was developed by optimising technology from the airplane industry. The moulds were produced via robot technology and filled with self-compacting concrete, which flows into the mould without vibration. The result can be viewed at the concrete-shuttering business Paschal-Danmark A/S in Glostrup.

– The potential for robot-produced moulds for future, innovative concrete architecture is massive. We expect the project results to help ensure that the new technologies can be implemented in the building industry in the near future, says Jacob Christensen, Technical Manager from Paschal-Danmark A/S.

The success is the result of an interdisciplinary cooperation headed by the Danish Technological Institute in collaboration with Aarhus School of Architecture, University of Southern Denmark, Gibotech A/S, Spæncom A/S, MT Højgaard A/S, Unicon A/S and Paschal-Danmark A/S. The work received funding from the Danish National Advanced Technology Foundation and has encompassed the entire process spanning from the drawing office to the robot workshop to sophisticated casting on the building site.

Case

03

Danish Technological Institute spearheads new innovation network in the building industry

How do we ensure that the buildings of tomorrow and existing buildings today become energy efficient and sustainable? And how do we best apply the latest knowledge across professional groups in the building industry to make Denmark a beacon of innovative building solutions?

Over the next four years, the Danish Technological Institute will spearhead the building industry's new network InnoBYG to provide the optimum framework for the Danish building industry to create the energy-efficient buildings of the future. The framework is created by means of development projects, knowledge dissemination and matchmaking across the industry and between businesses and knowledge institutions.

The perfect site hut of the future

So far, the InnoByg network has launched ten development projects. One of them is 'The sustainable construction site' where one of the challenges is to develop the sustainable site hut of the future. The project involves, e.g., Danish site hut manufacturer CP Pavilloner A/S.

Peter Jakobsen, manager of CP Pavilloner A/S, is thrilled to be part of the development project and believes that the energy challenges connected with the site huts can be solved.

– We see both the short-term and long-term possibilities. Right now it's a matter of taking the obvious choices and considering what we can do to reduce energy consumption. In the longer run, we need new solutions both for producing new site huts but equally for optimising the huts we already have to make them more energy-friendly. I believe that in this forum with highly skilled people from knowledge institutions, universities and industry we can develop the perfect site hut for the future, says Peter Jakobsen.

In relation to InnoByg, the Danish Technological Institute will make ongoing contributions to establishing more projects between member businesses and knowledge institutions in the network.

Facts

InnoBYG is composed of representatives from the building industry as a whole – clients, advisers, contractors, suppliers and producers. Michael H. Nielsen, Director of the Danish Construction Association, is chairman of the steering group.

Mette Glavind from the Building Technology division of the Danish Technological Institute is part of the steering group. The Building Technology division also houses the InnoBYG secretariat. InnoByg is co-financed by the Danish Agency for Science, Technology and Innovation in the order of EUR 2.7 million.

Case

04

Carpenters and joiners receive help with CE marking

Several building employers have stopped producing windows and outer doors due to new CE marking requirements. However, there is hope that this situation will improve.

CE marking of windows and outer doors can be difficult and several businesses have considered stopping their own production because the rules seem overwhelming, particularly after the mandatory CE marking scheme came into force on 1 February 2010. However, hope has arrived for the members of the Wood section under the Danish Construction Association. The Danish Technological Institute now offers advisory services that minimise the administrative and financial expenses of CE marking.

– Our members often become frustrated when they seek advice about CE marking. Indeed, many advisers don't know how producers think, which makes it difficult to determine the minor producers' needs, explains Søren Meyer, Consultant of the Wood section under the Danish Construction Association, continuing: The Danish Technological Institute has solved this problem by translating hard-to-grasp EU legal text into an accessible package solution so even small member businesses can successfully give their windows the CE marking.

More than 70 members have received help

So far, more than 70 members of the Wood section have used the package, which consists of an FPC system, a course, a calculation of U values and an evaluation visit to the business.

The process ends when the Institute hands over an evaluation report that can be used as documentation for proper CE marking.

Most of the businesses have responded positively. Master Carpenter Simon Schøler Steffensen from Solbjerg Tømrer- & Murerforretning A/S says:

– When we first heard about the new EU rules targeting window producers, we were sure we'd have to stop our own production of windows and outer doors. However, after participating in the Danish Technological Institute's course and counselling scheme, we became convinced that observing the CE marking requirements need not be so difficult. So now we've decided to retain one of our core business areas. Indeed, the new marking has made it easier to market our products.

Facts

Standardisation and CE marking are one of the Danish Technological Institute's central business areas in brickwork and building components. The Institute participates in more than 30 European committees and has testing equipment that supports the CE marking activities. As a supplement, business and industry agreements have been made for a large range of building articles and voluntary monitoring activities to document building article quality and performance.

Case

05

Massive water savings at swimming pool

Lyngby Svømmehal swimming pool saves 2,400 cubic metres of water annually with a new Danish water treatment system developed by the Danish Technological Institute in cooperation with HOH Water Technology A/S.

A renovation and modernisation of the water treatment system at Lyngby Svømmehal replaced the 35-year-old powder filter system of the swimming pool with a new concrete pressure sand filter system. Backwashing the sand filter system would normally increase the swimming pool's water consumption considerably compared with the old powder filter system. The local authority and the swimming pool were therefore looking for a solution that did not increase water consumption. Consequently, a delay tank and a wash water tank were established when the new sand filters were constructed, thus allowing any used backwash water to be cleaned and reused.

New water treatment system
Together with HOH Water Technology A/S, the Danish Technological Institute developed a new water treatment system so that Lyngby Svømmehal could reuse return water. The system, which is based on known and tested water treatment technologies, comprises a fine filter system with flocculation and an ozone system and UV system that disinfects and continuously preserves the water quality of the built-up return water.

– The new water treatment system is advantageous because we save huge volumes of costly water from waterworks and thus the significant sum of about EUR 20,000 in operating costs annually. At the same time, we protect the environment and reduce the load on the local-authority sewage system, says engineer Martin Rehn from Lyngby Svømmehal, adding that the pool is extremely satisfied with the new recycling system, which is simple, user-friendly and extremely safe.

First year operating experience with the new sand filter system and the new recycling system has been very satisfactory. The water quality of the swimming pool's 50-metre pool and diving pool has increased considerably and improved visibly, a change that benefits the pool's many users and staff.

82%

Massive water savings at swimming pool

The recycling system developed by the Danish Technological Institute for Lyngby Svømmehal swimming pool reduces the annual wash water consumption by 82%. This corresponds to annual water savings of 2,400 cubic metres.

Case

06

Become successful with innovation in practice

The Danish Technological Institute has helped find the competences VELUX A/S lacks in its development projects – competences that are essential to successful innovation.

For six months, a staff member from the Danish Technological Institute has served as a sounding board for VELUX A/S' radical innovation department Xlab. The Institute has helped Xlab to find key competences outside the VELUX organisation. Since the department is involved in highly diverse projects, it naturally uses subcontractors and industry partners with the required competences. With this innovation philosophy, Xlab achieves more targeted innovation.

– Today, Xlab can more quickly decide whether a concept is feasible before the product development process has become too expensive and without being bound by new staff, assesses Senior Consultant Ivar Moltke from the Danish Technological Institute, adding that accuracy increases because the business becomes part of a flexible professional forum that can add relevant technical input and consider the ideas from different perspectives throughout the development and design process.

Financial advantage

VELUX A/S is very satisfied with the results of the cooperation with the Danish Technological Institute. In future, the business will continue to include external partners in the innovative process on a regular basis via 'open innovation' workshops.

– We've become more aware of our strengths and weaknesses when we innovate – and we've become better at including relevant external suppliers holding the necessary competences early in the process, says Innovation Manager of Xlab Jens Høgh Simonsen from VELUX A/S. He assesses that this way of developing products will strengthen VELUX A/S' ability to maintain its market position in daylight and ventilation, also in the wider context that sets the framework for Xlab's innovation.

– Global networks, provided by the Danish Technological Institute, ensure the best skills and access to inspiration and knowledge from the very markets in which the solutions must prove their worth, stresses Jens Høgh Simonsen.

Case

07

Oeko-Tex-label helps businesses

The Danish Technological Institute is helping an increasing number of Danish businesses to obtain Oeko-Tex certification for textiles and clothing products. The Oeko-Tex-label is conducive to the businesses statutory documentation activities and increases sales.

Both Danish and foreign consumers have become very aware of whether their t-shirts or new sofa covers contain hazardous and illegal chemicals that are damaging to health and allergenic.

The Danish Technological Institute has seen this trend develop, as more and more businesses request regular tests of textiles according to the internationally acknowledged and voluntary certification scheme Oeko-Tex Standard 100. The scheme is recognised by its tagline 'Confidance in Textiles'. The label shows that the article has been tested and approved according to the requirements of the international Oeko-Tex association. Requirements concerning the content of chemical substances that may be or are suspected of being harmful to humans.

– The Oeko-Tex certification from the Danish Technological Institute greatly benefits our business and generates increased sales. In recent years, we've seen growing customer demands for reliable documentation showing whether products have been tested for health-harming chemicals, etc., says Director of Quality & Environment Kim Remin Rasmussen from Tytex A/S, the world's largest producer of healthcare articles for knitted and woven textiles in elderly care, orthopaedics and obstetrics. Kim Rasmussen adds that his company's customers have strict product and documentation requirements and that certification is a crucial quality mark since the Oeko-Tex requirements are more comprehensive than those in legislation.

An Oeko-Tex labelled product observes the legislation outlined in EU directives and Danish executive orders concerning azo colours and nickel in metal accessories such as zips and press buttons.

The labelled articles are eligible to join a list of labelled products where consumers can check which Danish dealers sell the articles. Certificate holders can also become part of the international Shopping Guide, which is the Oeko-Tex association's shopping assistant for those who are looking for suppliers of Oeko-Tex-certified textile raw materials, accessories and finished products.

– Oeko-Tex is the world's leading health label for textiles and more widespread than any other label such as the EU Ecolabel, explains Chief Consultant John Hansen from the Danish Technological Institute, continuing: Testing and control is impartial, which increases credibility. Moreover, we regularly improve the Oeko-Tex Standard on the basis of research in medical science and progress in the textile area. Test samples are taken regularly to increase the safety and credibility of the labelling scheme.

Facts

There are currently almost 11,000 valid Oeko-Tex certificates worldwide, of which the Danish Technological Institute is in charge of about 110.

DMRI

The Danish food industry must be better prepared!

We consider it our primary task to apply our knowledge of the newest technologies to create new business opportunities for the Danish food industry.

In close cooperation with the individual businesses and our many Danish and foreign partners, we strive to see possibilities where others see limitations.

One of the solutions is to automate the processing and handling procedures in the production – a key condition for attaining a leading edge.

Lars Hinrichsen

Director

Case

08

Great expectations for new low-fat sausage

The consumers of the future expect healthy foods high in fibre and low in salt and fat. This poses a major challenge to Danish food producers, since salt and fat give products flavour, texture, durability and food safety. The Danish Technological Institute helps develop solutions in cooperation with producers.

Together with the Danish Technological Institute, Tican Foods has developed a new, healthy, low-fat sausage with maximum 10% fat, some of which is omega-3 fish oil. Looking to create a low-fat sausage with the same taste qualities as ordinary sausages, the Danish Technological Institute and Tican Foods set the overall framework for the content of fat, fibres, salt and fish oil. Against this backdrop, the Institute developed a number of recipes. The one that suited Tican Foods' taste and met its quality requirements was then chosen for production. The recipe has been implemented at Tican Foods in cooperation with the Danish Technological Institute.

Great expectations for new sausage

The sausage contains the healthy omega-3 oil and is high in fibre, low in salt and completely free of wheat flour, soy and phosphates. During the development process it was important not to compromise on taste or quality. The product has already been marketed as Tican Max 10%.

– It's been a very positive experience having the Danish Technological Institute as an external partner throughout the process. The development process was well planned and the objectives extremely well-documented. This kept us on target at all stages and enabled us to achieve our goal with a product we expect to do well in the Danish food service and catering market, says Svend Schou Borch Director of Tican Foods, adding: We've seen the Danish Technological Institute as a professional partner and are pleased to be able to present a product that delivers the familiar Tican sausage in a low-fat version.

Case

09

Shelf-life model provides industry with documentation for fresh raw meat

Pork processing plants and cutting factories must be able to document that the pork chops in the cool counters will keep until their expiration date. The shelf-life test developed by the Danish Technological Institute prevents those in the industry from having to conduct expensive and resource-intensive shelf-life tests with raw pork meat.

As consumers we expect pork chops to keep until the use-by date on the package. For instance, the meat must not change colour from red to grey. An acrid smell of meat rotten from bacteria must not assault us when we open the pack. At the same time, the meat must be able to keep for some time to give retailers flexibility. This is a complex task for the meat industry, which is responsible for documentation.

– We increasingly need the ability to streamline shelf-life documentation of fresh pork meat visually, microbiologically and in terms of other sensory perceptions, says Quality and Laboratory Manager Gitte Pedersen from Tican a.m.b.a, adding: In future, we'll benefit greatly from the shelf-life model as it ensures targeted and efficient documentation of meat shelf life based on information about the raw material, packing method, storage time and temperature.

Thoroughly tested model

The shelf-life model is built on results from about 20 major storage tests, all conducted under controlled conditions with pork meat from various raw meat producers in Denmark, Sweden, Norway and Germany. Approx. 2,000 pieces of pork meat, such as loin, pork chops, minced meat and boneless pork collars, were included. The meat shelf life was tested in respect of storage temperature, packing method and the level of naturally occurring bacteria on packing. The model makes it possible to combine various packing methods and storage temperatures and still obtain a certain assessment of meat shelf life.

In principle, the shelf-life model consists of a growth curve for psychrotrophic bacteria and a shelf-life curve based on a sensory smell assessment of the raw meat.

The shelf-life model is still being validated and developed in cooperation with Danish Crown, Tican a.m.b.a. and Nortura AB.

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Case

10

Food businesses can obtain quicker results on sensory analyses

New methods for checking the quality of foods are gaining ground in the industry, thus increasing workplace efficiency.

Before the trays of hot liver pâté are packed and taken to the shop for consumers, the business uses sensory analysis to perform daily product checks to ensure that the pâté is satisfactory and meets all specifications. This procedure takes time and is resource-intensive. This causes problems for many food businesses where employees do the analyses while having to handle other tasks.

In cooperation with the Faculty of Life Sciences, University of Copenhagen, DTU-Informatics, Tulip Food Company, Tican Foods, 3-Stjernet A/S, Friland A/S and Bang & Olufsen A/S, the Danish Technological Institute has solved the problem by screening the availability of sensory fast-track methods and, against this backdrop, adapting selected methods for the specific needs of the Danish food industry.

Fast-track methods

The methods build on various principles. All the methods ensure that the businesses can perform sensory analysis faster and with the same high degree of accuracy as before. The project has also resulted in methods than can be used in developing and marketing products. The businesses involved have participated actively in the testing of new sensory fast-track methods for the industry. Quality Assistant from Tulip Food Company, Lars Peter Dalsgaard, has helped test a method suitable for assessing the properties of liver pâté in a product development situation, and he finds the new method highly interesting.

– We've learnt that our own taste panel can assess a liver pâté based on overall concepts such as appearance, complexity and harmony. This is a holistic approach where the people on the panel use their immediate perception of the various words without prior instructions or training, says Lars Peter Dalsgaard.

He assesses that businesses can save time as the panel consists of staff from departments such as production and marketing. He adds that he has high hopes for the project results and has been extremely satisfied with the Danish Technological Institute's approach to the task.

The new sensory fast-track methods will benefit more than just the Danish food industry. Sensory analysis is about measuring or describing the properties people perceive with their senses – regardless of whether it is meat cuts or radios. Indeed, Bang & Olufsen A/S is also participating in the project.

– In the practical part of product development, we perform sensory studies comprising assessments of sound and image. And I expect that the project will contribute with new knowledge and new methods that'll make these studies more effective, says Søren Bech, Head of Research at Bang & Olufsen A/S.

Case

11

Danish Technological Institute documents that the juicy roast is a sure thing

Thanks to new food research, residents at nursing homes and patients at hospitals can look forward to juicy, tender and tasty pork, beef and chicken products. Moreover, meat producers can offer the food service sector several types of semi-manufactured products for reheating or cooking.

A good piece of meat has to be tender and juicy. However, this is not the case when older and sick people receive food made at places such as catering centres. Since safety must take high priority, the meat is generally overcooked and therefore tough and dry. The future offers another possibility.

In a new project, the Danish Technological Institute helps document that preparing fresh pork, beef and chicken at a constant, low temperature for a long time is safe and produces good-tasting meat. Grethe Andersen from the Danish Agriculture & Food Council assesses that the project will improve food quality for everyone.

The new documentation on food safety will make it possible to serve juicy and tender lean meat with a centre temperature of 58-63 °C at hospitals, institutions and canteens instead of dry meat, which often has a centre temperature way above 75 °C, says Grethe Andersen.

Together with the Faculty of Life Sciences, University of Copenhagen, the Danish Technological Institute is working to document safety and quality by preparing fresh meat at 53-80 °C. One of the results shows that it is safe to prepare meat like pork silversides at 53 °C when the temperature is kept constant for at least six hours after the temperature in the middle of the meat has reached 53 °C.

Textural analyses of pork meat have also shown that the meat becomes especially tender at 58-63 °C, while a rosy appearance and more intense meat flavour is achieved. However, pork prepared at lower temperatures has a raw appearance and a more metallic flavour, but becomes juicier due to less shrinkage during cooking.

More semi-manufactured products to come

Laboratory tests at the Danish Technological Institute show that Danish meat producers can expect substantially lower shrinkage with meat prepared at low temperatures. The tests also document that businesses can offer catering centres more semi-manufactured products that are tender, juicy, bacteria-free and sufficiently rare to enable the centres to add the finishing touches before serving.

– We're thrilled that, with the help of the Danish Technological Institute, in future we will be able to process minced meat into meals with juicy, pink and tasty hamburgers documented to have adequate food safety. Customers will have a better food experience, and older and sick people will be able to chew and swallow the meat, says owner and Sales Manager Søren Kirketerp from Leco Convenience Food A/S.

Energy and Climate

Full speed on the development of cleantech products!

At Energy and Climate we consider it our prime task to offer unique opportunities for conducting research and development processes that match the needs of businesses producing components, system integration and equipment, among other things. We develop and test materials, constructions, installations, equipment and systems in scenarios that resemble normal use in the market.

We want to take active part in the innovation process. We want to be a partner in some of the processes that have to find new niches where Denmark's competitiveness is more than a question of price. In this way, we can help create and retain Danish workplaces.

David Tveit

Director

Case

12

Training for energy adviser – a win-win situation!

Bigger and more energy savings – that is what happens when builders return to work from the Danish Technological Institute as newly trained energy advisers. The outcome is satisfied customers and additional sales for contractors.

The energy adviser training programme was established by the Danish Construction Association, the Danish Mechanical and Electrical Contractors' Association and the Danish Technological Institute. So far, the Danish Technological Institute has trained 600 energy advisers, who provide advisory services and perform energy-saving tasks for their customers.

– I was among the first to complete the training programme, and I see demand for these competences increasing among our customers, says Energy Adviser Jesper Knopp, who has his own HVAC company in Rødovre.

He says that he has acquired valuable and systematised basic knowledge that he can use when he advises and makes offers.

Training is worthwhile

Energy Adviser Mikkel Sommer from the construction company Mikkel Sommer ApS says that, in his experience, knowledge about energy optimisation generates additional sales:

– For instance, I had a customer who wanted a new floor, floor heating and a gas furnace. However, after I'd checked the house, I made a calculation that showed he could save a fortune on his annual energy bill if he installed a new heat pump and reinsulated the walls and attic. This resulted in additional sales of EUR 40,000.

At the course, the participants develop specific energy solutions, and they can discuss specific problems with their peers and various experts. The participants are also updated in the most relevant construction and installation technology areas.

Both the Danish Construction Association and the Danish Mechanical and Electrical Contractors' Association, which were the original promoters of the energy adviser training programme, have received positive feedback.

– We have many members that give us positive feedback on the competences they've acquired via the training programme, explains Director Michael H. Nielsen from the Danish Construction Association, adding that they plan to continue cooperating with the Danish Technological Institute in the future.

Facts

Builders in the installation and construction fields can take a three-day course to become trained energy advisers. Energy advisers are automatically registered and marketed on the website www.energivejlederen.dk (in Danish).

Case

13

Intelligent sensor propels Danish business to new heights

The world-renowned ventilation systems from Danish KE Fibertec A/S will soon be fitted with a highly sensitive sensor that sends a text message with an alert that the air ducts in one's ventilation system need to be washed to work optimally. This makes the product easier and cheaper to maintain and gives KE Fibertec A/S an edge in the global market.

The Danish Technological Institute has developed a prototype of the unique sensor in close cooperation with KE Fibertec A/S, which for years has wanted to find a solution that ensures efficient cleaning of the product, as needed.

– We're leapfrogging ahead of our competitors now that we have a product whose ingenious sensor makes our product perform just that little bit better than other products. We expect that it'll contribute positively to total sales in the future, says Managing Director Carsten Jespersen from KE Fibertec A/S.

Sensor gives global strength

The plan now is to implement the intelligent sensor as a supplement to the business' standard products used in the industry, office environments, laboratories, hospitals and schools worldwide.

– The new sensor makes our products work better, and they will use less energy when they are maintained and dust-free. This ensures us and our customers better air distribution, greater electricity savings and reduced CO_2 emissions as well as a greener profile, says Carsten Jespersen, adding that cooperation with the Danish Technological Institute has been excellent.

– We didn't have the electronics knowledge that the Institute could offer, so the possibility of having discussions with competent professionals was rewarding – without them we'd still be on thin ice. The cooperation to develop the intelligent sensor is a stellar example of innovation at its best, ends Carsten Jespersen.

Facts

Air distribution systems from KE Fibertec A/S give fresh air to offices, in production halls and institutions worldwide.

The development of KE Fibertec A/S' sensor was funded through the Knowledge Coupons of the Danish Agency for Science, Technology and Innovation. In addition to product development, the Danish Technological Institute also helped complete the application to the Agency. KE Fibertec A/S received EUR 13,000.

64%

Energy courses save Danish local authorities huge sums of money.

Many Danish local authorities have achieved savings by training operating staff in energy-efficient operation. For instance, the primary school in Valby, Valby Skole, has saved 64% on its electricity and heating bills by letting the ventilation system run for just 24 hours per week against the former 65.5 hours. An estimate shows that the courses save the City of Copenhagen EUR 0.3-0.5 million annually.

Case

14

Energy courses save Danish local authorities huge sums of money

In 2010, the Danish Technological Institute conducted courses in energy-efficient operation for operating staff in a number of Danish local authorities. Experience shows that the course results in many profitable energy savings.

More than 200 local-authority operating staff in ten of Denmark's most progressive local authorities participated in the Danish Technological Institute's "Energy-efficient operation" course. This was the second year in a row the Institute held the course. The City of Copenhagen formed the template in 2009 when more than 165 staff members from the City's seven administrative units participated in this tailored course.

The course in energy-efficient operation took place at the Danish Technological Institute in Taastrup. The teaching team consisted of three Institute staff, while the Energy Team of Copenhagen City Properties had a staff member teach at the City's internal energy management programme. The Danish Technological Institute has developed an energy guide in a book on electricity, heat and ventilation.

Cash savings

The experience gained from the City of Copenhagen is positive, as the evaluation report prepared by TCG Consult ApS on behalf of the City shows. The report describes the great benefits that Janitor Kenn Joensen at the primary school in Valby, Valby Skole, finds he reaped from the course – even though he was already working to save energy before taking the course. The course has made it more realistic for Valby Skole to reach its target of saving light, heat and ventilation without impacting on pupils' and staff's working conditions. As a result of the course, the ventilation only runs for 24 hours per week against the previous 65.5 hours per week. This has generated electricity and heat savings of 64%. The night-time temperature reduction was changed from 21 °C to 16 °C. Calculations show that all the new initiatives will save the school EUR 7,500 annually from 2010.

The tangible effects of the training programme quickly repaid the course expenses, which pleases Michael Nilsson Head of the Energy Team for the City of Copenhagen.

– We've seen plenty of examples of cash savings, and conservative estimates show that the City of Copenhagen may save between EUR 0.3-0.5 million annually just by teaching operating staff about energy-efficient operation. So we're in no doubt that many more operating staff will take the energy course in the future, says Michael Nilsson.

As part of a broad professional forum, we have tested some ideas and verified that the concept of combining the domestic ventilation pump and the mini heat pump is feasible.

Managing Director of Nilan A/S Torben Andersen

Case

15

New mini heat pump to heat the low-energy houses of the future

In cooperation with Danfoss Compressors Holding A/S, Cowi A/S, Nilan A/S and Grundfos A/S, the Danish Technological Institute had a successful 2010 developing and testing prototypes of a new mini heat pump suitable for the low-energy houses of the future.

The participants tested the new type of mini heat pumps in combination with a domestic ventilation pump in the Danish Technological Institute's energy-neutral construction EnergyFlexHouse in Taastrup during the 2009 and 2010 heating seasons.

Three prototypes of the mini heat pump with a thermal capacity of approx. 2.1 kW have been produced. The prototypes are of the fluid-water type, i.e. the ground-heat type, and are based on a new compressor from Danfoss Compressors Holding A/S with speed control. The compressor delivers a thermal efficiency of approx. 1.0 kW to 2.1 kW.

– We've achieved good efficiencies for the prototypes in the lab, especially considering that these are small heat pumps, explains Senior Consultant Per Henrik Pedersen from the Danish Technological Institute. He is in charge of the project, which has received funding from the Energy Technology Development and Demonstration Programme under the Danish Energy Agency. He assesses that the double mini heat pump is highly suitable for low-energy houses because it can generate hot domestic water by using the energy of the exhaust air from the ventilation system while also providing homes with warmth from ground heat.

Nilan A/S is far ahead

In parallel with this project, Nilan A/S has marketed a mini heat pump based on a conventional compressor from Danfoss Compressors Holding A/S. Nilan A/S has also been working on a larger model to be tested in EnergyFlexHouse during the 2010 and 2011 heating seasons.

The combination of domestic ventilation heat pump and mini heat pump for floor heat is now also being marketed by Nilan A/S under the name 'VP 18 Compact', which has already been installed in a number of places around northern Europe.

– We've gained a lot from the cooperation with the Danish Technological Institute, Danfoss Compressors Holding A/S, Cowi A/S and Grundfos A/S in this project. As part of a broad professional forum, we've tested some ideas and verified that the concept of combining the domestic ventilation pump and the mini heat pump is feasible. We expect that implementing this knowledge into our product expansion will boost sales nicely as we can expect a growing market for low-energy houses, says Managing Director of Nilan A/S, Torben Andersen.

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Case

16

Danish Technological Institute to ensure more flexible electricity consumption in the industry

The Danish Technological Institute is spearheading a three-year project to develop new technologies that allow large, energy-intensive businesses to have more flexible electricity consumption.

It makes sense to take advantage of periods with large environment-friendly electricity generation and a low load on the electricity grid. The benefit is electricity bill savings, less environmental impact and better exploitation of environment-friendly wind energy that would otherwise be lost.

The challenge of the project is to identify, develop and demonstrate technological management tools that ensure more flexible electricity consumption at large, energy-intensive businesses in Central Denmark Region whose energy consumption exceeds 100,000 kWh/year.

Seven businesses

The Danish Technological Institute is working to map existing knowledge about and experience in this area and is including the user needs, development potential and barriers to achieving flexible electricity consumption of seven relevant businesses. Examples of equipment included in the demonstration tests are heat pumps and coolers used in conjunction with cold stores, as these can accumulate the energy of the overall energy system.

The Skjern Papirfabrik A/S paper mill is one of the seven demonstration businesses where the project has investigated how the business can save money by managing production more expediently in respect of the fluctuating electricity prices through the day.

– In the first review of our electricity consumption, the day profile revealed that we could not achieve more energy-flexible production since most of our energy consumption depends on the paper production, which occurs at the same pace and with the same intensity at all the times, explains Søren Skærbæk Energy and Environment Manager at Skjern Papirfabrik A/S, continuing: However, we discovered that we could reap the benefits of more flexible energy consumption by involving our employees via user-driven innovation. We are looking forward to an extremely exciting process that may provide useful knowledge when we gather key input and ideas from those working with energy-intensive processes on a daily basis.

The Danish Technological Institute must continuously ensure that this newly acquired knowledge is disseminated to Danish businesses and other stakeholders. The project will be completed at the end of 2011.

Facts

The ‘Demand response energy consumption’ project is funded by Growth Forum for Central Denmark Region and Energinet.dk under the ForskEL programme, which holds the overall responsibility for supply security in Denmark.

Case

17

International perspective benefits Danish businesses

The Danish Technological Institute focused on international cooperation and networks in 2010. In renewable energy and transport, the Institute is now participating in four new EU projects and has been joined by Danish partners in some of the projects.

Green eMotion, EasyBAT, EuroBioRef and BioWalk4BioFuel are the names of four projects totalling orders for approx. EUR 3 million, which the Danish Technological Institute helped bring in during 2010. The participation of six Danish businesses in the Green eMotion project has been ensured through the Institute's lobbying activities under the Transport Innovation Network and subsequent coordination during the application process.

– We were asked directly by the industry whether we could take on the task of ensuring a significant Danish role in the project, explains Programme Manager, Sustainable Transport Lars Overgaard from the Danish Technological Institute, who is coordinating the Danish involvement in the Green eMotion application work while also holding the negotiating brief for all the Scandinavian players in the application process.

Better Place, the global supplier of electric car networks, has benefited greatly from the Danish Technological Institute's work on the international stage.

– We're impressed by the strategic handling of the, at times, quite complex and difficult negotiations. For Better Place, the outcome is fantastic, because our Danish office is now guaranteed access to this internationally funded research and development project. The project will allow us to demonstrate vital parts of the Better Place concept and, together with other key parties, ensure interoperability between our solutions, says Europe Business Manager Amit Yudan from Better Place International, which is supporting the Danish office during their participation in Green eMotion, the largest European funded project in electromobility, with 40 partners and a turnover of EUR 40 million.

Infrastructure for electric cars

The City of Copenhagen, which is also participating in the electric car project, has great expectations for the cooperation:

– We're thrilled to be part of the Green eMotion project. Getting more electric cars on the roads plays a key part in our vision for reducing CO_2 emissions from the transport sector by 50,000 tonnes between 2005 and 2015. We're certain that this project will create new knowledge. Knowledge that we can use when we're rolling out a large-scale infrastructure for electric cars, states Søren Kastoft from Centre for Traffic under the City of Copenhagen.

Facts

The purpose of the Green eMotion project is to support the mass roll out of electric cars in Europe. Elements such as realising a European Clearing House concept, working with standards, setting up charge stations and battery replacement stations, developing services, conducting behavioural studies and testing electric cars and batteries are all aimed at supporting the imminent mass roll out of electric cars.

Case

18

The trucks and busses of the future will run on slaughterhouse waste

In the future, heavy vehicles such as trucks and busses may run on biodiesel produced from slaughterhouse waste at Danish slaughterhouses – this is the finding of a project conducted by the Danish Technological Institute as part of the Danish Transport Authority's large-scale biodiesel test.

In 2010, the Danish Technological Institute completed a major demonstration project describing the Danish transport sector's possibilities of using animal biodiesel as an alternative to fossil diesel. The project is one of four projects under the Danish Transport Authority's biodiesel test with a total funding of EUR 8 million. The Danish Technological Institute has participated in two of the other three projects involving emission tests and measurements. The two projects concerned the application of rapeseed-based biodiesel and pure cold-pressed rapeseed oil. The fourth project concerned biodiesel supply in Aarhus, Denmark. The tests from the major demonstration project show that it is possible to produce animal biodiesel mixtures that can be used as fuel for heavy vehicles even during winter when night-time temperatures reach minus 15 °C. The tests also show a drop in emissions when animal biodiesel is used. However, the tests also show a small increase in fuel consumption and a small drop in motor output and increased fuel filter greasing in some vehicles.

Alternative fuels

MSc (Engineering) Niels Frees from the Danish Transport Authority is pleased that, overall, the tests of the various vehicles and animal mixtures with biodiesel have yielded positive results:

– We're highly optimistic for the transport sector. Indeed, the finishing test results support our and the government's strategy to venture into areas such as alternative fuels to reduce the climate impact of the transport sector. We've been glad to have the Danish Technological Institute as a professional team player, not just in the project on animal biodiesel but also in the other projects that are part of our biodiesel tests.

The Danish Transport Authority's test with biodiesel is one of the largest, completed fuel projects to date – even by European standards. The Danish Technological Institute has delivered a comprehensive test process based on standard vehicles.

The animal biodiesel project at the Danish Technological Institute is a large measuring programme conducted on the roads and on the Institute's truck drive roller. During the test period from November 2008 to March 2010, 158 vehicles were driven approx. 10 million kilometres and used approx. four million litres of animal-based biodiesel produced in various solutions, e.g. with traditional diesel.

In addition, the Danish Technological Institute has demonstrated a full-scale mixing facility to ensure that biodiesel is more widely introduced in Denmark.

In addition to the fuel suppliers, the project also involved many local equipment suppliers and fleet owners.

The results were presented in Detroit at the Society of Automotive Engineers, SAE World Congress.

Case

19

New motor lab puts customers in the lead

They are busy at the Danish Technological Institute's new modern motor lab. There, Danish businesses and universities receive help for competence-intensive and time-consuming research and development assignments.

The motor lab is equipped with a motor test bench, a fuel flow meter and a particle counter supplied by AVL List GmbH, and all technical aspects are controlled from a control cell. The new equipment in the lab is used to test and develop alternative fuels and emission equipment for the transport sector.

Ideal framework for research

For instance, in 2010 as part of the 'Waste-2-Value' project, the Danish Technological Institute tested and developed particle filters for diesel vehicles in cooperation with Dinex A/S and the Technical University of Denmark.

– It's a big plus for us to be able to cooperate closely with the Danish Technological Institute on the development and long-term testing of particle filters, because it requires several hours of testing in the lab. It can be difficult to incorporate an assignment of this size alongside the normal assignments in our own motor lab, explains Henrik Christensen from Dinex A/S, which develops emission systems for various vehicles such as busses and trucks as well as industrial machines with diesel engines.

– In future, we'll also need the Institute's facilities and expertise since automobile production is becoming increasingly sophisticated, while EU regulations and, not least, American legislation on exhaust emissions are also constantly being tightened.

At the motor lab, the Institute has teamed up with Haldor Topsøe A/S to research how ethanol can be used as fuel for diesel cars.

– We benefit greatly from the new lab at the Danish Technological Institute, since the EU requires the transport sector in the member states to use alternative fuels. Now, we have the ideal framework for conducting research at a very high level, says Project Manager and Senior Technical Advisor Pär Gabrielsson from Research and Development with Haldor Topsøe A/S.

Case

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Danish ferries with funnel filters – heading for new export adventures?

The Danish Technological Institute is developing and testing a new funnel filter to limit the emission of smoke and particles from Danish ferries. This has paved the way for a new export adventure.

The project is conducted in cooperation with the company behind the Ærøfærgerne A/S, the Ærø ferries, and Danish Dinex A/S, which is a world frontrunner in developing emission-limiting equipment, primarily for the car industry.

Fight against pollution

In spring 2011, the Ærø ferries' funnels will be fitted with new filters for the purpose of gathering the first experience. Once the filter has proven that it works, a new market will open up in Denmark and abroad, assessed Project Manager Henrik Christensen from Dinex A/S.

– We have high hopes for the sale of the new filter. Denmark has more than 30 ferry lines, and the ferries are a major source of pollution. For instance, one ferry pollutes as much as ten old trucks without filters. However, particle filters on ferries are not statutory, says Henrik Christensen, adding: Legislation may be introduced in the near future, though, and under all circumstances we see great business potential in emission-limiting equipment for vessels sailing in domestic waters, both nationally and internationally. We see an increasing focus on the emissions of these vessels in both the EU and in the Scandinavian countries where the shipping companies want a greener profile.

The project has been financed with EUR 0.3 million. The Danish Environmental Protection Agency is financing about half of this amount, while the rest is covered by Dinex A/S and Ærøfærgerne A/S.

We see great business potential in emission-limiting equipment for vessels sailing in domestic waters, both nationally and internationally.

Project Manager Henrik Christensen, Dinex A/S

Case

21

Promising research in new Danish algae centre

In autumn 2010, the Danish Technological Institute started the pumps for the first recirculated algae growth facility, together with the other three partners in the consortium AlgaeCentre Denmark. This marked the beginning of a line of new research and development projects on the use of algae as a natural resource for energy, food, feed, medicine and more.

AlgaeCentre Denmark is expected to help develop new products that will benefit Danish businesses. The business sector and researchers from Aarhus University and the Danish Technological Institute are to conduct the research in a manner that allows the results to be used to stimulate growth and development in both Central Denmark Region and nationwide.

The location by the Kattegatcentret in Grenaa provides a unique opportunity to communicate the research through the educational service and exhibitions.

– With AlgaeCentre Denmark, we'll get one step ahead, and I'm convinced that it'll become a success. The Centre is ideally located, enjoys local support, has the right partners and focuses on the right projects, says David Tveit, Director of Energy and Climate at the Danish Technological Institute. He assesses that the potential of the algae research facility is substantial and that the ambitions reach beyond the regional area: Algae have made the international agenda. We see this clearly when we participate in conferences.

Deputy Director General Kurt Nielsen from the Danish National Environmental Research Institute stresses that the centre has gained international notice: – We want to become a Green Lab Jutland and create value for society that extends beyond our national borders. We're already part of the European agenda since the first research and development projects at AlgaeCentre Denmark have received research funding from the EU. The algae growth facility at Grenaa harbour only recirculates seawater. In addition to improving operations, this means better control of the water environment in the facility tanks and thus high-quality measurements for research.

– Algae are among the most promising resources of the future, says Michael Bo Rasmussen, Senior Adviser at the National Environmental Research Institute, adding: We're thrilled to be at the vanguard of developing growth technology that simultaneously ensures environment-friendly energy, healthy food and environmental improvement. Since the facility is recirculated, we can control the water environment in the tanks, which we expect to produce high-quality research results.

Facts

The National Environmental Research Institute at Aarhus University, the development project Ocean Centre Denmark and the Kattegatcentret join the Danish Technological Institute as partners in the consortium behind AlgaeCentre Denmark. The growth facilities are used for the projects energy from marine biomass, BioWalk-4BioFuel, Algae for Biogas and as the technological basis for applying the strategic research funds.

Case

22

Biofuel of the future as pellets

The Danish Technological Institute and Andritz Feed & Biofuel A/S, large-scale supplier of pellet presses, have joined forces to establish a biomass test facility south of Kolding, Denmark. This is where the new types of CO_2-neutral fuels are developed and tested for the benefit of the environment, power plants and the alternative energy industry.

Danish consumption of wood pellets totals one million tonnes annually, a figure expected to double in the coming years. Power plants in particular plan to use far more wood pellets than the 500,000 tonnes they use today. However, wood as fuel may quickly become scarce.

As demand for wood pellets increases, the future will bring a need for pellets made of other and new biomasses such as straw and willow and various residual products from the processing of agricultural products. The Danish Technological Institute and Andritz Feed & Biofuel A/S have therefore joined forces to extend the existing Biomass Test and Demonstration Plant in Sønder Stenderup, which can handle biomass for energy in a laboratory to industrial scale from pre-treatment, milling and pelleting to the subsequent analyses. Together with the other facilities in Sønder Stenderup, a flexible test facility has been established to document full-scale conditions in biomass pelleting. Tests using various types of biomass as raw material have to be performed, and experiments on how to increase energy density need to be done.

Facility with international outlook

The demand for wood pellets is also growing strongly in the rest of the world. Consequently, the international wood and biopellet sector is interested in optimising production capacity and extending the raw material market.

– With the new test facility for biopellets, we are now able to provide the sector with the production measurements that can otherwise be impossible or highly difficult and expensive to perform in an operating factory, explains Head of Section Peter Daugbjerg Jensen from the Danish Technological Institute, adding that the facility can handle several tonnes of wood pellets per hour, thus allowing industrial-scale testing. Without doubt this will strengthen us in our international cooperation and the work to support Danish industry growth in the business area of transforming biomass to energy.

Kim Behnke from Energinet.dk, which manages a large part of the Danish energy research funds, is also thrilled about the new biopellet test facility:

– The new biopellet facility provides concrete proof yet again that the Danish Technological Institute is fully capable of playing bridge builder between research and industry in an area as crucial as increasing the use of biomass to replace fossil fuels, says Kim Behnke, who also assesses that the vast amounts of biomass already used in Danish power plants are the result of many years' fruitful cooperation between the knowledge institutions and the power plant sector.

Business Development

Welfare technology and innovation!

Our primary task is to help boost company innovation as a means of enhancing competitive power.

Importing and using new knowledge and viably translating it into innovation are an increasingly important ability for both public and private enterprises desiring to future-proof a strong position in a changeable market.

Against this backdrop, we are implementing welfare technology in the health and care sector, performing innovation checks in small enterprises, making use of inventions and not least creating innovation in the service sector. We intend to ensure that major decisions are made based on extensive and relevant analyses rather than feelings.

Jane Wickmann

Director

Case

23

Denmark as Northern Europe's finance-IT metropolis?

What competences will tip the scale if Denmark is to have any hope of becoming the leading finance-IT metropolis in Northern Europe? The Danish Technological Institute knows the answer!

If Danish finance and IT companies are to compete successfully with other finance-IT metropolises in the global arena, they need access to highly qualified manpower. Companies and educational establishments need stronger strategic cooperation, and finance-IT staff and managers require more and better supplementary training – shows an analysis conducted by the Danish Technological Institute on behalf of the cluster organisation Copenhagen Finance IT Region (CFIR). Anette Broløs, Head of Secretariat at CFIR, also believes that requirements for staff and managers in the financial and IT sector will change in the coming years.

- According to the analysis, the companies in the cluster need staff and managers with a different competence profile than today. To this end, educational offers must be scrutinized and strategic cooperation between companies and educational establishments set up. Many Danish finance-IT jobs can be moved abroad where payroll costs are lower and the education level is high. Therefore, staff and managers with strong competences in both IT and business development in the financial sector are pivotal to keeping attractive finance-IT jobs in Denmark also in the future, says Anette Broløs.

Boost in competitive power

The Danish Technological Institute has drawn up a set of recommendations for how companies can gain more access to competences in future. The recommendations were drawn up on the basis of extensive data analyses, surveys and interviews in close cooperation with key players such as Danske Bank, Nordea, IBM and SimCorp A/S and, not least, a host of small and medium-sized enterprises and entrepreneurs in the financial and IT sector. The recommendations were subsequently presented and discussed at a big conference in the summer of 2010 to achieve a common understanding of the cluster's competence challenges and ensure that cluster companies and players follow up the recommendations.

Anette Broløs believes that the analysis conducted by the Danish Technological Institute laid the cornerstone for the cluster's future competence-oriented strategy and activities.

- On the basis of the Danish Technological Institute's thorough and valuable analysis and discussion paper, we've launched a number of new measures broadly involving the many companies and players in the cluster. For instance, we've established stronger and more formalised cooperation between companies and educational establishments. These competence-oriented measures will be crucial to the cluster's future competitiveness and growth, says Anette Broløs.

Case

24

Danish companies and researchers on the growth bandwagon in China

Central Jutland companies and researchers must get in on the positive economic trends in China say Central Denmark Region politicians, who have earmarked EUR 1.1 million for the purpose.

The MIDTNET programme is Central Denmark Region's helping hand to a wide group of private and public companies and knowledge institutions in the region wanting to participate in joint knowledge and development cooperation projects with similar partners in Shanghai, China. The cooperation will lead to specific projects in three overarching networks: IT, energy & environment and health & life science.

Together with AU Outreach at Aarhus University, the Danish Technological Institute is charged with initiating, supporting and managing the networks and projects both technically and culturally. This is to be achieved in cooperation with the business and development councils in Central Denmark Region, Innovation Center Denmark in Shanghai and the Shanghai Municipal Science and Technology Commission.

60 participants

The initiative originates in Growth Forum in Central Denmark Region, which expects the network cooperation to result in a host of specific development projects with one or more companies and public knowledge institutions from both countries taking part. In total, some 60 companies and knowledge institutions will come into play in various projects. Central Denmark Region is looking forward to seeing the results of the new initiative:

- MIDTNET represents a unique possibility for companies and knowledge institutions in Central Denmark to work jointly with an international knowledge capital and thus generate growth based on state-of-the-art knowledge. However, moving into a new market can be difficult. There're many barriers, but the MIDTNET programme offers much help, says Kaj Vestergaard Nielsen, Head of Research and Development, Central Denmark Region.

To support the projects initiated, the Danish Technological Institute organises regular seminars, workshops and project development meetings in both Central Denmark and Shanghai in cooperation with the various partners. The Danish Technological Institute also lends financial support to help knowledge holders mature companies' and researchers' specific projects and determines whether other relevant support schemes exist. A minimum of 12 ongoing development projects will receive project maturing support before 31 July 2013.

The Danish Technological Institute has also set up the www.midtnet.com web portal. Its objective is to facilitate contact between participants in the various networks and projects and cooperation across national borders. This makes MIDTNET an obvious opportunity for Central Denmark companies and researchers looking to embark on knowledge cooperation with China and book a seat on the growth bandwagon.

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Case

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Innovation agents turn knowledge into growth at Danish companies

In 2010, the Ministry of Science, Technology and Innovation decided to introduce a new national programme creating innovation in 3,000 small and medium-sized enterprises. The Danish Technological Institute has been appointed project manager of the programme.

New analyses prepared by the Danish Agency for Science, Technology and Innovation show that every time a company invests EUR 15,000 in research and development, it receives a return of EUR 25,000. Nevertheless, only 2% of small and medium-sized enterprises currently conduct research and development. The Ministry of Science, Technology and Innovation has thus decided to launch the Innovation Agents programme, a two-and-a-half-year initiative aimed at strengthening small and medium-sized enterprises' ability to translate new knowledge into growth within a short time and gain ground in the global competition.

The programme is a continuation of a successful pilot project undertaken in three of Denmark's regions from the summer of 2007 until the summer of 2010. Now, all small and medium-sized enterprises in Denmark can obtain free consultancy from experienced technology and innovation experts – so-called innovation agents – from the Danish Technological Institute and the eight other Approved Technological Service institutes.

- It's important to give small enterprises better possibilities for developing new products, services and business procedures through technological solutions. This is why the Ministry of Science, Technology and Innovation is now extending its help to a part of the Danish business sector that doesn't traditionally cooperate with knowledge institutions, says Centre Manager Knud Erik Hilding-Hamann, Danish Technological Institute.

Identifying innovation and growth possibilities

The innovation agent uses a so-called 'innovation check' to identify a company's innovation and growth possibilities and proposes tangible solutions for technological development projects. Next, the innovation agent, through his profound knowledge and overview of the Danish knowledge system, establishes contact between the company and relevant experts who can support the innovation process. The agents are thus the link between the companies and new research and technology.

- It can be a jungle for companies to get an overview of the vast supply of knowledge in Denmark, and many give up before they start a technological development project or come to a standstill under way. And that's too bad. However, with this programme companies can utilise their full potential, ends Knud Erik Hilding-Hamann.

Facts

Innovation checks made by an innovation agent are free of charge. The programme objective is to bring technological knowledge and inspiration into small and medium-sized enterprises and thus foster growth, production and employment.
Read more at www.innovationstjek.dk (in Danish).

Case

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Danish inventor wants to put an end to noise

Thomas Willum Jensen is one of the inventors receiving help from the Consultancy Service for Private Inventors at the Danish Technological Institute. His invention is a new type of perforated crash barrier that absorbs noise at the roadside and improves and lengthens the lives of many Danes.

Several studies show that traffic noise leads to stress that takes its health toll on residents in exposed areas. Since this is unlikely to prompt the elimination of roads and cars, sound barriers are being erected near big roads.

Today, large amounts of time and money are being spent erecting sound barriers along the main roads instead of capturing the noise close to its source. This fact both annoyed and inspired Danish metal worker and mechanical engineer – and now also inventor – Thomas Willum Jensen as he was driving on Ring Road 4 in Copenhagen one day. To him, it seemed illogical to put the sound barrier so far away from the vehicles, and he looked into the possibilities of finding a better solution to the noise problems.

Simple yet so brilliant

Thomas Willum Jensen's crash barrier consists of a noise-absorbing wall between two supporting beams and a perforated plate facing traffic. This means that most of the noise continues through the perforated plate into the noise-absorbing wall. Being placed closer to the noise source than the sound barriers we know from the roads, his crash barriers absorb the noise more effectively.

Preliminary calculations have shown that the invention can reduce road noise by 3-4 decibels.

- I was convinced that the idea was so obvious that others must already have patented it. Luckily, the Consultancy Service for Private Inventors helped me investigate the matter, and thanks to them, I have a Danish patent today, says Thomas Willum Jensen, who also hopes to obtain an international patent with the help of the Danish Technological Institute.

Facts

For nearly 40 years, the Consultancy Service for Private Inventors of the Danish Technological Institute has been advising inventors in Denmark on how to utilise their good ideas.

As something new, the Danish Technological Institute has launched a new website: www.opfind.nu, where inventor advisers blog.

By 1 November 2010, more than 900 users had registered with the forum at www.opfind.nu and had submitted more than 900 ideas for evaluation.

Case

27

Høje-Taastrup Municipality goes for growth in Danish concrete industry

The Danish Technological Institute is helping the concrete industry in Høje-Taastrup Municipality to use concrete in innovative ways, in cooperation with other Danish producers and suppliers of concrete as well as creative companies and research and development institutions.

Under the headline "City and Concrete – Creative City Challenge", the Danish Technological Institute is completing a large-scale EU project in cooperation with Høje-Taastrup Municipality. The project is a new form of business development through innovative and creative concrete partnership.

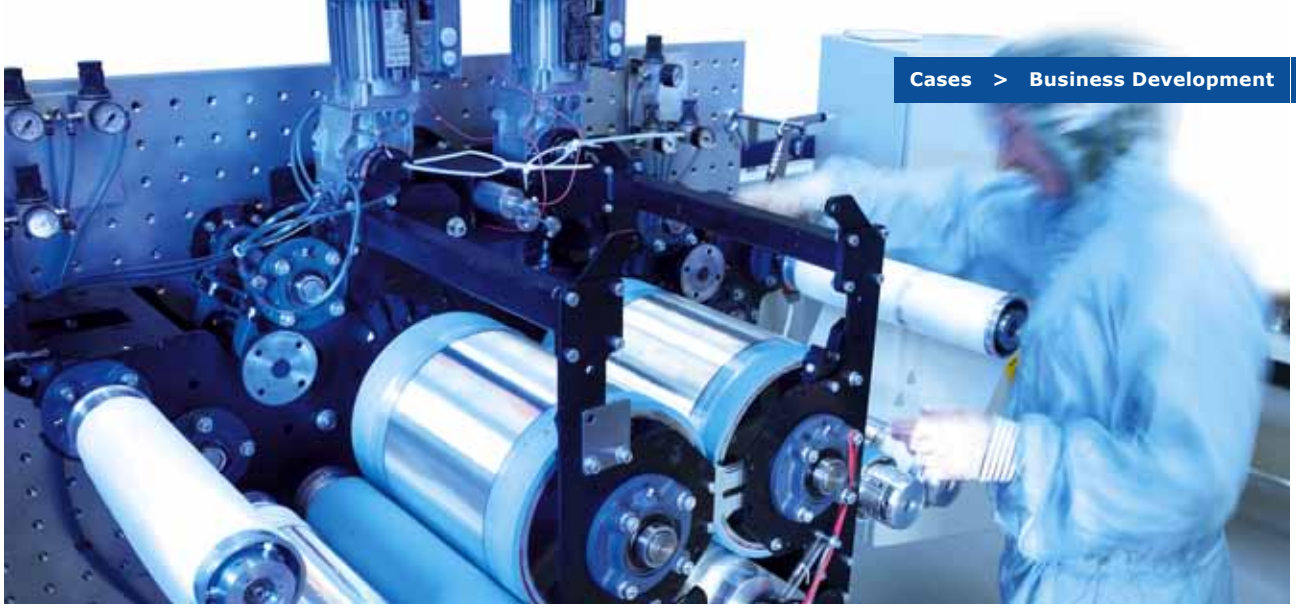
- Several concrete works and subsuppliers have been domiciled in the Hedehusene area over the years, and this constitutes an important part of Hedehusene's history and identity. Moreover, the Municipality faces extensive urban development south and south-east of Hedehusene. That project will require quite a quantity of concrete, and the urban development represents an opportunity to create a concrete testing laboratory to show the various uses of concrete, says EU and Project Manager Lars Dyreborg-Gunslev of Høje-Taastrup Municipality. He adds that concrete is very interesting because it is a sophisticated material that has seen a revival in architecture and climate adaptation, etc.

The Danish Technological Institute aims to strengthen Danish concrete companies' competences and involve overseas knowledge and experience. Furthermore, the Danish Technological Institute will establish a network for companies and identify a cluster of companies and players in the field of concrete.

New ways to go

In that context, innovation checks were made in a range of businesses. The results have laid the foundation for two workshops that pointed to interesting development paths through scenario processes and creative work.

- We hope that the project will allow us to market Hedehusene and Denmark as global frontrunners in new uses for concrete and thus boost growth for Danish players in the international concrete market, says Lars Dyreborg-Gunslev of Høje-Taastrup Municipality. He expects the project to give Høje-Taastrup the input to set new requirements and standards that promote innovation in the concrete industry.



Case

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En route to better treatment for chronic venous leg ulcers

The Danish Technological Institute involves citizens, wound care providers and experts in a new, large-scale three-year project to improve the quality of life for citizens with chronic venous leg ulcers.

In Denmark, some 18-20,000 people are living with chronic venous leg ulcers, and the number is likely to increase in future. A patient costs EUR 3-5,500 a year. Total costs to society run to more than EUR 67 million a year.

Leg ulcers are extremely unpleasant and painful and impose a lot of limitations and nuisances in everyday life. Today, compression treatment with bandages or stockings is the only way to treat leg ulcers. This treatment is difficult, however, and requires a large amount of knowledge and experience to be given correctly. To solve the problems, the local authorities of Ringsted and Slagelse, Region of Southern Denmark, Danfoss PolyPower A/S, Sahva A/S and the Danish Technological Institute have teamed up to develop new measures to reduce citizens' distress from healing, improve the treatment process and ease the work for wound care providers.

Solution in sight

The Danish Technological Institute has preliminarily performed an ethnographic study that has shed light on the situations of citizens and wound care providers. The results will now be used in an innovation process of which the Danish Technological Institute is also in charge. Through workshops, users and health care professionals are involved in developing new concepts for solving the problems of treating leg ulcers.

- We're very satisfied with the professional approach taken by the Danish Technological Institute in both the application phase and the preliminary phase. It has involved citizens with chronic venous leg ulcers and wound care providers in a very considerate and empathetic way, says Ann Roldan, Project Manager at Mediteam Consulting ApS.

- We greatly look forward to continuing the mutually beneficial cooperation. The broad technical competences in the project are producing inspirational new knowledge about the potential uses of our polymeric film, which can measure pressure and be activated as a form of artificial muscle, says Michael Hamann, General Manager and President of Danfoss PolyPower A/S.

The Danish Enterprise and Construction Authority's "Programme for user-driven innovation" funds the project. Region of Southern Denmark, the local authorities of Slagelse and Ringsted are contributing knowledge about citizen treatment as well as medical expertise. Sahva A/S is contributing knowledge about compression product development. Danfoss PolyPower A/S has developed a polymeric film capable of measuring pressure and being activated as a form of artificial muscle. The film can be used for leg ulcer treatment. The Danish Technological Institute is contributing its experience of completing user-driven innovation processes and collecting user information.

Case

29

When job satisfaction goes up, the number of sickness days goes down!

Through the "Presence in work" project, the Danish Technological Institute directed the spotlight on job satisfaction at 18 workplaces in the health area in 2010, the objective being to lower the number of sickness days and raising the level of staff job satisfaction, which was fulfilled.

One conclusion of the project is that it pays to take an interest in staff job satisfaction and change procedures. Charlotte Fuglsang, Director of the Prevention Fund, and a number of other experts monitored the project in a so-called Advisory Board, and she is very impressed with the results from Bornholm. They reveal that the number of sickness days in three of Bornholms Hospital wards fell by an average of 19% in the past year.

- That's a great story. It shows that taking an interest in how staff regard their working days and involving them in improving conditions can lower the number of sickness days at a busy workplace like a hospital. Achieving success in a project such as this requires sound project management, and the Danish Technological Institute delivered just that, says Charlotte Fuglsang.

More than one good "recipe"

Experience from the project shows that no simple recipe exists for a high level of job satisfaction and a small number of sickness days.

- There's no single course of action to take or one specific talk to give that will make all staff members suddenly feel much better. However, as external consultants, we can see where things are going well and less well. And we can provide both staff and managers with some specific tools for meeting any challenges, says Birgit Lübker, Project Manager at the Danish Technological Institute.

As part of the project, the Danish Technological Institute paid a visit to 18 workplaces to offer input on how to optimise procedures. The Institute's input came in the form of teaching with presentations by leading experts, internal sparring and thorough follow-up. For instance, the Danish Technological Institute communicated the latest knowledge about management, organisational development, physical working conditions, working hours and the embedding of useful habits. Moreover, the staff members involved in the project took cameras in hand for a photo safari to other workplaces that might provide inspiration for solving tasks in a new and smarter way.

- I've gained a lot from being involved in staff satisfaction at my workplace in this way. Getting the opportunity to define what will require special attention in future is a great motivator, says Dorte Hansen, Ward Nurse at Neurological Department F1 at Bornholms Hospital.

The project will culminate with a big conference in the spring of 2011 where the wealth of results will be presented and discussed.

19%

When job satisfaction goes up, the number of sickness days goes down!

It pays to have satisfied staff members. For instance, taking an interest in staff members' satisfaction and involving them in the procedures reduced the number of sickness days by 195 at a busy workplace like Bornholms Hospital. This achievement is documented in the Danish Technological Institute's "Presence in work" project.

The course of the project and cooperation with the Danish Technological Institute went extremely well. Without their help, we couldn’t have uncovered global knowledge in the area so effectively and subsequently identified the best of the best, which was our goal.

Peter Højlund Hviid, R&D Manager, Hamworthy Svanehøj A/S

Case

30

Danish pump business receives help becoming a global leader in its field

Danish pump business Hamworthy Svanehøj A/S has set up cooperation with the University of Stuttgart in Germany through the Danish Technological Institute. The goal of this international match is to become the leading pump supplier in the market.

Hamworthy Svanehøj A/S contacted the Danish Technological Institute realising that the company was in need of an international partner to enhance and redesign its pump range and revitalise its competitive power in the market. The Danish Technological Institute took on the task of finding out who could best help the Danish business to import, develop and implement state-of-the-art knowledge about applied pump theory.

- For us, it's about being among the very best in the market, so our products must always be top quality. We're therefore looking for the highest level of technical knowledge available in the world, and the Danish Technological Institute was of great use to us in that process, says Peter Højlund Hviid, R&D Manager at Hamworthy Svanehøj A/S.

Global network of experts

The Danish Technological Institute completed a search of its global network of experts, Technology Partnership, and identified eight potential partners through extensive screening and a host of inquiries to various leading international technological knowledge institutions.

The results were submitted to Hamworthy Svanehøj A/S, which decided to contact the University of Stuttgart. The contact led to constructive development cooperation, which will continue for the next one or two years.

- The course of the project and cooperation with the Danish Technological Institute went extremely well. Without their help, we couldn't have uncovered global knowledge in the area so effectively and subsequently identified the best of the best, which was our goal, concludes Peter Højlund Hviid.

Life Science

Life Science – technologies of the new opportunities!

Food, health and environment are central themes – in Denmark, Danish trade and industry and the rest of the world. In the Western world, we see the following trends:

• Fewer and fewer people to take care of more and more people
• An increase in lifestyle-related diseases
• A preference for individual solutions rather than 'one size fits all'

Danish industry needs to address these trends to a greater degree. We must use recent years' experience gained in nano-, bio- and information technology for specific solutions. This is where we want to a key player. Viably applied high technology addresses these societal challenges and benefits Danish industry.

We have the experience, the skills, partnership with universities and businesses and the infrastructure – use us.

Bo Frølund

Director

Case

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Danish fish and fishermen – also in future

A new subcluster is to create development and growth in the North Jutland fish industry, which is under severe financial pressure.

The new subcluster 'Seafood Cluster North' will unite the efforts of the North Jutland fish industry as a means of turbo-charging initiatives aimed to ensure business development, job retention and continued innovation in the region's fish industry.

The North Sea Science Park is managing the subcluster in cooperation with Innovative Fisheries Management, Aalborg University and the Danish Technological Institute.

- We want to contribute to the continued technological, organisational and economic development of North Jutland industry and thus maintain and strengthen its strong competitive position, says Alex B. Veje Rasmussen, Chief Consultant, from the Danish Technological Institute, adding: The next step is to initiate a wide range of development projects and networks across the industry during 2011.

- We're ready to welcome the North Jutland businesses that want to pool their efforts and resources for development projects and have good ideas but need support and money to realise them, says Alex B. Rasmussen: We help them apply for funds and further develop the good idea, if necessary. Furthermore, we offer competence development, e.g. in the form of themed meetings, and support them in developing websites and newsletters as well as other marketing activities.

130 fish businesses have joined

Jens Otto Størup, Director of The North Sea Science Park, is very satisfied with the work undertaken by the Danish Technological Institute in the new subcluster, which so far has approx. 130 fish businesses in a registered network.

- As a result of its high ambitions and professional approach, the Danish Technological Institute secured support for the idea of cooperating to boost competitiveness in the region's fishing industry, involving local authorities, institutions and the corporate sector. A task like this requires extensive cooperation with and knowledge of the industry, says Jens Otto Størup.

Together with the subcluster, the Hirtshals Fishermen's Association has won the demonstration project 'Ensiling organic waste from consumer vessels'. Niels K. Nielsen, Chairman, emphasises that the chief reason for joining the cluster is gaining the capacity to participate in such innovative projects:

- Normally, we wouldn't have the resources or skills to participate in development projects - but the cluster provides new, unique cooperation and development opportunities.

Facts

North Jutland is the largest fisheries region and main exporter of Danish fish and seafood. The total annual production value in Denmark amounts to more than EUR 2.7 billion. Fish and seafood exports account for EUR 2.4 billion, and 64% of the total sales value from fish canning and filleting factories comes from North Jutland. 45% of the total sales value from fish wholesale comes from North Jutland.

Case

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Does faster and better diagnosis increase productivity at Copenhagen University Hospital?

A research project aims to reduce the length of hospitalisation for patients with infections by introducing faster and better diagnostics based on molecular methods as a supplement to the traditional cultivation-based method.

Infections are costly to society and often require long-term hospitalisation, which is labour-intensive for the health sector. Old people are particularly susceptible to infectious diseases, and in step with the ageing population, the number of hospitalisations due to bacterial infections must be expected to increase. This will also mean more resource consumption in the heath sector.

Every year, about 250,000 people are hospitalised for infectious diseases – and the average hospital stay is five days. Today, bacteria cultivation is the most common method of diagnosing bacterial infections. This process takes several days and may be difficult to carry out if the patient is receiving antibiotics.

The sooner the bacteria causing the infection can be identified, the better. Because the sooner bacteria are identified, the sooner patients can receive more targeted treatment with the right antibiotics. This potentially reduces the length of hospitalisation. Shorter hospital stays benefit the patient and free up resources and hospital beds.

Diagnosis after only seven hours

Copenhagen University Hospital and the Danish Technological Institute are conducting a project to study the labour-saving potential of using the new diagnosis methods. The aim is to validate the results and subsequently disseminate the techniques to the national hospital service.

- The most recent project results indicate that in blood poisoning cases we can reduce the average time to final diagnosis from fifty to six hours. Even though, clinical factors have prevented the reduced diagnosis time from resulting in shorter hospitalisation at Copenhagen University Hospital, we now know that molecular-biological methods are an excellent diagnostic tool, says Dr. Claus Moser, MD at the Department of Clinical Microbiology, Copenhagen University Hospital, adding: We expect that swift microbiological diagnostics of a number of other infections will result in shorter hospital stays in cases where tablet treatment can replace the non-biological treatment.

Claus Moser emphasises that some of the techniques have already been applied at Copenhagen University Hospital, whereas other techniques will be ready for use in about a year, and that other hospitals can also implement the techniques.

The new molecular methods are being developed at the Danish Technological Institute, Aalborg University and Copenhagen University Hospital in close cooperation between the partners. The project is funded by the Danish Public Welfare Technology Foundation with EUR 1.5 million.

88%

Does faster and better diagnosis increase productivity at Copenhagen University Hospital? Will faster diagnoses mean shorter hospital stays? New research results show that patients with blood poisoning may receive an answer on the same day instead of waiting two days. The average time to final diagnosis goes down by 88% if molecular-biological methods are used as a supplement to traditional cultivation-based methods.

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Case

33

Danish biogas sector is heading towards higher productivity

In a biogas plant, a microbiological process transforms manure and other waste products into energy – but improved process monitoring and control may increase productivity by up to 10% in both existing and new biogas reactors.

A project in which the Danish Technological Institute has participated represents an important step towards more efficient utilisation of biomass. In cooperation with Aarhus University and Xergi A/S, the Danish Technological Institute has studied solutions for tomorrow's new biogas reactor monitoring and control systems. The project, funded by Energinet.dk, has documented how the microbiological process can be monitored optimally and be optimised. This is done by manipulating the microbiological processes in a pilot plant equipped with traditional monitoring systems and new systems not used to date. All systems have been thoroughly evaluated.

Good chemistry generates results

The project results show that controlling chemical substances in the microbiological process is key to achieving significant productivity improvement. The results will underpin the development of new biogas reactor monitoring and control systems, which will benefit the Danish biogas producer Xergi A/S.

- We help our customers develop technical solutions based on the idea of maximising the use of biomass right from container design to the completion and commissioning of the plant. And with the new knowledge, we expect to be even better players on the global market because we now have the input for product improvements, says Anders Peter Jensen from Xergi A/S.

Anders Peter Adamsen, Research Manager at the Faculty of Agricultural Sciences at Aarhus University, is pleased with the final outcome and the entire project:

- The cooperation between the university researchers and the development staff from the Danish Technological Institute and Xergi A/S has been highly satisfactory, and having the opportunity to see the project from different angles has been very enriching. A successful biogas project requires efforts from several fields of expertise, says Anders Peter Adamsen.

Case

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DONG E&P A/S prepared to combat corrosive bacteria

When Dong E&P A/S extracts oil from the North Sea underground, one of the challenges is the occurrence of bacteria that cause the pipes in offshore systems to corrode.

For several years, the Danish Technological Institute has been an important partner for DONG E&P A/S when the oil in the Danish part of the North Sea is to be extracted safely from the underground fields Siri, Cecilie, Nini and Stine. The fields are connected by pipelines that transport injection water to the injection wells at the individual fields. The injection water maintains the pressure in the underground to optimise the extraction of oil from the reservoir. Total production from the Siri field is about 20,000 barrels a day.

When seawater is pumped through the pipelines, harmful bacteria convert sulphate from the water into sulphide. The occurrence of sulphide combined with bacterial biofilm is one reason why the pipes corrode. Oil producers such as DONG E&P A/S therefore require highly specialised knowledge about methods for measuring and controlling the corrosive bacteria in the piping systems.

- Since a leakage in the injection pipe in 2007, we've intensified bacteria growth monitoring in our water and oil systems. In this connection, we've benefited from the Danish Technological Institute's great knowledge and experience regarding how microbiological methods can reveal the type and species of harmful bacteria, says Mads Østerbye, Head of Department at Offshore Technology in DONG E&P A/S, adding: For example, we received prompt and qualified help in connection with the leakage and the subsequent, considerable analysis work. The Danish Technological Institute tested the effect of production chemicals for us, giving us an independent evaluation of their effect on bacterial control.

Efficient monitoring programme

Through its cooperation with the Danish Technological Institute, DONG E&P A/S designed and implemented a modern monitoring programme for bacterial growth in the systems, based on rapid and accurate DNA methods. Furthermore, the Danish Technological Institute instructs the company's offshore and onshore staff in oil microbiology, microbial corrosion and offshore sampling.

In cooperation with the Danish Technological Institute, Dong E&P A/S initiated a development project in 2010, aimed at extending the partners' knowledge further about the bacteriological issues offshore and possible solutions.

- Our cooperation with the Danish Technological Institute has well prepared us to deal with the bacterial challenges posed in the Danish part of the North Sea and that will come from future oil and gas discoveries in more distant areas, says Mads Østerbye from DONG E&P A/S.

Materials and Production

New technologies and materials!

Materials and Production has a long history of researching and developing new materials and functional surfaces, particularly in the areas of medical technology, micro- and nanotechnology.

Our activities with DANCHIP at the Technical University of Denmark and our joint projects with Aalborg University about materials manufacturing are aimed to create a number of technological beacons that can lead the way for Danish industry to ensure a sustainable and solid Danish production base.

We also want to develop tools and technologies to keep 'innovation factories' requiring rapid development and change internationally competitive. In-depth knowledge of the most recent materials and material technology is alpha and omega to maintaining Danish business competitiveness.

Mikkel Agerbæk

Director

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Case

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Time to use gasification plants intelligently

The completed development of a new gasification plant will pave the way for new fuels for 'green' electricity production and 'green' transport – and for export of Danish energy technologies.

Radically reorganising energy supplies so that Denmark can convert to more reliable and environment-friendly energy sources is a significant future challenge that will reduce CO_2 emissions.

In a new project, new high-technology solutions are about to be implemented in gasification plants. The technology can remove tar and other impurities from gasification plants.

- To realise the political ambition of reorganising the energy supply, new technologies have to be developed to replace the existing fossil fuel-based energy production. And one promising solution is biomass gasification, as the clean syngas, consisting of carbon monoxide and hydrogen, can be used for several purposes. For instance, it can be used to produce petrol, dimethyl ether and methanol or 'green' electricity using turbine technology, says Jens Christiansen, Head of Section from the Danish Technological Institute, adding that although the gasification process is a well-known technology, the challenge is to obtain a syngas sufficiently clean for the subsequent processes to operate satisfactorily.

Sound business potential

The project is to pave the way for new fuels produced from the clean syngas from the gasification plant. In the project, the Danish Technological Institute cooperates with the small testing company ChimneyLab Europe ApS and the catalyst company Haldor Topsøe A/S.

- We've great expectations for the project and see a sound business potential in cleaning gasification gas, says Poul Erik Højlund Nielsen, Head of Haldor Topsøe A/S' exploratory catalysis research projects. Both in Denmark and abroad, we can see an interest in the technology and the types of fuels it can produce.

The project participants will also develop mobile test reactors for subsequent testing at existing gasification plants in Skive, Harboøre and Græsted in Denmark. Once the project has been completed, the mobile test reactors are intended to be used at various gasification plants in Europe, and Haldor Topsøe A/S aims to commercialise the technology.

The project is funded by the Danish Energy Agency under the Energy Technology Development and Demonstration Programme.

Case

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New coating improves medical product and dental procedures

The Danish Technological Institute has developed a new carbon-based low friction coating to be used on screws for dental applications. The product works better than former surface-treated titan implants and is easier for dentists to work with.

The new product allows the dentist to run the screw more smoothly during procedures like implanting a crown in a patient's jawbone. The customised dental implant coating is designed not only to be smooth but also to have an intermediate layer between screw and nut that reduces friction further when the screw is loosened and tightened several times. This surface coating is a customised biocompatible low-friction coating of the Diamond-Like-Carbon type.

Since the product has been developed without hydrogen, the materials do not risk having the hydrogen brittleness that other types of coatings do. The new coating is, of course, non-toxic – and can be deposited on almost all materials such as metals, alloys, ceramic materials and composites.

The innovative carbonaceous coating was developed on the Danish Technological Institute's advanced PVD coating machine in cooperation with Elos Medtech Pinol A/S, a company manufacturing medical and dental instruments and equipment.

Coating in mass production

The coating is called MediCarb® and went into mass production in late 2010. So far, four companies among the ten market leaders in dental applications have received test samples of the new medical product. Christian Schäfe Thomsen, Dental Product Manager from Elos Medtech Pinol A/S has high expectations for the new product:

- I'm thrilled about our cooperation with the Danish Technological Institute. By drawing on their vast experience with DLC coatings and excellent understanding of our challenges and needs, we have now developed a fantastic product, which will increase our turnover and make a difference to our customers and, above all, their patients.

The Danish Technological Institute now has three different types of low-friction coatings at its disposal, and other industries are also expected to benefit from the new coating.

Productivity and Logistics

We want Danish production in Denmark!

Since the turn of the millennium, Denmark has lost more than 100,000 industrial jobs.

We are no better or more creative than anyone else. Danish companies are often too small to be leaders in their particular technologies – on the other hand, they are open, cooperative and flexible. New knowledge gets successfully commercialised because of the will and ability to combine theory and practice in the production environment.

Conditions in the Danish industry structure are good for finding niches that are highly specialised and use small, flexible sub-suppliers.

We believe in future Danish production – but in a different form than today. Automation with the most recent robot technology is part of the answer. We need to automate in a way that differentiates us from China and other low-pay countries – we must produce unique products that no one else can.

Lars Germann

Director

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Case

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The Danish Technological Institute in new Asian food adventure

In 2010, the Danish Technological Institute signed an agreement with the Korean Ministry of Agriculture on partnership and cooperation in an international food venture named FOODPOLIS – a new South Korean dreamland for the world's leading food producers.

The new agreement offers a unique opportunity for the Danish Technological Institute and the Danish food and packaging industry to gain firsthand knowledge about Korea's endeavours to capitalise on the growth expected in the Asian food market in future.

Over the next five years, the Korean government will spend EUR 0.4 billion and use a number of infrastructure establishments to realise the dream of creating a world-leading food cluster for food exports to the Northeast Asian market. According to the forecasts, this market is mushrooming and much faster than the European and North American markets as a result of the high population growth rate in Asia, increasing affluence and the large-scale urban migration of the rural population, which will need consumer-packaged and portioned foods.

The venture springs from the Korean government's ambition to become the largest food supplier in Northeast Asia, with the inclusion of national and international food and packaging businesses as well as internationally oriented experts and researchers.

State-of-the-art laboratory

The Danish Technological Institute is to provide various solutions for the commercial establishment of FOODPOLIS. The first task is to help the Koreans establish a state-of-the-art packaging laboratory. This entails measuring the laboratory; producing drawings and an equipment shopping list; buying, installing, testing and certifying the equipment; and training employees to use the lab equipment. The Danish Technological Institute will also provide advice to the Koreans on management and strategic development once the packaging laboratory has been established.

The Danish Technological Institute expects to gain a deeper understanding of packaging challenges and customer preferences in the area. This understanding may benefit the Danish companies wishing to export to Asia or localise production in the region.

Case

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Funky fruit and vegetables for fussy teenagers – an alternative to sweets and cakes?

Children and adolescents know that they should eat healthy food, but they don't. An interdisciplinary project between Aarhus University and the Danish Technological Institute is to change this.

A group of adolescents are heading to the kiosk in the late afternoon. Their blood sugar levels are dropping and everyone is dying for a snack. One person picks a bag of liquorice, another an ice cream, but the rest pick a 'cool snack' with fresh fruit and vegetables. This might sound unrealistic, but a project undertaken by the Danish Technological Institute in cooperation with Aarhus University may soon make it a reality.

Interdisciplinarity is the cornerstone of a project called 'Cool Snacks'. The project will be conducted jointly by the Department of Philosophy and History of Ideas, the Department of History and Area Studies, the Department of Food Science, the Centre for Research on Customer Relations in the Food Sector MAPP, the Department of Information and Media Studies and the Department of Public Health and the Danish Technological Institute. Together, the participants will map adolescents' consumption of snacks and sweets from different scientific perspectives, and the Danish Technological Institute will share its knowledge about packaging and distribution technology.

As part of the project, ten health snack concepts will be developed in cooperation with a number of businesses. The next step will be to develop a number of specific snack products that appeal to children and adolescents. The products will then be tested in retail shops. All results so far indicate that the products should be prepared and ready to eat. However, processed food has a very short shelf life, which makes quick distribution, cooling and packaging with the correct air composition very important factors. The Danish Technological Institute is contributing knowledge about how to achieve this in the cooling chain starting when the product leaves the growers and ending when it reaches the shop.

Healthy 'cool snack'

The project shows that adolescents walk straight past the fruit and vegetable section to the shelves where they expect to find sweets, cakes and snacks. The problem is that these sections have no cooling equipment. The Danish Technological Institute is to advise shops on issues such as whether to teach adolescents to find the new health products together with other fruit and vegetable products or whether to establish small, simple, refrigerated impulse displays next to the sweets and cakes. Healthy 'cool snacks' with fresh fruit and vegetables are fragile products that must be handled with care to make them look appetizing to fussy teenagers.

- We're looking forward to participating in the project, and we expect it to result in some new, interesting initiatives that will give us inspiration for expanding our product range, says Anders Klinge, CEO of Slice Fruit A/S in Kolding.

Case

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Find the perfect packaging for microwave use!

In 2010, the Danish Technological Institute initiated a project aiming to find better solutions for packaging used to heat food in microwave ovens.

The purpose of this project is to develop packaging that can heat a complex meal perfectly. This is a tough challenge because some food components require boiling while others are to be fried or baked and some are to stay cold.

The Danish Technological Institute has established three different, useful technologies. Furthermore, the Institute has built a new laboratory for developing and testing packaging for microwave use. The laboratory consists of various microwave ovens and measuring equipment. The laboratory has acquired a thermographic camera to measure the temperature continually in the ovens and in the food to an accuracy of 0.1 °C. Furthermore the laboratory has different equipment for manufacturing packaging prototypes.

New packaging solutions coming up

In future, the Danish Technological Institute is to develop specific products for a large number of food producers such as Kohberg Bakery Group A/S and Royal Greenland A/S. The products will be developed in cooperation with Mammens Emballage A/S, which produces cardboard packaging, and AMCOR Flexibles, which produces plastic film with steam valves, and R. Færch Plast A/S, which produces plastic trays.

- So far, we've tried to find packaging for microwave use that suits our products. We've not been completely satisfied and hope that this project can find the right solutions, says Niels Bøknæs, MSc (Engineering) and Product Developer at Royal Greenland A/S.

The project is funded by the Ministry of Food, Agriculture and Fisheries.

Case

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Packtrade – a new innovation network in Denmark

The Danish Technological Institute has launched a new self-funded innovation network for packaging, trade and distribution. The Packtrade network aims to strengthen the interplay between research, innovation and technology development. The rationale is to establish a permanent national network as part of the infrastructure in the Danish innovation system.

In the autumn of 2010, Packtrade had a terrific start with a well attended kick-off meeting held at the Danish Technological Institute. At the meeting, further network development was discussed by the representatives of seventeen universities, five related food and logistics innovation networks and the Danish Technological Institute's specialist centre for packaging and transport. Peter Huntley, Managing Director of the Danish Packaging Industry, was pleased with the massive support from the entire supply chain.

- The great interest underlines why it's important for us to have a common voice and join forces to coordinate efforts in the packaging area. Businesses need more innovation and knowledge in their product development to face the intensified price competition in the market, and that requires inspiration, says Peter Huntley, adding: The individual universities don't have the same broad dialogue with the corporate sector as the Danish Technological Institute does. The new network will engender much-needed transparency in terms of who researches what and why, thus enabling us to optimise resources for research and development and create synergies by joining forces in new, exciting projects. Because the Danish Technological Institute is in close contact with the industry. In addition, the Institute knows about the most recent trends in the technology area and how to submit/what it takes to make a good application for a research and development project.

Twelve new project ideas

All expectations for the kick-off meeting were met. During the day, participants successfully identified fifteen Danish and foreign funding opportunities that will be available for Danish research and development projects in 2011. In addition, participants mapped 199 industrial or political challenges facing the packaging and food industry, the distribution chain and the retail sector. They also identified twelve ideas and themes for future research and development projects and appointed research teams and chief project coordinators. Finally, participants discussed how to be even stronger in the competition for co-financing from the Ministry of Science, Technology and Innovation the next time it allocates funds for innovation networks.

In 2011, the twelve ideas and themes for future research and development projects will be presented to Danish companies at a number of matchmaking events at the Danish Technological Institute.

Last autumn, the new building for the Danish Technological Institute's Centre for Robot Technology in Odense was inaugurated. The building is to set the scene for interdisciplinary cooperation on future robots for industry and welfare.

Case

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Keen interest in new robot centre

All forecasts and predictions show that Danish industry and welfare will need even more robots in future. With the new Centre for Robot Technology, which opened last autumn, the Danish Technological Institute addressed these perspectives.

About 500 visitors inaugurated the new building, which houses a large, open robot laboratory, workshops and offices. This is where future researchers, businesses and end-users will work together to implement, develop and test new robot technologies and thus stimulate growth and productivity in society.

Ulrika Iversen, Development Consultant from the local authority of Slagelse, was one of the customers participating at the inauguration. She wanted to study the most recent welfare technologies in the elderly care sector, as the Slagelse local authority is about to build a new, modern residential care home. She had the opportunity to visit the Danish Technological Institute's new 'living lab' – a laboratory and display window designed as a typical residential care home facility for people with dementia.

Brought home inspiration

The visit provided Ulrika Iversen and Slagelse with new knowledge and new contacts they can use to create a safe and secure environment for care home residents and in the local authority.

- It was exciting to visit the new showroom designed as a residential care home and inspiring to talk to employees at the Danish Technological Institute, who showed me various modern aids such as height-adjustable kitchen cabinets and a talking watch, says Ulrika Iversen. She was also keen on the new floors with built-in sensors containing a wireless connection that can send information about movement patterns and alert staff if someone falls.

The local authority of Slagelse has long considered what technological aids would be best to install at the new residential care home and in the homes of citizens. On the basis of Ulrika Iversen's visit to the Danish Technological Institute's new Centre for Robot Technology, the local authority has come a step closer to its decision. The new product with floor sensors from Finnish Marimils Oy is of particular interest. The local authority expects that such technology would enable the elderly to move around more safely in their homes and calm staff and relatives, reducing their stress because falls will be much easier to prevent and avert.

Slagelse has a long-standing, close, political cooperation with the Danish Technological Institute on the implementation of welfare technological aids – and this will continue in future.

Facts

The work of the robot centre is targeted at businesses in the following areas: The production and food industry, health and welfare and the experiences industry.

Case

42

Gripping story about robots that make a difference

Denmark is far ahead in the development of technology for flexible gripping robots. In 2010, the Danish Technological Institute established a laboratory, GribeLab, where Danish businesses can gain an understanding of gripping technology and meet the robot experts.

In a large number of research and development projects, the Danish Technological Institute has worked with robots' intelligent handling of physical material in interaction with humans and the surroundings. Now this knowledge is to be distributed to Danish production companies and show its worth, as the most recent gripping technology can make their production more flexible and competitive, explains Claus Risager, Centre Manager from the Danish Technological Institute.

- In GribeLab, we collect national and international knowledge about material handling technology for robots. We engage in dialogue with businesses about existing and future gripping robot solutions that – just like humans – can recognise, understand, grip and manipulate material with geometric and material variation. As an example, we show a number of advanced robots at the Centre for Robot Technology in Odense. We expect that it will provide Danish production businesses with a much-needed technology boost that will improve their competitiveness once they learn how the advanced technology can be used, says Claus Risager. He emphasises that many other production businesses in the Western world have already found the key to the advanced gripping solutions of the future.

- In the next four years, we expect to see the number of flexible industrial robots multiply worldwide. So Danish production businesses really need to advance now if they don't want to be overtaken on the inside track, says Claus Risager.

Success with suction cups

For several years, Scape Technologies A/S have benefited from the Danish Technological Institute's advice in a partnership aiming to develop two specific types of gripping technologies together with a camera. Through a suction cup, the unit is to lift and with a firm grip handle various massive cylindrical metal objects placed randomly in a box.

Facts

Through GribeLab, the Danish Technological Institute offers assistance in the special development of grippers, fingers, jaws, hybrid actuation mechanisms and simulation grip situations. Furthermore, the Institute offers gripper designs, variation tolerance testing and optimum layout for gripping robot cells.

Case

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Industrial production in Denmark – also in future?

Danish businesses aiming for advanced automation do not need to move industrial production to the Far East. A new project involving 500 businesses is to show the way.

The Danish Industry Foundation, Aalborg University, Copenhagen Business School, University of Southern Denmark, Eltronic A/S and the Danish Technological Institute have joined forces to help Danish businesses find the comprehensive economic model for and benefit of using advanced robot technology. The project is called 'Advanced Automation Investment Model' (AIM), and the Danish Industry Foundation has granted the project financial support of EUR 1.6 million.

- Industrial production is the bedrock of the Danish economy. The industry accounts for the bulk of Danish exports, and important development activities are closely related to day-to-day production. If industrial production leaves the country, so will development tasks. Advanced robot technology can keep production and innovative competences in Denmark. This project is therefore important to Danish industry, says Mads Lebech, CEO of the Danish Industry Foundation, a view shared by Bo Genefke, Team Leader from the Danish Technological Institute:

- In recent years, we've seen and helped many Danish businesses that have foregone the initially cheap solution of moving production to the Far East. In each case, management had been forward-looking and invested in domestic production, for which reason they now have sound businesses with high-technology production, says Bo Genefke.

Benefits from Danish production

In future, Danish businesses that invest in more complex facilities and systems while making the right changes to management and organisation will make a quantum leap in production and competitiveness – in addition to having up-to-date and future-proof production facilities and less physical strain on staff, states Jan Rose Skaksen, Professor of Economics at the Copenhagen Business School.

- Furthermore, keeping jobs and capital in Denmark benefits society. The project is to set economic goals for what is otherwise immeasurable: Innovation, knowledge, knowhow, cross-organisation cooperation, etc. As far as we know, there is nothing similar in Denmark or the world, even though the trend of transferring production abroad is a concern to all industrialised Western countries.

Facts

The project collects valid data about how automation impacts the economies and innovative forces of 500 Danish businesses. These data will result in a tool that can be used to provide tailored information about what the individual company will gain from investing in advanced automation – and how to go about it.

AIM is open to all businesses. Read more about the project on: www.teknologisk.dk/aim (in Danish)

Training

The Danish Technological Institute wants to strengthen Danish companies' performance.

One of the big questions is how we can ensure that tomorrow's society is sustainable, bolstered by a Danish business sector that is becoming better at staying the course. We can see a current, urgent need for added staff with fresh energy, motivation and new learning. One of the keys to success lies in access to practice-oriented and internationally based training, competence development and lifelong learning.

We regard it as our prime task to pave the way for real competence development through individually tailored training activities for both employees and managers. Our contribution to the Danish business sector is to support company performance by focusing on learning and ensuring the highest possible effect of competence development – be it acquisition of new knowledge or enhancement of existing competences. That strengthens performance!

Sanne Juul

Director

Page >
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Case

44

Danish Technological Institute tailors training for SimCorp A/S

In cooperation with SimCorp A/S, the Danish Technological Institute has developed a new training programme for programmers. The programme will ensure that these staff members are better prepared in future to develop software for customers using a Microsoft platform.

SimCorp A/S is a Danish IT company that develops software solutions for large financial institutions worldwide. The company employs a staff of just over 1,100, working in offices around the globe from Australia and Asia to North America and Europe.

The new supplementary training programme was initiated because SimCorp A/S wanted to help staff members develop new software more efficiently. For instance, SimCorp A/S must be able to observe the deadlines necessary to keep its promise to the market that product updates will be released twice a year. The Danish Technological Institute was an obvious choice for solving the training challenge, which also implies certification.

- We chose the Danish Technological Institute for this project because we had a very professional and constructive dialogue from idea to contract. Right from the beginning, we felt the Danish Technological Institute was a competent sparring partner and course provider, says Klaus Lagersted, Assistant Vice President IMS Development, SimCorp A/S, adding that the Danish Technological Institute has been living up to the great expectations throughout the process by offering excellent project management and providing valuable input at every step.

The Danish Technological Institute was tasked with developing and adjusting the new training programme for the SimCorp A/S programming platform in close dialogue with the company. A steering committee managed by the Danish Technological Institute was set up to ensure ongoing quality assurance and final approval of the training programme, training materials and certification.

Proof of competence enhancement

The training programme was ready for testing after four months, and only minor adjustments were needed. Subsequently, the training programme ran five times in 2010 – with great success for more than 50 participants. Everyone has been certified as proof of their new competences for developing new software for a Microsoft platform.

- Our new supplementary training programme for programmers has received a quality lift, and that's reflected in the many positive comments we regularly receive from our staff members who have completed the programme, says Klaus Lagersted.

And the cooperation continues. SimCorp A/S has ordered yet another round of the training programme to take place in 2011.

Case

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Increased productivity through staff training

In 2010, the Danish Technological Institute helped increase productivity for several Danish companies by raising the level of staff competences.

For the past year, the Danish Technological Institute has seen a rise in the demand for training programmes and tools to strengthen individual staff members in becoming more productive and efficient in a busy working life with a heavier workload. For instance, training in efficiently chairing meetings was high on many companies' priority lists. This led to increased productivity, says Bo Sune Christensen, Communication Consultant at Prosa:

- Our employees now have a range of constructive tools for avoiding a costly waste of time at inefficient meetings. We've become better at preventing meetings from starting 10 minutes late, being held without an agenda circulated in advance or digressing into small talk.

A large number of companies have also benefited from sending staff to personal planning training, one such company being CSC.

- Above all, our staff are now more aware that the efficiency of their work depends on setting the right priorities in relation to the results the company is to achieve, says Hanne Juel Larsen, Nordic Capability Resource Center Manager.

Meditation demystified

Moreover, many companies have been looking to enhance the abilities of staff to manage themselves and perform. And meditation is now an integral part of the toolbox companies have to ensure that their staff are productive and efficient, says Line Lou Mortensen, Senior Consultant, Danish Technological Institute:

- Many staff members are under considerable pressure in everyday life. In this context, meditation has proved an efficient tool for achieving inner peace of mind and balance, enabling people to manage stress better. Meditation used to be associated with something religious and spiritual, but is now a demystified and fully recognised technique on a par with other tools for personal development and efficiency at work. Well-known Danish executives such as Jørgen Mads Clausen, former CEO of Danfoss A/S, have also helped legitimise meditation by making their personal experiences public.

Finally, Danish companies have increasingly called for competence development in all aspects of project management – right from the classic project management tools to personal development in the role as project manager. In addition, 150 people decided to become certified project managers from the Danish Technological Institute in 2010.

- Demand for project management tools reflects the fact that individual staff members are more aware of ensuring and raising their market value. We also see that managers have realised how mastering the project method of working is critical to companies' competitiveness, ends Line Lou Mortensen.

Case

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Tailored IT boost for the digitalised local authority of tomorrow

The Municipality of Rudersdal pursues a strategy of becoming one of the leading digitalised local authorities in the near future. To realise this ambition, the local authority's 4,500 staff members are offered IT courses which the Danish Technological Institute has tailored for the various staff groups.

The Danish Technological Institute and the Municipality of Rudersdal have developed 17 new IT courses. During the next 18 months, these courses are set to develop and strengthen staff IT competences so that they can receive all information digitally and take part in the development towards a more digitalised society. For instance, the staff members must learn to use the local-authority Intranet and various digitalised self-service solutions. Another crucial point was to ensure relevant courses for staff members already working with IT on a daily basis so that they can optimise their use of IT.

– We're extremely satisfied with the exciting palette of IT courses the Danish Technological Institute has developed for us. The Institute has acted extremely professionally by recognising our special needs and has delivered a complex product of high quality, says HR Manager of the Municipality of Rudersdal Jan Weidekamp.

User-friendly course portal
Part of the assignment involved the Danish Technological Institute developing a user-friendly course portal that connects directly to Rudersdal's Intranet.

The first courses started immediately after the launch of the project in May 2010, e.g. "Your electronic mailbox", "Become familiar with IT" and "Social media".

Case

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Development of managers in Greenland

The Danish Technological Institute has helped the College for Education of Social Pedagogues in Greenland with management development. Top management as well as decentralised managers have manifested their personal and professional competences as managers – and the organisation has been strengthened.

The college needed a varied training programme for the top two tiers of management in the organisation. The training programme was required to focus on what characterises good management and how the organisation's individual managers and management teams can optimally exercise it in practice. The Danish Technological Institute has received kudos for the results:

- From the beginning, I had no doubt that the Danish Technological Institute was something for us, and we've not been disappointed – quite the contrary. For instance, one of the teachers was excellent at following up the things he told us to do, and that's probably why we've come such a long way, says Nuka Kleemann, Principal of the College for Education of Social Pedagogues in Greenland.

- We've regularly discussed how to use and embraced the new tools presented to us at the courses, and we can see how useful the technical input is for managers in a learning organisation like ours, says Andreas Ejlersen, Assistant Manager and Head of Education, College for Education of Social Pedagogues.

Looking at yourself in a new light

As part of the process, managers also received lessons in strategy and human resource development, and to Nuka Kleeman, Principal, the training programme meant significant personal development as a manager.

- Having completed the training programme, I'm much more aware of my strengths and weaknesses. The profile made of me as a manager has opened my eyes to how others see me as a manager, and I can use that to develop. For example, I'm now much more aware of how to present things to my colleagues so they feel more responsible and take ownership, says Nuka Kleeman, adding:

- The process with the managers has changed our organisation. The joint consultative committee, the safety organisation and the workplace representatives have become an asset to management and are used to reinforce relations between management and staff members.

Nuka Kleemann also believes that the college now has more productive management teams capable of independently formulating strategies for the future.

- In the coming years, we're going to take on far greater educational tasks, for not only are we continuing the education of pedagogues and social workers, but we're also offering an actual profession bachelor programme – and we're well equipped for that now, says Nuka Kleemann.

Danfysik A/S

At the fore of the accelerator market!

Danfysik's mission is to supply complete particle accelerator systems and related equipment to research, health care and industry all over the world. That requires knowledge about many different technologies encompassing fields such as magnets, power electronics, vacuums, high voltage, high frequency and instrumentation. Our staff have acquired this knowledge through many years of cooperation with the world's best research institutions.

We are proud to be leading the pack in the global market for accelerators – a position that we have achieved by constantly developing through the wealth of new and demanding tasks with which our customers entrust us. Focusing on the Green Magnets sustainable accelerator technology, which aims to reduce the energy consumption of the accelerators' magnetic systems to one fourth, we intend to set a new market standard.

Bjarne Roger Nielsen

Managing Director

Case

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Key deliveries to the USA's most advanced synchrotron radiation project

In spite of the financial crisis and unfavourable exchange rate conditions, Danfysik A/S succeeded in winning large orders for North American laboratories in 2010.

In August 2010 and with great hope, Danfysik A/S submitted a quotation of more than EUR 4 million for six damping wigglers to the American prestige project National Synchrotron Light Source II at the Brookhaven National Laboratory in New York, USA.

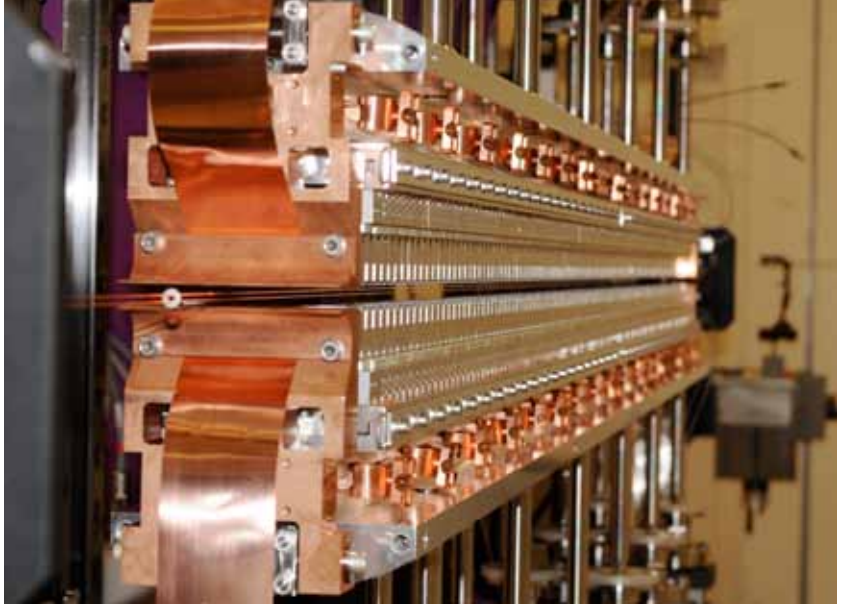
- We had done our utmost to win this order by preparing thorough calculations and obtaining the best quotations from sub-suppliers in advance, thus ensuring we could meet the strict specifications. However, we realised that our chances were slim, with difficult odds due to the low dollar rate and the "buy American act", says Lars Anthon, Sales Manager at Danfysik A/S.

However, the US Department of Energy recommended Danfysik A/S for the order, and Danfysik A/S received the contract in November. Representing a value equivalent to just under six months' revenue for Danfysik A/S, the project is scheduled for completion in 2011 and the first half of 2012.

A large number of orders won

The order is far from being the only North American order won. Danfysik A/S is already working on another large-scale contract for the same project and is completing large orders for the Thomas Jefferson National Accelerator Facility (Jefferson Lab) in Virginia, Stanford University in California and Canada's National Laboratory for Particle and Nuclear Physics (TRIUMF) near Vancouver among others.

- The key to our success lies in our deep technical insight into and knowledge about what customers need. Moreover, we're efficient and costs-conscious by virtue of the close cooperation between our developers and production staff plus sound planning, says Bjarne Roger Nielsen, Managing Director of Danfysik A/S. He also believes that the company's ability to establish contact right from the idea stage and continue the dialogue with the customer is a "secret" of its success in the market.



Case

49

Goodbye to energy guzzlers in particle accelerators

Together with four other partners in the Green Magnets project, Danfysik A/S aims at addressing the biggest energy-guzzling elements in particle accelerators and reducing their energy consumption by 75%. The accelerators are used for R&D, computer chip production, environmental certification and modern cancer treatment.

All accelerators propel nuclear particles to high energy and speed, so major consumers of electric energy often make it into the 10-megawatt class or higher. Some of the most energy-intensive components of the accelerators are the extremely heavy magnetic systems that are used for directing and controlling the particle beams and are based on classic electromagnetism. A typical accelerator with a life of 10-20 years consumes energy running into hundreds of gigawatt hours. The energy costs of simply driving these magnets are five to ten times higher than the actual investment, a fact that impacts on the environment.

New type of magnet in the pipeline

With the Green Magnets project, Danfysik A/S, in cooperation with Sintex A/S, Aarhus University, Aalborg University and the Aarhus School of Engineering and the support of the Danish National Advanced Technology Foundation, has decided to develop a new type of magnet that consumes only one fourth of the energy that conventional magnet types do.

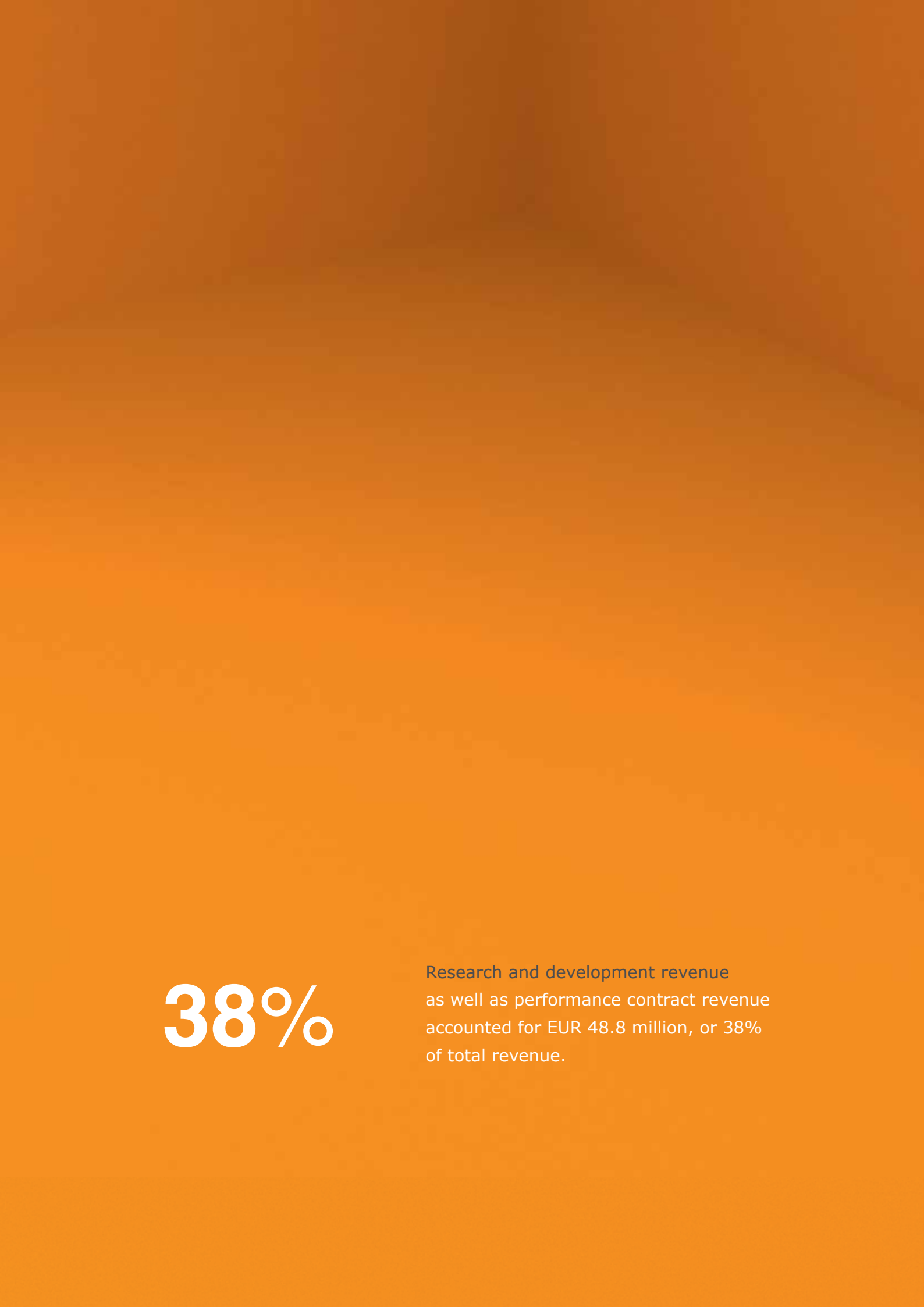
- The idea is based on utilising the latest permanent magnetic materials either alone or in hybrid magnets, where they are used in combination with an electromagnetic part. This also requires special high-efficiency power supplies. In addition to the task of developing the optimum magnetic design, the greatest technological challenge will be to ensure the stability of the magnet when it's exposed to radiation and thermal impact, says Danfysik A/S Managing Director Bjarne Roger Nielsen. He adds that the technology will be marketed as soon as possible and that the first customers are already set to use it, and a couple of customers are having it demonstrated in their own systems and thus in a realistic environment.

The new research accelerator known as European Spallation Source ESS AB is to be built in Lund, Sweden, with Denmark and Sweden as main sponsors. The ambition is to make it the first environmentally neutral accelerator facility. With this project, Danfysik A/S sees a great opportunity to set new standards in the market for accelerators and thus enhance its position in the global competition.

Review

2010


2010
38%
2009
32%
2008
26%


38%
Research and development revenue
as well as performance contract revenue
accounted for EUR 48.8 million, or 38%
of total revenue.

Review 2010

The Danish Technological Institute develops new knowledge through research and development activities in cooperation with Danish and foreign research institutions and enterprises. Developing new knowledge and technologies is the foundation for the Institute's services.

The Institute recorded highly satisfactory performance in 2010 – both professionally and financially – despite the difficult conditions for our customers and ourselves. Our strategic focus on research and development activities continued to make a positive contribution to performance as revenue from these activities rose to 37.7% of total revenue in 2010. Research and development revenue came to EUR 48.8 million, with performance contract revenue running into million EUR 12.5 million of this amount.

The year 2010 was characterised by the acquisition of DMRI from the Danish Bacon and Meat Council. The year was also characterised by an adjustment of Institute activities – partly to political requests for developing the framework conditions for the Danish business sector with special focus on maintaining competitive production in Denmark and partly to the economic climate where we have pursued a conservative strategy on costs, including new appointments.

The integration of DMRI went very satisfactorily. The industry supports cooperation with the Institute, e.g. by maintaining grants to DMRI research and development activities. Moreover, the latest staff satisfaction survey showed that DMRI staff are pleased with having become part of the Danish Technological Institute. The Institute has decided to move forward the relocation of DMRI from Roskilde to Taastrup for the purpose of further enhancing integration and cooperation. This being the case, the Institute will, in 2011, establish new facilities for DMRI in Taastrup of about 5,000 square metres, occupation expected to commence in early 2013.

Financial review

In 2010, the Danish Technological Institute realised net profit of EUR 3.6 million, up EUR 0.8 million on the budget and EUR 0.4 million on the year earlier. Total consolidated revenue was EUR 129.3 million, a rise of 14.5% compared to 2009. Performance is in keeping with the outlook of the 2009 annual report.

The Danish Technological Institute's revenue is generated through commercial activities and research and development activities, including performance contract activities.

Commercial revenue was EUR 80.5 million, which was EUR 3.9 million up on 2009, corresponding to a rise of 5.1%.

Research and development revenue as well as performance contract revenue accounted for EUR 48.8 million, or 37.7% of total revenue, 17.1% up from the level of 2009.

In 2010, the Institute's development activities financed by operations ran into EUR 7.6 million, EUR 1.0 million compared to the year-earlier period. The knowledge development resulting from the research and development activities is of considerable importance to the Danish business sector. This new knowledge means that the Institute will be able to provide technological services of the highest quality also in future.

Equity rose by EUR 3.3 million and stood at EUR 54.7 million at 31 December 2010. The balance sheet total fell by EUR 0.3 million to EUR 89.8 million. Reference is made to the change in accounting policies referred to in the accounting policies section below.

Cash flow from operating activities was negative at EUR 0.8 million compared to a positive cash flow of EUR 8.4 million in 2009. The fall is the result of investment in work in progress and receivables due to increased R&D activities and fewer prepayments received. Cash flow from investing activities totalled EUR 3.0 million.

Financial resources remained strong and worked out at EUR 21.8 million at end-2010.

Subsidiaries

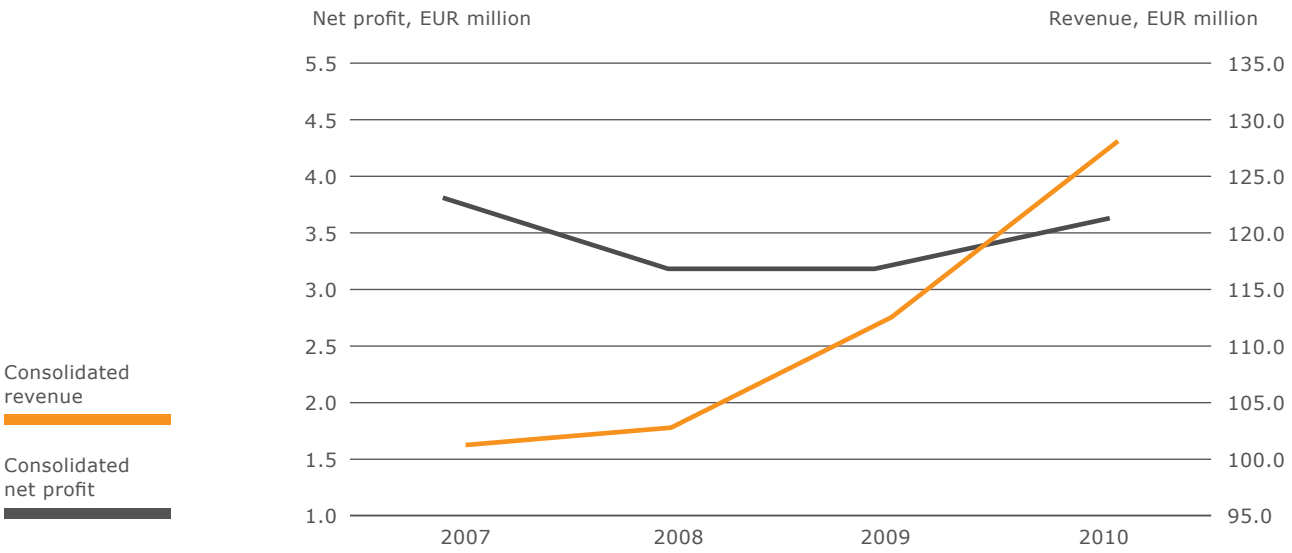
As expected and planned, Danfysik A/S performed positively.

The company recorded revenue of

14.5%

Total consolidated revenue was EUR 129.3 million, 14.5% up on 2009.

Consolidated revenue and net profit for the period 2007-2010



EUR 8.2 million, a rise of 43.2% compared to 2009. Profit came to EUR 0.3 million in line with the budget. The company saw a satisfactory order intake in 2010. Among the large orders are an undulator for Stanford University (USA) and five large-scale power supplies for Jefferson Lab (USA). Danfysik A/S received approval of its Green Magnets project from the Danish National Advanced Technology Foundation. The foundation provides project support in the total amount of EUR 1.2 million, out of a budget of EUR 2.4 million. The objective of the project is to develop particularly energy-friendly types of magnet.

Technological Institute AB Sweden recorded profit of EUR 0.1 million in 2010 after capacity adjustments in 2009, and this was slightly above budget. In spite of improved economic conditions in Sweden, the Swedish training and education market is still ailing. Profit is forecast for 2011.

The Polish subsidiary, FIRMA 2000 Sp. z o.o., realised profit of EUR 0.3 million in 2010 thanks to the considerable order book. The order book remains solid, meaning that the outlook for 2011 is positive.

Dancert A/S, charged with Institute certification activities, had a satisfactory year, recording profit of EUR 0.04 million.

In 2010, Swedcert AB managed to turn around trends and realised profit of EUR 0.03 million against breaking even in 2009.

Associates

Syddansk Teknologisk Innovation A/S, in which the Institute holds an interest of 50%, performed according to plan in 2010. The government initiative aimed at entrepreneurs had a positive effect on company investment volume, which largely doubled since the Institute joined it in 2009.

PhotoSolar A/S, in which the Institute holds an interest of 30.5%, received a capital contribution of EUR 2.6 million in 2010 from a Dutch venture fund and existing shareholders. The capital contribution guarantees company operations for the coming two years during which time the final market breakthrough is expected to materialise.

Special risks

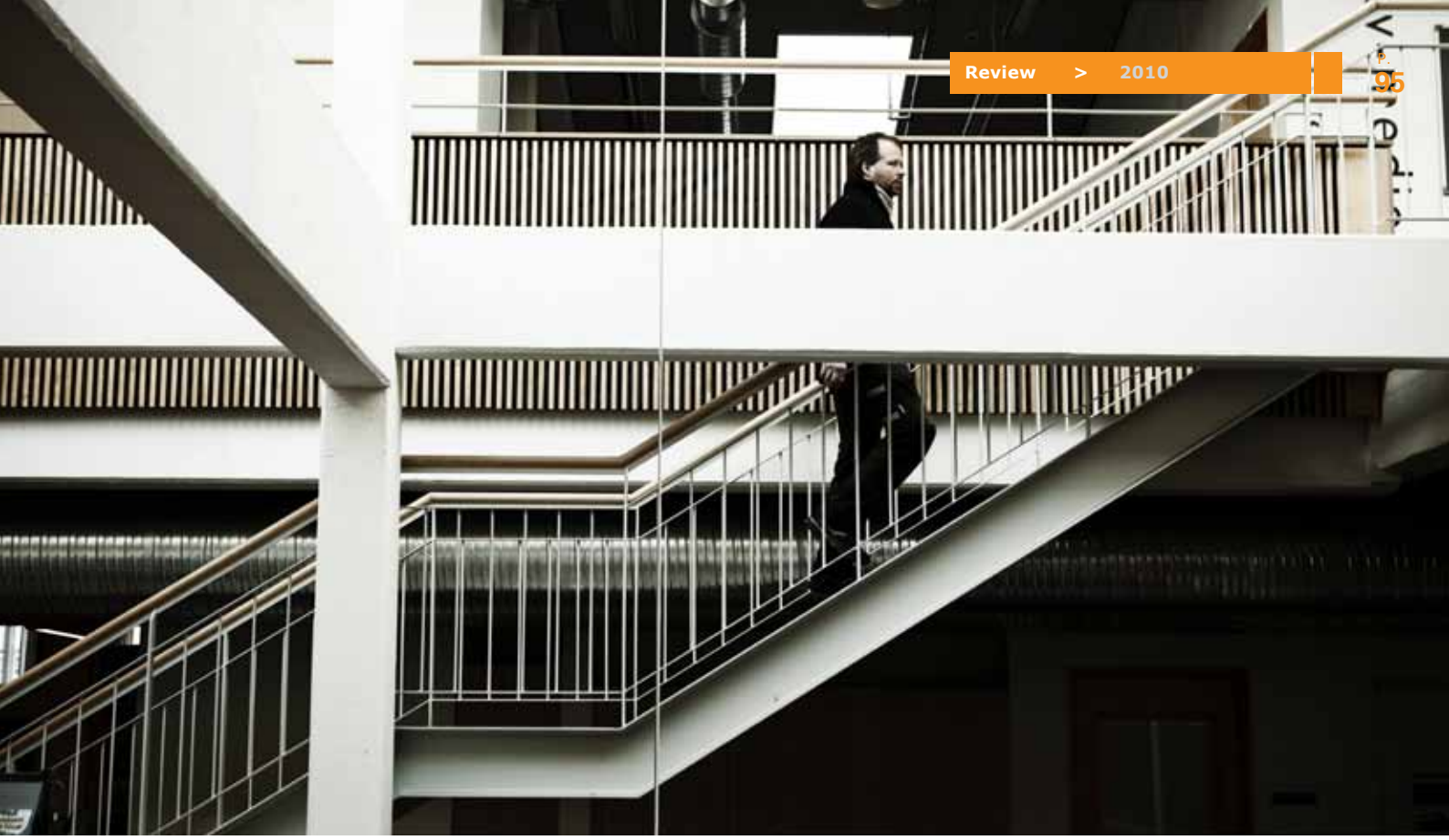
The Danish Technological Institute's prime operating risk is linked to the management of ongoing research and development projects and longer-term commercial projects. The risk has been paid due consideration in the financial statements. The Institute's solvency and financial resources render the Institute sensitive only to a limited extent to changes in the level of interest rates. No material currency risk or material risks relating to individual customers or partners exist.

Outlook for 2011

Following the integration of DMRI and a more normal year for Danfysik A/S, Danish Technological Institute revenue has seen a fair rise and is now approaching EUR 135 million. We budget for revenue in the amount of EUR 139.3 million and net profit of EUR 3.4 million for 2011. We expect to see a strong rise in commercial revenue and constant R&D revenue.

At year-end 2010, the Institute R&D order book was about EUR 52.3 million.

Subsidiary performance was as



planned in 2010. As mentioned, Technological Institute AB Sweden has trimmed costs to the new level of revenue and, using that as its basis in 2011, the company can consolidate its business with new products and generate a small profit.

At Danfysik A/S, the order book saw a positive change, and we forecast revenue of EUR 13.4 million in 2013. In 2011, quite a lot of efforts will be made to move the activities from Jyllinge to Taastrup.

For the group as a whole, profits are set to be on a par with 2010.

Customers
Customers buying the Institute's commercial services are Danish business customers, organisations, public customers and international customers. In 2010, the Institute provided solutions to a total of 14,895 customers, 11,737 of whom were Danish customers. Fifty seven per cent of the Danish business customers come from the service sector, while 43% come from manufacturing industry. In this context, too, the Institute works closely with small and medium-sized enterprises in particular. Enterprises with fewer than 50 employees accounted for 67% of the customers.

The Institute had 1,240 public customers in 2010. Public customers and organisations procure services such as consultancy and training in the same way as private customers. In addition, the Institute serves public customers via various operator projects.

International activities
The Institute had 3,158 international customers, including subsidiary customers in Sweden and Poland. Overall, the Institute's international revenue stands at EUR 29.2 million.

Project evaluation
To the Danish Technological Institute, the work of transforming new knowledge into daily practice in companies constitutes a central element in its non-profit activities, and it is important to learn how satisfied the customers are with the projects undertaken by the Institute. So in recent years, customers have been asked to evaluate the Institute's work in the light of a number of parameters such as quality and time of delivery. In 2010, 96.6% of customers said they were satisfied or very satisfied with the work.

Environment and health & safety
The majority of Institute workplaces are office workstations. The environmental impact of these comprises consumption of electricity and heat. In addition, the Institute has a number of laboratories that make use of different forms of consumables, the use and disposal of which comply with the acts and executive orders in force from time to time in the area, including the rules on health and safety at work.

New innovation consortia
The Danish Technological Institute strengthened its position within research and development again in 2010. During the period under review, the Institute assumed the role of project manager of four new innovation consortia granted by the Ministry of Science, Technology and Innovation, the total budget for the Institute running into EUR 3.8 million.

Performance contract activities
The Danish Technological Institute is well under way with its research

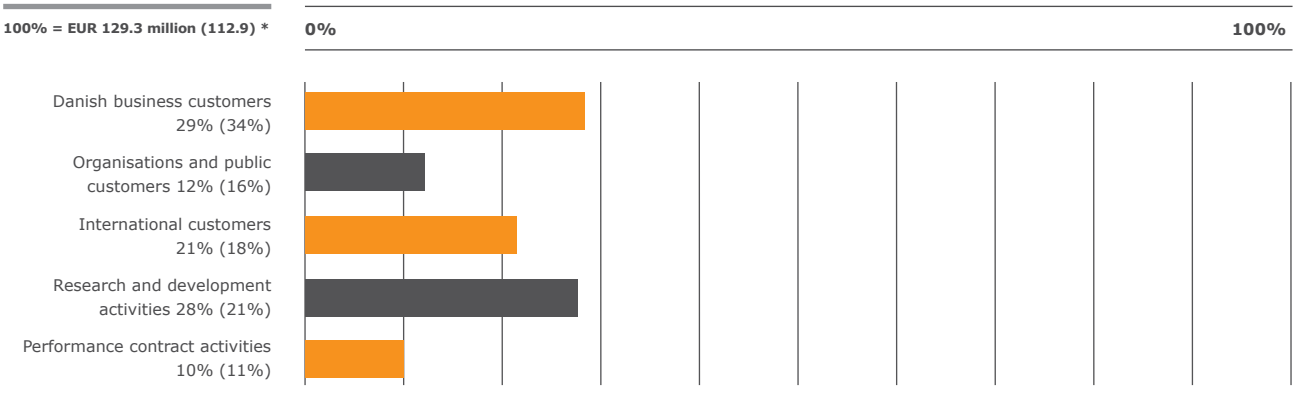
Financial highlights

EUR million	2010	2009	2008	2007	2006
Key financial figures					
Revenue	129	113	103	101	98
Operating profit	4	3	3	4	2
Financial income and expenses	0	0	1	1	0
Net profit for the year	**4**	**3**	**3**	**4**	**2**
Balance sheet total	90	90	75	71	70
Equity	**55**	**51**	**48**	**45**	**41**
Cash flow from operating activities	(1)	8	5	8	1
Cash flow from investing activities	3	10	5	4	4
Of which for investment in property, plant and equipment	3	5	5	4	4
Total cash flows	**(4)**	**(1)**	**0**	**4**	**(3)**
Financial ratios					
Operating profit margin	2.8	2.9	3.1	3.9	2.1
Equity interest (solvency)	61.0	57.0	63.6	63.9	59.0
Development financed by operations	5.9	5.9	5.3	4.5	3.9
Average number of full-time employees	**974**	**904**	**854**	**795**	**831**

Definitions and terms appear from the accounting policies.

Breakdown of revenue

100% = EUR 129.3 million (112.9) *



*The figures in parentheses refer to 2009.

and development activities under the performance contract entered into for the period 2010-2012 with the Ministry of Science, Technology and Innovation. These activities are set to be of great importance to the future competitiveness of the Danish business sector in a large variety of technologies.

EU projects
The Institute is an active participant in the EU's Seventh Framework Programme. In 2010, the Institute submitted 18 project applications, of which eight new projects were committed. This means that the Danish Technological Institute hit rate was 44% in 2010, which was above the average EU hit rate.

New facilities
In concert with the National Environmental Research Institute at Aarhus University, the Kattegatcentret and the Ocean Centre Denmark development project, the Institute has set up new cooperation under the name of Algae-Centre Denmark. The Centre aims at establishing an algae cultivation facility at the Kattegatcentret in Grenaa harbour. The facility will be Denmark's first recirculating facility for research and development related to the use of algae as a new resource for, e.g. sustainable energy, feed, medicine and food ingredients.

In March, the new pelleting test facility in Sønder Stenderup was inaugurated. More than 100 key persons from Denmark and abroad attended the inauguration. Established in a strategic partnership with Andritz Feed & Biofuel A/S, the facility takes the Institute to the forefront of European laboratories involved in biomass. The strategy is to develop methods, technologies and new knowledge that are user-oriented and have a high international level and market potential.

The establishment of a new motor laboratory also takes the Danish Technological Institute to the forefront among European laboratories with motor fuel testing and emissions measuring as their lines of business. The new motor laboratory was inaugurated in the spring of 2010. The laboratory contains a state-of-the-art motor test bench with equipment for determining fuel consumption and measuring pollution. The Institute can now perform measurements in compliance with the strictest European and American standards in the field.

In November, the Institute inaugurated the newly-built rented premises in Forskerparken in Odense, housing Institute robot activities. The premises are designed as one open robot laboratory, workshops and offices, covering an area of 1,100 square metres. The robot laboratory was built together with Region of Southern Denmark's new test hospital and will, in future, play a key role in the development and commissioning of new welfare technologies.

Consultancy services and training
Consultancy services for private and public companies account for 18.3% of total Institute revenue. Consultancy services are rendered on the basis of the knowledge developed from research and development activities and through long-term cooperation with a large share of the business sector. These tasks are essential in terms of giving the Institute insight into customer challenges.

Training accounts for 16.6% of total consolidated revenue. In 2010, a total of 39,505 people attended Institute courses, seminars and conferences.

Operator projects
Following a tender, the Danish Energy Agency decided to move the "Secretariat for energy labelling of buildings and inspection schemes" away from the Institute. In return, the Institute won a new scheme with the Danish Energy Agency – Skrotditoliefyr.dk – where citizens can apply for subsidies for scrapping their oil burners in return for more energy-efficient sources of heat.

The Institute has set up a new website – Opfind.nu – under the Consultancy Service for Inventors. More than 300 user profiles have been created on the website after only a couple of months' existence, and this is very satisfactory.

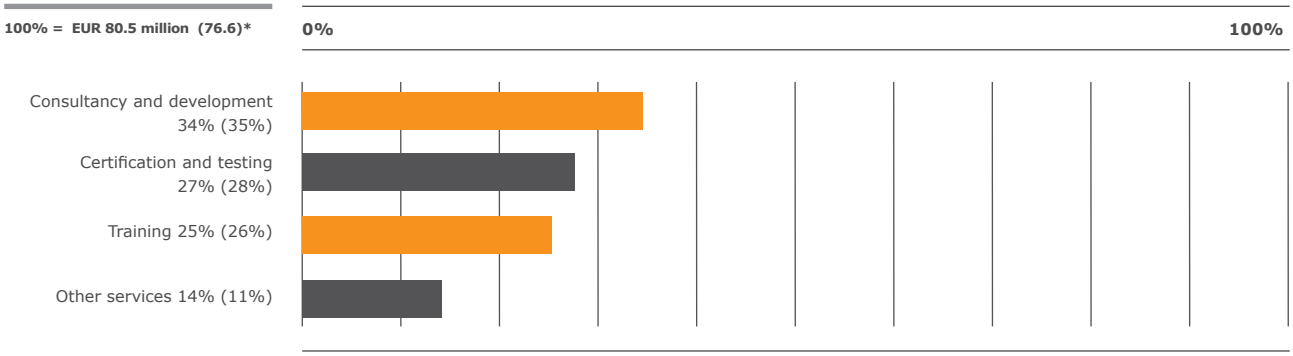
Organisation and employees
The activities and development of the Danish Technological Institute require competent and well qualified employees who constantly enhance their competences. In 2010, the Institute invested EUR 1.0 million in supplementary training of employees – primarily in short-term training programmes in customer relations, presentation techniques and project management.

In 2010, Institute centres underwent an optimisation process focusing on commercial activities. The process involved an analysis of business potential, organisation and staff composition, the purpose being to identify the centres' commercial

96.6%

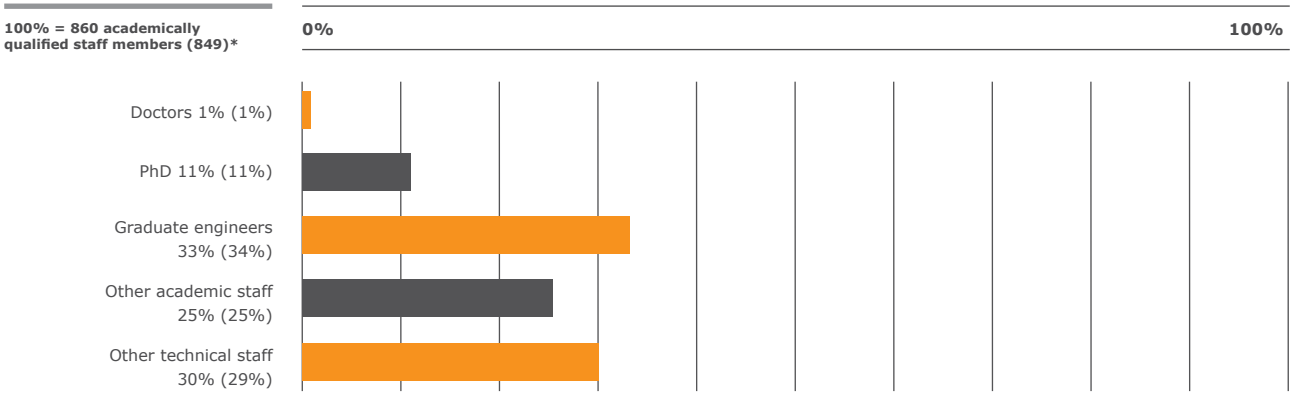
In recent years, customers have been asked to evaluate the Danish Technological Institute's work in the light of a number of parameters such as quality and time of delivery, and 96.6% of customers responded in 2010 that they were satisfied or very satisfied.

Breakdown of Institute commercial revenue



*The figures in parentheses refer to 2009.

Academically qualified staff



*The figures in parentheses refer to 2009.

activities and their intended direction of development.

At 31 December 2010, the Institute employed a staff of 981, of whom 860 were academically qualified. The Institute regularly evaluates its business procedures and efficiency. The number of academically qualified staff went up, but the number of administrative staff fell.

All staff from Denmark and Sweden gathered on 28 May 2010 at Vingstedcentret for the technical and social event the DTI Day 2010 where focus was on internationalisation. On this occasion, employees participated in a range of workshops addressing the Institute's international relations. The result of this work is a list of best practice methods covering the Institute's international relations from establishment of subsidiaries to participation in EU-funded development programmes. These methods will make up the foundation for the continued efforts to take an international approach to the development of the Institute.

The Institute completed its fifth staff satisfaction survey in 2010. According to the survey, the general level of staff satisfaction remains extremely high. Asked "How satisfied are you overall as an employee of the Danish Technological Institute?", 91% answered they were satisfied. The number of respondents in the 2010 staff satisfaction survey set a new record. The number of employees participating in the survey was 835, of whom 803 came from Denmark and 32 from Sweden. This resulted in a response rate of 91.8% – as much as 3.8% more than in 2009.

The Institute's IT infrastructure has been upgraded with the latest technology. The server park has been virtualised and the number of physical servers reduced markedly. Moreover, the Institute started using a new financial system, upgraded office applications and provided all staff members with a smartphone.

Corporate social responsibility
The Danish Technological Institute has described what it understands by corporate social responsibility and the policies and guidelines this entails. Management has decided to publish its statutory report on corporate social responsibility on its website at www.dti.dk.

Post-balance sheet events
No material events have occurred after the balance sheet date that will affect the financial statements.

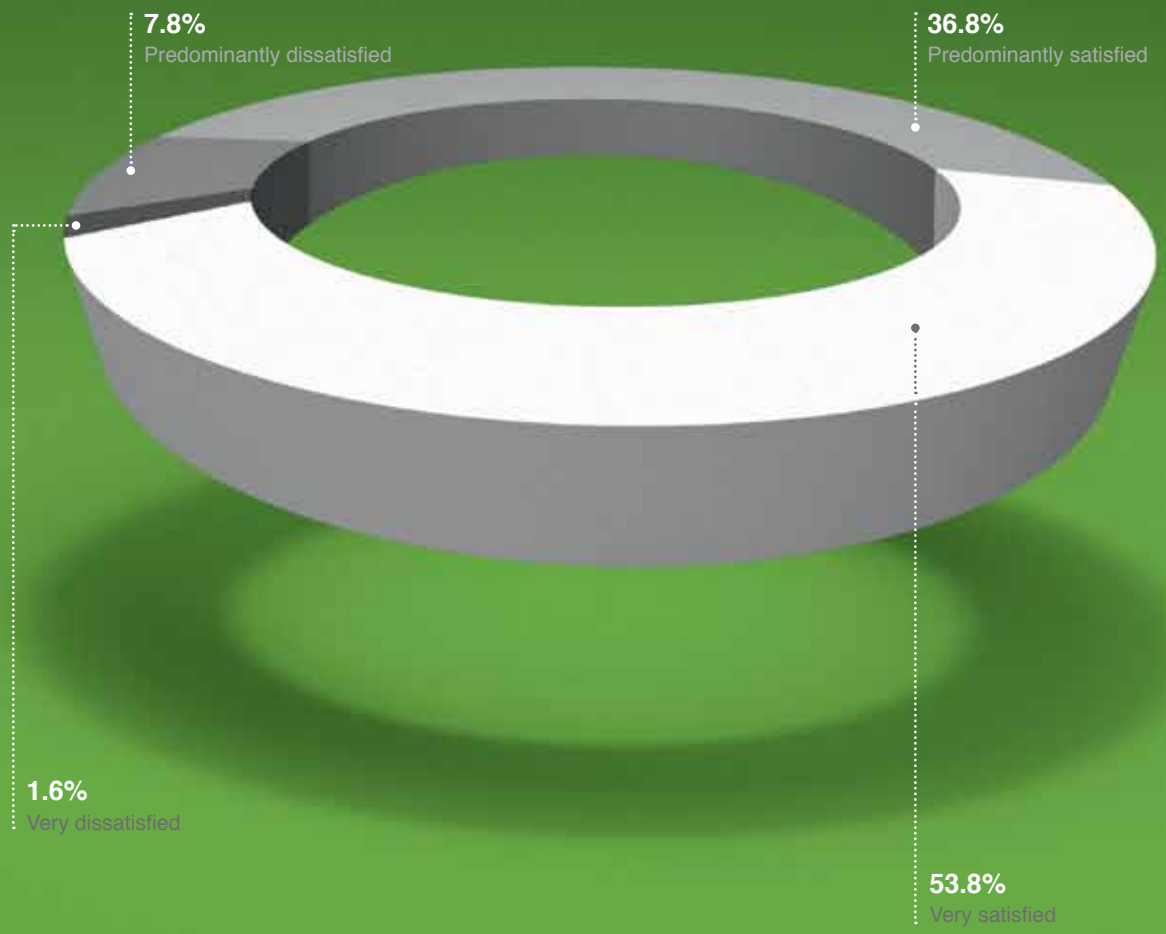
Extract of the

Financial statements

2010

In the Danish Technological Institute's staff satisfaction survey, 91% of staff members responded they were predominantly or very satisfied with working at the Institute.

91%



Income statement

EUR million	Note	2010	2009	2008
Commercial activities		80.5	76.6	75.9
R&D activities		36.3	24.0	15.4
Performance contracts		12.5	12.3	11.6
Revenue		**129.3**	**112.9**	**102.9**
Project costs, excluding salaries		(25.5)	(21.4)	(21.7)
Other external expenses		(21.7)	(19.9)	(20.0)
Staff costs	1	(70.0)	(64.7)	(55.9)
Depreciation, amortisation and impairment losses	2	(8.2)	(3.5)	(2.7)
Other operating items		0.1	(0.0)	0.0
OPERATING PROFIT		**4.0**	**3.4**	**2.6**
Share of profit after tax of associates		0.1	(0.2)	0.0
Financial income		0.3	0.7	1.1
Financial expenses		(0.6)	(0.6)	(0.6)
INCOME FROM ORDINARY ACTIVITIES BEFORE TAX		**3.8**	**(3.3)**	**3.1**
Tax on income from ordinary activities	3	(0.1)	(0.1)	0.0
NET PROFIT FOR THE YEAR BEFORE MINORITY INTERESTS		**3.7**	**3.2**	**3.1**
Profit of subsidiaries attributable to minority interests		(0.1)	0.0	0.1
NET PROFIT FOR THE YEAR		**3.6**	**3.2**	**3.2**

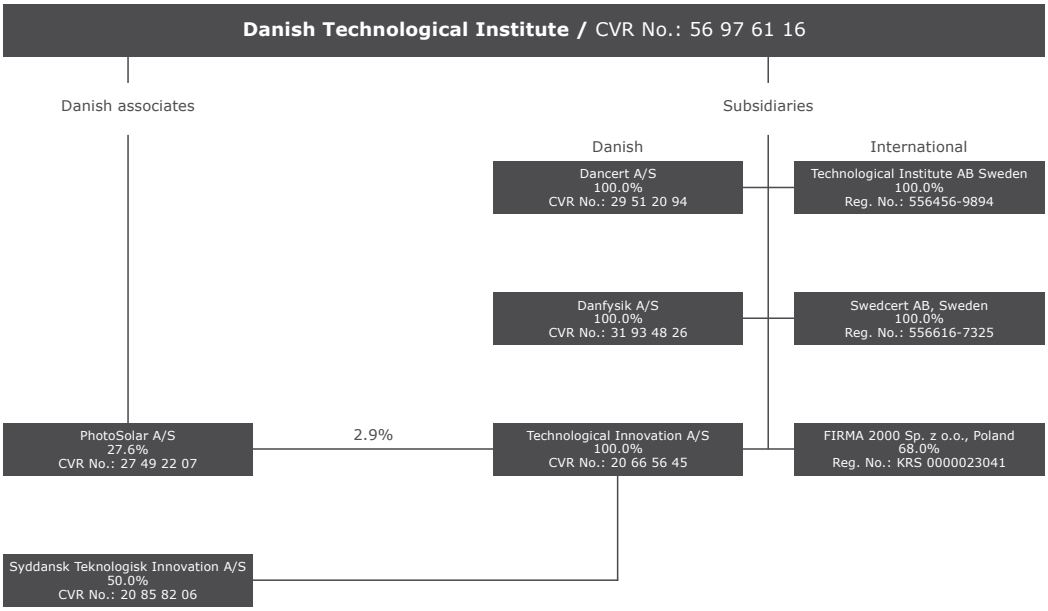
GROUP SEGMENT INFORMATION, EUR MILLION

Revenue	Commercial activities			R&D activities			Performance contracts (R&D)			Total revenue		
	2010	2009	2008	2010	2009	2008	2010	2009	2008	2010	2009	2008
Building Technology	11.8	12.6	12.9	2.2	1.9	1.3	1.6	1.7	1.9	15.6	16.2	16.1
Energy and Climate	10.6	10.2	10.0	6.5	5.9	4.5	3.0	3.1	2.8	20.1	19.2	17.3
Business Development	6.4	7.3	7.1	1.4	1.2	0.8	2.4	1.8	1.2	10.2	10.3	9.1
Materials and Production	7.7	7.9	7.6	6.4	5.4	4.0	1.9	2.3	2.2	16.0	15.6	13.8
Productivity and Logistics	6.3	6.6	7.0	4.0	2.9	1.4	1.0	1.5	1.1	11.3	11.0	9.5
International Centre	1.1	1.1	3.6	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.1	3.6
DMRI	3.9	1.0	0.0	11.6	2.7	0.0	1.2	0.0	0.0	16.7	3.7	0.0
Training	8.6	9.4	11.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6	9.4	11.0
Life Science	5.0	5.6	6.7	4.0	4.0	3.4	1.4	1.9	2.4	10.4	11.5	12.5
Total, Institute	**61.4**	**61.7**	**65.9**	**36.1**	**24.0**	**15.4**	**12.5**	**12.3**	**11.6**	**110.0**	**98.0**	**92.9**
Subsidiaries*	19.1	14.9	10.0	0.2	0.0	0.0	0.0	0.0	0.0	19.3	14.9	10.0
Total, Group	**80.5**	**76.6**	**75.9**	**36.3**	**24.0**	**15.4**	**12.5**	**12.3**	**11.6**	**129.3**	**112.9**	**102.9**

* Primarily training activities at Technological Institute AB Sweden, production of particle accelerator equipment at Danfysik A/S, certification activities at Swedcert AB and Dancert A/S and consulting and training activities at FIRMA 2000 Sp. z o.o.

REVENUE – GEOGRAPHICALLY

	Group		
	2010	2009	2008
Denmark	100.1	90.7	82.8
International	29.2	22.2	20.1
TOTAL	**129.3**	**112.9**	**102.9**



Balance sheet

ASSETS, EUR million	Note	2010	2009	2008
Goodwill		0.2	0.3	0.1
Development projects		0.1	0.0	0.0
Patents		0.5	0.6	0.0
Total intangible assets	**4**	**0.8**	**0.9**	**0.1**
Land and buildings		35.1	37.6	32.5
Fixtures and operating equipment		6.9	9.8	8.3
Total property, plant and equipment	**5**	**42.0**	**47.4**	**40.8**
Equity investments in associates	6	1.5	1.1	0.5
Receivables from associates		0.0	0.2	0.2
Other investments	6	0.3	0.5	0.8
Total investments		**1.8**	**1.8**	**1.5**
TOTAL NON-CURRENT ASSETS		**44.6**	**50.1**	**42.4**
Inventories	7	1.3	1.0	0.0
Total inventories		**1.3**	**1.0**	**0.0**
Trade receivables		16.1	14.6	13.4
Contract work in progress	8	14.1	8.0	1.5
Deferred tax asset	3	0.2	0.2	0.1
Other receivables		0.9	0.2	0.5
Prepayments		0.6	0.2	0.3
Total receivables		**31.9**	**23.2**	**15.8**
Cash	**9**	**12.0**	**15.8**	**17.1**
TOTAL CURRENT ASSETS		**45.2**	**40.0**	**32.9**
TOTAL ASSETS		**89.8**	**90.1**	**75.3**

EQUITY AND LIABILITIES, EUR million	Note	2010	2009	2008
TOTAL EQUITY	**10**	**54.7**	**51.4**	**47.9**
Minority interests		**0.2**	**0.1**	**0.1**
Deferred tax	3	0.3	0.2	0.0
Guarantees		0.1	0.1	0.0
TOTAL PROVISIONS		**0.4**	**0.3**	**0.0**
Mortgage debt		6.3	6.3	6.3
Total long-term liabilities other than provisions	**11**	**6.3**	**6.3**	**6.3**
Contract work in progress	8	6.0	10.0	4.6
Trade payables		4.9	5.0	4.5
Corporation tax		0.0	0.2	0.0
Other payables	12	17.3	16.8	11.3
Deferred income		0.0	0.0	0.6
Total current liabilities other than provisions		**28.2**	**32.0**	**21.0**
TOTAL LIABILITIES OTHER THAN PROVISIONS		**34.5**	**38.3**	**27.3**
TOTAL EQUITY AND LIABILITIES		**89.8**	**90.1**	**75.3**

Auditors' remuneration, note 13
Charges, guarantee commitments and rental and lease commitments, note 14, Contingent liabilities, etc., note 15
Derivative financial instruments, note 16, Related parties, note 17

Cash flow statement

EUR million	2010	2009	2008
Operating profit	4.0	3.4	2.6
Adjustment for non-cash items	4.6	3.3	(0.1)
Depreciation, amortisation and impairment losses	8.2	3.5	2.7
Cash flow from operating activities before change in working capital	**16.8**	**10.2**	**5.2**
Change in work in progress and prepayments	(9.5)	(0.6)	(2.3)
Change in inventories	(0.19	0.6	0.0
Change in trade payables and other short-term debt	(4.7)	(0.8)	3.7
Change in receivables	(2.7)	(1.0)	(2.0)
Cash flow from operating activities before items under financial income and expenses, net, and tax	**(0.2)**	**8.4**	**4.6**
Financial deposits and withdrawals, net	(0.3)	0.1	0.5
Corporation tax paid	(0.3)	(0.1)	0.0
CASH FLOW FROM OPERATING ACTIVITIES	**(0.8)**	**8.4**	**5.1**
Investment in intangible activities	0.0	0.0	0.0
Investment in company acquisitions and disposals	0.0	(4.3)	0.0
Investment in property, plant and equipment	(2.9)	(5.0)	(4.8)
Investment in fixed asset investments	(0.1)	(0.4)	(0.6)
CASH FLOW FROM INVESTING ACTIVITIES	**(3.0)**	**(9.7)**	**(5.4)**
CASH FLOW FOR THE YEAR	**(3.8)**	**(1.3)**	**(0.3)**
Cash and cash equivalents, 1 January	15.8	17.1	17.4
CASH AND CASH EQUIVALENTS, 31 DECEMBER	**12.0**	**15.8**	**17.1**

The cash flow statement cannot be directly deducted from the information in the income statement and balance sheet.
Figures without parentheses = increase in liquidity
Figures in parentheses = (reduction in liquidity)

Notes

1.

Note	EUR million	2010	2009	2008
	Staff costs			
	Wages and salaries, etc.	67.4	62.1	53.7
	Pension contributions	1.3	1.3	0.9
	Other social expenses	1.3	1.3	1.3
	TOTAL STAFF COSTS	**70.0**	**64.7**	**55.9**

Fees to Executive Board and Board of Trustees amounting to EUR 0.4 million (2009: EUR 0.4 million).
The number of Group employees averaged 974 against 904 in 2009.

2.

	Depreciation, amortisation and impairment losses			
	Depreciation and amortisation	4.3	3.5	2.7
	Impairment losses - loans	3.9	0.0	0.0
	TOTAL DEPRECIATION, AMORTISATION AND IMPAIRMENT LOSSES	**8.2**	**3.5**	**2.7**

3.

	Tax			
	Tax on profit for the year			
	Current tax for the year	0.1	0.2	0.0
	Adjustment of deferred tax	0.0	(0.1)	0.0
	TOTAL TAX ON PROFIT FOR THE YEAR	**0.1**	**0.1**	**0.0**
	Deferred tax asset			
	Deferred tax, 1 January	0.2	0.1	0.1
	Adjustment of deferred tax during the year	0.0	0.1	0.0
	DEFERRED TAX ASSET, 31 DECEMBER	**0.2**	**0.2**	**0.1**
	The deferred tax asset can be specified as follows:			
	Investments (internal profits)	0.1	0.1	0.0
	Tax losses	0.1	0.1	0.1
	Deferred tax asset, 31 December	**0.2**	**0.2**	**0.1**
	Deferred tax			
	Deferred tax, 1 January	0.2	0.0	0.0
	Acquisition of subsidiary	0.0	0.2	0.0
	Adjustment of deferred tax during the year	0.1	(0.0)	0.0
	DEFERRED TAX, 31 DECEMBER	**0.3**	**0.2**	**0.0**
	Deferred tax can be specified as follows:			
	Intangible assets	0.1	0.1	0.0
	Property, plant and equipment	0.0	0.0	0.0
	Current assets	0.4	0.1	0.0
	Tax loss	(0.2)	0.0	0.0
	Deferred tax, 31 December	**0.3**	**0.2**	**0.0**

4.

	Intangible assets			
	Goodwill			
	Cost, 1 January	2.1	1.9	1.7
	Additions	0.0	0.0	0.2
	Additions relating to acquisitions	0.0	0.2	0.0
	Disposals	0.0	0.0	0.0
	COST, 31 DECEMBER	**2.1**	**2.1**	**1.9**
	Amortisation, 1 January	1.8	1.8	1.6
	Amortisation	0.1	0.0	0.2
	Amortisation relating to disposals during the year	0.0	0.0	0.0
	Amortisation, 31 December	**1.9**	**1.8**	**1.8**
	CARRYING AMOUNT, 31 DECEMBER	**0.2**	**0.3**	**0.1**
	Development projects			
	Cost, 1 January	0.0	0.0	0.0
	Additions	0.1	0.0	0.0
	Disposals	0.0	0.0	0.0
	COST, 31 DECEMBER	**0.1**	**0.0**	**0.0**
	Amortisation, 1 January	0.0	0.0	0.0
	Amortisation	0.0	0.0	0.0
	Amortisation relating to disposals during the year	0.0	0.0	0.0
	Amortisation, 31 December	**0.0**	**0.0**	**0.0**
	CARRYING AMOUNT, 31 DECEMBER	**0.1**	**0.0**	**0.0**
	Patents			
	Cost, 1 January	0.7	0.0	0.0
	Additions relating to acquisitions	0.0	0.6	0.0
	Disposals	0.0	0.0	0.0
	COST, 31 DECEMBER	**0.7**	**0.6**	**0.0**
	Amortisation, 1 January	0.0	0.0	0.0
	Amortisation	0.2	0.0	0.0
	Amortisation relating to disposals during the year	0.0	0.0	0.0
	Amortisation, 31 December	**0.2**	**0.0**	**0.0**
	CARRYING AMOUNT, 31 DECEMBER	**0.5**	**0.6**	**0.0**
	CARRYING AMOUNT OF INTANGIBLE ASSETS, 31 DECEMBER	**0.8**	**0.9**	**0.1**

5.

Note	EUR million	2010	2009	2008
	Property, plant and equipment			
	Land and buildings			
	Cost, 1 January	56.3	50.5	49.9
	Additions	0.2	1.7	0.6
	Additions relating to acquisitions	0.0	4.1	0.0
	Disposals	0.0	0.0	0.0
	COST, 31 DECEMBER	**56.5**	**56.3**	**50.5**
	Depreciation and impairment losses, 1 January	18.7	18.0	17.5
	Depreciation	0.9	0.7	0.5
	Impairment losses	1.8	0.0	0.0
	Depreciation relating to disposals during the year	0.0	0.0	0.0
	Depreciation and impairment losses, 31 December	**21.5**	**18.7**	**18.0**
	CARRYING AMOUNT, 31 DECEMBER	**35.1**	**37.6**	**32.5**
	Public cash value, 1 January	**109.6**	**108.7**	**93.7**
	Fixtures and operating equipment			
	Cost, 1 January	31.6	29.3	25.3
	Translation adjustment	0.2	0.0	(0.1)
	Additions	2.9	3.4	4.5
	Additions relating to acquisitions	0.0	0.7	0.0
	Project-financed	(0.4)	(0.1)	(0.1)
	Additions, own development projects	0.2	0.1	0.0
	Disposals	(0.6)	(1.8)	(0.3)
	COST, 31 DECEMBER	**33.9**	**31.6**	**29.3**
	Depreciation and impairment losses, 1 January	21.8	21.0	19.3
	Translation adjustment	0.2	0.0	(0.1)
	Depreciation	3.1	2.5	2.0
	Impairment losses	2.1	0.0	0.0
	Depreciation and impairment losses relating to disposals during the year	(0.2)	(1.7)	(0.2)
	Depreciation and impairment losses, 31 December	**27.0**	**21.8**	**21.0**
	CARRYING AMOUNT, 31 DECEMBER	**6.9**	**9.8**	**8.3**
	of which value of assets leased under finance leases	0.0	0.0	0.0

6.

Investments

Investment in and value adjustment of securities and equity investments can be specified as follows:

Associates			
Balance, 1 January	1.6	0.5	0.1
Additions during the year	0.5	1.1	0.4
Disposals during the year	0.0	0.0	0.0
BALANCE, 31 DECEMBER	**2.1**	**1.6**	**0.5**
Value adjustment, 1 January	(0.5)	0.0	0.0
Translation adjustment	0.2	0.1	0.0
Share of profit or loss after tax for the year	(0.4)	(0.3)	0.0
Value adjustment relating to disposals	0.0	0.0	0.0
Impairment losses	0.1	(0.2)	0.0
Value adjustment, 31 December	**(0.5)**	**(0.5)**	**0.0**
CARRYING AMOUNT, 31 DECEMBER	**1.5**	**1.1**	**0.5**
Other investments			
Balance, 1 January	0.9	1.1	1.1
Additions during the year	0.0	0.1	0.0
Disposals during the year	(0.2)	(0.2)	0.0
Balance, 31 December	**0.7**	**0.9**	**1.1**
Value adjustment, 1 January	(0.4)	(0.3)	(0.2)
Translation adjustment	0.0	0.0	0.0
Share of profit or loss after tax for the year	0.0	0.0	0.0
Impairment losses	(0.1)	(0.2)	(0.1)
Impairment losses relating to disposals	0.1	0.1	0.0
Value adjustment, 31 December	**(0.4)**	**(0.4)**	**(0.3)**
CARRYING AMOUNT, 31 DECEMBER	**0.3**	**0.5**	**0.8**

7.

Inventories			
Raw materials and consumables	2.0	1.5	0.0
Work in progress	0.1	0.2	0.0
Manufactured goods and goods for resale	0.0	0.0	0.0
Prepayments, inventories	(0.8)	(0.7)	0.0
INVENTORIES, 31 DECEMBER	**1.3**	**1.0**	**0.0**
Of which the carrying amount of inventories recognised at net realisation value is	0.1	0.2	0.0

Notes

8.

Note	EUR million	2010	2009	2008
Contract work in progress				
Contract work in progress		40.5	48.8	39.4
Invoicing on account and prepayments		(32.4)	(50.8)	(42.5)
WORK IN PROGRESS, NET		**8.1**	**(2.0)**	**(3.1)**
recognised as follows:				
Contract work in progress		14.1	8.0	1.5
Contract work in progress (liabilities)		(6.0)	(10.0)	(4.6)
Work in progress, net		**8.1**	**(2.0)**	**(3.1)**

Work in progress is determined at selling price.

9.

Cash			
Free funds	9.5	11.6	17.1
Tied-up funds	2.5	4.2	0.0
TOTAL CASH	**12.0**	**15.8**	**17.1**

10.

Equity			
Equity, 1 January	45.7	43.5	41.0
Change in accounting policies	5.7	4.4	4.2
Adjusted equity, 1 January	51.4	47.9	45.2
Translation adjustment of financial instruments	(0.3)	0.1	(0.2)
Translation adjustment of subsidiary	0.0	0.2	(0.3)
Net profit for the year	3.6	3.2	3.2
EQUITY, 31 DECEMBER	**54.7**	**51.4**	**47.9**

11.

Long-term liabilities other than provisions			
Due in five years or more			
Mortgage debt	6.3	6.3	6.3
TOTAL LONG-TERM LIABILITIES OTHER THAN PROVISIONS	**6.3**	**6.3**	**6.3**

12.

Other payables			
Holiday pay obligation	9.8	9.9	7.4
Other liabilities	1.6	0.4	0.4
Tax payable	0.0	2.1	0.0
VAT payable	0.9	0.8	0.6
Other items payable	4.8	3.4	2.7
Miscellaneous deposits	0.2	0.2	0.2
TOTAL OTHER PAYABLES	**17.3**	**16.8**	**11.3**

13.

Remuneration of auditors elected by the Annual General Meeting			
Statutory audit	0.1	0.1	0.1
Assurance statements	0.1	0.1	0.1
Tax consultancy	0.1	0.0	0.0
TOTAL REMUNERATION OF KPMG	**0.3**	**0.2**	**0.2**

14.

Charges			
As security for bank debt (mortgages registered to the mortgagor and indemnification letter on Institute properties), nom.	0.0	0.0	0.0
As security for mortgage credit institutions (mortgages registered to the mortgagor on Institute properties), nom.	6.3	6.3	6.3
Guarantee commitments			
As security for on account payments received	4.7	5.4	1.8
Rental and lease commitments			
Rental commitments			
Commitment, next five years	3.3	0.7	1.4
Commitment, coming year	1.2	0.7	0.8
Operating leases			
Commitment, next five years	0.1	0.1	0.2
Commitment, coming year	0.1	0.1	0.1
Finance leases			
Commitment, next five years (incl. interest)	0.0	0.0	0.0
Commitment, coming year	0.0	0.0	0.0

15.

Contingent liabilities, etc.

The Group and the Institute are parties to a few disputes, the outcome of which is not expected to influence the financial position.
The Group and the Institute participate in projects that under certain circumstances may lead to a commitment to repay the grants received.
The Group and the Institute have issued statements on financial support to subsidiaries for the purpose of ensuring ongoing business for the next 12 months.

16. Note

Derivative financial instruments
As part of its hedging of individual foreign currency contracts, the Group uses forward exchange contracts.
The signed contracts can be specified as follows:

EUR million	Period	Contract value			Profit and/or loss recognised in equity		
		2010	2009	2008	2010	2009	2008
GROUP TOTAL	**0-6 MONTHS**	**4.1**	**5.3**	**0.7**	**(0.4)**	**(0.1)**	**(0.2)**

Forward exchange contracts have been signed for CAD, GBP, SEK and USD.

17. **Related parties**
The Group's related parties, with material influence, comprise members of the Board of Trustees and Executive Board as well as subsidiaries and associates.
The Group has no transactions with related parties apart from usual trade with subsidiaries and associates.
Transactions are on an arm's length basis.

Accounting policies

GENERAL

The Annual Report of the Danish Technological Institute for 2010 is presented in conformity with the provisions of the Danish Financial Statements Act governing class C companies (large) and the adjustments resulting from the Danish Technological Institute being an independent institution and an approved technological service institute.

The accounting policies have been changed compared to those applied in the previous financial year in respect of provisions for committed own funding. The change is attributable to adaptation to common practice in the area, and the change implies a more true and fair view of Institute assets and liabilities.

Until now, provisions have been made for committed own funding, the provisions being recognised under other payables as other liabilities.

The change in accounting policies for both the Parent Company and the Group raises profit for the year by EUR 2.4 million (2009: EUR 1.1 million). The balance sheet total is not affected by the change. Equity at 31 December 2010 increases by EUR 8.0 million (31 December 2009: EUR 5.5 million).

Except for the areas specified above, the consolidated financial statements and the Parent Company's financial statements have been drawn up on the basis of accounting policies consistent with those applied last year.

Recognition and measurement in general
Assets are recognised in the balance sheet when it is probable that future economic benefits will flow to the company and the value of the asset can be reliably measured.
Liabilities are recognised in the balance sheet when it is probable that future economic benefits will flow from the company and the value of the liability can be reliably measured.

At the time of initial recognition, assets and liabilities are measured at cost. Subsequent to initial recognition, assets and liabilities are measured as described for each individual accounting item below.

For recognition and measurement purposes, due consideration is given to gains, losses and risks arising before the Annual Report is prepared and proving and disproving matters arising on or before the balance sheet date.

Income is recognised in the income statement as earned, including value adjustments of financial assets and liabilities measured at fair value or amortised cost. Moreover, expenses incurred to generate earnings for the year are recognised, including depreciation, amortisation, impairment losses and provisions as well as reversals resulting from changed accounting estimates of amounts that used to be recognised in the income statement.

CONSOLIDATED FINANCIAL STATEMENTS

The consolidated financial statements comprise the Parent Company, the Danish Technological Institute, and subsidiaries in which the Danish Technological Institute directly or indirectly holds more than 50% of the voting rights or, in any other way, exercises control.

Undertakings where the Group holds between 20% and 50% of the voting rights and exercises a significant, yet no controlling, interest are considered associated undertakings, see group chart.

Intercompany income and expenses, shareholdings, balances and dividends as well as realised and unrealised gains and losses on transactions between consolidated companies are eliminated on consolidation.

Equity investments in subsidiaries are eliminated at the proportionate share of the subsidiaries' fair value of net assets and liabilities at the date of acquisition.

Newly acquired or newly established companies are recognised in the consolidated financial statements from the date of acquisition or establishment. Divested or liquidated companies are recognised in the consolidated income statement up to the date of divestment or liquidation. Comparative figures are not restated for newly acquired, divested or liquidated companies.

In the event of company acquisitions, the acquisition accounting method is used, according to which the identifiable assets and liabilities of the newly acquired companies are measured at fair value at the date of acquisition. Provisions are recognised to cover the cost of decided and published plans to restructure the acquired company in connection with the acquisition. Deferred tax is recognised of the reassessments made.

Positive differences (goodwill) between the cost and fair value of acquired identifiable assets and liabilities are recognised as intangible assets and amortised systematically in the income statement on the basis of the estimated useful life of the asset not exceeding twenty years.

Negative differences (negative goodwill), reflecting an expected unfavourable development of the companies in question, are recognised in the balance sheet on an accruals basis and recognised in the income statement in parallel with the realisation of the unfavourable development. An amount of negative goodwill not related to an expected unfavourable development is recognised in the balance sheet, equalling the fair value of non-monetary assets, which is subsequently recognised in the income statement over the average life of such non-monetary assets.

Goodwill and negative goodwill from acquired companies are adjustable until the end of the year following the acquisition.

Any profit or loss on the divestment of subsidiaries and associates is determined as the difference between the selling or liquidation price and the net asset value at the date of divestment, including unamortised goodwill, as well as the expected cost of divestment or liquidation.

Minority interests
The items of subsidiaries are fully recognised in the consolidated financial statements. Minority interests' proportionate share of the profits or losses and equity of subsidiaries are determined on an annual basis and recognised as separate items in the income statement and balance sheet.

Foreign currency translation
On initial recognition, transactions in foreign currencies are translated at the rates of exchange prevailing at the date of transaction. Exchange differences arising between the exchange rates prevailing at the date of transaction and the date of payment are recognised in the income statement as items under financial income and expenses, net.

Receivables, payables and other monetary items in foreign currencies are translated using the exchange rates prevailing at the balance sheet date. The difference between the exchange rate prevailing at the balance sheet date and the exchange rate prevailing at the date when the amount receivable or payable originated or was recognised in the latest annual report is recognised in the income statement under financial income and expenses.

Translation adjustments of intercompany balances with independent foreign subsidiaries that are considered a part of the total investment in the subsidiary are recognised directly in equity. Exchange gains and losses on loans and derivative financial instruments used for hedging foreign subsidiaries are also recognised directly in equity.

The income statement of foreign subsidiaries is translated using an average exchange rate, and balance sheet items are translated using the exchange rates prevailing at the balance sheet date. Exchange differences arising from the translation of the equity of foreign subsidiaries at the beginning of the year at the exchange rates prevailing at the balance sheet date and from the translation of the income statements based on average exchange rates at the exchange rates prevailing at the balance sheet date are recognised directly in equity.

Derivative financial instruments
Derivative financial instruments are initially recognised in the balance sheet at cost and subsequently measured at fair value. Positive and negative fair values of derivative financial instruments are included in other receivables and other payables, respectively.

Changes in the fair value of derivative financial instruments classified as and qualifying for recognition as an instrument used for hedging the fair value of a recognised asset or liability are recognised in the income statement together with changes in the fair value of the hedged asset or liability.

Changes in the fair value of derivative financial instruments classified as and qualifying for recognition as an instrument used for hedging future assets and liabilities are recognised in other receivables or other payables and in equity. If the future transaction results in the recognition of assets or liabilities, amounts previously recognised in equity are transferred to the cost of the asset or liability. If the future transaction results in income or costs, amounts recognised in equity are transferred to the income statement for the period during which the hedged item affects the income statement.

In regard to derivative financial instruments not qualifying for hedge accounting treatment, changes in fair value are recognised in the income statement when they occur.

INCOME STATEMENT

Revenue
The method of revenue recognition is the completed contract method according to which income is recognised in the income statement as invoiced.

The revenue of the Danish Technological Institute falls into three categories: Commercial activities, research and development activities and performance contract activities. Commercial activities include projects undertaken on behalf of private and public customers with the customer being the owner of the rights to the results of the project. Research and development activities are undertaken on behalf of Danish and foreign licensors. The results of these projects will become publicly available through the licensors. Performance contract activities comprise a number of projects undertaken on behalf of the Danish Council for Technology and Innovation, the general objective being to allow small and medium-sized enterprises to benefit from new knowledge and new technologies in a smooth and efficient manner.

Major and longer-term contract work in progress is recognised under the percentage of completion method, meaning that the profit on any services sold is recognised in the income statement as the work is performed.

Project costs
Project costs comprise costs incurred during the year, excluding salaries, which are directly attributable to the individual projects.

Research and development
Research and development costs and agreed development costs of completing project agreements entered into, completed without remuneration, are recognised in the income statement under project costs and staff costs, depending on their nature.

Other external expenses
Other external expenses comprise expenses of distribution, sale, advertising, administration, premises, bad debts, operating leases, etc.

Other operating items
Other operating items comprise items secondary to the principal activities of the company, including gains and losses on the sale of non-current assets.

Income from equity investments in subsidiaries and associates
The proportionate share of profit/loss after tax of the individual subsidiaries is recognised in the income statement of the Parent Company after full elimination of intercompany gains/losses.

The proportionate share of the profit/loss after tax of associates is recognised in the income statement of both the Parent Company and the Group after elimination of the proportionate share of intercompany gains/losses.

Financial income and expenses
Financial income and expenses comprise interest, exchange gains and losses on securities, liabilities and transactions in foreign currencies as well as reimbursements under the on-account tax scheme, etc.

Tax on profit for the year
Being an Approved Technological Service Institute, the Danish Technological Institute is exempt from liability to pay tax.

Danish subsidiaries liable to pay tax are subject to the Danish rules on compulsory joint taxation. Subsidiaries are included in the joint taxation scheme as from the time when they are included in the consolidated financial statements until the time when they are no longer consolidated.

Current Danish corporation tax is allocated through payment of tax contributions between the jointly taxed companies in proportion to their taxable incomes. In this connection, companies suffering a tax loss receive tax contributions from companies having been able to use these losses to reduce their own tax profits.

Tax for the year, which comprises current tax and changes in deferred tax, is recognised in the income statement with the part attributable to profit for the year and directly in equity with the part attributable to equity items.

BALANCE SHEET

Intangible assets

Goodwill
Goodwill is amortised over the estimated useful life,

which is determined on the basis of management's experience within the individual business areas. Goodwill is amortised on a straight-line basis over a period of five years. The carrying amount of goodwill is continuously assessed and written down to recoverable amount in the income statement provided that the carrying amount exceeds the expected future net income from the company or activity to which the goodwill relates.

Development costs
Development costs comprise costs, wages and salaries and amortisation that are directly and indirectly attributable to the Institute's development projects.

Development projects that are clearly defined and identifiable, and where the capacity utilisation rate, sufficient resources and a potential future market or development prospects for the company can be established, and where the intention is to produce, market or use the project, are recognised as intangible fixed assets if the cost can be determined reliably and there is adequate certainty that future earnings will cover selling costs and administrative expenses, etc., as well as development costs. Other development costs are recognised in the income statement as incurred.

Development costs recognised in the balance sheet are measured at cost less accumulated amortisation and impairment losses.

On completion of development work, development costs are amortised on a straight-line basis over the estimated useful life of the asset. The amortisation period is normally five years.

Patents and licences
Patents and licences are measured at cost less accumulated amortisation. Patents are amortised on a straight-line basis over the remaining patent period, and licences are amortised over the contract period, not exceeding five years. Any profit or loss on the disposal of patents and licences is determined as the difference between selling costs and the carrying amount at the date of disposal. Profit or loss is recognised in the income statement under depreciation, amortisation and impairment losses.

Property, plant and equipment
Land and buildings, plant and machinery as well as other fixtures and fittings, tools and equipment are measured at cost less accumulated depreciation and impairment losses. Land is not depreciated.
Cost comprises the acquisition cost and costs directly attributable to the acquisition up to the date when the asset is available for use. Interest is not included in cost.

Property, plant and equipment are depreciated on a straight-line basis over their estimated useful lives as follows:

Buildings	50 years
Machinery, equipment, etc.	5 years
Computer equipment	3 years

Property, plant and equipment are written down to the lower of recoverable amount or carrying amount. Impairment tests are conducted annually in respect of each individual asset or group of assets. Depreciation is recognised in the income statement under depreciation, amortisation and impairment losses.

Any profit or loss on the disposal of property, plant and equipment is determined as the difference between the selling price less selling costs and the carrying amount at the date of disposal. Profit or loss is recognised in the income statement under depreciation, amortisation and impairment losses.

Leases
Leases for non-current assets in respect of which the Institute has all significant risks and benefits related to ownership (finance leases) are measured at the time of initial recognition in the balance sheet at the lower of fair value and net present value of future lease payments. For the calculation of net present value, the internal rate of interest specified in a particular lease, or the Institute's alternative lending rate, is used as a discount rate. Assets under finance leases are subsequently treated like the Institute's other non-current assets.
Any capitalised remaining lease commitment is recognised in the balance sheet as a liability, and the interest portion of the lease payment is recognised in the income statement over the term of the lease.

All other leases are operating leases. Payments under operating and other leases are recognised in the income statement over the term of the lease. The Institute's total liability under operating leases is recorded under contingent liabilities, etc.

Equity investments in subsidiaries and associates
Equity investments in subsidiaries and associates are measured according to the equity method.

Equity investments in subsidiaries and associates are measured at the proportionate share of the equity value of the subsidiaries and associates, determined according to the Institute's accounting policies plus or less any unrealised intercompany profits or losses and plus or less the remaining value of positive or negative goodwill.

Equity investments in subsidiaries and associates with a negative equity value are measured at EUR 0.00 and any receivable from these associates is written down to the extent the receivable is deemed irrevocable. To the extent that the Parent Company has a legal or constructive obligation to cover a negative balance, which exceeds the receivable, the remainder is recognised under provisions.

Net revaluation of equity investments in subsidiaries and associates is taken to the reserve for net revaluation according to the equity method under equity to the extent that the carrying amount exceeds cost.

Impairment of assets
The carrying amount of both intangible assets and property, plant and equipment is tested on an annual basis for indications of impairment in addition to what is expressed through amortisation and depreciation.

In case of indication of impairment, an impairment test is carried out for each individual asset and group of assets, respectively. Assets are written down to the lower of recoverable amount or carrying amount. The highest value of net selling price and value in use is used as recoverable amount. The value in use is determined as the net present value of expected net income from the use of the asset or group of assets.

Inventories
Inventories are measured at cost in accordance with the FIFO method. Where net realisable value is lower than cost, inventories are written down to this lower value. Goods for resale and raw materials and consumables are measured at cost, comprising cost with the addition of delivery costs.

The net realisable value of inventories is calculated as selling price less completion costs and costs involved in executing the sale and is determined with due regard to marketability, obsolescence and movements in expected selling price.

Other securities, loans and equity investmentse
Other securities, loans and equity investments are measured at cost. In case of indication of impairment, the assets are written down.

Receivables
Receivables are measured at amortised cost. Following individual assessment, receivables are written down for uncollectibles.

Contract work in progress
Contract work in progress regarding major and longer-term projects is measured at the selling price of the work performed. The selling price is measured on the basis of the degree of completion at the balance sheet date and total expected income from the individual contract for work in progress.

If the selling price of a contract cannot be determined reliably, it is measured at the lower of costs incurred or net realisable value.

The individual contract for work in progress is recognised in the balance sheet under receivables or payables. Net assets are made up of the sum of construction contracts where the selling price of the work performed exceeds invoicing on account.

Prepayments
Prepayments comprise costs incurred relating to subsequent financial years.

Corporation tax and deferred tax
Current tax payable and receivable is recognised in the balance sheet as tax computed on taxable income for the year, adjusted for tax on taxable incomes for prior years and for taxes paid on account.

Deferred taxes are measured according to the balance sheet liability method on all temporary differences between the carrying amount and tax base of assets and liabilities.

Deferred tax assets, including the tax base of tax loss carryforwards, are recognised in the balance sheet at their estimated realisable value.

Provisions
Provisions comprise expected expenses for completing development projects. Provisions are recognised when the Institute has a legal or constructive obligation as a result of past events and the discharge of such obligation is likely to involve an outflow of the Institute's financial resources.

Liabilities other than provisions
Payables to mortgage credit institutions and banks are recognised at the date of borrowing at the proceeds received net of transaction costs paid. In subsequent periods, financial liabilities are measured at amortised cost, corresponding to the capitalised value using the effective interest rate. Accordingly, the difference between the proceeds and the nominal value is recognised in the income statement over the term of the loan.

Other payables are measured at net realisable value.

Deferred income
Deferred income comprises received payments relating to income in subsequent years.

CASH FLOW STATEMENT

The cash flow statement shows the Institute's cash flows for the year distributed on operating, investing and financing activities, changes in cash and cash equivalents for the year as well as the Group's cash and cash equivalents at the beginning and end of the financial year.

The cash flow effect of business acquisitions and divestments is shown separately under cash flows from investing activities. Cash flows from acquired companies are recognised in the cash flow statement from the date of acquisition, and cash flows from divested companies are recognised up to the date of divestment.

Cash flow from operating activities
Cash flows from operating activities are determined as the Institute's share of profit adjusted for non-cash operating items, changes in working capital and corporation tax paid.

Cash flow from investing activities
Cash flows from investing activities comprise payments in connection with the acquisition and sale of companies and activities and the acquisition and sale of intangible assets, property, plant and equipment and investments.

Cash flow from financing activities
Cash flows from financing activities comprise changes in the size or composition of the Institute's capital and related costs as well as borrowing transactions and repayment of interest-bearing debt.

Cash and cash equivalents
Cash and cash equivalents comprise cash as well as short-term securities with a term of less than three months that are readily convertible into cash and subject to insignificant risks of changes in value.

SEGMENT INFORMATION

Information about revenue is provided about primary Group segments. The segment information is based on the Group's accounting policies, risks and internal financial management. The primary segments comprise the Group's activities (divisions and companies).

Financial ratios
The financial ratios set out in the table of financial highlights are computed as follows

Profit margin:

$$\frac{\text{Profit} \times 100}{\text{Revenue}}$$

Equity interest:

$$\frac{\text{Equity at year-end} \times 100}{\text{Total equity and liabilities at year-end}}$$

Development financed by operations:

$$\frac{\text{Development financed by operations} \times 100}{\text{Revenue}}$$

Statement by the Board of Trustees and Executive Board

The Board of Trustees and the Executive Board have today considered and approved the Annual Report of the Danish Technological Institute for 2010.

The Annual Report is presented in conformity with the Danish Financial Statements Act and the adjustments resulting from the Danish Technological Institute being an independent institution and an Approved Technological Service Institute.

In our opinion, the consolidated financial statements and the Institute's financial statements give a true and fair view of the Group's and the Institute's assets, liabilities and financial position at 31 December 2010 as well as the results of the Group's and the Institute's operations and the Group's cash flows for the financial year ended 31 December 2010.

We also believe that the management's review provides a fair and accurate report on developments in the operations and finances, net profit for the year of the Group and the Institute and of the financial position of the Group and the Institute.

Taastrup, 10 February 2011

Executive Board

Søren Stjernqvist
President

Board of Trustees

Clas Nylandsted Andersen, Chairman	Lars Aagaard, Deputy Chairman	Jan Helbo
Niels-Erik Lundvig	Gunde Odgaard	Jens Nørgaard Oddershede
Jørgen Elikofer	Søren F. Eriksen	Carsten Christiansen

Independent auditors' report

The Auditor has attached the following audit report to the consolidated financial statements.

To the Danish Technological Institute and users of financial statements

We have audited the consolidated financial statements and the Parent Company's financial statements of the Danish Technological Institute for the financial year ended 31 December 2010 on pages 104-111. The consolidated financial statements and the Parent Company's financial statements of the Danish Technological Institute comprise the accounting policies, income statement, balance sheet, cash flow statement and notes. The consolidated financial statements and the Parent Company's financial statements are prepared in compliance with the Danish Financial Statements Act.

In connection with our audit, we have read the management's review, prepared in compliance with the Danish Financial Statements Act, and issued a statement in this regard.

Responsibility of management for the Annual Report

Management is responsible for preparing and presenting consolidated financial statements and Parent Company financial statements which give a true and fair view in conformity with the provisions of the Danish Financial Statements Act. This responsibility includes establishing, implementing and maintaining internal controls of relevance to the preparation and presentation of consolidated financial statements and Parent Company's financial statements which give a true and fair view and are free of material misstatement, regardless of whether such misstatement is the result of fraud or error, and choosing and applying appropriate accounting policies and making accounting estimates which are reasonable under the circumstances.

Responsibility of the auditors and basis of opinion

Our responsibility is to express an opinion on the consolidated financial statements and the Parent Company's financial statements based on our audit. We conducted our audit in accordance with Danish auditing standards and generally accepted auditing practices; cf. the audit instructions of Guidelines for Approved Technological Service in Denmark 2005. These standards require that we comply with ethical standards and plan and perform our audit to obtain reasonable assurance that the consolidated financial statements and the Parent Company's financial statements are free of material misstatement.

An audit comprises procedures to obtain audit evidence of the amounts and disclosures stated in the consolidated financial statements and the Parent Company's financial statements. The procedures chosen depend on the auditors' assessment, including an assessment of the risk of material misstatement in the consolidated financial statements and the Parent Company's financial statements, regardless of whether such misstatement is the result of fraud or error. In the risk assessment, the auditors consider internal controls of relevance to the Institute's preparation and presentation of consolidated financial statements and Parent Company's financial statements which give a true and fair view for the purpose of establishing audit procedures that are appropriate under the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Institute's internal controls. An audit also includes assessing whether the accounting policies applied by management are appropriate, assessing whether the accounting estimates made by management are reasonable and assessing the overall presentation of the consolidated financial statements and the Parent Company's financial statements.

In our opinion, the audit evidence obtained provides a reasonable and suitable basis for our opinion.

Our audit has not resulted in any qualification.

Opinion

In our opinion, the consolidated financial statements and the Parent Company's financial statements give a true and fair view of the Group's and the Danish Technological Institute's assets, liabilities and financial position at 31 December 2010 and of the results of the Group's and the Danish Technological Institute's operations and cash flows for the financial year ended 31 December 2010 in conformity with the Danish Financial Statements Act.

Statement on the management's review

Pursuant to the Danish Financial Statements Act, we have read the management's review. We have not performed any other procedures in addition to the audit of the consolidated financial statements and the Parent Company's financial statements. On this basis, it is our opinion that the information given in the management's review is consistent with the consolidated financial statements and the Parent Company's financial statements.

Copenhagen, 10 February 2011

KPMG
Statsautoriseret Revisionspartnerselskab

Finn L. Meyer
State-authorised Public Accountant

Carsten Strunk
State-authorised Public Accountant

Board of Trustees

Director
Clas Nylandsted Andersen
(Chairman)
Nielsen & Nielsen Holding A/S

Partner, Director
Jørgen Elikofer
Elikofer & Co.

Technical Director
Søren F. Eriksen
Danish Crown AmbA

Managing Director
Niels-Erik Lundvig
Q-Transportmateriel A/S

Vice-Chancellor
Jens Oddershede
University of Southern Denmark

Head of Secretariat
Gunde Odgaard
Federation of Building,
Construction and Wood-workers'
Unions

CEO
Lars Aagaard
(Deputy Chairman)
Danish Energy Association

Sales Consultant
Carsten Christiansen
Employee Representative

Senior Consultant
Jan Helbo
Employee Representative

BOARD OF REPRESENTATIVES

Director
Clas Nylandsted Andersen
(Chairman)
Nielsen & Nielsen Holding A/S
Appointed by the Danish Confederation of Industry

Manager
Per Bøch Andersen
Cargo Service A/S
Appointed by the Danish Chamber of Commerce

Chief Relations Officer
Gert Bronton
Danish Association of Managers and Executives
Appointed by the Danish Association of Managers and Executives

Managing Director
Ane Buch
Danish Federation of Small and Medium-Sized Enterprises
Appointed by the Danish Federation of Small and Medium-Sized Enterprises

Managing Director
Erling Duus
Eegholm A/S
Appointed by the Confederation of Danish Industry

Technical Director
Søren F. Eriksen
Danish Crown AmbA
Elected by the Board of Representatives

Managing Director
Ulrik Gammelgaard
KJ Industries A/S
Appointed by the Confederation of Danish Industry

Deputy Director General
Lars B. Goldschmidt
Confederation of Danish Industry
Appointed by the Confederation of Danish Employers

MSc (Engineering)
Per Højbjerre
Appointed by the Society of Danish Engineers

Managing Director
Niels Jørgen Hansen
TEKNIQ: Danish Mechanical and Electrical Contractors' Association
Appointed by the Confederation of Danish Employers

Regional Council Member
Jørgen Rørbæk Henriksen
North Denmark Region
Appointed by Danish Regions

Confederal Secretary
Ejner K. Holst
Danish Confederation of Trade Unions
Appointed by the Economic Council of the Labour Movement and the Danish Confederation of Trade Unions

Chairman
Thorkild E. Jensen
Danish Metal Workers' Union
Appointed by the Economic Council of the Labour Movement and the Danish Confederation of Trade Industries

Chief Adviser
Morten Andersen Linnet
Danish Agriculture & Food Council
Dep. of Food and Research
Appointed by the Danish Agriculture & Food Council

Consultant
Mette Lyshøj
3F (United Federation of Danish Workers)
Appointed by the Economic Council of the Labour Movement and the Danish Confederation of Trade Industries

Director
Inge Mærkedahl
Danish Agency for Science, Technology and Innovation
Appointed by the Ministry of Science, Technology and Innovation

General Manager
Flemming Ejde Nielsen
Ejde Nielsens Værktøjsfabrik A/S
Appointed by the Danish Federation of Small and Medium-Sized Enterprises

Director
Michael H. Nielsen
Danish Construction Association
Appointed by the Confederation of Danish Employers

Vice-Chancellor
Jens Oddershede
University of Southern Denmark
Appointed by the Danish Academy of Technical Sciences

Head of Secretariat
Gunde Odgaard
Federation of Building, Construction and Wood-workers' Unions
Appointed by the Economic Council of the Labour Movement and the Danish Confederation of Trade Industries

Councillor
Hans Olsen
Municipality of Lejre
Appointed by Local Government Denmark

Managing Director
Lauritz Rasmussen
Taasinge Træ A/S
Appointed by the Confederation of Danish Employers

Managing Director
Lasse Skovby Rasmusson
Danish Academy of Technical Sciences
Appointed by the Danish Academy of Technical Sciences

Consultant
Pia Mulvad Reksten
Danish Confederation of Trade Unions
Appointed by the Economic Council of the Labour Movement and the Danish Confederation of Trade Industries

CEO, MSc (Engineering)
Niels Techen
Helmer Christiansen A/S
Appointed by the Danish Federation of Small and Medium-Sized Enterprises

Branch Chairman
Simon Tøgern
Union of Commercial and Clerical Employees in Denmark, IT, Media & Industry Metropolitan Branch
Appointed by the Economic Council of the Labour Movement and the Danish Confederation of Trade Industries

Chairman
Torben Dalby Larsen
Confederation of Danish Employers
Appointed by the Confederation of Danish Employers

CEO
Lars Aagaard
(Deputy Chairman)
Danish Energy Association
Elected by the Board of Representatives

Employee representatives:

Technical Assistant
Susanne Gundlach
Metrology and Quality

Electrician
Niels Peter Lindeblad
Building Services

Consultant
Benny Neister
Plastics Technology

Measurement Technician
Jens Bording
Installation and Calibration

Executive Board

President
Søren Stjernqvist

Director
Mikkel Agerbæk

Director
Lars Drejer

Director
Bo Frølund

Director
Lars Germann

Director
Mette Glavind

Director
Lars Hinrichsen

Director
Sanne Juul Nielsen

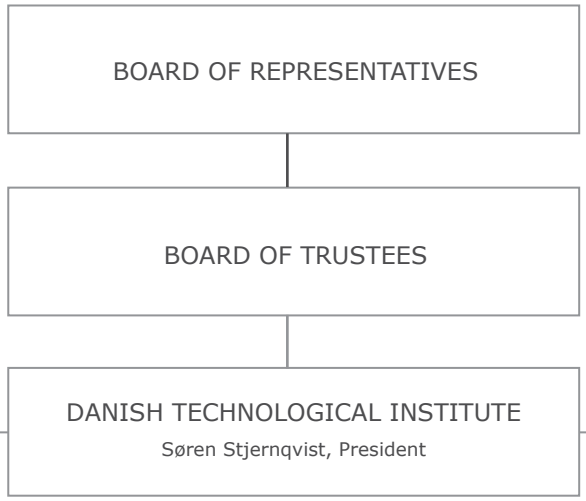
Group CFO
Jørgen Kunter Pedersen

Company Secretary
Andras Splidt

Director
David Tveit

Director
Jane Wickmann

Organisation



BUILDING TECHNOLOGY

Director
Mette Glavind

Concrete
Centre Manager
Mette Glavind

Indoor Climate and Building Examinations
Centre Manager
Jørgen Baadsgaard-Jensen

Masonry and Building Components
Centre Manager
Peter Bachmann Vestergaard

New Industrialisation
Centre Manager
Anders Thomsen

Swimming Pool Technology
Centre Manager
Ole Bisted

Textiles
Centre Manager
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