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A large, new commercial building project adjacent to Copenhagen Airport will change the Copenhagen skyline

Cover: Henning Larsen Architects' vision for King Abdullah Financial District









## **Central location only 5 r**

10.000 sq.m. new headquarters located with §



Photos of headquarters of future neighbours at Kalkbrænderihavnen

Bankinvest/Arator

## ninutes from Copenhagen town hall

#### great visibility at Kalkbrænderihavnen – tenancies from 1,500 sq.m

Kalkbrænderihavnen is one of the new corporate areas in Copenhagen with fresh air and the sound of the beating of waves. At the corner of Sundkrogsgade and Kalkbrænderihavnsgade the new headquarters will be constructed, comprising 10,000 sq.m. - combining glass, steel, and natural stone.

Sjælsø Gruppen also developed headquarters for SAP/Tiscali, Bankinvest/Arator, and DFDS which are next-door neighbours. The location is magnificent – close to the water basin, only 200 m distance to the city train, and very close to the city centre. Good visibility for passers-by







# in brief

## BEST ICT NATION IN THE WORLD

#### INFORMATION TECHNOLOGY:

Denmark now tops the rankings of The Global Information Technology Report 2006-2007's "Networked Readiness Index", as a culmination of an upward trend since 2003.

With record coverage of 122 economies worldwide and published for the sixth consecutive year, The Global Information Technology Report (GITR) has become the world's most respected assessment of the impact of information and communication technology (ICT) on the development process and the competitiveness of nations. The Networked Readiness Index (NRI) measures the propensity of countries to leverage the opportunities offered by ICT for development and increased competitiveness. It also establishes a broad international framework mapping out the enabling factors of such capacity.

The World Economic Forum in cooperation with INSEAD, the leading international business school in Paris, produces the Report. "Leveraging ICT is increasingly becoming an essential instrument for countries and national stakeholders to ensure continued prosperity for their people. Nordic countries have shown how an early focus on education, innovation and promotion of ICT penetration and diffusion is a winning strategy for increased networked readiness and competitiveness. Denmark in particular has benefited from very effective government e-leadership, reflected in early liberalization of the telecommunications sector, a first-rate regulatory framework and large availability of e-government services," said Irene Mia, Senior Economist of the Global Competitiveness Network at the World Economic Forum and co-editor of the Report.

#### **Clear ICT vision**

Denmark is No.1, moving up 2 positions from last year and reflecting an upward trend dating back to 2003. Denmark has benefited from a clear government ICT vision and early focus on ICT penetration and usage, which has resulted in impressive levels of Internet and PC usage as well as that of e-government and in a very dynamic e-business environment. A well-developed internal market, together with a continuous emphasis on educa-



tion and research and development and a talent for pioneering applications and technologies, have laid the foundation for the development of a first-league high-tech industry.

The United States loses its top position and drops 6 places to 7<sup>th</sup>, mainly due to relative deterioration of the political and regulatory environment. However, the country maintains its primacy in innovation, driven by one of the world's best tertiary education systems and its high degree of cooperation with the industry as well as by the extremely efficient market environment displayed.

#### DANISH CORPORATE SECTOR MAKES RECORD INVESTMENTS

The Danish corporate sector is making substantial investments in new production equipment to benefit competitiveness. More than EUR 30 bn will be invested in new machines, robots, factory buildings and IT in 2007. According to the Confederation of Danish Industries, it is the highest sum ever, and corresponds to 20% of all value created in the corporate sector being used for new investments.

The figure excludes the substantial investments in new ships being made by the Danish shipping industry, which has previously announced that it will invest more than EUR 10 bn in the coming years.

The large investments are especially being used for labour-saving production equipment in the industrial sector.



# in brief



### A HUB FOR CRUISES

Copenhagen has become a north European hub for cruises. In 2007, more than 300 ships carrying 460,000 tourists will call at the Port of Copenhagen. Not only is the number of ships increasing year by year, the ships themselves are also becoming larger. The Visit Copenhagen tourist organisation has calculated that the size of the cruisers has more than doubled in five years.

The number of cruisers which use Copenhagen as a turnaround point, i.e. starting and ending their journey in Copenhagen, has also increased significantly. The cruises primarily go to ports in Norway, Sweden, the Baltic States and St. Petersburg in Russia. 60% of the tourists on the cruisers are from the US and UK.

#### COPENHAGENERS AMONG EUROPE'S WEALTHIEST

The average income in the Danish capital is equivalent to almost EUR 58,000 annually.

"Affluence is boosted by the fact that there are so many jobs with a high educational level concentrated in Copenhagen," says Henrik Christoffersen, head of research at the Danish Institute of Governmental Research, and adds:

"The gap between the educational level in Copenhagen and the rest of the country has increased significantly. Education is the source of income creation and greater wealth."

The majority of jobs in Copenhagen are knowledge-based with a high degree of value creation.

"Copenhagen is changing a lot these days. The city has become a dynamic centre in northern Europe for knowledge intensive professions. This is a major factor behind the income and affluence that Copenhageners are creating," says Henrik Christoffersen.

Among the reasons why Copenhagen is attracting so many highly educated people is its well functioning infrastructure, good educational opportunities, rich cultural life and metropolitan atmosphere, which is lively without being too stressful. Good quality housing and a low crime rate also contribute to the excellent life quality.

# economy

### SIGNS OF THE BOOM COMING TO AN END



By Department Director Steen Bocian, Danske Bank

**ECONOMY:** The sturdy Danish economic upswing appears to be slowly but surely petering out.

Signs of slowing growth have become more evident over the past few quarters. National accounts figures point to a relatively weak second half of 2006 with consumer spending, investments and exports slowing down.

Consumer spending actually stepped hard on the brakes during the second half of 2006. In real terms, consumer spending actually fell by 0.2%, following a three-year period during which the indicator had consistently climbed by an average of more than 1.5% per sixmonth period.

There is much to indicate that the decelerating consumer spending marks an actual turn away from the consumption boom in recent years and therefore should not be interpreted as if consumers are merely taking a breather in the wake of a number of years of hectic spending. Supporting this view, indicators for 2007 point to continuing weakness in consumption. Car sales are still quite high but trends are pointing downwards, retail sales have proven surprisingly weak, and consumer confidence is sliding. The slowing trends in consumer spending are following in the wake of rising interest rates and a housing market that has come to an abrupt halt. However, we are not necessarily witnessing the beginning of a hangover. Instead, consumer spending seems to be entering a phase of more moderate growth.

#### Possible decline in unemployment

Consumption is underpinned by the prospect of a decent increase in real wages over the next few years, and it should be kept in mind that the overall wealth situation of Danish households is still quite healthy. In addition, interest expenses after tax relative to developments in disposable incomes are still relatively low – although the trend has been pointing upwards since interest rates started to rise. We forecast a growth in consumer spending of approximately 2% this year and of about 1.5% in 2008.

Despite the lower growth rates we are still witnessing a very healthy development on the labour market. With 106,600 persons registered as unemployed in March 2007, unemployment has plummeted to the lowest level since 1974. Since unemployment started to decline in the winter of 2003-2004, nearly 80,000 people have left the dole queue. According to Statistics Denmark, employment rose by 107,000 persons during the same period. It is very difficult to say for certain how low unemployment can technically drop, but we are rapidly approaching the floor.

As previously mentioned, growth in the Danish economy appears to have peaked, causing a slight decline in demand for labour. In fact, we forecast such a large slump in growth that unemployment is expected to rise during 2008. The slightly less favourable economic trends will lead to a more severe demographic impact on the labour force. Accordingly, the outlook is for a shrinking labour force. As a result of this diminished labour force, the curbed growth will only trigger a moderate rise in unemployment. This also means that the slowing growth is not expected to be felt as a crisis.

#### Housing market remains unscathed

In the present situation, it appears that the Danish economy will avoid a hard landing. The housing market is expected to remain unscathed, wage developments do not look as if they will be going through the roof, and the slower economic growth will only to a moderate extent result in rising unemployment in 2008, as a shrinking labour force pulls in the opposite direction. We expect that the economy is slowly starting to shift gear down towards a growth rate of 2.1% this year, dropping to 1.6% in 2008. Given the current structures in the Danish economy involving full employment and demographic changes that are starting to bite into the economic growth, we should start getting used to sub-2% growth rates. In other words, we do not foresee any dramatic economic trends for Denmark in this forecast.



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#### THE MANAGEMENT GURU:

## DROP THE POWER AND LET CREATIVITY GROW

MANAGEMENT THE DANISH WAY: A short distance between top and bottom, trust between management and staff, interdisciplinary collaboration – these are some of the characteristics of the Danish corporate sector which, according to the author, businessman and entrepreneur Lars Kolind, make Denmark the world's most advanced country in terms of conditions for running a business.

#### It is when the company is doing well that the organisation needs to look critically at itself

Drop the hunt for quick profits and give meaning to what your company does. A meaning that creates value for the company management, the staff and society as a whole. Start seeing your staff, your suppliers and your customers as collaboration partners in your company's development, and not as potential adversaries to be defeated. Give your staff responsibility and strengthen creativity by providing collaboration opportunities across the organisation and across disciplines. And last but not least, give up the idea that leadership is about power and instead cultivate the idea that good management is value-based.

This handful of axioms summarizes Lars Kolind's philosophy of good management of a knowledge-based company. His topical book "The Second Cycle – Winning the War on Bureaucracy", published by The Wharton School at the University of Pennsylvania has become a bestseller in management literature over the last year.

#### **Saving Oticon**

But Lars Kolind is much more than an author. He was the architect of one of the more spectacular company turnarounds in recent years. As managing director of the Danish hearing aid company Oticon, he pulled it out of a death spiral and gave it a platform for new growth, which has made Oticon the world's leading manufacturer of advanced hearing aids. Lars Kolind himself applied one of his other axioms – when the company's success was ensured, he stepped down and handed over control to others.

"There are three factors which make mature organisations easy prey for the virus that changes success into failure: size, age, and success itself," says Lars Kolind. "It is when the company is doing well that the organisation needs to look critically at itself. Success has a habit of laying the roots of failure, if you are not awake to it."

#### Redefining self-understanding

Lars Kolind became managing director of Oticon at a time when the company was dangerously close to collapse. Despite being able to offer the market's best sound quality, Oticon hearing aids were large and clumsy. They were also expensive, and the company's marketing strategy was ineffective. The company culture was distinctly hierarchical and conservative, with a built-in resistance to change. It was only a matter of time before Oticon would go under.

"During my first few months at Oticon, while I was acquiring an overview of how bad things really were, the first thing I introduced was tight cost control, creating a cost consciousness in all staff which was previously non-existent. Then we changed the marketing strategy. From targeting patients with reduced hearing, we now approached audiologists, who in most cases were actually the ones who decided which hearing aids patients should have. Then we redefined our self-understanding from being a manufacturer of hearing aids to being a company which helps people to live in the best possible way with the hearing they have."

#### New business culture

Although the various initiatives helped to dramatically improve the liquidity situation, Lars Kolind quickly realised that Oticon's fundamental problem was the *way* the company worked. That resulted in changes which echoed around the world, and which today form the basis of the management principles that have made Lars Kolind a guru in the international business world.

"From being a highly rule-based, sharply department-divided hierarchical engineering culture, Oticon became a customer-oriented, flexible and innovative business culture in a short space of time," says Kolind.

The cultural shift was based on a number of initiatives:

• Apart from a few staff functions, the department structure was discontinued and became project-oriented

• Conventional titles were discontinued, and everyone in the company could join a project group

• All walls were pulled down and no one had permanent offices, but were in a project group

• Paper was discontinued, and Oticon became the world's first company to be 95% computer-based

 A salary system was introduced which was based on the value the individual employee added to the company

#### Give up old-fashioned power

Lars Kolind coined the phrase 'Think the unthinkable' for the new and revolutionary transformation of Oticon. The unthinkable was thought, and it worked. In the 10 years Kolind headed Oticon, revenues increased threefold. Creativity flourished, and new products set completely new standards for digital hearing aids. Enthusiasm and teamwork made Oticon one of Denmark's best workplaces.





#### The leader's principal task is to give meaning to what the company does and to formulate the framework for where it is heading

"In Danish companies there is a basic trust between top and bottom," says Lars Kolind. "The social and the labour market structures we have achieved through negotiations over the last 100 years, and which form the basis for what is called the Danish model regarding social security and labour market flexibility, makes Denmark one of the most advanced countries in the world. We do not need old-fashioned management based on power. I would go as far as to say that the principles and tools for good management which I have described in "The Second Cycle – Winning the War on Bureaucracy" can be used by all knowledge based companies across the entire industrialised world."

Kolind does acknowledge however that the basic conditions for success are greater in Denmark than in most other countries: "Denmark has a tradition for flat structures. Less distance between power and people. More direct connections between managers and staff. And a distinct tendency for staff to take on responsibility themselves, and openly express their opinions to managers."

### Collaboration across demarcations

The Danish mentality, which forms the basis of company culture, has its historical roots embedded in geography: the country is small and sandwiched between large industrial nations, and so has had to survive by developing values in ways other than mass production. Through their education, Danes



their education, Danes have developed skills in learning quickly.

"There is a sizeable element of equality-thinking in the Danish teaching system, which is also part of democratizing our behaviour. It is natural for Danes to seek responsibility and work independently. While conventional pyramid organisations kill creativity in the individual, collaboration across demarcations helps create added value. Engineers are inspired by designers, designers by sales people and sales people by engineers. It very

quickly becomes a win-win situation."

#### Partnership creates value

According to Lars Kolind, managers must give up their power positions in order to create the framework for a looser company structure.

"Management by fear and rigid styles of management can create good products and good sales figures some of the time. But not all of the time. The organisation stiffens, and products that previously were good are overrun by new and innovative ones, which are shaped through dialogue and creativity by enthusiastic staff. In the old days when a company's capital was based on the physical presence of money, labour mattered less. It just needed to be present.

> Today it is the partnership between management and good staff which constitutes a company's value."

To Lars Kolind, a good leader can be compared with a captain of a ship. Today, it is not the captain's role to actually run the ship; that is the task of the officers and crew. The captain needs to concentrate on ensuring that the ship functions and that it ar-

rives at its destination.

"The leader's principal task is to give meaning to what the company does and to formulate the framework for where it is heading," says Kolind. "The leader must define the company values in relation to society and motivate the staff.



Ensure sustainability, which becomes a matter of course if one accepts that the company primarily benefits the world around it. Sustainability must be embedded in all future work. When that happens, growth and profits come by them-

selves. Simply because value-based management has an in-built innovation power which is necessary to create the winners of the future."

#### LARS KOLIND

Born 1947, MSc in mathematics, B.Com in organisation. Management consultant. Deputy director of Risø National Laboratory. Finance director in medico company Radiometer. External lecturer in business economics and planning theory.

1988-1998 group chief executive of hearing aid company Oticon.

Today, deputy chairman of the board of Grundfos, chairman of the board of Poul Due Jensens Fond, member of the board of Unimerco, deputy chairman of the board of Zealand Pharmaceuticals, member of the board of holding company K.J. Jacobs AG, Switzerland, and on the board of representatives of the newspaper Kristeligt Dagblad.

Associate professor at the Aarhus School of Business.

Member of the management of The Governing Board of The World Scout Foundation.

In 2000, published "Vidensamfundet – Dagsorden for Danmark i det 21. Århundrede" [The Knowledge Society - Denmark's agenda for the 21st century] and in 2007, "The Second Cycle – Winning the war on Bureaucracy."

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2. 22

# A REVOLUTION IN HEARING AIDS



#### **STEREOPHONIC: Hearing**

loss cannot be cured, but Denmark's Oticon, a manufacturer of hearing aids, is closer than ever before to recreating normal hearing with the development of Oticon Epoq

One of the world's largest and most innovative manufacturers of hearing aids, Denmark's Oticon, has developed a new product – Oticon Epoq – which could revolutionise everyday life for people with hearing impairment. Epoq is the world's first hearing aid with built-in wireless broadband, which makes it possible to give users very realistic, stereophonic sound perception. Epoq also offers wireless connection to other electronic devices like mobile phones, music players and PCs.

"Until now, hearing aids have systematically focused on compensating hearing loss by amplifying sound and deadening noise," says development director Jes Olsen at Oticon. "With our new hearing aid – Epoq – we have created a concept that focuses on the actual role of the hearing aid, which is to function as an interface between the user and the near and distant surroundings in all those situations encountered in everyday life."

#### A completely new level

Epoq is based on a new and powerful system architecture – the most advanced in the world so far. Its development has involved more than 200 people, has lasted more than five years and has cost almost USD 100 million.

"We have raised the capacity of hearing aids to a completely new level," says Jes Olsen. "We cannot cure hearing loss, but we have never before been so close to recreating normal hearing for the user. We also give the user perfect sound in both ears for mobile telephone use and listening to music."



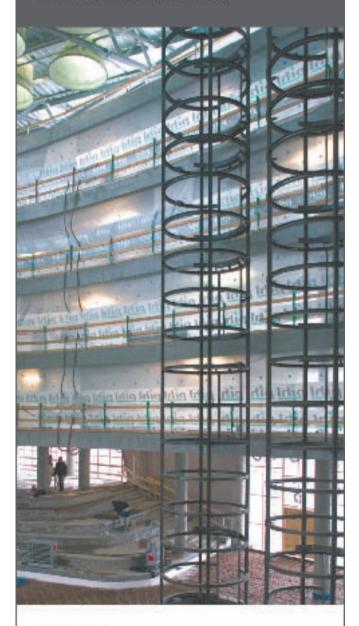
#### **Doubled frequency range**

In addition to the improvements achieved through wireless interplay between the two hearing devices and the further development of intelligent sound filters, there is another explanation as to why the sound quality in Epoq is so unique. Traditional hearing aids operate within a frequency range of 100-5,000 Hz. The frequency range in Epoq has been extended to 10,000 Hz, which makes it possible to vary the sound quality dramatically. The two small hearing devices, hidden behind the ears, send the sound through an ultra-thin wire into the auditory canal, and via the built-in broadband connection, the synchronisation creates stereophonic sound reproduction that exceeds all other hearing aids on the market.

Wireless transmission direct to the ear "Bluetooth cannot be built directly into a hearing aid because of its size and power consumption. We have built our own wireless technology – EarStream –

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into the devices. Although our radio transmitter is only about a square millimetre in size, it can transmit at broadband speed and communicate with the small "streamer" which comes with Epoq. Via the streamer – an elegant iPod-like companion – Bluetooth units like mobile phones and MP3 players can be connected directly to the hearing aids. So you get the sound sent wirelessly directly into both ears," says Jes Olsen.

Audiology research in Denmark is among the most advanced in the world, covering not only sound technology of the kind developed by companies like Bang & Olufsen, but also the development and production of hearing aids. Three Danish companies, Oticon, GN Resound and Widex, are among the six leading manufacturers of hearing aids worldwide. They jointly have a 50% share of the world market.

#### www.oticon.com

# DENMARK DESIGNS TOMORROW'S WIRELESS WORLD

**WIRELESS TECHNOLOGY:** The city of Aalborg in northern Denmark is a beacon of research and development in wireless technology. State-of-the-art research involving the university and a cluster of innovative companies is pioneering technology that will be used in 10-15 years' time What started as the development of a relatively simple ship's radio in the middle of the last century has now evolved into a research and development environment for wireless technology on a global scale. In Aalborg today, one development project after another is being started, which will evolve into the latest thing in the mobile and wireless world.

#### Designing the future

The wireless cluster around Aalborg, which comprises around 25 companies providing more than 3,000 high-tech jobs, has been developed in a close partnership between Aalborg University and the local public authorities. Aalborg University is today recognised in the global wireless industry as a beacon of research and development. It was here the foundations for the first mobile phones were laid, and where second generation mobile technology began. And it is here that the fourth generation is on the drawing board, in preparation for everyday life in 10-15 years' time.

#### Unique combination

"The combination of state-of-the-art research at university level and an innovative and competent business world, where global companies like Texas Instruments, Nokia, Motorola, Thrane & Thrane, RTX Telecom and a number of smaller Danish companies have placed development centres, is simply unique," says Jørgen Hedevang, secretariat director of the umbrella organisation NorCOM, the Association of mobile and wireless industry located in Northern Denmark.

"There is an interplay and cross-fertilisation of ideas and experience across disciplines and interests, which is hard to find elsewhere in the world."

The environment also reflects the intense and often turbulent development that has taken place in the industry. Small entrepreneurial companies have grown into big ones in a few years, have been acquired and sold on, and mergers or closedowns and reestablishments have been the order of the day.

"There is a dynamism in the area which attracts the best minds from the whole world," says Jørgen Hedevang. "For example, the development department at Texas Instruments has people from the US, Japan, Germany, France, India and China. You can't get more international than that."



#### MOTOROLA ACQUIRES UNIQUE KNOWLEDGE

**MOBILE PHONES:** Having acquired a development department employing 300 highly trained engineers from a brief Taiwanese electronics venture in Aalborg, Motorola is now surging ahead with Danish-developed mobile phones

When Motorola had the opportunity in the summer of 2006 to acquire Danish development competences in mobile phones, it took full advantage and gained the services of 300 highly trained engineers in software, hardware, systems, and electronics. This became possible when Taiwanese electronic entertainment giant BenQ, which had acquired Siemens' development department for mobile phones the previous year, withdrew from the mobile phone market. Located in the unique R&D wireless technology environment in the northern city of Aalborg, the department had all the competences Motorola could wish for.

#### Bought and sold five times over

"Actually, we have really been acquired five times in the last 18 years," says Motorola's Danish director Flemming Eriksen. "From Dancall to Amstrad, from Amstrad to Bosch, from Bosch to Siemens, and from Siemens to BenQ. And now Motorola. The small group, which started making some of the world's first mobile phones at Dancall, has today become more than 300 people. And having been acquired by Motorola, things are going faster and faster."

"The reason why we have been so sought after is the knowledge we have accumulated through our close association with the wireless network that has evolved in this region," says Flemming Eriksen. "We can do it all, from systems, software and hardware to electronics, and production processes. There are few who can do that, all under the same roof."

#### Blurring the borders between mobile phones and the Internet

"We focus exclusively on product development," says Flemming Eriksen. "Sometimes with proposals from Motorola in Chicago, but often with ideas and input from us."

In August 2007, after only 14 months' ownership of the development group in Aalborg, Motorola will market the group's first product, after which new products will be marketed at intervals of a few months.

"They are telephones with completely new applications, which blur the borders between the mobile phone, PC and access to the Internet," says Flemming Eriksen. "They are highly complex challenges which our system know-how is perfectly suited to solve."

## PLANT-DERIVED DAIRY PRODUCTS GAIN POPULARITY

#### SOYA-BASED FOOD: Mini-

mal content of saturated fatty acids and cholesterol-free – that is one of the reasons why increasing numbers of people are choosing dairy products based on soya beans



"Replacing animal-derived protein with plant-derived protein can reduce the cultivation area by a factor of 10, water consumption by a factor of 100 and fuel consumption by a factor of 11," says

Poul Agger, director of Naturli' Foods, whose production of plant-derived dairy products is growing by 30% annually in Denmark, and 100% in Norway.

"What we are actually doing at Naturli' Foods is to replace the cow's digestive process, but in a far more effective and healthy way," says Poul Agger. "Our soya-based milk products are cholesterol-free and have a minimal content of saturated fatty acids. When we introduced our products 18 years ago, they were originally intended for people allergic to dairy products, people with cholesterol problems and vegetarians. But today we see a clear consumer trend towards organic foods and healthy alternatives to animal-derived products."

#### Great market potential In the near fu-

ture, Poul Agger will assess the opportunities for starting Danish production of organic soya beans. Today the sova beans are imported from USA, Canada and Europe, and the production is carried out at Europe's largest plant, Alpro in Belgium. Poul Agger, a trained engineer in the dairy sector, develops production recipes in collaboration with Alpro. This year, the collaboration between Naturli' Foods and Alpro is being strengthened through a strategic partnership to share

product ranges, sales and distribution.

"This will help us meet the increasing demand," says Poul Agger. "There is enormous potential, especially in the Nordic region where consumption still lags behind UK, Benelux and Germany. Consumption in Britain is 10 times greater than in Denmark. Experience shows however that what the US and Britain do, the Nordic countries adopt a few years later."

#### Expanding the product range

Product development is also being accelerated. In addition to plant-derived milk products, one of the most successful products is a cooking alternative to cream. Naturli' Foods aims to expand its range with low-fat desserts and ice cream products, as well as cream cheeses.

"This is just the beginning. Consumers have recognised that our plant-derived alternatives are not only replacement products, but also have independent value," says Poul Agger.

#### www.naturli-foods.dk

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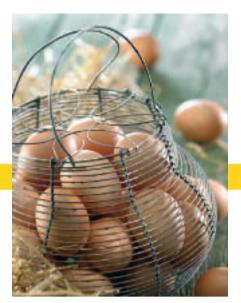
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## THE PERFECT EGG

There is nothing like a soft-boiled egg for getting cooks steamed up about how best to prepare it. The latest theory of perfection is 40 minutes at precisely 67°C, but it is one theory among many. Some advocate placing the egg in cold water and then heating to boiling point, which is then maintained for 3 1/2 minutes. Others place the egg in boiling water for 4 minutes. Others again insist that the egg must be at room temperature to start with, while yet others equally insist that it must be taken directly from the fridge. And there are many more variations on the theme. The perfect soft-boiled egg is a much disputed affair!

"I am a traditionalist myself," says Executive Director Ivan Noes Jørgensen of Hedegaard Foods. "I put the egg in cold water, bring it quickly to the boil, then let it simmer for 4 minutes. But I acknowledge that it can be done in countless other ways."

#### Eggs for all purposes

Hedegaard Foods is among the Nordic region's leading egg producers of both the organic and non-organic varieties, as well as pasteurised eggs and boiled and shelled egg products. The company sells to both consumers and the food industry. Hedegaard Foods takes a very scientific approach to processing and product development. In collaboration with the Danish Technological Institute in Kolding, the company is trying to produce eggs with perfect properties for all purposes.

"Egg white contains more than 10 dif-

#### FOOD TECHNOLOGY: Is it

possible to improve one of nature's most perfect creations, the egg? That is what they are trying to do at Hedegaard Foods, one of Scandinavia's largest egg producers, to add value for customers



One of Hedegaard Food's latest egg products is whipped egg in an aerosol. Instead of painting egg on baked goods to achieve a golden surface, it can now be sprayed on. ferent proteins which influence the egg's functional properties," says Ivan Noes Jørgensen. "We are experimenting with various processes to adjust these properties so that we can offer optimised eggs with added value for our customers. We do this by homogenising, pasteurising or preserving the eggs in different ways which, depending on the method, give different results.

"If an egg can be processed to achieve a 15% increase in baking volume, that would be of great interest to the food industry, from both a quantitative and qualitative perspective. That could help make the perfect layer cake base, which can resist the pressure from all the delicious fillings in between."

#### Customised

Hedegaard Foods has formed an alliance with the Danish Technological Institute, which has the expertise and equipment to test the physical properties of baked goods. The institute has already carried out test measurements on layer cake bases to examine rigidity and elasticity.

"We are going to start carrying out a lot more tests," says Ivan Noes Jørgensen. "Our long-term objective is to develop further egg products which can be customised to end user needs. For example, eggs for frozen bakery products are still a major challenge, just as the stability of foamed egg whites can be improved."

www.hedegaard-foods.dk www.teknologisk.dk

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## ERADICATING BACTERIA WITH STEAM AND ULTRASOUND

FOOD SAFETY: Each year millions of people suffer food poisoning caused by *Salmonella* or *Campylobacter* in poultry. A new Danish invention solves the problem

In as little as one second, a chicken can be made free of *Salmonella* and *Campylobacter* through the use of steam and ultrasound. The method is based on a Danish invention which could dramatically improve food safety.

"It sounds simple, but the combination of steam and ultrasound really is a stroke of genius," says vice president Niels Krebs of consulting engineers Force Technology. The company has researched into ultrasound for many years and has found ways of exploiting it especially for the medico industry. Force Technology's extensive knowledge of ultrasound was the background to its involvement in a number of experiments to decontaminate liquids using ultrasound.

#### **Dramatic improvement**

"Those experiments were not that successful," says Krebs. But they did lead to a discovery.

"Many different types of foods are steam treated to eradicate surface microorganisms. But while the method is reasonably efficient, it is not wholly effective," says Krebs. "If the steam is used for as long as is necessary on for example a chicken, the result would be closer to a cooked chicken than a fresh one. That is because a laminar boundary layer forms between the steam and the surface, which to some extent protects the microorganisms present in the skin. But we discovered by simultaneously exposing the chicken to ultrasound, that the excitation of the air molecules disrupted the boundary layer. The steam could now penetrate properly and eradicate the bacteria. A treatment time of just one second can dramatically reduce the bacterial population on the surface without adversely affecting the product," says Niels Krebs.

#### Full-scale testing

Force Technology has patented the new method of killing *Salmonella* and *Campylobacter* under the name SonoSteam.

The method has now been further refined, and the first full-scale tests will commence in mid-2007 in collaboration with a Danish poultry abattoir. Linco Food Systems, a world-leading manufacturer of processing equipment for poultry abattoirs, is building the module which will be installed in the processing line. Niels Krebs reckons that the first SonoSteam processing modules for poultry abattoirs will be ready for marketing early in 2008.

www.sonosteam.com



The Danish Veterinary and Food Administration has calculated that a 100-fold reduction of *Campylobacter* in poultry will result in a 25-fold reduction in the number of food poisoning cases. In tests on *Campylobacter* infected poultry, SonoSteam reduced the bacterial population by 99.9%, corresponding to a factor of 1,000

At a European level, the EU estimates that food poisoning caused by *Salmonella* and *Campylobacter* costs society EUR 2.9 billion in treatment and lost production.

In 2006, 18 people in Denmark died after eating poultry infected with *Campylobacter*. More than 3,500 cases were officially registered by the Danish health authority. But that is only the tip of the iceberg. It is estimated that a total of over 90,000 people have been affected without seeking treatment. This costs society a fortune in treatment and lost working hours.

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Tina Kristensen, TK Validate



## MAKING LUCKY WINNERS

#### **PRINTING TECHNOLOGY:**

Danish manufacturer of printing machines, Tresu Production, has developed the world's largest and most complex machine for printing lottery tickets and scratchcards



For some it means the squeal of joy. For more it's the indifference of disappointment. But either way there are very few who ever take a closer look at the scratchcard after the hidden panels have been revealed.

"In terms of printing technology and security, most scratchcards are like banknotes," says Allan Sander, senior sales manager of Tresu Production in Denmark. And he knows what he is talking about. Tresu Production has recently supplied one of the world's largest of these special printing machines to an American customer who makes scratch cards for gambling providers worldwide.

#### Fulfilling exacting requirements

"With its 19 printing units, the machine is one of the world's largest and most complex printing machines," says Allan Sander. "It is able to print paper on both sides at the rate of 300 metres per minute, with several variations including gold and glitter."

The reason why the machine "only" prints at 300 metres per minute, while still being the fastest and most effective of its kind, is due to the extremely high security requirements for scratchcards. Immediately after printing the winning numbers and symbols, the scratch fields are coated with four layers of a special



latex. Additional layers make it impossible to shine a light through the cards, and they are also made anti-magnetic. The printing of the number and symbol combinations is carried out via computer controlled inkjet printer units.

#### Supplying packaging for foods

"We attach importance to productivity, flexibility and a good working environment around the machine," says Allan Sander. "This involves fast changeovers and minimizing waste of material and resources. We have also developed very powerful drying machines, which can be individually adjusted on each printing unit. This naturally helps to optimise production."

The development of large printing machines for scratchcards is because of Tresu Production's many years of experience in developing flexible printing machines for the packaging industry. The world's largest manufacturer of packaging for liquid food products, Sweden's Tetra Pak, is a major purchaser of Tresu's machines. A printing machine has recently been shipped to Tetra Pak's new printer in China, and twenty-eight 40foot containers containing a complete scratchcard printing machine were shipped to the USA.

www.tresu.com

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## PROFITING FROM DESIGN

#### **INDUSTRIAL DESIGN: It is**

one of those products that nobody takes much interest in – as long as it works. But Cimbria Herning has created significantly more sales by redesigning its loading chute

Bulk goods from silo to ship, truck or railway – a transportation process that takes places thousands of times every day all over the world without anyone giving it a single thought. It just needs to be done, and how difficult can it be?

Not very, if you know how and have the right tools for it.

So does Cimbria Herning, a Danish company, which for many years has manufactured the special coupling that connects a silo with the hold. A loading chute that helps ensure the transportation process takes place in a reliable and environmentally sound way. Cimbria's knowledge in the area has made it into the world's largest manufacturer of loading chutes, which are marketed under the Moduflex name.

#### 100% sales increase

But even the world's biggest and best in its field can improve. Cimbria Herning's director Lars Nørgaard realised that after



Designer Simon Skafdrup of 3Part with a model of the loading chute.



a number of the company's engineers and industrial designers from 3Part sat down together to hatch new ideas. The result was a range of products, which have boosted sales significantly.

"In recent years, Cimbria Herning has generated revenue growth of 10-15%, but the collaboration with the designers resulted in a revenue increase last year of more than 100%. Profits likewise increased, which is important," says Lars Nørgaard. According to Lars Nørgaard, this is due not only to the design company's involvement in the visual expression of the loading chute, but also to the choice of materials and the production process itself. 3Part subsequently helped prepare the sales material.

#### Lower production costs

"We succeeded in simplifying a lot of the components a loading chute consists of," says designer and director Simon Skafdrup of 3Part. "A large number of variants were standardised, which resulted in lower production costs and a more flexible production process. Since we consider design a part of the totality, it was also implemented in the sales material, which now to a much greater extent appeals to those who handle purchasing of Cimbria's loading chutes."

www.cimbria.com www.3part.com Fredericia Kommune for two years in a row named top-selling Danish municipality in regard to commercial land sales

## **DANMARK**C



## **ATTRACTIVE SITES IN CENTRAL DENMARK**

New commercial areas available in Fredericia. DanmarkC is Denmark's new dynamic commercial district, enjoying a central location along the motorway grid at the town of Fredericia, Jutland. In DanmarkC we give companies that demand high standards in terms of logistics, visibility and expansion potential the opportunity of securing the most ideal Danish business location – literally in the centre of Denmark. We offer six million square metres of land for sale – strategically designated for specific commercial uses – e.g. for companies within the knowledge-based industries, large-space retail outlets and leisure facilities, distribution, light industry and food refinery. We have already come a long way. Arla Foods, Post Danmark, PricewaterhouseCoopers, ALD Bilsalg and Zederkof have already settled in central locations in DanmarkC, with many more companies set to follow suit, including Fuglsang Export-Maltfabrik, SMC, Energinet.dk, Transport Gruppen, Sanistål, KM Telecom and CMP Furniture. For further details about Fredericia's new commercial development scheme we invite you to order our presentation folder concerning DanmarkC. Please contact Carsten Gørtz Petersen, Director of Sadolin & Albæk, tel: +45 70 11 66 55, or visit our website www.danmarkc.dk



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For further information please visit www.lingtech.com or contact Annika Mortensen on tel. +45 3325 7171

#### FLOOR HEATING FOR THE TOP END OF THE MARKET

A new system for installing floor heating cables has been developed by Danish manufacturer DEVI. The integrated system, called Devicell, can be installed on an existing subfloor without embedding the cables. A wooden floor can then be laid directly on top of the cables.

The system consists of an aluminium plate formed in a patented shape that holds the cables in place. The plate, which carries an insulating layer of foamed polystyrene on the underside, heats up quickly and radiates upwards. The new system also saves significant installation time The interlocking plates are a square metre in size and can be cut



and adjusted with a standard electric saw.

"Devicell is a luxury product aimed at building contractors seeking the very best in heating convenience," says mechanical engineer Rasmus Hovgaard, who developed the system for DEVI. "The heat distribution is brilliant, the response time is short, and the system is economically viable since only the wooden floor is heated and not the concrete subfloor, which other floor heating systems lose heat into. The insulating foam also cuts down on noise."

DEVI sells electric floor heating systems to dealers worldwide. The company is part of the global Danfoss group.

#### www.devi.com

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KING ABDULLAH FINANCIAL

DISTRICT: World-renowned Henning Larsen Architects has created the master plan for the largest building project on the Arabian Peninsula – Riyadh's new financial centre. It will unite old and new Arabian urban traditions and become a landmark for Saudi Arabia's modern development. Over the next 7-10 years, Saudi Arabia's capital Riyadh will acquire a new landmark. A completely new part of the city, the King Abdullah Financial District, will emerge right in the middle of a gigantic motorway intersection north of the city. The new district will create a distinctive feature on the skyline, while still maintaining a number of traditional characteristics from the desert landscape. The King Abdullah Financial District is the largest building project so far on the Arabian Peninsula.

Denmark's world renowned Henning Larsen Architects has created the visionary master plan for the construction. The firm, which has also created the legendary Saudi Arabian Ministry of Foreign Affairs building, won the competition for the financial centre, and functions as building consultants to the owners, Public Pension Authority and Capital Market Agency.

#### A symbol of development

The new financial district will cover an area of 1.6 km2 and provide 75,000 workplaces. In a number of ways, the King Abdullah Financial District will serve as a symbol for modern development in Saudi Arabia.

"Our master plan not only involves the largest building project so far in Riyadh, but also touches on the development of society itself in the country," says Louis Becker, director and partner of Henning Larsen Architects. "We are planning a number of new initiatives which will significantly change the way people live, work and travel. But at the same time we are ensuring that they are appropriate to the country and the climate."

# AN ARABIAN VISION

Until now, Riyadh has developed mainly by the outspread of relatively low-rise buildings. The King Abdullah Financial District will give the city a whole new profile with high-rise buildings, of which the highest will be 365 meters. A consistent feature of the master plan is to exploit an existing wadi – a low-lying area in the desert where greenery springs up after rain. The wadi will be a green and shaded area, which traverses the entire financial district.

Banks, insurance companies and other financial institutions have already reserved around 50% of the building lots. Louis Becker expects that site preparation will begin in 2007.

#### New ways of transport

Today, a car is essential for getting round Riyadh. But when the King

Abdullah Financial District is built, businessmen will be able to travel to their meetings on foot.

"Covered footbridges above street level will connect the buildings, making it possible to walk easily from one to another," says Louis Becker. "It will help to create a new business environment and serve as a model for new ways of working in Saudi Arabia."

#### Integrated monorail

"The master plan is inspired by the old quarter of Al-Dirriyah with its squares and winding streets," says Louis Becker. "The height of the houses is determined by the length of the shadows they cast on the promenades and squares, where cultural institutions, museums, conference centres and sports facilities will be placed. The financial district's grand mosque will be built on one of the city's largest publicly accessible squares. And in the winding streets, there will be shops, cafés and restaurants which will help keep the district a vibrant place around the clock."

"One of the biggest problems in Riyadh is the traffic," says Louis Becker. "There are very few public means of transport, so cars dominate the scene. To reduce their number in the streets of the financial centre, an overhead monorail – one of the first in Saudi Arabia – will be built. This will be integrated with a future city monorail and will bring in commuters from a number of car parks outside the district, where the water and power utilities will also be located."

www.hlt-architects.com



## THE PLANS BEHIND THE VISION



The green wadi will wind through the entire King Abdullah Financial District and connect the traditional desert city with the modern metropolis.

FROM VISION TO REALITY: In collaboration with Henning Larsen Architects, the Danish city planning and architect firm Møller og Grønborg has implemented the vision for the King Abdullah Financial District in Riyadh.

For the last 12 months, city planners Johannes Vindum and Mads Jordan have worked day and night on the local plans for construction on each lot. "Detailed plans for the 100 lots, including traffic access, air conditioning, water, sewers and electricity, have been pushed ahead so that they are now ready for official approval," says Johannes Vindum.

"Site preparation has just begun, and construction of the district's highest and central building which will be occupied by the owners, Public Pension Authorities and Capital Market Agency, will start later this year."

The central building will be 365 meters high, making it one of the tallest in Saudi Arabia. The entire financial district spreads out from this point, which is encircled by medium-rise buildings along the avenues and the reconstructed wadi that glides through the district. The entire site is completed with a ring of adjoining buildings that front onto the motorway.

"Urban quality will be exceptional," says Johannes Vindum. "The adjoining buildings are reminiscent of the old city walls around traditional Arabian desert towns, while at the same time signalling a modern metropolis like the financial centres in London and New York."

Building owners can choose their own architect for each lot. But the local plans regulate the character of the buildings with minimum and maximum heights and usage of the area.

"When the King Abdullah Financial District is completed, it will form a unique totality which one would not find elsewhere in the world," says Johannes Vindum.



The architects Johannes Vindum (right) and Mads Jordan plan in detail the building of every lot in Riyadh's new financial district.

#### www.mgarkitekter.dk

Construction of the Great Belt Bridge, 1988-1998

The secret behind The Danish Broadcasting Corporation's new concert hall

### We know how to build the impossible

Right now we are busy building a piece of world class architecture: The Danish Broadcasting Corporation's spectacular concert hall. Originally the plan was to erect a 37 metre high steel framework and then clad it with trapezoidal sheets and shot-crete. But at a height of 37 metres, gusting winds would have transformed the framework into a giant sail, making it highly unstable under construction. It was simply not

feasible, so the project went back to the drawing board.

MT Højgaard had previously mounted the heavy superstructure of the Great Belt Bridge. And it was experience gained from this task which enabled us to build the concert hall. Instead of a large steel framework, we built a 25 metre high, 250 ton "bridge" – as a foundation for the gigantic walls encircling the concert hall.

MT Højgaard is Denmark's leading building and construction company.

We have built everything from bridges, airports and motorways to private residences, pharmaceutical manufacturing plants and hotels. And as you would expect, it's not only when we are building a state-of-the-art concert hall that our knowledge and experience comes in useful. To find out more about Denmark's strongest contractor, visit mthojgaard.com, mail us at mail@mthojgaard.com or phone +45 3954 4000. We are happy to help – whatever you are building. And that's no secret.



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## STUDENTS LIVING IN WORLD



**CAMPUS:** Tietgenkollegiet in Copenhagen is no ordinary student residence. It is an architectural study in communal living space – striking, unconventional and nominated for the Mies van der Rohe Award 2007.





When the Foundation behind Denmark's new student residence, Tietgenkollegiet in Copenhagen's new urban district Ørestaden, invited architects to submit competitive design proposals for the building, ambitions were sky high. World class architecture was what the Foundation wanted, and what it got. The student residence, which was completed in 2006, is already one of the most prizewinning buildings in Denmark, and has become an attraction for architects visiting Denmark to study building and design.

The striking and unorthodox building, designed by Lundgaard & Tranberg Arkitekter, has already become a landmark in Ørestaden. The circular building with its 360 student rooms is an eye catcher among the otherwise largely angular buildings in the surrounding area.

#### Inspiration from dinner plates

"Actually, the proposal that we submitted came about by serendipity," says architect and partner in Lundgaard & Tranberg, Peter Thorsen. "While we were sitting discussing the generally angular architecture that characterises Ørestaden, someone placed a stack of dinner plates in the middle of the table. That brought our pencils rapidly to life, and the round shape set our thoughts going around the living space that a student residence represents – the interplay between the shared and the individual in modern college life. When we submitted our design, we took a bit of a risk because the local plans didn't anticipate a

circular building in that location. But we had a strong feeling that our solution was the right one."

#### **Democratic form**

It was just as much the project's concept of interplay between shared and private living as its aesthetics and functionality which gave Lundgaard & Tranberg the prize. In contrast to conventional apartment block design, the round form brings the residents together around a communal area containing kitchens, TV rooms, eating areas etc.

"When we started the development process, we began by asking ourselves – and the Foundation's board of management, who all have their own student past – a number of questions. What is a modern student residence all about? And



## CLASS ARCHITECTURE

we all agreed that it's about social interaction, with everything that involves of give-and-take. And this is where the circular form helps to emphasise the sense of democratic community. Everyone lives equally close and equally distant from everything and everybody."

#### Gravity-defying

Tietgenkollegiet is unusual both in its form and component materials. An advanced construction has been used for the dramatic out-projections, which seem to defy gravity.

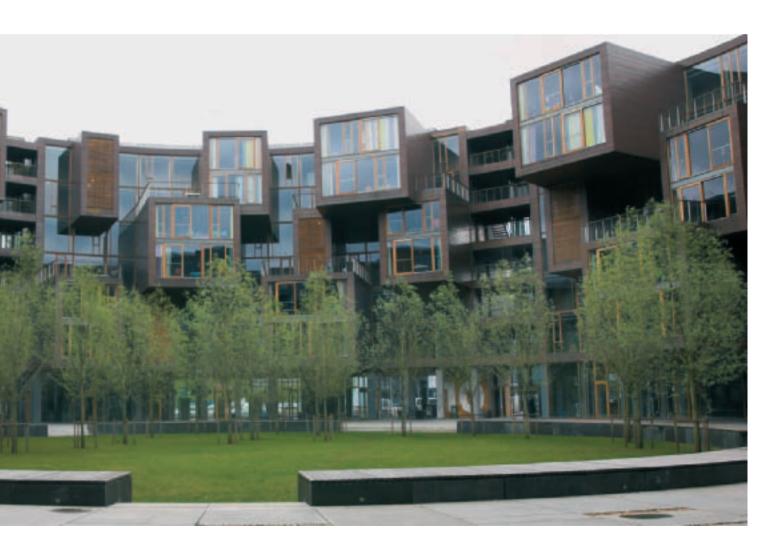
"Our philosophy is to use materials which have their own intrinsic qualities and can pass the test of time. We also emphasise that the connection between the constructional form and the materials used is easy to appreciate," says Peter Thorsen. "The concrete is raw and rustic, and the facade elements have the natural quality of American oak. For wall coverings, we have made the unusual choice of plywood, decorated with a special printing technique to make each panel unique. The external copper cladding has a jigsaw effect which helps to emphasise the building's individual character."

#### Like a bridge

When you see the building for the first time, one is struck by how the individual modules are suspended like spokes in a wheel. The effect is astonishing and is based on bridge building principles developed for the building by consulting engineers COWI. Pre-stressed steel cables are cast into the walls to reinforce the construction. "Seen from the outside the building seems to defy gravity," says Peter Thorsen. "But I can promise you that it will still be standing in 100 years time."

#### Tietgenkollegiet in Copenhagen

Site area: 13,190 m<sup>2</sup> Floor area: 26,828 m<sup>2</sup> Number of apartments: 330 1-room apartments of 26-33 m2 and 30 2room apartments of 45 m<sup>2</sup> Tietgenkollegiet has been nominated for the international Mies van der Rohe Award 2007



## NEW SKYLINE WELCOMES TRAVELLERS

**SCANPORT:** A large, new commercial building project adjacent to Copenhagen Airport will change the Copenhagen skyline

Over the next few years, striking new commercial buildings will start taking shape at the centre of the Øresund region close to Copenhagen Airport. The buildings, which will comprise approximately 95,000 m2 floor area and create space for 3,000 jobs, will be the first city impression air travellers to Copenhagen will experience. The project, Scanport, is being implemented by Skanska, one of the world's largest construction companies.

"Scanport is a bit like a mini-version of Wall Street, New York's financial dis-

trict on Manhattan, whose southern end you see when you fly into New York along the East River," says Skanska's market manager in Copenhagen, Peter Nymann. "A new local plan of the area has just been approved, and it gives us the opportunity to construct relatively





Skanska's market manager in Copenhagen, Peter Nymann

high buildings, creating a condensed architectural skyline, which is otherwise a rare sight in Copenhagen."

#### Ideal commercial location

Scanport will boast high profile commercial buildings for international companies looking to establish their businesses with Nordic or north European headquarters. The location is ideal, with close access to the motorway leading to the nearby Øresund Bridge to Sweden, and Copenhagen Airport, the largest and busiest in the Nordic Region, just a few hundred metres away. A new metro station, which will open during 2007, is also close by. With the many new residential buildings in the South Harbour, on Amager and in Copenhagen's new urban district Ørestad, and the increasing number of commuters from Sweden to Copenhagen, Scanport will be well positioned to attract well qualified labour.

#### Bridging commercial and residential

"Scanport has a very central location in the expansive Øresund region," says Peter Nymann. "It will offer high quality buildings, with lots of car parks, views over recreational areas and an exclusive marina which helps to create a connection between land and water."

In addition to the commercial buildings, Scanport will include Bryggergården, a listed building that Skanska is currently renovating.

"Bryggergården will be converted into 30 strikingly unconventional homes, which together with a low building for creative businesses, will create the transition to Copenhagen's largest recreational area, Amager Strandpark, and the adjoining site, The Blue Planet, to which Denmark's Aquarium plans to relocate," says Peter Nymann.

Construction of the first commercial buildings is expected to commence in 2007/2008.

www.skanska.com/oresund

# LARGE-SCALE USE OF

**RENEWABLE ENERGY:** 25,000 inhabitants will be going on an energy diet when the Danish city of Frederikshavn goes over to 100% renewable energy, the first in the world to do so

Frederikshavn in northern Denmark will be the first medium-sized city in the world to be exclusively supplied with electricity, heat and power for transportation from renewable energy sources. In 2015 the city's 25,000 inhabitants will enjoy the fact that they are not contributing to global warming, because electricity will be supplied from wind turbines, heat from heat pumps, solar panels and biogas plants, while cars will be powered by electricity or biofuel.

The Danish government has set the objective that by 2025, renewable energy will account for 30% of total energy consumption in Denmark. This is far more ambitious than the EU's energy plans and is based on the fact that Denmark today is a world leader in renewable energy technologies such as wind energy, solar heating, wave energy and research into production of fuels from biomass. Denmark also has the world's most well developed district heating system, which is largely based on combusting waste.

A shop window to inspire the world The vision of basing a whole city's energy needs on renewables in an integrated system covering electricity, heat and cooling, and power for transport, will make Frederikshavn a shop window to inspire the world. At present, although Danish energy technology is world-class and is exported worldwide, it tends to be sold for individual applications rather than for entire systems like cities.

"Danish energy technology is a priority focus area, so it is vital to demonstrate that it can work on the large scale," says Mayor Erik Sørensen of Frederikshavn Municipality. "The challenge is to find the best combination of the various forms of renewable energy."

#### Using energy optimally

Frederikshavn city council's agreement to act as a showcase for Danish renewable energy technology was conditional on making the project a purely commercial enterprise.

"This means that implementation of the project will not put extra cost burdens on the citizens of Frederikshavn," says Erik Sørensen. "We don't see this as an energy saving project where our citizens make sacrifices. We are not asking people to ride a bicycle when they mostly need a car. Nor are they expected to economise on heating and lighting. We want to show how energy can be used optimally, and in that way encourage citizens to perhaps change some habits. We want to show the world that renewable energy can be implemented on the large scale, and that this can be done without adversely affecting life quality or compromising effectiveness."

#### Six new wind turbines

One of the first tasks will be to install six new, 4 MW wind turbines, which together with the existing wind turbines will cover the city's electricity needs.

"Today renewable energy from wind turbines and the city's waste-fuelled combined heat and power station accounts for around 17% of Frederikshavn's total energy needs," says Erik Sørensen. "So the changeover to 100% renewable energy will require massive investments in both public and private sector power plants. Although we have an extensive district heating system, oil



and natural gas still account for 20% of citizens' private heating needs. To get them to change to renewable energy, we need to develop solutions that will make it attractive both environmentally and financially." Mayor Sørensen believes that

making Frederikshavn an international showcase for renewable energy technology will attract knowledge-based companies and new population groups to the city. "There is an amazing amount of support for this plan to put the city firmly on the world map. There is a

sense of pride around doing something to tackle climate change, and share our experience to the benefit of all. It will also create a lot of jobs. Although it will require major investment, I am convinced that it will ultimately result in economic success for the city."

Conversions and new constructions

Frederikshavn is the main city in Denmark's most northerly municipality. Its port is home to a number of maritime businesses, and is also Denmark's main naval base. The city has shipping routes to several destinations in Sweden and Norway.

Frederikshavn was chosen as a showcase for renewable energy because of its existing plants for production of electricity and heat. The city has four wind turbines supplying electricity, as well as a combined heat and power station



that supplies heat and electricity from waste combustion.

A 50 MW solar heating plant and the conversion of existing heating plants from using natural gas to combusting straw and wood are among the planned investments. Connected to this will be a new bioethanol plant for the production of energy for the transport sector. Energy optimising renovation will be offered for the city's existing housing stock, and new building constructions will be of the low energy type.

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