



**Monday**morning

**MINISTRY OF FOREIGN AFFAIRS OF DENMARK**

# Green IT

## Denmark: Key Developer of Climate Solutions

Denmark is one of the world's most energy efficient countries – Focused strategy has created economic growth without a corresponding growth in energy consumption – Whole-hearted political endeavour, combined with a unique culture of innovation make up the backbone of the Danish energy adventure.

# A nation coping with climate change

WHILE THE DANISH ECONOMY has grown by 75% over the last 25 years, energy consumption has remained constant. Since the oil crisis in the Seventies, only a very few countries have managed to erect so many wind turbines, create such an effective local heating plant network, increase industrial energy productivity and save so much household energy as Denmark. See figure 1.

Only a very few Danes are aware that they live in a country that has set world records in energy efficiency. Denmark has been able to decouple energy consumption from economic growth. Private car use and road and sea transport have never been greater, and the Danes increased desire for mobility weighs heavily in the national CO<sub>2</sub> accounts. Yet the truth about the Danish energy adventure is that today only a very few nations can measure up to Denmark when it comes to saving energy.

Even the Republican presidential candidate, Senator John McCain, feels obliged to visit Vestas' factory in Colorado and sign a turbine wing, while China imports Danish pumps and looks on enviously at Denmark's efficient local heating plants. Denmark's cleantech exports are reaching new heights, leaving other Danish exports behind.

The reorganisation of Danish energy policy builds on a number of crucial strategic decisions, taken against a background of increasing global energy prices and geostrategic uncertainty about future energy supplies. Taken as a result of pressure from visionary civil servants and grassroots organisations from the middle of the Seventies onwards, they make up the foundations of a success story now resonating in more and more countries around the world.

- **NEW ENERGY BLEND.** Denmark has gradually replaced coal and oil with natural gas and much more wind power. This has reduced CO<sub>2</sub> emissions. Not using nuclear power has increased the need for alternative sources of energy.
- **INCREASED FOCUS ON ENERGY.** Duties and subsidies have stimulated energy savings and the application of more energy friendly technology in the industrial and private sectors.
- **INFRASTRUCTURE.** The deliberate development of an efficient

collective heating plant and district heating distribution network combined with a ban on electric heating has reduced wastage.

- **COMMERCIAL STRUCTURE.** The change to a more service based economy has reduced domestic energy consumption.
- **DEVELOPMENTAL INCENTIVES.** Active public support for innovative companies developing cleaner technologies.

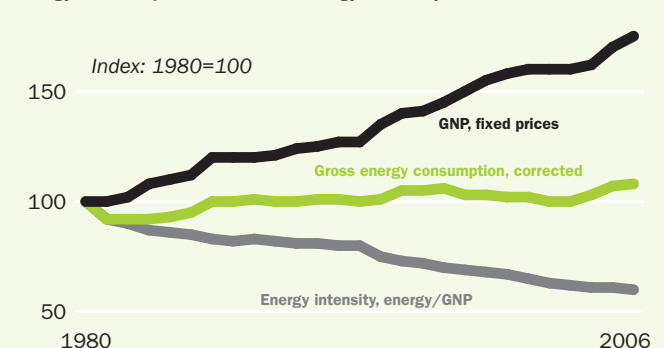
## Flexible change

The story of the nation that has made 'Modern Energy' its brand and its new source of income started with a jolt in October 1973. Rapidly increasing oil prices and the Yom Kippur War had created severe concerns about Danish energy supplies, where 90% of the country's energy needs had to be met by oil.

Anker Jørgensen's Social Democratic government panicked,

### MM | High productivity

Energy consumption, GNP and energy intensity

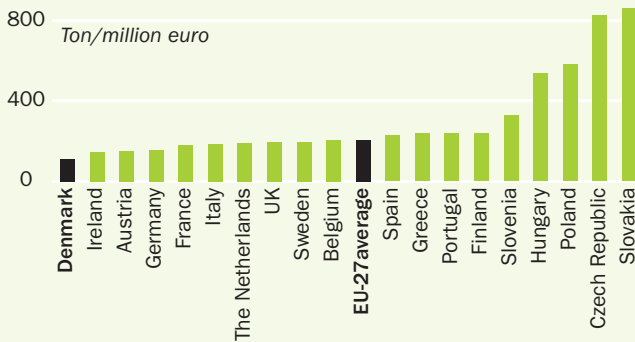


**Figur 1:** Since 1980, the Danish economy has increased by approx 75 per cent, while the domestic consumption of energy largely has been constant. Maersk international shipping and international air transport are not included in the account, since they are not included in the Kyoto Protocol.

Source: The Danish Ministry of Climate and Energy.

## MM | Denmark as European champion

Energy intensity in selected countries



**Figur 2:** The energy efficiency in Denmark is the best in Europe. No other European country has as low an energy consumption compared to GNP.

Source: The Danish Ministry of Climate and Energy.

introduced car free Sundays in November and asked shops to switch off lights outside of opening hours to save on ever more expensive energy. This was just the beginning. Despite a fall in oil prices over the next few years, Denmark and a generation of politicians never got over the shock of the first international energy crisis.

Jens Kampmann, who back in 1971 was Denmark's first environment minister and the minister responsible for taxes and excise in the Social Democratic government of 1977-78, is convinced that it was the wake up call provided by the energy crisis that paved the way for a new approach.

"Denmark began thinking in energy and environmental lines at the beginning of the Seventies – long before the majority of other countries. It was realised early on that economic means where necessary to ensure a decoupling of energy consumption. This has resulted in major win-win scenario for Denmark," says Kampmann. Today, Denmark is number one in Europe. See figure 2.

Mette Wier, Executive Director of the Danish Institute of Governmental Research and with years of environmental economics research experience, believes that underpinning the decoupling of energy consumption and growth is the fact that Denmark is a remarkably flexible society, highly skilled in adjusting to global change. "The two major energy crises did not just change energy consumption. They also spread through an entire society's production and consumption, making the country much more focused on energy use. Danish energy policy has always been heavily influenced by the global situation, and not least by developments in the Middle East. Changes have forced the Danish model over into a far more energy aware direction," she explains.

### Local energy heroes

Without concerted popular pressure in the land of the cooperative and 1,000 town halls to find solutions to the global challenges created by the energy crises of the Seventies, it is unlikely that renewal would have taken off. The Tvind School erected Denmark's

first wind turbine in Ulfborg on Denmark's west coast. Popular movements featured prominently in the energy debate, gaining moral and intellectual support from the Club of Rome, which had begun to talk about "limits to growth." The country's most visionary business leaders were beginning to realise the value of renewal long before this became one of the world's biggest growth sectors in the 21st century.

"The heroes of the Danish energy story are the entrepreneurs of the wind turbine sector, those responsible for the partnerships between the public and private sector, the insulation advocates within the building industry and – not least – the architects of the finance ministry's subsidy and duty package. It has created a number of unique clusters in the Danish energy world," means Lars Goldschmidt, Executive Director of the Danish Association of Consulting Engineers, and who for a number of years has closely followed developments in the energy sector from positions at the Danish Energy Agency and Maersk Oil and Gas.

Generations of politicians – from Erling Jensen and Jens Kampmann through Jens Bilgrav-Nielsen and Svend Auken to Denmark's first climate minister, Connie Hedegaard – have helped implement the many regulations, duties, subsidies, incentives and energy efficiency campaigns that have gradually changed Denmark from an energy glutton into an energy economiser.

"As a result of intense political demands, we have developed a collective heating distribution network and the world's most efficient heating plants. A major part of Denmark's success today is a consequence of political decisions taken many years ago," states Jens Kampmann. "The market cannot cope alone, and it's important that there are a range of incentives and regulations from the state that can help innovation along the way."

1976 turned out to be a key year. A new electricity distribution act was passed, the Danish Energy Agency was established, and the country's first unified energy plan was set out. Reduced oil dependency and energy consumption were now very much top of the agenda, and Danish homeowners busily began insulating cavities and doors and putting up Hessians on the walls. The government again considered nuclear power, but grassroots organisations fought the plans via petitions and anti-nuclear demonstrations and by persuading researchers to develop an alternative energy plan. In 1997 parliament approved an increase in duties on electricity, and oil. More duty increases followed, designed to motivate Danes to save energy – and secure extra funds for the hard-pressed state economy.

The price shock during the second energy crisis in 1978-79 provoked yet another major shift. In 1979, parliament passed acts relating to heating and natural gas distribution, and Denmark set up its first energy ministry.

"From 1979 to 1985 major progress was made towards decoupling Denmark's energy consumption," says Peter Bach, Senior Consultant at the Danish Energy Agency. "During this time Denmark reduced its energy consumption by 25-30%, and this is definitely a world record of which we can be very proud. Insulation and home improvements were responsible for the first advance. Later expansion of natural gas and district heating

and not least conversion to local heating plants had a major impact.

### The Danish heating model

Today, the Danish energy adventure is especially associated with wind turbines. And they are also central to the acceleration that took place during the Nineties. Yet, as many of the experts contacted by Monday Morning point out, seen as a whole it is collective heating distribution that more than anything has reduced Danish energy consumption.

“District heating has been much more important for decoupling than wind power.” Local heating plant expansion increased rapidly after 1980, and today two thirds of industrial energy comes from highly-efficient collective heating systems. On this front, Denmark is way ahead of most other countries. For example, Germany has not been particularly good at building up district heating,” says Professor Mikael Skou Andersen of the University of Aarhus and recently appointed to an international expert committee set up to advise the Chinese government about developing more sustainable energy provision.

Climate minister Connie Hedegaard relates that even today, fascinated foreign ministerial delegations visit Copenhagen heating plants to see how refuse is transformed into heat.

“Denmark is doing relatively well, with a good basic structure in place. We have a lot of district heating and decentralised heating plants, we are very energy efficient, and we have relatively little transport wastage in relation to other countries,” she says. Hedegaard acknowledges that Denmark still burns too much fossil fuel. See figure 3. Yet points to the fact that wind power now provides 17.5% of total Danish energy needs. The target is 30% sustainable energy by 2020. “We are a wind nation and world leaders in installed wind power,” says Connie Hedegaard.

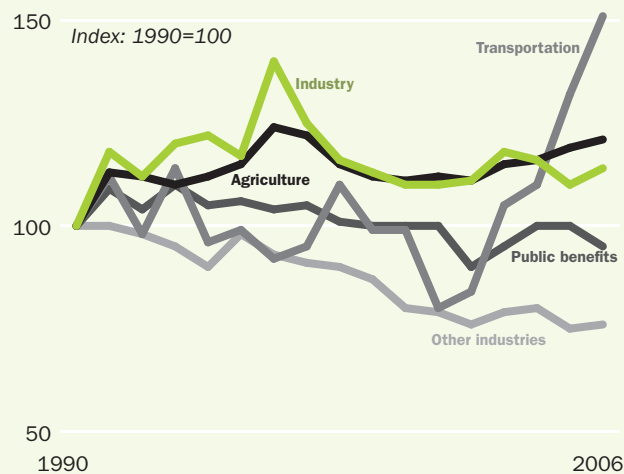
The interplay between innovative companies and still more demanding energy legislation has helped ensure that Denmark’s energy consumption has not exploded in step with economic growth.

Incentives to encourage change have been regular and consistent, including subsidies to encourage the use of sustainable energy and energy savings in buildings in 1981; energy labelling legislation in 1982, and the definitive decision to drop nuclear power in 1985. “Denmark has done a number of things to keep down energy consumption that other countries can learn from. I’m referring not least to our collective heating system, and the fact that the Danes learnt to save energy and better insulate their houses during the Seventies,” says Greenpeace climate and energy staff member Tarjei Haaland, who in 1974 was a co-founder of Denmark’s biggest anti-nuclear movement, and as such contributed to stopping nuclear power.

From heated discussions about the Brundtland report of the late Eighties to the adoption of the then visionary Energy Plan 2000 in 1990, Danish politicians have constantly pressured the business community. Having increased annually up to 1993, corporate energy consumption per produced economic unit has since fallen by an average of 2.5% a year. Household energy consumption is lower today than in 1973.

### MM | The efficiency of the industry

The gross energy intensity in production, per cent



**Figure 3:** The service industry and the public benefits are the most important contributors to the Danish achievement of lowering energy consumption while continuing economic growth.

**Note:** “Industry” covers industry, energy, water supply and construction. “Other industries” covers trade, hotel and restaurant and financial services. International refueling of ships and aeroplanes operated by Denmark are included in “Transportation”, which also covers postal services.  
**Source:** Statistics Denmark, 2008.

Energy Plan 2000 set targets to reduce energy consumption in relation to 1988 levels by 15% and to reduce CO<sub>2</sub> emissions by 20% by 2005. It has not been possible to meet these ambitious targets, in spite of a major increase in subsidies for sustainable energy and a dramatic increase in energy duties in the Nineties.

“During the Nineties, under Svend Auken, the Danish Ministry for the Environment and Energy was incredibly influential, and the environment was invested with great value,” recalls Mette Wier from the Danish Institute of Governmental Research. “There where no limits to what could be done. However, nobody remembered to ensure— and there was no great desire to work out — whether there was a real return on investment. The environmental movement almost enjoyed too much success, and it has taken a number of years for it to recover. Today, the issue of the environment has been resurrected within the wider climate debate, where it now represents business worth billions.”

### Global sales of Danish success

Climate Minister Connie Hedegaard is clearly proud of how long Denmark has come on its journey of renewal. “Since 1981 we have had 70% growth in GDP while keeping energy consumption more or less stable within the same period,” she says. Along with the Danish Prime Minister, Anders Fogh Rasmussen, she now travels the world with figures from the Danish Energy Agency showing how successful decoupling has been.

If there were an energy efficiency world championship, Denmark would be a serious contender for gold. “Denmark has had the advantage of not having much heavy, energy consuming industry to begin with, and support has been available to carry out energy savings in a number of areas,” assesses Lars Goldschmidt.

Even Tarjei Haaland of Greenpeace accepts that Denmark has been a pioneer in this area. “Denmark is a small country with very low energy consumption. For example, Norway’s energy consumption is four times greater and Sweden uses two and half times more energy than Denmark,” he says.

Associate Professor Anders Christian Hansen of Roskilde University, who is writing a book about the Danish energy story, believes that Denmark can teach the rest of the world a thing or two. “The rest of the world can learn about our experiences with decentralised power plants and wind turbines, as well as gain inspiration from our way of applying environmental taxes,” he says. For instance, Denmark is one of the countries where environmental taxes contribute most to GDP. See figure 4. In 2006, the state collected DKK 78 billion or 4.7% of GDP in environmental and energy duties. This naturally affects corporate and private behaviour.

“If you do not include sea transport, Denmark has experienced a major increase in energy productivity in relation to other countries. Industrial energy consumption has fallen since 1993, and household gross energy consumption is lower today than in 1973.

### New deal

Yet according to the Danish Energy Agency and Statistics Denmark, gross energy consumption – and CO<sub>2</sub> emissions – have begun increasing again over the last few years. The current Danish Liberal-Conservative government has been criticised for not doing enough to reduce energy consumption. “This government put a stop to many good energy and environment initiatives in the Nineties, and this has led to years of energy policy idling,” says Tarjei Haaland of Greenpeace. “Gross energy consumption has been increasing in the last few years, CO<sub>2</sub> emissions are beginning to grow again, coal consumption is going up, and wind power has been put on hold – no new turbines have been erect-

ed in Denmark since 2004,” says Haaland, and points to among other factors the adjusted figure for CO<sub>2</sub> emissions, which increased by almost 3% from 2004 to 2006.

Anders Christian Hansen from Roskilde University agrees: “The last couple of years have seen a decline in energy productivity, CO<sub>2</sub> emission reduction and conversion to sustainable energy. Not applying duties that would have otherwise made it more costly to pollute and the abandonment of the climate targets in 2002 have had an impact. Yet a new consensus in parliament regarding the latest energy bill would appear to have stopped the decline. And this broad consensus is encouraging for new agreements regarding what should happen after 2011,” he adds.

However, it was not just the government that lowered its ambition levels at the beginning of the new century. It could also be seen in a broader shift in thinking, where it became modern to say, ‘Cool it’, and where voters stopped showing the same enthusiasm for environmental issues as before.

During the economic boom of the last ten years, where we have experienced historically low rates of interest, Danes have borrowed money to build new kitchens, buy new cars and spend money on things that give status. Yet they have invested remarkably little in energy savings and house insulation. It would appear to demand a combination of regulation, motivation and information to get people to save energy,” says Peter Bach from the Danish Energy Agency.

Yet recent dramatic increases in oil prices and a new, more pragmatic awareness of climate issues – in Denmark and in the rest of the world – have once more changed the basis for energy policy. A paradigm shift is taking place. A majority of ordinary Danes and politicians wish to bring climate and energy policy up to speed, in order to save more energy and ensure an increase in the use of sustainable energy.

Connie Hedegaard still regrets that the Liberal-Conservative government postponed a number of wind farms during its first years in power. “We lost valuable time, and we would not have postponed the farms today. Yet this has changed now,” she says and points to the decision to erect numerous wind farms on land and sea since the latest energy act was passed in February.

Instead of looking back at previous disagreements, the climate minister thinks that we should look forward, and agree to exploit the first mover advantage that Denmark has built up in many areas. Ever higher oil prices over the next few years combined with a global climate consensus should lead to major growth in the worldwide market for energy saving technology. And Denmark has great potential in this market, emphasises Connie Hedegaard:

“Now it’s about maintaining our advantage. Danish cleantech exports grew four times faster than all other sectors in 2007. Exports have tripled within the last ten years, and sources within the industry believe that a turnover of DKK 200 billion is realistic by 2020.

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### Sources

• Danmarks Statistik, Statistiske Efterretninger 2008:2, Miljøøkonomisk regnskab for Danmark 2006.

## MM | Incentives of conduct

Environmental taxes distributed in main groups



Figur 4: There has been a general increase in Environmental taxes in the past ten years.

Source: Statistics Denmark, 2008.

Intelligent use of IT is an important weapon in the fight to reduce CO2 emissions – Denmark is spearheading energy-saving combined technologies – Politicians give the go-ahead for green IT exports.

# Tackling climate change digitally

DENMARK IS POISED to become the new green IT trendsetter. Denmark possesses a unique combination of strengths and competencies in software development and public digital services – Denmark is a world leader within environment and energy technologies and has a unique tradition for partnership across different branches of industry – All ingredients in an innovative cocktail that can bring Danish IT companies to the forefront in the race to combat man-made climate changes.

A thesis supported by Monday Morning's research into green IT competencies and opportunities in Denmark. Denmark might not be a country that develops hardware and new IT products. The country does, however, have the ability to combine technologies and find solutions that cross the traditional boundaries between branches and there is a massive potential in being able to identify new perspectives to solve interdisciplinary problems.

“Denmark is a very small country. We are close-knit and different branches work together. We often collaborate with the electricity sector, for example. This means that we are in a position to come up with integrated, innovative solutions,” states Tom Togsverd. He is director of ITEK, the Danish ICT and electronics federation, part of the Danish Confederation of Industry.

Denmark's Ministry for Science, Technology and Innovation recently published a plan of action for green IT in Denmark. An international workshop, organised by the Ministry in cooperation with OECD, was held recently, and three Danish industry federations are about to launch campaigns and conferences to discuss the importance of thinking green in any IT development and application context.

“We are aiming to set the agenda,” says Jakob Lyngsø, who is director at IT-Branch. He firmly believes that there is money to be made: “Several companies are already making good money from green IT solutions. I'm certain there will be a lot more of them once they are aware of the market's potential.”

Jakob Lyngsø is not willing to give an exact figure, but quite simply describes the potential as “enormous”. In his view, the UN Climate Change Conference in Copenhagen in 2009 is the perfect arena for demonstrating what Danish companies can do.

## MM | What is green IT?

There is no single definition of green IT. In 'Green IT: The New Industry Shock Wave', the Gartner Group describes it as a discipline in the making. In essence, green IT is all about optimal use of information and communication technologies (ICT), for controlling an organisation's environmental sustainability, both in relation to business processes and supply chain, and in relation to the company's products, services and resources during their lifecycles.

“When the delegates get here, they will find that the hotels they are staying in, the taxis they travel in and the restaurants where they dine are all brimming with the kinds of integrated solutions at which Denmark excels,” he predicts.

According to the industry experts that Monday Morning has interviewed, conditions are favourable for Denmark to exploit the advantages of climate leadership where IT is concerned. Environment and energy technologies are already one of the most promising fields in Danish exports. Turnover is currently DKK 50 billion a year with annual growth at approximately 8%.

Potentially, green IT and the intelligent utilisation of energy-saving technologies will accelerate the rate of export growth in this sector. “Denmark has an impressive track record in energy saving. There is no doubt in my mind that there is a massive export market out there,” says ITEK's Tom Togsverd. The Energy Branch sector at the Danish Confederation of Industry has estimated that exports of energy technology will be around DKK 200 billion a year by 2020, if growth continues as it has done until now.

Furthermore, green IT solutions are open to everyone. They are in no way restricted to traditional IT companies. “The boundaries are blurring,” says Keld Jersild Olsen, who is CEO at HP and who manages the IT-Branch green IT campaign. “There's a huge number of companies out there where IT is so important to them that I'd call them IT companies too: for example, all the major banks are developing IT solutions of their own and service their markets digitally,” he says.

## MM | The green dilemma of information technology

Information technology is hero and villain in the global struggle to beat climate change.

The development and application of IT produces 1 billion tons of CO<sub>2</sub> emissions annually. This corresponds to 2% of total global CO<sub>2</sub> emissions, and is more or less the same as the airline industry emissions.

These figures are increasing sharply. IT is spreading like wildfire from sector to sector and into almost all products. Industry is automated, trade routines are digitalised and our homes are brimming with computers, mobile phones, TVs and gaming consoles. More and more equipment is linked up to broadband internet connections and left permanently switched on – flashing and beeping and using energy to remind us that there are new updates.

On the other hand, IT is also a significant weapon in the battle to reduce CO<sub>2</sub> emissions. In sectors increasing their use of IT applications, the aim is to further optimise work processes. Furthermore, the IT developers are increasingly aware of the need to improve energy consumption – and this includes consumer electronics. During the past decade, the energy efficiency of mobile phones has improved drastically, and the stand-by energy consumption of TV sets has been reduced by more than 90%.

IT generally plays a pivotal role in what we know about man-made climate change and the methods available to limit them. Much of the information about global warming in the current debate is based on digital models of the effects of harmful emissions and climate change. Without IT applications, we would probably not be in a position to appreciate the scale of climatic problems nor identify how best to tackle them.

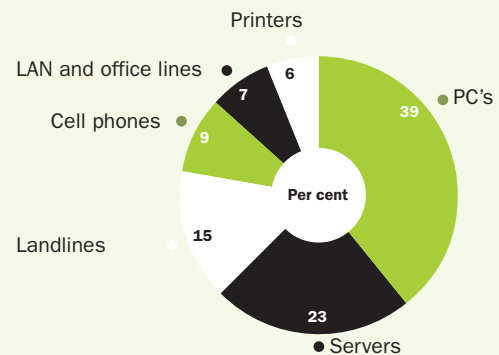
As an independent business area, green IT is, for the time being, virgin territory. Global giants Intel, IBM, HP, Microsoft and Google can

see big profits and are competing to establish themselves as front-runners. At the world's largest IT exhibition CeBIT in Hanover in Germany this spring, there was a special exhibitor section and conferences reserved for green IT solutions. The leading consultancy and analysis institutes, such as Forrester Research, Gartner and McKinsey, have all produced analyses related to sustainable digitalisation.

However, integrated solutions applying technology to reduce other sectors' carbon footprint and which are themselves optimised throughout production, distribution, application and disposal, remain few and far between. Demand for such solutions will be massive in the coming years.

## MM | Digital scoundrels

Contribution to CO<sub>2</sub>-emissions, per cent.



Sources: Gartner Group, Intellect, Nokia, Statistics Denmark.

## Denmark leads the field

One of the largest markets for green IT involves optimising production and energy consumption relative to one another, so that excess energy production is avoided, and the share of energy from sustainable sources is increased.

“In our view, this is climate technology on a par with wind turbines and solar panels – a sector in which Denmark is already doing very well,” says Tim Mondorf. He is responsible for environmental and energy at computer giant IBM, which is currently making huge investments in these sectors.

One Danish speciality is highly efficient power plants. Another is incorporating sustainable energy into the established electricity grid. The market potential for both is huge.

“The energy sector utilises a massive assortment of IT hardware,” says Lars Aagaard, a director at the Danish Energy Agency. He points out that IT is an indispensable tool for combining data about ideal production conditions with information about consumer consumption. “Nothing really makes sense until you include all the software. Software is what binds it all together and makes your data into something you can put to practical use,” he says.

Today, sustainable energy accounts for 20% of the energy produced in Denmark, but only 8% of the country's energy consump-

tion, simply because demand doesn't increase when the wind blows. Using digital technology and weather reports, we can make precise prognoses calculating when we will be able to produce energy most efficiently. One example is Danish Cotas Computer Technology, now owned by Vestas.

The fact that Danish companies head the field in a limited number of technologies means that Danes tend to think outside the box and can combine existing technologies in new ways. “We must concentrate efforts on integrating IT and technology by thinking of both aspects in a variety of operational scenarios,” says Peter Dreyer, who is partner in consultancy company Seismonaut, which works with innovation and strategic concept development, with IT at the core.

“Today the whole world is talking user-driven innovation. It's no accident that this is a Danish discovery, far from it in fact. We have a long tradition in this country for thinking in terms of utility scenarios and we are aware that we must not just do things for the sake of technology. Rather, we innovate to benefit the end user.”

Dreyer believes that Danish companies should aim to produce green alternatives that require minimal changes in behaviour. In the electricity sector, for example, Information Technology is the means of communication between supplier and consumer, and

IT systems monitor electricity consumption and prices relative to peak demand, and control the flow of excess energy from households back to the electricity grid – so called flexible energy. Monday Morning's contacts confirm that potential in this field extends far beyond Denmark.

Danfoss has been working in heating control, Lauritz Knudsen with light control, and NRGi has recently developed the Electronic Housekeeper concept, an intelligent system to monitor electricity in the home that works via a simple remote control unit that can shut down all electrical installations with a single click. "If we can roll this concept out to the world, we have a unique opportunity to amass very useful know-how. "And the export potential is enormous," adds Peter Dreyer.

### Optimising transport and working practices

Globalisation involves companies joining forces in networks and supply chains across the globe. Many companies have supply chains that stretch from Shanghai via New York to Europe. If we optimise the logistics, huge benefits for our climate and massive economic savings can be achieved.

Maersk Logistics has developed a method that simultaneously reduces costs and CO<sub>2</sub> emissions. Using computer simulation, the Supply Chain Carbon Check system calculates how much CO<sub>2</sub> can be saved by, for example, improving space management inside their containers or by choosing sea freight instead of air freight. "Increasing numbers of our customers in Europe, the USA and Asia are showing an interest in reducing CO<sub>2</sub> emissions by simplifying their supply chains," confirms Erling J. Nielsen, who leads global Supply Chain Development at Maersk Logistics.

When companies reduce the cost of transport and travel, the climate benefits too. "Meetings and business travel activities are probably the biggest CO<sub>2</sub> offenders in our budget," says Dan Bælum, director at Microsoft and responsible for green IT at the company. He firmly believes in using Unified Communications, which includes simple-to-use videoconference equipment, as an alternative to meetings in person. "It makes little sense for all of us to travel three hours by air to sit and watch the same three-hour presentation together and then all of us travel three hours again to get back home, when we can watch the presentation at the office," he says.

In addition to Microsoft and IBM, Norwegian company Tandberg is also a major advocate of the technology in Scandinavia. In its plan of action for green IT, the Danish Ministry for Science, Technology and Innovation recommends that more resources be allocated to videoconferences, virtual meetings and teleworking in both the public and private sector.

Denmark is already among the leaders. Public institutions and private companies in Denmark are, in fact, world leaders in the application of digital communication. What is more, the systems that have been developed for public and private sectors are exportable. A good example is SKAT, Denmark's tax administration authority. More or less all communication with taxpayers is now digital. The same applies to Danish banks' net banking systems.

"Denmark has a wealth of expertise and know-how in this field that we can export to other countries," says Keld Jersild Olsen from HP.

### Political will is crucial

Several of Monday Morning's sources emphasise that strict environmental standards are the driving force behind digital innovation in Denmark. Widespread environmental awareness means that both customers and consumers expect more. If you set higher goals for yourself than your peers, you have to expect to be in for a rough ride. In the long term, however, this approach will provide Denmark with the muscle needed to compete globally.

Industry federations have welcomed the Science Ministry's plan of action. The plan includes compiling a scientific catalogue of best practice designed to help companies; an information campaign targeted at consumers; green IT research funding, and an export offensive focused, in particular, on the new growth centres in Asia.

These are all prerequisite for green technologies developing into a yet another Danish export success. Nevertheless, according to agencies in the field, these activities are far from exhaustive. As many of the major software manufacturers are foreign, what Denmark has to do, first and foremost, is to make the country an attractive place for global players to locate development activities. Innovation happens when heavyweight companies meet unique Danish competencies.

While negotiating a new EU Directive for the EU's internal energy market, planned for completion next year, the EU Parliament has, for example, proposed that all electricity consumers in Europe must switch to flexible energy. If this resolution is passed, it will open a huge market. However, the Danish Minister for Climate and Energy has deferred a decision about what will happen in Denmark until the autumn. The minister's hesitation has provoked frustration in the industry:

"We need to establish as fast as possible, the optimal framework and best development activities here in Denmark. If Denmark is too slow off the mark, key research and development will take place elsewhere," says Lars Aagaard of the Danish Energy Agency.

The first priority must be, therefore, to get things off the ground as soon as possible. Several sources have voiced the opinion that there is an awful lot of talk about green IT. Now it is time to get on with the job, and exploit the advantages of being first mover at the UN Climate Change Conference. Danish companies are not alone in having set their sights on the new market.

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#### Sources

- The Gartner Group: Green IT: The New Industry Shock Wave.
- Intellect: High Tech: Low Carbon. The role of technology in tackling climate change, February 2008.