

# Energy Efficiency



[www.caddet-ee.org](http://www.caddet-ee.org)

# INFO

## Better production facilities using Energy-Efficient Design

**A Danish method for reducing energy consumption in industry**

Photo: Færch Plast A/S



Energy-Efficient Design at Færch Plast A/S has reduced energy consumption by 50%

Companies that are building new production facilities or renovating older ones can reduce their energy consumption by using an Energy-Efficient Design method developed by the Danish Energy Agency (DEA) in collaboration with the Danish Association of Consulting Engineers.

Energy-Efficient Design (also known as Energy-Conscious Design) uses an energy review team to analyse the actual needs of the company. This approach highlights opportunities for significant energy savings, which may involve the installation of alternative process methods. The company then

optimises its investment in energy-consuming equipment, taking into account both purchase price and operating costs.

Guidelines and computer tools are available for most common types of plant. DEA subsidies have helped projects to pay for consultancy fees, allowed the adoption of more energy-efficient solutions or facilitated the introduction of energy management systems that encourage employee involvement in efficient plant operation.

Demonstration projects have shown that companies can achieve typical energy savings of 15-30%, and even up to 50%, by

using Energy-Efficient Design. Descriptions of some of these projects are available on the CADEET EE Web site\*. In addition, six of the initial projects are currently being monitored, with results that are better than expected.

The financial benefits achieved can often repay the additional investment required in 1-2 years.

**For more information please contact the CADEET Danish National Team (E-mail: [novapro@novapro.dk](mailto:novapro@novapro.dk)).**

**A brochure, *Energy Efficient Design - for better production plants*, is available from Energioplysningen (E-mail: [energioplysningen@ens.dk](mailto:energioplysningen@ens.dk)).**

**Guidelines are available in Danish on the Web site ([www.energiebevdst.dk](http://www.energiebevdst.dk)).**

\*Project descriptions available on the CADEET Web site include:

Newsletter articles: Issue 3/99 Electricity consumption of compressed air reduced by 60% (ABB Motors) [www.caddet-ee.org/nl\\_pdf/993\\_07.pdf](http://www.caddet-ee.org/nl_pdf/993_07.pdf)

Issue 3/00 Energy conscious design of a new chicken-processing plant (Danpo) [www.caddet-ee.org/nl\\_pdf/003\\_02.pdf](http://www.caddet-ee.org/nl_pdf/003_02.pdf)

Technical brochure (R374): Energy-efficient design of new industrial production facility (Scan Coat) [www.caddet-ee.org/techpdf/r374.pdf](http://www.caddet-ee.org/techpdf/r374.pdf)

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## CADDET Energy Efficiency

CADDET Energy Efficiency is a programme operating under the International Energy Agency (IEA) for the exchange of information on commercial energy efficiency projects. CADDET stands for Centre for the Analysis and Dissemination of Demonstrated Energy Technologies. This news bulletin is one of its products. Copies are available to those in member countries from their National Teams (see page 7) and annual subscriptions are available to non-members from the CADDET Centre (see below). It is also available at [www.caddet-ee.org](http://www.caddet-ee.org)

## International Energy Agency

The IEA is an autonomous body established in 1974 within the framework of the Organisation for Economic Co-operation and Development (OECD) to implement an international energy programme. Member governments have agreed to share energy information, to co-ordinate their energy policies and to co-operate in the development of rational energy programmes.

More information about the IEA is available at [www.iea.org](http://www.iea.org)

## InfoPoint Energy Efficiency

Articles published in this news bulletin reflect the views and opinions of the authors. They do not necessarily reflect the views of the CADDET Centre, CADDET member countries or the IEA.

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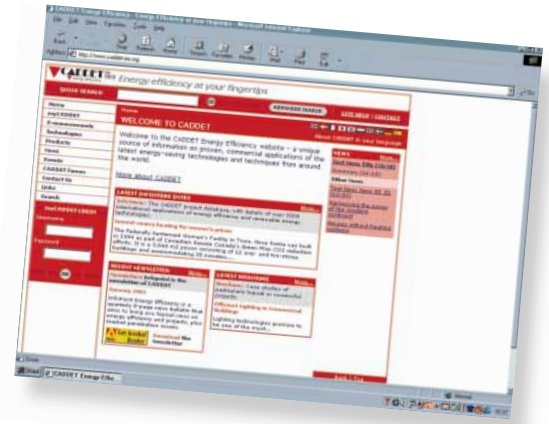
# CADDET - the new energy Web sites designed for you

**The CADDET Web sites for Energy Efficiency (EE) and Renewable Energy (RE) technologies have been relaunched with a new look. But the redesign is not about image - the sites have been enhanced to incorporate new tools and create a more efficient information source.**

The CADDET EE and RE Web sites are an outstanding source of information on proven, commercial applications covering the full range of EE and RE technologies worldwide. David Pegg, Webmaster at the CADDET Centre, has spent the last few months analysing the sites' role in disseminating this information and, in collaboration with Web site designers Trainer Thornton, has rebuilt the sites to include new tools that enhance their operating power.

"User friendly" has been a key phrase in the redesign. A new tool has been created that provides an easy-to-navigate site, enabling users to identify and download quickly the information they need.

*InfoStore* is a new site product that replaces the Register database. It makes available detailed information on more than 1,500 EE and 500 RE full-scale energy projects worldwide. David Pegg explains: "It's the new processes that control *InfoStore*, together with more detailed information, that make for a better product - all information is submitted and processed on-line, making the end-product available more quickly to users."

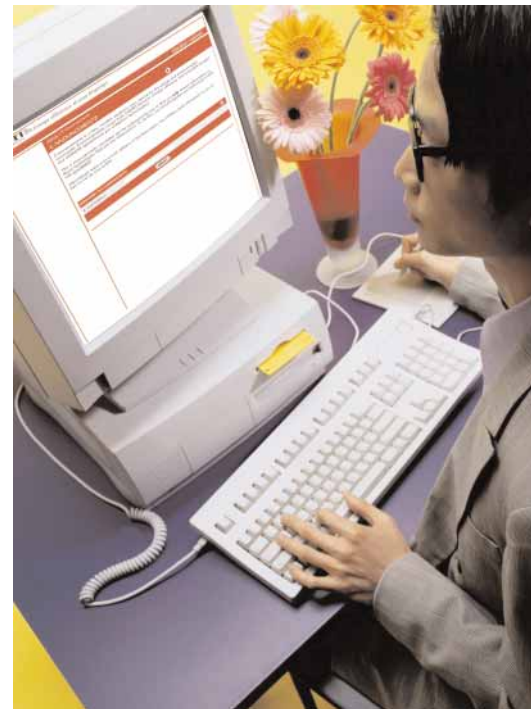


*myCADDET* is another new tool that caters for individuals' needs. By completing a form stating which technologies you want to be informed about, *myCADDET* will select and send that information monthly, via e-mail.

A third new feature is a news site that contains up-to-date stories, uploaded by the CADDET National Teams.

Mike Landy, CADDET Centre Manager, comments: "CADDET is an international programme and, therefore, ensuring that the Web sites were designed to be as interactive as possible for both the National Teams and visitors to the site, was of top priority. We are confident that the new sites will provide the best and most comprehensive range of information on EE and RE technologies available from CADDET member countries."

**The new Web sites can be viewed at [www.caddet-ee.org](http://www.caddet-ee.org) (for CADDET EE) and [www.caddet-re.org](http://www.caddet-re.org) (for CADDET RE).**



# Real prospects for a low-carbon future

by Tom Delay, Chief Executive of The Carbon Trust, UK

**Climate change is probably the most serious man-induced environmental threat that we face, and it must be taken seriously if we are to have an economic and sustainable future. The real challenge is to combine a reduction in greenhouse gas emissions with meeting expectations of economic growth.**

Work undertaken in the UK by The Carbon Trust and published in November 2001, indicates that a low-carbon future is a real prospect. However, its implementation will need a massive technological effort coupled with political commitment and economic and cultural change.

The Carbon Trust is an independent, not-for-profit company with a clear and challenging remit from UK Prime Minister, Tony Blair: to take the lead on low-carbon technology and innovation in the UK and put Britain in the lead internationally. To achieve this, The Carbon Trust has developed a portfolio of complementary elements designed to heighten public and private sector awareness of climate change and to promote the commercial opportunities that the climate change challenge presents. More specifically, it will:

- help business and the public sector to reduce energy waste and manage energy more effectively by promoting the more rapid adoption of existing energy-saving measures;
- encourage innovation and investment in low-carbon technologies so that fledgling initiatives can enter the marketplace and flourish.

This approach should allow UK business to become more competitive and acquire an increasing share of the growing market for low-carbon goods.

## Helping to deliver carbon savings today

A major component of The Carbon Trust's work is to cut out energy waste in the non-domestic sector, thereby contributing

to the UK's carbon-reduction targets. It is taking over the UK Government's Energy Efficiency Best Practice Programme and is planning to enhance its effectiveness and impact. Two changes have already been identified:

- a large increase in the number of visits by energy consultants to the workplace;
- expansion of the Energy Helpline facility.

**"A responsible attitude towards the environment does not have to be at odds with profitability and commercial success. Indeed, in the move towards a low-carbon economy, the two goals become inseparable."**

The Carbon Trust is also responsible for the Enhanced Capital Allowances scheme, whereby the most energy-efficient technologies qualify for 100% capital allowances in the first year. It will seek to raise awareness of the scheme, encourage more companies to qualify, and extend the scheme to new, low-carbon technology categories.

## Developing new, low-carbon technologies

The Carbon Trust is also working on a major new initiative - the Low Carbon Innovation Programme - which it hopes to launch in early 2002. The aim is to

stimulate the significant investment that will bring new, low-carbon technologies to market and to achieve this through:

- support for cutting-edge research, development and demonstration;
- innovative financial instruments that will bring new and emerging technologies to market in partnership with other funding bodies.

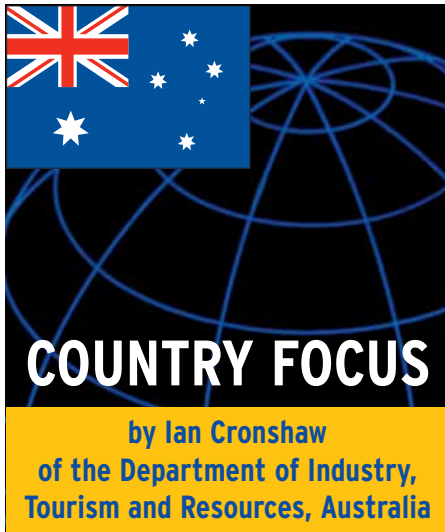
The Trust will act as both catalyst and venture capitalist: it will seek the best possible carbon return while helping stakeholders to maximise their financial benefits.

## Looking to the future

The Carbon Trust's growing team of professionals and its independence from government and business will ensure that it speaks authoritatively and takes a lead in the low-carbon economy debate. It is already developing the expertise and vision to think creatively about the UK's response to climate change, and it is introducing innovative ways of working to meet its objectives. A responsible attitude towards the environment does not have to be at odds with profitability and commercial success. Indeed, in the move towards a low-carbon economy, the two goals become inseparable. The Carbon Trust, working with government, business and the public sector, is determined to demonstrate how delivering climate change goals is good for the bottom line.

For more information about The Carbon Trust and its work please visit [www.thecarbontrust.co.uk](http://www.thecarbontrust.co.uk)





# Sharing the responsibility for Australia initiates a collaborative national energy policy

The next two decades will experience major changes in energy demand. According to the IEA's World Energy Outlook (see [www.iea.org](http://www.iea.org)), the forecast increase in global primary energy demand over that period is around 57%. Australian primary energy demand over the same period is expected to grow by between 35% and 50%, depending on the rate of economic growth and on patterns of energy supply and use.

Energy is a basic input into virtually every aspect of business and personal activity. In every country, including Australia, meeting the aspirations of the community by providing jobs, ensuring wealth creation and improving the economic and social wellbeing of individuals requires a consistent approach to energy supply and use. Furthermore, national energy policy frameworks need to acknowledge not just the needs of the current population but also those of future generations. In other words, energy supply and use must be sustainable.

## A national energy policy framework

Australia is well-endowed with fossil fuels and renewable energy resources and has strong capabilities in a wide range of

energy technologies. It is also a major exporter of energy resources and technical services. Even its known reserves of crude oil - the resources with which Australia is least amply endowed - are sufficient to meet many of its basic requirements and earn export income.

However, resource availability and technological capacity are not, of themselves, sufficient to guarantee secure and reliable energy services in the future. Efficient energy markets and an effective policy framework are needed to reduce investment uncertainty, facilitate infrastructure development and encourage the adoption of alternative, environmentally friendly energy sources. To achieve this in a country with a federal system of government, where energy is a shared responsibility, requires close collaboration between the different tiers of government.

In June 2001, the Council of Australian Governments (COAG) - comprising the Prime Minister of Australia and the Chief Ministers of the States and Territories - formally endorsed its common energy policy objectives and reaffirmed its existing commitment to agreed principles and reform processes. It also initiated a number of measures and institutional frameworks to help achieve these objectives.

COAG agreed three national energy policy objectives:

- to encourage the efficient provision of reliable, competitively priced energy services that will underpin wealth and job creation and an improved quality of life, and take into account the needs of regional, rural and remote areas;
- to encourage the responsible development of Australia's energy resources, technology and expertise, their efficient use by industries and households, and their exploitation in export markets;
- to reduce the local and global environmental impact, particularly the greenhouse gas impact, of energy production, transformation, supply and use.

## Priority areas for collaborative action

COAG identified the following three key areas for priority action.

### National energy policy leadership

A Ministerial Council on Energy has been set up, consisting of the Ministers responsible for energy in each jurisdiction.

Its role is to provide an effective policy leadership that will address the opportunities and challenges facing the energy sector. It will also oversee the continued development of national energy policy.

**Immediate action on high priority national electricity market issues**

An open, efficient and competitive energy market is central to the delivery of governments' shared energy policy objectives. The National Electricity Market Forum, comprising Ministers from New South Wales, Victoria, Queensland, South Australia and the Australian Capital Territory, has been asked to give urgent

energy market reform and to prioritise the measures needed to achieve them.

**The importance of energy efficiency and diversity**

While the expected growth in demand will provide strong incentives for investment in energy supply, it could also have significant environmental consequences at a time when communities are demanding much higher levels of environmental protection. This presents new challenges, particularly in relation to energy efficiency and diversity:

- Opportunities for improved efficiency at every stage in the production, transmission and distribution of energy services need to be pursued. This includes a greater take-up of distributed energy opportunities and the development of hybrid energy systems.
- Although energy efficiency improvements have been made by energy end-users in the industrial, commercial, transport and residential sectors, much work remains to be done.
- Opportunities for greater energy diversity must also be explored. While Australia will rely mainly on fossil fuels for its energy supply over at least the next decade, improving the diversity of energy sources will become increasingly important. This will involve the greater use of renewable energy, the development of alternative transport fuels etc.

These challenges are central to the Ministerial Council on Energy's work. The collaborative framework that the Council provides should ensure a genuinely national response.

**For more information please contact the CADET Australian National Team (E-mail: [caddet@auroraenergy.com.au](mailto:caddet@auroraenergy.com.au)).**

# Smart Traffic Light uses LED technology

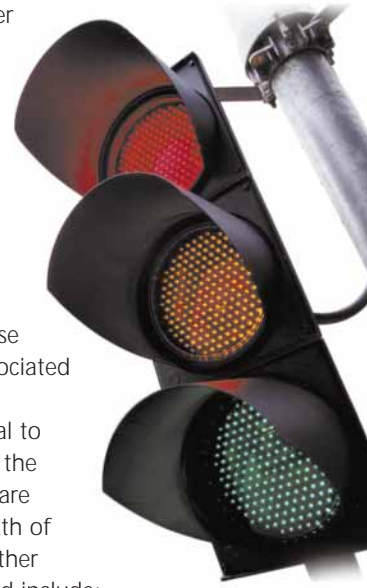
**News from Australia** 

Traffic Technologies has developed a Smart Traffic Light (STL™) that uses high luminous intensity light emitting diodes (LEDs). The company claims that the lights have a power consumption of only 10 watts, a reduction of more than 80% compared with the power used by conventional traffic lights (more than 60 watts). Greenhouse gas emissions, associated with generating electricity from coal to provide power for the new traffic lights, are reduced to one sixth of previous levels. Other advantages claimed include:

- a typical lifetime of 10 years (100,000 hours), around 20 times longer than that of a typical conventional lamp (5,000 hours);
- a reduction in maintenance costs of 50-80%.

The Smart Traffic Light's energy-efficient operation and long life make it a potentially attractive alternative to conventional traffic lights. Units have been installed at a number of sites in Queensland and South Australia for evaluation by local authorities and feedback has been positive. The STL™ has been sold in Malaysia, and several overseas distributorship agreements have been established, notably in Asia, the Middle East, Europe and South America, which should encourage exports in the future.

**For more information please visit [www.traffictechnologies.com.au](http://www.traffictechnologies.com.au)**



# energy framework

consideration to several issues, including impediments to investment in interconnection, transmission pricing, regulatory overlap, market behaviour (eg rebidding), and the effectiveness of regulatory arrangements in promoting an efficient electricity market.

**An independent, high-level strategic review of energy market development in the medium to longer term**

Because COAG recognises the importance of an open and competitive national energy market in achieving Australia's energy policy goals, it has initiated an independent review that will identify the strategic issues arising during on-going energy market development. The findings will help governments to identify the major benefits still to be gained from



## New publications

### New transmission options for heavy trucks

Although specifying a transmission for a heavy truck can be challenging, this important decision has a considerable impact both on the individual truck's fuel consumption and on the fleet's bottom line. Automatic-type transmissions have been used in lighter truck configurations for more than 20 years and are now beginning to find their way into heavy vehicle fleets, with promising results.

Natural Resources Canada's FleetSmart programme recently commissioned a study of three fleets that operate vehicles equipped with manual and semi-automatic transmissions. This study highlighted two important results:

- drivers need significantly less training to operate a vehicle equipped with a semi-automatic transmission;
- one of the fleets reported a 5% improvement in fuel efficiency with semi-automatic trucks, while the others reported no fuel efficiency improvements at all.

The overall conclusion is that, while automatic-type transmissions are not the right choice for everyone, they may provide time and money savings in many situations.

**A report, *Technical Evaluation of Automatic-Type Transmissions for the Heavy Truck Market*, was published in July 2001.**

ISBN: 0-662-30631-7 (English)

ISBN: 0-662-85916-2 (French)

Copies are available free of charge from the FleetSmart programme:

Fax: +1 613 952 8169

E-mail: [fleet.smart@nrcan.gc.ca](mailto:fleet.smart@nrcan.gc.ca)

For more information on reducing fuel costs and vehicle emissions please visit <http://oee.nrcan.gc.ca/fleetmart>

### Energy Policies of IEA Countries - 2001 Review

This publication contains an analysis of energy market developments in Member countries of the International Energy Agency.

Among its highlights are:

- Summaries of in-depth reviews of Australia, Belgium, the Czech Republic, New Zealand, Spain and Turkey which were conducted October 2000 to June 2001. The full reviews are published separately.
- Short reviews of policy developments in Finland, Hungary, Ireland, Italy, Japan and Switzerland.
- Energy balances and key statistical data for all Member countries.
- Key energy statistics for the past 20 years.

The overview section examines trends in energy markets, including an analysis of energy demand and supply changes over the last decade and the price trends of fuels for the past two years. It examines the Member countries' progress in regulatory reform with an analysis of the electricity crisis in California. It also analyses actions taken by the Member countries to meet their Kyoto targets. It contains a short study on developments in non-members including Russia, Saudi Arabia, India and China.



### Energy Policies of IEA Countries - 2001 Review

350pp. ISBN 92-64-19659-5

Price: USD 120 (where USD is the US dollar)

The book can be ordered from IEA Books,  
Fax: +33 1 40 57 65 59, E-mail: [books@iea.org](mailto:books@iea.org),  
Web site: [www.iea.org/books](http://www.iea.org/books)

## The Diagnostic Agent for Building Operators

### News from Canada



Almost imperceptible flaws in building heating, ventilation and air-conditioning (HVAC) systems are frequently responsible for significant energy losses, equipment deterioration and occupant discomfort. Sometimes these flaws remain undiscovered until building occupants complain. To overcome the problem, the CANMET Energy Diversification Research Laboratory (CEDRL) in Varennes, Québec, Canada, has developed a new approach to detecting and diagnosing such faults. This is known as the Diagnostic Agent for Building Operators (DABO).

The new fault detection and diagnosis (FDD) system is an integrated tool that is based on statistical and artificial intelligence models. In a conventional system, data from a building's numerous sensors are used to initiate alarms or produce a graphic showing development of the variables over time. Analysis and interpretation are left to the operator. In the DABO system, sensor data pass continuously to the FDD software and are analysed automatically. A hierarchical sequence of decision-making operations is used to detect and diagnose faults.

The system is capable of detecting up to 30 types of fault in an air distribution system alone. It is currently being tested in the CEDRL offices and, in the year since its installation, has been instrumental in improving indoor environmental conditions as well as reducing HVAC operating costs.

For more information please E-mail [mstylian@nrcan.gc.ca](mailto:mstylian@nrcan.gc.ca) or [daniel.choiniere@nrcan.gc.ca](mailto:daniel.choiniere@nrcan.gc.ca)

# Available from CADET EE

Many CADET Energy Efficiency products can be downloaded free from our Web site. Publications for which charges are made may also be ordered via the Internet. Detailed summaries and other product information are available at: [www.caddet-ee.org](http://www.caddet-ee.org)

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[www.caddet-ee.org/e-ntouncements/index.php](http://www.caddet-ee.org/e-ntouncements/index.php)

## National Team Contacts

The countries listed below participate in the IEA CADET Energy Efficiency programme. National Teams collect information on successful demonstration projects and forward it to the CADET Centre. CADET products, such as news bulletins and technical brochures, are distributed through the National Teams at the addresses below. If your country is not a member of CADET, please forward your enquiries to the CADET Centre (E-mail: [caddet@caddet-ee.org](mailto:caddet@caddet-ee.org)).

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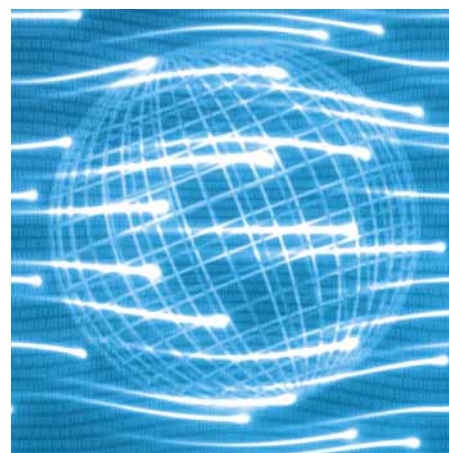
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## Web sites worth a visit

### Finding out about distributed energy resources

The term 'distributed energy resources' (DER) refers to the small, modular power-generating technologies that can be combined with energy management and storage systems and used to improve operation of the electricity grid.

The US Department of Energy's Office of Distributed Energy Resources now has a fully redesigned Web site that showcases the growing body of information the Office has to offer on this topic. The site gives details of DER applications and issues, provides information about the DER Office and has links to all DER programmes. Although the site already has a substantial information content, more will be added during 2002. Additions will include in-depth information on DER projects, resources, suppliers, project financing, and regulatory and policy issues.

**For more information please visit**  
[www.eren.doe.gov/der/](http://www.eren.doe.gov/der/)

# Sun shading for increased energy efficiency

## Tests combining automatic blind control with daylight control of lighting achieve energy savings in Norway

by Trond Gärtner of the CADET Norwegian National Team

Sun shading is widely used in office buildings. Used correctly, it can reduce energy consumption: used inappropriately, it can increase energy consumption. Therefore, correct control of sun shading is a key factor in improving energy efficiency.

Tests and simulations have been carried out by Erichsen & Horgen A/S in Norway. Temperature and light measurements were made in an 11 m<sup>2</sup> test office with automatically controlled blinds mounted inside and outside of the windows. Simulations using the TRNSYS computer program calculated the annual energy demand for different blind-control strategies.

Temperature is an essential indoor climate indicator. Since thermometers are often mounted on a wall away from windows, the measured temperature frequently differs substantially from the actual temperature at sunny locations close to windows. Using a globe thermometer, tests were carried out to measure the temperature experienced by individuals at their workstations.

Measurement of light conditions showed that, without blinds, the illuminance was more than 40,000 lux at a window workstation in the middle of the day. This is significantly above the 500-750 lux regarded as adequate. However, while blinds are obviously necessary under these conditions, they need to be regulated so that they let sufficient daylight into the room, thereby minimising the need for artificial lighting. Combining blind regulation with light sensors to control the artificial lighting optimises energy use.

Three different control strategies were tested:

1. Regulation of external blinds according to the level of solar radiation.

2. Regulation of external blinds as above, plus daylight control of office lighting.
3. Regulation of external blinds according to the level of solar radiation whenever external temperatures exceeded 0°C. Use of internal blinds at external temperatures below 0°C. Daylight control of lighting. Internal blinds let down on cold nights to provide extra insulation.

All three strategies proved effective in reducing glare. They also reduced indoor temperatures on hot, sunny days, indicating that the correct use of blinds will reduce the need for cooling and could reduce investment in cooling equipment.

Strategies 2 and 3 substantially reduced energy consumption for lighting. Strategy 3 was the most energy efficient overall, keeping out both excess heat and light on

warm days, and allowing heat to enter the office on cold, sunny days while optimising light to the workstation. The simulation predicted a reduced energy demand of about 18% for Strategy 3, compared with Strategy 1. For the test office, this is equivalent to a reduction in energy consumption of about 200 kWh/year.

Although the strategies used were designed for Norwegian meteorological conditions, the principles of sun shading are universally applicable and will result in energy saving wherever they are applied. However, experience suggests that the best results are achieved where blinds are controlled automatically.

**For more information please contact the CADET Norwegian National Team (E-mail: [kanenergi@kanenergi.no](mailto:kanenergi@kanenergi.no)).**

Photo: Norges solskjermingsforbund/Denorma Krone

