

The Danish Electricity Saving Trust Purchasing Guidelines 2006

For organisations that want to purchase energy-efficient products and save money

IT and office equipment

White goods

Water coolers

Food and drink vending machines

Consumer electronics

Lighting

Ventilation

Pumps

Motors

Server equipment



By purchasing equipment featured in the Danish Electricity Saving Trust's "Purchasing Guidelines 2006", purchasers are fulfilling the requirements of the "Circular on Improving Energy Efficiency in Danish Public Sector Institutions" and the conditions for being a member of the Trust's A-club.

Energy-efficient purchasing is profitable

Choose energy-efficient electrical equipment and save substantial amounts on the electricity bill over the life of the equipment. It is often not any more expensive to buy, and if it is, the money is soon recouped. Therefore it is advantageous to purchase only energy-efficient equipment. Now it is also mandatory for all public sector institutions. Furthermore, members of the Danish Electricity Saving Trust's A-club have voluntarily agreed to adhere to the purchasing requirements.

How to buy energy-efficient electrical equipment

Wherever possible, only purchase energy-efficient electrical equipment that fulfils the requirements described in the "Purchasing Guidelines 2006", which are valid for 12 months at a time. This applies to the purchase of both new equipment and new components for existing systems – a new ventilator for an existing ventilation system, for example. The requirements also cover equipment that you plan to install on your premises that is supplied under other types of agreements, such as leasing contracts.

The easiest way to do this is to ask suppliers or stores to ensure that the equipment fulfils the purchasing requirements. Show them the "Purchasing Guidelines 2006" or refer them to www.sparel.dk/indkoeb. When preparing tenders, you can incorporate the requirements set out in the "Purchasing Guidelines 2006" into the tender documents to highlight that you only wish to receive offers on products that fulfil the requirements of the Trust's "Purchasing Guidelines 2006".

If you want a more in-depth choice of products, you can check the Danish Electricity Saving Trust's approved lists covering a range of energy-efficient products. You can also look at the technical specifications for the equipment and see if they conform to the purchasing policy requirements.

Purchasing requirements

On the following pages we present purchasing requirements, good advice and references on the equipment described. See below for an example of how the information is structured on the pages.



The blue tables contain the requirements that the electrical equipment must fulfil.

The yellow box provides references to the Danish Electricity Saving Trust's approved lists and links to web sites with additional information.

The green box offers good advice on how to make further savings when purchasing and operating the equipment.

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These "Purchasing Guidelines" apply in 2006. See www.sparel.dk/indkoeb for changes made compared with 2005.

Any comments or questions?

Please contact us. E-mail: sparel@sparel.dk
or Tel: (+45) 70 26 90 09.

Computers and monitors

There is such a large variation in power consumption for computers and monitors that it is actually possible to halve the consumption by choosing the energy-efficient route when replacing equipment. For every unit, savings of up to DKK 1,000 can be made over the life of the equipment. Generally speaking, choosing the energy-efficient purchasing option is no more expensive, unless you plan to move from desktop to notebook computers and from the old bulky CRT monitors to flat panel monitors. But in this situation, there are other advantages apart from low power consumption – more space on the desk, a more relaxing display and better indoors climate because the monitor radiates less heat.



Purchasing requirements – Computers

Type	On ⁽¹⁾ Watt	Sleep ⁽²⁾ Watt	Standby ⁽³⁾ Watt	Delay before sleep Min.	Other require- ment
Desktops and notebooks	80	5	2	30	(5)
Desktops with built-in monitor					
Screen resolution (O) less than 1 megapixel	103	5	2	30	(5)
Screen resolution (O) greater than/equal to 1 megapixel	$80 + 28 \cdot O^{(4)}$	5	2	30	(5)

The requirements apply to standard types of personal computers connected to the mains, including types with an external power supply, and types that can operate with rechargeable batteries. Power consumption and times displayed in the table are the maximum permitted for energy-efficient equipment. See www.sparel.dk/ for a full description and scope of the definitions.

(1) On/active power is the idle mode immediately after power-up with the computer running the operating system, drivers, etc., but excluding user activity.
 (2) The computer must automatically switch to sleep mode/low power after a maximum of 30 minutes without user activity. Computers must be able to re-start rapidly.
 (3) Computer is in off mode/standby power when the user closes down the operating system in the normal way.
 (4) O is horizontal x vertical resolution in megapixels. Example: Resolution of 1280 x 1024 is equal to 1.31072 megapixels. Maximum power consumption is 80 + 36.7 W (1.31072 x 28 W) equivalent to 116.7 W.
 (5) Computer must power down connected or built-in monitor after a maximum of 30 minutes.

Purchasing requirements – Monitors

Monitor type	On Watt	Sleep ⁽¹⁾ Watt	Standby ⁽²⁾ Watt	The requirements cover standard monitor types connected to the mains. Power consumption and time displayed in the table are the maximum permitted for energy-efficient equipment. See www.sparel.dk/skaerme for a full description and scope of the definitions.
Resolution (O) less than 1 megapixel	23	2	1	(1) The sleep function is controlled by the computer. (2) The monitor is in off mode/standby power when the user switches off the unit using the 'on/off' button.
Resolution (O) greater than/equal to 1 megapixel	$28 \cdot O^{(3)}$	2	1	(3) O is horizontal x vertical resolution in megapixels. Example: Resolution of 1280 x 1024 is equivalent to 1.31072 megapixels. Maximum power consumption is 36.7 W (1.31072 x 28 W).

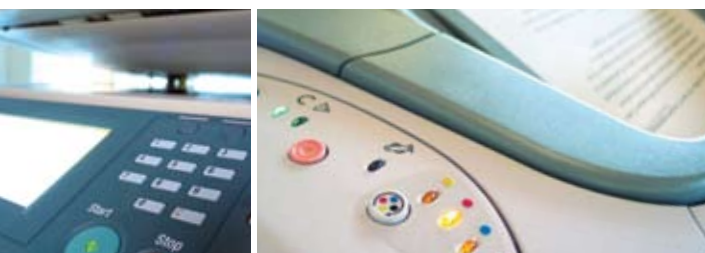
Good advice on purchasing and operating equipment

- Choose notebooks and flat panel monitors. Typically, these consume less than half as much power compared with desktop computers and conventional CRT monitors.
- Choose computers and monitors with the lowest power consumption costs over their lifetimes. The most efficient examples use less than half as much power compared with the most inefficient. Check running costs over their operational lifetime at www.it.sparel.dk
- Choose products with external power supplies that conform to the requirements for power supplies listed on page 5.
- Buy auto power saving plug banks (elspareskinne) that automatically power down any connected equipment (monitor, printer, etc.) when the computer is switched off.
- Make sure that computers and monitors are programmed to switch to sleep mode/low power after 5 to 30 minutes of non-activity using the operating system's 'Control Panel' power management options. If possible, use special server software that can close down a networked computer when it is not in use.
- Make users aware that they need to remember to switch off the computer and monitor when they go home, and switch off the monitor when they go to meetings or to lunch. If everyone has an auto power saving plug bank, then it is only necessary to switch off the computer, because all the attached equipment is powered down automatically.

Further information

- View the in-depth purchasing requirement with a comprehensive description of the definitions and scope at:
 - www.sparel.dk/computere
 - www.sparel.dk/skaerme
- View the product lists covering computers and monitors from suppliers that have entered into a voluntary agreement with the Danish Electricity Saving Trust on the basis that they fulfil the requirements relating to energy-efficient purchasing:
 - www.it.sparel.dk/computere
 - www.it.sparel.dk/baerbare
 - www.it.sparel.dk/skaerme
- View the power consumption in the energy declaration displayed in advertisements, technical data, etc., by suppliers bound by the Danish Electricity Saving Trust's voluntary agreements.
- Read more on energy-efficient purchasing and operation of computers and monitors at: www.it.sparel.dk
- Read more on the auto power saving plug bank, and where it can be sourced, at: www.sparel.dk (under power saving equipment).
- Download the Danish Electricity Saving Trust's fact sheet on IT and office equipment at: www.it.sparel.dk
- Contact the Danish Electricity Saving Trust.
E-mail: sparel@sparel.dk or Tel: (+45) 70 26 90 09.

Photocopiers and printers



Photocopiers and printers in the office are often hidden power guzzlers inasmuch that most of the time they stand around waiting without producing anything. If equipment is not configured to switch to energy-saving mode, or if the power consumption is too high in the energy-saving mode, one can easily waste several thousand kroner per machine annually on the electricity bill.

Purchasing requirements – Printers and printer/fax combinations

Type	Sleep Watt	Off Watt	Delay before sleep ⁽¹⁾ Min.	The requirements apply to printers and printer/fax combinations connected to the mains and using standard A4 – A3+ paper. Power consumption and times shown in the table are the maximum permissible for energy-efficient equipment. See www.sparel.dk/printere for a full description and scope of the definitions. (1) The first number applies to printers and the second to printer/fax combinations.
Black-ink and colour inkjet				
Printing speed < 10 ppm (pages per min)	5	1	5/5	
Printing speed 11–20 ppm	10	1	15/5	
Printing speed 21–30 ppm	15	1	30/15	
Printing speed > 30 ppm	15	1	30/15	
Professional colour (laser, LED, thermal transfer, etc.)	30	1	30	
Printer without manual 'on/off' switch	3		30	

Purchasing requirements – Photocopiers and multifunction machines

Type	Sleep Watt	Auto-off ⁽¹⁾ Watt	Off ⁽²⁾ Watt	Delay before sleep Min.	Delay before auto-off ⁽³⁾ Min.	Activation time ⁽⁴⁾ Sec.	Other requirement
Normal format (up til A3+)							
Speed (S) < 20 ppm	1.5·S	1	1	5	30	10	(5)
Speed (S) 21–44 ppm	3·S	5	1	30	60	30	(5)
Speed (S) > 44 ppm	3·S	5	1	30	60	30 ⁽⁶⁾	(5)
Large format (over A3+)							
Speed (S) < 40 ppm		10			30		(5) (7)
Speed (S) > 40 ppm	5+(3.85·S)	20		15	90		(5) (7)

The requirements apply to analogue and digital photocopiers and multifunction machines connected to the mains and using normal paper. Power consumption and times shown in the table are the maximum permissible for energy-efficient equipment. See www.sparel.dk/kopimaskiner for a full description and scope of the definitions.

- (1) Machine goes automatically into auto-off mode/standby power (special type of 'off' mode) based on the inputted auto-off time. Requirement not applicable to multifunction machines with built-in fax.
(2) 'Off' is when users manually switch off the machine. Requirement not appli-

cable to multifunction machines with built-in fax.

- (3) Requirement not applicable to multifunction machines with built-in fax.
(4) Activation time is the time a machine takes to 'wake' from sleep mode/low power.
(5) The maximum delay time for switching to off mode/standby power and sleep mode/low power should not exceed four hours in total for both modes.
(6) Recommended but not required.
(7) If the machine has a duplex function, make sure this feature is enabled.

Good advice on purchasing and operating equipment

- Play a part in choosing equipment that meets rather than exceeds your needs.
- Check the data for power consumption in ready mode, and, whenever possible, choose equipment with low consumption.
- Choose machines with good energy-saving functions, which also warm up quickly to ready mode.
- Choose products with external power supplies that conform to the requirements for power supplies listed on page 5.
- Whenever possible, choose a model with duplex (two-sided printing) capability. Configure the equipment to automatically print or copy in duplex, or persuade staff use the duplex feature. Several tons of paper can be saved over the machine's life-time, with twice as much space available on the shelves.
- Make sure that the machines are configured to switch to sleep mode/low power and auto-off mode/standby power in the shortest possible time acceptable in relation to warm-up time.
- Set the timer control on the machine to auto-off based on the office's closing time, or involve users so the last person leaving the office switches off all the machines.

Further information

- View the in-depth purchasing requirement with a comprehensive description of the definitions and scope at:
 - www.sparel.dk/printere
 - www.sparel.dk/kopimaskiner
- Download the Danish Electricity Saving Trust's fact sheet on IT and office equipment at: www.it.sparel.dk
- Contact the Danish Electricity Saving Trust.
 - E-mail: sparel@sparel.dk
 - or Tel: (+45) 70 26 90 09.

Other office equipment

Most offices have fax machines, scanners, cordless and mobile telephones and many small devices with separate power supplies. Taken individually these devices do not consume very much power, but if there are many the amount of wasted power can be significant.



Purchasing requirements – Fax machines

Type	Sleep Watt	Delay before sleep Min.	
All	1	5	The requirements apply to fax machines, including types with integrated phone, telephone answering facility, etc. Power consumption and times displayed in the table are the maximum permitted for energy-efficient equipment. See www.sparel.dk/telefaxer for a full description and scope of the definitions.

Purchasing requirements – Scanners

Type	Sleep Watt	Off ⁽¹⁾ Watt	Delay before sleep Min.	
All	5	1	15 ⁽²⁾	The requirements apply to scanners used in normal circumstances in the office and at home. Power consumption and times displayed in the table are the maximum permitted for energy-efficient equipment. See www.sparel.dk/skannere for a full description and scope of the definitions. (1) If function is present. (2) Should never be set at more than 60 minutes.

Purchasing requirements – Cordless and mobile telephones

Type	Standby ⁽¹⁾ Watt	Not connected ⁽²⁾ Watt	
All	1	0.3	The requirements apply to cordless and mobile phones used in normal circumstances in the office and at home. Power consumption and times displayed in the table are the maximum permitted for energy-efficient equipment. See www.sparel.dk/telefoner for a full description and scope of the definitions. (1) Phone is connected to the charger or base station, is fully charged and is not in use. (2) Phone is switched off and is not connected to charger or base station.

Purchasing requirements – External power supplies and battery chargers

Type	Efficiency On/active power ⁽¹⁾	At idle ⁽²⁾ Watt	
Maximum power output Watt	%		
Power < 1.5	30	0.30	The requirements apply to external power supplies and battery chargers used in normal circumstances in the office and at home that are either supplied separately (i.e. not built into the appliance), or those supplied with portable personal devices (PDA, music players, etc.). Power consumption displayed in the table is the maximum permitted for energy-efficient equipment, but the efficiency figures represent the minimum permitted. For a full description and scope of the definitions see www.sparel.dk/stroemforsyninger (1) Average efficiency at 25%, 50%, 75% and 100% load. (2) No appliance connected.
1.5 ≤ power < 2.5	40	0.30	
2.5 ≤ power < 4.5	50	0.30	
4.5 ≤ power < 6.0	60	0.30	
6.0 ≤ power < 10.0	70	0.30	
10.0 ≤ power < 15.0	75	0.30	
15.0 ≤ power < 25.0	75	0.50	
25 ≤ power < 50.0	80	0.50	
50.0 ≤ power < 60.0	80	0.75	
60.0 ≤ power < 150.0 ⁽³⁾	80	1.0	

Good advice on purchasing and operating equipment

- Consider whether a traditional fax machine is necessary as opposed to having a fax modem on a server which is constantly 'on'.
- Choose a scanner fitted with an 'on/off' switch. If this is not possible, then connect the scanner to a power plug that can easily be switched off by users and encourage them to do this after use.
- Choose products with external power supplies that conform to the above requirements for power supplies.

Further information

- View the in-depth purchasing requirement with a comprehensive description of the definitions and scope at:
 - www.sparel.dk/telefaxer
 - www.sparel.dk/skannere
 - www.sparel.dk/telefoner
 - www.sparel.dk/stroemforsyninger
- Download the Danish Electricity Saving Trust's fact sheet on IT and office equipment at: www.it.sparel.dk
- Contact the Danish Electricity Saving Trust.
E-mail: sparel@sparel.dk or Tel: (+45) 70 26 90 09.

White goods, water coolers, food and drink vending machines



It is easy to choose energy-efficient household appliances (white goods) by checking the European Union's energy label. Requirements covering professional equipment are currently only available for fridges and freezers. Hundreds of kroner in savings are available per appliance by choosing an energy-efficient model from all the types of white goods on the market. Many offices have water coolers and food and drink vending machines that dispense coffee, soft drinks and sweets. These machines are often power guzzlers. The Trust has not yet formulated any purchasing requirements for vending machines, but we can offer good advice on purchasing and operating them.

Purchasing requirements – Large domestic appliances (white goods)

Type	Energy label	The requirements apply to white goods covered by the European Union energy labelling directive for household appliances and their combinations. See www.sparel.dk/hvidevarer for a full description and scope of the definitions.
Fridges and freezers	A+ or A++	
Washing machines, dishwashers, tumble-dryers, ovens, cookers	A	

Purchasing requirements – Commercial refrigeration and freezer equipment

Type	Relative power consumption KWh/48h/m ³	The requirements apply to fridges and freezers suitable for professional use. Power consumption displayed in the table is the maximum permitted for energy-efficient equipment and fulfils the criteria required for inclusion on the Danish Electricity Saving Trust's recommended list (www.prof-hvidevarer.sparel.dk) of energy-efficient refrigeration and freezer equipment. See www.sparel.dk/koelemoebler for a full description and scope of the definitions.
Fridges 400 og 600 litres 1300 litres	15 12	
Freezers 400 og 600 litres 1300 litres	40 36	

Good advice on purchasing and operating equipment

- Play a part in choosing equipment that meets rather than exceeds your needs.
- Some white goods appliances have a standby consumption which is not included in the energy label. Check how much power is used and choose a type with low consumption.
- Consider a natural gas powered tumble-dryer if natural gas is available.
- Consider washing machines and dishwashers with both cold and hot water feeds, as this can save electricity used to heat up the water.
- Before signing a contract, talk to your supplier about power consumption of food and drink vending machines, and consider whether there are alternative less power-hungry solutions.
- Wherever possible, only install food and drink vending machines that have sleep mode/low power functionality which is activated when the machines are not in use for a predetermined period.
- Wherever possible, only install soft drinks vending machines conforming to Energy Star specifications (see www.energystar.gov).
- Consider whether it is possible to use a tap water flow cooler instead of a bottled spring water cooler.
- Measure the power consumption of existing vending machines to check whether something needs to be done about the consumption.
- Install clock timers or other types of automatic controllers on food and drink vending machines that do not have sleep mode/low power functionality, which is activated when the machines are not in use for a predetermined period. However, this does not apply to machines that have to keep products cold.

Further information

- View the in-depth purchasing requirement with a comprehensive description of the definitions and scope at:
 - www.sparel.dk/hvidevarer
 - www.sparel.dk/koelemoebler
- Check www.hvidevarerpriser.dk for approved lists covering all large domestic appliances and the market's lowest prices.
- Check the approved lists covering commercial fridges and freezers that fulfil the energy-efficient purchasing requirements:
 - www.prof-hvidevarer.sparel.dk/koeleskabe
 - www.prof-hvidevarer.sparel.dk/frysere
- Download the Danish Electricity Saving Trust's fact sheet on commercial refrigeration and freezer equipment: www.prof-hvidevarer.sparel.dk
- Contact the Danish Electricity Saving Trust.
 - E-mail: sparel@sparel.dk or
 - Tel: (+45) 70 26 90 09.

These days, most new traditional TVs feature low standby power consumption. But some of the new types of consumer electronics have a high power consumption in both standby and 'on' modes, so it is well worth looking for the energy-efficient types.



Purchasing requirements – TVs

Type	Active standby Watt	Standby Watt	The requirements apply to TVs connected to the mains with visible screen size exceeding 20 cm (8 inches). Power consumption displayed in the table is the maximum permitted for energy-efficient equipment. See www.sparel.dk/fjernsyn for a full description and scope of the definitions.
Traditional analogue		1	
With integrated digital receiver and decoder			
Terrestrial aerial	8	1	
Cable network	7	1	
Satellite	9	1	
With VCR and/or DVD		2.5	

Purchasing requirements – VCRs and DVDs

Type	On Watt	Standby Watt	Delay before standby Min.	The requirements apply to VCRs and DVDs connected to the mains. Power consumption displayed in the table is the maximum permitted for energy-efficient equipment. See www.sparel.dk/videoer for a full description and scope of the definitions. (1) Only applies to traditional cassette-tape-type VCRs. (2) Applies to period commencing from time that media (tape, DVD, etc.) have finished playing.
Playing and recording	15 ⁽¹⁾	2.5	30 ⁽²⁾	
Playing only	11	1	30 ⁽²⁾	

Purchasing requirements – Satellite receivers and set-top boxes

Type	On Watt	Active standby Watt	Standby Watt	The requirements apply to satellite receivers and set-top boxes connected to the mains. Power consumption displayed in the table is the maximum permitted for energy-efficient equipment. See www.sparel.dk/settopbokse for a full description and scope of the definitions. (1) Power consumption depends on type (terrestrial aerial, cable network, or satellite aerial) and additional functions. See "Code of Conduct for Digital TV Service Systems (Annex B)" that can be downloaded at: energyefficiency.jrc.cec.eu.int/html/standby_initiative.htm (2) Must fulfil minimum requirement if function is available on device.
Analogue satellite receiver			1	
Digital set-top box (terrestrial aerial, cable network, satellite)		6-15 ⁽¹⁾	3 ⁽²⁾	
Digital to analogue converter				
Terrestrial aerial, cable network	6		1	
Satellite	9		1	

Purchasing requirements – Audio systems and separates

Type	Standby Watt	Delay before standby Min.	The requirements apply to music systems and separates connected to the mains. Power consumption displayed in the table is the maximum permitted for energy-efficient equipment. See www.sparel.dk/musikanlaeg for a full description and scope of the definitions. (1) If function is available. (2) Applies to period commencing from time that media (tape, DVD, etc.) have finished playing.
Integrated audio systems	1		
Audio separates	1 ⁽¹⁾	30 ⁽²⁾	

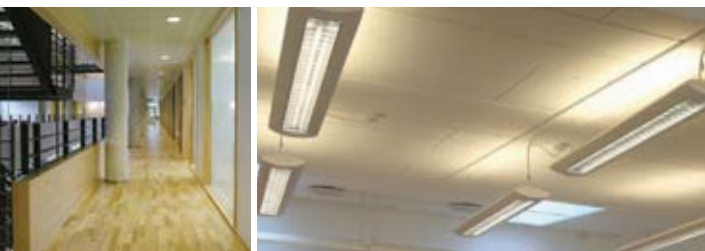
Good advice on purchasing and operating equipment

- Play a part in choosing equipment that meets your needs. Particularly on TVs, power consumption increases dramatically as screen sizes increase.
- Also check the power consumption for the 'on' mode. Plasma screen TVs have a very high power consumption when switched 'on'.
- Choose products with external power supplies that conform to the requirements for power supplies listed on page 5.

Further information

- View the in-depth purchasing requirement with a comprehensive description of the definitions and scope at:
 - www.sparel.dk/fjernsyn
 - www.sparel.dk/videoer
 - www.sparel.dk/settopbokse
 - www.sparel.dk/musikanlaeg
- Contact the Danish Electricity Saving Trust. E-mail: sparel@sparel.dk or Tel: (+45) 70 26 90 09.

Lighting



In many places, lighting systems provide a poor light and use too much electricity, but it is possible to have better lighting and reduce power consumption by half by replacing the old lighting system. Because lighting systems are often an investment over a 10 to 20-year horizon, they can have a great impact on electricity bills. Thus, it is important to choose energy-efficient systems. If the lamps and fittings are not replaced, then it is a question of choosing the best light source.

Purchasing requirements – Lighting systems

Type	Power consumption ⁽¹⁾ W/m ²	Other requirement	
Offices	10	(2)	<p>The requirements apply to lighting systems installed in normal office locations, where the fittings and lighting quality are not required to exceed the official standards. The power consumption displayed in the table is the maximum permitted for energy-efficient equipment. See www.sparel.dk/belysning for a full description and scope of the definitions.</p> <p>(1) The power consumption includes the power consumed by the components controlling the lighting, and are per square metre of floor area.</p> <p>(2) Must fulfil legal requirements covered by DS 700, and where possible the requirements for consumption specified in the Danish Electricity Saving Trust's approved lists for lighting systems (see www.belysning.sparel.dk), and must also have movement sensor and daylight sensor control in offices with adequate daylight.</p> <p>(3) Must have daylight sensor control in offices with adequate daylight so that the lighting system is adjusted in relation to the amount of natural light. Must have movement sensors to ensure that lights are only switched on when people are in the room. Must have energy-efficient fittings with an efficiency rating of at least 50%.</p>
Daycare centres	10	(2)	
Classrooms	8	(2)	
Access areas	5	(2)	
Other locations		(3)	

Purchasing requirements – Lighting sources

Type	Energy label	
All, where fitting design and requirement for lighting permit	A	The requirements apply to normal types of lighting sources where the fitting design and lighting quality requirements permit the use of energy label class A lighting sources. See www.sparel.dk/lyskilder for a full description and scope of the definitions.

Good advice on purchasing and operating equipment

- Carry out a thorough survey before choosing a lighting system. Involve the users and, where necessary, a lighting consultant. Consider whether the furniture can be arranged differently in order to make the best possible use of daylight.
- Use a combination of basic lighting and individual energy-efficient work lights.
- Use the Danish Electricity Saving Trust's diagnostic tools that can help you evaluate your existing lighting and calculate the economics of installing a new system.
- Choose fittings that are robust, easy to clean, well screened so that users do not see the light source, flexible and with an output that suits the space. Also, always view a sample with a light fitting installed.
- Buy low energy light bulbs from the list available on the Danish Electricity Saving Trust's www.a-paere.dk web site because these fulfil the requirements for both quality and energy efficiency.

Further information

- View the in-depth purchasing requirement with a comprehensive description of the definitions and scope at:
 - www.sparel.dk/belysning
 - www.sparel.dk/lyskilder
- Read more about lighting systems for offices and institutions and the grant possibilities available for the public sector at: www.belysning.sparel.dk This is also where you can download our diagnostic self-assessment and financial calculator tools.
- Read more about lighting in homes at www.boliglys.dk
- Download the Danish Electricity Saving Trust's fact sheet on lighting at: www.it.sparel.dk
- Contact the Danish Electricity Saving Trust.
E-mail: sparel@sparel.dk or Tel: (+45) 70 26 90 09.

Ventilation, pumps and motors

In many locations, ventilation is very poor in rooms and spaces and power consumption is excessive. Nonetheless it is possible to improve ventilation and reduce the electricity bill. Furthermore, circulation pumps and motors are often not matched to requirements and thus far more power than necessary is consumed.



Purchasing requirements – Ventilators

Type	Efficiency ⁽²⁾ %	Other requirements	
Radial ventilators (centrifugal ventilators) and axial ventilators ⁽¹⁾			<p>The requirements apply to ventilators for ventilation systems installed in offices, open spaces, etc. The requirements are equivalent to the Spareventilator® standards laid down by the electricity supply companies. The minimum requirement for energy-efficient ventilators is that they conform to the requirements specified in the table. See www.sparel.dk/ventilation for a full description and scope of the definitions.</p> <p>(1) Interval stated includes upper threshold figure; e.g. 1 kW output is classified under 0.5–1 kW interval.</p> <p>(2) The efficiency is the minimum value that a ventilator must achieve at the duty point, which is the point on the efficiency curve relative to the shaft power when the requirement is fulfilled. This is usually around the maximum possible revolutions per minute (RPM), but it can also be at some other point on the curve.</p> <p>(3) The ventilator must have a capacity range on the curve for maximum efficiency that, as a minimum, extends from the duty point down to a value equivalent to the duty point minus 50%.</p>
Shaft power < 0,5 kW	76	(3)	
Shaft power 0,5–1 kW	78	(3)	
Shaft power 1–3 kW	79	(3)	
Shaft power 3–10 kW	80	(3)	
Shaft power 10–20 kW	81	(3)	
Shaft power 20–50 kW	82	(3)	
Shaft power 50–100 kW	83	(3)	
Shaft power > 100 kW	84	(3)	
In-line radial ventilators, shaft power < 3 kW	65	(3)	

Purchasing requirements – Pumps

Type	Other requirement	
All	(1)	<p>The requirement comprises all types of pumps that are included on the lists of pumps (www.sparepumpe.dk) produced by the electricity supply companies. See www.sparel.dk/pumper for a full description and scope of the definitions.</p> <p>(1) Must be on the electricity supply companies' approved lists of pumps (see www.sparepumpe.dk) or otherwise fulfils the acceptance requirements for the lists.</p>

Purchasing requirements – Motors

Type	Efficiency class	
All	EFF1 ⁽¹⁾	<p>The requirements include all types of motors covered by the agreement between the EU Commission and CEMEP (European Committee of Manufacturers of Electrical Machines and Power Electronics). For a full description and scope of the definitions see www.sparel.dk/motorer.</p> <p>(1) EFF1 requirements are covered under "Voluntary Agreement of CEMEP".</p>

Good advice on purchasing and operating equipment

- Get a ventilation system check by undertaking a 'VENT' check-up as one element of the Danish Electricity Saving Trust's ventilation package. A free electricity meter system with remote reading capacity is supplied with the package, which makes it possible to view power consumption on the Internet and compare it with other consumers. Government and public sector institutions can receive grant assistance for making improvements.
- Ensure that the ventilation system can operate when required. Install a timer control system if none is fitted, and check that the installation correctly matches your needs.
- Ensure that the system's air flow is adjusted to cover the required needs.
- Comply with the building regulations' requirements applying to the SEL (specific electricity consumption for air transport) factor for ventilation systems. Pay particular attention to the filter, ducts, size of the heating surfaces and automatic units so as to improve the SEL factor.

Further information

- View the in-depth purchasing requirement with a comprehensive description of the definitions and scope at:
 - www.sparel.dk/ventilation
 - www.sparel.dk/pumper
 - www.sparel.dk/motorer
- Read more on ventilation systems for offices and institutions and the grant possibilities available in government and public sectors at: www.ventilation.sparel.dk
- Read more on pumps for buildings at: www.elsparepumpe.dk
- See recommended lists for pumps at: www.elsparepumpe.dk and www.sparepumpe.dk
- Download the Danish Electricity Saving Trust's fact sheet ventilation equipment at: www.ventilation.sparel.dk
- See recommended lists, and read more about motors at: www.sparemotor.dk
- Contact the Danish Electricity Saving Trust. E-mail: sparel@sparel.dk or Tel: (+45) 70 26 90 09.

Server equipment



Server room power consumption represents a large proportion of the total consumption in office buildings because equipment in a server room is always 'on'. In the average Danish workplace, the server room costs DKK 100,000–200,000 per year to operate: servers account for 60% of the consumption, with air conditioners (30%) and other equipment (10%) making up the balance. In some server rooms it is possible to save up to half the electricity used through energy-efficient purchasing and layout of the server room without compromising operational and IT security.

The Trust has not yet formulated any purchasing requirements for servers, cooling systems for server rooms and other equipment. We recommend that you take advantage of the good advice listed below on purchasing and operation. In addition, you can search our web sites for more information about the possibilities for saving electricity.

Good advice on purchasing and operating equipment

- Check the power consumption of server equipment and choose a version with low consumption. Typically, by saving 1 kWh on the server equipment, you can save 1.5 kWh for the whole server room, including electricity saved by the cooling system.
- Implement server consolidation, where programmes and functions are combined on fewer servers and disk drives so that the total number of servers and disk drives can be reduced.
- Switch off the equipment that is not in use, and move equipment that does not require cooling out of the room.
- Locate the server room in a naturally cool room which is not heated by warm air from outside, but conversely with the possibility of using the warm air from the server room to heat colder surrounding areas.
- Use the free cooling principle, where external cold air is used to cool the server room. Typically, power consumption in this situation can be halved.
- Ensure that the cold air from the cooling system is ducted as directly as possible to the equipment that requires cooling, without it being mixed with the warm air given off by the equipment. This cold air can be circulated through ducts in the floor set between the server racks, and vented through the racks from front to back.
- Ensure that the outer element of the cooling system is placed in a suitably cold and shaded area that allows the air to circulate freely.
- Use the heat dissipated from the server room to heat rooms in other places by ducting the warm air into the building's heat recirculation system.
- Increase the temperature in the server room to the maximum allowable in terms of safety margins. Power savings of 1–3% can be achieved for every degree that the temperature is increased.

Further information

- Use the Danish Electricity Saving Trust's www.selvtjekserverrum.sparel.dk web site to get an estimate of the power consumption in your server room, as well as advice on savings tailored to your situation.
- View more recommendations about the server room at www.serverrum.sparel.dk where you can also see the results of detailed analyses of ten server rooms.
- Download the Danish Electricity Saving Trust's fact sheet on the server room at: www.serverrum.sparel.dk
- Download the Danish Electricity Saving Trust's guide "Good advice for saving electricity in the server room" at: www.serverrum.sparel.dk
- Contact the Danish Electricity Saving Trust. E-mail: sparel@sparel.dk or Tel: (+45) 70 26 90 09.

The Government only purchases energy-efficient equipment

Public sector institutions are taking the lead and must now only purchase energy-efficient electrical equipment. This equipment must either conform to the Danish Electricity Saving Trust's purchasing requirements or be featured on other recommended lists and schemes referred to on the Trust's www.sparel.dk web site. From now on this will be the main gateway to energy-efficient purchasing under the terms laid out in the "Circular on Improving Energy Efficiency in Danish Public Sector Institutions" of April 2005.

Institutions must also formally report and publicise their power consumption. If power consumption exceeds 100,000 kWh, it must be displayed on the Danish Electricity Saving Trust's www.se-elforbrug.sparel.dk web site. These public sector institutions must also undertake financially-viable energy-saving schemes that have a payback period of under 5 years.

Membership requirements for the Danish Electricity Saving Trust's A-club

For some time, about 200 members of the Danish Electricity Saving Trust's A-club have been voluntarily purchasing equipment based on the requirements laid down by the Trust's "Purchasing Guidelines". The members have entered a partnership agreement with the Trust on energy-efficient purchasing because they want to make a positive contribution to reduce electricity consumption and improve the environment.

Apart from receiving help with energy-efficient purchasing, there are other particular membership benefits such as information-sharing groups, arrangements, newsletters, and participation in the development of new electricity-savings activities.

Both large and small ministries, county councils, municipalities and other public sector and private organisations have realised the benefits of being in the A-club. The Ministry of Transport and Energy recommends that all public sector institutions enter into a partnership agreement with the Danish Electricity Saving Trust and become members of the A-club. Read more about the A-club on the club's www.a-klubben.dk web site.

Also for private industry

There are also many private companies that have seen the benefits of purchasing energy-efficient products. Purchasing requirements are just as applicable to the private sector as they are to the public sector.

Background to the requirements

The requirements for energy-efficient purchasing laid down in the Danish Electricity Saving Trust's "Purchasing Guidelines" have been compiled from a number of sources including energy labelling schemes (European Union energy labelling), GEEA (Group for Energy Efficient Appliances) and Energy Star. Thus you can be sure that there are enough electrical appliances to choose from, and that the appliances that fulfil the requirements are the most energy-efficient available. The requirements are reviewed annually.

Good advice

Calculate the lifetime costs

When comparing the purchase prices of different equipment, you should calculate the lifetime costs to arrive at the cheapest buy. Remember that when purchasing equipment you are also buying the power costs over the equipment's total lifetime. Lifetime costs are the sum of the purchase price plus the annual electricity costs multiplied by the anticipated lifetime of the equipment.

Purchasing via SKI (National Procurement Ltd – Denmark)

SKI offers framework contracts to the public sector which not only provide easy access to lower prices but

also enables organisations to avoid having to put bids out to tender under EU rules. SKI's electronic purchasing system provides help with sourcing products that fulfil the purchasing requirements of the Danish Electricity Saving Trust.

Good for the environment

Purchasing energy-efficient equipment is also good for the environment. If you want to do even more, you can specify additional environmental requirements by using the Danish Environmental Protection Agency's (www.miljoevejledninger.dk) environmental guidelines.

The Danish Electricity Saving Trust helps eliminate wasteful consumption of electricity

Government and public sector institutions can save many millions of kroner on their electricity bills. For example, more than one-third of all electricity consumption in public sector workplaces occurs after all employees have gone home.

The Danish Electricity Saving Trust has a range of offerings within the power consumption area covered by the "Purchasing Guidelines". The main portal to the offerings can be found at www.sparel.dk which links you to additional web sites featuring information on how you can reduce power consumption in real terms.

Publicise your electricity consumption

A good place to start is to publicise your electricity consumption on www.se-elforbrug.sparel.dk. This service is completely free for organisations that consume in excess of 100,000 kWh per electricity meter per year. This allows you to track your consumption in real time and compare it with others. Subscribers also receive a consumption report detailing the electricity used, which makes it easy to identify waste.

Subscribe at www.se-elforbrug.sparel.dk

The Danish Electricity Saving Trust

The Danish Electricity Saving Trust is an independent trust led by a Board appointed by the Danish Ministry of Transport and Energy. The Trust was established in 1997 for the purpose of ensuring electricity savings in the household and public sectors.



Further information

- www.sparel.dk
- www.se-elforbrug.sparel.dk
- www.a-klubben.dk
- www.it.sparel.dk
- www.hvidevarer.sparel.dk
- www.prof-hvidevarer.sparel.dk
- www.belysning.sparel.dk
- www.boliglys.dk
- www.a-paere.dk
- www.serverrum.sparel.dk
- www.selvtjekserverrum.sparel.dk
- www.ventilation.sparel.dk
- www.elforbrug.dk
- www.farveled.dk
- www.selvtjek.sparel.dk
- www.elsparefonden.dk
- Contact the Danish Electricity Saving Trust.
E-mail: sparel@sparel.dk
or Tel: (+45) 70 26 90 09.