

THE DANISH ELECTRICITY SAVING TRUST

PURCHASING GUIDELINES

MAKING IT EASY FOR ORGANISATIONS TO PURCHASE ENERGY EFFICIENT PRODUCTS AND SAVE MONEY

07

- IT AND OFFICE EQUIPMENT
- LARGE APPLIANCES
- WATER COOLERS
- AUTOMATIC FOOD AND DRINK VENDING MACHINES
- CONSUMER ELECTRONICS
- LIGHTING
- VENTILATION
- PUMPS
- MOTORS
- NETWORK EQUIPMENT AND SERVERS

The Danish Electricity Saving Trust recommends that all public sector organisations and private companies follow the purchasing guidelines. Purchases based on these guidelines comply with the requirements laid down in the Danish Energy Authority's 'Circular on improving energy efficiency in Danish government institutions'.



ELSPAREFONDEN

CONTENTS

Computers and monitors.....	page 4
Photocopiers and printers, etc.....	page 6
Other office equipment.....	page 8
- Electric height adjustable desks	
- Cordless telephones	
- Mobile phones	
- External power supplies	
- Battery chargers	
Large appliances, water coolers and food and drink vending machines.....	page 9
- Fridges and freezers	
- Washing machines	
- Dishwashers	
- Tumble dryers	
- Ovens	
- Cookers	
- Commercial fridges and freezers	
- Water coolers	
- Coffee makers	
- Automatic food and drink machines	
Consumer electronics.....	page 10
- TVs	
- VCRs and DVDs	
- Simple digital to analogue converters and set-top boxes	
- Audio systems and separates	
Lighting.....	page 12
- Lighting systems	
- Light sources	
Ventilation, pumps and motors.....	page 13
- Ventilators	
- Pumps	
- Motors	
Network equipment and servers.....	page 14
How to use these guidelines.....	page 15
The Trust helps you reduce your electricity bill.....	page 16

The purchasing guidelines apply in 2007. See www.elsparefonden.dk/indkoeb for full description of scope and definitions, including changes in relation to the 2006 guidelines.

COMMENTS OR QUESTIONS

Please contact us on: +45 7026 9009 or by e-mail at: sparel@sparel.dk

Energy efficient purchasing is just common sense

Choose energy efficient electrical equipment and save substantial amounts on the electricity bill over the lifetime of the equipment.

The Danish Electricity Saving Trust (hereinafter referred to as the Trust) has calculated that the public sector can reduce its annual electricity bill by DKK 700 million by purchasing energy efficiently.

Usually, energy efficient purchasing costs the same, but even if it is more expensive the investment is quickly recouped. Therefore it is advantageous to purchase only energy efficient equipment.

All government institutions must follow the purchasing guidelines. The Trust also recommends that all public sector organisations and private companies comply with the guidelines when purchasing equipment.

PURCHASING ENERGY EFFICIENT EQUIPMENT IS EASY

Inform suppliers or shops that the equipment must comply with the Trust's purchasing guidelines. Show them the Purchasing Guidelines or refer to www.elsparefonden.dk/indkoeb.

When preparing tenders, you can incorporate the requirements in the guidelines into the tender specifications to highlight that you only wish to receive offers on products that comply with the requirements of the Trust's Purchasing Guidelines.

For more in-depth information on the choice of products, you can check the Trust's product lists covering a range of energy efficient equipment. You can also look at the technical specifications for the equipment concerned to see if these comply with the purchasing requirements.

The guidelines apply 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 are supplied under other types of agreements, such as leasing contracts.

The guidelines are valid for one year and cover most standard electrical equipment in offices and some other buildings. Learn more about using the guidelines on page 15, where you can also find out what you should do if an item of equipment you plan to buy is not covered by the requirements.

PURCHASING REQUIREMENTS

On the following pages we present the purchasing requirements, together with expert advice and further information on the equipment described.

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

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

The green box provides referrals to the Trust's recommended lists and links to Web sites for additional information.



Computers and monitors

Because there is such a large variation in power consumption for computers and monitors, you can halve the consumption by choosing energy saving equivalents when buying or replacing equipment. Savings of up to DKK 1,000 can be made for every unit over the lifetime of the equipment. You can save most by choosing notebook computers instead of the desktop varieties. Always buy flat screen monitors and check whether the time has come to replace the old CRT monitors with the new flat screen monitors. This also frees up space on the desk.



PURCHASING REQUIREMENTS – PERSONAL COMPUTERS

Requirements conform to Energy Star specifications effective from 20 July 2007

Type	On ⁽¹⁾ Watt	Sleep ⁽²⁾ Watt	Standby ⁽³⁾ Watt	Delay before Sleep Minutes	Other requirements
Stationary computers ⁽⁴⁾					
Category A ⁽⁵⁾	50.0	4.0 – 4.7 ⁽¹⁰⁾	2.0 – 2.7 ⁽¹⁰⁾	30	(11) (12)
Category B ⁽⁶⁾	65.0	4.0 – 4.7 ⁽¹⁰⁾	2.0 – 2.7 ⁽¹⁰⁾	30	(11) (12)
Category C ⁽⁷⁾	95.0	4.0 – 4.7 ⁽¹⁰⁾	2.0 – 2.7 ⁽¹⁰⁾	30	(11) (12)
Notebook computers					
Category A ⁽⁸⁾	14.0	1.7 – 2.4 ⁽¹⁰⁾	1.0 – 1.7 ⁽¹⁰⁾	30	(11) (12)
Category B ⁽⁹⁾	22.0	1.7 – 2.4 ⁽¹⁰⁾	1.0 – 1.7 ⁽¹⁰⁾	30	(11) (12)

The requirements apply to standard types of personal computers. Power consumption and times are the maximum permitted for energy efficient equipment. See www.elsparefondens.dk/indkoeb for full description of categories and specifications.

- (1) On is the idle mode immediately after power-up with the computer running the operating system, etc., but excluding user activity. Monitor is off on integrated and notebook computers.
- (2) Sleep mode is a power saving mode which the computer (but not server) automatically enters after a period of inactivity, and 'wake' facility which quickly allows programmes and documents stored in memory (RAM) to be recalled.
- (3) Computer is in Standby (off mode) when the user switches off in the normal way via the operating system.
- (4) Includes integrated computers with monitor, smaller desktop-derived servers and game consoles.
- (5) Category A: standard types of desktop office and home computers.
- (6) Category B: powerful computers with multi-core processor(s) and minimum of 1 gigabyte of system memory.
- (7) Category C: powerful computers with multi-core processor(s), graphic card, RAM, hard disk and TV and video capability.
- (8) Category A: standard types of notebooks in offices and homes.
- (9) Category B: powerful notebook computers with graphic card.
- (10) The highest level requires additional functionality for network card WOL (Wake on Lan).
- (11) Computer must switch off separate or built-in monitor within 15 minutes of user inactivity.
- (12) Internal or external power supplies must be energy efficient, e.g. minimum 80% efficiency for internal power supplies, and conform to the Trust's requirements for external power supplies.

PURCHASING REQUIREMENTS – WORKSTATIONS

Requirements conform to Energy Star specifications effective from 20 July 2007

Type	Typical power consumption ⁽¹⁾ Watt	Delay before Sleep Minutes	Other requirements
Workstations	0.35 x (maximum power ⁽²⁾) + 5 x no. of hard disks ⁽³⁾	30	(4) (5)

The requirements apply to computers sold as workstations and conform to Energy Star's definition for workstations.

Power consumption and time are the maximum permitted for energy efficient equipment. See www.elsparefonden.dk/indkoeb for full description.

(1) Typical consumption calculated as: 0.1 x power in Standby + 0.2 x power in Sleep + 0.7 x power in on idle mode.

(2) Maximum power as measured in tests per Energy Star test methods.

(3) Number of installed hard disks on workstation.

(4) Computer must switch off separate or built-in monitor within 15 minutes of user inactivity.

(5) Internal or external power supplies must be energy efficient, e.g. minimum 80% efficiency for internal power supplies, and conform to the Trust's requirements for external power supplies.

PURCHASING REQUIREMENTS – MONITORS

Requirements conform to Energy Star specifications effective from 1 January 2006

Type	On Watt	Sleep ⁽¹⁾ Watt	Standby ⁽²⁾ Watt
Resolution (O) < 1 megapixel	23	2	1
Resolution (O) ≥ 1 megapixel	28 x O ⁽³⁾	2	1

The requirements apply to standard computer monitors connected to mains electricity.

Power consumption is the maximum permitted for energy efficient equipment. See www.elsparefonden.dk/indkoeb for full description.

(1) Computer power management function puts monitor to Sleep.

(2) Monitor is in Standby (off) mode when turned off using the on/off switch.

(3) O is horizontal x vertical resolution in megapixels – e.g. 1280 x 1024 resolution equals 1.31072 megapixels. Maximum power consumption is 36.7 W (1.31072 x 28 W).

GOOD ADVICE ON PURCHASING AND OPERATING EQUIPMENT

- Choose notebook computers and flat screen monitors. Typically, these consume less than half as much power compared with desktop computers and CRT monitors
- Choose computers and monitors with the lowest power consumption costs over their lifetime. 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.elsparefonden.dk/it
- Choose products with external power supplies that comply with the requirements for power supplies listed on page 8
- Use an 'Elsparaskinne' (auto power saver plug bank) that automatically switches off any connected equipment when the computer is switched off or after a period of inactivity
- Make sure that computers and monitors are programmed to switch to Sleep mode after 5 to 30 minutes of inactivity using the operating system's 'Control Panel' power management options. Wherever possible, use special server software that can close down a computer when it is not in use on a network
- Make users aware that they need to remember to switch off the computer and monitor before they go home, and switch off the monitor when they go to meetings or to lunch. If everyone has an auto power saver 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 requirements with a comprehensive description of scope and definitions at: www.elsparefonden.dk/indkoeb
- View the product lists covering computers and monitors from suppliers that have entered into a voluntary agreement with the Trust on the basis that they comply with the requirements relating to energy efficient purchasing at: www.elsparefonden.dk/it
- View the power consumption on the energy declarations displayed in advertisements, technical data, etc., by suppliers that have voluntary agreements with the Trust
- Learn more about energy efficient purchasing and operation of computers and monitors at: www.elsparefonden.dk/it
- Read about the 'Elsparaskinne' (auto power saving plug bank) and where it can be sourced, at: www.elsparefonden.dk/elsparaskinne
- The Trust's 'Interior Layout Guidelines 2007'

Photocopiers and printers, etc.

Photocopiers, printers, fax machines and scanners are often hidden power guzzlers in the office because most of the time they sit 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 hundred euros per machine annually on the electricity bill. There are now requirements covering power consumption in all modes for the larger machines.



PURCHASING REQUIREMENTS FOR PHOTOCOPIERS, PRINTERS, MULTIFUNCTION DEVICES AND FAX MACHINES WITH RAPID FUSING TECHNOLOGY, AND STANDARD FORMAT DIGITAL DUPLICATORS

Requirements conform to Energy Star specifications effective from 1 April 2007

Type		Typical electricity consumption kWh/week	Other requirements
Photocopiers, printers, fax machines, digital duplicators	Monochrome		
	Speed (S) ≤ 12 pages per minute	1.5	(1) (2) (3)
	Speed (S) 12–50 pages per minute	$0.20 \times S - 1$	(1) (2) (3)
	Speed (S) > 50 pages per minute	$0.80 \times S - 31$	(1) (2) (3)
	Colour		
	Speed (S) ≤ 50 pages per minute	$0.20 \times S + 2$	(1) (2) (4)
	Speed (S) > 50 pages per minute	$0.80 \times S - 28$	(1) (2) (4)
Multifunction devices	Monochrome		
	Speed (S) ≤ 20 pages per minute	$0.20 \times S + 2$	(1) (2) (3)
	Speed (S) 20–69 pages per minute	$0.44 \times S - 2.8$	(1) (2) (3)
	Speed (S) > 69 pages per minute	$0.80 \times S - 28$	(1) (2) (3)
	Colour		
	Speed (S) ≤ 32 pages per minute	$0.20 \times S + 5$	(1) (2) (4)
	Speed (S) 32–61 pages per minute	$0.44 \times S - 2.8$	(1) (2) (4)
	Speed (S) > 61 pages per minute	$0.80 \times S - 25$	(1) (2) (4)

The requirements apply to products connected to mains electricity. Printer technologies covered include: electro photography, direct thermal, solid ink, dye sublimation, thermal transfer and stencil. Power consumption is typically based on weekly consumption measured according to the test method and is the maximum permitted for energy efficient equipment. If the machine has a digital front end powered by the machine, the power used by the controller in active mode is deducted from the machine's weekly consumption. See www.elsparefonden.dk/indkoeb for full description.

- (1) Where a machine is powered by an external power supply covered by the Trust's purchasing requirements, the power supply must comply with the requirements.
- (2) Where a machine is supplied with a digital front end with a separate power supply, the device must comply with the Trust's requirements for computers.
- (3) Photocopiers, printers and multifunction devices (monochrome) with speeds of 15 to 44 pages per minutes must be supplied with an automatic duplexing unit as a standard function or as an add-on at the time of purchase. Automatic duplex must be a standard feature on machines that print 45 or more pages per minute.
- (4) Photocopiers, printers and multifunction devices (colour) with speeds of 20 to 39 pages per minutes must be supplied with an automatic duplexing unit as a standard function or as an add-on at the time of purchase. Automatic duplex must be a standard feature on machines that print 40 or more pages per minute.

PURCHASING REQUIREMENTS FOR OTHER PRINTERS, PHOTOCOPIERS, MULTIFUNCTION DEVICES AND FAX MACHINES, SCANNERS AND FRANKING MACHINES

Requirements conform to Energy Star specifications effective from 1 April 2007

Type	Sleep ⁽¹⁾ Watt	Standby Watt	Other requirements
Printers, multifunction and fax machines (standard format; inkjet)	3	1–2 ⁽²⁾	(4) (5) (6)
Printers (standard format; stencil and similar)	6	1–2 ⁽²⁾	(4) (5) (6)
Printers, multifunction fax machines (large format; inkjet)	13	–	(4) (5) (6)
Printers (large format; electro photography, direct thermal, solid ink, dye sublimation, thermal transfer and stencil, etc.)	54	–	(4) (5) (6)
Photocopiers and multifunction devices (large format; electro photography, direct thermal, solid ink, dye sublimation, thermal transfer)	58	–	(4) (5) (6)
Printers (small format; electro photography, inkjet, direct thermal, solid ink, dye sublimation, thermal transfer and stencil, etc.)	3	1–2 ⁽²⁾	(4) (5) (6)
Scanners (all formats)	5	1–2 ⁽²⁾⁽³⁾	(4) (5) (6)
Franking machines (monochrome; electro photography, direct thermal, thermal transfer, inkjet)	3	–	(4) (6)

The requirements apply to products connected to mains electricity or a data link. Power consumption is based on the maximum permitted for energy efficient equipment measured according to the test method. If the machine has a digital front end powered by the machine, the power used by the controller in active mode is deducted from the machine's Sleep mode consumption. See www.elsparefonden.dk/indkoeb for full description.

- (1) If the product has one or more extra functions, the maximum threshold for Sleep mode can be increased depending on the function.
- (2) 2 watts if fax is built-in.
- (3) Standby requirement does not cover large format scanners.
- (4) Where a machine is powered by an external power supply covered by the Trust's purchasing requirements, the power supply must comply with the requirements.
- (5) Where a machine is supplied with a digital front end with a separate power supply, the device must comply with the Trust's requirements for computers.
- (6) Products must be supplied with the Sleep mode set to activate within a given period of time depending on the size of the machine.

GOOD ADVICE ON PURCHASING AND OPERATING EQUIPMENT

- Try to choose equipment that meets rather than exceeds your needs
- Choose machines which warm up quickly to operational mode and with good energy-saving functions
- Choose products with external power supplies that comply with the requirements for power supplies listed on page 8
- Whenever possible, choose a model with duplex functionality (two-sided printing and/or copying). Configure the equipment to automatically print or copy in duplex, or persuade staff to use the duplex feature. Several tons of paper can be saved over the machine's lifetime, with twice as much space available on the shelves
- Make sure that machines are configured with Sleep mode set to activate automatically in the shortest possible time acceptable in relation to warm-up time
- Check whether you need to have a conventional fax machine in situations where you can use a multifunction device with a built-in fax or a fax modem on a server, which is nonetheless permanently switched on
- Choose a scanner that has a separate on/off switch. Where this is not possible, connect the scanner to a separate plug which users can easily switch on and off, once persuaded to do so
- Set the timer controls to switch off machines automatically at the end of the working day, or influence user behaviour so the last person leaving the office turns off all the machines

FURTHER INFORMATION

- View the in-depth purchasing requirement with full description of scope and definitions at: www.elsparefonden.dk/indkoeb
- The Trust's 'Layout Guidelines 2007'

Other office equipment

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



PURCHASING REQUIREMENTS – ELECTRIC HEIGHT ADJUSTABLE DESKS

Type	Standby Watt
All	2

The requirements apply to all electric height adjustable desks. Power consumption is the maximum permitted for energy efficient equipment. Desks must have Standby mode activated no more than five minutes after desk has come to rest. See www.elsparefonden.dk/indkoeb for full description.

PURCHASING REQUIREMENTS – CORDLESS AND MOBILE TELEPHONES

Requirements conform to GEEA standards for Standby effective from 1 January 2007, in combination with Energy Star specifications for power supplies effective from 1 January 2005

Type	Standby ⁽¹⁾ Watt	No-load ⁽²⁾ Watt
All	1	0.5

The requirements apply to chargers and base stations for cordless phones and chargers for mobile phones for normal use in offices and homes. Power consumption is the maximum permitted for energy efficient equipment. See www.elsparefonden.dk/indkoeb for full description.

- (1) Phone is connected to the charger or base station, is fully charged and is not in use.
 (2) Consumption by power supply with phone no-load to charger or base station.

PURCHASING REQUIREMENTS – EXTERNAL POWER SUPPLIES AND BATTERY CHARGERS

Requirements conform to Energy Star effective from 1 January 2005 amended per note 3 below

Type Maximum power output – Watt	Active mode Efficiency – %	No-load ⁽²⁾ Watt
0 < Power ≤ 1	49 x power	0.50
1 < Power < 10	9 x Ln (power) + 49	0.50
10 ≤ Power ≤ 49	9 x Ln (power) + 49	0.75
49 < Power ≤ 75	84	0.75
75 < Power ≤ 250 ⁽³⁾	80	0.75

The requirements apply to external power supplies and battery chargers (supplied with appliance or separately) for normal use in offices and homes. Power consumption is the maximum permitted for energy efficient equipment, but efficiency is the minimum allowed. See www.elsparefonden.dk/indkoeb for full description.
 (1) Average efficiency, which is the minimum allowed for energy efficient equipment. 'Ln' is the natural logarithm of efficiency, which is the maximum power output in watts.
 (2) No appliance connected.
 (3) Conforms to power factor correction per EN61000-3-2 standard. Adapted per Energy Star

GOOD ADVICE ON PURCHASING AND OPERATING EQUIPMENT

- Use an 'Elsparaskinne' (auto power saver plug bank) to switch off electric height adjustable desks, separate power supplies and other devices that only need to operate when the computer is switched on
- Choose products with external power supplies that comply with the above requirements for power supplies

FURTHER INFORMATION

- View the in-depth purchasing requirement with full description of scope and definitions at: www.elsparefonden.dk/indkoeb

Large appliances, water coolers, and automatic food and drink machines

It is easy to choose energy saving large domestic appliances by checking the European Union's energy label. Requirements covering professional equipment are currently only available for fridges and freezers. Savings running into several euros per appliance can be made by choosing an energy saving type. Many offices have water coolers and automatic food and drink 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 expert advice on purchasing and operating them.



PURCHASING REQUIREMENTS – LARGE DOMESTIC APPLIANCES

Requirements conform to A, A+ and A++ European Union energy labelling scheme

Type	Energy label
Fridges, freezers and combinations	A+ or A++
Washing machines, dishwashers, tumble dryers, cooker ovens	A

The requirements apply to large domestic appliances covered by the European Union energy labelling scheme for household appliances and their combinations. See www.elsparefonden.dk/indkoeb for full description.

PURCHASING REQUIREMENTS – COMMERCIAL REFRIGERATION AND FREEZER EQUIPMENT

Requirements conform to equivalent schemes in UK

Type	Relative power consumption KWh/48h/m ³
Fridges	
400 and 600 litres	15
1300 litres	12
Freezers	
400 and 600 litres	40
1300 litres	36

The requirements apply to fridges and freezers suitable for professional use. Power consumption is the maximum permitted for energy efficient equipment and fulfils the criteria required for inclusion in the Trust's recommended list of energy saving refrigeration equipment. See www.elsparefonden.dk/indkoeb for full description.

PURCHASING REQUIREMENTS – AUTOMATIC COFFEE MAKERS

Automatic coffee makers should have Sleep mode activated on delivery. Instructions on activating the Sleep function should always be displayed near the unit.

GOOD ADVICE ON PURCHASING AND OPERATING EQUIPMENT

- Try to choose large appliances that meet rather than exceed your needs
- Some large 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 automatic food and drink machines, and consider whether there are alternative energy saving solutions
- Wherever possible, only install automatic food and drink machines that have Sleep mode, which is activated when the machines are not in use for a set period of time
- Wherever possible, only install soft drinks vending machines conforming to Energy Star specifications (see www.energystar.gov)
- Where the quality of the tap water allows, 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 automatic food and drink machines that do not have Sleep mode functionality, which turn off the machines when they are not in use

FURTHER INFORMATION

- View the in-depth purchasing requirement with full description of scope and definitions at: www.elsparefonden.dk/indkoeb
- Check recommended lists covering all large domestic appliances and the lowest prices at: www.elsparefonden.dk/hvidevarer
- Check the recommended lists covering commercial fridges and freezers that comply with the energy efficient purchasing requirements at: www.elsparfonden.dk/prof-hvidevarer

Consumer electronics

Most new conventional TVs have low Standby power consumption. But some of the new types of consumer electronics have high power consumption in both Standby and on modes, so it is well worth looking for the energy efficient versions.

PURCHASING REQUIREMENTS – TVS

Requirements conform to GEEA and European Union Code of Conduct (active Standby for Digital TVs) effective from 1 January 2007

Type	Active Standby ⁽¹⁾ Watt	Passive Standby ⁽²⁾ Watt
Conventional analogue		1
With integrated digital receiver and decoder		
Terrestrial aerial	7–16 ⁽³⁾	1
Cable network	8–16 ⁽³⁾	1
Satellite	9–16 ⁽³⁾	1
With VCR and/or DVD		2.5

The requirements apply to TVs connected to mains electricity with visible screen size exceeding 20 cm (8 inches).

Power consumption displayed is the maximum permitted for energy efficient equipment. See www.elsparefonden.dk/indkoeb for full description.

- (1) Product is plugged in, but does not operate main functions. Can be switched to another mode with remote controller, signal from an internal device (clock timer, etc.) and via external signal (aerial, etc.). Product can receive a limited amount of data from an external signal (aerial, etc.).
- (2) Product is plugged in, but does not operate main functions. Can be switched to another mode with remote controller, and via signal from an internal device (clock timer, etc.).
- (3) Increase above lowest threshold only permitted for extra components in relation to European Union Code of Conduct.

PURCHASING REQUIREMENTS – VCRS AND DVDS

Requirements conform to GEEA standards effective from 1 January 2007

Type	On Watt	Standby Watt	Delay before Standby Minutes
Playing and recording	15 ⁽¹⁾	2.5	
Playing only	11	1	30 ⁽²⁾

The requirements apply to VCRs and DVDs connected to mains electricity. Power consumption displayed is the maximum permitted for energy efficient equipment. See www.elsparefonden.dk/indkoeb for full description.

- (1) Only applies to traditional cassette-tape VCRs.
- (2) Applies to period commencing from time that media (tape, DVD, etc.) have finished playing.

PURCHASING REQUIREMENTS – SIMPLE DIGITAL TO ANALOGUE CONVERTERS AND SET-TOP BOXES

Requirements conform to GEEA and European Union Code of Conduct effective from 1 January 2007

Type	On Watt	Active Standby ⁽¹⁾ Watt	Passive Standby ⁽²⁾ Watt
Simple digital to analogue converter			
Terrestrial aerial			
Basic converter	7		2
With 2 built-in tuners	9		2
With HD ⁽³⁾ , SD format ⁽⁴⁾	11		2
With HD ⁽³⁾ , SD format ⁽⁴⁾ , 2 built-in tuners	14		2
With HD, HD format	12		2
With HD, HD format, 2 built-in tuners	14		2
Cable network			
Basic converter	7		2
With HD ⁽³⁾ , SD format ⁽⁴⁾	11		2
With HD, HD format	12		2
Satellite			
Basic converter	10		2
With HD ⁽³⁾ , SD format ⁽⁴⁾	14		2
With HD, HD format	15		2
Internet DSL			
Basic converter	7		2
Basic converter with ADSL modem	9		2
With HD ⁽³⁾ , SD format ⁽⁴⁾	11		2
With HD ⁽³⁾ , SD format ⁽⁴⁾ , with ADSL modem	13		2
With HD, HD format	12		2
With HD, HD format, with ADSL modem	14		2
Digital set-top box			
Terrestrial aerial		6–20 ⁽⁵⁾	3 ⁽⁶⁾
Cable network		7–20 ⁽⁵⁾	3 ⁽⁶⁾
Satellite		8–20 ⁽⁵⁾	3 ⁽⁶⁾
Internet DSL		6–20 ⁽⁵⁾	3 ⁽⁶⁾

The requirements apply to set-top boxes and simple digital to analogue converters connected to mains electricity. Power consumption displayed is the maximum permitted for energy efficient equipment. See www.elsparefonden.dk/indkoeb for full description.

- (1) Product is plugged in, but does not operate main functions. Can be switched to another mode with remote controller, signal from an internal device (clock timer, etc.) and via external signal (aerial, etc.). Product can receive a limited amount of data from an external signal (aerial, etc.).
- (2) Product is plugged in, but does not operate main functions. Can be switched to another mode with remote controller, and via signal from an internal device (clock timer, etc.).
- (3) High definition.
- (4) Standard definition.
- (5) Increase above lowest threshold only permitted for extra components in relation to European Union Code of Conduct.
- (6) Requirement must be fulfilled if function available.

PURCHASING REQUIREMENTS – AUDIO SYSTEMS AND SEPARATES

Requirements conform to GEEA effective from 1 January 2007

Type	Standby Watt	Delay before Sleep Minutes
Integrated audio systems	1	
Audio separates	1 ⁽¹⁾	30 ⁽²⁾

The requirements apply to music systems and components connected to mains electricity. Power consumption displayed in the table is the maximum permitted for energy efficient equipment. See www.elsparefonden.dk/indkoeb for full description.

- (1) If function is available.
- (2) Applies to period commencing from time that media (tape, DVD, etc.) have finished playing.

GOOD ADVICE ON PURCHASING AND OPERATING EQUIPMENT

- Choose a system that meets rather than exceeds your needs. Remember that TV power consumption increases dramatically as screen sizes increase
- Before buying, ask about the power consumption in the on mode. Plasma screen TVs use particularly high levels of power when switched on
- Choose products with external power supplies that comply with the requirements for power supplies listed on page 8
- Ask whether Standby mode is activated automatically after a period of inactivity, and how long the period is

FURTHER INFORMATION

- View the in-depth purchasing requirement with full description of scope and definitions at: www.elsparefonden.dk/indkoeb

Lighting

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

PURCHASING REQUIREMENTS – LIGHTING SYSTEMS

Type	Power consumption ⁽¹⁾ W/m ²	Other requirements
Offices	10	(2)
Day care centres	10	(2)
Classrooms	8	(2)
Access areas	5	(2)
Other locations		(3)

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. Power consumption displayed is the maximum permitted for energy efficient equipment. See www.elsparefonden.dk/indkoeb for full description.

- (1) The power consumption includes the power consumed by the components controlling the lighting, and is per square metre of floor area.
- (2) Must fulfil legal requirements covered by DS 700, and where possible the requirements for consumption specified in the Danish Electricity Saving Trust's recommended lists for lighting systems (see www.elsparefonden.dk), and must also have movement and daylight sensors in offices with adequate daylight.
- (3) Must have daylight sensors in offices with adequate daylight so that 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%.

PURCHASING REQUIREMENTS – LIGHT SOURCES

Requirements conform to European Union energy labelling scheme

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 A-rated light sources. See www.elsparefonden.dk/indkoeb for full description.

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 the Danish Electricity Saving Trust's diagnostic tools that can help you assess your existing lighting and calculate the economics of installing a new system
- Use a combination of basic lighting and individual energy efficient work lights
- 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 room. Also, always view a sample with a light fitting that is switched on
- Working lamps should be fitted with compact fluorescent lamps (CFLs) and with electronic ballast units
- If you choose halogen table lamps for design or size reasons, then these should be the low voltage type where the on/off switch is on the 230 volt side to avoid wasting power. The power supply should be efficient. Where the on/off switch is on the secondary side, or there is no switch at all, consumption at no-load should not exceed 1 watt
- Buy energy saving bulbs from the list available on the Trust's www.elsparefonden.dk/a-paerer Web site because these fulfil the requirements for both quality and energy efficiency

FURTHER INFORMATION

- View the in-depth purchasing requirement with full description of scope and definitions at: www.elsparefonden.dk/indkoeb
- Read more about lighting systems for offices and institutions at: www.elsparefonden.dk/belysning. This is also where you can download our diagnostic self-check and financial calculator tools
- Read more about lighting in homes at: www.boliglyys.dk

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, circulator pumps and motors are often not matched to requirements and thus far more power than necessary is consumed.



PURCHASING REQUIREMENTS – VENTILATORS

Requirements conform to 'Sparventilator®' specifications of the Danish electricity supply companies

Type	Efficiency ⁽²⁾ %	Other requirements
Radial ventilators (centrifugal ventilators) and axial ventilators ⁽¹⁾		
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)
Room ventilators, shaft power ≤ 3 kW	65	(3)

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 comply with the requirements specified in the table. See www.elsparefonden.dk/indkoeb for full description.

(1) Interval stated includes upper threshold figure; e.g. 1 kW output is classified under 0.5–1 kW interval.

(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.

(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%.

PURCHASING REQUIREMENTS – PUMPS

Requirements conform to energy label A per Europump (Association Européenne des Constructeurs de Pompes) voluntary agreement on energy efficiency labelling scheme, and the Danish electricity supply companies' requirements for inclusion on energy saving pump list

Type	Other requirements
All	A-rated ⁽¹⁾
If no A-rated pump is available for area of activity specified	Meets requirements for energy saving pumps ⁽²⁾

The requirement covers all types of pumps included in Europump's voluntary energy efficiency labelling scheme, and in the electricity supply companies' energy saving pump list. See www.elsparefonden.dk/indkoeb for full description.

(1) Read about Europump's voluntary energy efficiency labelling scheme at: www.europump.org.

(2) View the electricity supply companies' requirements and energy saving pump lists at: www.sparepumpe.dk.

PURCHASING REQUIREMENTS – MOTORS

Requirements conform to EFF1 per agreement between the European Commission and CEMEP (European Committee of Manufacturers of Electrical Machines and Power Electronics)

Type	Efficiency class
All	EFF1 ⁽¹⁾

The requirements include all types of motors covered by the agreement between the European Commission and CEMEP. See www.elsparefonden.dk/indkoeb for full description.

(1) EFF1 requirements cover energy saving motors per the CEMEP Voluntary Agreement of August 2004.

GOOD ADVICE ON PURCHASING AND OPERATING EQUIPMENT

- Get a ventilation system check-up as one element of the 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
- Ensure that the ventilation system only operates 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) 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 full description of scope and definitions at: www.elsparefonden.dk/indkoeb
- Read more on ventilation systems for offices and institutions at: www.elsparefonden.dk/ventilation.
- Read more on pumps for buildings and view product lists at: www.elsparefonden.dk/a-pumpe
- See recommended lists, and read more about energy saving motors at: www.sparemotor.dk

Network equipment and servers

Network equipment and servers account for a large proportion of the total electricity consumption in office buildings because equipment is generally always on. It is possible to save up to half the electricity used through energy efficient purchasing and good server room layouts 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.



PURCHASING REQUIREMENTS – BROADBAND EQUIPMENT

Requirements conform to European Union Code of Conducts effective from 1 January 2007

Type	On Watt	Off Watt	Other requirements
ADSL/VDSL USB powered modem	1.5 ⁽¹⁾	0	(3)
ADSL modem, cable modem, PLC modem ⁽²⁾	6.0 ⁽¹⁾	0.3	(3)
VDSL modem ⁽²⁾	8.0 ⁽¹⁾	0.3	(3)
WLAN access point	6.0	0.3	
VoIP box	5.0	0.3	
Small printer server	5.0	0.3	
Small hub and switch	5.0	0.3	

Requirements cover all types of equipment conforming to the European Union Code of Conduct for broadband equipment used by consumers. See www.elsparefonden.dk/indkoeb for full description.

- (1) Extra consumption of up to 2 watt allowed for each additional function for the following types: WLAN 802.11b/g, WLAN 802.11a, FXO, FXS/VoIP, hub/switch for several ports, DECT and Bluetooth.
- (2) Up to and including the following ports and functionality: 1 DSL, 1 Ethernet 10/100, 1 USB 1.1/2.0 and firewall.
- (3) DSL modem should support network power management, e.g. ADSL2 and ADSL2+.

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 further savings of electricity in running 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 cool room which receives no 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
- Check whether it makes financial sense to re-use heat produced in 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
- Follow the European Union Code of Conduct for UPS (uninterruptible power supply, emergency power) systems. Further information is available at: energyefficiency.jrc.cec.eu.int

FURTHER INFORMATION

- View more recommendations about server rooms at: www.elsparefonden.dk/serve
- The Trust's server room tools at: www.selvtjekserverrum.dk
- The Trust's layout guidelines
- The Trust's guide 'Good advice for saving electricity in the server room'

How to use the Guidelines

IN GOVERNMENT ORGANISATIONS

Government institutions can only purchase energy efficient electrical equipment that conforms to the Trust's purchasing guidelines. These requirements are laid down in the Danish Energy Authority's 'Circular on improving energy efficiency in Danish government institutions', which also requires institutions to make their energy consumption visible and invest in financially viable energy savings projects.

Persons responsible for energy and purchasing in government institutions must ensure that they comply with the Trust's purchasing guidelines whenever they purchase equipment.

Purchasing computers, multifunction devices, printers and office furniture such as electric height adjustable desks is straightforward because all government institutions have to use the Danish Ministry of Finance and SKI's (National Procurement Ltd – Denmark) special framework contracts that only feature a limited number of products. In terms of computers and monitors, there will be an e-auction approximately every other month, where organisations can register their purchase requirements. Find out more at: www.statensindkoeb.dk and www.ski.dk.

IN LOCAL AND REGIONAL AUTHORITIES AND SEMI PUBLIC SECTOR COMPANIES

The Trust recommends that all purchasers should follow the purchasing guidelines and preferably enter into a partnership on their use. More than 200 organisations have already signed a voluntary agreement with the Trust on the purchasing guidelines.

Purchases made by all public sector organisations can be made using the SKI framework contracts. Suppliers also have the possibility to label products that comply with the purchasing guidelines. This makes it easy for customers to find the energy saving products.



IN PRIVATE ORGANISATIONS

Many private companies have also discovered the benefits of purchasing energy efficient products. These guidelines are as relevant to private companies as they are to the public sector.

WHAT ABOUT PRODUCTS NOT FEATURED IN THE GUIDELINES

If you need to purchase a product that is not covered by the guidelines, The Trust recommends that you ask about power consumption in the on and Standby modes, and choose one of the products with the lowest Standby consumption, which in any case should not exceed 1 watt. For further information please contact the Trust's Customer Advice service on: +45 7026 9009 or by e-mail at: sparel@sparel.dk.

CALCULATE THE LIFETIME COSTS

When comparing the purchase prices of different equipment, you should calculate the lifetime costs to arrive at the most cost-effective solution. Remember that when purchasing equipment you are also buying the electricity 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.

ADDITIONAL ENVIRONMENTAL REQUIREMENTS

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 environmental guidelines at: www.miljoevejedninger.dk.

BACKGROUND TO THE REQUIREMENTS

The requirements for energy efficient purchasing described in these purchasing guidelines have been compiled from a number of sources, including:

- European Union Energy Labelling Directives (www.ens.dk/sw13972.asp)
- Energy Star (www.eu-energystar.org and www.energystar.gov)
- GEEA (Group for Energy Efficient Appliances, www.efficient-appliances.org)
- European Union Code of Conduct (energyefficiency.jrc.cec.eu.int)
- CEMEP (European Committee of Manufacturers of Electrical Machines and Power Electronics at: www.cemep.org)
- Europump (Association Européenne des Constructeurs de Pompes at: www.europump.org)

For this reason, you can be sure that there are enough electrical appliances to choose from, and that the appliances fulfilling the requirements are the most energy efficient available. The Trust reviews the requirements on an annual basis.

The Trust helps you reduce your electricity bill

The Trust's Customer Advice service can help public sector organisations reduce their electricity bills. There are many ways of achieving this. For example, more than one-third of all electricity consumed by public sector workplaces is used after 17.00, when all employees have gone home.

The Trust has calculated that the Danish public sector could save nearly 100 million euros worth of electricity every year through energy efficient purchasing.

Customer Advice can provide advice and guidance on the purchasing, operation and refurbishment of some of the following:

- Lighting
- Ventilation, cooling and circulator pumps
- IT and office equipment
- Server rooms
- Large appliances
- Energy saving equipment

You are welcome to ring or send us an e-mail if you have any questions. Our specialists and process advisers will do everything they can to help. We can also assist you with the organisation of the work and can contribute to meetings and theme days about how to save energy.

USE THE TRUST'S WEB SITE AND TOOLS

The Trust's Web site contains a wealth of helpful information and knowledge about electricity consumption and savings possibilities at: www.elsparefonden.dk.

The site also provides access to tools developed by the Trust that make it easy to get an overview of your electricity consumption and find out how to make savings. The tools are:

- 'Se Elforbrug', which lets you view your consumption and compare it with others. Also features key indicators with consumption divided by time and type of equipment, which makes it easier to identify the savings possibilities
- Product lists that make it easy to find products that comply with the purchasing requirements. Lists feature light fittings, energy saving bulbs, computers, monitors, A-rated pumps, large appliances, refrigeration equipment and energy saving equipment
- Calculator tools for lighting, IT equipment and servers make it easy to plan for replacement of old equipment with more energy efficient solutions
- Ventilation package at a fixed price including check-up, electricity meter and online access to key indicators which allow you to compare your consumption with other ventilation systems

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.



The Danish Electricity Saving Trust's Purchasing Guidelines 2007.
'Making it easy for organisations to purchase energy efficient products and save money.'

Published by The Danish Electricity Saving Trust. January 2007.

Contact the Trust's Customer Advice service
Tel.: +45 7026 9009
E-mail: sparel@sparel.dk
www.elsparefonden.dk