



# Recommendations for the environmentally friendly procurement of desktop PCs

Guideline  
Version 1.1

## ■ Impressum

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## Introduction

This guideline has been created by a workgroup made up of members from the Beschaffungsamt des Bundesministeriums des Innern (BeschA) [Federal Interior Ministry Procurement Office], the Bundesverband Informationswirtschaft, Telekommunikation und neue Medien e.V. (BITKOM) [Federal Association for Information Management, Telecommunications and New Media], the Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (BMU) [Federal Ministry for the Environment, Nature Conservation and Nuclear Safety] and the Umweltbundesamt (UBA) [Federal Environment Agency]

The goal of this document is to provide public, order-awarding and procurement agencies at federal, state and municipal levels – as well as company purchasers and institutional procurers, such as churches and associations – with a reliable and comprehensible aid for observance of environmental aspects in the procurement of desktop PCs.

Protection of the environment is one of the most important tasks of our time. Information and telecommunications technology (ITC) can make a significant contribution to this task. Aside from matters of energy consumption and emission of greenhouse gasses, there are also other aspects to be addressed from an environmental perspective such as the conservation of natural resources by increasing material efficiency, improving health protection by lowering acoustic emissions, and the reduction of substances which can have negative effects on the environment.

In this context, both the manufacturer and the purchaser of ITC equipment are challenged to be responsible. The manufacturer is challenged to develop and offer energy and resource efficient products, the purchaser to actually request environmentally friendly products so that they can gain widespread market acceptance. Both sides make an essential contribution toward achieving sustained supply and demand market patterns; they are directly interrelated.

This guideline is an attempt to influence the demand side. Public order-awarding and procurement agencies play a key role here. Because the combined total of federal, state and municipal expenditures amount to about 250 billion € annually (17 billion € of this for ITC products), these agencies exert enormous market influence. This market influence should be aimed at demand for environmentally friendly products in order to stimulate technical and systematic innovation and to realize environmentally positive effects like reductions in Co2 emissions, energy or resource consumption. In the framework of the national sustainability strategy, the German federal government has acknowledged its leadership position in public procurement.

However, the observance of these objectives in daily procurement practice is often coupled with difficulties. There is general uncertainty about how relatively abstract environmental goals are to be „translated“ into specific requirements founded on target values and certification regulations. Implementation of the “Allgemeine Verwaltungsvorschrift zur Beschaffung energieeffizienter Produkte und Dienstleistungen” [general administrative order for the procurement of energy efficient products and services] on January 24, 2008 and the revised version of the Energy-Star-Verordnung<sup>2</sup> [Energy-Star directive] on March 4, 2008 give cause to anticipate a tremendous demand from personnel in procuring offices for additional information and consultation.

BeschA, BITKOM, BMU and UBA have therefore joined together under the umbrella of the national dialog process for promoting sustainable supply/demand behavior to establish joint recommendations for environmentally-friendly procurement of selected ITC equipment product groups. These recommendations are oriented on five basic principles which are summarized on page 10.

The most recent version of this guideline can be found online at [www.ict-procurement.org](http://www.ict-procurement.org).

1 <http://www.bmwi.de/BMWi/Redaktion/PDF/A/aav-zur-beschaffung-energieeffizienter-produkte,property=pdf,bereich=bmwi,sprache=de,rwb=true.pdf>  
 2 <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:039:0001:0007:DE:PDF>

# 1 Prolonging service life, return and recycling

Environmentally sound product design is a decisive element for the long-term utilization of products. Modular construction permits function and performance enhancements to be added readily and also simplifies repair when necessary. Modular construction also ensures a high rate of product recycling.

## ■ 1.1 Modular structure

The system unit is built in modules so that components can be replaced, or the system can be upgraded, without need of special tools. Replacements and/or upgrades are particularly applicable to:

- working memory (i.e. RAM)
- hard disk/s
- other disk drives
- any of various expansion cards (graphic, sound, network „etc.) and CPU

| Criterion | Verification  |
|-----------|---|
| Award     | Manufacturer declaration with reference to technical specification (pursuant to guideline „Product-Neutral Bidding Procedure“, Chapter 4) |

## ■ 1.2 Replacement parts stock

Mechanical replacement parts which may become necessary because of normal usage (e.g. HDD, DVD) are available for at least 5 years after delivery date. Components or parts which routinely outlast the average service life of the product need not be stocked as replacement parts.

| Criterion | Proof                    |
|-----------|--------------------------|
| Award     | Manufacturer declaration |

## ■ 1.3 Marking of plastic parts > 25 g

Plastic parts having a mass in excess of 25 grams are to be permanently marked per ISO 11469:2000.

| Criterion | Proof                    |
|-----------|--------------------------|
| Award     | Manufacturer declaration |

## ■ 1.4 Free-of-charge return of old ITC equipment

The customer must be able to turn in old equipment without charge to a recycling location named by the supplier which is compliant with ElektroG § 10 Absatz 2 [electrical law, section 10, paragraph 2].

| Criterion | Proof                    |
|-----------|--------------------------|
| Exclusion | Manufacturer declaration |

## 2 Energy

From the life cycle perspective of a PC, its energy efficient operation is the most important aspect with the greatest potential for savings. Energy efficient equipment lowers operating cost and reduces CO<sub>2</sub>-emissions.

### 2.1 Energy-Star

The device should comply in full with the requirements of the given valid stage of the Energy-Star Program for Computers.

Current requirements of Energy Star v. 4.0

- Off mode, e.g. ACPI S<sub>5</sub> mode:
  - ≤ 2.0 W – Wake on LAN blocked
  - ≤ 2.7 W – Wake on LAN enabled
- so-called Sleep mode, e.g. ACPI S<sub>3</sub> mode:
  - ≤ 4.0 W – Wake on LAN blocked
  - ≤ 4.7 W – Wake on LAN enabled
- Idle state, e.g. ACPI S<sub>0</sub> Idle mode:
  - category A: ≤ 50.0 W
  - category B: ≤ 65.0 W
  - category C: ≤ 95.0 W
- Requirements for built-in power supplies (when a part of the quote):
  - efficiency rating of at least 80% at 20%, 50% and 100% of rated load
  - power factor > 0.9 at 100% load „
- Requirements for external power supplies (when a part of the quote):
- affiliated external power supplies must meet Energy Star requirements for external AC/AC power supplies and AC/DC power supplies (Version 1.1, Level 1)<sup>3</sup>

Current requirements of Energy Star V5.0 for desktops (valid from July 2009):

- Typical Energy Consumption (TEC):
  - category A: ≤ 148.0 kWh

- category B: ≤ 175.0 kWh
- category C: ≤ 209.0
- category D: ≤ 234.0 kWh

The TEC value represents the typical annual electricity consumption of the respective device. This is measured in kilowatt hours (kWh) using an accepted typical working cycle.

The following can be added to the TEC due to capability adjustments:

- 1 kWh for every GB of memory exceeding the base (base memory = 2GB for categories A-C, 4GB for category D)
- 25 kWh for additional internal storage
- 35 kWh (categories A-B, frame buffer ≤ 128-bit) resp. 50kWh (categories A-D, frame buffer > 128-bit for “Premium Graphics“)

The current criteria can be found online at [www.energystar.gov](http://www.energystar.gov).

| Criterion | Proof   |
|-----------|---|
| Exclusion | 1. Manufacturer declaration and<br>2. Test report per Energy Star V 4.0 test procedure or a document containing the following information: <ul style="list-style-type: none"> <li>■ Name of the test laboratory (external or company-internal testing institute)</li> <li>■ Signature of authorized laboratory person (e.g. laboratory manager)</li> <li>■ Verification of compliance with requirements according to 2.1</li> </ul> Test report of document only on demand prior to bid award (see also Info box on page 9) |

<sup>3</sup> [http://www.energystar.gov/index.cfm?c=ext\\_power\\_supplies.power\\_supplies\\_consumers](http://www.energystar.gov/index.cfm?c=ext_power_supplies.power_supplies_consumers)

## 2.2 Energy management

The device is to be delivered with energy management activated per given valid stage of the Energy-Star Program for Computers::

- As delivered, the monitor’s idle mode must be set to activate after 15 minutes of user inactivity.
- As delivered, the idle mode for all devices, except for servers with desktop connections, must be set such that it will activate after 30 minutes of user inactivity.

| Criterion | Proof                    |
|-----------|--------------------------|
| Exclusion | Manufacturer declaration |

## 2.3 On and Off switches

The device must support an ACPI compliant operating system. It must have an on/off switch. This switch must be located on the device’s front side. When the device is switched off, activation of the switch must at least put the device into its off mode state (ACPI S5 or equivalent).

| Criterion | Proof                    |
|-----------|--------------------------|
| Exclusion | Manufacturer declaration |

### Other potential savings with respect to energy consumption

Some devices have no line switch which totally remove them from the source of line power. They consume energy even when they are supposedly switched off. There are three possibilities to further reduce electric power consumption:

- Electric power consumption can be reduced to zero by pulling the power plug from its outlet after the computer has been shut down.
- Alternatively, this can also be accomplished with a power outlet strip that has an manual on/off switch. One should note that both of these options make the PC inaccessible to certain applications – such as updates – but this can be resolved by organizational procedures.
- A third option is to use a power outlet strip which has master/slave capabilities such that multiple electrical devices (e.g. PC, monitor, printer) can be switched on/off simultaneously. When the load on the master outlet (typically the PC) is switched on or off then the slave outlets are also automatically switched on or off. In addition to user convenience, access to the PC is maintained for certain applications – such as updates. However, this variant with a master/slave power outlet strip cannot reduce power consumption to 0 because the power outlet strip itself consumes a certain amount of power (about 1 Watt). Furthermore, master/slave power outlet strips are significantly more expensive than manually-switched power outlet strips.

## 3 Acoustic noise emissions<sup>4</sup>

Acoustic noise is a significant factor so devices located in the immediate vicinity of the workplace should operate as quietly as possible. Low-noise devices make a contribution to health protection.

Guaranteed acoustic noise level, as determined on the basis of EN ISO 7779:2001 in conjunction with ISO 9296:1988, is to be specified in dB(A) (alternatively, since 1 B(A) = 10 dB(A), specification in B(A) is also permissible when accuracy to two decimal digits is specified).

### 3.1 Limitation for acoustic noise level per ITI TC6

A limit of 45 dB(A) in idle and 48 dB(A) in operation (activation of the hard disk drive) shall not be exceeded.

| Criterion | Proof   |
|-----------|---|
| Exclusion | 1. Manufacturer declaration and<br>2. Test report per ISO 7779 from an organization accredited per ISO 17025, or a document containing the following information: <ul style="list-style-type: none"> <li>■ Name of the test laboratory (external or company-internal testing institute)</li> <li>■ Accreditation certificate of the test laboratory per ISO 17025 for measurements per ISO 7779</li> <li>■ Signature of authorized laboratory person (e.g. laboratory manager)</li> <li>■ Acoustic noise emission values<br/>Test report or document only on demand prior to bid award (see also Info box on page 9)</li> </ul> |

### 3.2 Limitation for acoustic noise level per Blue Angel

A limit of 40 dB(A) in idle and 44 dB(A) in operation (activation of the hard disk drive) shall not be exceeded.

| Criterion | Proof   |
|-----------|---|
| Award     | 1. Manufacturer declaration and<br>2. Test report per ISO 7779 from an organization accredited per ISO 17025, or a document containing the following information: <ul style="list-style-type: none"> <li>■ Name of the test laboratory (external or company-internal testing institute)</li> <li>■ Accreditation certificate of the test laboratory per ISO 17025 for measurements per ISO 7779</li> <li>■ Signature of authorized laboratory person (e.g. laboratory manager)</li> <li>■ Acoustic noise emission values<br/>Test report or document only on demand prior to bid award (see also Info box on page 9)</li> </ul> |

<sup>4</sup> Blue Angel also considers noise emissions at a 90 percent CPU performance-load. This requirement is currently being tested in a bidding procedure and may later be adopted as an evaluation criterion.

## 4 Material characteristics / substance related requirements

Computers are made of a myriad of individual components and different substances. Their impact upon introduction into the environment, as well as burdens to health at the workplace, can be reduced by excluding problematic and hazardous substances.

### ■ 4.1 Exclusion of certain halogen compounds

Plastic enclosure substances are not to be made of polymers with halogen content (e.g. PVC). Furthermore, no flame retarding agents containing chlorine or bromine are to be added to plastic enclosure parts > 25 g.

| Criterion | Proof                    |
|-----------|--------------------------|
| Exclusion | Manufacturer declaration |

### ■ 4.2 Exclusion of certain substances

Substances classified by Appendix 4 of EU Guideline 67/548/EWG as having the following hazardous properties may not be added to plastic materials in computer enclosures (parts > 25 g):

- Carcinogens in EU categories 1, 2 or 3
  - R 40 suspicion of carcinogenic effect
  - R 45 can cause cancer
- Mutagens in EU categories 1, 2 or 3
  - R 46 can cause inheritable damage
  - R 68 irreversible damage possible

- Reproduction endangering substances per EU categories 1, 2 or 3
  - R 60 can impair fertility
  - R 61 can harm the fetus
  - R 62 can potentially impair fertility
  - R 63 can potentially harm the fetus

| Criterion | Proof                    |
|-----------|--------------------------|
| Exclusion | Manufacturer declaration |

### ■ 4.3 Packaging

Plastics containing halogen are not to be used.

| Criterion | Proof                    |
|-----------|--------------------------|
| Award     | Manufacturer declaration |

## 5 Manufacturer declarations, test reports and user information

Depending on the given criterion, verification of compliance with the established criteria can be made by manufacturer declarations or test reports. Technical, environmental and health-relevant user information support the user in ways that include correct handling of the PC with respect to matters of environment and health.

Products awarded with the ecolabel Blue Angel (basic criteria document version December 2007) are certified to fulfill all criteria listed here beginning January 2009. For these products, other verification of compliance is not necessary. For the transition period prior to January 2009, Blue Angel designated devices may not comply with the requirements of Section 2 (Energy).

- Manufacturer declarations and test reports (e.g. Eco Declaration ECMA-370<sup>5</sup>, test reports per Energy Star, Blue Angel or equivalent) may be provided in German or English language.
- Manuals with technical, environmental, and health-relevant user information are to be available in electronic form in German language, e.g. written on CD or as an Internet download.

| Criterion | Proof   |
|-----------|---|
| Exclusion | Manufacturer declaration, test reports, manuals |

### ■ Additional explanations about evidentiary obligations per Sections 2.1, 3.1 and 3.2

The awarding office must assess, on a case-by-case basis, the relationship between projected order value and the overhead involved in carrying out the measurements recommended here. Under some circumstances, low volume procurement orders may run into the following problems:

- In individual cases, the cost to produce a compliant bid may be disproportionately high for potential suppliers. It can happen that only a small number of bids are submitted or, in worst case, no (economical) bid at all. This problem can be counteracted by the awarding office by requesting the evidentiary measurements for quoted devices be made only by the bidder with the most economical bid (exclusion criterion).
- It must be considered that the cost of these measurements can be incorporated into the bidding calculation such that, under circumstances, this may lead to a considerable increase in procurement cost for the awarding office.

5 <http://www.ecma-international.org/publications/standards/Ecma-370.htm>

## Appendix

The recommendations are oriented on five fundamental principles:

- **Steering effect:** Use of the procurement portal should induce suppliers (industry) and enquirers (procurement officers for public entities, companies and organizations) to improve the environmental friendliness of ITC devices. When enquirers increasingly purchase the most environmentally friendly devices, this will generate incentives in industry to further promote efforts with respect to environmentally friendly devices.
- **Environmentally sound friendliness:** PCs which meet the criteria listed here can be counted among those which are currently the most environmentally sound. The principle to be followed in a procurement decision is to choose the most ecologically efficient system solution.
- **Ambitious and accomplishable requirements:** The goals must be ambitious in order to reflect the most environmentally sound devices on the market (status quo) and simultaneously stimulate trends (development potential). At the same time, the requirements should not be too challenging so that only a marginal share of market participants could fulfill them. This present guideline solves this challenge with the use of exclusion and award criteria.
- **Comprehensibility:** Procurers should be able to understand the significance of the criteria. The selection and formulation of criteria is therefore organized according to the following principles:
  - decisive environmental criteria („quality“)
  - manageable number („quantity“)
  - unambiguous presentation („legibility“)
- **Verifiability:** Procurers should be able to check whether devices truly meet the values provided in the „self-declarations“. The guideline therefore calls for standardized test procedures that yield measurement values which can be reproduced (verified) and repeated (for example, by an „accredited testing laboratory“ or „third-party audit certification“).
- The criteria established in this present guideline can be used directly in the tender documents. The incorporation of environmental aspects in the tender documents is not critical with respect to the legal aspects of bidding procedures. German contracting rules (VOL/A, VOB/A and VOF) explicitly state that environmental aspects may be a part of technical requirements and that environmental characteristics represent permissible award criteria.

A general introduction to the subject of green procurement as well as notices about special requirements for various different stages of the bidding process can be found, for example, in the „Handbook on environmental public procurement published by the European Commission.

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