UNEP

Sustainable United Nations

Sustainable Procurement Guidelines

IT EQUIPMENT
BACKGROUND REPORT






ICLEI Local Governments for Sustainability

These procurement guidelines are part of a series. Additional guides are available at: **www.greeningtheblue.org & www.ungm.org**

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Messages from the United Nations and UNEP

"I would like to make a public commitment. We are already moving towards making our Headquarters in New York climate-neutral and environmentally sustainable. I would like to see our renovated headquarters complex eventually become a globally acclaimed model of efficient use of energy and resources. Beyond New York, the initiative should include the other UN headquarters and offices around the globe.

We need to work on our operations too, by using energy more efficiently and eliminating wasteful practices. That is why, today, I am asking the heads of all UN agencies, funds and programmes to join me in this effort. And I am asking all staff members throughout the UN family to make common cause with me."

Ban Ki-moon
UN Secretary General
New York, 5 June 2007
World Environment Day

Achim Steiner
Executive Director, UNEP
Geneva, 8 October 2007
117th Assembly of the Inter-Parliamentary Union

"Ban Ki-moon is determined to put global warming at the top of the global political agenda and determined to build the trust so urgently needed if we are to succeed in combating climate change. Under his leadership, the UN is also determined to demonstrate its 'sustainability credentials' by action on the ground and by good housekeeping at home.

Reviews are underway across all agencies and programmes to establish a strategy for a carbon neutral UN and to make the refurbishment of the UN headquarters in New York a model of eco-efficiency.

UNEP is committed to take part in the fight for climate change and in showing leadership. We are committed to become carbon neutral by reducing our energy consumption and carbon footprint and by offsetting emissions."

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Purpose of this guide

What is Sustainable Procurement?

"Sustainable Procurement practices integrate requirements, specifications and criteria that are compatible and in favour of the protection of the environment, of social progress and in support of economic development, namely by seeking resource efficiency, improving the quality of products and services and ultimately optimizing costs."[1]

Sustainable Procurement practices should be introduced progressively and in full respect of the right of access to the UN market for suppliers from developing countries and countries with economies in transition.

How to use the Sustainable Procurement Guidelines?

The main goal of the Guidelines is to facilitate the implementation of sustainable procurement by providing criteria that may be used by UN staff for the requisition and procurement of goods, civil works and services.

In practice, this means thinking carefully about what the true needs are, as a first step. Then, basing purchasing decisions (for products, services and works) on the lowest environmental impact and most positive social impact which make the most economic sense over the lifetime of the product. Therefore, the guidance covers the following: key environmental impacts, key social considerations, most appropriate means of verification and information on the availability of sustainable products and lifetime costs (where available).

As with local product availability, prices, costs and relevant legislation may vary considerably between regions. The way sustainable procurement is practiced should be adapted to local conditions and markets, and depends on how ambitious the purchasing organization is in terms of sustainable development.

For these reasons, the UN Sustainable Procurement Guidelines comprise of the following for each of the addressed products and services:

- a detailed **background report,** and
- a practical **product sheet**.

The main role of the **background report** is to provide staff involved in procurement with more comprehensive information on the rationale behind the sustainable procurement guidelines presented in the product sheets. The background reports cover various issues related to purchasing a product and service in an environmentally-friendly and socially-responsible way, such as: identifying the key environmental impacts and social considerations, listing the most appropriate schemes for verification, most relevant legislation regarding the environment and social considerations, and providing an indication of the availability on the market of sustainable products.

The **product sheets**, on the other hand, provide sustainability criteria designed specifically for the various phases or steps of the UN procurement cycle. These are: detailing the subject matter of tenders, technical specifications (or terms of reference, for services), sourcing suppliers evaluation criteria and contractual clauses. Guidance is also provided on how compliance with the criteria should be verified. The criteria are also presented in check-list form for use by requisitioners and a weighting matrix is provided.

[1] Definition adopted by the High Level Committee on Management Procurement Network.

Regional differences

As market conditions vary from region to region, the potential for sustainable procurement may also vary. Therefore, for certain product groups different product sheets may be produced for different regions. The region for which each product sheet is produced for will be clearly indicated on the document itself and also on the SUN Greening the Blue website and the UNGM SP knowledge centre where they can be downloaded.

Differences in ambition

Additionally UN procurers must decide whether they wish to apply the “basic” or “advanced” criteria:

- **Basic sustainability criteria** address the most significant environmental and social impacts and require minimum effort in verification and minimal increases (if any) in price
- **Advanced sustainability criteria** are intended for use by procurers who seek to purchase the most advanced environmentally-friendly and socially-responsible products available on the market, and may require additional administrative effort or result in a price increase as compared to other products fulfilling the same function.

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Abbreviations and Acronyms

BFR	Brominated flame retardant
CPU	Central processing Unit
CRT	Cathode ray tube
DVI	Digital video interface
EMAS	Eco-Management and Audit Scheme
EP	Electro-photography
EU	European Union
EuP	Energy Using Products
IEEE	Institute for Electrical and Electronics Engineers
GPP	Green public procurement
LCA	Life-Cycle Assessment
LCC	Life-cycle cost
LCD	Liquid crystal display
IT	Information Technology
MFD	Multifunctional device
MFP	Multifunction product
OM	Operational mode
PBB	Polybrominated biphenyls
PBDE	Polybrominated diphenyl ethers
PCs	Personal Computers
PVC	Polyvinyl chloride
RFP	Request for proposal
TEC	Typical electricity consumption
UDC	Upgradeable digital copier
VGA	Video graphics array
VOC	Volatile organic compound
UNEP	United Nations Environment Programme
WEEE	Waste Electrical and Electronic Equipment

1. Introduction

This background report, together with the practical product sheet, constitutes the sustainable procurement guidelines for office IT equipment for the UN system. The main objective of this background report is to give comprehensive information on the rationale behind the sustainable procurement recommendations made in the product sheet. This covers aspects such as “key environmental impacts”, “key social considerations”, “appropriate verification schemes”, “indicative market availability of sustainable products” amongst others.

Sustainable procurement means thinking carefully about what to buy, buying only what you really need, purchasing products and services with high environmental performance and considering the social and economic impacts of purchasing decisions.

1.1. Scope

Office IT equipment as dealt with in this document covers three sets of products:

- Computers
- Monitors
- Imaging equipment

The definitions are taken from the *Agreement between the Government of the United States of America and the European Community on the coordination of energy-efficiency labeling programs for office equipment*[2] and from the EuP Preparatory Studies for Imaging Equipment.[3]

Computers

A device which performs logical operations and processes data. Computers are composed of, at a minimum: (1) a central processing unit (CPU) to perform operations; (2) user input devices such as a keyboard, mouse, digitizer or game controller; and (3) a display screen to output information. For the purposes of this specification, computers include both stationary and portable units, including desktop computers, gaming consoles, integrated computers, notebook computers, tablet PCs, desktop-derived servers and workstations. Although computers must be capable of using input devices and displays, as noted in numbers 2 and 3 above, computer systems do not need to include these devices on shipment to meet this definition.

Monitors

A commercially-available, electronic product with a display screen and its associated electronics encased in a single housing that is capable of displaying output information from a computer via one or more inputs, such as VGA, DVI, and/or IEEE 1394. The monitor usually relies upon a cathode-ray tube (CRT), liquid crystal display (LCD), or other display device. This definition is intended primarily to cover standard monitors designed for use with computers. To qualify, the computer monitor must have a viewable diagonal screen size greater than 12 inches and must be capable of being powered by a separate AC wall outlet or a battery unit that is sold with an AC adapter. Computer monitors with a tuner/receiver may qualify as ENERGY STAR® under this specification as long as they are marketed and sold to consumers as computer monitors (i.e., focusing on computer monitor as the primary function) or as dual function computer monitors and televisions. However, products with a

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2 http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/l_381/l_38120061228en00260104.pdf

3 EcoDesign of EuP Products: Preparatory Studies LOT 4: Imaging Equipment: Copiers, Faxes, Printers, Scanners, MFD, http://www.ecoimaging.org

tuner/receiver and computer capability that are marketed and sold as televisions are not included in this specification.

Office Imaging Equipment

Imaging Equipment is a commercially available product which was designed for the main purpose of producing a printed image (paper document or photo) from a digital image (provided by a network/card interface) through a marking process. Office Imaging Equipment is also a commercially available product, which was designed for the main purpose of producing a digital image from a hard copy through a scanning/copying process. The definition covers products, which are marketed as printer, copier, facsimile machine, and (document) scanner. The definition also covers multifunction devices (MFD) which incorporate a printing function in combination with a scanning/copying function and/or facsimile function.[4]

MFDs are becoming increasingly common on the market, replacing single function machines such as scanners and copiers.

The following definitions are again taken from the *Agreement between the Government of the United States of America and the European Community on the coordination of energy-efficiency labeling programs for office equipment:*[5]

Copier: A commercially-available imaging product whose sole function is the production of hard copy duplicates from graphic hard copy originals. The unit must be capable of being powered from a wall outlet or from a data or network connection. This definition is intended to cover products that are marketed as copiers or upgradeable digital copiers (UDCs).

Facsimile Machine (Fax Machine): A commercially-available imaging product whose primary functions are scanning hard copy originals for electronic transmission to remote units and receiving similar electronic transmissions to produce hard copy output. Electronic transmission is primarily over a public telephone system, but also may be via computer network or the Internet. The product also may be capable of producing hard copy duplicates. The unit must be capable of being powered from a wall outlet or from a data or network connection. This definition is intended to cover products that are marketed as fax machines.

Multifunction Device (MFD): A commercially-available imaging product, which is a physically-integrated device or a combination of functionally-integrated components, that performs two or more of the core functions of copying, printing, scanning, or faxing. The copy functionality as addressed in this definition is considered to be distinct from single sheet convenience copying offered by fax machines. The unit must be capable of being powered from a wall outlet or from a data or network connection. This definition is intended to cover products that are marketed as MFDs or multifunction products (MFPs).

Printer: A commercially-available imaging product that serves as a hard copy output device, and is capable of receiving information from single-user or networked computers, or other input devices (e.g., digital cameras). The unit must be capable of being powered from a wall outlet or from a data or network connection. This definition is intended to cover products that are marketed as printers, including printers that can be upgraded into MFDs in the field.

Scanner: A commercially-available imaging product that functions as an electro-optical device for converting information into electronic images that can be stored, edited, converted, or transmitted, primarily in a personal computing environment. The unit must be capable of being powered from a wall outlet or from a data or network connection. This definition is intended to cover products that are marketed as scanners.

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[4] Definition taken *from EuP Preparatory Studies "Imaging Equipment" (LOT 4) Draft Final Report on Task 1 "Definition",* Available at: http://www.ecoimaging.org/docs/Lot4_T1_Final_Report_2007-11-12.pdf

[5] http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/l_381/l_38120061228en00260104.pdf

2. Key environmental impacts

Given the diversity of the product group, the most relevant environmental impacts differ slightly depending on which product is being considered.

Several environmental impacts are relevant for all products:

- Energy consumption
- Hazardous constituents
- Metals contained within batteries
- Waste reduction - Reuse/recycling and the guarantee of spare parts
- Noise emissions

For PCs/notebooks, it is also important to consider upgradability.

For monitors, the use of mercury in flat-panel displays is of concern.

For imaging equipment, the consumption of paper and toner should additionally be considered.

Each of these issues will be addressed separately or in combination below.

2.1. Energy consumption

For PCs, notebooks and monitors

For many office IT products the most significant environmental impact relates to the energy consumption during its lifetime.[6] This is particularly the case for office PCs/notebooks and monitors.

According to the ENERGY STAR® website[7], most studies report that for an office PC primary energy consumption during use is more than 3 to 4 times higher than the primary energy needed for manufacturing and materials production, whilst the energy costs/credits of waste disposal and recycling are negligible (<15% of production energy). This is the result for a typical office PC, used 8 hours per day (including Standby) over 260 days.

A laptop typically uses 50 to 80% less energy in use than a desktop, but it is also much lighter (1.1 to 2 kg compared to >8 kg for a desktop). Therefore, here also, the energy consumption during its useful product-life is expected to be the dominant factor.

It should be noted, however, that this is still an area of some debate, with other studies giving higher importance to the manufacturing stage.[8]

Most office IT equipment now come with energy saving modes (‘sleep’ / ‘standby’). However, such products also consume electricity even when they have been turned off, but are still plugged in. Additionally, user behavior plays a critical role here. Although such modes tend to be included as standard, this function is often not enabled by the end-user. Delivering equipment with these modes already enabled, or ensuring IT staff configure the machines appropriately is highly important.

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6 Schmidt & Fryendal (2003): Methods for Calculating the Environmental Benefits of 'Green' Products in Erdmenger (ed.) Buying into the Environment – Experiences, Opportunities and Potential for Eco-Procurement, Greenleaf

7 http://www.eu-energystar.org

8 A study by Eric Williams suggested that manufacturing stage of a desktop PC held the most significant environmental impacts (Eric Williams (UN University, Tokyo) 2005). A Fujitsu LCA suggested that the manufacturing stage of a laptop was had most environmental impact (Fujitsu, 2005, Environmental Considerations in the PC Lifecycle, http://www.fujitsu.com/downloads/ECO/rep2005/2005report41-42-e.pdf). A US EPA LCA on computer monitors and found that the manufacturing stage of both CRT and LCD monitors was the most dominant life cycle impact (US EPA, Life-Cycle Assessment of Desktop Computer Displays, http://www.epa.gov/oppt/dfe/pubs/comp-dic/lca-sum/index.htm).

Whilst substantial improvements have been made in the energy saving modes of IT equipment, the same cannot be said for 'active/idle' mode requirements, i.e. when the machine is in active use. Large variations in active energy use exist between different models on the market (some devices consume twice as much energy as others), and the active mode is in most cases responsible for the majority of total energy consumption. Whilst energy consumption in the 'active' mode is principally determined by the functionality of the machine (powerful, high-specification models will consume more energy), differences exist between models offering the same level of functionality.

Products offered on the market differ quite significantly in their energy consumption in the different modes ('on' / 'sleep' / 'off' etc.) and introducing some simple requirements to procurement can make a big difference.

In the most recent version of the ENERGY STAR® standards for PCs/notebooks, requirements have been set for energy consumption during 'active/idle' mode, which represents a significant development for procurers looking to set appropriate criteria.

For imaging equipment

According to the ENERGY STAR® website eco-profiles for imaging equipment are totally different. It states: "this equipment [is] idle for relatively much longer periods - which is why low standby use and power management are relatively more important than with computer equipment"[9].

Furthermore the EuP preparatory study on imaging equipment[10] indicates that for EP printers the energy used to produce paper is up to 6 times as high as the energy consumed by the machine itself during use. For inkjet printers the energy consumed is about the same for the paper and the machine itself.

ENERGY STAR® therefore reasons that "duplexing, i.e. double-sided printing/copying, is the best energy saving option. After that, the use of recycled paper is another option as the manufacture of recycled paper consumes less energy than non-recycled paper. Addressing the standby-power and power management are other means. The electricity in 'on' mode is relatively less important, unless we are talking about professional, high-volume copiers/printers." (ENERGY STAR® website, 2007).[11] Taking a look at the toner consumption of your machine is another alternative for reducing life-cycle energy consumption given the energy required to produce toner cartridges.

2.2. Hazardous Constituents

Electronic and electrical equipment may contain a variety of hazardous substances. These include:[12]

Brominated Flame Retardants (BFRs): used in printed circuit boards, cables, wires and plastic for computer casings. Certain BFRs can affect learning and memory functions in humans.

Mercury: used in flat-panel displays, may be harmful to the nervous system and toxic in high doses. Approximately 0 to 50 mg mercury is present in each LCD monitor, due to the use of energy efficient CFL backlighting. However, there are trends towards LED and OLED backlighting in the market over the next 5 to 10 years which would not require mercury content.

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9 ENERGY STAR website: http://www.eu-energystar.org/en/en_015p.shtml

10 EuP Preparatory Studies "Imaging Equipment" (Lot 4). Report on Task 5: "Definition of Base Cases", available at www.ecoimaging.org

11 As part of this study a paper product sheet has also been developed which provides purchasing criteria.

12 *OK Computer?* Nicola Scott and Mary Rayner, 2007, http://www.ethicalconsumer.org/magazine/buyers/computers.pdf

Lead: used in cathode ray tubes and batteries, can be harmful to the nervous system and poisonous in high doses.

In Europe the Direction on th Restriction of Hazardous Substances (RoHS Directive) 2002/95/EC has now severely restricted the use of a number of substances in electronic and electrical equipment: lead, mercury, cadmium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE). This is mirrored in legislation in different parts of the world.

Certain ecolabels also highlight the use of **chlorine-based plastics** in the casing (and packaging) of the product, the production and disposal of which can lead to emissions harmful to human health and the environment.

2.3. Noise

Computer noise is becoming more of an issue and PCs can be loud enough to be distracting, especially if the workspace is otherwise tranquil, and this can cause stress for those sensitive to such sounds.

PC makers are beginning to consider acoustics when they design systems. But many PCs are still built with inexpensive cooling components that can create a noisy system. The main sources of noise are motors and spinning components such as the hard drive, CPU fan, case cooling fans, and power supply fan.

The noise emissions of imaging equipment can also be significant, and there are market alternatives offering much quieter operation.

2.4. Disposal and durability

United Nations Environment Programme (UNEP) estimates that up to 50 million tonnes of waste from discarded electronic goods is generated annually. The disposal of electronic appliances in landfill sites or through incineration creates a number of environmental problems. Firstly a considerable amount of resources that went into making the products is lost. Improper disposal of electronic waste can also release hazardous chemicals and heavy metals into the environment (see hazardous constituents section above).

A key concern in the IT sector is the current limited life cycle of many devices and the need for regularly replacing devices. It is important to ensure that sufficient warranty and spare parts availability is provided. The design of the machine (i.e. how easy it is to simply upgrade parts) is also significant.

The life cycle of the product is also of key importance in reducing environmental impacts related to production processes. However it needs to be born in mind that introducing more efficient equipment sooner may result in reduced energy consumption in the use phase leading to overall life-cycle reductions. The best option in each case will depend on the individual products involved, their waste impacts and the potential energy savings between the two options.

2.5. Consumable materials for imaging equipment

A number of office IT products, notably those involving printing (printers, photocopiers and multifunctional devices), also consume large quantities of other materials, especially paper and ink/toner.

In Europe, both the Nordic Swan and Blue Angel have criteria for remanufactured toner cartridges themselves which cover a number of environmental impacts. These cover four areas (not all issues are covered by both labels):

Ecolabels covering toner cartridges tend to focus on the following environmental impacts:

- Chemicals contained in the toner powder, which can be harmful to both human health and the environment, for example the use of heavy metals or aromatic amine residues.
- Chlorinated plastics such as PVC used in the cartridge parts or packaging, together with the use of brominated flame retardants in the casing

- Use of recycled materials, reuse and take-back systems
- Release of VOCs (volatile organic compounds) during use

The Nordic Swan background report on Toners[13] notes that the greatest environmental problem with toner cartridges is resource consumption. As noted above, the energy which goes into the production of toner cartridges is significant. As such, the encouragement of reuse and recycling of toner cartridges is of most importance in reducing environmental impacts.

Currently two different approaches to reuse are common. Certain companies remanufacture cartridges for resale. Many manufacturers of cartridges also offer take-back services although these are then typically recycled rather than remanufactured. Such take-back services are likely to increase.

Comparing the environmental impacts of remanufacture rather than the purchase of original cartridges (with manufacturer take-back schemes) is not straightforward. Remanufactured cartridges, for example, may not offer as good quality as originals which may lead to early disposal. Depending on local waste policy remanufactured cartridges will also typically end up in landfill sites, rather than being returned to manufacturers for recycling.[14]

Packaging

Packaging is an integral part of the goods supply chain. It is used to protect goods from damage, allows efficient distribution, informs the consumer and in some cases, although less for office IT equipment, helps to promote goods. Environmental issues relating to packaging include resource consumption, primary energy consumption in manufacturing the packaging, environmental effects of chemicals used during manufacture and in the final packaging (particularly chlorinated plastics), and waste generation.

Although this represents a very small proportion of the total environmental impact of office IT equipment, as with any consumer products, it is important to consider packaging and it is also easy for procurers to put simple conditions in place when tendering. For example, the quantity and type of packaging used and the opportunities for recycling should be considered.

2.6. Manufacturing

As mentioned earlier, although the main environmental impact for a computer is energy consumption during the use phase, according to the 2003 United Nations University Report “Computer and the Environment: Understanding and Managing their Impacts” manufacturing of computers is materials intensive when comparing products by weight. “The total fossil fuels used to make one desktop computer weigh over 240 kilograms, some 10 times the weight of the computer itself. This is very high compared to many other goods: For an automobile or refrigerator, for example, the weight of fossil fuels used for production is roughly equal to their weights. Also, substantial quantities of chemicals (22 kg), and water (1,500 kg) are used. The environmental impacts associated with using fossil fuels (e.g. climate change), chemicals (e.g. possible health effects on microchip production workers) and water (e.g. scarcity in some areas) are significant.” The report notes that there may be possible long-term health effects on workers, families, and neighboring communities due to chemical exposure and emissions from production stages such as microchip fabrication. (Kuehr & Williams, 2003). However, an evaluation carried out by a Scientific Advisory Committee (SAC) for the semiconductor industry concluded there was no evidence of increased cancer risk to cleanroom workers, although it could not rule out the possibility that circumstances might exist that could result in increased risk. An independent retrospective

[13] Available on request from www.svanen.nu

[14] UK Market Transformation Programme: BNICT23: Waste considerations relating to printer cartridges http://www.mtprog.com/ApprovedBriefingNotes/PDF/MTP_BNICT23_2007September20.pdf

epidemiological study about increased cancer risk among wafer fabrication workers was commissioned by SIA (Semiconductor Industry Association) in 2005 and is currently conducted under the direction of researchers from Vanderbilt University.[15]

Key environmental impacts – Office IT Equipment		
Impact		**Approach**
• Energy consumption and resulting Carbon Dioxide (CO_2) emissions • Air, soil and water pollution, ozone formation (smog), bioaccumulation or food chain exposure and effects on aquatic organisms due to hazardous constituents e.g. mercury content of LCD displays and flame retardants • Negative impact on the health of employees due to noise, causing stress for those sensitive to such sounds	→	• Purchase energy efficient models • Purchase products with a restricted amount of hazardous constituents and promote take back options • Purchase products with a restricted noise level • Design for recycling, longer life and promote take back options
• Use of energy, finite resources and harmful emissions related to the production of IT products • Generation of waste material including packaging and final disposal	→	• Decrease the quantity of packaging used • Ensure the recyclability of the packaging used • Increase the use of recycled packaging

[15] See http://www.sia-online.org/iss_environment.cfm

3. Key social considerations

The social dimension of sustainable procurement operations aims at ensuring that competition among bidders does not exert a downward pressure on the working conditions of the workers employed or, even worse, leads to practices such as the use of child or forced labour, discriminatory practices or denial of freedom of association and the right to collective bargaining. For the furniture industry the core ILO conventions should be binding over the whole supply chain – that is, production, manufacture and disposal of furniture items.

International labor standards adopted by the International Labour Organization (ILO) have an essential role to play in this respect as they provide clear rules on the "do's" and "don'ts" for bidders and buyers. As will be explained below, a number of other international instruments also provide valuable guidelines on this matter.
For the office IT electronics industry the core ILO conventions should be binding over whole supply chain. This includes Original Equipment Manufacturers (OEMs), Electronic Manufacturing Services (EMS) firms and Original Design Manufacturers (ODMs) including contracted labour (contract manufacturers) that may design, market, manufacture and/or provide goods and services that are used to produce electronic goods.

3.1. International labour standards

The International Labour Conference, which comprises tripartite delegations (from governments, employers and workers) of all ILO Member States, meets annually and adopts two types of international labour standards: Conventions, which are binding for Member States that ratify them, and Recommendations that often complete the Conventions and provide additional guidance. They are globally designated as international labour standards, which are the legal component of the ILO's strategy for governing globalization, promoting sustainable development, eradicating poverty, and ensuring that women and men worldwide enjoy decent work. Today, international labour standards have grown into a comprehensive system of instruments concerning work and social policy and cover a broad range of subjects, from working conditions to employment policy, and from occupational safety and health to social security to take only a few examples. They are backed by a supervisory system designed to address all sorts of problems in their application at the national level.

Mention will be made here only of a Convention and a Recommendation that deal explicitly with the social dimension of public procurement, and of the eight so-called core ILO Conventions, covering the four categories of fundamental principles and rights at work to which extensive reference is made in other instruments such as the Global Compact or codes of conduct.[16]

Labour clauses in public contracts

The Labour Clauses (Public Contracts) Convention (No. 94) and Recommendation (No. 84), 1949 respond specifically to the concerns around the potentially negative social impact of public procurement operations.[17] Convention No. 94 is about good governance, it addresses

[16] Additional information on international labour standards may be found at: http://www.ilo.org/global/standards/lang--en/index.htm. The full text of all ILO Conventions and Recommendations, as well as their status of ratification, can be found at: http://www.ilo.org/ilolex/english/index.htm.

[17] For detailed information on the content of Convention No. 94 and Recommendation No. 84, as well as on national legislation and practice and the current trends in this area, see the General Survey on Labour clauses in public contracts prepared by the ILO Committee of Experts on Conventions and Recommendations, ILC, 97th session, Geneva, 2008, available at www.ilo.org/ilc/ILCSessions/97thSession/reports/lang--en/docName--WCMS_091400/index.htm. In addition, the International Labour Office has published a practical guide on Convention No. 94, available at: www.ilo.org/wcmsp5/groups/public/@ed_norm/@normes/documents/publication/wcms_099699.pdf.

socially responsible public procurement by requiring bidders/contractors to align themselves with the locally established prevailing pay and other working conditions as determined by law or collective bargaining. Its aim is to remove wages and working conditions from the price competition necessarily involved in public tendering.

Convention No. 94 requires bidders to be informed in advance, by means of standard labour clauses included in tender documents, that, if selected, they would have to observe in the performance of the contract wages and other labour conditions not less favorable than the highest minimum standards established locally by law, arbitration or collective bargaining. The same rules apply to their subcontractors as well as to assignees of the public procurement contract. Bidders should prepare their offers accordingly.

The Convention proposes a common level playing field – in terms of labour standards – for all economic actors, and thus promotes fair competition and socially responsible procurement. Most importantly, the Convention enables contracting authorities to evaluate bids based on objective criteria, such as the efficiency of production methods, the quality of materials, or long-term benefits including technology transfer, which ultimately leads to cost-effective public procurement operations and contributes to sound economic development.

Convention No. 94 provides for two specific types of measures in cases where the labour clauses are not fully respected (without prejudice to other available remedies such as judicial proceedings): first, contracting authorities must take measures, such as the withholding of payment due under the contract, so that the workers concerned can receive the wages to which they are entitled; second, contracting authorities must provide for adequate sanctions, such as the withholding of contracts.

Conventions on fundamental rights at work

The ILO Conference has also adopted eight core Conventions, almost universally ratified, on freedom of association, forced labour, equality in employment, and the elimination of child labour. A brief summary is presented below.[18] One of the major challenges is to monitor the implementation of these Conventions at each level of the global supply chain, including in the context of public procurement operations.

Freedom of association and collective bargaining

The *Freedom of Association and Protection of the Right to Organize Convention, 1948 (No. 87)* provides that workers and employers must have the right to establish and join organizations of their own choosing without previous authorization. Their respective organizations must be free to organize themselves and their activities without undue interference from the public authorities. They must also have the right to establish and join federations and confederations, which themselves must be free to affiliate with international organizations of workers and employers.

The *Right to Organize and Collective Bargaining Convention, 1949 (No. 98)* provides that workers must enjoy adequate protection against acts of anti-union discrimination, including requirements that a worker not join a union or relinquish trade union membership for employment, or dismissal of a worker because of union membership or participation in union activities. Workers' and employers' organizations must also enjoy adequate protection against any acts of interference by each other. Finally, measures appropriate to national conditions must be taken, where necessary, to encourage and promote collective bargaining.[19]

[18] For a more detailed presentation, see ILO, Fundamental rights at work and international labour standards, Geneva, 2003.

[19] To date, Convention Nos. 87 and 98 have been ratified by 150 and 160 States respectively. For more information, see the General Survey on freedom of association and collective bargaining, ILC, 81st session, 1994 : http://www.ilo.org/public/libdoc/ilo/P/09661/09661(1994-81-4B).pdf. See also the Digest of decisions and principles of the Committee on Freedom of Association, 5th (revised) edition, 2006:

Forced labour

The *Forced Labour Convention, 1930 (No. 29)* prohibits the use of forced or compulsory labour in all its forms, defined as "all work or service which is exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily."

The *Abolition of Forced Labour Convention, 1957 (No. 105)* prohibits forced or compulsory labour as a means of political coercion or education or as a punishment for holding or expressing political views or views ideologically opposed to the established political, social or economic system; as a method of mobilizing and using labour for purposes of economic development; as a means of labour discipline; as a punishment for having participated in strikes; and as a means of racial, social, national or religious discrimination.[20]

Equality in employment

The *Equal Remuneration Convention*, 1951 (No. 100) requires Member States that ratify it to promote the application to all workers of the principle of equal remuneration for men and women workers for work of equal value, and to ensure its application where the State is involved in wage fixing. The Equal Remuneration Recommendation, 1951 (No. 90), which complements Convention No. 100, makes express reference to the desirability of ensuring application of the principle of equal remuneration for men and women workers for work of equal value for work executed under the terms of public contracts.

The *Discrimination (Employment and Occupation) Convention*, 1958 (No. 111) requires ratifying States to declare and pursue a national policy designed to promote, by methods appropriate to national conditions and practice, equality of opportunity and treatment in respect of employment and occupation, with a view to eliminating any discrimination in these fields. Discrimination is defined as any distinction, exclusion or preference made on the basis of race, colour, sex, religion, political opinion, national extraction or social origin, which has the effect of nullifying or impairing equality of opportunity or treatment in employment or occupation. The Discrimination (Employment and Occupation) Recommendation, 1958 (No. 111), which complements Convention No. 111, provides that eligibility for contracts involving the expenditure of public funds should be made dependent on observance of the principles of non-discrimination.[21]

Child labour

The *Minimum Age Convention*, 1973 (No. 138) provides that the general minimum age for admission to work or employment must not be less than the age of completion of compulsory schooling and, in any case, must not be less than 15 years. Where the economy and educational facilities are insufficiently developed, the minimum age can be initially set at 14 years. The minimum age for hazardous work is set at 18 (16 under certain strict conditions). For light work, the minimum age is 13 years (12 years if the general minimum age is set at 14 years).

The *Worst Forms of Child Labour Convention,* 1999 (No. 182) requires ratifying States to take immediate and effective measures to secure the prohibition and elimination of the worst forms of child labour as a matter of urgency. "Child" is defined as a person under 18 years of age. The worst forms of child labour include all forms of slavery or practices similar to slavery (such as the sale and trafficking of children, debt bondage and serfdom and forced or

http://www.ilo.org/wcmsp5/groups/public/@ed_norm/@normes/documents/publication/wcms_090632.pdf.

[20] To date, Convention Nos. 29 and 105 are ratified by 174 and 169 States respectively. For more information on the application of these Conventions, see the General Survey on forced labour, ILC, 96th session, 2007: http://www.ilo.org/wcmsp5/groups/public/@ed_norm/@relconf/documents/meetingdocument/wcms_089199.pdf . See also ILO, *Combating forced labour : a handbook for employers and business*, 2008, available at: http://www.ilo.org/sapfl/Informationresources/ILOPublications/lang--en/docName--WCMS_101171/index.htm.

[21] To date, Conventions Nos. 100 and 111 have been ratified by 168 and 169 States respectively.

compulsory labour, including forced or compulsory recruitment of children for use in armed conflict); child prostitution and pornography; using children for illicit activities, in particular for the production and trafficking of drugs; and work which is likely to harm the health, safety or morals of children.[22]

Other relevant ILO instruments

The *ILO Declaration on Fundamental Principles and Rights at Work*[23], adopted in 1998, proclaims that all Member States, even if they have not ratified the eight core Conventions mentioned above, have an obligation arising from the very fact of membership in the Organization to respect, to promote and to realize, in good faith, the principles concerning the four corresponding categories of fundamental rights, namely:

- freedom of association and the effective recognition of the right to collective bargaining;
- the elimination of all forms of forced or compulsory labour;
- the effective abolition of child labour; and
- the elimination of discrimination in respect of employment and occupation.

The Declaration makes it clear that these rights are universal and must be respected in all States, regardless of their level of economic development. It stresses however that labour standards should not be used for protectionist trade purposes.

The *ILO Tripartite Declaration of principles concerning multinational enterprises and social policy*[24], adopted in 1977 and last amended in 2006, recognizes that multinational enterprises play an important part in the economies of most countries and in international economic relations. Its aim is to encourage the positive contribution which multinational enterprises can make to economic and social progress and to minimize and resolve the difficulties to which their various operations may give rise. The Declaration sets out principles in the fields of employment, training, conditions of work and life and industrial relations which governments of host and home countries, employers' and workers' organizations and multinational enterprises are recommended to observe on a voluntary basis. Its provisions do not affect obligations arising out of ratification of ILO Conventions. It provides inter alia that all parties concerned should contribute to the realization of the ILO Declaration on Fundamental Principles and Rights and Work of 1998.

3.2. Other international instruments

UN Global Compact

The UN Global Compact[25] is an initiative launched in 1999 by the Secretary-General of the United Nations during the World Economic Forum meeting at Davos. It is both a policy platform and a practical framework offered to businesses for the development, implementation, and disclosure of sustainability policies and practices around 10 principles in the areas of human rights, labour, environment and anti-corruption. It is not a regulatory instrument but rather a voluntary initiative to which companies around the world are invited to participate through a formal commitment to support the Global Compact and its principles. The four principles related to labour issues are derived from the ILO Declaration on

[22] To date, Conventions Nos. 138 and 182 have been ratified by 157 and 173 States respectively.
[23] For additional information on the 1998 Declaration, including its full text, see http://www.ilo.org/declaration/lang--en/index.htm.
[24] The text of the 1977 Declaration is available at: http://www.ilo.org/empent/Whatwedo/Publications/lang--en/docName--WCMS_094386/index.htm.
In addition, the ILO has established a Helpdesk for Business that provides free and confidential assistance service and is available for company managers and workers, as well as government agencies, employers' and workers' organizations and other interested organizations. The Helpdesk can be contacted at : http://www.ilo.org/empent/Areasofwork/business-helpdesk/lang--en/index.htm.
[25] http://www.unglobalcompact.org/

Fundamental Principles and Rights and Work of 1998.

The Global Compact asks companies to embrace, support and enact, within their sphere of influence, a set of core values in the areas of human rights, labour standards, environment, and anti-corruption. Businesses must respect (even if it is not a regulatory instrument) the following 10 principles:

- Support and respect the protection of internationally proclaimed human rights;
- Ensure that they are not accomplices in human rights abuses;
- Protect the freedom of association and the effective recognition of the right to collective bargaining;
- Elimination of all forms of forced and compulsory labour;
- Abolition of child labour;
- Discrimination-free employment and occupation;
- Support a precautionary approach to environmental challenges;
- Undertake initiatives to promote environmental responsibility;
- Encourage the development and diffusion of environmentally friendly technologies;
- Fight against corruption in all its forms, including extortion and bribery.

Global Compact membership is still limited among UN suppliers in developing countries, with the large majority of orders from the UN placed with Global Compact members located in developed countries and especially in Europe. UN procurement from Global Compact members as a percentage of orders of USD 30,000 or more increased from 12.32 % in 2006 to 14.15 % in 2008.[26]

UN Supplier Code of Conduct

The UN Code of Conduct[27] provides the minimum standards expected of suppliers to the UN. It is the expectation of the UN that suppliers adhere to all laws, rules and regulations, and strive to exceed both international and industry best practices. The Code of Conduct has been developed with recognition of the importance of the ILO Core Labor conventions and the ten principles of the UN Global Compact, and is viewed as an important means of integrating the Compact's principles into the operations of the UN.

The UN recognizes that reaching the standards established in this Code of Conduct is a dynamic rather than static process and encourages suppliers to continually improve their workplace conditions.

While a number of UN organizations have adopted the UN Supplier Code of Conduct (SCC), others, like ILO, are still to adopt a Code of Conduct. ILO intends to publish such a Code that will contain some provisions which differ from those of the UN SCC, particularly with respect to labour issues.

The OECD Guidelines for multinational enterprises

The OECD Guidelines for multinational enterprises[28] pursue the same goal at the ILO Tripartite Declaration of 1977. They contain recommendations addressed to multinational enterprises operating in or from adhering countries (the 34 OECD countries plus 8 non-OECD countries: Argentina, Brazil, Egypt, Latvia, Lithuania, Morocco, Peru and Romania). These recommendations are directly addressed to multinational enterprises and not to workers' and employers' organizations, since the OECD is not a tripartite organization like the ILO. The recommendations on employment and industrial relations make reference in concise terms to freedom of association, the abolition of child labour and forced or compulsory labour, as well as non-discrimination with respect to employment or occupation.

[26] 2008 Annual Statistical Report on United Nations Procurement, UNOPS
[27] http://www.un.org/depts/ptd/pdf/conduct_english.pdf
[28] http://www.oecd.org/dataoecd/56/36/1922428.pdf

The commentaries that accompany these guidelines recognize that the ILO is the competent body to set and deal with international labour standards, and to promote fundamental rights at work as recognized in its 1998 Declaration on Fundamental Principles and Rights at Work. They stress that the provisions of the guidelines on employment and industrial relations echo relevant provisions of the 1998 Declaration, as well as the 1977 Tripartite Declaration.

Other Codes of Conduct

In addition to the above-mentioned instruments that were adopted under the auspices of intergovernmental organizations, a number of codes of conduct were developed, either at the sectoral level or at a broader scale. Some of them are relevant for the social dimension of public procurement.

The NGO Social Accountability International (SAI)[29] developed the *SA8000 standard* that makes express reference to a number of ILO Conventions, including the eight core Conventions. Nonetheless, the ILO is not linked in any manner to the development and supervision of the implementation of the SA8000 standard. A voluntary certification procedure for companies has also been put in place.

In September 2010, the International Organization for Standardization (ISO) adopted the *International Standard ISO 26000:2010, Guidance on social responsibility. Contrary to other standards developed by the ISO, this standard cannot be used for certification purposes.* It is more comprehensive than the SA 8000 standard and provides guidance for organizations that voluntarily want to strengthen their social responsibility regarding in particular human rights (including fundamental rights at work) and working conditions. A Memorandum of Understanding was concluded between the ISO and the ILO to ensure consistency of the new standard with ILO standards.

The Electronics Industry Code of Conduct (EICC)

Codes of conduct are not widespread in the ICT sector as in some other sectors, such as the garment of coffee industries. Reference can however be made to the Electronics Industry Code of Conduct (EICC)30. The code provides guidance in five areas: labour; health and safety; environment; management systems; and ethics. The labour component of it comprises seven elements: freely chose employment; child labour avoidance; working hours; wages and benefits; humane treatment; non-discrimination; and freedom of association. It also contains a section on safety and health, with an express reference to the ILO Guidelines on Occupational Safety and Health Management Systems (ILO-OSH 2001).

4. Most relevant environmental policy and legislation impacting on office IT equipment

Although UN procurement organizations are not always directly affected by the legislation it is important to be aware of it, as legislation may already sufficiently address some important environmental aspects, which need not therefore be addressed by procurers. For example, certain hazardous substances may be banned, or suppliers may be required to provide a take-back and disposal service.

Legislation may also, for example, require products to be labeled or indicate if they contain a certain amount of a hazardous substance. This may provide a useful information source for procurers to assess the environmental characteristics of products.

[29] http://www.sa-intl.org/

[30] http://www.eicc.info/EICC%20CODE.htm.

4.1. Europe

The European standards set by the EU WEEE and RoHS Directives (see following sections) have a worldwide impact, as the size of European market has a major influence on product development in such a global industry. Statistics released by the China Electronics Imports & Exports Corp. indicate that products falling under the Directives account for about 70% of the country's export to the EU market (SOMO 2005). Therefore, European together with North American (especially US) environmental policy and regulation have the most impact on the office IT equipment available on the global market.

Directive 2005/32/EC on the Eco-design Requirements for Energy-using Products (EuP)

The EuP directive establishes a framework for the setting of eco-design requirements for energy-using products with the aim of ensuring free movement of those products within the internal market. The Directive aims to encourage manufacturers to produce products which are designed to minimize their overall environmental impact, including the resources consumed in their production and disposal.

Before an EuP is marketed or put into service, a CE conformity marking must be fixed to it and a declaration of conformity issued, which states that it complies with all relevant implementing measures. The manufacturer or their authorized representative must make sure that an assessment of the EuP's conformity with all relevant requirements is carried out.

The Directive does not itself introduce binding requirements for specific products, but it does define conditions and criteria for establishing such requirements for environmentally relevant product characteristics. Binding implementation measures are now being established for several product groups including office IT equipment.

Within this framework the Commission presented a "*working document on possible ecodesign requirements for Standby and Off Mode electric power consumption of electrical and electronic household and office equipment*" to a Consultation Forum in October 2007 at which maximum power consumption levels were proposed. As yet no concrete decision has been taken.

Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE)

Directives 2002/96/EC on waste electrical and electronic equipment and 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment are designed to tackle the fast increasing waste stream of electrical and electronic equipment and complement European Union measures on landfill and incineration of waste.

The WEEE Directive is one of a series of 'producer responsibility' Directives that makes EU producers of new equipment pay for the recycling and/or safe treatment and disposal of the products they put on the market when they eventually come to be thrown away.

The WEEE Directive provides for appropriate channels for take-back, treatment and disposal of products at the end of life.

The aim of the Directive is that waste electrical and electronic equipment, including the office IT equipment referred to in this study, can be disposed of free of charge, if the owner takes the product to the agreed collection point.

UN procurement organizations can require certain characteristics which make the recycling of products easier, such as how easy it is to disassemble, limiting the mixing of different plastic types, the appropriate labeling of parts, and the use of easily recyclable materials.

Directive 2002/95/EC on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS Directive)

The Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment 2002/95/EC (commonly referred to as the RoHS Directive) dictates

that Member States shall ensure that, from 1 July 2006, new electrical and electronic equipment put on the market does not contain lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

There are, however, certain acceptable limit values and exemptions listed in the Annex to the Directive for these substances (e.g. the use of mercury in fluorescent lamps, lead in glass, etc.). This means that these substances do still exist in electrical and electronic equipment to some extent.

The Annex to the Directive has been amended several times (2005/618/EC, 2005/717/EC, 2005/747/EC, 2006/310/EC), altering the list of exclusions and limit values.

REACH Regulation (1907/2006)[31]

The REACH (registration, evaluation, authorisation and restrictions of chemicals) Regulation (1907/2006) was adopted in December 2006, and entered into force on 1 June 2007. It provides a new regulatory framework for the collection of information on the properties of chemicals on the European market, and also for future restrictions on their use.

The previous legislative framework had made a distinction between “existing” (over 100,000) and “new” chemicals (i.e. introduced after 1981), with no appropriate testing mechanism for the potentially harmful properties of existing chemicals. Furthermore public authorities, rather than industry were responsible for undertaking risk assessments, which meant a burdensome (and slow) evaluation process.

Under the new regulation manufacturers and importers will be required to gather information on the properties of their chemical substances (both existing and new), which will allow their safe handling, and to register the information in a central database run by the European Chemicals Agency (ECHA) in Helsinki. It also calls for the progressive substitution of the most dangerous chemicals when suitable alternatives have been identified

A new Agency acts as the central point in the REACH system: it will run the databases necessary to operate the system, co-ordinate the in-depth evaluation of suspicious chemicals and run a public database in which consumers and professionals can find hazard information.

Substances with properties of very high concern will be made subject to authorization. Applicants who wish to produce and/or market such substances will have to demonstrate that risks associated with uses of these substances are adequately controlled or that the socio-economic benefits of their use outweigh the risks. Applicants must also analyse whether there are safer suitable alternative substances or technologies. If there are, they must prepare substitution plans, if not, they should provide information on research and development activities, if appropriate. The Commission may amend or withdraw any authorization on review if suitable substitutes become available.

The restrictions provide a procedure to regulate that the manufacture, placing on the market or use of certain dangerous substances shall be either subject to conditions or prohibited. Thus, restrictions act as a safety net to manage Community wide risks that are otherwise not adequately controlled.

In future, this will provide not only a rigorous testing and restriction procedure for all chemicals on the European market, but also provide a highly valuable centralized information source which could be used by public purchasers. However, it will take some years before the system will be fully operational and comprehensive.

Directive on Batteries and Accumulators and Waste Batteries 2006/66/EC

The 2006 Battery Directive, officially repealing the 1991 Battery Directive, was approved July 4, 2006 and became official on September 26, 2006. It gives European Member States until Sept. 26, 2008, to implement its national laws and rules on batteries.

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[31] REACH in Brief, http://ec.europa.eu/environment/chemicals/reach/pdf/2007_02_reach_in_brief.pdf

The Battery Directive has an objective of reducing the amount of hazardous substances used in the manufacture of batteries e.g., lead, lead-acid, mercury, cadmium, etc., and better waste management of these batteries.

With the exception of "button" cells with mercury content of no more than 2% by weight, the 2006 Battery Directive restates the earlier Battery Directives' prohibition of marketing all batteries with more than 0.0005% mercury and 0.002% cadmium and mandates symbols on battery labels that indicate the battery's chemical contents if mercury or cadmium. Lead is no longer being totally prohibited from batteries.

In Art. 21 labeling must indicate separate collections or recycling and the heavy metal content. Labels should state collection information and chemical content of batteries. They should show a symbol of the "crossed-out" wheeled recycling bin (Annex II, P. 13 of the new Directive) to indicate that the battery should not go in the bin.

4.2. North America

Restriction of Hazardous Substances (RoHS) California and the Waste Electrical and Electronic Equipment (WEEE) law of California[32]

Californian state law has adopted most of the provisions of both RoHS and WEEE in relation to displays (CRT, LCD and plasma), although PBB and PBDE are not restricted. This may, in future, also extend to the other products covered by the European legislation.

Individual US State laws on e-waste

For a comprehensive overview of US e-waste systems focussing on disposal of CRTs, promoting take-back and recycling of electronics please see the Electronics Take Back Coalition website.[33]

Other relevant US legislation

- Energy Policy Act of 2005 which requires federal agencies to buy ENERGY STAR® products[34]
- Executive Order 13423 which requires federal agencies to buy EPEAT registered products (all EPEAT registered products must be ENERGY STAR® qualified and meet other environmental performance criteria, including being required to comply with RoHS provisions)[35]
- IEEE Standard for Environmental Assessment of Personal Computer Products[36]
- Occupational Safety and Health Act[37]
- Pollution Prevention Act[38]
- Resource and Conservation and Recovery Act + Clean Water Act[39]
- Toxic Substances Control Act[40]

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[32] More information can be found at www.rsjtechnical.com/WhatisCaliforniaRoHS.htm.

[33] http://www.e-takeback.org/docs%20open/Toolkit_Legislators/state%20legislation/state_leg_main.htm

[34] www.epa.gov/oust/fedlaws/publ_109-058.pdf

[35] www.doi.gov/greening/Executive%20Order%2013423_01-26-07.pdf

[36] www.ieee.org

[37] http://www.osha.gov

[38] http://www.epa.gov/oppt/p2home/pubs/p2policy/act1990.htm

[39] http://www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/electronics.html

4.3. Other regional legislation

Due to the international nature of the product group, suppliers tend to follow the legislative requirements of Europe and North America. Therefore no other specific legislation applying to East Africa, Latin America, the Middle-East and South-east Asia has been included in this background report.

5. Implementing sustainable procurement guidelines

5.1. Relevant typical UN tendering procedures

During the survey on procurement procedures for (sustainable) office IT equipment carried out in February 2008 the asked UN procurers indicted that they mainly tender for the best price of a certain product (including brand/model) that has been pre-selected by a requisitioner. Besides including selection criteria regarding the environmental management system of the bidding company, competitive tendering aiming at the environmental performance and social aspects of the product is normally not addressed specifically.

The following table outlines the common procurement procedures for office IT equipment for seven UN procurement entities.

Organisation	Procurement procedure for office IT equipment
UNEP DTIE	For printers/copiers: Selection of several suppliers and manufacturers and competitive bidding For notebooks: Selection of a specific brand/model and competitive bidding for the best price
UNEP IETC	Purchase order
UNOG	Volume purchase agreements for PCs and laptops, leasing of photocopiers. A Request For Proposal (RFP) for managed printing services has been launched recently
UNDP/Common Services	UNDP procures IT equipment based on Long Term Agreements established with manufacturers
UNON	a) Any IT or IT related request is cleared by the Information Communication & Technology Service (ICTS) of UNON before processing: ICTS advise end-users on required specifications, provision of support, warranty issues etc. b) ICTS encourages end-users with a list of standardized PCs and Laptops c) Procurement Travel & Shipping Section (PTSS) of UNON has in place a systems contract for the Supply of the Single Model PC - Hp Compaq DC7800 for a year. The single model PC initiative has been operational since 2005 d) For non-standard IT requests, PTSS checks the list of UNHQ System Contracts to establish whether any contract for similar equipment exists. If so, PTSS, in co-ordination with UNHQ, uses this contract. An example is the Lenovo UNHQ Systems Contract that PTSS uses to buy Lenovo laptops e) In exceptional cases, PTSS carries out Competitive Bidding for requests that are not standard e.g. Macintosh PCs, Dell Servers etc. that are specifically required by end users to perform their day to day tasks f) PTSS currently has a lease agreement for photocopiers/scanners and fax machines (Canon & Kyocera). The Contractor is based in-house

[40] http://www.epa.gov/compliance/civil/tsca/index.html

	and provides maintenance and support g) Competitive bidding is carried out for photocopiers that are outside the lease agreement
UNRWA	Long Term Agreements
ROLAC-Panama	(1) Selection of brand/model, (2) assessing three quotes and (3) issuing the Purchase Order

5.2. Sustainability considerations in procurement

The indicative results from the survey on procurement procedures for office IT equipment carried out in February 2008 showed that criteria addressing environmental and social criteria are addressed generally in an annex[41]. Vendors are required to submit evidence of compliance with these sustainable procurement guidelines. A range of issues are addressed within these annexes. This includes:

- In general, products that are harmful to the environment shall not be used in the provision of services or supply of goods.
- Energy sources that have minimal impact on global warming / greenhouse gases must be used.
- Materials should be easily recyclable using locally available facilities and have minimum impact on the release of greenhouse gases, ozone-depleting gases and on ecological balance, during production, use and disposal.
- Equipment that contains ozone-depleting substances (ODSs) that are controlled by the Montreal Protocol (e.g. Methyl Bromide, Chlorofluorocarbon (CFC) gases and Persistent Organic Pollutants (POPs)) will not be considered at all.
- In the scope of this background report on office IT equipment the following environmental performance criteria on equipment is of special interest:
- Durable equipment that has minimal impact on the environment (i.e. green batteries, energy efficient printers with double-sided printing facilities) and equipment that can be refilled, recharged or reused will be given priority. Equipment that has too long of a lifecycle (plastic bags, or those containing PVC, chlorine, heavy metal and ODSs) will not be purchased.

These already existing requirements for office IT equipment have been taken into account when developing the copy-and-paste guide for sustainable procurement of office IT equipment (see Product Sheet).

The social aspects (issues such as poverty eradication, equity in the distribution of resources, labor conditions and human rights) are normally described separately in e.g. the "Fair Pack" and are based on the ILO core conventions and the Global Compact (see Section 3).

It is noted that precise verification schemes for the requirements are not included. Nevertheless such sustainable procurement policy documents are valuable to use in tendering procedures to highlight the importance of sustainability aspects in the procurement process in the UN system.

5.3. Using a lifecycle approach

Using a lifecycle approach means taking into account the costs incurred by the purchasing organization over the whole life of the product from purchase, through usage and maintenance costs to disposal. For office IT equipment the main costs to be considered are the purchase price, energy and materials consumption during use, and the disposal of the equipment (the latter does not apply to leasing).

[41] See as an example Annex F: UNON SUPPLIER SUSTAINABLE PROCUREMENT GUIDELINES used in UNON tender documents.

As with any electricity-using product, purchasing energy efficient models is generally a win-win option – reducing running costs, and also reducing environmental impacts. Generally, the energy efficiency of the product also has relatively little impact on the purchase price, certainly if you are aiming for a model within the 25% most efficient on the market. The EU ENERGY STAR® website has a useful tool for calculating the possible financial savings of buying a more efficient product: http://www.eu-energystar.org/calculator.htm.

Lifecycle Costing (LCC) of computers, notebooks and monitors

The following graphics give an indicative overview of the lifecycle costs (LCC) for desktop PCs and notebooks comparing energy efficient and non-energy efficient products. A notebook is included in this comparison as it may also be an option to purchase notebooks instead of desktops PCs, as they can be used both at fixed workplaces and when travelling. The LCC is calculated over a period of five years, excluding disposal costs and using constant energy costs of 0,12 EUR/kWh.

The results show that LCC for conventional and energy efficient products are similar.

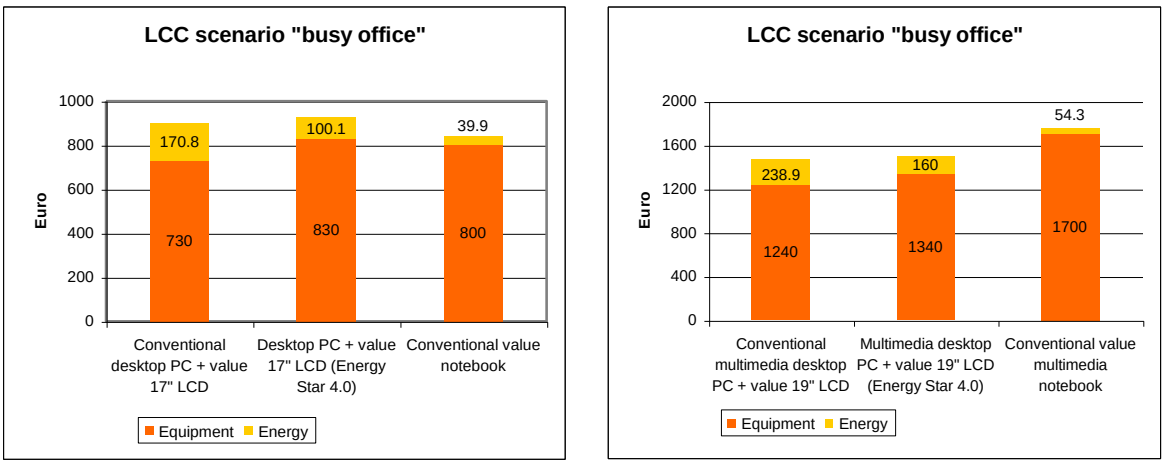

Figure 1: Figure 1: LCC scenario "busy office" for desktop PC and notebooks, prepared using the ENERGY STAR® LCC calculator - **http://www.eu-energystar.org/en/en_008b.shtml**

When including eco-labeled products into the LCC comparison for different product types it is clearly visible that they do not have a major influence on the overall LCC (see 3rd column in the following figure).

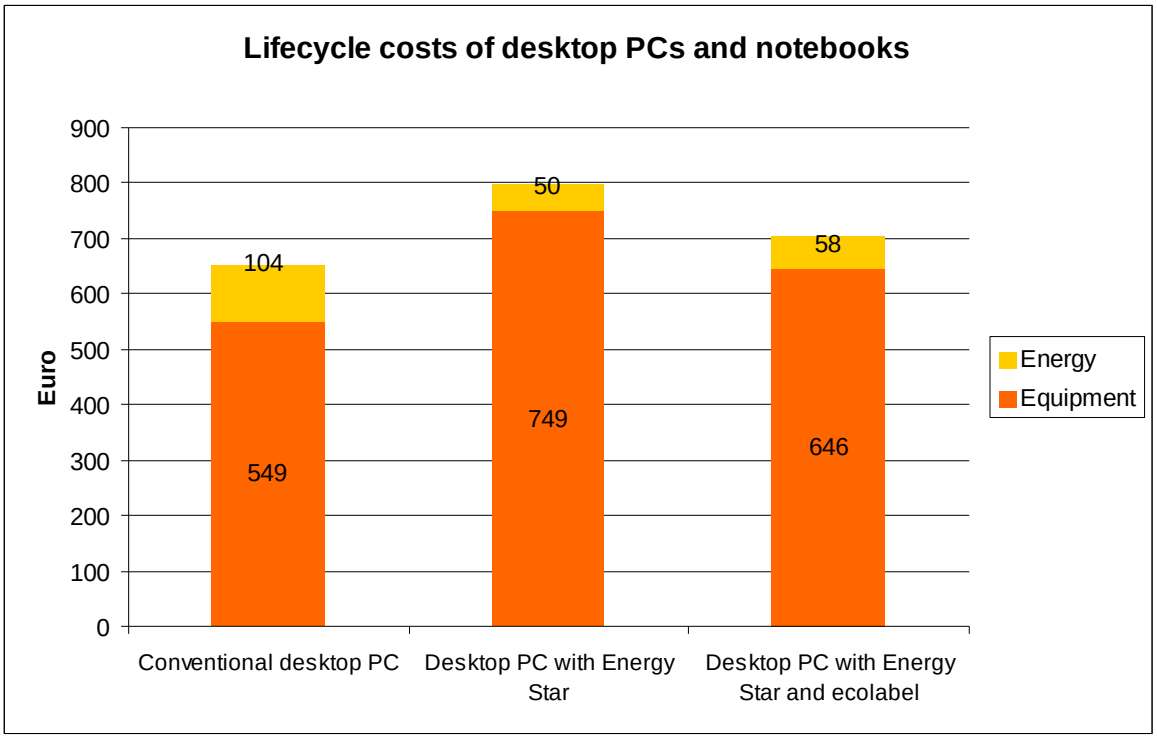

Figure 2: Comparison of lifecycle costs over five years (energy costs and purchase price) of conventional desktop PC (without monitor), desktop PC with ENERGY STAR® (without monitor), and desktop PC with ecolabel Blue Angel (without monitor). Source: Ökoinstitut 2008

Another European Commission study on the Costs & Benefits of GPP in 2007[42] examined the cost implications of purchasing green (eco-labeled) IT devices – computers, monitors and imaging equipment products.

For computers the differences between the green and the non-green version are calculated to amount to between 3% higher to 7% lower costs for the green version. However, there are a number of uncertainties that might have significant influence on the results: Usage behavior, costs for repair, influence of the on-site service for the overall product lifetime, and rapid changes in the market (e.g. due to prices and variability of components) lead to rapidly changing product composition and product prices.

For notebooks the differences between the green and the non-green version are calculated to amount to between 6% and 24%, with the green version being more expensive than the non-green version. The energy savings of the green version have no major influence on the overall costs, with a typical saving of €8 over 4 years.

Lifecycle Costing (LCC) of printers, copiers and multifunctional devices

The following figure gives an indicative overview of the lifecycle costs (LCC) for multifunctional devices comparing energy efficient and non-energy efficient products. The LCC is calculated over a period of five years, excluding disposal costs.

The results show that energy efficient products with a duplex function have reduced LCC in comparison to conventional products.

[42] *Study on costs/benefits of Green public procurement in Europe,* Öko-Institut & ICLEI 2007, available at: http://ec.europa.eu/environment/gpp/index_en.htm.

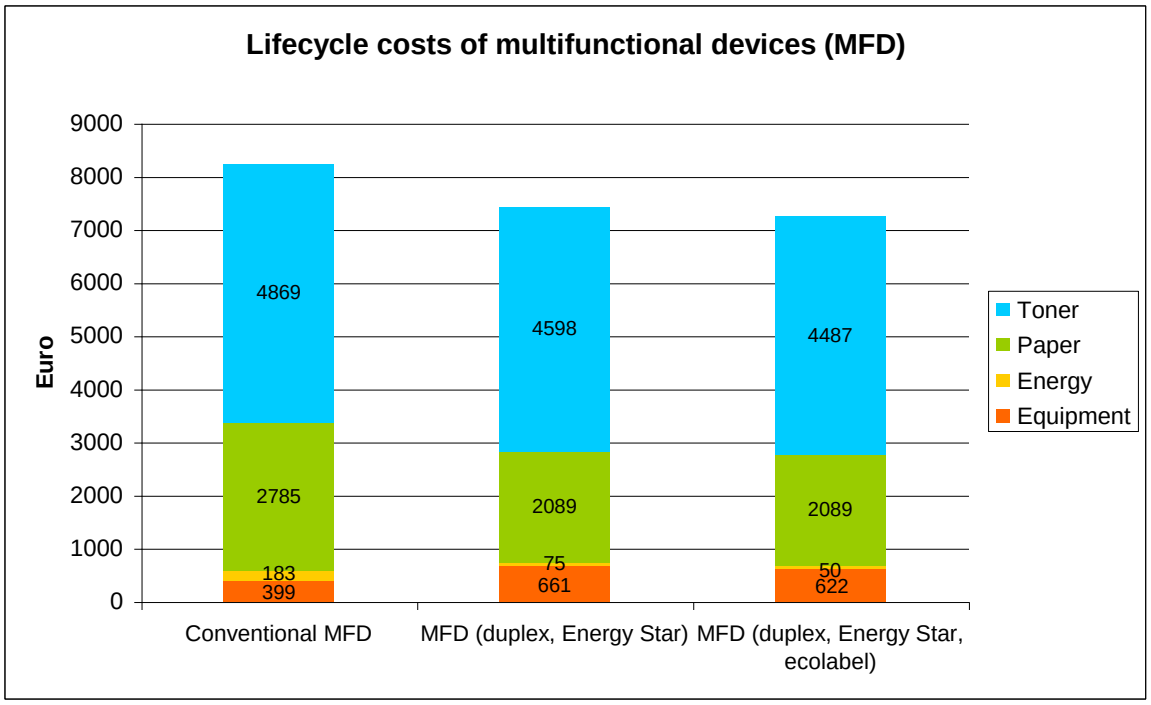

Figure 3: Comparison of lifecycle costs over five years (energy costs and purchase price) of conventional MFDs (without duplex), MFD with duplex and ENERGY STAR®, MFD with duplex, ENERGY STAR® and ecolabel Blue Angel. Source: Ökoinstitut 2008

The main results summarized in the European Commission study on the Costs & Benefits of GPP for printers and copiers are as follows:

- The green version of single-function Ink Jet printers as specified in the Costs and Benefits study (i.e.: automatic duplex unit and meeting ENERGY STAR® requirements) are more expensive than the conventional ('non-green') version. This is mainly due to the quite high price of the automatic duplex unit (between 38 and 45 % higher than the non-green version). As the printing volume is quite low, these higher costs cannot be compensated for by the lower paper consumption.
- In contrast, the LCC of the green version of the single-function Electro-photography[43] (EP) printers as specified in the Costs and Benefits study (i.e. automatic duplex unit and meeting ENERGY STAR® requirements) is between 7 and 11% lower than the LCC of the non-green version. Even though the purchase price of the printers with automatic duplex unit is between 20 and 25% higher than the price of the non-green version, the lower costs during the use phase overcompensates this difference due to the much lower paper consumption.
- With about 38% for multifunctional EP devices, the most important cost saver is the use of the duplex function. Large multifunctional EP devices come with a duplex unit, so no extra costs have to be assigned to this function. It is more critical whether users actually use the duplex function or rather abstain from using it. Cost savings due to a better electricity standard are negligible.

[43] Electro-photography (EP) is a marking technology characterised by illumination of a photoconductor in a pattern representing the desired hard copy image via a light source, development of the image with particles of toner using the latent image on the photoconductor to define the presence or absence of toner at a given location, transfer of the toner to the final hard copy medium, and fusing to cause the desired hard copy to become durable. Colour EP is distinguished from monochrome EP in that toners of at least three different colours are available in a given product at one time.

- In all cases it can be seen that the use of recycled paper leads to cost reductions as the price for recycled paper in Germany is lower compared to the price for conventional paper. Combining the use of the green version of the printers with the use of recycled paper leads to lower additional costs in case of the IJ printers and to higher savings in case of the EP printers.

Disposal costs

Disposal costs (or resale) at the end of the useful life of the product may also have a significant impact on the LCC of office IT equipment, particularly due to the electronic nature of the product and the inclusion of hazardous substances. However, the actual costs incurred by the purchasing organisation in disposal will very much depend on local disposal regulations and responsibilities, such as take-back systems – whether these costs must be borne by the supplier, for example.

As such it is difficult to provide an overview of the influence of disposal in the typical LCC for these products, and little data is available. It is advisable to be fully aware of local systems and regulations, and to take these into account in costing.

6. Environmental performance criteria sources

There are many different voluntary environmental performance labels and declarations for office IT equipment including the, ENERGY STAR®, the German Blue Angel, Nordic Swan, EPEAT, the European Ecolabel, TCO, NIL, Terrachoice Ecológico, Environmental Choice Canada and the ECO IT declaration. This section presents the most common criteria sources that will be used later in the Product Sheet as copy-and-paste solutions to identify the most green versions of green office IT equipment for competitive tendering and selection processes (see Product Sheet).

The following analysis compares the key ecolabels as regards their criteria addressing the most important environmental aspects identified in section 3.

6.1. Relevant Ecolabels: Energy consumption and noise

Energy consumption – PCs, notebooks and monitors

Following the recent revision of the ENERGY STAR® criteria for computers (including notebooks and monitors) and imaging devices, which are aimed at the top 20-25% of products on the market, these standards are now being recognized as the international norm for highly efficient IT products.

ENERGY STAR® also now sets criteria for “idle/on” state for computers – i.e. the state in which the operating system and other software have completed loading, the machine is not asleep, and activity is limited to those basic applications that the system starts by default. This is a significant addition, which up to now has not been covered by the majority of the ecolabels, as there was no agreed method of assessment.

Other ecolabels have and will take ENERGY STAR® criteria as their basis in the future[44]. A comparison of the ecolabeling criteria for desktops, monitors and notebooks can be found in the Tables below.

The full criteria are available on the EU ENERGY STAR® website, and are outlined in the official EU ENERGY STAR® Agreement[45].

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[44] Blue Angel will, for example, adopt the Energy Star criteria for computers in 2008.

[45] www.eu-energystar.org and http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/l_381/l_38120061228en00260104.pdf

Comparison of the key ecolabeling criteria for desktop PCs						
Energy criteria for Desktop PCs	**Energy Star** 2007	**Nordic Swan** 2007	**EU Ecolabel** April 2005	**TCO´05** Jul 2005	**Blue Angel** 2006***	**EPEAT**
Sleep	4 W	4W	4W	5W	4.5W	*
Off	2W	2W	2W	2W	2.5W	*
On/idle	50-95 W**	-	-	-	-	*

* Same requirement as ENERGY STAR®
** Depending on category of PC
*** Will be adjusted to ENERGY STAR® levels in 2008

Comparison of the key ecolabeling criteria for notebooks						
Energy criteria for notebooks	**Energy Star** July 2007	**Nordic Swan** 2007	**EU Ecolabel** Apr 2005	**TCO`05** Jul 2005	**Blue Angel** 2006***	**EPEAT**
Sleep	1.7W	3W	3W	1.7W	3,5W	*
Off	1W	2W	2W	1W	2W	*
On/idle	14-22 W**					*
Power supply	84%	0.75W	0.75W			*

* Same requirement as ENERGY STAR®
** Depending on category of PC
*** Will be adjusted to ENERGY STAR® levels in 2008

Comparison of the key ecolabeling criteria for monitors						
Energy criteria for monitors	**Energy Star** Jan 2006	**TCO´03** (Updated Jan 2006)	**Nordic Swan** 2007	**EU Ecolabel** Apr 2005	**Blue Angel** 2006	**EPEAT**
Sleep	2W	*	*	*	*	*
Off	1W	*	*	*	*	*
Active mode	Y**	*	*	*	*	*

* Same requirement as ENERGY STAR®
** If X < 1 megapixel, then Y = 23; if X > 1 megapixel, then Y = 28X. Y is expressed in watts and rounded up to the nearest whole number and X is the number of megapixels in decimal form. X = Megapixels. Y = Allowed power consumption

Energy consumption – imaging equipment

The updated ENERGY STAR® requirements for imaging equipment include two different acceptable approaches for energy consumption, with different consumption depending on the type and power of product:

- **Operational Mode (OM) Approach** – A method of testing and comparing the energy performance of imaging equipment products, which focuses on product energy

consumption in various low-power modes. The key criteria used by the OM approach are values for low-power modes, measured in Watts (W).[46] Certain "functional adders" (i.e. add-ons to the devices that require additional power consumption) give additional allowances to the limit values. The Blue Angel criteria for imaging equipment are based on this approach.

- **Typical Electricity Consumption (TEC) Approach** – A method of testing and comparing the energy performance of imaging equipment products, which focuses on the typical electricity consumed by a product while in normal operation during a representative period of time. The key criteria of the TEC approach for imaging equipment is a value for typical weekly electricity consumption, measured in kilowatt-hours (kWh).[47]

The Blue Angel uses a similar system to the OM approach described above. The Nordic Swan allows products which meet either the Blue Angel or ENERGY STAR® approach. EPEAT will be developing a standard for imaging equipment soon. There is no European Ecolabel for this group.

As for PCs, the criteria behind these recommendations are relatively complex and would be difficult for a contracting authority to verify compliance with independently. However there is a sufficient number of ENERGY STAR® labeled products on the market for contracting authorities to be confident of not having to go through this complex process. It is unlikely that products meeting these criteria would not be labeled.

Noise

Through the EuP study consultation in Europe it was raised whether noise is an environmental issue for IT equipment or not. The conclusion was that noise is considered as such in some situations such as in quiet offices and should be therefore included as criteria. Table 6 below compares criteria for noise for the Blue Angel, Nordic Swan, the European Ecolabel and TCO.

Comparison of the key ecolabelling criteria for desktop PCs

Noise levels	The Blue Angel	Nordic Swan	EU Ecolabel	TCO
Desktop computers				
Idle mode	4.0 B(A)	4.0 B (A)	4.0 B(A)	3.9 B*
When accessing a hard-disk drive / Operating mode	4.4 B (A)	4.4 B (A)	4.5 B(A)	4.4 B*
Notebooks				
Idle mode		3.5 B (A)	3.5 B (A)	
When accessing a hard-disk drive / Operating mode		4.0 B (A)	4.0 B (A)	

* If the product does not emit prominent discrete tones according to procedures specified in ECMA 74 Annex D a higher declared A-weighted sound power level (LWAd) is accepted but shall not exceed: Operating mode: 4.7 B Idling mode: 4.2B

[46] Detailed information can be found in the "ENERGY STAR Qualified Imaging Equipment Operational Mode Test Procedure" available at www.energystar.gov/products.

[47] Detailed information can be found in the "ENERGY STAR Qualified Imaging Equipment Operational Mode Test Procedure" available at www.energystar.gov/products.

For imaging equipment both the Nordic Swan and Blue Angel use essentially the same calculation, with a sliding scale based on the power of the machine in terms of pages per minute.

6.2. Relevant Ecolabels: Other Criteria

This section provides an overview of the 'other' criteria used by ecolabels such as hazardous substances, recycling, disposal, durability and packaging for computers, imaging equipment and monitors.

Hazardous substances for PCs, notebooks and monitors

For hazardous substances there is no direct way of comparing the ecolabels, especially for PCs/notebooks. This is mainly because of the complexity of the criteria and because they are presented in different ways. For example, the ecolabels go into detail on different aspects of hazardous substances and for different components of a computer.

The tables below show which issues are covered by the key ecolabels.

Comparison of the key non-energy and noise ecolabeling criteria for desktop PCs

Criteria for Desktops	TCO'05	The Swan	Blue Angel	EU Ecolabel	EPEAT
Environmental Responsibility					
Company's environmental Responsibility	X	X			X
Environmental hazards					
Mercury, cadmium, and lead	X	X	X	X	X
Flame retardants	X	X	X	X	X
Chlorinated plastics	X	X	X		X
Preparation for Recycling					
Material coding of plastics	X	X	X	X	X
Variety of plastics	X	X	X	X	X
Metallization of plastics	X	X	X	X	X
Material recovery of plastics and metals		X	X	X	
Design for recycling - Mercury lamps	X	X	X	X	X
Easy to dismantle		X	X	X	X
Recycling information for customers	X	X	X	X	
Guarantee and spare parts					
Guarantee		X	X		
Supply of spare parts		X	X		X
upgradability/performance expansion		X	X	X	X
Packaging					
Requirements regarding packaging materials			X	X	X

Comparison of the key non-energy and noise ecolabeling criteria for notebooks					
Criteria for Desktops	**TCO'05**	**The Swan**	**Blue angel**	**EU Ecolabel**	**EPEAT**
Environmental Responsibility					
Company's environmental responsibility	X	X			X
Environmental hazards					
Mercury, cadmium, and lead	X	X	X	X	X
Flame retardants	X	X	X	X	X
Chlorinated plastics	X	X	X		X
Preparation for Recycling					
Material coding of plastics	X	X	X	X	X
Variety of plastics	X	X	X	X	X
Material recovery of plastics and metals		X	X	X	
Mercury lamps	X	X	X	X	X
Easy to dismantle		X	X	X	X
Recycling information for customers	X	X	X	X	
Guarantee and spare parts					
Guarantee		X	X		
Supply of spare parts		X	X		X
Upgradability/performance expansion		X	X	X	X
Packaging					
Requirements regarding packaging materials			X	X	X

Comparison of the key non-energy and noise ecolabeling criteria for monitors					
Criteria for Desktops	**TCO'05**	**The Swan**	**Blue angel**	**EU Ecolabel**	**EPEAT**
Environmental Responsibility					
Company's environmental responsibility	X	X			X
Environmental hazards					
Mercury, cadmium, and lead	X	X	X	X	X
Flame retardants	X	X	X	X	X
Chlorinated plastics	X	X	X		X
Preparation for Recycling					
Material coding of plastics	X	X	X	X	X
Variety of plastics	X	X	X	X	X
Metallisation of plastics	X	X	X	X	X
Material recovery of plastics and metals		X	X	X	
Mercury lamps	X	X	X	X	X
Easy to dismantle		X	X	X	X
Recycling information for customers	X	X	X	X	

Guarantee and spare parts					
Guarantee		X	X		
Supply of spare parts		X	X		X
upgradability/performance expansion					
Packaging					
Requirements regarding packaging materials			X	X	X

In Europe, and by extension in much of the global market, the RoHS Directive has now restricted the use of most harmful substances in electrical and electronic equipment (EPEAT includes compliance with the RoHS provisions as mandatory). However certain limit values and exemptions are set. The ecolabel criteria also tend to be slightly stricter than the values in the RoHS Directive. Additionally, other potentially harmful substances may be included in office IT equipment which are not covered by the RoHS Directive such as beryllium, arsenic, phthalate esters and organotins.

One area of agreement between the various ecolabels is in limiting the use of mercury in the background lighting of LCD monitors, which go beyond the restrictions set in the RoHS Directive, defining limits of 3 mg (Blue Angel & European Ecolabel) or 3.5 mg (Nordic Swan). All five labels included in the table above also prohibit the use of flame retardant substances and preparations in plastic parts above 25g assigned with certain risk phrases (carcinogenic, mutagenic or harmful to reproduction). The European Ecolabel goes further than the other labels as it also restricts flame retardant substances and preparations that are harmful to the environment.

The tables above list as an issue “company’s environmental responsibility”, for example the TCO label has a requirement that “Each manufacturing plant shall be certified in accordance with ISO 14001, or EMAS registered.”

Hazardous substances

The main ecolabels for imaging equipment which cover more than energy consumption are the EPEAT, Blue Angel and Nordic Swan.

For the Nordic Swan these criteria cover the use of chlorinated polymers, additives classified as hazardous to human health, brominated flame retardants, heavy metals in batteries, and ozone depleting chemicals used in production.

The Blue Angel also restricts the use of halogenated polymers and additions of organic halogenated compounds such as flame retardants, heavy metals in batteries, and the use of substances classified as hazardous to human health. It also restricts the use of PBBs (polybrominated biphenyls), PBDEs (polybrominated diphenyl ethers) or chlorinated paraffins in the base material of circuit boards.

For computers nd notebooks the EPEAT ecolabel addresses the restriction of SCCPs (Short Chain Chlorinated Paraffins) in paints, coatings, plastics, rubbers or seals, compliance with the final requirements of the European RoHS (Restriction on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment) Directive (2002/95/EC), the elimination of certain flame retardants (referring to the European Council Directive 67/548/EEC) and the restriction of batteries and accumulators that contain lead, cadmium and mercury (referring to the European Directive 91/157/EEC).

Emissions of VOCs for imaging equipment

The Blue Angel sets limits for emissions of VOCs (volatile organic compounds) during use. The Nordic Swan states that the Blue Angel or the Japanese Eco Mark criteria must be met.

Disposal

The end of life behavior regarding computers and monitors in Europe is very much influenced by the WEEE Directive. The WEEE Directive puts the responsibility for of the disposal of electrical and electronic equipment on the producer rather than the purchaser, however owners are responsible for bringing equipment to collection points.

The majority of the ecolabels also specify that the manufacturer shall offer, without any extra fee, the take-back for refurbishment or recycling of the product and for any component being replaced. Criteria are also specified for the easy disassembly and recyclability of equipment. Mostly the ecolabels use similar criteria for this

As referred to in section 5 on relevant environmental policy and legislation, it will be important for procuring entities to refer to the relevant national regulations, legislation and/or agreements within the sector regarding the take back and recycling systems for products.

Durability

Office IT equipment is one of the product groups where there are rapid advances in technology and products and spare parts for products can quickly become obsolete.

According to the EuP study (2007) "*computers (but hardly monitors) can be upgraded to fulfil a better performance by changing processors, hard disk drives, graphics cards and other parts. This is an opportunity sometimes used by private consumers, but hardly by companies. The industry gave some figures saying approximately 2% of the customers use that opportunity*."

As noted in this quote, the issue of upgradability is relevant for computers (PCs and notebooks), not monitors or imaging equipment, although some components within imaging products such as network cards and RAM can be upgraded. The majority of ecolabels for PCs/notebooks, including the Nordic Swan, Blue Angel, EPEAT and the European Ecolabel, specify criteria for upgradability. These criteria are rather similar and concentrate on working memory expansion, installation, exchange and expansion of mass storage, installation and/or exchange of CD-ROM, DVD and hard disk drive and that the graphic cards are easily accessible. There are also specific criteria for notebooks such as criteria for example ports[48] for external monitor, external keyboard and mouse and at least two additional interfaces for external storage media and other peripheral devices.

Additionally the Blue Angel and Nordic Swan, for both computers and imaging equipment specify a five-year availability of spare parts to extend the life-time of products by limiting the need to have them replaced. This also applies to the EPEAT gold ecolabel.

Both the upgradability of the equipment and the availability of spare parts are straightforward and effective ways to limit the overall environmental impact of the sector, by reducing the consumption of resources and energy in production, together with harmful emissions related to the manufacturing processes, and the disposal of used products at the end of life.

Packaging

Packaging is addressed by EPEAT, the Blue Angel and the European Ecolabel. Some of the other labels, such as the Nordic Swan, refer to adhering to relevant national regulations, legislation and/or agreements for packaging and ask for advice to be put in the instruction manual of products.

The European Ecolabel stipulates that packaging shall meet the following requirements:

(a) all packaging components shall be easily separable by hand into individual materials to facilitate recycling.

(b) where used, cardboard packaging shall consist of at least 80 % recycled material.

[48] A "port" is a socket for connecting external devices, such as a monitor, keyboard, mouse or printer to the notebook

The Blue Angel stipulates that plastics used for product packaging may not contain halogen-containing polymers. The plastics used must be marked in accordance with the German Verpackungsordnung (Packaging Ordinance, transcribing the EU Packaging Directive 94/62/EC).

The EPEAT ecolabel addresses the exclusion of heavy metals in any packaging or packaging component, non-reusable packaging separable into like materials without using tools and the declaration of the recycled content.

6.3. The ECO DECLARATION (ECMA-370)

A common self-declaration format available on the market and used by most manufacturers is the ECO IT declaration (ECMA-370). Although this verification scheme is not based on third-party verification processes such as demanded by the above mentioned Type I ecolabels, it is a good source for UN procurers to use for verification of the sustainability criteria as it is available globally and for many office IT products.[49]

7. Most appropriate verification schemes for the UN

7.1. Common verification schemes used in the UN system

The indicative assessment of common verification schemes used by six UN procurement entities shows that self-declarations from the vendors and manufacturers of office IT equipment play a major role for verifying compliance of the (technical) specifications outlined in the tender documents. At the same time it indicates that although UN procurers are aware of other verification schemes such as ecolabels they are not used commonly to develop the specifications yet.

Organization	Common verification schemes used
UNEP IETC	Manufacturer homepage information and independent organizations' reviews (professional IT websites)
UNOG	Self-declarations from the buyers, and eventual copies of certificates or test data
UNDP/ Common Services	Self-declarations
UNON	Before any contract is awarded, the contractor is required to submit evidence of compliance with the 'UNON Supplier Sustainable Procurement Guidelines'
UNRWA	Product information available on the internet
ROLAC-Panama	Self-declarations

Common known verification schemes							
Organization	**TCO**	**ENERGY STAR®**	**EPEAT**	**Blue Angel**	**EU ecolabel**	**Nordic Swan**	**ECMA-370**
UNEP IETC		X					
UNOG	X	X		X	X		
UNDP/ Common	X	X	X	X	X	X	

[49] More information on the ECO DECLARATION (ECMA-370) can be found on the website: www.ecma-international.org

Services							
UNON	X	X					
ROLAC-Panama		X					

7.2. Recommended verification schemes for the UN system

The following table presents indicative figures about existing, most common and most ambitious ecolabels and verification schemes that are appropriate for regions with a high concentration of UN offices. They show the responses to a survey carried out in February 2008 including IT experts from Europe, Latin America, North America, South-east Asia and Africa.

Legend

- ● Existing verification scheme for office IT equipment in the region.
- ● Verification scheme with the most labeled products on the market in each region.
- ■ Most ambitious verification scheme in terms of environmental criteria.

	TCO	*ENERGY STAR®*	*EPEAT*	*Blue Angel*	*European Ecolabel*	*Nordic Swan*	*EPDs*	*ECMA-370*	*Others*	*Comments*
Europe										
Canon Europe NV	● (only for displays)	●		■	●	●	●	●		Blue Angel: Current criteria for Imaging Equipment are very difficult to meet. Especially the chemical emission limits are strict and lack scientific justification.
Danish Electricity Saving Trust		■								Focus only on energy performance
GRIP - Green in Practice, Norway	● (only for displays)	● (only for PC)				■		● (only for PC)		Probably all labeled printing devices have all these verification schemes. Swan is maybe the strictest, TCO the widest.
Hewlett-Packard	● (only for displays)	●	●	■	●	●	●	●		Blue Angel: Current criteria for Imaging Equipment are very difficult to meet. Especially the chemical emission limits are strict and lack scientific justification.
Etat de Genève	●	●		●	●	●				
UNIDO - Vienna	●	■		●	●	●				Whatever the most ambitious scheme might be, at the level of the EU, the objective is to coordinate the labeling of energy-efficient office equipment using the ENERGY STAR® logo.
TCO	●	●			●	●		●		No answer on which one is most ambitious regarding environmental criteria.

	TCO	ENERGY STAR®	EPEAT	Blue Angel	European Ecolabel	Nordic Swan	EPDs	ECMA-370	Others	Comments
North America										
Green Electronics Council	●	●	●						Environmental Choice Canada	More detail on global sales breakdown of EPEAT at http://www.epeat.net/Docs/EPEAT%20Env%20Benefits%20Report%202006.pdf
UN procurement expert		●	● (only for PC)							
US EPA ENERGY STAR® program		●	●							EPEAT as it is multi-attribute. But all EPEAT products are ENERGY STAR® labeled, whereas all ENERYG STAR products are not EPEAT
US EPA		●	●						Terrachoice Ecologo	EPEAT has 485 registered computer desktops, laptops, or monitors (February 2008). EPEAT will be developing a standard for imaging equipment soon, but at this point there is no overlap between Terrachoice and EPEAT in terms of imaging equipment. Terrachoice has a set of criteria for computers.
Latin America										
NCPC Costa Rica		●	●							
Centro Nacional de Producción Más Limpia - Colombia		●								Few IT products have labels and they are not recognized by consumers.
South-east Asia										
NCPC India		●							NIL	No answer on which one is most ambitious regarding environmental criteria.
Africa										
NCPC Kenya										Do not know which verification scheme is most ambitious regarding environmental criteria.

The above table shows that the most suitable ecolabels suitable for verifying the environmental performance of the product differ from region to region. For Europe the ENERGY STAR® energy ecolabel, the ECO IT declaration and the TCO ecolabel have the most products on the market. The ENERGY STAR® energy ecolabel and the Blue Angel ecolabel are considered as the most ambitious.

In North America the ENERGY STAR® energy ecolabel and the EPEAT ecolabel scheme both have a high market availability and are considered as the most ambitious ecolabels. This applies partly also to Latin America and South-east Asia but the assessed data is

restricted because of limited responses. For Africa and the Middle-east no data is available from this survey.

In summary the outcomes of the survey suggest focusing on the underlying criteria of the ENERGY STAR®, EPEAT, Blue Angel and ECO IT declaration.

7.3. Energy use

Compared to other product and service groups there are many office products on the market meeting ecolabel standards for energy consumption. There are a large number of ENERGY STAR® labeled products available on the market.[50] The energy consumption standards of the other major ecolabels are now being harmonized, based on the ENERGY STAR® criteria.

As such contracting authorities can be confident that most or all products offered in response to tenders including the ENERGY STAR® energy consumption requirements will be labeled. This makes the verification process considerably simpler. This is important as the calculation methodology underpinning the ENERGY STAR® criteria are relatively complex and it would prove challenging for UN procuring entities to verify compliance through examining technical documents submitted by the bidders.

The ENERGY STAR® energy consumption criteria for PCs, notebooks and monitors will therefore be recommended. For imaging equipment the Blue Angel takes a slightly different approach to ENERGY STAR®, but also ensures advanced energy performance. As such it is recommended to accept either ENERGY STAR® or Blue Angel compliant products for this group.

7.4. Other environmental issues

For the other environmental issues discussed above, there are significant differences between the above mentioned criteria sets of the main ecolabels. However, there are a number of areas of common ground between the labels, particularly in relation to:

- Extending the useful life of products
- Mercury in background lighting in LCD monitors
- Noise emissions
- The disassembly of equipment
- The use of plastics containing flame retardants with certain risk phrases.

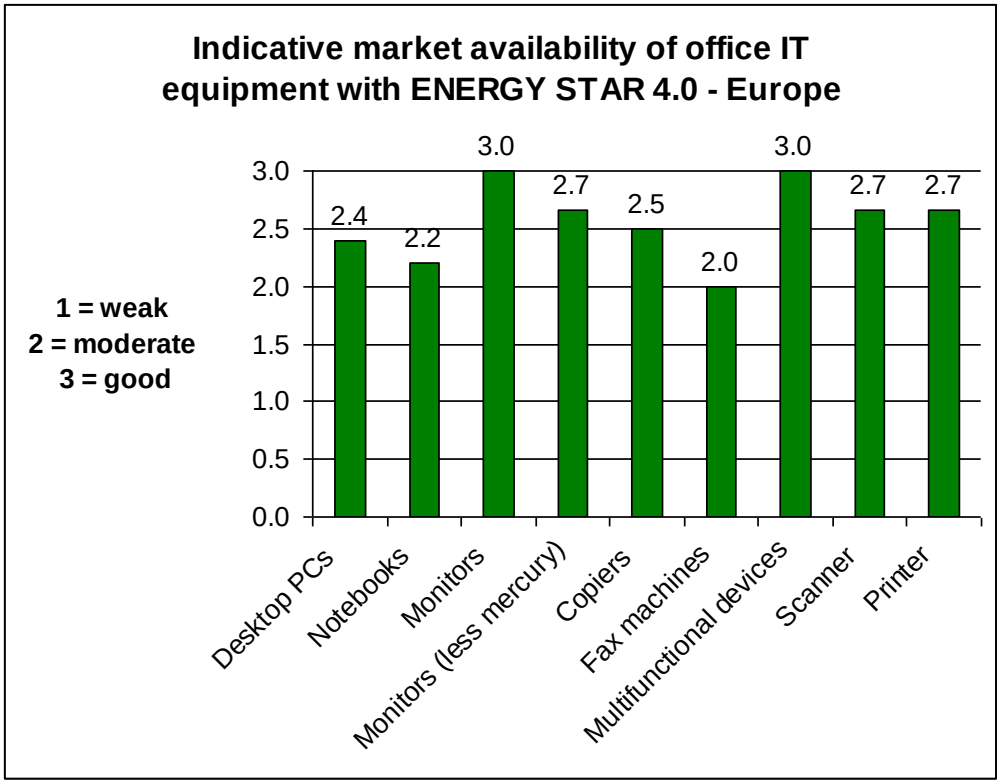
8. Global and regional market availability of green office IT equipment

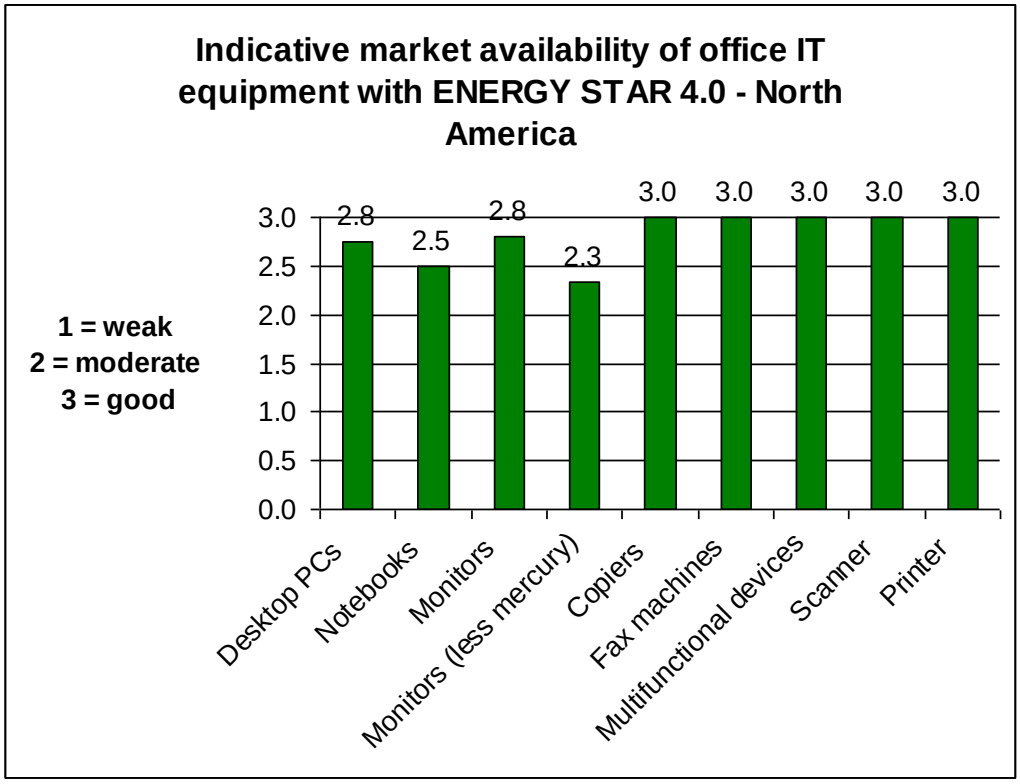
This section presents the results of a survey carried out in February 2008 on the market availability of environmentally-friendly office IT equipment. It focuses on the main issues such as energy consumption (meeting the ENERGY STAR® 4.0 standard) and the exclusion of certain hazardous substances, as well as on e-waste.

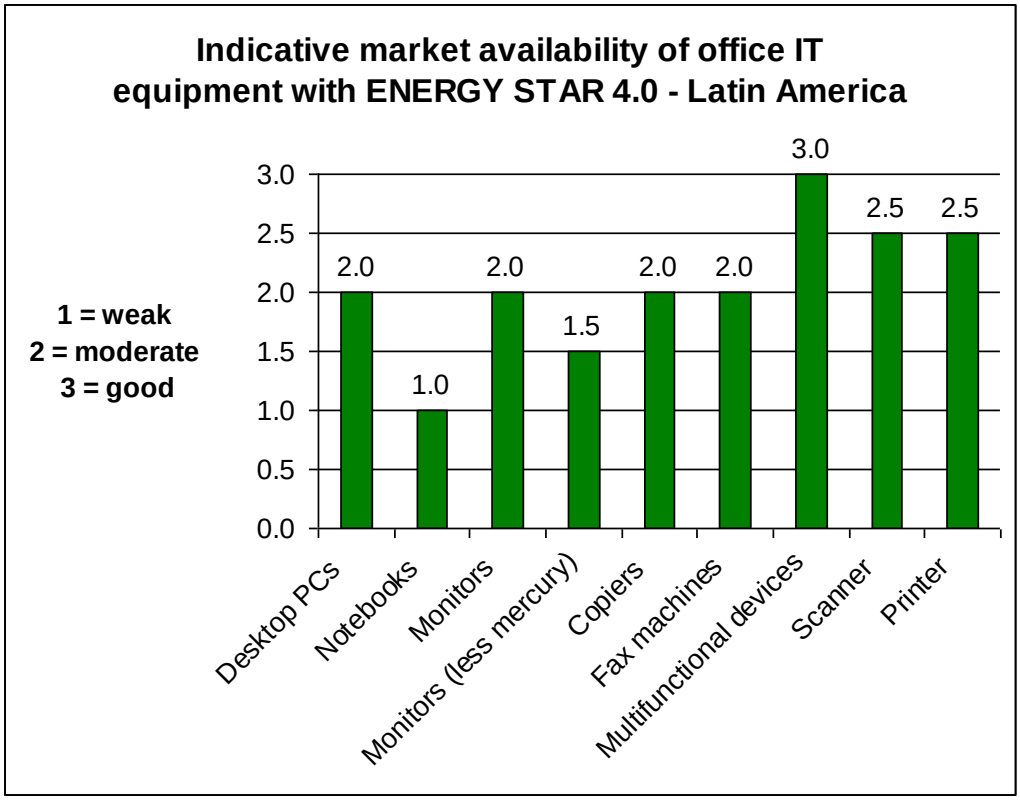
8.1. Energy consumption

The following figures show the market availability of office IT equipment with ENERGY STAR® 4.0 in different region.

[50] On the EU ENERGY STAR website (www.eu-energystar.org), there are currently 68 desktops PCs, 195 notebooks, 927 monitors, 624 MFDs, 537 printers, and 82 copiers labelled (as of January 2008). On the EPEAT website, there are 96 desktops, 143 notebooks and 309 monitors labelled (and therefore meeting the ENERGY STAR standards


Indicative market availability of office IT equipment with ENERGY STAR 4.0 - Europe
1 = weak
2 = moderate
3 = good
3.0
2.5
2.0
1.5
1.0
0.5
0.0
2.4
2.2
3.0
2.7
2.5
2.0
3.0
2.7
2.7
Desktop PCs
Notebooks
Monitors
Monitors (less mercury)
Copiers
Fax machines
Multifunctional devices
Scanner
Printer


Indicative market availability of office IT equipment with ENERGY STAR 4.0 - North America
1 = weak
2 = moderate
3 = good
3.0
2.5
2.0
1.5
1.0
0.5
0.0
2.8
2.5
2.8
2.3
3.0
3.0
3.0
3.0
3.0
Desktop PCs
Notebooks
Monitors
Monitors (less mercury)
Copiers
Fax machines
Multifunctional devices
Scanner
Printer


Indicative market availability of office IT equipment with ENERGY STAR 4.0 - Latin America
1 = weak
2 = moderate
3 = good
3.0
2.5
2.0
1.5
1.0
0.5
0.0
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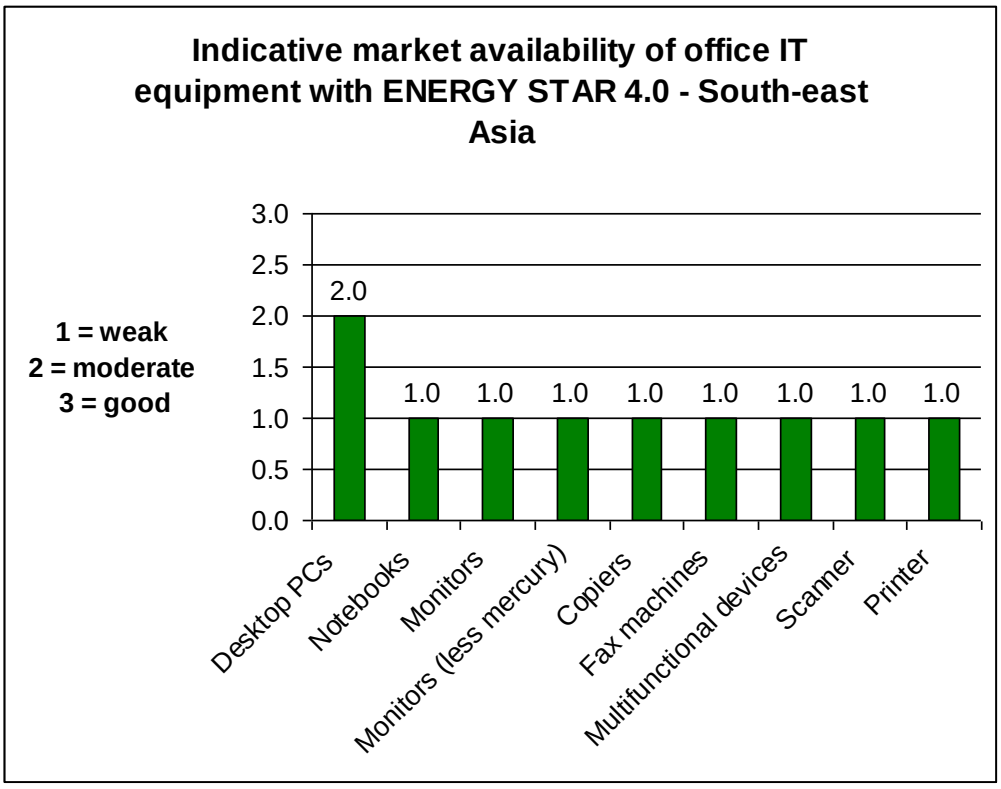
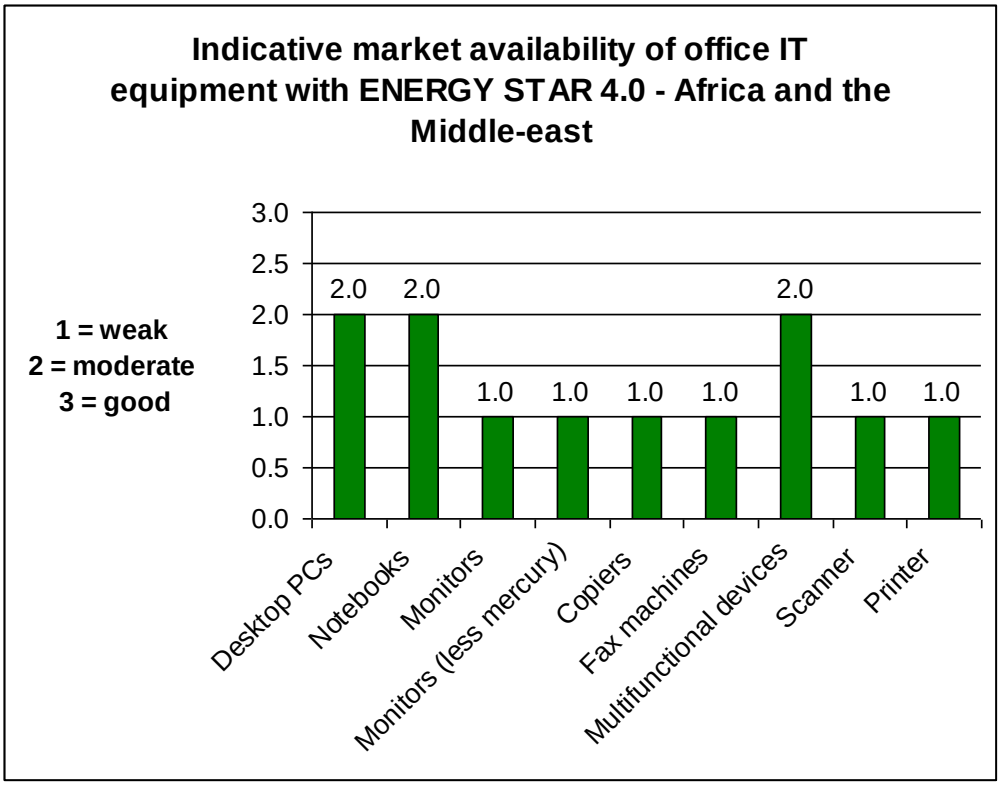
1.0
2.0
1.5
2.0
2.0
3.0
2.5
2.5
Desktop PCs
Notebooks
Monitors
Monitors (less mercury)
Copiers
Fax machines
Multifunctional devices
Scanner
Printer


Indicative market availability of office IT equipment with ENERGY STAR 4.0 - South-east Asia
1 = weak
2 = moderate
3 = good
3.0
2.5
2.0
1.5
1.0
0.5
0.0
2.0
1.0
1.0
1.0
1.0
1.0
1.0
1.0
1.0
Desktop PCs
Notebooks
Monitors
Monitors (less mercury)
Copiers
Fax machines
Multifunctional devices
Scanner
Printer



8.2. Exclusion of hazardous substances – computers and imaging equipment

The global market availability of office IT equipment meeting the standards of the RoHS Directive is moderate to good. When applying more ambitious limitations of hazardous substances such as the replacement of mercury in the backlighting of monitors (LCD) by software supported functions the market availability is still weak. Nevertheless there is a moderate market availability for monitors with a reduced amount of mercury (< 3.5mg/lamp) and reduced backlighting sources (number of lamps).

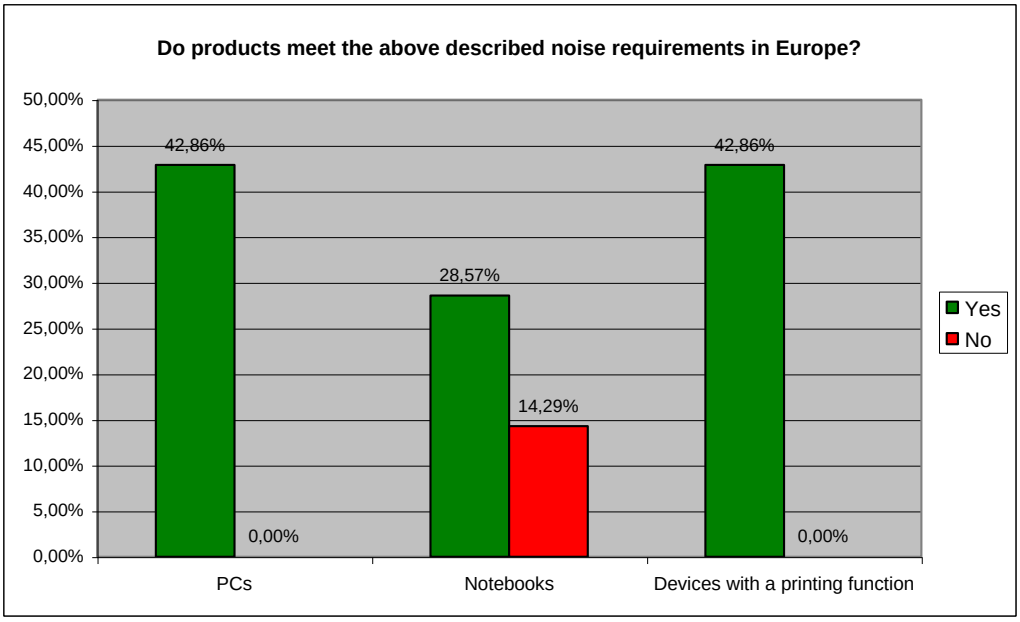
8.3. Noise reduction – computers and imaging equipment

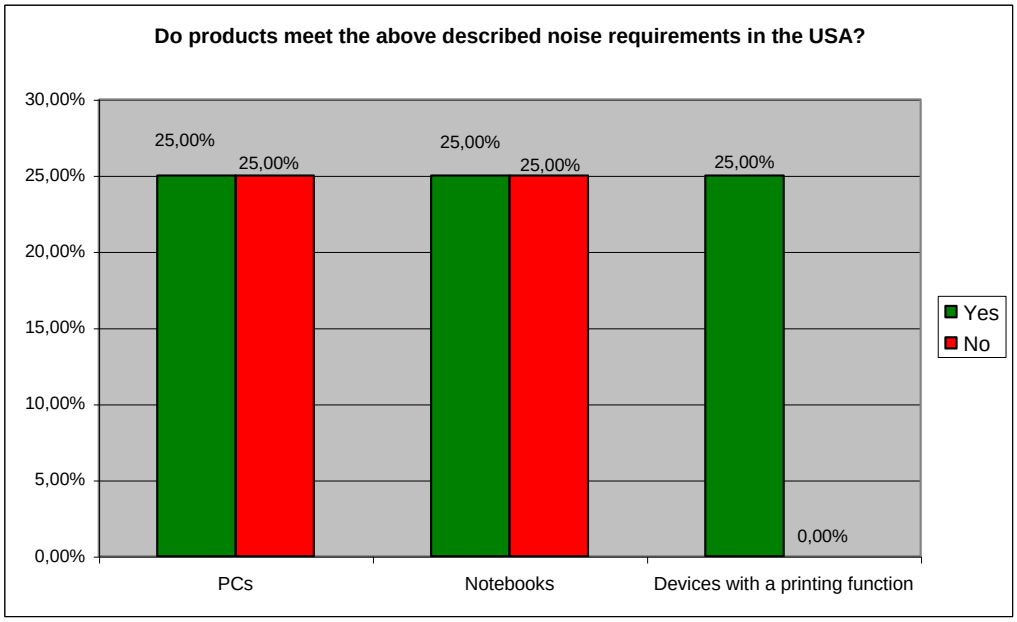
The following figures show that there is moderate market availability in Europe and North America of products which meet certain ambitious noise levels.

The requirements given in the survey for noise levels were as follows[51].

For PCs: • 4.0 B(A) in the idle operating mode • 4.5 B(A) when accessing a hard-disk drive	**For notebooks:** • 3.5 B(A) in the idle operating mode • 4.0 B(A) when accessing a hard-disk drive
For devices with a printing function: • L_{WAd}: 0.035 x CPM + 5.9 (B) (CPM = copies per minute) • Devices shall not exceed 7.5 (B) L_{WAd} except for devices with a CPM >71.	

[51] Please note that the given data is only indicative as more than 50% of the respondents (N=15) did not respond to this question.





8.4. Double-sided copying – computers and imaging equipment

There is generally a good global market availability of double-sided copying and printing office IT products. LCC data demonstrates how effective double-sided copying is in terms of costs savings.

8.5. Other aspects

The following table gives an overview of the regional market availability of office IT equipment meeting certain environmental criteria relating to e-waste, end of life, recycling, production processes, packaging, ozone emissions etc. (number = number of responses).

Category	Good	Moderate	Weak
Europe			
- Refillable cartridges	1	2	
- For non-European regions apply e.g. European legal requirements e.g. RoHS to prevent dumping of non-compliant products	1		
- End of life: recyclability	2	1	
- Production (low emissions)			1
- Compliance			
- Collection systems	1	1	
- Easy of disassembly			2
- Environmentally friendly materials			1
- Waste reduction	2		
North America			
- Compatible with remanufactured cartridges	1		
- Ease of disassembly, REUSE and recycling			1
- Low ozone emissions		1	
- Packaging reduction – reusable packaging, supplier recycling			2
- Service contracts/leasing options verses purchasing	1		
- Maintenance contracts	1		
- Takeback/recycling systems for consumables/recyclables		2	1
Latin America			
- Take-back system			2
- Environmental regulation compliance		1	
- Refillable cartridges - recycling		1	
- End of life recovery		1	
- Extended useful life - refurbishing			1
South-east Asia			
• Ease of disassembly			1
• Guarantee of spare parts			1
• Waste reduction and recycling			1
• Refillable cartridges			1
• Collection systems			1
Africa			
- Low radiation for PCs and Mobile phones		1	
- Quality of the equipment	1		
- Reduction of bulkiness	1		

9. Conclusions and recommendations

For PCs, notebooks and monitors the energy consumption of the products during their active life-time is clearly the most significant environmental impact and should therefore be the main focus of the recommended criteria.

Beyond this, extending the useful life of the product is a relatively simple and effective approach to reducing environmental impacts and should therefore also be dealt with.

For imaging equipment, where relevant (i.e. where a printing function is included), studies have shown that reducing paper consumption through having a duplex function is in fact the most influential factor in reducing environmental impacts. Energy consumption, though less important, can be considered a still significant issue, as can the appropriate recycling/reuse of toner cartridges. Again, extending the useful life of products is straightforward and has substantial benefits.

The ENERGY STAR® standards are the internationally recognized norm for energy efficiency for IT products (and are aimed at the top 20-25% of products on the market), and there is a healthy supply of ENERGY STAR®-labeled products on the market for all product groups. In the coming months and years it is likely that the major ecolabels will adopt these energy efficiency standards (EPEAT already does this, the Blue Angel will adopt them for computers in 2008, TCO has the stated aim of adopting them in future). As such, the ENERGY STAR® standards are recommended as the basis for Core and Comprehensive criteria for PCs, laptops and monitors. For imaging devices Blue Angel has a different method and limit values for energy consumption, therefore both the ENERGY STAR® and Blue Angel criteria could be used.

The Core criteria will therefore cover the following issues:

- Energy consumption
- Extending the useful life of the product
- Duplex function (for imaging devices with a printing function)
- Restriction of hazardous substances

A number of other environmental issues can also be considered, in addition, within the Comprehensive criteria. The ecolabels have relatively similar criteria for these issues and are used as the basis of the criteria:

- Noise emissions
- Alternatives to mercury in LCD monitor backlighting
- The disassembly of equipment
- Comprehensive restriction of hazardous substances (e.g. BFR)

The consumption of certain models is heavily dependent on the type of performance required by the product – for a desktop PC, for example, the power supply, the processor and the graphics card, can make a significant difference to energy consumption. Thus, an exception may need to be made where high-performance models are required, energy consumption will necessarily be higher.

9.1. Recommended criteria options – office IT equipment

Please see the comprehensive description of the sustainability criteria in the **Product Sheet**. The developed sustainability criteria are recommended for use for selection or competitive tendering for office IT equipment in order to achieve environmental relief potentials. These are divided into Core criteria (applicable globally, good market availability of products meeting the criteria) and Comprehensive criteria (region-specific, ambitious environmental and social criteria aiming at the best performing products available on the market).

9.2. Further aspects

This section introduces ideas for improving the overall environmental and social performance of the complete office IT system required. These further aspects are more based on a systemic and strategic level than on an individual product level.

Thin client solutions

A thin client is a computer workspace designed to be especially small so that the bulk of the data processing occurs on the server. Although the term thin client usually refers to software, it is increasingly used for computers, such as network computers and Net PCs, that are designed to serve as the clients for client/server architectures. A thin client is a network computer without a hard disk drive, whereas a thick client includes a disk drive.[52]

Depending on the office's requirements it is worthwhile looking into the benefits of a thin client base network. This option can be generally taken into consideration where a certain number (> 15 personal workplaces) is reached and where users do not need their computer to work on video, audio or graphic files but for normal office applications, databases, internet, etc.

The benefits include:

- Lower energy consumption: Thin clients "consume anywhere from 6 to 50 watts — far less than the 150 to 350 watts used by typical PCs," according to Forrester report, titled "Green Benefits Put Thin-Client Computing Back On The Desktop Hardware Agenda."[53] However, more powerful servers and communications are required that consume additional energy. Real energy savings depend on the overall network system and have to be assessed case by case.
- More efficient use of computing resources: A typical thick-client will be specified to cope with the maximum load the user needs, which can be inefficient at times when it is not used. In contrast, thin clients only use the exact amount of computing resources required by the current task – in a large network, there is a high probability the load from each user will fluctuate in a different cycle to that of another user (i.e. the peaks of one will more than likely correspond, time-wise, to the troughs of another).
- Lower noise. The removal of fans in thin clients reduces the noise produced by the unit. This can create a more pleasant and productive working environment.
- Higher resource efficiency: Thin client solutions need less hardware and can remain in service longer resulting in a longer lifecycle and better LCC performance. "Unlike PCs and laptops, which commonly have a three- to four-year replacement cycle, thin clients last an average of seven years. They slow down technology's inevitable slide into obsolescence because they have fewer points of failure and rarely need upgrades."[54]

Sustainable Facility management

As with any product, for office IT equipment it is critical to analyse the actual needs of each working place before tendering for the products.

This includes focussing on possibilities for extending the lifecycle of Desktop PCs, notebooks and imaging equipment and the downsizing of equipment to the real needs. An example would be that a normal working place in an office does not need to have a computer that is suitable for high-end graphic, audio and video applications.

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[52] Definition used from www.webopedia.com/TERM/t/thin_client.htm in combination with http://en.wikipedia.org/wiki/Thin_client.

[53] see http://www.forrester.com/Research/Document/Excerpt/0,7211,43638,00.html

[54] see http://www.forrester.com/Research/Document/Excerpt/0,7211,43638,00.html

Questions to ask during the analysis can include:

- What performance (resolution, black/white, colour) of imaging equipment is needed at which working space?
- How many print jobs are carried out realistically during a certain period of time (e.g. one month)?
- Where can working places share office IT equipment?
- How can individual office IT equipment be shared with other users, reducing the overall amount of office IT equipment needed?

User behavior

Office IT equipment meeting the above mentioned sustainability criteria is normally supplied together with a series of software-controlled measures to reduce energy consumption. The IT administrator can examine the individual work place settings and adjust them to high energy performance levels by including certain settings related to stand-by and sleep modes, hard-disk shut down, CPU performance, pre-set double-sided printing, and ready-to-print timeframes, etc.

User behaviour should also be addressed by regular training programmes for office staff that include raising awareness for reducing print jobs and power settings on their personal computer.

9.3. Outlook – related products and service groups

This section provides an overview of product and service groups that are connected to the sustainable procurement of office IT equipment.

Data-centers and server solutions

The energy consumed for data streams, servers, data-centers and the end-users for the internet alone account for nearly five per cent of the energy consumption in Europe – tending upwards[55]. There exist suitable approaches to design and maintain data-centers in a way that energy savings of up to 90% are achievable.

Sustainable procurement approaches include criteria focussing on the design of the data-center (separation of cool and hot areas), the correct configuration of the Power-Saver Modes, analyzing the airflow (e.g. by using computer-supported flow diagrams), highly energy efficient UPS systems, and using solar-based cooling systems.

Green electricity

Although there exists a great potential to reduce energy consumption by purchasing energy efficient office IT equipment, it seems appropriate to secure that the remaining energy consumption results from renewable energy sources. When purchasing green electricity the two major challenges (assuming it is possible to select your electricity supplier at all):

- How to define “renewable/green electricity” – many different definitions are used within legislation, and by certification bodies. In the EU, the most appropriate definition is that of European Directive 2001/77/EC
- How to verify that the electricity genuinely derives from renewable sources. In the EU Guarantee of Origin (GoO) schemes are being set up in each Member State to achieve this

Paper products

All imaging equipment should support recycled paper that fulfils the EN 12281 standard (or regional equivalent) in relation to the running characteristics. It is recommended to use

[55] Source: Prognos AG, Basel/ Wuppertal Institute 2001, 2008

recycled paper for general office use and certified[56] paper products for high-quality printing purposes. For further information on the costs and benefits of green versus non-green paper products please look at the Costs and Benefits of Green Public Procurement report[57].

Ink and toner

The office IT equipment should support the returnability and reusability of the toner cartridges used by the product with an appropriate take-back system in place, as well as the possibility of using remanufactured toner cartridges in the machines. Imaging equipment labeled with the Nordic Swan and the Blue Angel ensures this requirement.

Regarding the ink and toner used sustainability criteria refer to the availability of consumer information on the proper handling of toner modules, exclusion of hazardous substances added to ink and toner formulations, the minimization of production-related impurities caused by heavy metals and the exclusion of dyes which can release carcinogenic amines. Imaging equipment that is labeled with the Blue Angel complies with these requirements.

[56] The Forest Steward Council (FSC) certification scheme is the most recommended scheme to secure high sustainability performance. See www.fsc.org.

[57] See www.iclei-europe.org/fileadmin/user_upload/Procurement/GPP_Costs_Benefits/GPP_EU_Final_Report_all_small.pdf

10. Information sources

10.1. Ecolabels and other criteria sources

- Agreement between the Government of the United States of America and the European Community on the co-ordination of energy-efficiency labelling programs for office equipment (ENERGY STAR® criteria), http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/l_381/l_38120061228en00260104.pdf
- Blue Angel - Computers RAL-UZ 78, www.blauer-engel.de/englisch/navigation/body_blauer_engel.htm
- Blue Angel - Office Printing Devices RAL-UZ 122, www.blauer-engel.de/englisch/navigation/body_blauer_engel.htm
- Blue Angel - Reprocessed Toner Modules RAL-UZ 55, www.blauer-engel.de/englisch/navigation/body_blauer_engel.htm
- Preparatory studies for Eco-design Requirements of EuPs (Contract TREN/D1/40-2005/LOT3/S07.56313): Lot 3 - Personal Computers (desktops and laptops) and Computer Monitors. Final Report (Task 1-8). IVF Industrial Research and Development Corporation, http://extra.ivf.se/ecocomputer/downloads/Eup%20Lot%203%20Final%20Report%20070913%20published.pdf
- EcoDesign of EuP Products: Preparatory Studies LOT 4: Imaging Equipment: Copiers, Faxes, Printers, Scanners, MFD, www.ecoimaging.org
- EPEAT, www.epeat.ne
- Nordic Swan – Personal Computers, version 5.0, www.svanen.nu/SISMABDesktopDefault.aspx?tabName=CriteriaDetailEng&menuItemID=7056&pgr=48
- Nordic Swan – Imaging Equipment, version 5.0, www.svanen.nu/SISMABDesktopDefault.aspx?tabName=CriteriaDetailEng&menuItemID=7056&pgr=15
- Nordic Swan – Toner cartridges, www.svanen.nu/SISMABDesktopDefault.aspx?tabName=CriteriaDetailEng&menuItemID=7056&pgr=8
- TCO ’05 – Desktops, www.tcodevelopment.com/tcodevelopment1200/Datorer/TCO05/TCO05_Desktopversion_1.0.pdf
- TCO ’05 – Notebooks, www.tcodevelopment.com/tcodevelopment1200/Datorer/TCO05/TCO05_Notebook_computers_version_2.0.pdf
- TCO ’03 – Displays, www.tcodevelopment.se/tcodevelopment1200/Datorer/TCO03_Displays/TCO03_FPD_version_3_0.pdf
- TCO ’99 – Printers www.tcodevelopment.com/tcodevelopment1200/Datorer/TCO99/TCO99_Printers_2_1.pdf

10.2. Legislation

- Draft Regulation on a Community energy-efficiency labelling programme for office equipment, www.europarl.europa.eu/sides/getDoc.do?Type=TA&Reference=P6-TA-2007-0298&language=EN

- Directive 2005/32/EC on the eco-design of Energy-using Products (EuP), http://eur-lex.europa.eu/LexUriServ/site/en/oj/2005/l_191/l_19120050722en00290058.pdf
- Directive 2002/95/EC on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment, http://eur-lex.europa.eu/LexUriServ/site/en/consleg/2002/L/02002L0095-20060701-en.pdf
- Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE), http://eur-lex.europa.eu/LexUriServ/site/en/consleg/2002/L/02002L0096-20031231-en.pdf
- Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC, http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/l_396/l_39620061230en00010849.pdf
- Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC, http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/l_266/l_26620060926en00010014.pdf

10.3. Studies, other information

- AEAT (2001): Revision of the EU ecolabel criteria for computers: A report produced for Department for the Environment, Food and Rural Affairs.
- Clement, S (2006): “The Procura+ Manual 2nd ed.: A guide to cost effective Sustainable Public Procurement”. ICLEI, Freiburg, Germany.
- Edwards, R. (1995): "Leak links power lines to cancer". New Scientist, 7 October 1995
- Kuehr, R.; and Williams, E. (2003): Computers and the Environment: Understanding and Managing their Impacts, Springer.
- Meyer and Schaltegger (1999): Bestimmung des Energieverbrauchs von Unterhaltungselektronikgeräten, Bürogeräten und Automaten in der Schweiz, St. Gallen
- Öko-Institut e.V. (2008): Results of the UFOPLAN-Research „National Implementation of the EU Procurement“. Presentations of 26 February 2008 at UBA Berlin, Germany
- Schmidt & Fryendal (2003): Methods for Calculating the Environmental Benefits of 'Green' Products in Erdmenger (ed.) Buying into the Environment – Experiences, Opportunities and Potential for Eco-Procurement, Greenleaf
- Scott, N. Rayner, M (2007): “Ok Computer?” Ethical Consumer
- SOMO (2005): Irene Shipper & Esther de Haan – CSR issues in the ICT hardware manufacturing sector. SOMO ICT Sector Report. Available at www.somo.nl.
- United Nations Environment Programme (UNEP) (2006): EMG report on Sustainable Procurement in the UN System. Available at www.unemg.org/download_pdf/EMG11/SustProcurement.pdf
- UK Market Transformation Programme (2006): BNICT13: Trends in the use of imaging equipment, Version 1.3.

10.4. Internet sources

- http://www.ecocomputer.org
- http://www.ecoimaging.org/underreview_documents.php
- www.somo.nl
- www.procuraplus.org
- www.epeat.com
- www.greenpeace.org/international/campaigns/toxics/electronics/how-the-companies-line-up. – indicative environmental performance by company

SUSTAINABLE UNITED NATIONS

Sustainable United Nations (SUN) is a UNEP initiative that provides support to UN and other organisations to reduce their greenhouse gas emissions and improve their sustainability overall.

SUN was established in response to the call from UN Secretary General Ban Ki-Moon at the World Environment Day 2007 (5 June), to all UN agencies, funds and programmes to reduce their carbon footprints and "go green". This call was echoed in October 2007 in a decision of the UN Chief Executives Board (CEB/2007/2, annex II) to adopt the UN Climate Neutral Strategy, which commits all UN organisations to move towards climate neutrality. Within this context, SUN is working with the UN Environment Management Group – the UN body coordinating common environmental work within UN – to provide guidance, and develop tools and models for emission reduction within organisations.

ICLEI - LOCAL GOVERNMENTS FOR SUSTAINABILITY

ICLEI – Local Governments for Sustainability is an international association of local governments and national and regional local government organisations founded in 1990. ICLEI currently has 1,200 members worldwide and almost 200 in Europe. Since 1996, ICLEI's Sustainable Procurement team has been providing professional information, advice, networking opportunities, training and tools to public authorities wanting to implement high quality, cost effective sustainable procurement practices (www.iclei-europe.org/procurement).

For more information

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www.unep.org/sun

About the Sustainable Procurement Guidelines

The UN operates to achieve the goals of peace, equality, sustainable development and respect for human rights. The way the UN manages its operations and procures products and services should reflect these goals.

Ensuring lowest environmental and most positive social impact of procurement does not only build on the international community commitments. It also manages the reputational risks associated with labour exploitation or environmental damage in the supply chain; it gives a strong signal to the market and encourages the innovative production of cleaner and more ethical products enhancing an economy based on social and environmental responsibility.

These guidelines are designed to assist UN procurers and requisitioners in their choice to include sustainability considerations in their procurement work. They are built on the recognition that market situations are different from one country to another and thus provide advice based on research made about availability of more sustainable products in world regions. Overall, the guidelines provide a comprehensive overview of the specific factors affecting the sustainability of a given product category and suggest a language and specific criteria to include sustainability in tenders.

Guidelines are specifically provided for the areas of:
- IT equipment
- Cleaning
- Furniture
- Stationary
- Vehicles
- Cafeterias, Food and Kitchen equipment.
- Freight Forwarding
- Generators and Batteries
- Carbon Credits

They are available at: **www.greeningtheblue.org** and **www.ungm.org**