



The Green
Office Guide

Introduction

Day by day society is becoming increasingly aware of the need to protect the environment and to promote a more sustainable type of development. A new model based on the rational use of natural resources - which are limited - on a change in consumer habits that favour energy saving, on the use of more suitable products and cleaner technologies and on a reduction in the environmental impact caused by our activities, via the reduction, reuse and recycling of waste.

The Barcelona City Council - which is currently working on production of the Agenda 21 - is committed to building a city that is aware of these environmental challenges, a city that shows increasing sustainability and solidarity. Alongside the policies being introduced in this area - promotion of renewable energies, new systems of selective waste collection, an increase in urban green areas, etc., it is also necessary that we improve our functioning as an organisation committed to sustainable development.

The Green Office Guide - designed for the staff of the Barcelona City Council, aims to work as a tool in this direction. A set of information and tips that will help us improve our environmental coherence, with regard to the use of paper, office and filing materials, computer materials, drinks

machines, etc.. In it you will find criteria and useful advice for purchasing, using and recycling products.

Making our organisation more environmentally friendly in itself is a commitment towards preserving the environment, and at the same time, it means a saving in energy and financial resources and an improvement in quality of life in the workplace. It also reinforces the public's impression of municipal organisations, which must be a model of coherence and responsibility towards environmental challenges and towards the international declarations to which we have subscribed.

The transition towards a more sustainable society involves a profound change in many of our collective and individual daily habits. Often this translates into small gestures that require us to change our routine. At home, at school, in the office, in the neighbourhood, in our leisure activities... a commitment to the environment is possible, necessary and positive.

Imma Mayol

President of the Commission
on Sustainability and Urban Ecology

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Why promote the use of environmentally friendly products from the City Council?

The administration, which often demands the involvement of the production sectors, as well as each and every citizen on an individual level to care for the protection of the environment and make our city more sustainable, has an important function as a role model.

To lead environmentally friendly processes and promote a demand for ecologically correct products and services forms part of a shared strategy for preserving the environment.

What does green buying on a municipal level involve?

Local authorities contract a large number of products and services with an environmental impact:

- the purchasing of products (such as furniture, offices supplies, vehicle fleet)
- the contracting of services (such as cleaning and maintenance of buildings and public equipment)
- the maintenance of properties and public services (green areas, lighting)
- contracting new building work or building refurbishment

- the organisation of certain municipal events (popular festivals).

Who plays a role in promoting environmental friendliness?

In reducing these environmentally negative factors, two types of players may be involved:

- producers of materials, machines and office furniture, who have to develop less harmful alternatives,
- suppliers, who have to include environmentally correct products in their range,
- political officials, who have to adopt political commitments to back the environmental policies of the administration
- those in charge of purchasing and contracting services, who have to arrange homologation and purchase products and services
- and finally employees, who make their requests for office supplies and with their behaviour contribute to consumer awareness, which includes the reuse and reduction of waste.

Environmental problems in the workplace

We spend more than 1700 hours per year in our office workplace. Administrative work may be the cause of more environmental and health problems than it would seem at first glance:

glues, correcting fluid, photocopiers, furniture, air conditioning, detergents, tobacco and other products release harmful and problem substances

the noise produced by machines often makes it difficult to concentrate on one's work

bad lighting, electro-magnetic radiation or a lack of ergonomics can produce stress.

All this, together with a lack of ventilation can produce what is known as the "ill building syndrome" which is made evident by a high incidence of illnesses in people who work there.

In a green office

- consumption of materials and energy is reduced
- less waste is produced
- possible health problems are reduced
- in many cases financial savings are made



Principles of Green Purchasing

What to buy?

Selecting products with environmentally friendly qualities makes it necessary to define criteria that allow differentiation between products in terms of their greater or lesser impact on the environment. Ecological products are products that, in comparison with others:

| Criteria | Product |
|------------------------------------------------------------------------------|--------------------------------------------------------|
| Save resources, energy or water | Low energy light bulbs made in Catalonia |
| Use renewable resources | Solar calculators |
| Low content or absence of problem substances in waste and with low emissions | Dry text highlighters Water based glues and markers |
| Reduce waste | Refillable biros |
| Made from recycled materials | Recycled paper |
| Are long-lasting | Staplers with high quality mechanisms |
| Are easy to repair | Fountain pens with refills |
| Are reusable (not disposable) | Own glasses or multi-purpose glasses |
| Are recyclable, made from materials that can be separated | Metal scissors, without plastic handles |

How do we select products?

To be able to choose the most ecological alternative that exists there are basically two strategies:

Comparison of 2 alternative products

The comparison of 2 alternative products, based on the criteria defined above. In this case the idea is to compare 2 products in order to choose the most ecological option. For example, a TCF (totally chlorine free) paper product has more environmentally friendly characteristics than an ECF (elementary chlorine free) product.

Ecological Labels

Environmental certificates or ecological labels aim to be a tool to assure the buyer/consumer of a more environmentally friendly purchase. In the annex the most important ecological labels are listed along with the groups of products for which they exist.

Principles of Green Purchasing

How should products be used?

Environmental criteria must not only be taken into account when purchasing. Equally important is the way in which we use products, in order to reduce any unnecessary environmental impact.

Before purchasing a product we should ask ourselves whether it is really necessary or we can make do without it!

We have to take advantage of the environmentally friendly aspects of products: it is no good buying refillable markers if we aren't going to get used to ordering refills!

Even though we choose ecological products, we have to use them in an economical way. Using recycled paper is as important as using it on both sides.

What should be done with waste ?

Minimising waste, and the correct management of unavoidable waste are, as everywhere, environmental objectives in the office.

Office waste is made up of used products (paper, writing materials, cartridges, etc.), packaging (cardboard, film, bags, metal and plastic containers), organic waste (food leftovers, etc.), special waste (toners, fluorescent bulbs, sprays, etc.) and others.

According to the results of the Barcelona City Council's Environmental Audit and the Environmental Diagnosis of the Municipal Education Institute, around 90% of the waste produced internally corresponds to paper and cardboard !

The most important principles to bear in mind are:

- Selective paper collection in every workplace
- Collection of packaging and plastics in a centralised place
- Collection of special waste such as toners, fluorescent tubes and batteries in a centralised place.

Paper

The traditional work and communication medium in administration is paper. Whether for meetings, or processing licences, applications and other documentation, it is our habitual work tool. The current tendency is a transition towards functioning using electronic media.

We use:

- A4 and A3 paper (paper in reams)
- personalised printed products, such as envelopes, cards or writing paper
- notepads, exercise books, diaries and other paper articles

Environmental Problems

The ecological problems linked to the production and consumption of non-recycled paper are a high consumption of resources (wood), water and energy, the contaminating impact on wastewater, atmospheric emissions of organochlorine products and sulphur compounds.

An important and especially problematic part of the emissions are those produced above all by substances linked with the bleaching of paper using chlorine. The environmental effects of the different paper production processes are differentiated by the origin of the paper pulp and the bleaching process.

The consumption of A4 office paper at the Barcelona City Council amounts to 36,817,500 sheets per year, which averages out at 26 kg per employee per year!

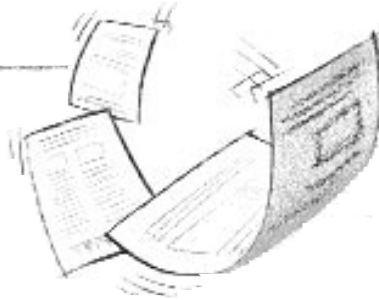
The paper pulp may come from

- used paper recycling processes
- remains of wood from other uses
- chemical pulp made from cellulose originating from sustainable forests
- chemical pulp made from cellulose originating from non-sustainable forests

The bleaching process may be

- without bleaching (without extraction of dyes)
- bleaching without chlorine
- using chlorine dioxide or other compounds
- bleaching using elementary chlorine

The new electronic press cuttings service saves, with respect to the traditional press cutting service, 2,400,000 sheets of paper per year, corresponding to over 30 kg of paper per day and around 21% of the CRD's paper consumption. At the same time it means a saving in courier fees and an improvement in the service, since it can be consulted from 9 a.m. onwards.



Paper

Ecological certificates

Ecolabels certify products that are more environmentally friendly, either in terms of their production process, or in terms of the origin of the raw materials.

The certificates awarded by official organisations for paper that exist in the market are:

Environmental Quality Guarantee Mark

The Generalitat de Catalunya's Environmental Quality Guarantee Mark is intended to promote products that favour waste minimisation or reuse, and that mean a saving of resources. The mark for paper certifies that paper is recycled and whitened without the use of chlorine (TCF).

The Blue Angel

The Blue Angel certifies that paper is 100% recycled paper, whitened without chlorine (TCF), and that it complies with DIN 19309 standards (paper apt for use in photocopiers). The paper has to be produced without the use of optical whiteners and contain minimum quantities of formaldehyde and PCB and comply with DIN standards with respect to the paper's durability. It is, therefore, very demanding in terms of the paper's technical qualities. Despite being a German certification, around Europe, there

are a large number of copier paper brands that are Blue Angel certified and that are therefore recycled and suitable for all types of use. Some of these can also be found in Barcelona.

The White Swan

The White Swan is a certificate that originates from the Nordic countries. The criteria refer to the origin of the raw materials, and the emissions produced during paper production. This certificate does not guarantee that the paper has been whitened without using chlorine nor that it has any recycled paper content. There are quite a number of paper brands that opt for this certificate. Habitually this is used on non-recycled paper and when the paper is chlorine-free this is indicated separately.

The European Union Eco-label

The European label also aims to control emissions during the production process, the environmental management of the producing companies, and the origins of the raw material. This can be recycled paper, or if not, it demands that a sustainable forest certificate be presented. There are currently two brands of copier paper that carry this European label.

TCF and ECF denominations

These denominations or labels are frequently seen and refer exclusively to the use of chlorine. Even though in the best of cases they may respond to a specific analysis, since there is no body awarding the denomination, the label in itself is no guarantee and also it does not enjoy official recognition.

If the maximum concentration of chlorine compounds in the paper pulp is less than 15 ppm, then it is labelled as Totally Chlorine Free (TCF). The ECF denomination only excludes elementary chlorine bleaching, but it may mean that this is substituted by high quantities of chlorine dioxide, with the corresponding contamination of waste water.

ECF quality corresponds to 90% of the world production and is therefore the current standard. No type of environmental commitment is required in order to exhibit the ECF denomination.

Ecological Paper

"Ecological paper" does not represent any official certification or guarantee. It is often producers of TCF or ECF quality paper that award themselves this "label".

What to buy ?

| Product | Not recommended | Alternative |
|------------------------------------------------------------|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| A4 and A3 Paper, continuous paper | ECF Paper "Ecological" paper with no further specifications or official certifications | Recycled paper with certification TCF paper with certification in special cases |
| Notepads, blocks, exercise books | ECF Paper | Recycled paper |
| Envelopes and other printed articles (dossier files, etc.) | ECF Paper | Recycled paper with certification |

The products that save most resources are those made from recycled paper.

If, in special cases, the use of white paper is chosen, at least TCF quality should be used, and this is 36% more expensive than recycled paper.

Articles with a short life such as notepads, blocks, and exercise books should always be chosen made from recycled paper. These products can be made from non-bleached recycled paper.

Paper

The popular yellow post-it notes are also offered in recycled paper - by the same producer.

The use of recycled paper for cards, writing paper and envelopes is a demonstration of commitment to the environment and gives an example to the general public.

Coloured "indication tags" used to mark the pages of documents are made of plastic and can therefore interfere in the process of recycling paper as they are stuck on documents that will end up in selective waste collection.

Markers exist for coloured paper pages.

For all paper products, such as labels, continuous paper, notebooks, etc., recycled paper alternatives exist. Here it is necessary to insist with regular suppliers to get them to offer these products and to specify the quality of the paper in their catalogues.

How should we use it ?

Independently of the characteristics of the paper chosen, the most environmentally friendly option is the rationalisation of the excessive consumption of paper. We can act in the following way:

reuse paper that has been copied or printed on only one side (such as note paper, etc.)

copy or print on both sides

run off only those prints or copies that are strictly necessary

if we reduce sizes we can reduce the number of pages photocopied

proofing documents with a spell check before printing

correcting by hand any final spelling errors in documents for internal use

instead of paper use e-mail or the intranet; send faxes from the computer

check publications mailings to reduce the number of print-runs to the necessary quantity

What do we do with the waste ?

place boxes next to photocopiers and printers to store paper that has been written on only one side for its reuse to guarantee the selective separation of paper it is necessary

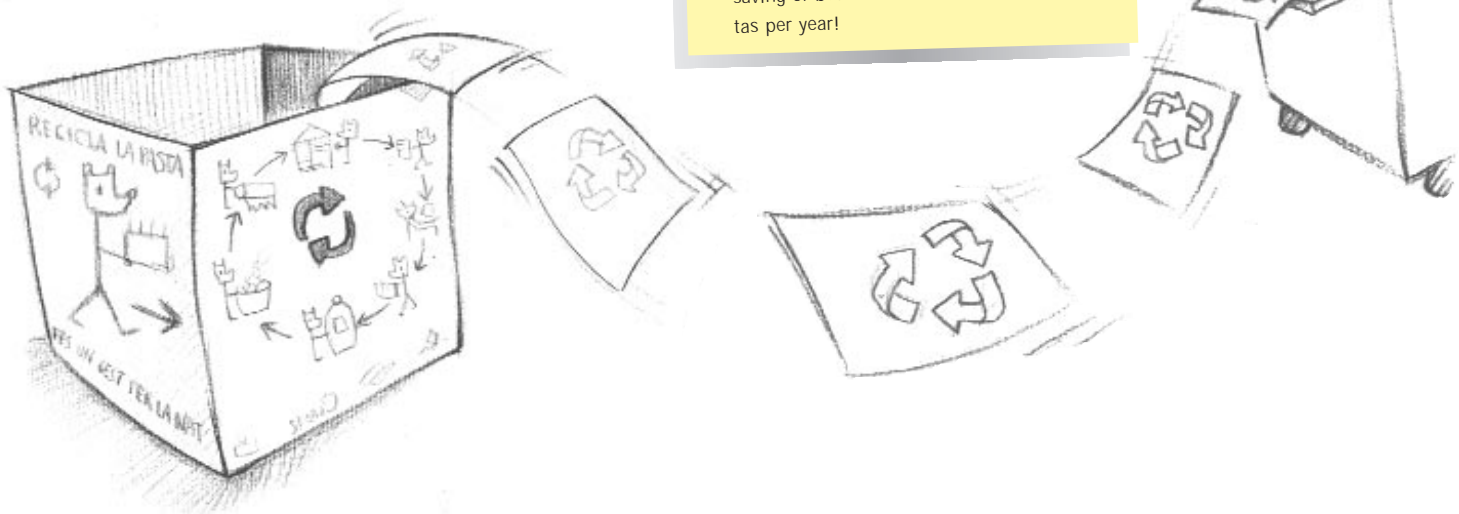
to put paper collection points not only in central places. The best idea is to have an eco-paper basket at each work station to collect paper and another for any other rubbish.

If selective collection of paper is not yet established in your department, the logistics of such collection need to be agreed, whether by the usual cleaning services or the subcontracting of a recovery company that will come to collect the paper.

The financial benefits of using recycled paper:

A packet of recycled paper is 10% cheaper than "white" (ECF) paper. In the year 2000, some 9% of the paper purchased by the Barcelona City Council was recycled paper.

If we achieved recycled paper quotas similar to other administrations (around 95% recycled paper), this would mean a saving of between 4 and 5 million pesetas per year!



Paper

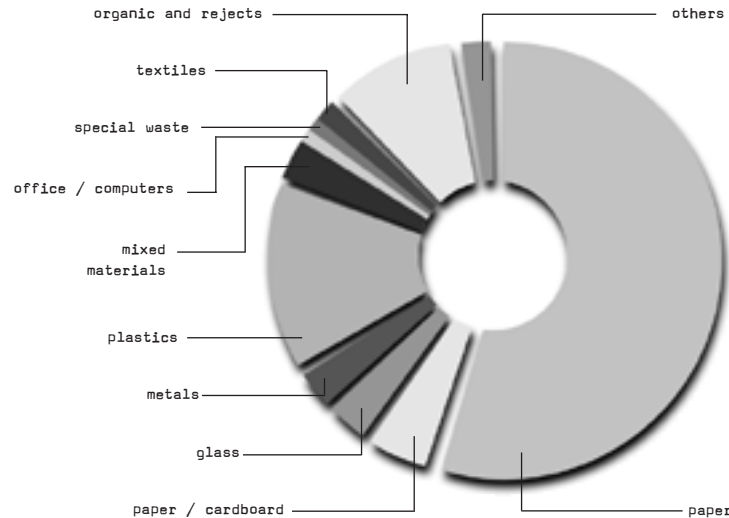
Within the framework of the internal Environmental Audit of the Barcelona City Council central buildings, an analysis of waste generated internally was carried out. The most significant results were:

with the selective collection of paper in municipal buildings, levels of around 80% of the total paper generated are reached.

even so, the analysis of waste in waste paper baskets (non-separated waste) shows that paper, with 66% (by weight), is the most important component.

An almost identical result was given in the Environmental Diagnosis of the Municipal Institute of Education: some 76% of paper was selectively collected, and the fraction of paper and cardboard in non-separated waste is, at 63%, the most significant component.

Environmental Audit of the Barcelona City Council
Analysis of non-separated waste



Classification and filing

Products for classification and filing are the constituting elements of office organisation. A great diversity of articles exists, such as files, boxes, and folders.

Files, boxes and folders

These classification and filing products are often mixtures of materials, such as lever files made of plastic covered cardboard. This leads to an increase in non recyclable waste and causes problems as to its final destination.

Clip files, page covers and dossiers

Clip files are usually made from coloured plastic with a transparent plastic cover and a clip. Suppliers mainly offer products made from Polyvinyl Chloride (PVC), although they are also starting to offer Polypropylene (PP, non chlorinated and free of heavy metals). The transparent page covers or sheets used to store documents with a few pages are usually made of PVC or PP type plastic

Binding

Both the transparent covers and the spines that are used mainly for binding are made of PVC.

What to buy?

| Product | Not recommended | Alternative |
|--------------------------------------------|-----------------------|-----------------------------------------------------------------------|
| Files and folders | Mixed materials | Products made from PP |
| | PVC products | Products made from cardboard Products made from recycled cardboard |
| Clip files, page cover sheets and dossiers | PVC products | Products made from PP or PE |
| Binding material | PVC covers and spines | PP, PE or cardboard covers Metal spines |

We have already made a start:

The covers and dossiers approved by the City Council's Central Purchasing Service are already being served exclusively made from PP.

Classification and filing

Products with environmental certification

For products made from recycled paper and cardboard official certifications exist, such as the Department of the Environment's Guarantee of Environmental Quality mark and the German Blue Angel.

Many of the major producers offer articles with this certificate (files, folders, etc.)

However, suppliers offer few certified articles, as do stationery shops.

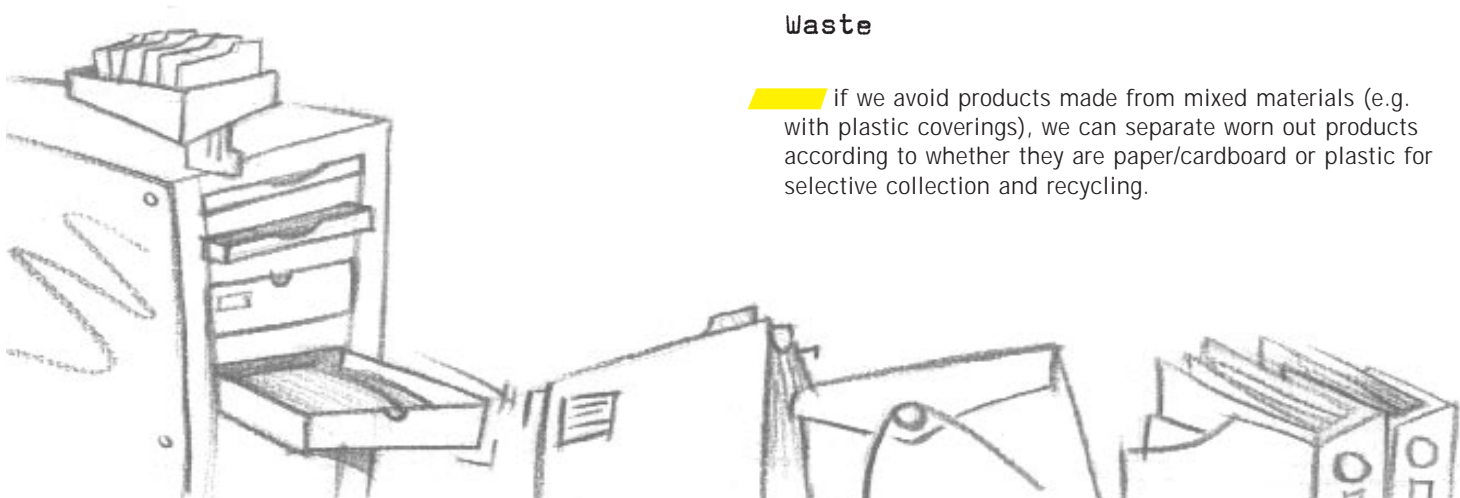
How do we use them ?

with an efficient documentation and filing system we can rationalise the use of material.

we should buy quality products and reuse them as far as possible. Thus the useful life of products can be lengthened before converting them into waste. This not only saves resources, but also costs! For example, if we have extra labels for sticking on spines, we can reuse boxes, lever arch files, etc.

Waste

if we avoid products made from mixed materials (e.g. with plastic coverings), we can separate worn out products according to whether they are paper/cardboard or plastic for selective collection and recycling.



Writing Material



Felt-tip pens, biros, pencils and text highlighters are daily tools that we all have on our desks. Even though a single felt-tip pen has a very slight effect on the environment, the high total quantity of these products recommends that we take into account environmental criteria.

Biros and Felt-tip Pens

An enormous variety of brands and models exists with metal, plastic, wooden or cardboard barrels, refillable or disposable. Currently we use mainly disposable biros and thus increase, even though only to a small extent, the volume of waste produced, unnecessarily. Usually biros are made of PVC, although some producers are replacing PVC with other types of plastic. The ink contains thickeners, organic solvents and colours that contain heavy metals. Possibly we will soon find biros with barrels made from recycled plastic.

Pencils

The pencils that we use are either made of wood with a graphite lead glued in or propelling pencils made of plastic, metal or wood, in which only the leads are replaced. The wood of pencils is usually lacquered on the outside and is sometimes tropical wood. The lacquer uses paints that

may contain organic solvents and heavy metals.

Biting on pencils, whilst engrossed in thought, means we are exposing ourselves to carcinogenic heavy metals! Yet the lacquer is unnecessary for the pencil's function.

Fluorescent highlighters

Used as a disposable product with a plastic casing, text highlighters mean a large volume of plastic waste, with pigments containing heavy metals.

As regards the type of ink, both water based and organic solvent based products are used, and the latter may contain formaldehyde as a preservative.

Over half of the highlighters used by the Barcelona City Council are refillable! Yet at the same time, nobody has ordered refills!

Writing Material

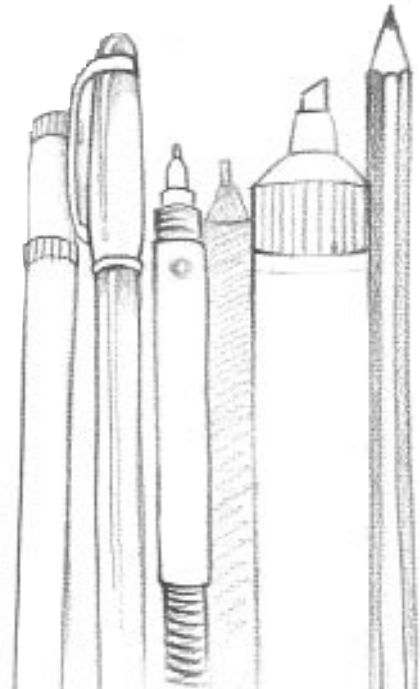
What to buy ?

| Product | Not recommended | Alternative |
|-------------------------|------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Felt-tip pens and biros | Disposable products, made from PVC | Made from other plastics, from recycled plastic, metal or wood, refillable |
| Pencils | lacquered products | non-lacquered, propelling pencils |
| Text highlighters | with barrel made from PVC, disposable, solvent based | with PP barrel, refillable, water based, Fluorescent (dry) pencil instead of liquid highlighters. |

How do we use them ?

use materials in an economical way, only use what is necessary and do not scatter materials around.

Do not leave highlighters and felt-tips without the lid on, to avoid them drying out.



Waste

When buying, we should avoid products with individual packaging (such as cardboard and plastic blister packs for a single highlighter).

maximum reuse of existing material is recommended as the most ideal option

some of the utensils described should be treated as special waste, therefore it is best to avoid them when buying or ordering.

do not mix used material or waste with the selective collection of paper.

once unusable, writing materials should go into the rubbish.

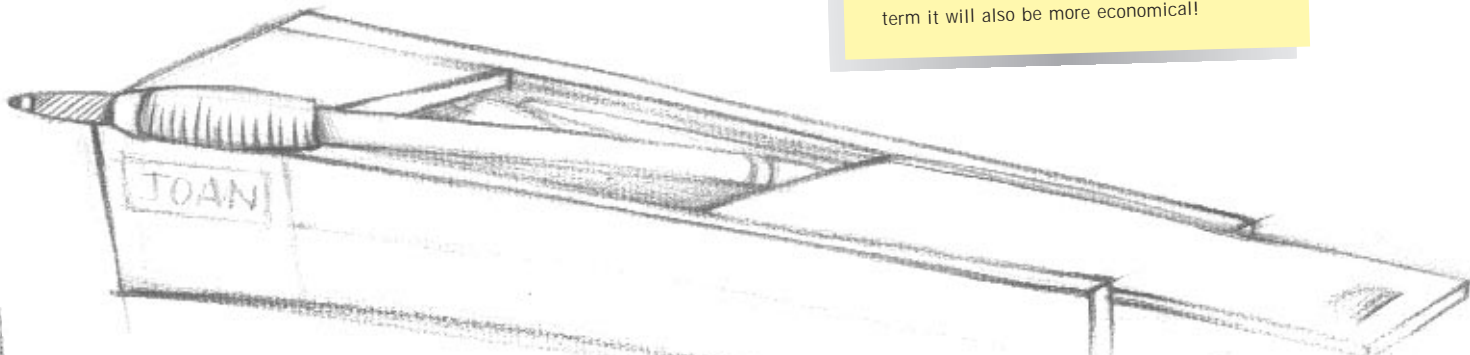
Ideally, each person has their own basic equipment chosen exercising environmental criteria:

- a refillable felt-tip pen or biro
- a propelling pencil
- a dry fluorescent pencil

If good quality and long life products are chosen, we will be more wary of losing them, and we will reduce our orders to refills and cartridges.

Other utensils used occasionally such as special highlighters, can be provided for shared use.

With this selection, we are not only taking into account environmental criteria, but in the long term it will also be more economical!



Glues, correctors and adhesive tapes

In administration work, glues are used above all to stick paper or cardboard, and for these uses special products are not required. The most frequently consumed products are:

Adhesive stick

Adhesive sticks are made of a plastic cover (that may be PVC) and an adhesive substance that, according to the product, may contain organic solvents or be water-based. They may also contain preservatives. According to the size and type (refillable or not), a large volume of waste may be produced.

Gum arabic

Gum arabic is a liquid glue for paper, recommendable from an environmental viewpoint: these glues are water-based. The bottle may be made of glass or plastic. The associated waste produced depends on the size (volume of the contents) and whether refillable systems are used or not. In comparison with adhesive sticks, this product produces less waste.

White glue

White glue is a universal glue for different materials, in the form of a paste or liquid, it is used in small quantities. In general the container is made of plastic and is not refillable.

Special glues

Special glues, such as contact or rapid glues, are solvent based and only used in small quantities, but they are highly toxic.

Transparent adhesive tape

Rolls of adhesive tape are commonly used products. Different qualities exist, and adhesive tapes are mainly made from PVC, and may contain other substances that pose a risk for health such as plastic coating, stabilisers and organic solvents. The use of adhesive tapes may make the recycling of paper more difficult.

Correcting fluid

Correcting fluid - water or organic solvent based, is increasingly being replaced by correction tapes.

Correction tapes

Correction tapes have, in comparison with correcting fluid, the advantage of being dry and they do not contain organic solvents. Against this, however, they are disposable products. A large volume of waste is produced, especially according to the type of dispenser used.

Glues, correctors and adhesive tapes

What to buy ?

| Product | Not recommended | Alternative |
|-------------------------------------|--------------------------------------|--------------------------------------------------|
| Adhesive sticks and universal glues | products containing organic solvents | water based products refillable products |
| Correction tape | non replaceable tapes | replaceable tapes products for recycled paper |
| Adhesive tapes | PVC products | products made of PP or cellulose acetate |

whenever possible it is best to choose water based glues.

indications such as "non-toxic" or "ecological" alone are no guarantee regarding the type of solvents used.

for adhesive tapes there are articles from major producers that provide an alternative to PVC, in the form of PP. Here we have to insist to get regular suppliers to offer these products.

Acetate based adhesive tapes are an environmentally correct alternative offered by all the major suppliers. They are also more expensive.

Chemicals in the office

Glues and corrections can be grouped into two categories:

Organic solvent based glues and corrections

These glues contain up to 70% solvents, such as benzene, toluene, xylene, ethanol, acetone, and others. These solvents cause health problems, as they can have a highly toxic effect if inhaled, or upon contact with the skin.

Water based glues and corrections

Water based glues contain cellulose, starch or gum and water as a solvent. They are free of organic solvents. On the other hand they may contain preservatives such as formaldehyde.

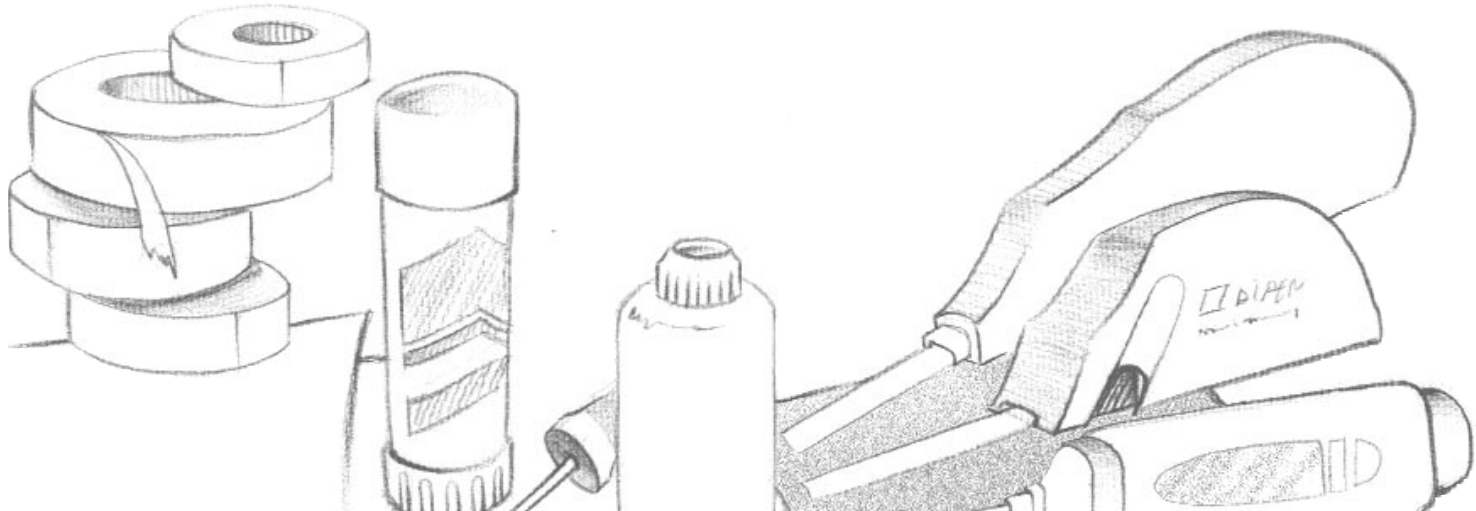
Glues, correctors and adhesive tapes

How should we use them ?

- Select the product according to its use, do not use special glues for paper
- Close glues after use to avoid unnecessary waste (organic solvents) and so that they do not dry up.

Waste

- do not buy adhesive tapes with disposable rolls !
- whenever possible it is best to choose refillable products in order to reduce the volume of waste.
- glues and adhesive tapes purchased in individual units may have a large volume of packing that should be avoided when purchasing
- organic solvent based glues are special waste that have to be separated and taken to a waste site.



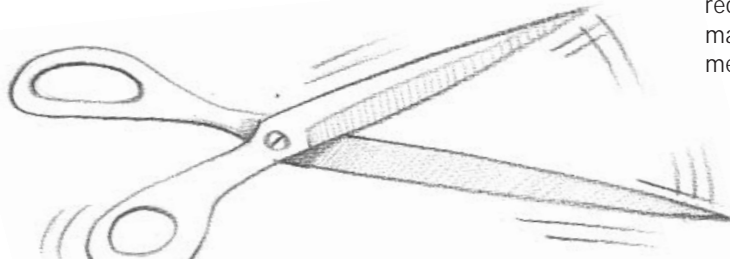
Non-consumable Office Materials

Non-consumable office materials include the following products:

- staple remover
- pencil sharpener
- desktop stapler
- office scissors
- stackable trays

The production of these articles may affect the environment, both in terms of the materials selected and the type of surface treatments used.

As long-lasting products it is preferable that they are made of a resistant material such as metal, and if possible with no nickel or chrome finish. Mixes of materials (plastic + metal) should be avoided. If for price or aesthetic considerations products are chosen with a shorter life, or with little possibility for replacement parts or repairs, the consumption of raw materials is increased unnecessarily as is the generation of waste.



Paper clips and staples

Used for attaching loose sheets of paper in a permanent (staples) or temporary (paper clips) way. In general these are metal products with different types of metal surface finishes, such as lacquer, nickel or plastic. The objective of these treatments are to avoid wear, but they also have an aesthetic purpose. On the other hand, however, they are unnecessary for their functioning, and against their use, the industrial processes associated with these treatments involve important environmental effects that could be avoided.

What to buy?

It is proposed that we buy, whenever possible, products made of one single material, in general metallic, free of mixtures.

In the case of trays, if we buy plastic trays, PVC should be avoided. Products are also offered that are made using recycled materials (for example, staplers with plastic parts made of recycled ABS, or scissors made from recycled metal and plastic).

Non-consumable Office Materials

How do we use them ?

paper clips are a reusable product that do not need to be thrown away with the paper !

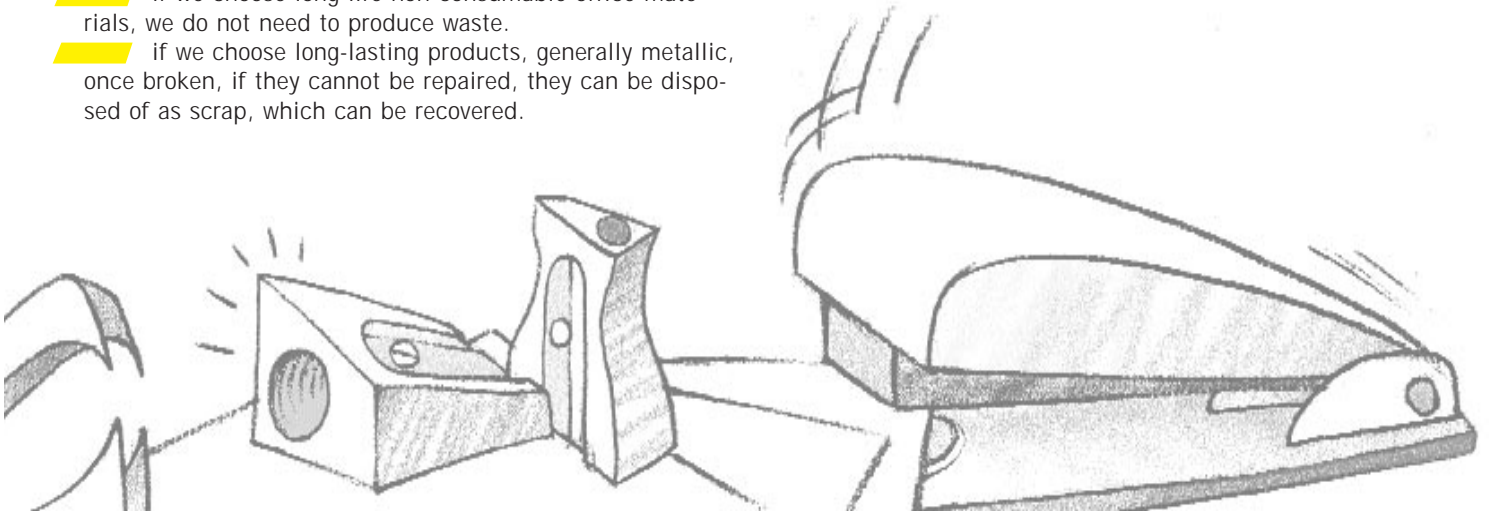
If we identify an Administrative Unit where paper clips accumulate, we could invent an internal reuse system !

What do we do with the waste ?

if we choose long-life non-consumable office materials, we do not need to produce waste.

if we choose long-lasting products, generally metallic, once broken, if they cannot be repaired, they can be disposed of as scrap, which can be recovered.

In the waste analysis carried out within the framework of the Environmental Audit of the Barcelona City Council, a quantity of paper clips was discovered that corresponded to over 30% of the annual purchases of these items !



Computer and Office Automation Consumables

Computer and Office Automation consumables include, apart from diskettes, filters, as the most consumed products, toner, ink cartridges and ribbons for printers, photocopiers and fax machines.

All these products may cause problems due to preservatives, heavy metals or pigments in the ink or toner.

If used as disposable products a large volume of waste is produced containing remains of ink, or toner dust and therefore they have a certain degree of toxicity. In addition, the components have often not exhausted their function, they have only run out of ink.

Since 1997, the Central Purchasing Service began introducing recycled toners for laser printers, and the level reached in the first year was some 56% recycled out of the total. Buying recycled toner means a financial saving of some 40%!

What to buy ?

Compatible, non-original toners and ink cartridges exist for many models, produced by recovery companies that totally or partially reuse the components of the original cartridges. These are recovered and sold in the market under their own brand. There are also original branded products that incorporate recycled or recovered materials since the producer itself has a system for collecting and recovering or recycling the spent units.

An alternative for ink cartridges, that is beneficial in both economic and ecological terms, is the purchase of cartridges with a system that can be dismantled, where the print head and the ink well are two separate elements. The former can be maintained and used up to 5 times. Once the ink runs out, just the ink well is substituted (in the conventional system the print head and the ink well are incorporated into a single element and both are necessarily changed at the same time).

All these products are positive for minimising the associated waste, however, experiences with recovered or recycled products are diverse and in different aspects.

Computer and Office Automation Consumables

To guarantee the proper functioning of the product, one can resort to ecolabels, for example products exist that bear the Blue Angel label with the specification RAL UZ 55a/55b or that fulfil the technical requirements for bearing it. Another possibility is to request that the supplier provides a guarantee of quality from the producer.

What do we do with the waste ?

Cartridges and toners are special waste that have to be collected selectively.

There are three options for the selective collection of empty toners and ink cartridges:

- return is agreed with the suppliers
 - a recovery company authorised by the Waste Authority is used
 - collection is agreed via a charity organisation such as Caritas or other Foundations
- The first two options can generate a financial saving with the return, the third option allows generation of a social benefit. The only option that generates no benefit is throwing the spent cartridge into the bin !

On an internal level, the selective collection of cartridges can function in two ways:

a container can be installed in a centralised place and all staff informed of its existence.

a more effective method is to request the return of the empty cartridge when handing over a new one. In this way, 100% of spent cartridges and toners can be collected

Quality criteria for recycled cartridges and toners

The number of copies/ prints that can be made with a cartridge/toner (with average contrast and percentage of 6% black) is around 3,000 pages.

The toner/ ink cartridge/ drum is refillable, 5 times

On the product the fact that this is a refilled product is indicated along with the ink expiry date

The producer gives a guarantee of the quality of the toner/ink and functioning, as well as liability in the case of any damage being caused to the printer.



Office Machines

Computers, photocopiers and fax machines are integral parts of every office, and with their emissions, their energy consumption and their increasingly short life cycle, they have an important effect on the environment.

For the purchase or homologation of such equipment, several different Administrative Units of the Barcelona City Council are involved, for example the Municipal Computers Institute as regards computers and printers, or the Central Purchasing Service as regards photocopiers and fax machines.



| Equipment | Possible environmental effects |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Personal Computers | <p>Large quantity of "electronic" waste</p> <p>Effects on health (radiation and body posture)</p> <p>Problem substances in the equipment (anti-inflammable substances, PVC, heavy metals)</p> <p>Energy consumption</p> |
| Printers | <p>Emission of ozone</p> <p>Sound emissions (matrix printers)</p> <p>Problem substances in the equipment (anti-inflammable substances)</p> <p>Problems with the use of recycled paper</p> <p>Energy consumption</p> <p>Treatment of photosemiconductive waste from toners, ink ribbons and cartridges (selenium, cadmium sulphite)</p> |
| Photocopiers | <p>Ozone emissions</p> <p>Dust emissions</p> <p>Sound emissions</p> <p>Problems with the use of recycled paper</p> <p>Energy consumption</p> <p>Problem substances in the equipment</p> <p>Waste treatment: photoconductors, toner, disposable material</p> |
| Fax machines | <p>Consumption of thermal paper</p> |
| Calculators | <p>Batteries</p> |
| Typewriters | <p>Sound emissions</p> <p>Consumption of material: non refillable ribbons</p> |

office machines environmental certificates exist such as the German Blue Angel. Taking into account that generally the producers are international companies, it is easy for us to find and approve office machines that comply with these environmental standards.

All certified machines from major producers allow the use of recycled paper!

How do we choose the machines ?

Computers and printers

When purchasing computers, the IMI takes into account environmental criteria such as energy consumption, longevity and materials. Radiation from computer screens has to comply with the Swedish regulations (low radiation).

Photocopiers

When acquiring photocopiers the possibility of leasing the machine is usually contemplated, this includes the return of the machine once its use is exhausted. The possibility of photocopying on both sides of the paper and reducing size is also contemplated.

Fax machines

Fax machines approved by the Central Purchasing Service do not need thermal paper, which is a problem from an environmental viewpoint, and work using normal paper.

Office Machines

How do we use the machines ?

- we should print using "econofast" if printing drafts or documents for internal use
- we should not automatically switch on machines when we reach work, only when we need to use them
- photocopiers should be installed in places with natural ventilation, and always sufficiently distant from continual working places
- printing in colour often means non-rational use of inks and special paper
- an arrow on the paper's packaging indicates the position of the first sheet of the copy. Thus it will not get stuck.

What do we do with the waste ?

- leased machines are returned to the supplier once the contract ends or they may continue to be used by taking up the purchase option
- The Municipal Computers Institute has a warehouse for machines that have fallen into disuse and it gives those machines that are usable to charity.
- During the year 2000, the City Council donated 407 computers to NGOs.

For photocopiers and fax machines purchased by the Barcelona City Council, a criterion established is that they allow the use of recycled paper

Lighting

Poor lighting in the workplace can cause symptoms such as tiredness, problems concentrating or headaches. During building designs decisions are taken to try and make the most of natural light and to see what energy consumption by artificial lighting will be.

We do not make the most of natural light

In some places, a lack of curtains means that blinds have to be pulled down during the day to avoid reflections on computer screens. As a solution, anti-reflective sheets can be incorporated into glass or two-way curtains installed.

Excess of artificial lighting

Often excesses of lighting are found, for example in corridors, and these can be easily solved by unplugging any unnecessary fluorescents and reducing the lighting installed.

Incandescent or fluorescent bulbs ?

Old incandescent bulbs use 80% more energy than fluorescent (low consumption) bulbs. The latter can also last up to 10 times longer.

What can we do ?

- we can increase lighting by incorporating more efficient tubes (triphosphorous fluorescents) instead of increasing the power installed
- switch off or unplug unnecessary lights
- turn off lights when leaving the toilets or meeting rooms
- replace incandescent bulbs with low energy bulbs
- raise blinds whenever possible

What do we do with the waste ?

- Fluorescents and low energy bulbs are special waste and have to be collected selectively!

Solar energy generated in City Council buildings during the period from June to December in the year 2000 was 20,661 kWh, equivalent to 917,008 pesetas. The reduction in CO2 emissions was 4.73 tonnes

In recent years numerous energy saving actions have been carried out in municipal buildings. In 1998, all optical and fluorescent lighting at the Llúisa Cura school was changed to high efficiency lighting. For the year 2000, the energy saving achieved was some 18% more than in 1997.

Drinks vending machines

An increasingly frequent item to be found in administration buildings are drinks machines, with both cold and hot drinks.

Environmental Problems

Automatic drinks vending machines usually offer soft drinks in cans and water in plastic bottles, whilst coffee machines offer hot drinks with a cup and spoon. At the Barcelona City Council, these are without exception disposable recipients. Their influence on the volume of waste generated is significant; according to the analysis of the waste generated by the Barcelona City Council, cans from machines account for over 50% of the metal waste.

Alternatives

Drinks vending machines are managed by vending companies, based on a contract with the Council. Until now, environmental criteria were not included in the selection of the service.

Environmentally beneficial alternatives exist:

Cold drinks machines

There are vending services that offer machines containing soft drinks in glass bottles with automated return systems. This system has already been installed in the UAB and UPC universities, and at the Waste Board, etc.

Hot drinks machines

Hot drinks machines exist that allow users to do without the plastic cup and use their own multi-use cup. Some models allow the introduction of a double price system (with or without a cup) which benefits conscious consumers.

The initiative of offering Fair Trade coffee in hot drinks machines is being carried out at the UAB and can easily be implemented in any office.

Installation of a cold water fountain

An alternative to cold drinks machines could be the installation of a drinking fountain, that allows bottles to be filled and taken to the workplace. This means an important reduction in plastic residues.

Cleaning

In the great majority of Barcelona City Council buildings, cleaning is a service that is contracted externally. Cleaning products are the responsibility of the company contracted. The idea still persists that showing a high consumption of cleaning products means offering a better service.

Environmental Problems

The problems linked to cleaning are

- an eco-toxological effect on wastewater due to chlorine (bleach) and other aggressive cleaning substances
- the generation of packaging of dangerous substances
- possible effects on the health of cleaning staff and other employees.

"Green" cleaning, for a start, needs a change of mentality, both in terms of employees and cleaning staff. Rather too many people identify smelling of bleach as smelling "clean" !

Alternatives

More environmentally friendly products also have an effect on the environment, but this is less than with conventional products. Therefore action is required on three levels:

- do without unnecessary products, such as air fresheners, conditioners, disinfectants
- reduce the consumption of chemical products with controls of consumption and dose dispenser systems
- replace problem products with products that are more environmentally friendly, for example instead of cleaning the toilet with bleach, use acetic acid.

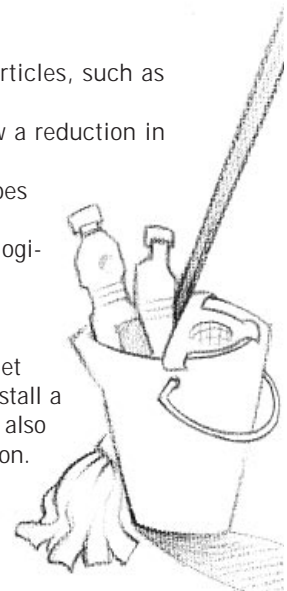
Hygiene Material

Cleaning services also include hygiene articles, such as soap, towels or toilet paper.

- hand soap dispenser systems allow a reduction in consumption

- toilet paper has a short life and does not need to be bleached or coloured! Recycled toilet paper exists with an ecological certificate (Environmental Quality Guarantee Badge)

- when electric hand dryers are used, employees often dry their hands using toilet paper. In these cases, it is advisable to install a cotton towel dispenser system, which can also use products with an ecological certification.



Batteries

Desktop and pocket appliances, such as calculators, tape recorders or paging devices usually work using batteries. These items have no homologation, but are purchased directly from regular suppliers.

For calculators, for example, there are versions that use batteries, adapters or solar power. The choice of product and its characteristics depends on us !

Environmental Problems

Batteries contain heavy metals such as mercury, lead or cadmium. In a landfill site these cause problems for the environment and health, as they are released through the soil and water. Batteries are special waste, that have to be collected separately.

What to buy ?

| Product | Not recommended | Alternative |
|-------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Calculators | products with batteries | 1 - solar calculator 2 - solar calculator 3 - with adapter for connecting to the mains electricity 4 - with rechargeable accumulators |

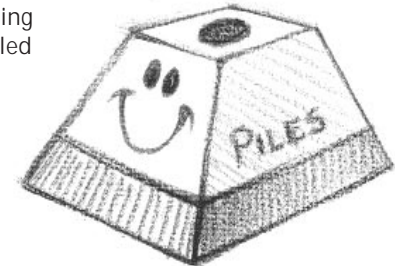
How do we use them ?

Dry accumulators (rechargeable with a complementary charger) can be used for a much longer period of time than batteries. Once exhausted, they are also special waste.

Switch off equipment when not being used to lengthen the life of the batteries.

What do we do with the waste ?

The Waste Authority offers small containers for collecting batteries that can be installed in a centralised place. The collection is carried out by a waste management company.



Glossary

Asbestos: a generic denomination for minerals of silicate origin with a fine fibrous structure, used basically as a construction material, also in the automotive industry (brakes and clutch system) and for the manufacture of refractory (fireproof) textiles.

Asbestos dust affects the respiratory system and is considered a carcinogen. Even though it is no longer used, it is necessary to adopt protection measures when old buildings are being altered, in order to avoid affecting workers.

Bioaccumulation: a process of enrichment and concentration of determined substances in living beings. In general these are substances that cannot be metabolised and are toxic (heavy metals, pesticides, etc.) that end up accumulating in organs such as the liver or kidney and in fatty tissues.

Through the food chain they pass from one organism to another up to higher organisms, where the highest levels are observed.

OVC's: abbreviation of the generic denomination Organic Volatile Compounds, which is applied to chemical substances that evaporate rapidly, such as solvents, benzene, etc..

Organic solvents: liquids used to dissolve other substances without producing chemical changes in them. They are usually fairly volatile and therefore we can "identify" them in those articles that once open dry up quickly if not closed properly. Articles or products that are commonly used in offices and may contain them are:

- the most frequently used glues may be composed of up to 70% solvent, generally acetone, methyl acetate or ethanol (the least problematic of the organic solvents)
- Special "Glues" (fast and contact glues) may use highly toxic substances as solvents, such as xylene, toluene or methyl chloride.
- correcting liquids and felt-tip pens in general may contain alcohol (ethanol, methanol), aromatic hydrocarbons (such as benzene, toluene or xylene) and chlorinated hydrocarbons (the most frequent being tri-chloroethane and methyl chloride).
- inks in biros or felt-tip pens may contain formaldehyde as a preservative
- chipboard furniture, the manufacture of which uses formaldehyde

Also many products used in the cleaning or maintenance of offices may contain solvents:

- cleaning products may contain alcohol, aromatic or chlorinated hydrocarbons (PCP), formaldehyde and derivatives
- many paints, varnishes and other products for surfaces treatments contain aromatic hydrocarbons.

Many of these substances can be classified as POP's due to the risk they pose not only to health but also to the environment.

In many cases, alternative products are being developed that use water as a basic solvent.

Heavy metals: generic denomination for high density metals with toxic

effects on many organisms (plants, animals and human beings).

Released into the environment they have a bio-accumulative effect.

They are present in different office articles and machines:

- the plastic cases of electronic appliances contain metallic compounds of chromium and bromide (PBB) as stabilisers and anti inflammables
- printer toner and ink cartridges may contain compounds of selenium, tellurium, arsenic or cadmium
- inks from felt-tip pens and coloured pens, especially cheap imported high-lighters, may contain considerable quantities of lead, chrome or cadmium.

Ozone (O3): a gas with major oxidant powers that may affect both materials and living beings. In plants it may cause effects from the apparition of stains on leaves to the partial death of the plant. In relatively low concentrations it can be highly irritant for the respiratory tract, mucous membranes and eyes in people and animals.

In office spaces ozone forms from the regular functioning of photocopiers, laser printers and (thermal) fax machines, due to the high voltage generation at the level of the drum.

In atmospheric control, ozone is a measure of an indicative type that involves the existence of other reaction products (secondary contaminants) in the atmosphere.

Plastics: a generic denomination for a set of macromolecular compounds that

may be obtained either by the transformation of natural products or through synthesis based on base chemical products (for example ethylene or acetylene). Their qualities of resistance to water and non-conductors of electricity, as well as the possibility of obtaining them through the possibility of obtaining them through low cost chemical synthesis, has generalised their use in all types of applications.

This chemical synthesis allows plastics to be obtained with specific plastics via the introduction of additives, in such a way that new synthesis materials are produced that generally, for reasons of cost, substitute traditional materials.

These new materials are identified by a code containing letters, and in offices we frequently find the use of articles made of PP (polypropylene), PVC (polyvinyl chloride), or ABS (acrylonitrile-butadiene-styrene) and PS (polystyrene). In many cases the environmental problems caused are more associated with the use of additives than the original plastic polymer, whether due to chlorinated substances or because they contain heavy metals or other environmentally relevant substances. As consumable articles (articles with a short usage time that quickly become waste), increasingly more plastic articles are consumed. The diversity of materials, forms and sizes of these articles makes their recovery difficult, and thus a fraction of specific waste characteristic of administrative services is generated.

Waste management is often unable to foresee and avoid the release of additives incorporated into different plastic materials, so there are risks of contamination of the natural environment. So-called bioplastics are polymers with qualities similar to synthetic plastics but made from natural substances, basically esters of cellulose or starch. They are basically environmentally neutral materials that are biodegradable and compostable.

Toner dust: this is made up of particles of smoke, of thermoplastic resins and ferrous oxides. It forms during the habitual functioning of photocopiers and laser printers and accumulates electrostatically. At a certain moment, the difference in charge leads to the dispersion of the toner into the environment. Its inhalation may affect the respiratory system.

POP's: abbreviation of the generic denomination "Permanent Organic Pollutants" that is applied to a large number of compounds that are characterised by their persistence, by being bioaccumulative, and by having an increasingly extended presence, given that they can move over great distances. They are contained in such diverse products as pesticides, foaming agents, stabilisers, refrigerants, etc. They may have their origins in agricultural applications, specific industrial applications (electrical equipment, domestic electrical appliances, furniture, etc.), in the treatment of residues due to incineration or in accidents in

transport. Once precipitated into the environment these contaminants are scattered to an extraordinary degree and can no longer be collected.

The United Nations Environment Programme (UNEP) is working on the progressive prohibition of these substances.

Chlorinated products and compounds: those which incorporate chlorine into their composition. In an office they may be present, amongst others, as:

- chlorinated plastics, basically PVC, applied for the manufacture of office materials as diverse as briefcases or erasers and in containers and packaging.
- chlorinated solvents
- paper bleached using chlorine:
- chlorinated cleaning products, especially bleach, but also other products such as insecticides, etc.

The Barcelona City Council, given the controversy generated over these products and considering that in many cases there are substitute products available in the market, adopted the "Government measure relating to the use of chlorinated products in municipal activities and premises", approved on 27 July 1997, where the will is expressed to progressively substitute the use of this type of products.

Radiation: In any office we can find diverse sources of radiation that are emitted by different types of equipment according to their characteristics.

- electromagnetic radiation: all computer screens in operation generate a low frequency electromagnetic field

that may affect the person working with them. The use of mobile telephones also involves the emission of electromagnetic radiation. This electromagnetic radiation constitutes the basic element of the so-called electro-smog. The direct effects of this on health is a question under discussion that can range from alterations of cognitive capacities through alterations in metabolism, influence on the cardiovascular system to the development of cancer.

- electrostatic radiation: any electrical apparatus in operation generates an electrostatic field on the surface that according to the charge causes the accumulation of dust particles. The difference in charges between the apparatus and its environment (including personnel) leads to the projection of the accumulated particles that generates irritation for the eyes, skin, or can penetrate the respiratory system through inhalation. The power of this field also depends on the atmospheric humidity of the clothes that we are wearing (types of textiles) or the type of surface (PVC mats, etc.)

The main generators of electrostatic fields are screens and photocopiers.

- **noise:** the sources of the most important sound radiation were previously typewriters and needle printers. These items are gradually falling into disuse, at the same time the generalisation of usage and the progressive accumulation of computer equip-

ment may maintain certain levels of background noise radiation. The increasingly common installation of air conditioning systems involve a new source of noise.

In addition to the possible direct effects, radiation is important in the so-called Ill Building Syndrome.

Ill Building Syndrome: a set of clinical pathologies that can be detected in people who work in buildings for administrative use and that are not attributable in a direct way to a specific cause, but rather that are identified as the consequence of a diffuse set of circumstances that converge in a single place or physical space and that act in synergy.

Amongst these circumstances we find the presence of chemical compounds in the work environment (organic solvents, etc.) radiation, ozone, dust, ... in hermetic spaces or buildings, that are closed off with forced ventilation or little air circulating.



Glossary

Ecolabels

Symbols that identify products (and also services) that have been environmentally improved or that incorporate environmental improvements with respect to the more common product in the market.

The improvements may refer to:

- both their composition and/ or manufacture (for example: products made from recycled material),
- the use or functioning (e.g. equipment that incorporates systems for reducing water or energy consumption),
- possibilities for recovery (e.g. by incorporating components that can be dismantled and /or recycled or made from compostable materials)
- improvements in their elimination as waste (e.g. because they are free of CFC's).

Official ecolabels are those that guarantee that the products that present them have been subject to a control supervised by the administration.

For the entirety of office articles and equipment, the most common official ecolabels that we find are the following:



Environmental Quality Guarantee Mark (DGQA), for all types of products or services that comply with the criteria established for each category by the Department of the Environment, of the Generalitat de Catalunya.



European Eco Label, for all types of products and services that comply with the criteria established for each category by the General Environment Authority, the European Commission, the E.U.



Blauer Engel (Blue Angel) for all types of products that comply with the criteria established in each category by the Federal Agency of the Environment (Umweltbundesamt), Germany.



Energy-Star: an energy standard for all types of electrical equipment that complies with the criteria established by the Environmental Protection Agency (EPA), USA.



TCO: standard of radiation emissions for monitors, somewhat stricter than the MPR, established by the Swedish Trade union of Civil Servants and Public Administration Employees. In the review of the standard, energy, ergonomic and environmental criteria have gradually been incorporated, giving way successively to the TCO 92 and TCO 95.

MPR II: radiation emissions standard for computer screens established by the Swedish Standards Institute in Sweden. The revision and updating of criteria gives rise to the standard MPR II, which also constitutes a criterion in the concession of the German Blue Angel.

Addresses and telephone numbers of interest

Waste collection companies

Collection of batteries
RF. PROCES, SA,
Tel.: 900 30 05 06

Collection of Paper and Toner
TRINI JOVE
Tel: 93 311 46 60
Fundació ENGRUNES
Tel.: 93 223 27 29

Public Bodies

Generalitat de Catalunya

information on waste management:
The Waste Management Board
www.junres.es

Information on ecolabels:
Department of the Environment
General Environmental Quality Board
Tel.: 93 444 50 00
<http://www.genocat.es/mediamb/qamb>

Barcelona City Council

Purchases:
Central Purchasing Centre
Plaça Sant Miquel s/n, 7a pl
08002 Barcelona
Tel.: 93 402 71 09

Resources:
Sustainable Resources Barcelona
c / Nil Fabra 20 08012 Barcelona
Tel.: 93 237 47 43

Mailbox for queries and suggestions:
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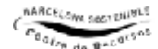
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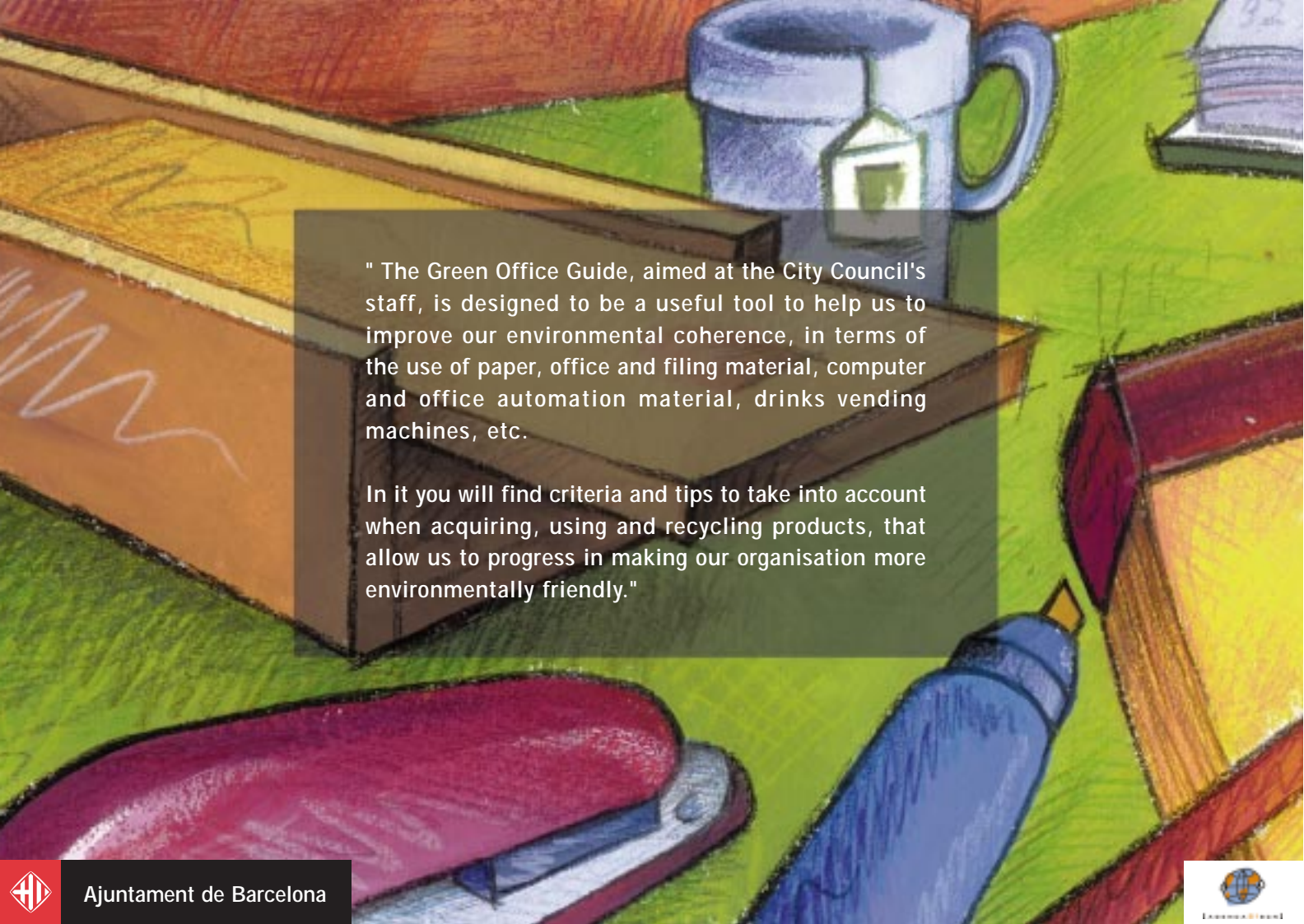
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" The Green Office Guide, aimed at the City Council's staff, is designed to be a useful tool to help us to improve our environmental coherence, in terms of the use of paper, office and filing material, computer and office automation material, drinks vending machines, etc.

In it you will find criteria and tips to take into account when acquiring, using and recycling products, that allow us to progress in making our organisation more environmentally friendly."