

## **BUY SMART**

Green Procurement for Smart Purchasing

### **Procurement and Climate Protection**

Guideline for procurement of  
appliances, lighting, vehicles, and power  
with criteria of energy efficiency and environment

#### **Household Appliances**

Supported by  **INTELLIGENT ENERGY**  
EUROPE 

[www.buy-smart.info](http://www.buy-smart.info)

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## 1. Introduction

The EU developed two complementary ways of reducing the energy consumed by products: Labelling to raise awareness of consumers on energy consumption in order to influence their buying decisions (such as labelling schemes for household appliances), and energy efficiency requirements imposed to products from the early stage on the design phase with the Ecodesign Directive.



Different household appliances are commonly used in private household but also in companies, administrations and other institutions: fully equipped kitchens are often at office workers' disposal as well as in many public buildings as schools, kindergartens, hospitals, etc.

During the procurement of household appliances for offices, schools etc., a contribution to the preservation of resources and a reducing of the operating cost could be achieved by taking into consideration energy efficiency and environmental criteria. Additional criteria may be also considered in order to prevent the impact of the manufacturing process and the use phase on the environment.

The most common household appliances in office buildings are refrigerating appliances, ovens, ranges and dishwashers. In schools, hospitals, kindergartens etc., also washing machines, dryers or washer-dryers are used.

This guideline concentrates on the large appliances (the so called white-goods) intended for household applications, while other small appliances such as coffee machines, kettles, microwave ovens, etc. are not addressed as well as TVs and other electronic appliances than can be used home. Also commercial and industrial equipments are not taken into consideration.

Initially the different appliances types are described along with their most important energy and functional performance. Then the relevant energy and environmental labels are briefly described with their main (awarding) criteria. A summary of the implementing Regulations for household appliance under the Ecodesign Directive is also presented.

Performance sheets and calculation tools have been prepared, to support the procurement action by showing how energy efficiency and environmental criteria can be integrated in the tender documents. They are mainly based on the efficiency classes of the Community energy labelling scheme but also considering, when justified, possible requirements derived from the voluntary EU eco-labelling schemes, and are downloadable from the Buy Smart project website: [www.buy-smart.info](http://www.buy-smart.info), where also this Guideline can be downloaded.

## 2. Considered products and related criteria

### 2.1 Products

#### 2.1.1 Refrigerating appliances

Refrigerating appliances (refrigerators, freezers and their combinations) have to be labelled by the European Union label since 1995. The label clearly indicates the energy efficiency class, assigned depending upon the energy consumption of the equipment, along with the model volume, the compartment composition and the noise emission. The energy consumption of refrigerators is

measured for 24 hours under standard conditions, since this appliance is always in on-mode. However the actual energy consumption in households can be different from the value indicated on the EU Label in relation to the appliance location the room, the filling with foodstuffs, the number of door opening and the room temperature.

### **2.1.2 Dishwashers**

Dishwashers are covered by the Community Energy Label since 1999. Important environmental criteria are, in addition to energy consumption (that from December 2011 will be calculated on a yearly base including also the low power modes), the cleaning and drying efficiency, the capacity in standard place settings, the water consumption and the noise emissions. The energy and water consumption in real life depend on the selected washing programme.

### **2.1.3 Electric ovens**

Since January 2003 electric ovens are also covered by the Community energy labelling scheme. Values indicated on the EU Label depend on the size and volume of the models, which are divided into small, medium and large categories. The basic environmental relevant criterion is the energy consumption.

Gas ovens and microwave ovens are current not covered by any EU energy/environmental policy measure.

### **2.1.4 Washing machines**

Washing machines have to be labelled since 1998 with the EU Label. In addition to the energy consumption (that from December 2011 will be calculated on a yearly base including also the low power modes), the functional performance criteria (washing and spin drying efficiency), the water consumption and the indication of the noise emissions are important environmental aspects. All data on the label were referred to the standard washing programme (initially for the cotton programme at 90°C, then for the cotton programme at 60°C, and starting from 2012 to the cotton programmes at 60°C and 40°C at full and partial load. An appliance with good spin drying results in a lower moisture content in the washed load, that can lead to a significant energy saving if a dryer is then always used to dry the wet laundry.

### **2.1.5 Dryers**

Also for dryers the Community Energy Label became effective in 1998. On the label the energy efficiency class and the energy consumption per drying cycle, the capacity and the noise are indicated. The relevant values refer to the standard program "cotton, iron dry".

The current technologies on the market are vented tumble dryer, condenser tumble dryer, gas-heated tumble dryer, heat pump tumble dryer and cabinet dryer. Gas dryers are not covered by the current labelling scheme.

- Air-vented tumble dryer: air is heated by electrical heating element and warm moist air thrown outdoors. This technology constitutes the majority of appliances at the lower end of the market.
- Condenser tumble dryer: air is heated with electrical heating element and moist air condenses with the help of a cooling unit which may use water as cool coolant. Although

normally more expensive to buy, there is no installation cost unless direct drainage is desired. Collected water should be emptied after every load but many units can be attached to the drain directly. In 2005, a class B condenser dryer that used cold water to condense the heated air was announced.

- Heat pump dryer: is like condenser dryer, but the electric heating unit replaced by a heat exchanger. Heat, normally wasted to the surroundings is recycled via an evaporator and condenser. Essentially this is a refrigeration unit which adds to the initial cost and has implications for disposal of the appliance. Lifetime of appliance is estimated to be the same as the other appliance types. These dryers approximately halve the energy in drying compared to a traditional condenser dryer.

The claimed most efficient drying systems use either heat pump technology, gas fuel and/or ventilation systems with heat recovery and they shut down automatically as soon as the laundry is dry.

#### **2.1.6 Washer-dryers**

The Community Energy Label is mandatory since 1998. The energy efficiency class and energy consumption in the washing programme for cotton at 60 °C for cotton are shown on the label, as well as in the program washing and drying<sup>1</sup>. In addition the water consumption, washing performance and noise have to be indicated.

#### **2.2 Evaluation criteria**

For the procurement of eco-efficient household appliances different criteria are important. These environmentally relevant criteria will be represented hereinafter. On the basis of the following criteria appliances can be compared and their environmental impact evaluated.

- a) *Energy Consumption*: due to their long lifetime, the energy consumption of household appliances is vitally important if their impact on the environment has to be estimates. Possible higher initial purchase price for a more energy efficient model, it can be overcome after a few years by lower operating costs. Also the energy consumption due to the low power modes should be considered.
- b) *Water consumption*: also water consumption of household appliances is vitally important if their impact on the environment has to be estimates. Possible higher initial purchase price for a less water consuming model can be overcome after a few years by lower operating costs. However, attention should be paid that lowering the water consumption does not hamper the washing and above all the rinsing performance.
- c) *Durability*: the durability is a controversial issue. It should be considered during the comprehensive evaluation of an offer. In fact, the production of any appliance requires energy and results in some wasted being produced, while at the end of their life discarded appliances need to be properly disposed or recycled. The possibility to repair or upgrade the equipments should also be taken into consideration. Nonetheless, selecting products with a longer lifetime may be counterproductive, when more efficient models are put on the market before the (extended) end of the life of the owned - and less efficient - ones.
- d) *Manufacturing and Material*: the product should be designed and manufactured to allow an easy disposal, recycling and reuse as appropriate, although such characteristic is hardly verifi-

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<sup>1</sup> The value refers to the sum of the energy consumption in the standard programs "cotton 60°C" and "cotton, iron-dry".

able. Hazardous substances should be eliminated as much as possible when reliable substitutes are available allowing continuing to meet product's existing requirements and without creating a safety risk, injury, or harm to the environment. This the aim of the RoHs Directive<sup>2</sup>.

e) *Packaging*: reusable packaging, or packaging made with recyclable materials should be preferred.

f) *Noise*: airborne acoustical emissions from household appliances are important for the indoor comfort. It is nevertheless worth noting that for some appliances the reduction in noise can correspond to an increase in the energy consumption. For refrigerators, the absorption models are practically silent, but their energy efficiency is much lower than the more noisy compressor technology models, For washing machines, a higher spinning spin results in a higher noise emission, but also in a lower moisture content of the laundry that in turn decreases the energy consumption when the wet laundry is dried in a dryer.

g) *End-user information*: for appliances covered by the Community energy labelling scheme the energy consumption and other resources consumption is indicated on the label along with the most important functional performances (such as washing performance, drying performance, spin drying performance)

The elements c), d) and e) are based on the criteria for the awarding of national environmental labels or the EU Ecolabel. They can be integrated - if considered appropriate – in the procurement of household appliances.

### 3. Relevant European labels

There is a number of national labelling schemes in the EU focusing on energy and environmental aspects of household appliances. However, some of them are almost ineffective in supporting the market transformation since they do not result in a large number of appliances complying with the awarding criteria. In many cases the environmental requirements are too strict or burdensome for manufacturers (for example due to the certification procedure and costs) and both the low market demand and high cost of the complying equipments result in only few models, if any to be labelled.

Some of the existing labelling schemes are described below: the Community Energy Label and Ecolabel and the national schemes of the UK Energy Saving Trust and the Nordic Environmental Label. It is worth noting that the awarding criteria for the national ecolabelling schemes are very close or even overlapping with the criteria set in the EU ecolabel.

#### 3.1 The Community Energy Label

The Community Energy Label is based on the framework Directive 2010/30/EU<sup>3</sup>, recast of the previous framework directive 92/75/EEC, and provides a legal basis for energy labelling of household appliances, requiring the manufacturers to made available and the retailers to display an energy label to appliances.

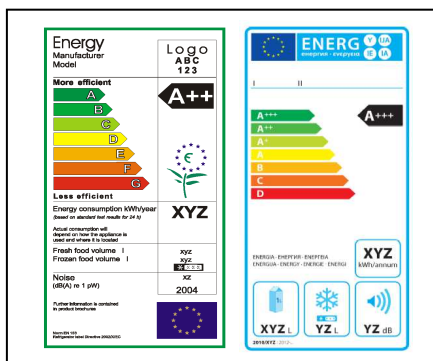
<sup>2</sup> Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

<sup>3</sup> Directive 2010/30/EU of the European Parliament and of the Council of 19 May 2010 on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products (recast), O.J. L 153, 18.06.2010.

The revised framework labelling Directive includes some important modifications to align it to the Ecodesign Directive (see following paragraph). In particular:

- extension of the scope to energy-related products;
- procedure simplifications: the implementing measures will be Regulations instead of Directives;
- reinforcement of the provisions for market surveillance;
- including guidelines on how Member States should set the performance levels for procurement and national incentives;
- design and content of the labels: uniform design characteristics across product groups, type of the scale also to be addressed;
- setting of a list of criteria for the selection of the products to be labelled.

Product specific implementing Directives (under directive 92/75/EEC) and delegated Regulations (under the recast directive 2010/30/EU) then set the information that shall be specified in technical documentation and the labels for all each appliance type, including an energy efficiency and often functional performance indicators. The declared data are measured and calculated according to product specific European standards.



**Target:** the purpose of the energy labelling scheme is to provide accurate, relevant and comparable information on the specific energy consumption of energy-related products, including household appliances, to influence the public's choice in favour of less energy consuming models thus prompting manufacturers to take steps to reduce the consumption of the appliances which they manufacture, and to indirectly encourage the efficient use of these appliances by consumers.

**Website:** [http://ec.europa.eu/energy/efficiency/labelling/energy\\_labelling\\_en.htm](http://ec.europa.eu/energy/efficiency/labelling/energy_labelling_en.htm)

**Product/service group:** Implementing directives (based on the previous Directive 92/75/EEC) have been established since 1994 for nine products:

- Refrigerators & Freezers: directive 94/2/EC and 2003/66/EC
- Washing machines: directives 95/12/EC and 96/89/EC
- Washer driers: directive 96/60/EC
- Dryers: directive 95/13/EC
- Dishwashers: directives 97/17/EC and 99/19/EC
- Air-conditioners (up to 12 kW of cooling capacity): directive 2002/31/EC
- Ovens: directive 2001/40/EC
- Household Lamps: directive 98/11/EC.

After the introduction of the new framework directive in 2010, new delegated Regulations have

been adopted by the Commission and, after the final approval by the European Parliament and the Council, have been published on the EU Official Journal.

**Awarding Institution & criteria:** In the European Union, regulatory policies concerning tradable goods - including appliance labels, mandatory ecodesign/energy efficiency requirements and Voluntary Agreements - are developed at EU-wide level. Information campaigns, procurement activities, financial incentive programmes and other appliance efficiency schemes are carried out by the 27 Member States and local Authorities. Accession Countries and other European countries (Norway, Switzerland and Turkey) have adopted appliance efficiency policies that are completely or largely consistent with the EU.

The managing Authority for the labelling programme is set in Art. 10 the framework directive 2010/30/EU. The Commission lays down details relating to the label and the fiche by means of delegated acts i, relating to each type of product. The European Parliament or the Council may object to the delegated act within a period of two months (extendable by other two months) from the date of notification. If, on expiry of that period, neither the European Parliament nor the Council has objected to the delegated act, it is published in the Official Journal of the European Union and enters into force on the stated date. If the European Parliament or the Council objects to a delegated act, it does not enter into force.

The technical specifications for each product's label are set in the individual implementing delegated Regulation.

The "label" itself is attached on the models displayed in the shops by the retailer, in order to direct the consumers purchasing towards better energy efficient models. The label also shows information on the functional performance of the products so that any reduction in energy consumption that is attained through a reduction of the quality of the primary service is visible. Additional information are indicated on a technical information sheet named "fiche". Label and fiche display is under the retailers' responsibility, but they must be made available by the suppliers (manufacturers and importers).

**Control mechanisms:** According to Article 3 of the framework directive, control mechanism is left to the national Authorities of Member States. Member States shall take all necessary measures to (i) ensure that all suppliers and dealers established in their territory fulfil the obligations under the directive; (ii) prohibit the display of other labels, marks, symbols or inscriptions relating to energy consumption which do not comply with the requirements of the directive (excluding Community or national environmental labelling schemes) if this likely to mislead or confuse the consumer, (iii) accompany the introduction of the system of labels and fiches by educational and promotional information campaigns aimed at encouraging more responsible use of energy by private consumers and (iv) take measures to encourage the relevant national or regional authorities to cooperate and provide each other and the Commission with information in order to assist the application of the directive. Member States may also require suppliers to furnish evidence concerning the accuracy of the information supplied on their labels or fiches when they have reason to suspect it is incorrect.

**Charges:** No provision fee, monthly and/or yearly costs are foreseen.

**Relevance on the market:** The label aims at communicating information about the relative efficiency performance of different appliances to consumers, retailers and manufacturers mainly through the use of a categorical efficiency scale (from A+++ to G), thus facilitating the comparison of efficiency between many products by consumers. The label also shows information on the

functional performance of the products so that any reduction in energy consumption that is attained through a reduction of the quality of the primary service is visible. The additional information indicated on the “technical fiche” shall be available at the point of sale, in catalogues and included in the instruction booklets.

The energy label is particularly effective in giving the consumer correct and well-balanced information about the appliance’s consumption/ performance ratio in an easy to read and understandable format. Indirectly, it spurs the manufacturer to update the product to bring it as far as possible into line with the consumer’s motivated choices. The energy label is an effective option and respectful of the competition but it adapts mainly to the more mature and developed markets, with classified offers.

The effects of the introduction of the energy labelling for household appliances were evaluated both at EU and specific Member State level through several studies. The main EU-wide survey covering household appliances energy labelling were published at the end of 2001 and in 2008 .

Contemporarily, CECED (the European Association of household appliance manufacturers) developed European databases for major appliances in the framework of specific Voluntary Commitments discussed with the Commission and Member States. For example, for refrigerators and freezers the percentage of A class models was from 3,2% in 1994, while in October 2008 refrigerators show about 65% of the models in class A and about 25% in classes A+/A++. The results on the completeness of the labelling by type of appliance are very similar for refrigerators, freezers, washing machines, tumble driers and dishwashers, of which between 73% and 76% are completely labelled. For electric ovens (59%) and especially for air conditioners (39%), the degree of compliance is considerably lower and the share of appliances displayed with no label is rather high (20% for electric ovens and 50% for air conditioners). This means that there is a clear difference in the degree of compliance between white household appliances for which the Implementing Directives came into force more than 10 years ago (between 1994 and 1997) and electric ovens and air conditioners, for which the labels were adopted in 2002 and had to be applied at national level from 2003.

**Upgrading:** Currently each product label is valid until an updating of the implementing directive is issued. This already happened for refrigerators and freezers where the initial directive 94/2/EC was amended by directive 2003/66/EC. In fact in 2002 the revision of the implementing directives for refrigerators & freezers was discussed and the new directive was issued in July 2003, foreseeing the addition two new classes, “A+” and “A++” on top of class “A”, to indicate the best available models on the market. The new labelling scheme entered into force in July 2004. To keep the design of the label unmodified as much as possible the two new classes are currently shown inside the black arrow in the right part of the label. For washing machines the same process was developed, but the final decision of Member States was to leave the present labelling scheme unchanged. Nevertheless 10% high energy efficiency washing machines are identified as “A+”, via a manufacturers commercial agreement that with time has spread all over the EU and has become a common market tool.

**The new EU energy labelling:** The new framework directive 2010/30/EC was published in June 2010. The first implementing measures, under the legal form of delegated Regulations were published on 30 November 2010 on the O.J L134. The new label for refrigerating appliances (refrigerator, freezers and their combinations), washing machines and dishwashers foresees three additional classes on top of class A: A+/A++/A+++ . The new label will become mandatory one year after the entry into force of the relevant delegated Regulation (i.e. on 20 December 2011):

- washing machines: delegated Regulation (EU) N. 1061/2010

- refrigerating appliances: delegated Regulation (EU) N. 1060/2010
- dishwashers: delegated Regulation (EU) ) N. 1059/2010.
- Televisions: delegated Regulation (EU) ) N. 1062/2010
- Air conditioners: delegated Regulation (EU) ) N. 626/2011

### 3.2 The EU Ecolabel

The EU Eco Label scheme was introduced in the EU in 1992. It is a logo awarded to products fulfilling a complete set of criteria. Manufacturers, distributors and retailers apply for the EU Eco Label award on a voluntary basis. Ecolabel criteria are defined for each product type in specific Commission Decisions. In 2010 Regulation 66/2010/EC<sup>4</sup> was published, setting the revised provisions for the awarding and use of the EU Ecolabel.

**Target:** The aim of the EU ecolabel is to induce manufacturers in using more eco-friendly materials in order to reduce the polluting emissions and to put on the market high energy efficient and performing products.

**Website:** [http://ec.europa.eu/environment/index\\_en.htm](http://ec.europa.eu/environment/index_en.htm)  
<http://www.eco-label.com/> (list of awarded products)



**Product/service group:** there are currently about twenty-six different product groups in twelve major areas of manufacturing and one service activity and already about 850 licenses have been awarded for several hundred products: tourist accommodation services represent 34% of the total number of licences, followed by all-purpose and sanitary cleaners (12%), textile products and indoor and outdoor paints and varnishes each representing 10% of licences. The label is awarded to single product models, this means that a manufacturer may produce both eco-labelled and non-ecolabelled products contemporarily.

**Awarding Institution & criteria:** The EU Eco Label is administered by the European Ecolabelling Board (EUEB) and receives the support of the European Commission, all EU Member States and the European Economic Area (EEA).

Criteria for the EU Ecolabel are based on the product's impact on the environment throughout its life cycle and include those used to determine whether a product is fit for use, as well as the extraction of raw materials before the appliance is built and their disposal, reuse or recycle once the appliance reaches the end of its useful life. They also include the energy that manufacturers use to produce the appliance, and the possible impact on user health.

The definition of the ecolabelling criteria is based on Life Cycle Assessment (LCA), developed by European research centres according to the "cradle to grave" approach, i.e. from manufacturing to final disposal, and covers the following aspects:

- use of energy and of natural resources
- emissions to air, water or soil
- waste production and disposal
- noise
- effects on ecosystems.

<sup>4</sup> Regulation (EC) No 66/2010 of the European Parliament and of the Council of 25 November 2009 on the EU Ecolabel

Ecolabel criteria for a product groups are usually established for a period of about three years, to take into consideration technical improvements.

Energy efficiency requirements for ecolabelled products are sometimes specified in relation to Community Energy Label in terms of a the minimum energy efficiency class to be fulfilled. For the four household appliances, to which also EU Ecolabel applies, the old energy efficiency requirements were:

- *Dishwashers*: energy label Class A and B depending on the number of place settings
- *Washing machines*: energy consumption  $\leq 0.17$  kWh/kg wash load (better than energy class A). Spin drying efficiency: class A or B
- *Refrigerators*: energy efficiency Class A+/A++ .

Other environmental criteria are applied separately to each product category as specified in the relevant Commission Decision. The criteria for household appliances are under revision.

**Control mechanisms:** All products bearing the " ecolabel " are tested by independent Competent Bodies for compliance with the awarding criteria. The EU Ecolabel logo indicates that the specific model has been independently assessed and found compliant with the environmental criteria covering all phases of its life cycle.

**Charges:** An application fee and annual fees are c are applied by the national Competent Bodies. The application fee covers the costs of processing the application with a min. of 300 Euro and a max of 1.300 Euro; annual fees for the use of the Ecolabel equals 0,15% of annual volume of sales of the product within the Community, from a min. of 500 Euro and a max of 25.000 Euro per product group per applicant. 25% reduction for SMEs and applicants from developing countries and 15% for companies registered under EMAS or certified under ISO 14001 are applied. Other reductions are possible via the relevant national Competent Body.

**Relevance on the market:** At the beginning of 2009, more than 750 companies were awarded the Ecolabel for their products. Italy and France have the greatest number of Ecolabel holders, with more than 240 and 140 licences respectively. They are followed by Denmark and Germany who each have more than 50 licences. By the end of 2008 the Ecolabel was awarded to about 3000 products and services, ranging from tourist accommodation services, home appliances, cleaning materials, and mattresses to office supplies, gardening and so called "Do It Yourself products". The relevance for household appliances is none or quite marginal. In fact, the ecolabel applies to:

- dishwashers: no models/manufacturers awarded
- washing machines: no models/manufacturers awarded
- refrigerators: no models/manufacturers awarded
- light bulbs: one manufacturer from Austria (3 models), Hungary (7 models) , Ireland (6 models), China (1 model) and Hong-Kong (with several brands).

### 3.3 The Energy Saving Trust (EST) label

The Energy Saving Trust (EST) is a non-profit organization funded by the British government and the private sector. The EST develops and runs programs on behalf of the government (awareness-raising campaigns, mostly) and serves as a consulting capacity. EST issues the "Energy Saving Recommended" product labelling scheme (formerly known as the Energy Efficiency Recommended scheme), a registered certification mark allowing consumers to spot the most energy-efficient products available



on the market. Products carrying the mark meet or exceed the Energy Saving Trust's established criteria.

**Target:** The goal is to give consumers verified and unbiased information about the advantages of energetically sustainable products and services.

**Website:** <http://www.energysavingtrust.org.uk/> The EST website contains a database of products that have earned the Energy Saving Recommended logo, to help consumers find the most energy-efficient products in each category.

**Product/service group:** The Energy Saving Recommended scheme covers 36 products belonging to 8 groups, including the following household appliances:

- washing machines
- dishwashers
- refrigerators, freezers and their combinations
- tumble dryers (including gas fired ones)
- kettles and instantaneous water heating devices.

**Awarding Institution & criteria:** The scheme aims to review the criteria on an annual basis as the efficiency of appliances improves, to maintain 'best practice' recognition for recommended appliances. This mark is a guarantee that the product will help to reduce energy wastage in the home, as well as benefiting the environment and costing less to run. The Energy Saving Trust's criteria are set to award the label to the top 20% energy efficient products, using the energy efficiency classes set in the energy labelling directives as indicator.

For the five products groups to which the EST label applies the energy efficiency requirements are:

- washing machines: models rating AAA (class A for energy consumption, class A for washing performance, and class A for spin drying efficiency) passive standby power consumption  $\leq 1W$ ;
- refrigerators, freezers and refrigerator-freezers: models rated class A+ or A++ ;
- dishwashers: models rating AAA (class A for energy consumption, class A for washing performance, and class A for drying efficiency); water consumption per cycle  $\leq 8$  litres for machines  $\leq 7$  place settings;  $\leq 13$  litres for machines with 8 or 9 place settings, and  $\leq 14$  litres for machines  $\leq 10$  place settings; passive standby power consumption  $\leq 1W$ ;
- tumble driers: models rated class B or better, and products that are rated class C if they feature an automatic drying function; passive standby power consumption  $\leq 1W$ .

**Control:** EST is in charge of efficient product/service accreditation.

**Charges:** No provision fee, monthly and/or yearly costs are foreseen.

### 3.4 The Nordic Environmental Label (the Swann)

Sweden and Norway launched the Nordic Ecolabel (the Swann label) in 1989. Finland adopted it in 1990, Iceland in 1991, and Denmark in 1998.

**Website:** [http://www.ecolabel.nu/nordic\\_eco2/welcome/](http://www.ecolabel.nu/nordic_eco2/welcome/)



**Product/service group and relevance on the market:** This label covers 25 different product groups and almost one thousand licences have been awarded so far. In the

electrical household appliance sector, the Swan label applies only to:

- Washing machines: criteria validity from 18 March 2004 to 31 December 2011
- Dishwashers: criteria validity from 14 March 2007 to 31 December 2011
- Refrigerators and freezers. criteria validity 29 May 2008 to 31 December 2011.

For the household appliances to which Nordic Swan applies, major requirements are:

- Dishwashers: models rating AAA (class A for energy consumption, class A for washing performance, and class A for drying efficiency); water consumption lower than 1,2 litres per place setting; noise in terms of sound power,  $\leq 48$  dB(A).
- Washing machines: energy consumption:

Type of machine	Energy consumption, washing, 60°C, cotton (kWh/kg washing)	Mean value of four different operating modes * (kWh/kg washing)
Machines comprised by the mandatory Energy Labelling Scheme	0,19	0,23
Other machines	-	0,23

- Washing performance index greater than 1.00 when tested according to the specified test method; water consumption  $\leq 16$  litres of water per kilogram of wash load; rinsing performance, using the alkali method with a score  $\geq 5$ ; noise - in terms of sound power level –  $\leq 56$  dB(A) or  $\leq 76$  dB(A) during the spin cycle.
- Refrigerators and freezers: products that are Class A+/A++ ; noise, in terms of sound power,  $\leq 40$  dB(A).
- **Awarding Institution & criteria:** The Nordic Council of Ministers developed this programme and the label is administered by the Nordic Eco-labelling Board (NMN) and by national agencies. The NMN decides which new product groups warrant a labelling initiative, and appoints a pilot country to work on the criteria, based on suggestions from a group of experts from across Scandinavia.

The Nordic Swann ecolabel license is valid providing the criteria are fulfilled and until the criteria expire. The validity period of the criteria may be extended or adjusted, in which case the license is automatically extended and the licensee informed. Revised criteria shall be published at least one year prior to the expiry of the present criteria. The licensee is then offered the opportunity to renew their license.

**Control mechanisms:** The application has to be sent to Nordic Ecolabelling in the country in which the appliance is sold. The application documents comprise an application form and documentation demonstrating fulfilment of the requirements (specified in the criteria). Before a license is granted, normally an onsite inspection is performed to ensure adherence to the requirements.

**Charges:** An application fee is charged to companies applying for a license. There is an additional annual fee based on the turnover of the Swan labelled products.

#### 4. The Ecodesign Directive and the implementing Regulations

The Directive 2009/125/EC<sup>5</sup> on the eco-design of energy-related products provides coherent EU-wide rules for eco-design and defines conditions and criteria for setting, through subsequent implementing measures, requirements regarding environmentally relevant product characteristics. This policy initiative is expected to increase the effectiveness and synergies of other EU legislative acts and initiatives concerning environmental aspects of products.

The production, distribution, use and end-of-life management of energy-using products is associated with a considerable number of important impacts on the environment, namely the consequences of energy consumption, consumption of other materials/resources, waste generation and release of hazardous substances to the environment. It is estimated that over 80% of all product-related environmental impacts are determined during the design phase of a product.

Eco-design directive aims at improving the environmental performance of products throughout the life-cycle by systematic integration of environmental aspects at a very early stage in the product design. Products which have been awarded the Eco-label will be considered as compliant with the implementing measures in so far as the Eco-label meets the requirements of the implementing measure.



The text of the EuP Directive 2005/32/EC, as adopted by the European Parliament and the Council in July 2005, was published in the Official Journal of the European Union L 121 22.7.2005. In 2009 the directive has been recast by Directive 2009/125/EC<sup>6</sup> on 21 October 2009 with the aim to extend its scope to energy-related products.

After the enforcement of the ecodesign Directive, the Commission, assisted by a Regulatory Committee, was able to enact implementing measures – Regulations - on specific products:

- Fans driven motors (Regulation 327/2011, 20 March 2011)
- Dishwashers (Regulation 1016/2009, 10 November 2010)
- Washing machines (Regulation 1015/2009, 10 November 2010)
- Circulators (Regulation 641/2009, 22 July 2009)
- Electric Motors (Regulation 640/2009, 22 July 2009)
- Refrigerators and Freezers (Regulation 643/2009, 22 July 2009)
- Televisions (Regulation 642/2009, 22 July 2009)
- External power supplies (Regulation 278/2009, 6 April 2009)
- Lighting products in the domestic and tertiary sectors (Regulations 244/2009 and 245/2009, 18 March 2009)
- Simple set-top boxes (Regulation 107/2009, 4 February 2009)
- Standby and off mode electric power consumption of household and office equipment (Regulation 1275/2008, 17 December 2008).

Further information about the Regulations can be found at:

<sup>5</sup> Directive 2005/32/EC of 6 July 2005 establishing a framework for the setting of ecodesign requirements for energy-using products and amending Council Directive 92/42/EEC and Directives 96/57/EC and 2000/55/EC of the European Parliament and of the Council

<sup>6</sup> Directive 2009/125/EC of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products, O.J. L 295, 31.10.2009.

[http://ec.europa.eu/energy/efficiency/ecodesign/legislation\\_en.htm](http://ec.europa.eu/energy/efficiency/ecodesign/legislation_en.htm)

As far as the household appliances are concerned, the Regulation on refrigerators and freezers establishes that no appliances with an Energy Efficiency Index (EEI) higher or equal than 55 (below the current energy efficiency class A) will be allowed on the market starting from 1<sup>st</sup> July 2010. For absorption-type and other-type appliances the EEI shall be lower than 150 from the same date.

Further more stringent minimum requirements have also been set for the following years.

Further Regulations on washing machines and dishwashers have been positively voted by the Member States within the Regulatory Committee and are now under the final approval procedure by the European Parliament and the Council. The main new element is the setting of a new formula for the calculation of the models' energy efficiency based on the annual energy consumption including the contribution of the low power modes and the use, for washing machines, of a combination of the cotton cycles at 60°C and 40°C at full and partial load.

## 5. Practical instructions for procurement and use of Household Appliances

The purchasing of an household appliance should be preceded by the analysis of the economy, effectiveness, ecology, end-users behaviour, energy costs, etc. of the purchased goods. In this part of the Guidelines these aspects are presented as well as some advises and suggestions are proposed.



### 5.1 Practical procurement instructions

#### a) Buying appliances which meet the real demand

Before the procurement of household appliances, a demand analysis should be performed. On the basis of the available information on future use conditions and own requirements, the type and number of units and the size/volume or capacity of the appliance(s) should be evaluated. Overestimating these parameters will result in higher purchasing cost and energy and/or water consumption; but also underestimating the real needs could lead to higher running costs and resources consumption, for example by using a washing machine more than expected because of a lack of capacity.

#### b) Appliance energy efficiency

Currently the energy efficiency "class A" applies with the most household appliances as the most commonly found on the market. In order to consider the further technical development above this class - in particular with refrigerators and freezers – additional classes, A+ and A++ - have been created. As soon as the new delegated Regulations will be applicable new classes A+/A++/A+++ will be available for the most important household appliances.

#### c) Power consumption in low power modes

Refrigerating appliances consume energy 24h a day, since they are constantly in "on-mode". In other cases, appliances can stay for long time in other operating modes (for example "left-on" or "off" mode) with a lower power consumption. It is important to pay attention to the power consumption for these so called "low power" modes, if not controlled it can add a significant contribution to the total energy consumed during the life time of the appliance.

When connected to the mains power source, and not performing the main function, some power

consumption will always be consumed by household appliances, thus care should be taken that this power input is the lowest possible. The power consumption in “standby” and “off” modes has been recently addressed in the above mentioned Commission Regulation (EC) No 1275/2008 of 17 December 2008 *implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for standby and off-mode electric power consumption of electrical and electronic household equipment*. The definitions of standby and off modes are:

- **‘standby mode(s)’** = a condition where the equipment is connected to the mains power source, depends on energy input from the mains power source to work as intended and provides only the following functions, which may persist for an indefinite time:
  - reactivation function, or reactivation function and only an indication of enabled reactivation function, and/or
  - information or status display;
- **‘off mode’** = a condition in which the equipment is connected to the mains power source and is not providing any function; the following shall also be considered as off mode:
  - conditions providing only an indication of off-mode condition;
  - conditions providing only functionalities intended to ensure electromagnetic compatibility pursuant to Directive 2004/108/EC of the European Parliament and of the Council.

The Table below summarizes the requirements for energy consumption in standby and off-mode.

Table 1: Ecodesign requirements for energy consumption in standby and off-mode

Mode	Maximum power consumption from January 07, 2010	Maximum power consumption from January 07, 2013
Off-mode	1,00 W	0,50 W
Standby mode without display	1,00 W	0,50 W
Standby mode with display	2,00 W	1,00 W

It is admissible to claim the inappropriateness of the requirements for the intended use of equipment, provided a technical justification is given in the technical documentation. The Regulation requires manufacturers to provide technical justification that the requirements to provide a standby and/or off-mode and/or low energy mode, and in a second stage an additional power management or similar function, are inappropriate for the intended use of the products. The onus to determine if a function is inappropriate for the intended use of the product is on the manufacturer who is best placed to assess the characteristics and functionality of the product.

For washing appliances (washing machines and dishwashers) a slightly different definition “off-mode” and “left-on mode” where recently defined:

- **Off mode:** condition where the product is switched off using appliance controls or switches that are accessible and intended for operation by the user during normal use to attain the lowest power consumption that may persist for an indefinite time while connected to a mains power source and used in accordance with the manufacturer’s instructions. Where there are no controls, the washing machine is left to revert to a steady state power consumption of its own accord;

- **Left on mode:** lowest power consumption mode that may persist for an indefinite time after the completion of the programme and unloading of the machine without any further intervention of the user.

Due to the new minimum requirements entered into force in 2010 for off and standby modes, the setting of any other procurement minimum and/or target criteria should be carefully considered. For washing appliances equipped with sensor-based protection functions (such as the anti-flood protection system) inappropriateness of the above requirements for the intended use of the equipment can be claimed. Should this be the case, specific minimum and/or target criteria could be set in the procurement, still attention should be paid in setting power consumption values compatible with the functioning of the protection sensors.

## 5.2 Practical tips for product use

a) Refrigerating and freezing units should not be located close to the radiators and other elements emitting heat. Also direct sun exposure leads to an increase of the energy demand as well as frequent and prolonged door(s) opening. Additionally the easy air circulation on the back side of the appliance is important for the efficient energy use. Attention should also be made to the room where the appliance is installed, if the temperature drops below +10°C a poor performance will result as consequence of the reduced heat exchange

b) The dishwasher should be used only when is fully loaded and working with full capacity. Depending on the load and soil level of the dishes, the most appropriate programme should be used, thus ensuring the possibility for saving of energy and water by using a less intensive or a lower temperature programme.

c) The machine should be switched “off” after the completion of the washing programme.

d) machines should have instructions making consumer aware on the negative effects of an excessive use of detergents

e) The remarks from b) to d) concern also the washing machines.

f) washing machines, washer-driers and dishwashers should be suitable for connection to a hot-fill water supply (ATTENTION: this results in energy savings only if the inlet hot water is produced through either electric or thermal energy from a RES or similar source, if not this criterion results only in waste of material)

g) washing machines and washer-driers should achieve a lower residual moisture content (i.e. the amount of water remaining in the wet load after spinning) when a dryer/drying cycle is then used in countries belonging to the Moderate or Cold Climatic Zone.

## 5.3 Procurement general instructions

The energy efficiency, the functional performance, the environmental quality and other criteria previously described can be used in a procurement procedure by being integrated as minimum and/or target criteria, depending on the selected procedure:

- Minimum criteria define mandatory requirements for offered products. The non-compliance of a product with such criteria automatically excludes a participant from the tender.
- Target criteria are instead optional, but bring additional “points” to the participant when the comprehensive procurement procedure is followed. The points are assigned based on the importance of the different aspects of the purchased product(s). Maximum possible number of

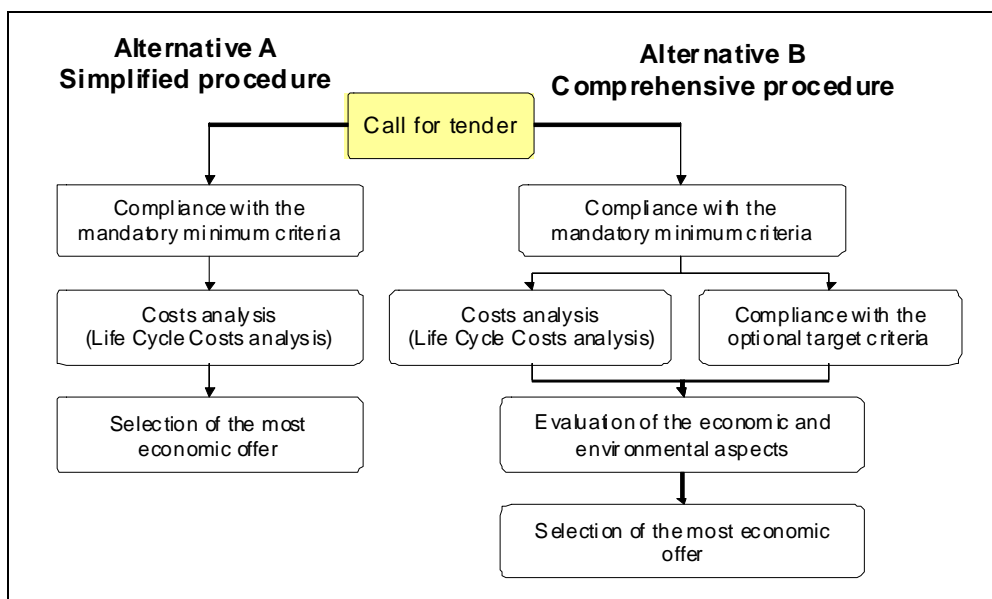
points is 100, when offered product complies with all minimum and target criteria.

These steps should be followed to perform an effective green procurement:

- ⇒ Chose the “Simplified” or the “Comprehensive” procurement procedure.
- ⇒ Send an invitation to participate to the tender and the relevant “performance sheet” to the selected suppliers. Indicate that offers shall comply with minimum criteria, otherwise the offer will be excluded. Make sure that the tender procedure and all documents respects EU and local legislation.
- ⇒ Select the received offers that comply with the mandatory minimum criteria and procurement legal requirements.
- ⇒ Use the “calculation tool” to select the best economical offer: insert information related to the use of the product (cells marked in yellow the ‘Life Cycle Cost’ excel sheet must be filled in). insert the information provided in the performance sheet into the ‘Best Economic Offer’ excel sheet. The tool will show the best economic offer, that i.e. the winner of your tender.

#### 5.4 Procurement procedures: the Simplified and Comprehensive approaches

Two procedures are possible for procuring household appliances: the Simplified Procedure (Alternative A) and the Comprehensive Procedure (Alternative B).



In the Simplified procedure only mandatory minimum criteria are set for the products; the final evaluation of the offers - fulfilling the specified criteria - can be made by comparing the total procurement price, or on the basis of the LCC (evaluated through the calculation tool) also considering the duration of the guaranteed service without additional surcharge.

In the Comprehensive procedure minimum criteria and optional target criteria are defined for the products, and “points” are assigned to the latter. The tender is awarded after the evaluation of the economic and the environmental aspects of the offered products.

## 5.5 Procurement supporting tools

### 5.5.1 Supporting tools description

#### 5.5.1.1 Performance Sheets

The assessment with “points” occurs in the column “target”. The maximum total number of the points is 100 and represents a case when the offered product fulfils all the target criteria.

The presented evaluation and points distribution are shown as an example and can be modified and adapted to the purchaser needs and internal procurement policy.

The suggested sections for the performance sheets are:

**Product details:** in this section the supplier will give specific data of the product offered. In particular data such as capacity or volume.

**Energy consumption:** in this section the indication of the energy efficiency class and the energy consumption, measured under standard conditions (e.g. standard washing programme), the annual energy consumption and the power input in different operating modes are given. Other parameters can be added if necessary. In the proposed performance sheets the energy efficiency class A is usually specified as a mandatory minimum criterion with the exception for dryers where energy efficiency class C is requested as minimum level.

**Durability:** in this section requirements about the warranty, the duration of guarantee of services without surcharge as well as minimum period of availability of parts and services can be included. The proposed values were defined when possible on the basis of the previously described eco-labelling schemes. It is worth noting that the compliance with these criteria can influence significantly the product lifetime to be used in the following LCC assessment.

**Noise:** in the Community Energy Label the value of the airborne acoustical emission shall be declared in the technical documentation and on the energy label, but no limiting values are set. The proposed values were defined when possible on the basis of the previously described eco-labelling schemes.

**Water consumption:** water consumption is mandatory declared in the Community Energy Label for dishwashers, washing machines and washer-dryers, but no water use efficiency has been set. The proposed mandatory minimum criteria as well as the target criteria are based on the EU Ecolabel scheme.

**Other Performance Criteria:** in this section indication of parameters such as washing, cleaning and drying performance is requested. The proposed mandatory minimum criteria are based on the Community Energy Label performance classes: washing and/or cleaning performance are particularly important due to the consumer satisfaction and are evaluated by comparison with a reference machine.

**Environmental Criteria:** the more strict environmental product characteristics are proposed in terms of optional target criteria, and were derived from the previously described environmental labelling schemes. Aspects such as the presence of energy saving programmes, refrigerants and foaming agents, and (cardboard) packaging with recycled material can be included in this section.

**The Performance Sheets for the large household appliances addressed in this guidelines can be downloaded from the Buy Smart project homepage: [www.buy-smart.info](http://www.buy-smart.info).**

### 5.5.1.2 Calculation Tools

The proposed calculation tool is an excel file consisting of two spreadsheets: the **Life Cycle Cost** and the **Best Economic Offer**.

#### Calculation of the Life Cycle Cost

The economy of an offer depends not only on the purchase cost but also on the operating costs:

- The purchasing cost usually consists of:
  - purchasing price per appliance
  - Installation price per appliance including accessories
  - delivery expenses
  - visible fee according to WEEE directive (relevant to the appliance disposal after its lifetime termination).
- The annual operating costs are usually:
  - Annual maintenance and standard services cost
  - Energy cost
  - Water cost
  - Detergent cost.

All of these elements should be considered during the calculation of the Life Cycle Cost (LCC). In order to provide the LCC assessment, it is also necessary to assume some additional parameters like:

- Appliance life time
- Discount rate.

The two mentioned above parameters, if applied to all offers on the same level, do not influence the final selection of the best offer, however by that it is possible to show the real life cycle costs.

Based on these parameters, estimation of the offers can also consider the period of the services guaranteed without additional surcharge declared by the appliance supplier.

The lifetime for the major household appliances is generally assumed to be of 15 years and the discount rate at 5%. These values are indicative averages and can be changed depending on the approach and internal policy of the purchaser.

#### Evaluation of the Best Economic Offer

The evaluation of the best economic offer is defined by dividing of the score (number of points based on the performance sheet) by the total Life Cycle Cost, also considering period of guaranteed services without additional surcharge if necessary.

**The Calculation Tools for the major household appliances addressed in this guidelines can be downloaded from the Buy Smart project homepage: [www.buy-smart.info](http://www.buy-smart.info).**

## 5.5.2 Use of the Supporting Tools

### 5.5.2.1 Use of the support tools for the Simplified Procedure (Alternative A)

In Alternative A the following procedure and tools are suggested:

- The performance sheet in Alternative A include only mandatory minimum criteria.
- Send the performance sheet as integral component of call for tender, and indicate:
  - that the provider is obliged to complete the performance sheet to confirm the compliance with the minimum criteria.
  - that products not fulfilling the (single) minimum criteria will be excluded.
- The final evaluation of the offers fulfilling the minimum criteria can be made by comparing the total procurement price, or on the basis of the LCC (evaluated through the calculation tool) also considering the duration of the guaranteed service without additional surcharge.

### 5.5.2.2 Use of the support tools for the Comprehensive Procedure (Alternative B)

In Alternative B the following procedure and tools are suggested:

- The performance sheet in Alternative B includes mandatory minimum criteria and optional target criteria.
- Send the performance sheet as integral element of the call for tender, and indicate:
  - that the supplier is obliged to complete the performance sheet to confirm the compliance with the mandatory minimum criteria and to detail the specific target criteria
  - that products not fulfilling the (single) mandatory minimum criteria will be excluded.
- Decide the weight of the optional target criteria and the Life Cycle Cost and describe them in the call for tender documents:
  - a weight of 30 % for the environmental-related criteria is recommended. It should not be nevertheless higher than 45%, to comply with European legal opinion (Wienstrom Rs.C-448/01, 04.12.2003)
  - in any case, when points for optional target criteria are given, it should be taken care that the weight for the Life Cycle Cost is higher than 50 % and thus the economic aspect remains the most important awarding criterion.
- The final evaluation of the valid offers can be made through the Calculation Tool to identify the best economic offer.

### 5.5.2.3 Calculation of the offers economic effectiveness (Alternative B)

The investment costs have the same importance as the operating costs, since the initial purchasing price for household appliances is relatively high. However, the operating costs are lower for energy efficient models, so that the more expensive efficient products may represent the best economic alternative in the long term.

The Calculation Tool can be used as support for the evaluation of the overall economy of the received offers. On the basis of the product characteristics and the results of the calculation, offers can be compared and the best economic offer can be identified.

**Use of the calculation tool to calculate the Life Cycle Cost:**

- Fill in the product specific information given by the supplier as well as the number of target criteria points evaluated in the performance sheets.
- Adapt the user-specific basic conditions (lifetime, discount rate, energy price, etc.).
- The calculation results in the Life Cycle Cost considering the selected parameters.

**Use of the calculation tool to calculate the Best Economic Offer:**

The evaluation of the best economic offer is done by dividing of the score (number of points based on the performance sheet) by the total Life Cycle Cost, also considering the extended period of guaranteed services without additional surcharge.

## 6. References

- DIRECTIVE 2010/30/EU of the European Parliament and of the Council of 19 May 2010 on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products (recast)
- Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products (recast)
- Regulation (EC) No 66/2010 of the European Parliament and of the Council of 25 November 2009 on the EU Ecolabel
- Regulation (EC) No 106/2008 of the European Parliament and of the Council of 15 January 2008 on a Community energy-efficiency labelling programme for office equipment, OJ L 39, 13.12.2008, p.1.
- Commission Regulation (EC) No 1275/2008 on ecodesign requirements for standby and off-mode power consumption of electrical and electronic household and office equipment, OJ L 339, 18.12.2008, p. 45.

For more information on GPP: [http://ec.europa.eu/environment/gpp/index\\_en.htm](http://ec.europa.eu/environment/gpp/index_en.htm)

## 7. Abbreviation

EC	European Commission
EEl	Energy Efficiency Index
EST	Energy Saving Trust
EU	European Union
GPP	Green Public Procurement
LCC	Life Cycle Cost
W	Watt