# For a tasty but efficient coffee

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## Abstract

The stock of coffee machines in the European Union is estimated 100 Mio units, consuming 17,000 Mio kWh per year and causing electricity costs of about 2,500 Mio Euro (according to estimations by Topten). Roughly 20 million coffee machines are annually sold in Europe. For comfort and quality reasons, the trend goes towards espresso machines (capsule machines, fully automatic machines) and filter pad machines; by now those machines account for about 45 % of total sales (pieces), while the rest are mainly traditional filter coffee machines.

Regarding the high saving potentials, manufacturers have taken various efforts to increase the energy efficiency of coffee machines in the past five years. Energy efficiency particularly was enhanced with measures as auto-power-down, better insulation of hot parts and low standby consumption.

A striking development towards super efficient coffee machines is the application of flow-type heaters. Due to the introduction of this technology by some innovative manufacturers these types of coffee machines represent the current best available technology (BAT). The most efficient coffee machines available on the European market are presented on www.topten.eu.

This paper discusses the energy saving technologies as auto-power-down and flow-type heaters, gives an overview of the current state of the EU Ecodesign process (Lot 25) and IEC 60661 standard (update in progress) and discusses policy measures on European Minimum Energy Performance Standards MEPS and a labelling directive.

## Introduction

For many of us drinking coffee is lifestyle. Coffee is a brewed drink prepared from roasted coffee beans. The spectrum of the different coffee beverages is very broad. In Europe filter-coffee, espresso, cappuccino and latte macchiato are well known. Coffees sometimes also get enriched with cream, whipped cream, ice cream, alcohol or flavour.

The coffee beverages and the consumer's preferences of coffee drinking habits are very various and so are coffee preparation methods. Among the coffee machines with electricity supply drip filter machines still are widespread. But for comfort and quality reasons, the trend clearly goes towards fully automatic machines and portioned machines such as capsule machines and pad machines.

Conventional machines among these comfort products however account for large energy losses in particular in the ready mode to keep the temperature in the boiler or thermo-block permanently on 85 °C to 90 °C. Their keeping warm function may consume up to 150 kWh per year, depending on user's switching off practice. Never switching off would double this value. 150 kWh exceeds the annual energy consumption of a small A++-refrigerator, 75 kWh equals the consumption of an A-class oven used twice a week. The key parameters that strongly enhance the energy efficiency of coffee machines thus are auto-power-down, better insulation of hot parts, application of flow-type heaters, reduced or zero standby consumption and low amount of water to be heated for hygienic and quality purposes.

The electricity consumption of coffee machines and its saving potentials are of high relevance. If in the next years 100 million coffee machines in Europe were replaced by energy efficient models, every year more than 10,000 million kWh or up

**Table 1. Types of coffee machines.**

| Type | Pump pressure | Quality of Coffee | Synonymously named |
|---|---|---|---|
| Fully automatic machines | High (> 8 bar) | Espresso | Espresso machine |
| Portioned machines:<br>Capsule machines | High (> 8 bar)<br>Low (< 8 bar, e.g. Tassimo) | Espresso<br>Drip-filter-like | Espresso machine<br>---- |
| Portioned machines:<br>Pad machines | Low (< 8 bar) | Drip-filter-like | ---- |
| Machines with piston lever | High (> 8 bar) | Espresso | Espresso machine<br>Semi automatic machine |
| Drip filter machines | No pump | Drip-filter-like | ---- |
| Combi machines<br>(piston lever/drip filter) | High (> 8 bar)/Low (< 8 bar) | Espresso/drip-filter-like | ---- |

**Fully automatic machine** | **Portioned machine, capsule** | **Portioned machine, pad** | **Machine with piston lever** | **Drip filter machine** | **Combi machine**

*Figure 1. Types of coffee machines.*

**Table 2. Sales of Coffee Machines in 2006 and 2007 (GfK).**

| Sales of Coffee Machines (in 1'000) | 2006 | 2007 | Increase |
|---|---|---|---|
| Fully automatic machines (Espresso machines) | 824 | 870 | 5.5% |
| Portioned machines with high pressure (Espresso machines) | 1'647 | 2'356 | 43.1% |
| Portioned machines: pad machines | 3'546 | 3'410 | -3.8% |
| Machines with piston lever (Espresso machines) | 1'358 | 1'246 | -8.2% |
| Drip filter machines | 10'076 | 10'072 | 0.0% |
| Combi machines | 312 | 284 | -8.9% |
| All coffee machines | 17'763 | 18'238 | 2.7% |
| **All espresso machines and portioned machines for pads** | **7'375** | **7'882** | **6.9%** |

to 2,000 million Euro electricity costs could be saved (according to estimations by Topten: consumption old coffee machine = 170 kWh/a, new coffee machine = 50 kWh/a).

In the framework of the Ecodesign Directive, the preparatory study on "non-tertiary" (i.e. for household use) coffee machines DG TREN Lot 25 is being carried out by BIO Intelligence Service (Paris) for the European Commission. It is attended by various stakeholders e.g. the European Committee of Domestic Equipment Manufacturers CECED, manufacturers, the Swiss Agency for Efficient Energy Use S.A.F.E., Topten (see Annex), the European Environmental Citizens Organisation for Standardisation ECOS, The Blue Angel, Oeko-Institute (Freiburg, Germany).

Leading initiatives to push the market introduction of high efficient coffee machines since many years are taken by the Swiss Agency for Efficient Energy Use S.A.F.E. and Topten.

## Types of coffee machines

Coffee machines with electricity supply can be categorised e.g. by pressure or quality of coffee (see Table 1 and Figure 1).

## Stock, sales and market trends of coffee machines in Europe

### STOCK OF COFFEE MACHINES

The stock of coffee machines in Europe is estimated 100 to 110 million units (Topten, Ecodesign Lot 25 Task 2).

### SALES OF COFFEE MACHINES

The total sales figures of coffee machines in 2006 and 2007 are shown in Table 2.

(GfK-data of 18 European countries: AT, BE, CH, DE, FR, GB, ES, IT, NL, PT, SE, DK, FI, GR, PL, HU, CR, SR).

- More than 18 million coffee machines are sold in Europe every year.
- Traditional drip filter machines still have the highest market share (about 55 %), followed by the portioned machines for pads (about 20 %).
- Espresso machines and portioned machines for pads have a market share of 43 % and an actual growth of 6.9 %.

#### MARKET TRENDS OF COFFEE MACHINES

- According to Table 2 there is a considerable trend towards fully automatic machines (+5.5 %) and an extremely strong trend towards espresso portioned machines (+43.1 %).
- Sales of low-comfort machines are constant or declining (machines with piston lever, machines with filter-coffee quality such as portioned machines for pads, and the already rare combi machines). Their market share therefore is decreasing. The Ecodesign Lot 25 Task 2 report supports that estimation.

## Brief history on technical developments of coffee machines

This section gives a brief overview on how the energy efficiency of coffee machines has been improved over the past few years. It is based on the expert knowledge of the Swiss Agency for Efficient Energy Use S.A.F.E and Topten.

- Until 2005 most coffee machines had to be switched off manually after use. If consumers didn't do so, the coffee machines stayed all the time in the high energy using ready mode (heating unit at 85 °C to 90 °C).
- When launching the www.topten.ch presentation in 2007, the auto-power-down function (see below) was found in about 5 machines on the Swiss market. However, the factory settings of the auto-power-down delay time were at 3 hours and more. Nowadays all (non-tertiary) coffee machines of the important manufacturers that enter the market are equipped with an auto-power-down function. Factory settings of the auto-power-down delay have been shortened: for some models the factory setting is 2 hours (or more), for many models between 10 minutes and 1 hour and for some models 1 minute or even below.
- The first models with an auto-power-down function had a standby consumption of about 3 Watts. Since January 2010 the standby of coffee machines is regulated by the Ecodesign regulation for standby and off mode consumption (tier 1: max. 1.0 W, Commission Regulation (EC) No 1275/2008). Nowadays, for coffee machines typical values are 0.5 to 0.9 W; more and more models switch even to zero power (see below).
- Coffee machines that are equipped with an energy saving mode (see below) that lowers the temperature of the heating element after a certain time entered the market in 2009.
- In the past few years, thermal losses of heaters were also lowered by better insulation of the hot parts of coffee machines such as thermo-block and water heaters of any kind. Before 2005 certain models needed 30 W and more in ready mode (even without actively heated hot plate), today efficient models hardly exceed 10 W.
- First machines (portioned) equipped with flow-type heaters (see below) entered the market in 2008. Flow-type heaters are the most efficient water heaters for coffee machines.

## Key parameters of coffee machines

The importance of the use phase energy consumption for life cycle eco-balance is shown by several studies (e.g. Nipkow, Bush 2003, Ecodesign Lot 25 Task 5).

For most types of coffee machines large energy losses in the ready mode (to keep the temperature in the heating element permanently at 85 °C to 90 °C) account for the bulk of the usage energy consumption. The coffee preparation itself plays a minor role.

#### FUNCTIONAL PRINCIPLES OF COFFEE MACHINES

- Drip filter machines: A flow-type heating system heats the water from the storage tank. The boiling water is driven by its steam power and flows through a tube to reach the paper filter filled with coffee grounds on top of the jug. Drips of hot water fall on the coffee grounds and percolate to the jug. Figure 2 shows the heating unit from below; the heater is mounted below the plate and is heating the jug after brewing, keeping its own temperature at about 100 °C, controlled by a thermostat switching on and off.
- Portioned machines with capsules: Water is pumped at high pressure (espresso: > 8 bar), for some types with low pressure < 8 bar through the heating unit (boiler, thermo-block, flow-type heater). At a temperature of about 90 °C a pre-set amount of water is then injected into the capsule, where the brewing process spends coffee to a cup placed below the spout.
- Portioned machines with (soft) pads: Water is pumped at low pressure (< 8 bar, often 2,5 to 4 bar) through the heating unit (boiler, thermo-block, flow-type heater). At a temperature of about 90 °C a pre-set amount of water is then forced

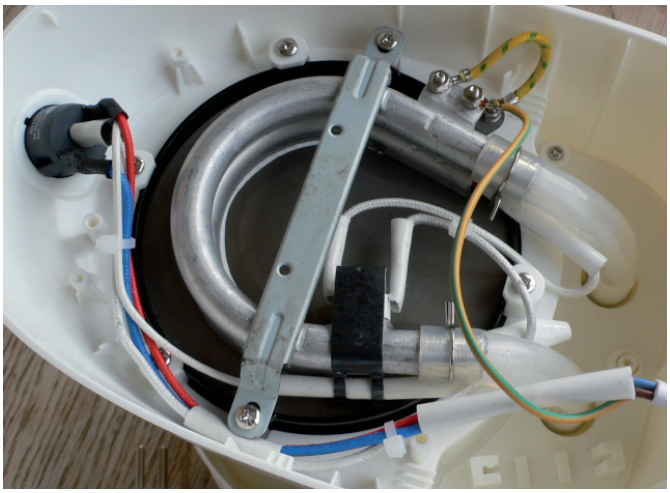

*Figure 2. Heating unit of drip filter machine.*



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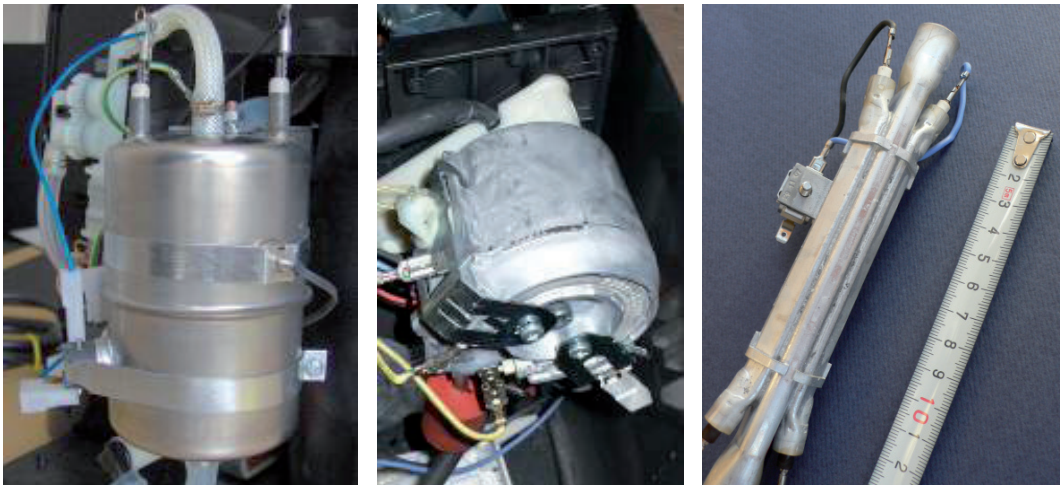

*Figure 3. Boiler, thermo-block and flow-type heating units of coffee machines.*

through the pad, where the brewing process spends coffee to a cup placed below the spout.

- Machines with piston lever (semi automatic machine): Instead of capsules, a piston lever (portafilter) containing coffee grounds in a metal filter is manually placed in a support. A pre-set amount of water is pumped at high pressure (> 8 bar, mostly 15 bar) through the heating unit (boiler, thermo-block). At a temperature of about 90 °C water is then pressed through the piston, where the brewing process spends coffee to a cup placed below the spout.
- Fully automatic machines: Similar function as semi automatic machines, but containing an electrically driven brewing unit and a grinder. A pre-set amount of coffee (beans) is ground, the grounds are shifted into the brewing unit and after brewing ejected. Water is pumped at high pressure (mostly 15 bar) through the heating unit (boiler, thermo-block, flow-type heater) and – heated up to about 90 °C – through the brewing unit and spent to a cup.

## ENERGY CONSUMING FUNCTIONS OF COFFEE MACHINES

- Heating unit: Due to high power rating (about 1,000 to 1,500 W) and considerable active time the heating unit claims the largest share of energy consumption. Most heating units do not only heat up cold water, but also keep it hot or keep a jug hot (drip filter) as long as they are supplied with electricity. Three types of heating elements are common in coffee machines: boilers (containing several hundreds of millilitres), thermo-blocks (containing 10 to 20 ml of water, but several hundred of grammes of aluminium) and flow-type heaters (containing about 10 ml of water). In figure 3 the 3 types are shown, in table 3 their material contents and resulting heat capacity at a temperature difference of 70 °C (ambient 20 °C, coffee production 90 °C).
- Energy needed for the production of a cup of coffee: the amount of energy physically needed to heat up water for an average cup (80 ml) is, at a temperature difference of $\Delta T = 70$ °C, 6,5 Wh. Measured values range from 8,1 to 14,7 Wh (see figure 4), they comprise also the energy for pump and grinder, if existing (in the range of 1 Wh each). These values are significantly lower than the heating up energy of typical boilers.
- Standby: Appliances with automatic functions such as a coffee brewing process or a timer to switch on at pre-set times or an auto-power-down function need a power supply unit to generate the low DC-voltages for the electronics. Power consumption of older electronic power supplies was up to 5 W, while efficient new ones consume less than 1 W (limit of Ecodesign regulation), e.g. 0,3 W. Standby duration depends on the active state duration, typically it is about 7,000 hrs, resulting in 2 to 7 kWh p.a. This is a small but for very efficient coffee machines not quite negligible value. For coffee machines, zero standby is possible, see below.
- Electric motors, pumps and magnet valves: Motors are used for grinding and automatic brewing units, pumps for all coffee machines except drip filter and electric valves for special process steps. These units may have considerable power ratings of e.g. 20 to 100 W, but their switched-on time is normally very short, e.g. some seconds to one minute. Therefore, their consumption share is very low and no specific efficiency measures are taken.

## BASIC PHYSICAL EFFICIENCY MEASURES

1. Abbreviate keeping hot duration: this is easily obtained by an auto-power-down function. If consumers are asked how quickly they would switch off their coffee machine, the answers are often too optimistic. Experience shows that many times appliances are forgotten and only switched off at night, if even.
2. Reduce heat losses of hot parts by thermal insulation: this is an old physical principle; very efficient new coffee machines are using it.
3. Reduce the significant temperature difference when possible (in keeping hot periods). From temperature reduced "ready" mode it takes some time to heat up again to real ready, but this is shorter than from cold.
4. Reduce heat capacity of parts to be heated up: the smaller, the less heating up energy has to be supplied, see figure 3.

**Table 3. Properties of heating units for coffee machines.**

| Type | Boiler | Thermo-block | Flow-type heater |
|---|---|---|---|
| Water | 200 g | 10 g | 10 g |
| Metal | 400 g | 650 g | 120 g |
| Heat capacity at ΔT = 70°C | 22 Wh | 12 Wh | 3 Wh |

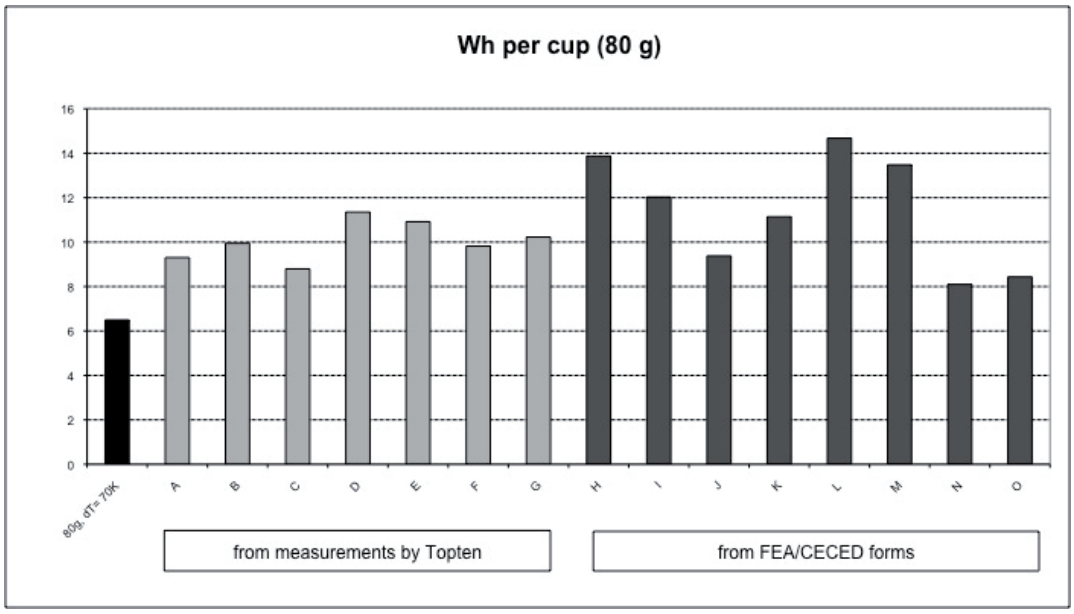


*Figure 4. Energy needed for the production of a cup of coffee.*

The lowest heat capacity is featured by flow-type heater technology.

5. Reduce standby consumption to zero (see below).
6. Reduce energy consumption of auxiliary processes such as decalcification or rinsing for hygienic purposes. These consumptions are of minor significance, but not negligible for very efficiency coffee machines.

## Details of efficiency technologies for coffee machines

### AVAILABILITY OF AN AUTO-POWER-DOWN AND SHORT DELAY TIME

An auto-power-down function is the first and simple measure for coffee machines to reduce the high energy consumption of the ready mode (keeping hot of the water). However, the duration of the delay time or in other words the time until the coffee machine switches from the ready mode to standby is important: the shorter the delay time the more it is impacting.

New water heaters units designed as flow-type heaters (see below) do not need auto-power-down, as they are activated only for coffee brewing and switched off immediately when the coffee production is finished.

### INSULATION OF HOT PARTS

Thermal losses of heaters are substantially lowered by (even thin) insulation of the hot parts of coffee machines such as thermo-blocks and water heaters of any kind. The insulation prevents the cooling effect of air ventilating the hot parts immediately. Even with flow-type heaters a small efficiency gain by insulation is to be expected.

A very efficient type of insulation can be implemented for drip filter machines: if the coffee is stored in a thermos jug (with vacuum insulation), keeping hot energy in the form of electricity is not needed at all. This reduces strongly the coffee period energy consumption; the value depends on the coffee period definition (see below).

### "ENERGY SAVING MODE"

Some coffee machines have an "energy saving mode" or "eco-mode" which can be programmed in the menu or is factory set. This mode lowers the temperature of the heating element after a certain time (e.g. 5 minutes), from standard 90 °C to about 60 °C (e.g.). The machine then is no longer in a real ready mode, but requires some heating time before dispensing coffee. It takes less time however than heating up from the cold state. This type of energy saving mode allows good energy efficiency figures also with somewhat longer auto-power-down delays, depending of the details of the measuring method. A question of technical terms may arise: the "low-temperature eco-mode" is not a standby mode nor a real ready mode and should not be treated as ready mode by the measuring method. Therefore measuring methods should comprise a reasonable usage cycle, irrespective of the "behaviour" of the machine.

### APPLICATION OF FLOW-TYPE HEATERS

Flow-type heaters are the most efficient water heaters for coffee machines. They avoid ready mode losses, and heat losses of the brewing process are low due to their little water content and thermal capacity. Problems of the first brew being of minor



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quality because of too low water temperature can be solved by discarding the first few millilitres leaving the heater. Flow-type heaters need a sophisticated control of heating energy and pump.

#### REDUCED OR ZERO STANDBY

The shorter the delay time of the auto-power-down the longer the machine remains in standby. The allowed energy consumption in standby is regulated by the Ecodesign regulation for standby and off mode consumption (Commission Regulation (EC) No 1275/2008). As the use of a coffee machine requires pressing a button or another manipulation anyway, there is no need for a standby function as e.g. for TV sets, which are to be activated by a remote control. Therefore zero standby does not cause any technical problems for coffee machines and can be easily implemented. As most coffee machines afford an electronic control and soft switches, the extra costs of zero standby are small.

#### LOW AMOUNT OF WATER TO BE HEATED FOR HYGIENIC AND QUALITY PURPOSES

Most coffee machines heat up certain quantities of water for rinsing purposes when switched on or off, or they discard a small amount of coffee at the beginning of the brewing process, which might be not hot enough or not of sufficient quality. Decalcification and (automatic) cleaning also is an energy (and resources including chemicals) consuming aspect in the life cycle of coffee machines. This might be reduced in some cases, e.g. by lower water temperatures and volumes for these processes.

## Best Available Technology BAT, future features, potential problems

#### BEST AVAILABLE TECHNOLOGY ON THE MARKET

Highly efficient coffee machines feature the above discussed efficiency technologies in an optimal combination. Presently, comparable measurement results of a broad selection of coffee machines are not available due to not yet harmonised measurement methods, see below. The analysis of many results and own (Topten) measurements suggest that several coffee machines – portioned as well as fully automatics – are very nearby the theoretical "Best Available Technology". Experience shows also that good efficiency can be achieved not only with flow-type heaters, but also with relatively small, well-insulated thermoblocks and energy saving temperature control. Presently it seems that there are no really new "Best Not Available Technologies" BNAT to be expected for the types of coffee machines in the focus. The physical analysis of the functions and energy flows prompts this assumption.

With respect to the overall energy and resources consumption of coffee preparation the production of capsules and pads should also be taken into account. This is likely to (over-)compensate the slightly lower energy consumption of portioned machines for a coffee period. As the energy and resources expenses of capsules cannot be influenced by the buyers, a declaration of the eco-balance of capsules and pads may be discussed.

#### POTENTIAL PROBLEMS WITH ENERGY SAVING FUNCTIONS

A crucial issue considering energy efficiency is the possible affection of coffee quality by too restrictive efficiency measures. An example: optimal coffee (espresso) quality presumes that all objects coming in contact with the brewing unit and brewed coffee to be hot. The challenge is to come near to that without the need of keeping all at high temperature. A possible solution is to discard a very small amount of coffee first leaving the brewing unit. The effect is similar to rinsing the machine before brewing.

Another development area for coffee machine efficiency – not considered in measuring methods – is the consumption of energy and water for maintenance and hygiene purposes.

Flow-type heater technology might lead to higher electric power demand: actually, most coffee machines have a maximum power input of 1,000 to 1,500 W. To enable a machine to brew 2 cups at once in a short time, power ratings of 2,000 W or more may be attractive. Problems may arise for household electrical installations.

## Methods to measure the energy consumption of coffee machines

#### PRESENTLY USED MEASURING METHODS

At the present time two methods to measure the energy consumption of coffee machines are applied in Europe in parallel. One measuring method was developed by S.A.F.E./Eurotopten in 2006/2007, the other one by FEA (Swiss Association of the Domestic Electrical Appliances Industry)/CECED in 2008/2009. The two methods are compared in the Table 4.

Measurement results of the two methods are not directly comparable due to different "standard usage", i.e. the amount of produced coffee, the duration of "ready mode" and the range measured functions are different. But the declared energy consumption values (kWh p.a.) are not the same with the two methods. As the Ecodesign Lot 25 preparatory study should recline upon a generally accepted measuring method, the Cenelec working group TC59X_WG15 is working on a harmonisation of the elements of the two methods. The new harmonised method will be integrated into IEC 60661.

#### FUTURE TEST STANDARD: REVISED IEC 60661

The existing standard IEC 60661 Ed. 2.2. (2006-2) does not include a method how to measure the energy consumption of coffee machines. However there is a need for such measuring norms also for possible Ecodesign measures such as a European energy label or minimum energy performance standards MEPS.

Both methods described in Table 3 have benefits and drawbacks. In the context of the preparatory study for Ecodesign Lot 25 the opportunity has come to work out one revised European approach validated by Cenelec (TC59X_WG15) in a collaboration of CECED, manufacturers, Topten, ECOS, The Blue Angel etc.

The revised IEC 60661 is in development and will contain two measuring procedures: one for coffee machines with pumps (high and low pressure) and one for drip filter machines (no pump).

##### Proposal for coffee machines with pumps

- Measurement along a logical sequence: start of the coffee machine from cold, heating up, ready, coffee preparation at defined points in time, wait until defined total duration of

**Table 4. Comparison of the S.A.F.E./Euro-Topten and FEA/CECED-measuring method for coffee machines.**

| | S.A.F.E./Euro-Topten | FEA/CECED |
|---|---|---|
| Year of implemantation | 2007 | 2009 |
| Main advantage | • Measurement along a "coffee period"<br>• Simple proceeding irrespective of "eco"-functions | • Measurement of coffee preparation and steaming function |
| Main disadvantage | • Presumed coffee preparation energy consumption: standard value of 20kWh/year (Note: corresponds well to measurements, see figure 4, 9 Wh for 80 ml, 2190 cups p.a.). | • Impact of auto-power-down delay and "eco-modes" not adequately considered |
| Applied by | • Topten<br>• The Blue Angel (RAL-UZ 136)<br>• Manufacturers in order to get presented on www.topten.eu or on national Topten-sites e.g. www.topten.ch<br>• Swiss Electrical utilities and Swiss communities for various rebate programmes on basis of Topten | • The voluntary Swiss energy label for coffee machines (Class A to G)<br>• Manufacturers in order to get the voluntary Swiss energy label |

the "coffee period" is ended. During the measurement the behaviour of the machine will be as set by factory (e.g. auto-power-down, delay-time, "eco-mode"). As only the "coffee period" energy consumption is measured, the behaviour details are non-relevant.

#### Proposal for drip filter machines

- A draft proposal was worked out by Topten. It is being circulated for comments to stakeholders. For drip filter machines the measuring method has to comply with the different technologies for keeping hot the brewed coffee: the conventional heating plate (very inefficient) and the newer system with a thermos jug, not needing any keeping hot energy. The concept of the coffee period will be adopted from the pump machines method.

## Preparatory study on non-tertiary coffee machines Lot 25

Since mid of 2009 the preparatory study on non-tertiary coffee machines Lot 25 is being carried out by BIO Intelligence Service for the European Commission DG ENER in the context of the Ecodesign Directive.

The preparatory study follows the MEEuP methodology, which is mandatory for all Ecodesign preparatory studies, comprising the following 8 tasks:

- Task 1 – Definition
- Task 2 – Economic and market analysis
- Task 3 – Consumer Behaviour and Local Infrastructure In order to get yearly energy consumption values the consumer behaviour is taken in account by the coffee period (cup size and number, sequence) and the yearly standard usage (number of coffee periods, switching off, etc.).
- Task 4 – Technical Analysis Existing Products
- Task 5 – Base-Cases
- Task 6 – Technical Analysis BAT
- Task 7 – Improvement Potential
- Task 8 – Scenario, Policy, Impact and Sensitivity analysis

Tasks 1–3 are final, tasks 4–7 are in progress (drafts published March 2011). For the Lot 25 preparatory study it is a challenge that the IEC 60661 amendment with the harmonised measuring method is still in progress (April 2011). Ecodesign measures should recline upon the new standard.

## Discussion of policy measures

Policy measures are needed to realize the high electricity saving potential of coffee machines. The standby and off mode regulation (Commission Regulation (EC) No 1275/2008) must be implemented also in the case of coffee machines. Furthermore, minimum energy performance standards MEPS and a EU energy label for coffee machines should be established in order to accelerate the adoption of efficiency technologies by the manufacturers.

#### APPROPRIATE IMPLEMENTATION OF THE STANDBY- AND OFF-MODE REGULATION

Since January 2010 the "horizontal" (covering all products) Ecodesign standby and off mode regulation (Commission Regulation (EC) No 1275/2008) is in force and requires also coffee machines to have a standby consumption of no more than 1.0 Watt (2 Watt with display), from 2013 the limits will be 0.5 W (1 W with display). As for non-tertiary coffee machines there is no need to display any information in standby mode, only the lower values should apply (1 W, 0.5 W). Nevertheless, zero standby represents BAT and helps manufacturers to get a better energy label (see below).

From January 2013 energy-using products must have a power management function switching to a standby or off mode "after the shortest possible period of time appropriate for the intended use of the equipment". For non-tertiary coffee machines, auto-power-down will therefore be a need. Highly efficient coffee machines with flow-type heater (BAT) do not need auto-power-down as there is no ready mode.

#### INTRODUCTION OF MINIMUM ENERGY PERFORMANCE STANDARDS MEPS

The preparatory study on non-tertiary coffee machines Lot 25 is in progress. Effective Ecodesign measures should include Minimum Energy Performance Standards MEPS targeting the coffee machines' keeping hot energy consumption. Maximum limits should be guided by the most efficient products on the market. As the measuring method according to the revised IEC 60661 is not yet definitely maximum thresholds for energy consumption cannot yet be proposed.

Energy measurements presume factory settings. Factory settings of the auto-power-down delay from the last activity will therefore hardly exceed 30 minutes.

#### INTRODUCTION OF A EU ENERGY LABEL FOR COFFEE MACHINES

- The introduction of a EU energy label for coffee machines on basis of the revised IEC 60661 for energy consumption measurement (in work) is recommended. It would be a very effective measure to help buyers to recognise the most efficient products on the market. As retailers like to offer products of best label classes the label would give incentives to industry and trade to develop and offer energy-efficient coffee machines. It further would be a useful tool for promotion programmes.
- At the time of the introduction of the EU energy label the best coffee machines available on the market shall be A-classed. This allows to hold the super-classes A+, A++ and A+++ ready for future most energy-efficient coffee machines.

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www.topten.eu – Best Products of Europe

## Annex: Topten

#### TOPTEN

- Topten is an international programme to create a dynamic benchmark for high-efficient consumer products.
- Topten presents online high-efficient household appliances, office equipment, consumer electronics, building components, lamps and cars.
- Topten started in Switzerland in 2000 and in the meantime is online in 16 European countries such as in Austria, Belgium, Czech Republic, Finland, France, Germany, Greece, Italy, Luxemburg, Netherlands, Norway, Poland, Portugal, Romania, Spain and Switzerland.
- Since October 2010 Topten is also online in China (www.top10.cn) and in the USA (www.toptenusa.org).

#### EURO-TOPTEN-PROJECT "BEST PRODUCTS OF EUROPE"

- "Best Products of Europe" presents on www.topten.eu the most efficient products available on the European market such as household appliances, office equipment, consumer electronics, building components, lamps and cars.
- The site is a reliable Best Available Technology (BAT)-reference and resource for best available technology values. Topten sets product efficiency benchmarks and offers policy recommendations. Thus it is an important tool for policy design processes.
- The Euro-Topten-project is supported by the European Commission (Intelligent Energy Europe) and national organisations.