Commission's proposals to reduce standby electric power consumption

Introduction

This draft Commission Regulation on Standby is one of the priorities of the Commission Action Plan on Energy Efficiency.

The measure is based on the Ecodesign Directive 2005/32/EC of the European Parliament and of the Council which gave a mandate to the Commission to set Ecodesign requirements for energy-using products. Ecodesign requirements are environmental performance levels that products covered by the measure need to meet if they are to be put on the EU market (regardless of where they are produced).

The Ecodesign Framework Directive 2005/32/EC lists products which have been identified by the Council and the European Parliament as priority areas, including “a separate implementing measure reducing stand-by losses for a group of products”.

Stand-by and off-mode losses

Standby functions (e.g. remote control activation of a television set) and off mode losses (occurring when a product cannot be switched off completely when providing no service/function) are a common feature of electrical and electronic household and office equipment (consumer electronics, information and communication technology equipment, personal care products, etc.). In general these products compete on highly price sensitive markets. On the other hand users are often not aware of the electricity consumption and costs of standby/off mode, which are usually small for a single product, therefore low power consumption in standby/off mode is not an important purchasing criterion. However, a typical household is in general equipped with dozens of products featuring the standby/off mode, and the resulting energy consumption and related costs are significant.

Technical solutions that reduce energy consumption in standby/off mode are frequently not applied, mostly due to possible additional costs for the manufacturer albeit in general very low (i.e. several Euros). Nonetheless, a slightly higher purchasing price pays off for the user because the overall life cycle cost, i.e. the purchasing cost plus the costs for operating the product, is reduced. This leads to electricity consumption and related costs being (much) higher than necessary.

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3 As an example, 5 Watts standby power consumption activated 20 hours per day imply an annual electricity consumption of 5 Watts x 20 hours/day x 365 days = 36.5 kWh, corresponding to approx 5 € electricity cost.
Electrical and electronic household and office equipment featuring the standby and off mode is sold in vast numbers throughout the Community. Electricity consumption related to standby and off mode is significant, and significant cost effective improvement potentials exist.

**Electricity consumption in standby/off mode today**

Widespread use of electronic household and office equipment leads to important overall electricity consumption related to standby/off mode.

For the year 2005 a study estimated that approximately €3.7 billion installed products in the EU feature standby/off mode, leading to electricity consumption in standby/off mode of close to 50 TWh, corresponding to electricity costs of about €7 billion, and 20 million tons of CO2 emissions.

However, if applied appropriately, standby functionalities can help save electricity because they provide a convenient way to switch equipment into a condition with reduced power consumption compared to the "active" condition that provides the main function, which typically uses much more power. In order to optimise the combined active/standby/off electricity consumption of a certain product, consumption in standby/off mode must be minimised, while ensuring that standby functionalities are not left out from the product.

**Electricity consumption of standby/off mode in 2020**

The evolution of electricity consumption related to standby and off mode until the year 2020 indicates that:

- There is an increasing penetration rate of equipment featuring standby and/or off mode, and, assuming the typical product lifetime and usage times, the installed base of equipment featuring standby mode and off mode will increase to approx. 4.6 billion products in 2020. It is expected that electricity consumption in standby/off mode will stand at around 50 TWh per year in 2020 (an amount comparable to the total electricity consumption of Greece or Portugal).

- Awareness raising campaigns aimed at increasing demand for products with low standby/off mode, and educating users to switch or plug off equipment when not using it, have and continue to be carried out in several EU Member States, to some extent leading to better "switch off habits" and influencing purchasing decisions regarding equipment with low electricity consumption in standby and off mode. Nevertheless the Parliament and Council have identified standby/off mode as a priority measure, since it is difficult and time consuming to address the underlying problem laid out above through promotional/awareness raising approaches aimed at individual consumers.

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4 figures are for EU-25 (data basis of the preparatory study); the figures for EU-27 are slightly higher.

5 average electricity price in the EU 2005: 0.136 €/kWh

6 average specific EU emissions in 2003 for EU-25: 400g CO2 per kWh (EURELECTRIC, Environmental Statistics of the European Electricity Industry, Trends in Environmental Performance 2003-2004); this figure is higher if e.g. mining related effects are taken into account (MEEuP: plus 10%)
Costs of the measure for consumers

The additional costs that may arise from the technologies necessary to achieve compliance for the equipment that does not yet meet the requirements are expected to be very low. Therefore the affordability of such products should not be negatively affected even for low income households. On the contrary, consumers will make electricity and monetary savings on the running costs of the appliances.

It is estimated that in 2020 the measure will lead to a reduction of standby/off mode electricity consumption of 35 TWh compared to a "business as usual" scenario. The electricity savings correspond to savings of electricity costs of approx. €4.5 billion in electricity prices of the year 2005 (of which 80-90% is accounted for in households). Due to economy of scale effects it is to be expected that potential added purchasing costs - if any - will decrease after Ecodesign requirements are introduced, and the electricity cost savings become net savings. Furthermore, electricity costs are likely to increase further, and the resulting cost savings will thus be higher.

This improvement is subject to the reduction of the power consumption of standby/off mode operating conditions only. Additional reductions can be expected from the requirement for the automatic power down functionality, which serves to switch equipment from active mode to standby/off mode.

How was the measure developed?

The Ecodesign Directive requires the Commission to first consider relevant Community and national environmental legislation or voluntary initiatives to assess whether further legislation would be justified.

On Community level several voluntary programmes related to standby/off mode have been launched, such as the Energy Star programme for office equipment, the Ecolabel and the Commission's Codes of Conduct. However, these programmes address only a very limited subset of standby/off mode electricity consuming equipment and only a limited number of manufacturers take part.

As already mentioned, awareness raising campaigns that have already been undertaken in several Member States cannot solve the problem alone. Furthermore, legislative action on standby/off mode cannot be taken at the level of Member States. Both the Member States and the industry expect harmonised measures to ensure free circulation for the products that are in compliance with them.

The level of ambition for improving the electricity consumption in standby/off mode was determined by an analysis of the lowest life cycle cost for the equipment user. Benchmarks for technologies that yield the best performance were considered.

Several policy options for achieving a market transformation that realises the appropriate level of ambition were considered in close consultation with experts from Member States and the affected stakeholders (consumers, environmental NGOs, industry).

An assessment of the proposed implementing measure has also been carried out. In particular, options for the timing of eco-design requirements were analysed, taking into account the criteria set out in the Ecodesign Directive, such as:

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7 Average electricity price in 2005 in EU-25: 13.6 Cent/kWh
- there shall be no significant negative impacts on the functionality of the product, from the perspective of the user;
- health, safety and the environment shall not be adversely affected;
- there shall be no significant negative impact on consumers in particular as regards affordability and life cycle cost of the product;
- there shall be no significant negative impacts on the industry's competitiveness;
- in principle, the setting of an Ecodesign requirement shall not have the consequence of imposing proprietary technology on manufacturers;
- no excessive administrative burden shall be imposed on manufacturers.

**Improvement potential, level of ambition and benchmarks**

Existing cost effective technical solutions allow for standby/off mode power consumption levels in the range of 0.5 Watt – 1.0 Watt, or below. Today standby/off mode power consumption levels of electric and electronic household and office equipment are typically several Watt\(^8\). Assuming that electric and electronic equipment has a power consumption between 0.5 Watt (off mode, standby – reactivation function) and 1.0 Watt (standby – display/clock), it is estimated that the resulting electricity consumption of electrical and electronic equipment in standby/off mode in 2020 will amount to about 15 TWh. This means a reduction of 35 TWh or more, approx. equal to the total electricity consumption of Denmark.

![Figure 1: development of stock and electricity consumption of standby/off mode, assuming a 0.5W/1.0W power consumption level in 2020 (RO: reactivation only; ISD: information or status display)](image)

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\(^8\) standby/off mode examples: computer 3.6 Watt/2.2 Watt, DVD player 4.8 Watt/1.5 Watt, washing machine 5.7/1.2 Watt
The preparatory study has shown that the benchmark set by the best available technology yields standby/off mode power consumption levels in the range 0.1 Watt – 0.3 Watt. However, depending on the product in question, such levels may imply technical solutions which are not cost-effective and lead to material related trade-offs (e.g. back-up batteries), potentially resulting in an increase of life-cycle environmental impact.

Environmental impact - Annual reduction of CO2 emissions in 2020

The proposed requirements are expected to lead to a reduction of standby/off mode electricity consumption of approx. 35 TWh in 2020 (compared to the "no action" scenario as set out in Section 2), yielding annual CO₂ emission savings of 14 million tons⁹, and reductions of further electricity production-related environmental impacts (e.g. SO₂, NOx, heavy metals). As discussed above this improvement is due to the reduction of the power consumption of standby/off mode operating conditions only, and further important reductions can be expected from requirements on automatic power down functionality, and improved energy performance in further operating conditions which cannot be quantified.

To a large extent the equipment covered by this regulation is produced for the world market. Therefore these requirements will have an impact on the design of equipment shipped to markets other than the EU, and the resulting reductions in their environmental impact will be much higher than those estimated for the EU alone.

Conclusions of the studies

Discussions showed that the appropriate policy to improve the potential for stand-by and off-mode electricity losses is a regulation that lays down the requirements for standby and off mode for a broad range of products. Such a regulation would come into effect in two stages. This approach ensures:

- that the cost-effective potential to improve electricity consumption in standby/off mode is quickly realised, leading to important electricity and CO₂ savings, while reducing the life-cycle costs for electrical and electronic household and office equipment;
- the annual electricity consumption in 2020 will be reduced by about 35TWh compared to a business as usual scenario;
- accumulated electricity savings / electricity cost savings / CO2 emission savings of 194 TWh / € 26.4 billion / 77.6 Mt CO₂ by 2020;
- a clear legal framework providing a level playing field for manufacturers, ensuring fair competition;
- harmonised requirements for standby/off mode in the Community, leading to a minimisation of administrative burdens and costs for economic operators;
- that no disproportionate burdens for manufacturers are created due to transitional periods which duly take into account re-design cycles;
- that additional energy savings will be triggered outside the Community because a broad range of the equipment covered are produced according to identical specifications for the world market.

⁹ assuming the specific CO2 emissions of 2003 (see footnote 15) which, however, is expected to change e.g. due to the Community's strategy for promoting renewable energy sources
Types of products covered
The scope of this Ecodesign measure on standby/off mode losses addresses plug and play electrical and electronic household and office equipment. Fixed installed equipment/systems such as building infrastructure (e.g. "split" air conditioning installations), individual parts and industrial equipment are not included (standby functions are typically developed for being useful to the end-user).

The scope of the proposed Regulation is defined by using an approach similar to the "Waste electrical and electronic equipment“ (WEEE) Directive10, while limiting the application to products corresponding to "household" and "office" equipment. Furthermore, "catch all" clauses are included to ensure that future types of household and office products are covered.

Staged implementation of ecodesign requirements

*Power levels for off mode and standby*

Maximum power levels are proposed which are scheduled to come into force in two stages.

**Stage 1**

Off mode and Standby – reactivation function: 1W,
Standby – information or status display: 2W.

**Stage 2**

Off mode and Standby – reactivation function: 0.5W,
Standby – information or status display: 1W.

Those levels are cost-effective and can be achieved with current state-of-the-art technology, the levels corresponding to the second stage yielding lower life cycle costs than the levels corresponding to the first stage. However, taking into account possible impacts on manufacturers, including SMEs, less demanding requirements are set in a first stage, and more time is given to achieve compliance with the stricter requirements of the second stage.

**Definitions for "off-mode" and "standby"**

The set of definitions for "off mode" and "standby" are related to the international "standby standard" IEC 62301.

The conditions for equipment involving sensor-based safety functions are not included in the definition of standby in order to prevent safety relevant functions being left out of equipment merely for the sake of meeting legal requirements. This is relevant mainly for wet appliances (water stop functions) and cooking equipment, e.g. sensors indicating that a cooking field is hot. Those functions will be taken into consideration in the relevant product-specific Ecodesign implementing measures.

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"Hard off switch" or "0 Watt off mode" requirement

In general a "hard off switch"\(^\text{11}\) can help reduce the overall energy consumption of a particular product. However, depending on the characteristics related to requirements on electromagnetic compatibility, even with a hard off switch power consumption in the range of 0.1W to 0.3W can often not be avoided, and "0 Watt" are technically not achievable.

The proposed "horizontal" regulation therefore takes the approach to require a power consumption in off mode and standby mode close to the best available technology, but does not contain a requirement for a mandatory "hard off switch" or a "0 Watt off mode", and it is left to the manufacturer to decide whether a hard off switch would be appropriate to comply with off-mode requirements. The technical feasibility and the appropriateness of a "0 Watt"/"hard-off switch" requirement ("benchmark") will be considered on a product by product basis for product-specific implementing measures.

\(^{11}\) A switch on the product facilitating to disconnect it from the mains power source