EUROPEAN COMMISSION

Brussels, XXX
[…](2012) XXX draft

COMMISSION STAFF WORKING DOCUMENT

IMPACT ASSESSMENT

Accompanying the document

Commission Regulation

implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for household tumble driers

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Lead DG: ENER

Associated DG: ENTR

Other involved services: CLIMA, COMP, ECFIN, ENV, INFSO, LS, MARKT, RTD, SANCO, SG, TRADE

Agenda planning or WP reference: 2011/ENER+/010

1. PROCEDURAL ISSUES AND CONSULTATION OF INTERESTED PARTIES

1.1 Organisation and timing

No ecodesign requirements within the framework of Directive 2009/125/EC of the European Parliament and of the Council establishing a framework for the Commission to set ecodesign requirements for energy-related products[1] (hereafter referred to as the Ecodesign Directive) have so far been set on household tumble driers. In relation to labelling, household tumble driers are covered by *Commission Directive 95/13/EC implementing Council Directive 92/75/EEC with regard to energy labelling of household electric tumble driers*.

The *Action Plan for Energy Efficiency: Realising the Potential*[2] identified 'wet' household appliances (i.e. household washing machines and tumble driers) as one of the 14 priority product groups for which an up-date of the existing labelling together with minimum energy performance standards (ecodesign) should be adopted.

Combined washer-driers are covered by Directive 96/60/EC but these products fall outside the scope of this Impact Assessment specifically related to household tumble driers. They are excluded from the ecodesign and labelling requirements of household tumble driers because these products are washing machines with additional drying function[3]. Therefore washer-driers can not be included in the specific tumble driers legislation because the washing part will not be addressed. These products were also not included in the washing machine ecodesign/labelling legislation because the drying part could not be addressed. It is also not possible to cover the washing part of a washer-drier in the washing machine legislation and the drying part in the driers legislation because the machines with the continuous washing/drying cycle will not be covered, although not all washer-driers have this continuous

[1] OJ L 285, 31.10.2009.

[2] COM(2006) 545

[3] Washer-driers can be used in different ways by the consumers: as washing machine, as washing and drying machine in a discontinuous process and as washing and drying machine in a continuous process.

cycle. A product specific legislation (ecodesign/labelling Regulations) is needed for washer-dryers.

The impact assessment was launched in June 2010 supported by an Interservice Steering Group including CLIMA, COMP, ECFIN, ENTR, ENV, INFSO, LS, MARKT, RTD, SANCO, SG, TRADE. The agreement of the ISG was forthcoming during all critical steps of the impact assessment, namely: drafting of the stakeholders' consultation working document and design of the impact assessment and policy options.

1.2 Impact Assessment Board

This impact assessment was scrutinised by the Commission's Impact Assessment Board (IAB). In its opinion, the IAB concluded that the impact assessment contains an adequate and proportionate analysis. The analytical steps based on the requirements of the Ecodesign Directive 2009/125/EC have been respected.

This impact assessment integrates the additional recommendations for improvements advocated by the IAB.

1.3 Transparency of the consultation process

A background preparatory study was carried out from November 2007 to March 2009 in order to give input to this impact assessment[4]. The preparatory study provided the European Commission with technical background supporting the design of eco-design requirements following the methodology defined in Annex I and II of the Ecodesign Directive.

The opinion of stakeholders was gathered throughout the process through bilateral meetings and the Consultation Forum which was created in compliance with Article 18 of the Ecodesign Directive. The Commission's minimum standards on public consultation can thus be considered to be met.

- The preparatory study consulted manufacturers in bilateral meetings as well as through their European Federation, CECED. Their input was instrumental in establishing the description of the base case appliances and their characteristics, the environmental impacts over the entire life cycle and the technological means and costs of ecodesign improvements. The preparatory study is published and publicly available on the study website: www.ecodryers.org.

- A consumer survey was run in 2008 during the course of the preparatory study (Task 3) in order to better understand and identify consumer's needs, expectation and daily use of wet appliances. The opinion of 750 European households from three different climate zones (France, United Kingdom and Poland) was gathered with the aid of an external market research institute. Furthermore a manufacturer survey was held, to enquire about consumer drying habits and preferences.

- The Ecodesign Consultation Forum, set up in accordance with Article 18 of the Ecodesign Directive, was consulted on 25 June 2010 with the participation of Member States, consumer organisations, environmental NGOs and the manufacturers represented by CECED. The working document presenting the policy options was sent one month in advance of the meeting. All replies to the working document as well as the minutes of the meeting are available on CIRCA website. The minutes of the Consultation Forum are also available in Annex I.

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4 Ecodesign of laundry driers (i.e. household tumble driers) - Preparatory study for ecodesign requirements of Energy-using-Products (EuP) - Lot 16, Final Report, March 2009, France. Co-ordinator: Clement Lefevre, PriceWaterHouseCoopers Advisory (France). Available on: www.ecodriers.org.

1.4 Outcome of the consultation process

All respondents throughout the consultation process supported the revision of the Energy Labelling scheme applicable to household tumble driers. The following issues were raised and taken into account within this impact assessment:

- Member States, consumer representatives and environmental NGOs unanimously supported the setting of ecodesign requirements on the energy consumption of tumble driers in addition to a review of the Commission Directive 95/13/EC on energy labelling. Some Member States advocated the removal of class D in the first step and the removal of class C in the second step. However some Southern European Member States indicated that class C vented driers with lower than average efficiency still meet a certain consumer demand and represent the most economically advantageous option for them (especially for those vented driers which are not often used by consumers, e.g. in Southern Member States). This parameter has been integrated in the two options for ecodesign presented in this Impact Assessment.
- The approach on establishing energy efficiency based on annual consumption including low power modes and part load was generally agreed upon. The calculation method proposed by the Commission at the Consultation Forum was seen as an improvement over the previous method which was based on the specific electricity consumption (kWh/kg) with the effect of favouring larger machines (since these have relatively lower fixed energy losses[5]). Several stakeholders however requested that the new calculation method be improved to avoid smaller tumble driers being given too large a bonus (jump of up to two classes on the energy label) which is not technologically justified. This impact assessment uses an improved calculation method which addresses this concern.
- The proposed revised energy label was broadly supported with the following characteristics: inclusion of gas-fired and electric tumble driers on a single energy scale, display of the condensation efficiency and acoustical noise emissions, and addition of three extra energy classes (A+, etc.) on top of the existing ones.
- A majority of stakeholders requested that ecodesign requirements are set on the condensation efficiency of condenser driers. The impact assessment consequently includes a discussion on condensation efficiency.

[5] Each drier has some degree of energy loss from heating up components that do not add to the removal of moisture from the load. The larger the machine (higher capacity), the smaller the relative contribution of this ('fixed' since not associated to actual load) heat loss is. Larger machines therefore attain more easily lower specific (kWh/kg) energy consumption values.

2. PROBLEM DEFINITION

Since the introduction of the energy label by Commission Directive 95/13/EC, household electric tumble driers have improved their energy efficiency by around 12 % in the last ten years[6]; the EU energy label is believed to have been one of the most important market drivers in this respect, tapping into a market demand for more energy efficient products. Despite further significant improvement potentials, the market transformation observable over the past years indicates that the market mechanism driving forward the energy efficiency of household tumble driers has come to a halt.

The consequences are that the past increase in energy efficiency is not enough to outweigh the increase in absolute sales of household tumble driers so that the total energy consumption of the stock keeps increasing.

Grounds for an implementing measure

According to Article 15(1) of the Ecodesign Directive, a product shall be covered by an implementing measure or self-regulation if the criteria listed in Article 15(2) are met, namely:

(a) the energy using product shall "represent a significant volume of sales and trade, indicatively more than 200 000 units a year";

(b) it shall "have a significant environmental impact within the EU";

(c) it shall "present significant potential for improvement in terms of its environmental impact without entailing excessive costs, taking into account in particular:

  (i) the absence of other relevant EU legislation or failure of market forces to address the issue properly;

  (ii) a wide disparity in the environmental performance of energy using products available on the market with equivalent functionality."

2.1 Baseline scenario

2.1.1 Sales and stock (Article 15(2)(a))

The overall sales show a continuing growth, indicating that the EU-27 market for household tumble driers has not met its saturation point yet.

Ownership levels of 40% to over 60%[7] in some Member States are not uncommon and still rising, albeit at a somewhat slower pace indicating that the maximum saturation level is getting nearer. In 2005, the Western EU average ownership for households was 34.4%, in Eastern EU this was only 1%, giving an overall EU ownership of close to 29%. Ownership in Western Europe is expected to increase up to 2020 to an overall value of approximately 38% and in Eastern Europe up to 20%, which gives for the whole EU-27 34%.

The product life of driers is estimated to be 13 years, which gives (when based on the saturation levels provided) an installed base (or stock) of almost 57 million units in 2005, increasing to almost 72 million units in 2020.

Sales in the EU-27 in 2005 are estimated at 5.1 million units which is clearly above the indicative threshold of 200.000 units set by the Ecodesign Directive. With an average product

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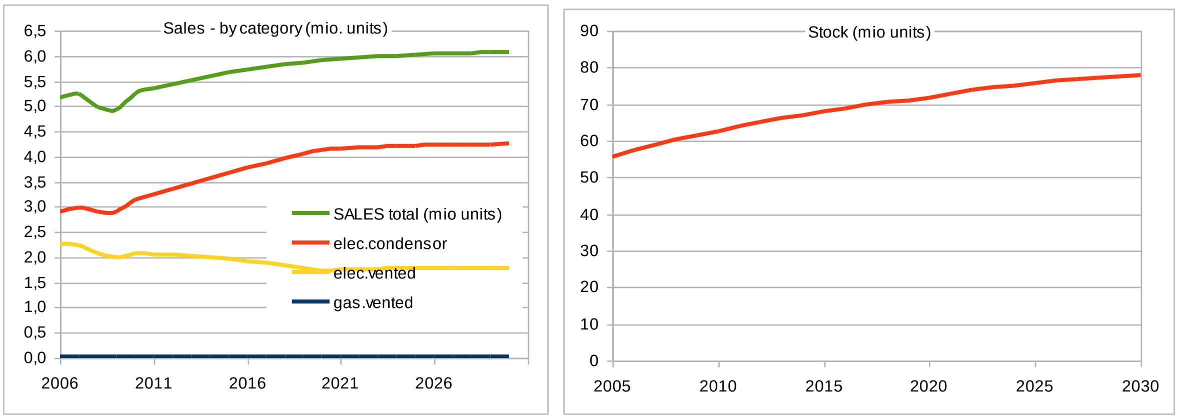
6 In 1995, the average condenser drier consumed some 0.79 kWh/kg (GEA study, 1995), which is approximately 0.69 kWh/kg according to the current standards. In 2010, the average condenser drier is assumed to consume 0.61 kWh/kg corresponding to a reduction of around 12%.

7 Netherlands 2005 is 65% ownership.

price of 438 EUR (vented and condenser combined, incl. VAT, 2005) the total annual trade represents a value of 2.2 billion EUR.

By applying stock model corrections for new sales and replacement sales the number of sales in 2020 is estimated to be 5.9 million units[8].

Figure 2: Baseline sales ('000) and installed stock ('000)



As illustrated in table 1 below, the majority of household electric tumble driers' model placed on the market in 2005 is of the condenser type and its market share is slowly increasing. Gas fired tumble driers are still a niche product in Europe with overall sales varying between 4 and 12 thousand units annually and currently around 7 thousand/a. The current estimates are that the sales will remain fairly constant. The table also shows that the average nominal capacity of the appliances is also increasing, from an average of 5.5 kg in 2002 to almost 6 kg in 2005.

Table 1: Models by type and capacity

	2002	2005	2010	2020
Type (% of sales):				
vented	48%	45%	40%	30%
condensing	52%	55%	60%	70%
gas driers	sales0.01% of total	sales0.01% of total	sales0.01% of total	sales0.01% of total
Capacity (% of sales):				
<4.5 kg	7.5%	6.1%	4.5%	2.2%
4.5-5 kg	68.2%	33.4%	8.1%	0.0%
5.5-6 kg	24.1%	51.9%	25.2%	1.0%
6.5-7 kg	0.1%	7.4%	46.6%	66.2%
7.5-8 kg	0.0%	1.1%	14.5%	24.7%
>8 kg	0.1%	0.1%	1.1%	5.9%

8 This is somewhat higher than indicated in the preparatory study which is partly caused by incomplete market data (identified sales are estimated to be 90% of total), partly by differences in the number of households between the preparatory study and this impact assessment and partly because of differences in the modeling approach (the same stock figures leads to different sales figures, the discrepancies could not be identified). Furthermore this impact assessment takes into account the economic downturn between years 2008-2009 resulting in estimated 2010 sales at roughly the same level as 2005 sales.

average capacity	5.1 kg	5.6 kg	6.6 kg	7.3 kg

Source: values for 2002/2010 from preparatory study Task 2, table 18/19 (p.92), values for 2010/2020 are estimates

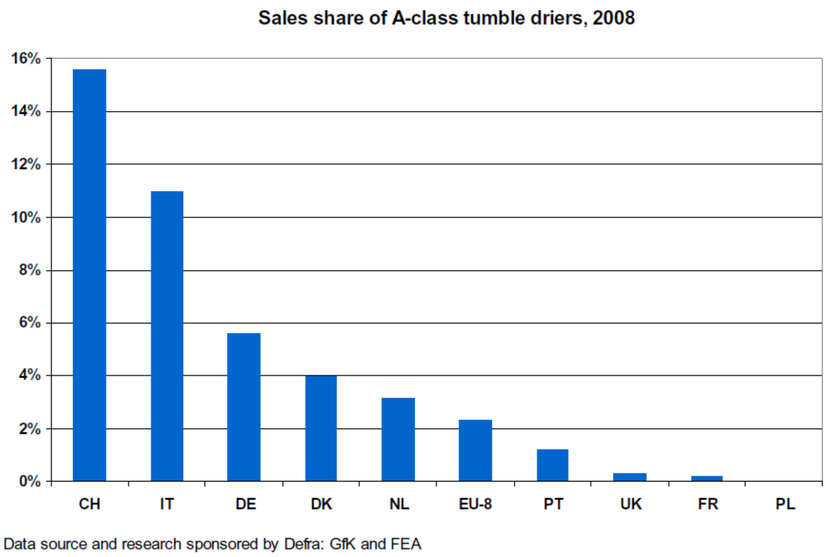
2.1.2 Environmental impacts (Article 15(2)(b))

The environmental impact of household tumble driers was assessed in the preparatory study on the basis of two so called "base case" tumble driers (air vented and condenser) with a 6 kg rated capacity which are representative of the average driers on the market. The preparatory study established a bill-of-materials to assess impacts over their lifecycles including the production, distribution and end-of-life phases.

The analysis showed that the use phase is the dominant life cycle phase for important impacts regarding air pollution and primary energy use. The energy consumption during use was identified as the most important environmental parameter.

The graph[9] below illustrates the 2008 market share in the sales of A-class tumble driers, which are de facto only heat pump driers.

Figure 3: Market share of class A driers in EU



It indicates that for the 8 Member States quoted on the graph above, average of class A driers in sales is around 2.2%. Considering that these Member States constitute the majority of sales (the largest drier markets are Germany, UK, France, Netherlands and Belgium), and that sales are very much lower in the other EU-19 Member States, the average share of A class is estimated to be 1.5% for the whole of the EU-27. The high scores of Switzerland and Italy are due to specific rebate programs. With very low absolute drier sales in Italy (saturation max 3%) such programs have a large effect on the Italian market shares, but not for the whole of the EU.

Without an up-grade of the energy label, it is assumed that the market share of heat pump driers will show a modest increase to 4% of total sales in 2020, because the same market failures will continue to apply (see section 2.2.1 above) and it seems appropriate to assume that fiscal measures to increase heat pump drier sales (by individual Member States) remain

9 Source: Promotion of energy-efficient heat pump driers, by Jurg Nipkow, Eric Bush, Swiss Agency for Efficient Energy Use (S.A.F.E.), Topten International Group (presented on EEDAL '09).

limited. This has led to the following assumptions regarding the market shares of driers by energy label class for the years up to 2030.

Table 2: Market share of class A driers (heat pump driers) in baseline scenario

% class A in sales	2005	2010	2015	2020	2025	2030
Total (vented/condenser combined)	0.6%	2%	2.7%	4.3%	6.5%	9.7%

The baseline scenario indicates that the total energy consumption of household tumble driers is expected to grow from 21 TWh in 2005 to around 30 TWh in 2020, a growth of 50%. The product group represents 2% of the total energy consumption of households in the EU and is therefore considered significant[10] (see further details in Annex III).

The scenario is based upon the real life consumption values, corrected for different initial moisture levels for testing and real life conditions (due to higher spin speeds of washing machine), average 154 cleaning cycles per year[11] and an average drying load of 3.4 kg in 2005.

The average capacity of both washing machines and driers is increasing, but it is difficult to forecast whether the annual load to be dried will stay the same, since much will depend on future washing habits and load capacities of both washing machines and driers. In this impact assessment the average capacity of driers is taken into account (this has a direct effect on average appliance energy efficiency), whereas the annual number of drying cycles is presumed to be constant (154 cycles/year). Therefore the baseline assumes an increase of the annual drying load.

2.2 Improvement potential (Article 15 (2) (c))

Electric driers

There appear to be a strong disparity in the energy consumption of household tumble driers on the market. New technologies (heat pump) would allow the placing on the market of household tumble driers consuming up to 50% less than current class A[12]. According to the preparatory study, however, the market is considered to be sitting already close to the least lifecycle cost point for consumers (corresponding to current energy efficiency class C which is populated by some 90% of the products). This may imply that part of the third criterion of the Ecodesign Directive (strong disparity "without excessive costs") is not met.

However, there are still appliances on the market carrying energy class D (or worse): their share is estimated to be around 6% in 2005 and anecdotal evidence suggests that with increasing pressure on prices, this share may have increased recently. Indeed, the low efficiency driers are a low cost solution for consumers for whom purchase price is most important than running costs and stakeholders have suggested that an increase of sales in class D is likely given the enlargement of the EU with Member States with on average lower incomes per households.

10 According the Statistical Pocketbook 2010 (DG Energy), the EU27 residential CO_2 emissions (households) were 478 million tonnes CO_2 equivalent. The impact assessment calculated a CO_2 emission of driers of 9.5 Mt CO_2 eq. which represents 2% of total residential CO_2 emissions.

11 The calculation of standard annual energy consumption assumes 160 cycles per year, but for the real life energy consumption 154 cycles/year was retained, since it can be traced back to assumptions regarding wash loads.

12 Going from class B to A represents some 14% savings, but most heat pump driers perform much better that the A-class threshold, boasting average consumption values to 0.37 kWh/kg (42% savings compared to B), some models even claim 0.23 kWh/kg, (corresponding to 64% savings compared to B).

On the other hand, there are also B-class condenser appliances that are much better than C-class appliances with a difference of 13% in energy consumption. They use primarily the same techniques as class C driers but use a better mass-heat transfer, reduced heat losses and reduced waste heat at the end of the cycle.

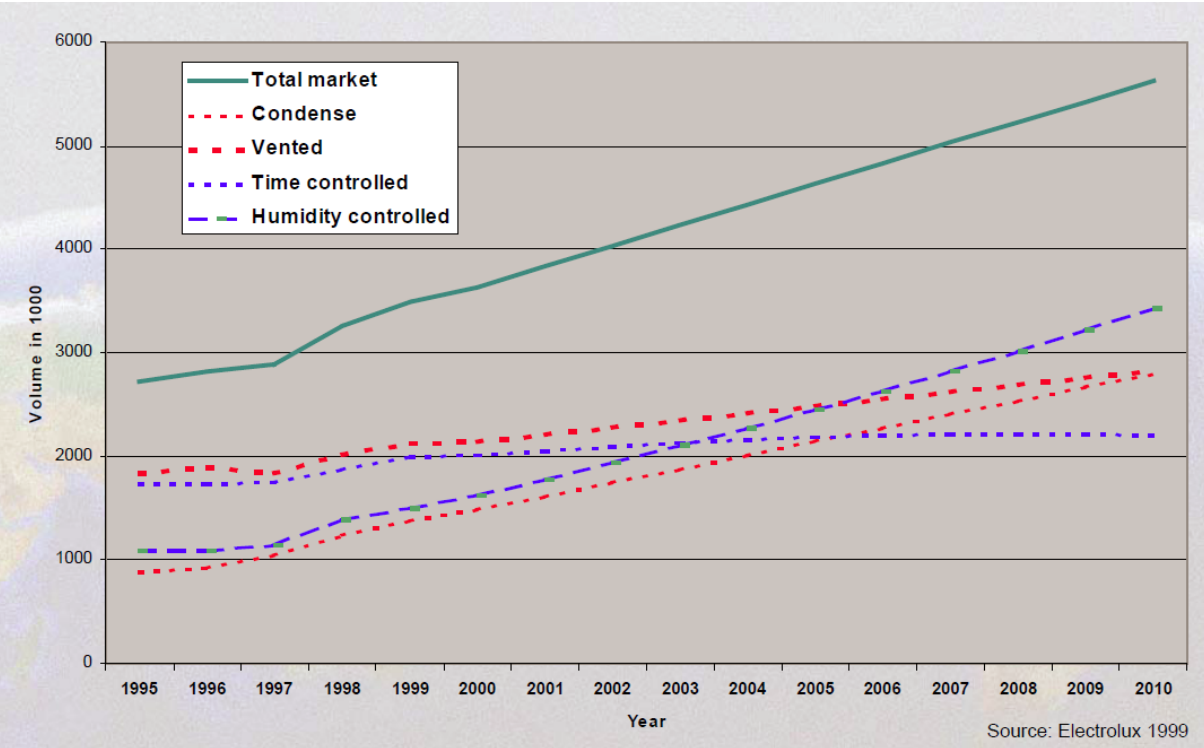
Gas driers

Gas driers are by definition 'vented' and could reach class A and beyond if they were recalculated to equivalent electric energy consumption (class A vented electric drier would use 0.51 kWh/kg or 1.275 kWhprim/kg, a popular gas drier consumes 0.61 kWhprim/kg for gas and 0.09 kWhprim/kg for electricity, which gives 0.7 kWhprim/kg).

Timer control or sensor control

The less expensive driers on the market apply a timer-controlled drying cycle. This is believed to lead to exaggerated drying times, since most consumers under load the appliance in real life. US-based studies show that on average some 12% of energy can be saved if the model is equipped with a humidity sensor-controlled drying cycle which terminates the cycle when the desired humidity level is reached[13]. The current market trend is towards using humidity-controlled devices. The humidity sensor controlled appliances generally have a higher purchase prices than timer-controlled devices (some 200 euro[9]), but the price difference can not be explained by the extra hardware only: It is believed that since sensor controlled devices also offer other features (more drying programmes and features like indication of remaining cycle time) than timer controlled devices, the sensor controlled appliances are positioned in a more luxurious market segment which enables higher purchase prices.

Figure 4: Timer controlled versus humidity controlled driers



13 Energy efficiency of different drier types in a real-life environment, Dipl. Ing. Christoph Wendker, Miele & Cie. KG, Gütersloh, Germany

2.3 Existing legislation and failure of market forces to address the issue (point (i) of Article 15(2) (c))

2.3.1 Existing legislation

Minimum efficiency requirements and labelling

As highlighted above, household tumble driers are currently not subject to minimum energy efficiency requirements in the EU. The only directly applicable EU measure regarding energy efficiency of household tumble driers is the Commission Directive 95/13/EC which provides consumers with the following information (see layout of the label in Annex II):

- Energy efficiency ranking on an A-G scale (based on specific energy consumption);
- energy consumption per cycle (kWh/kg);
- rated capacity (kg);
- type: air vented or condenser model;
- acoustical noise emissions (dB(A);

The introduction of the label helped consumers in identifying the most efficient models on the market and weigh energy efficiency against the other performance aspects. At the same time, the label provided manufacturers with a neutral marketing tool through which they could state the energy efficiency of their appliances, allowing a competition for highest energy efficiency scores.

Legislation on other environmental aspects

The use of (product related) hazardous substances during the production phase is dealt with by Directive 2002/95/CE on the Restriction of Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS Directive).

The end-of-life phase is addressed in the Waste of Electrical and Electronic Equipment Directive 2002/96/CE (WEEE Directive). Since household tumble driers comprise many materials that are recyclable and have a high economical value (e.g. stainless steel, aluminium, copper), the majority of materials are recycled at the end-of-life. The WEEE Directive states that entities responsible for bringing onto the market of tumble driers are also responsible for adequate take-back.

2.3.2 Voluntary measures

There has been no voluntary agreement in place as regards household tumble driers in the EU. The industry announced that it does not intend to make any voluntary commitments for the promotion of more efficient technologies. It considers the market too scattered for proper and fair implementation of a voluntary agreement.

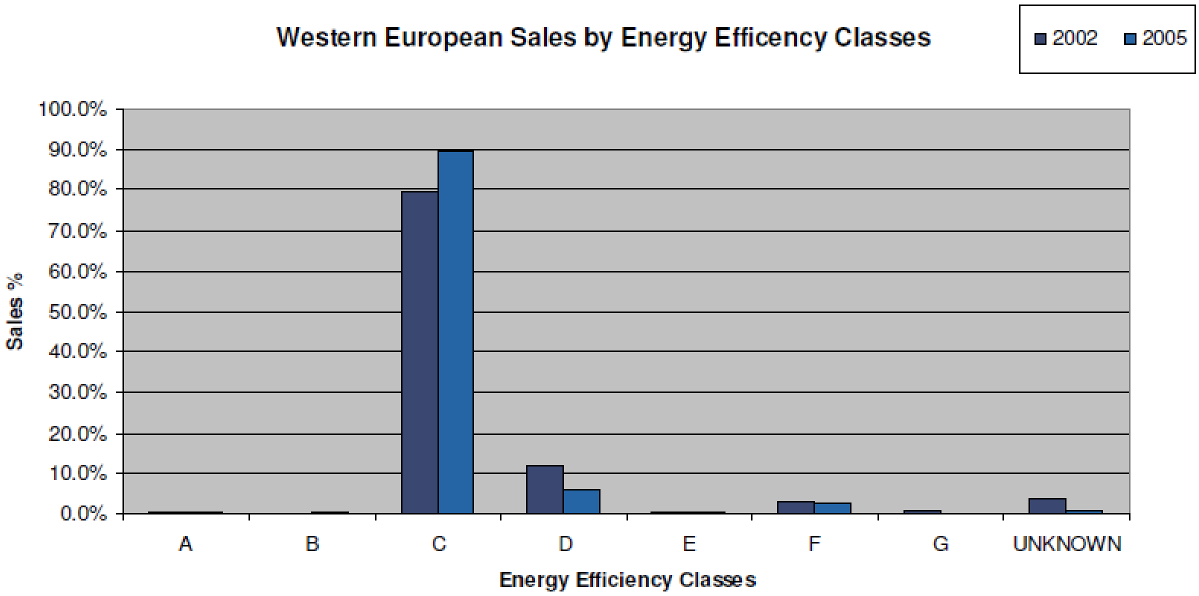
As regards voluntary labelling initiatives (environmental/energy) the preparatory study identified only one applicable to gas driers: In the UK (where a significant market share of gas driers exists) the Energy Saving Trust issues a "Energy Saving Recommended - ESR" label in addition to the EU Energy Label (which does not cover gas driers). It is the perception that the lack of interest in voluntary labelling of driers by environmental organisations that issue such labels is caused by these organisations not wanting to give the impression of endorsing the use of electric or gas driers: they favour less energy intensive methods for drying clothes.

2.3.3 Market failures

2.3.3.1 Inadequate energy labelling

The overwhelming majority of household tumble driers are currently populated in classes B and C (in 2008, around 95% of the models placed on the market) of the current energy label. In 2005, most household tumble driers were in class C as illustrated below but recent market data indicate that the share of appliances in class B has increased.

Figure 1: Market distribution of tumble driers by energy efficiency classes (vented/condenser combined)



Source: Preparatory study, task 2, p.94[14]

Appliances representing the best available technology (equivalent to class A) made up only 0.5% of sales in 2005, the reference year of the preparatory study, increasing to 1.5% in 2010. The market transformation observable over the past years indicates that the market mechanism driving forward the energy efficiency of household tumble driers has come to a halt.

The reason for the limited growth of the market share of class A driers is that the only electric driers able to reach class A are heat pump condenser driers which are more expensive to produce. Consumers appear not ready to spend a significant price premium for the gain of only one or two classes. However, driers in class A may consume up to 60% less than those in class B[15]. With the current labelling scheme, the price difference between BAT[16] products and average products is not reflected in the difference in energy label performance[17]. As a consequence, manufacturers, in the absence of classes above class A (see previous paragraph), appear not willing to invest in heat pump technology which would in return reduce its production costs by 'economy of scale' benefits. A typical situation is recognised where high prices keep demand low and low demand for heat pump driers keeps prices high.

14 The graph shows the figures for Western Europe because the ownership rate of Central/Eastern Europe in 200,5 the date used for the preparatory study, was around 1%.

15 In the current energy label, the B class threshold is set at 0.64 kWh/kg (condenser drier) and the A class threshold at 0.55 kWh/kg, a 14% reduction. However, the 'market best' heat pump drier consumes 0.27 kWh/kg, which is consuming 58% less than a B class drier.

16 Best Available Technology

17 See footnote 9.

In addition, gas-fired driers currently not included in the energy label may consume up to half less energy consumption than the average electric drier. Sales of these BAT appliances are however very low, despite their availability for more than 10 years and despite significant market share in, for instance, the USA (around 20%).

The low sales of gas driers appear to result from a combination of a lack of consumer awareness (gas driers are virtually absent from traditional white-goods shops), the often higher purchase price than its average electric counterpart and the installation demands and costs (a gas connection and a flue exhaust need to be installed). Some of these aspects may be linked however to the fact that gas driers are not included in the current energy labelling scheme.

This can be called a **regulatory failure**, as the outdated label deprives consumers of a useful tool to distinguish the most efficient technologies and manufacturers of a useful marketing tool and incentive to invest in new energy efficiency technologies.

Another regulatory failure is related to the current calculation methodology used for the Energy Efficiency Index on which the energy classes are based. The fact that it is based on the energy consumption of the standard drying programme at full load does not reflect real consumer behaviour since the preparatory study showed that most consumers under load their appliance. The current energy label therefore does not convey the most relevant information to consumers and deprives the industry of the incentive to invest in programmes aiming at decreasing the energy consumed at partial loads (such as sensor controls, weigh or humidity sensors).

2.3.3.2 Negative externality and asymmetric information

Not all environmental costs are included in the energy prices (**negative externality**). The result is a smaller significance of energy costs to end-users than ought to be the case from an environmental perspective. This contributes to the general perception of most end-users that running costs are less important than purchase price.

In addition, consumer choice is made mainly on the basis of the purchase price. Few people realise that the use-phase represents over 90% of the total life cycle cost of household tumble driers (**asymmetric information**).

2.4 Legal basis for EU action

Article 16 of the Ecodesign Directive provides the legal basis for the Commission to adopt an implementing measure for this product category.

The scrutiny of criteria enshrined in Article 15(2) of the Ecodesign Directive shows that household tumble driers qualify for the adoption of an implementing measure setting new ecodesign requirements:

a) sales and trade of tumble driers in the EU is significant (5.1 million units in 2005, value of 2.2 billion EUR);

b) the environmental impacts are significant (21 TWh/a of electricity used in 2005, CO_2 emissions of 9.5 mt/a);

c) the potential for improvement is significant (>60% compared to market average energy consumption in class C) but is difficult to unlock because of higher life cycle costs than current market average.

However, the second part of the requirement listed in point (c) of Article 15(2) may not be fully met: the product shall present significant potential for improvement "<u>without excessive costs</u>". As highlighted in section 2.2. above, appliances with higher efficiencies might require more investments in purchase price than can be recuperated through lower running costs. Recent market development however indicates that this situation may change in the near future. This issue will be assessed in more detail when developing policy options that aim to meet the objectives.

3. OBJECTIVES

As laid out in Section 2, the preparatory study has confirmed that a potential for reducing energy consumption of household tumble driers exists. This potential is not likely to be tapped with the current market measures and initiatives.

The **general objective** is therefore to develop a policy which corrects the market failures, and which:

– reduces energy consumption and related CO_2 and pollutant emissions by household tumble driers hence contributing to the objective of decoupling economic growth from the use of resources set out in the Europe 2020 strategy (COM(2010) 2020) under the flagship initiative: ‘resource efficient Europe’;

– promotes energy efficiency hence contributing to security of supply in the framework of the EU objective of saving 20% of the EU's energy consumption by 2020.

The **specific objectives** are to:

– remove least efficient products from market;

– promote market take-up of more energy efficient tumble driers for domestic use;

– address the current regulatory failure thereby maintaining and supporting the past market trend towards more energy efficient tumble driers;

– drive further investments in new technologies towards environmentally friendly tumble driers.

The **operational objectives** are to address some of the problems resulting from the current labelling scheme and comply with the requirements laid down in the Ecodesign Directive, Article 15 (5):

– there shall be no significant negative impacts, from the perspective of the user, on the functionality of the product such as drying performance or noise emissions;

– 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 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.

Section 4 describes which policy options have been validated to meet these objectives.

4. POLICY OPTIONS

This Chapter describes the policy options, both discarded and proposed, that have been considered in the context of this Impact Assessment.

- **No new EU action**

This option would have the following implications.

– The regulatory and market failures would persist. The impact of this option is described in more detail in Section 2 as the Baseline scenario.

– It is to be expected that Member States would want to take individual, non-harmonized action on household tumble driers. This would hamper the functioning of the internal market and lead to high administrative burdens and costs for manufacturers, in contradiction to the goals of the Ecodesign Directive.

– There is a risk of competitive disadvantages, in particular for very price sensitive products, for those manufacturers designing their products to meet high efficiency standards vis-à-vis competitors that focus on low-cost / low-efficiency products.

– The specific mandate of the Legislator (Article 15 (1)) would not be respected despite the fact that the criteria of Article 15 (2) setting the rationale for an implementing measure are met.

Therefore this option is discarded from further analysis.

The "Business-as-usual" scenario is based upon this option and provides the reference or baseline for the proposed other scenarios, on which basis savings are calculated

- **Voluntary Commitment**

This option is discarded for the following reasons.

– Relevant voluntary initiatives have not been brought forward by the relevant industrial sector. The sector advocated against such an initiative.

– The industry expressed a need for a clear legal framework ("level playing field") ensuring fair competition, while voluntary agreements could lead to competitive advantages for free-riders and/or non-participants to the "self-commitment".

- **Ecodesign requirements only**

This option would involve setting ecodesign requirements on energy efficiency, without revising the current energy labelling scheme.

As indicated by stakeholders during several consultation rounds, the practical implementation of this option would be to ban all appliances of class D and worse. For households using average priced appliances this will most likely reduce life cycle costs, since class C appliances are closest to LLCC[18].

The benefits of this option are:

– The least efficient appliances are banned from the market, allowing industry to focus on supplying appliances of average and better than average efficiency.

The drawbacks of this option are:

– The adoption of ecodesign requirements alone will ban from the market the most energy consuming appliances but does not address the regulatory failure identified in the problem definition. It will not provide for a dynamic framework for further investments in energy improvements while the arguments to do so still persist (consumer demand for visibility of more efficient appliances, competitive advantages for industry).

– The industry, consumer organisation and Member States, in the consultation forum have repeatedly asked for a combined revision of both measures (labelling and ecodesign).

[18] Least Life-Cycle Cost

This option is discarded in the quantitative assessment since it does not respond to the problems defined in section 2.3.3, in particular to the regulatory failure.

- **Revision of the labelling scheme only**

This option would entail the introduction of classes on top of class A in accordance with the Energy Labelling Directive 2010/30 and a revision of the calculation method for the Energy Efficiency Index based upon annual consumption values that include part load performance.

The benefits of this option are:

– By extending the classes beyond the current best a new ground for competition within heat pump driers (and possibly gas driers) would be unveiled. Even a slight increase in consumer demand may set in motion the mechanism of up-scaling of production and reduction of prices.

– Better distribution (and options for competition) between the current average and the current BAT and beyond; hence incentives to increase competition on energy efficiency at levels currently neglected (between current average and current BAT).

– Incentives to address part load efficiency.

– Increased market penetration of energy efficient products by helping consumers to make cost effective purchasing decision by addressing running costs.

The drawbacks of this option are:

– A labelling scheme alone does not ensure that cost effective improvement potentials are realised quickly for all products on the market, implying that the full energy and cost savings potential is not captured.

– A labelling scheme alone does not guarantee that the market evolves "backward", i.e. back towards low cost household tumble driers with higher energy consumption than today's average.

– The speed of the market transformation is entirely determined by the voluntary take-up of labelled products. The market transformation due to the implementation of the labelling scheme will not be driven forward by the 'pushing' effect from ecodesign requirements setting minimum energy efficiency thresholds. In addition without banning the least efficient products, consumers will not be able to see that class C driers are actually the lowest end of the market in terms of energy efficiency. This situation is likely to slow down the market transformation towards the top classes of the label (the value of a B or C class label is not perceived the same on a A+++ to G label, as on a A+++ to D label).

– Member States could still set minimum requirements individually, and the administrative burdens for manufacturers would be higher when compared with the burdens associated to EU ecodesign requirements.

– The specific mandate of the Legislator (Article 15 (1)) would not be respected despite the fact that the criteria of Article 15 (2) setting the rationale for an implementing measure are met.

– This policy would be against the position expressed by all stakeholders (Member States, manufacturers, consumer organisations and environmental NGOs) who have repeatedly call for a combination of labelling and ecodesign requirements.

This option is included in the quantitative assessment to allow comparison with other options on the most relevant aspects.

- **MEPS and Labelling combined**

The policy option which is advocated by a majority of stakeholders is the combination of minimum efficiency requirements and a revised labelling scheme. The benefits and drawbacks have been highlighted in the previous paragraphs.

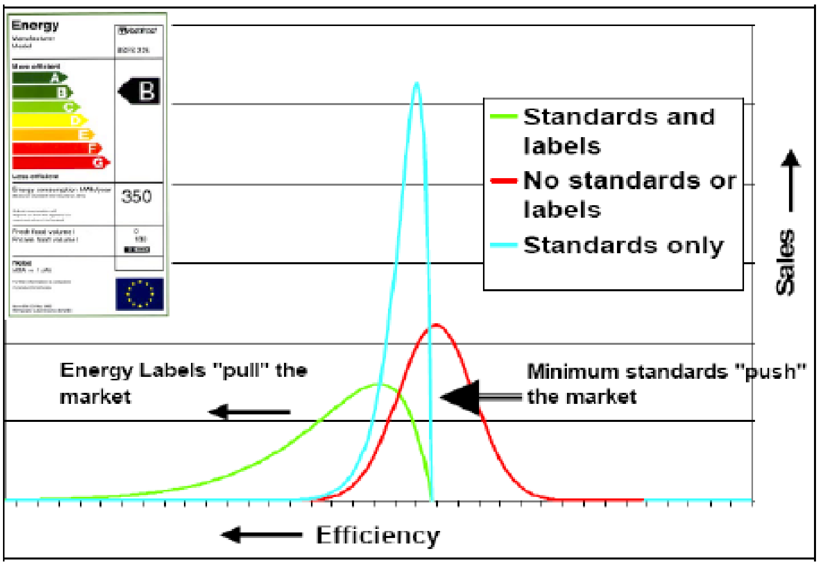
The simultaneous introduction/revision of both measures (ecodesign and labelling) will ensure that:

– The introduction of ecodesign measures will have the effect that the least efficient models are removed from the market.

– The simultaneous revision of the labelling scheme will ensure that the revised scheme is adapted to the impacts of the proposed ecodesign measures on the market and that the label is able to function as a market tool to drive tumble drier efficiency.

– A synergic effect of the pushing effect of the eco-design specific requirements and the pulling effect of the new labelling energy efficiency scale, according to the qualitative but well experienced relation illustrated in figure 5.

Figure 5: Cumulative impact of ecodesign and labelling



Source: IEA, P. Waide, International use of policy instruments: country comparisons, Copenhagen, 05 April 2006

Since the setting of mandatory requirements should obviously not set "significant negative impacts on industry's competitiveness" as underlined in Article 15 (5), the time line set for the application of the energy efficiency requirements should take into account the time the industry needs to prepare for the revised labelling methodology (requires testing at part load) and the minimum requirements (if based on the same methodology, the same time for preparation should be allowed).

4.1 Level of ambition for ecodesign requirements and labelling

This section discusses the appropriate levels of ecodesign requirements and labelling. It is envisaged that both measures will be based on appliance efficiencies using a new calculation methodology for the energy efficiency index.

4.1.1 Methodology for establishing the energy efficiency

It is proposed to introduce a revised calculation method for the energy efficiency index with the view to align the methodology to the revised delegated Regulations on the energy labelling of household washing machines and dishwashers.

The following revisions are introduced:

- The current calculation methodology is based on the energy consumption at full load only, whereas most end-users also use partial load. It is proposed to include the energy consumption of partial load into the calculation method. It has two advantages: (1) it will give incentive on suppliers to optimise the energy consumption of the partial load programme; (2) it will convey information to the end-users (on the energy label) which is closer to the energy consumption of their appliance in real use.
- The current calculation methodology does not take into account low power modes, whereas we know that technologies exist to optimise their energy consumption. The introduction of low power modes into the calculation methodology will therefore: (1) give incentive on suppliers to optimise the energy consumption of the low power modes beyond the stand-by requirements, (2) convey information to the end-users (on the energy label) which is closer to the energy consumption of their appliance in real use.
- A revised reference line (standard annual energy consumption) is introduced according to which the overall annual energy consumption necessary to reach one energy efficiency class is a function of the rated capacity of the household tumble drier; as a consequence, when evaluated on a per kg of dried laundry, larger household tumble driers will be forced to consume less than a smaller household tumble drier in one given energy class. This update will correct the slight advantage which is currently given to larger appliances whereas appliances above 8 kg are not cost-effective in terms of energy consumption.

0 This is because according to the consumer survey of the preparatory study, the average load is around 3,4 kg which is directly related to the average load of the washing machine. As it is more energy efficient to dry *x* kg load, in a driers with a capacity of (*x+1)* kg, the rated capacity of the optimum drier would rather be around 4,4/5 kg rather than 8 kg and above. The 8 kg driers become relevant for those end-users using a 6 or 7 kg washing machine at full capacity. 9 kg driers and above will never or rarely be the most energy efficient appliance from the perspective of the end-user considering that the sales of washing machines with a rated capacity of 8 kg or above is still a niche market.

0 In addition, larger appliances can reach more easily lower specific energy consumption levels per kg because of their size. This is because each drier has some degree of energy loss from heating up components that do not add to the removal of moisture from the load. The larger the machine (higher capacity), the smaller the relative contribution of this ('fixed' since not associated to actual load) heat loss is.

0 In short, the current calculation methodology by giving better energy classes to larger machines, compared to smaller machines with equivalent technologies, convey misleading information to the end-users as larger appliances will rarely be the most cost–effective appliance for their real use.

Consequently, the drier efficiency index EEI, standard annual energy consumption SAEc and annual consumption AEc are calculated as:

EEI = AEc / SAEc *100

For condenser driers: SAEc = 140*$c^{0.8}$, where c=nominal capacity of drier

For vented driers: SAEc =140*$c^{0.8}$- (30*Tt/60), where c=nominal capacity of drier and T_t is the weighted programme for the standard cotton programmes

AEc = 160*weighted energy consumption of the standard cotton programmes at full and partial loads + annual low power modes consumption

4.1.2 Revised energy labelling scheme

This section considers only the thresholds of the energy efficiency classes. It is not the task of this impact assessment to discuss the layout of the label.

Table 4 summarises the BAT levels which shows where the market may be reasonably driven in the short to long-run. The design of the energy efficiency classes should reflect these levels. The analysis of the price trends in section 2.3.2 showed that in some cases, the BAT level represent the LLCC point for consumers.

Table 4: BAT energy consumption levels of tumble driers

Capacity	Base case	BAT_{-HP}	BAT_{-Gas}
7 kg	condenser drier: EEI 83	heat pump drier: EEI 37	electricity: 0.09 kWh/kg gas: 0.61 kWh/kg combined: EEI 46

Table 5 shows the specific energy consumption according to the proposed labelling scheme using the revised calculation method for the Energy Efficiency Index discussed in the previous section. Note: these values include correction for part load performance to full load.

Table 5: Energy consumption (kWh/cycle) for Energy efficiency classes by capacity (values conform to current test standard, assuming full load and 13.5 kWh/a for low power mode consumption)

Condenser driers		capacity							
	EEI/100	3	4	5	6	7	8	9	10
A+++	0.33	0.79	1.03	1.25	1.46	1.67	1.87	2.07	2.26
A++	0.43	1.07	1.37	1.66	1.94	2.21	2.47	2.72	2.97
A+	0.53	1.34	1.72	2.07	2.42	2.75	3.07	3.38	3.69
A	0.65	1.67	2.13	2.57	2.99	3.39	3.79	4.17	4.55
B	0.76	1.97	2.51	3.02	3.51	3.99	4.45	4.90	5.34
C	0.85	2.22	2.82	3.39	3.94	4.47	4.99	5.49	5.98
D	0.95	2.49	3.16	3.80	4.42	5.01	5.59	6.15	6.70
E	1.04	2.74	3.47	4.17	4.85	5.50	6.13	6.74	7.35
F	1.13	2.98	3.78	4.54	5.27	5.98	6.67	7.34	7.99
Vented driers		capacity							
	EEI/100	3	4	5	6	7	8	9	10
A+++	0.33	0.73	0.95	1.16	1.36	1.56	1.74	1.92	2.10
A++	0.43	0.99	1.28	1.55	1.81	2.06	2.30	2.54	2.77
A+	0.53	1.24	1.60	1.93	2.25	2.56	2.86	3.16	3.44
A	0.65	1.55	1.98	2.40	2.79	3.17	3.54	3.90	4.25

B	0.76	1.83	2.34	2.82	3.28	3.72	4.16	4.58	4.98
C	0.85	2.06	2.63	3.17	3.68	4.18	4.66	5.13	5.59
D	0.95	2.32	2.95	3.55	4.13	4.68	5.22	5.75	6.26
E	1.04	2.55	3.24	3.90	4.53	5.14	5.73	6.30	6.86
F	1.13	2.78	3.53	4.25	4.93	5.59	6.23	6.86	7.47

4.1.3 Ecodesign requirements on energy consumption

According to the methodology laid down in Annex II of the Ecodesign Directive, minimum energy efficiency requirements should aim at the point of LLCC for end-users[19], provided there are no significant negative impacts on the parameters listed in Article 15 (5) including on the affordability of the product for consumers.

A list of possible technological innovations (already applicable and/or estimated to be available in the future) that improve energy consumption of household tumble driers has been identified in close cooperation with manufacturers, together with the price increase and environmental impact of each of the identified technological option[20].

The preparatory study calculated the LLCC and BAT for the two base cases, for both the standard load conditions and the real life load conditions. The performance of the products was not negatively affected, apart from a slight increase in drying time for heat pump driers. Not all options are uniformly applicable: Gas driers are by definition always vented, heat pump driers are better suited as condenser driers, although heat pump vented driers are investigated as an option. The following table presents an overview.

Table 3: Overview of base cases, LLCC and BAT data

	vented		condenser	
General data:	standard	real life	standard	real life
product life	13			
electricity tarif	0.17			
gas tarif	0.047			
maintenance	5.5 /year			
disposal/recycling	41 euro/product life		51 euro	
BASE CASE				
purchase price	380	see standard	547	see standard
load	6 kg	3.4	6 kg	3.4
cycles/year	88	155	88	155
energy kWh/cycle	3.36	2.01	3.6	2.15
spec.consumption kWh/kg	0.56	0.59	0.6	0.63
annual cons. kWh/a	296	312	317	333
energy costs EUR	474	499	508	534
LCC EUR	906	931	1106	1129
LLCC	all values identical to BASE CASE			
BAT (electric heat pump)				
purchase price EUR	380+250=630 (for LLCC:+121)	see standard	547+330=877 (for LLCC:+121)	see standard
energy consumption kWh/cycle	2.5 kwh/cycle (-24%)	(n.a.)	2 kwh/cycle	(n.a.)
energy costs EUR	353 (-25%)	(n.a.)	283 (-44%)	(n.a.)
LCC EUR	1035	(n.a.)	1211	(n.a.)
BAT (gas drier, vented only)		(n.a.)	(n.a.)	(n.a.)
purchase price EUR	380+350=730			

[19] "Concerning energy consumption in use, the level of energy efficiency or consumption will be set aiming at the life-cycle cost minimum to end-users for representative EuP models, taking into account the consequences on other environmental aspects".

[20] See results of the preparatory study, task 6 and 7.

	(for LLCC: +278)
energy consumption kWh/cycle	1.83 kWheq. / cycle[21]
energy costs EUR	196 (-58%)
LCC EUR	978

Contrary to other white-goods studies the preparatory study concluded that all technology options aimed at increasing energy efficiency of vented or condenser driers are increasing their life cycle costs. Depending on the specific design option the payback times range from 5 (sensor and control improvements) to over 20 years (improved motors, insulation, etc.). Gas driers have a slightly better payback than heat pump driers, but the calculation in the preparatory study appears not to include installation costs. Thus, the conclusion of the preparatory study was that improvements of energy efficiency are only possible at higher life cycle costs.

An analysis of current market trends indicates however different conclusions. In order to have the BAT options achieve the LLCC level, the cost increase would need to be limited to 121 EUR for heat pump technology compared to average price (giving a maximum purchase price of 547 + 121 = 668 EUR) and 278 EUR for gas driers (giving a maximum purchase price of 380 + 278 = 658 EUR). In the Netherlands heat pump driers are available between EUR 529 to 1524. Excluding the most expensive ones, the average price is close to EUR 760 and is decreasing. So it appears that in certain conditions and with certain models this LLCC level would be achievable for heat pump driers. This trend is confirmed in Germany by the EcoTopTen database[22] showing that heat pump driers can provide comparable life cycle costs to condenser driers and even to vented driers.

In the calculation of options this probable price decrease is taken into account.

The same can be said for gas driers that are available - at least in the UK - from GBP 296 / EUR 354 euro (7 kg) to GBP 374 / EUR 447 (7 kg, sensor functions)[23]. The latter gas drier in the Netherlands costs EUR 749 - 849. Again it appears that in certain conditions and with certain models the LLCC level is achievable for gas driers. These costs however do not include installation costs, which can be a substantial addition to the overall costs.

Against this background and taking into account that minimum energy efficiency requirements should aim at the LLCC level which is corresponding to current class C appliances or class B for condenser driers, two options for ecodesign requirements are considered in this impact assessment. Both consider the removal of class D to G in a first stage, corresponding to specific energy consumption higher than class C: "0.67" kWh/kg for vented driers and "0.73" kWh/kg for condensing driers. According to the new energy efficiency methodology this coincides with a maximum EEI of 85 (new class C). For the second stage,

- the first option considers the removal of all driers in class C,
- the second option considers the removal of condenser driers in class C but not vented driers.

4.1.4 Other performance aspects

Condensation efficiency

[21] According the preparatory study (p. 327) the gas drier consumes 0.37 kWh per cycle of electricity and 3.65 kWh/cycle of gas. Converting 3.65 kWh of gas to electric energy equivalents (divide by 2.5) gives 1.46 kWh_el.eq., and combined with 0.37 electric energy gives 1.83 kWh electric energy equivalents (including the gas share).

[22] http://www.ecotopten.de/prod_trocknen_prod.php

[23] Source: http://www.tradingpost-appliances.co.uk/store/customer/home.php?cat=27, shipping (within UK) adds GBP 45. Site visited 22-7-2010.

The condensation efficiency indicates how much moisture is released by condenser driers in the room where the drier is located. The lower the condensation efficiency, the higher the moisture released in the room with negative impact on the comfort of the end-users and a risk of negative impact on health due to mildew. Condensation efficiency is therefore an important functionality from the perspective of the user in addition to its potential impact on health.

In view of Article 15(5), points (a) and (b) quoted above; it should be avoided that the setting of ambitious requirement with regard to the energy consumption of condenser driers is achieved at the cost of condensation efficiency. Under Article 15(5), points (a) and (b), of the Ecodesign Directive, the ecodesign requirements shall have "no significant negative impact on the functionality of the product, from the perspective of the user" and "health shall not be adversely affected". With a condensation efficiency of condenser driers below 60-70%, the end-users might have to install ventilation in the room to circulate the humid air so as to avoid mildew in the room. There is a risk therefore that improvement on energy consumption of the condenser driers are compensated/cancelled by energy consumption of ventilation mechanism.

The average condenser driers currently reach a condensation efficiency of 60%, while the best models achieve 80%. It is therefore proposed 60% in the first stage, which will be attainable with no or minor investments by suppliers, and 70% in the second stage, which will request additional investments.

Since new technologies allow to improve condensation efficiency beyond 70% and even beyond 80% according to the manufacturers, it is also proposed that condensation efficiency is added on the energy label for condenser driers (condensation efficiency is not relevant for vented driers, since the humid air is evacuated directly outside the building).

Noise emissions

Despite some disparity in noise emissions of household tumble driers, it seems appropriate not to adopt specific requirements on noise considering the trade-off between noise emissions and energy efficiency.

The display of noise emissions into the labelling scheme could however provide consumers with an instant assessment of noise performance and might give the industry stronger incentives to further optimize this parameter.

Sensor control (weigh or humidity sensors)

Current low-cost driers use timers to control the duration of the drying cycle. If the user knows exactly which timer settings corresponds with the actual load being dried then there is no energy saving possible by using sensors. In reality however, most consumers use fixed timer settings and appear to accept suboptimal drying results (often too long drying cycle) which leads to higher energy consumption. Electronic sensor could improve upon this, but the current purchase price difference (some 200 EUR on average [24]) between timer and sensor controlled appliances makes it difficult for a mandatory requirement since it would lead to potentially significant higher life cycle costs. The inclusion of partial load into the calculation of the Energy Efficiency Index is therefore considered the best way to provide incentives on the manufacturers to invest in control sensors (see section 2.3.1) while avoiding a negative impact on affordability of the appliances in compliance with Article 15 (5) (c) of the Ecodesign Directive.

* * *

[24] "Energy efficiency of different drier types in a real-life environment", Dipl.Ing. C. Wendker, Miele&Cie KG, Gütersloh, Germany.

Table 6 summarizes the options considered in this impact assessment. Stage one is foreseen one year after entry into force and stage 2 five years after entry into force.

Table 6: options considered in this impact assessment

	BaU	MEEPS+label		Label-option
		option 1	option 2	
stage 1	No ecodesign requirements / no review of the energy label	-all driers: EEI < 85 (phase out current class D and worse) -condensation eff.: > 60%	-all driers: EEI < 85 (phase out current class D and worse) -condensation eff.: >60%	No ecodesign requirements / review of the energy label
stage 2		-all driers: EEI < 76 (phase out class C) -condensation eff.: >70%	-condenser driers: EEI < 76 (phase out class C) -vented driers: no additional requirements -condensation eff.: > 70%	

The impacts of these options are discussed in section 5. A sensitivity analysis is also performed in section 5.4 assessing the introduction of a revised labelling scheme and the introduction of ecodesign requirements in two stages: removal of class D driers and worse in the first stage and removal of 50% of class C driers, for both condenser and vented driers, in the second stage.

5. COMPARING THE OPTIONS

This section looks into the impacts of the proposed policy options.

The assessment is done with a view to the criteria set out in Article 15 (5) of the Ecodesign Directive, and the impacts on manufacturers including SMEs. The aim is to find a balance between the quick realization of the appropriate level of ambition and the associated benefits for the environment and the user (due to reduction of life cycle costs) on the one hand, and potential burdens related e.g. to unplanned redesign of equipment for achieving compliance with ecodesign requirements on the other hand, while avoiding negative impacts for the user, in particular as related to affordability and functionality.

In order to assess the impact of the policy options, the following factors are taken into account:

1. Economic impacts

- energy savings: annual electricity cost savings in 2020 and accumulated electricity cost savings
- impact on consumers, including possible additional costs related to the improved technology, e.g. for additional and/or more expensive components
- impacts on manufacturers including SMEs
- impacts on trade
- administrative burden
- impact on innovation

2. Social impacts

- jobs related to the production/sales of affected equipment
- affordability of equipment

3. Environmental impacts

– annual electricity savings and reduction of CO_2 emissions in 2020

– accumulated electricity savings and reductions of CO_2 emissions

The impacts of the proposals are assessed against a baseline scenario which describes the impacts in case the Commission decides not to put forward any measures.

5.1 Economic impact

5.1.1 Energy savings

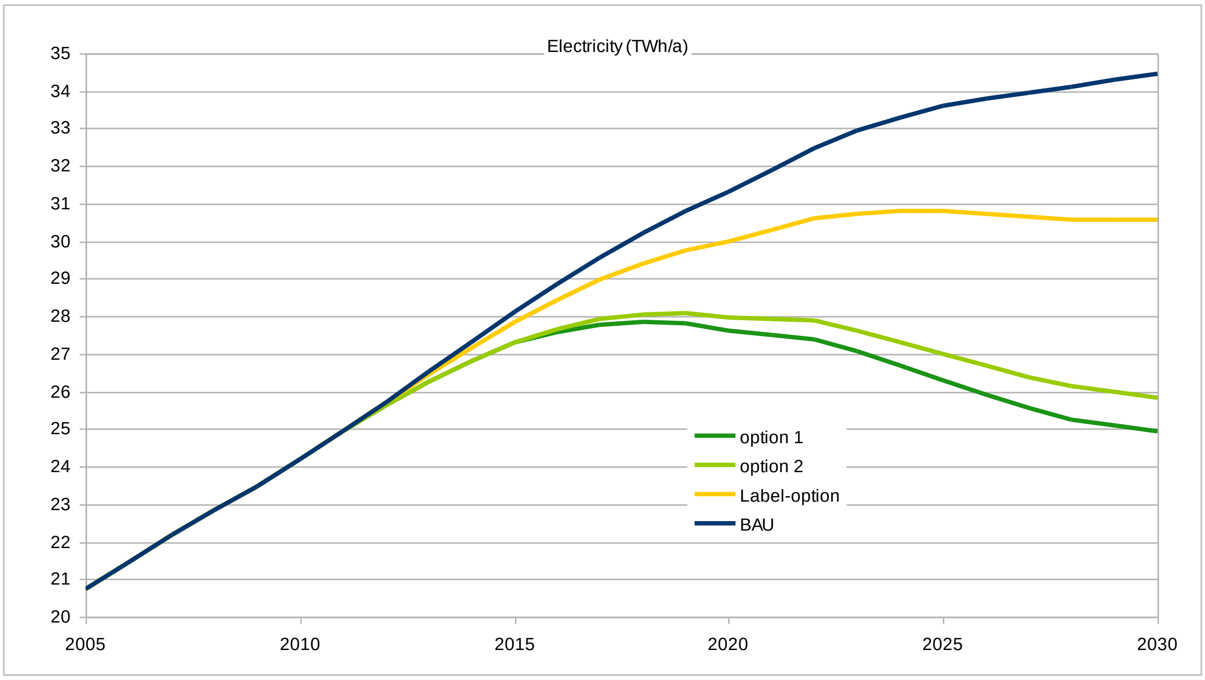
The table and graphs below show the electricity consumption of the three options compared with the baseline scenario. The savings are accomplished by reduction of primarily the cycle energy consumption but also by lowering partial-load power consumption. The consumption is based on real-life consumption values, based on test standard consumption and corrected for initial moisture content of the drying load (affected by washing machine spin drying performance), part load performance, increased capacity of new models and the generally assumed average annual number of cycles.

Table 7: Overview of electricity consumption and savings vs. baseline

Electricity (TWh/a)	2005	2010	2015	2020	2025	2030
BaU	20.7	24.2	28.1	31.3	33.6	34.4
option 1	20.7	24.2	27.3	27.6	26.3	24.9
option 2	20.7	24.2	27.3	28.0	27.0	25.8
Label-option	20.7	24.2	27.3	27.9	26.9	25.7
Electricity savings (Twh/a)	2005	2010	2015	2020	2025	2030
BaU						
option 1			-0.8	-3.7	-7.3	-9.5
option 2			-0.8	-3.3	-6.6	-8.6
Label-option			-0.8	-3.4	-6.7	-8.7
Electricity savings (%)	2005	2010	2015	2020	2025	2030
BaU						
option 1			2.9%	11.7%	21.7%	27.6%
option 2			2.9%	10.6%	19.6%	25.0%
Label-option			2.9%	10.8%	20.0%	25.4%
Accumulated electricity savings	2005	2010	2015	2020	2025	2030
BaU			-1.7	-13.8	-43.0	-86.9
option 1			-1.7	-12.7	-39.1	-78.8
option 2			-1.7	-12.9	-39.8	-80.1
Label-option			-0.5	-4.7	-15.7	-33.2

Source: input to this impact assessment by VHK

Figure 6: Electricity consumption (TWh/a)



The growth of the BaU consumption is primarily due to increased sales (maximum saturation levels are not yet reached).

The options "Label-only" is expected to limit the growth of the energy consumption of the stock but not significantly. The option "MEEPs + review of the energy label" (options 1 and 2) are expected to reduce more significantly the total energy consumption because of a faster market transformation towards the top energy classes. This is due to the fact that the ecodesign requirements banning class D to G and class C (all driers in option 1 or condenser driers only in option 2) will allow to clearly identify on the energy label that classes B and C appliances are the 'worst' classes available on the market. It is likely to speed up the market transformation towards upper classes as it will give more pressure on suppliers to place on the market products populated in the upper classes and on consumers to buy products which are not in the lowest classes of the label.

Annual savings on electricity costs are 10 to 11% for option 1 and 2 in 2020 compared to the BAU scenario, rising to 24 to 26% in 2030. A consumption of 21 TWh compares to approximately 1% of the EU electricity consumption[25].

Table 8: Overview of running costs and savings vs. baseline

Total running costs (mio EUR)	2005	2010	2015	2020	2025	2030
BAU	3580	4107	4697	5169	5505	5610
option 1	3580	4107	4570	4589	4353	4108
option 2	3580	4107	4570	4644	4463	4249
sensitivity option 3	3580	4107	4570	4634	4445	4230
Label-option	3580	4107	4654	4963	5061	4995
Running costs savings (%)	2005	2010	2015	2020	2025	2030
BAU						
option 1			-2.7%	-11.2%	-20.9%	-26.8%
option 2			-2.7%	-10.1%	-18.9%	-24.3%
sensitivity option 3			-2.7%	-10.4%	-19.2%	-24.6%

25 EU-27 electricity final demand without the energy sector was 2755 TWh in 2005. With distribution losses, final demand was 3106 TWh in the same year.

Label-option	-0.9%	-4.0%	-8.1%	-11.0%

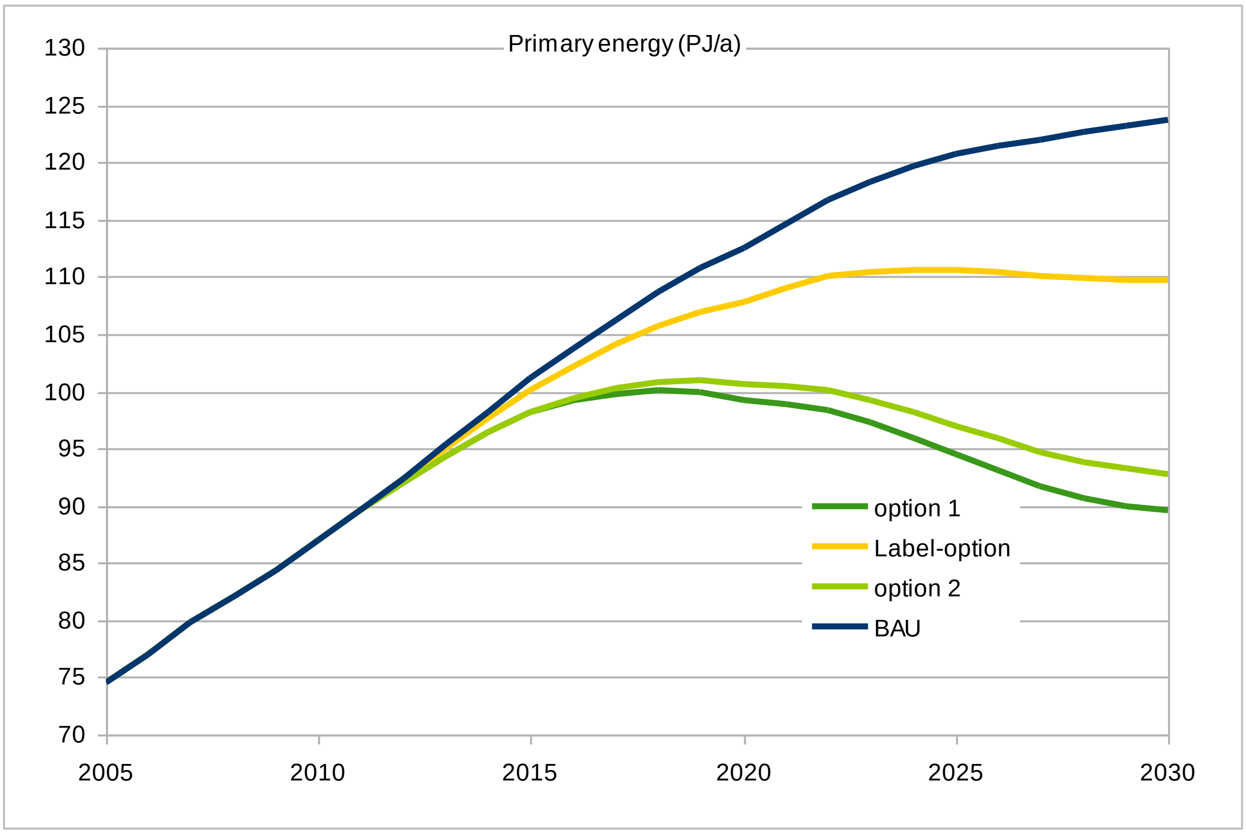
The accumulated energy cost savings over the 2010-2020 period are between EUR 3.3 to 3.6 bn, rising to 27 to 30 bn in 2030.

Table 9: Overview of accumulated savings on running costs

Accumulated electricity cost savings	2005	2010	2015	2020	2025	2030
BAU						
option 1			-265	-2173	-6796	-13731
option 2			-265	-2004	-6186	-12445
sensitivity option 3			-265	-2039	-6295	-12654
Label-option			-85	-740	-2474	-5247

The graph below presents the energy consumption as primary energy equivalents (9 PJ = 1 TWh electric). This consumption includes both electric and gas-fired driers, but the latter is still insignificant given the very low market share. The primary energy values are a more common unit for Security of Energy Supply considerations and enables a direct comparison with the impacts of non-electric appliances (e.g. fossil fuel fired boilers, water heaters, etc.).

Figure 7: Energy consumption (primary, in PJ/a)



5.1.2 Impact on consumers

This section describes the impacts of the options on consumers as regards total expenditure (the combined purchase and running costs, including installation and maintenance costs) and the development of purchase price, following the methodology commonly applied to ecodesign impact assessments.

Expenditure

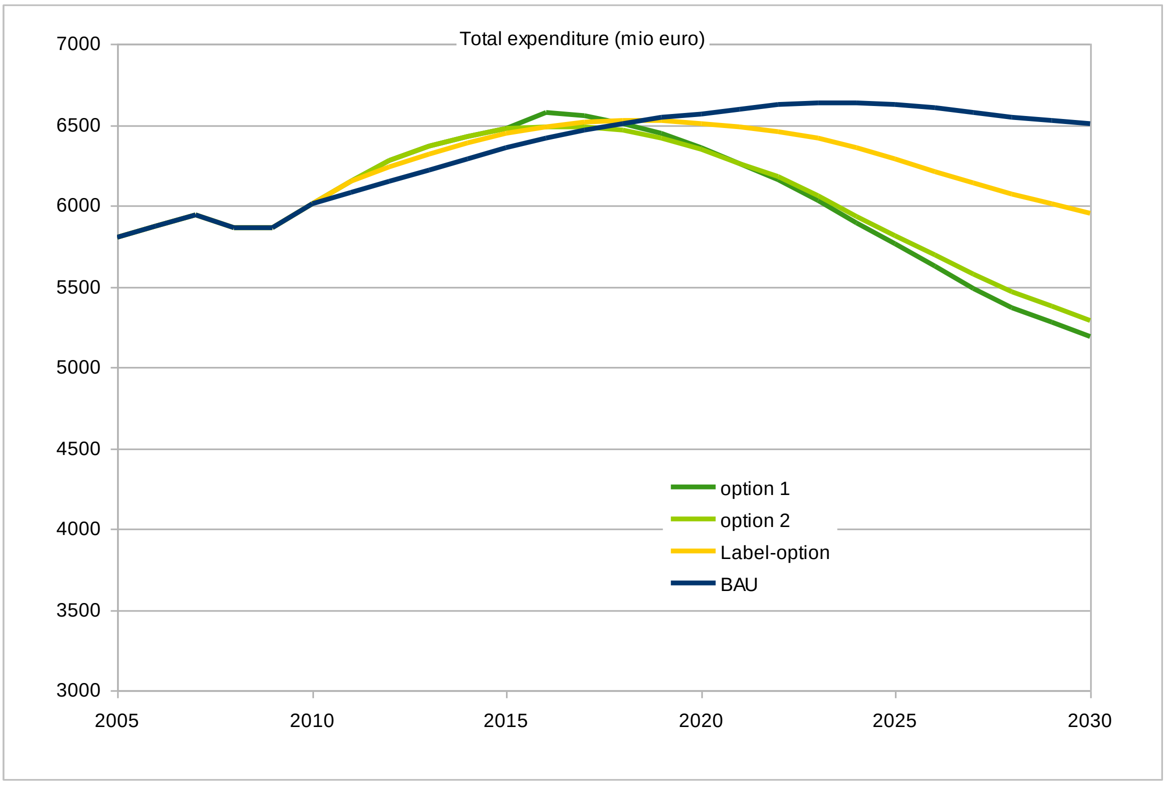
Table 10 shows the annual EU-27 total expenditure for household tumble driers, i.e. in purchase costs and discounted running costs (more than 95% of which are electricity costs and the rest repairs and maintenance).

The policy option 1, implying the banning of vented driers would unevenly affect consumers taking into account that (1) the use of vented driers is more cost-effective in Southern Member States, and (2) vented driers are a low entry product so that removing vented driers from the market would be more costly for those Member States with a below average GDP.

Table 10: Overview of expenditure and savings vs. baseline

Total expenditure (bio EUR/a)	2005	2010	2015	2020	2025	2030
BAU	5803	6011	6354	6562	6624	6503
option 1	5803	6011	6475	6355	5759	5190
option 2	5803	6011	6475	6343	5816	5289
sensitivity option 3	5803	6011	6475	6361	5821	5287
Label-option	5803	6011	6446	6504	6287	5952
Expenditure savings (%)	2005	2010	2015	2020	2025	2030
BAU			0.0%	0.0%	0.0%	0.0%
option 1			1.9%	-3.3%	-15.0%	-25.3%
option 2			1.9%	-3.4%	-13.9%	-23.0%
sensitivity option 3			1.9%	-3.2%	-13.8%	-23.0%
Label-option			1.4%	-0.9%	-5.4%	-9.3%

Figure 8: Expenditure (million euro)



Purchase costs

The options are assessed using scenarios in which the consumer costs (purchase price, installation and maintenance - electricity is treated separately) are calculated taking into account the development of average efficiency. The data for these costs stems from the preparatory study under task 6 (anchor year 2005). The values were checked with actual market prices and discussed with relevant industry.

For the calculation of the purchase price of vented and conventional condenser dryers in this Impact Assessment the improvement costs were expressed as cost curves, which allow cost calculation of appliances with intermediate efficiency levels. Furthermore the purchase price was slightly corrected for a somewhat lower average capacity of new sales than the base case capacity presented in the Preparatory study. For future price levels an average price decline of 1% per year was assumed (due to improved production efficiency and cost reductions).

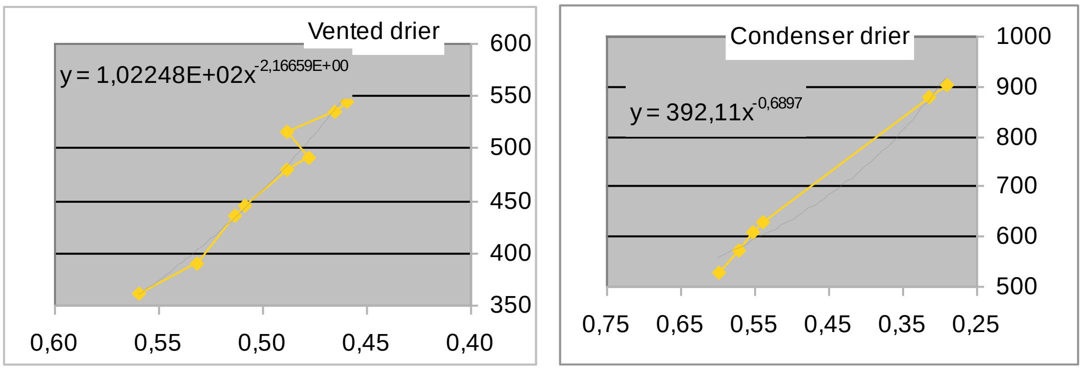
For heat pump (condenser) dryers the purchase cost calculation was adapted following comments from stakeholders. It is expected that especially these types of dryers will experience a more rapid price decrease (than for conventional condenser dryers) if a revised energy label were to be introduced. Therefore a purchase price of 800 euros was assumed for heat pump dryers in 2010 (in line with expectations from preparatory study based on 2005 price levels, and adapted to current 2009 price levels) with an annual price decrease twice as high as for other products (2%/annum). The overall condenser dryer purchase price is then based on the relative share in sales of conventional condenser and heat pump dryers.

The average weighted purchase price for conventional vented and condenser driers (incl. VAT) is € 438/unit. For both vented and condenser driers a relationship between the specific energy consumption 'sc' (current test standard, kWh/kg) and purchase price (PP) for several ecodesign options was established, based on the assessment in the preparatory study:

For vented driers: PP = 102*sc^-2.17.

For condenser driers: For BAU and other options up to year 2011: PP = 392*sc^-0.69.

Figure 9: Price curves of vented and condenser driers



As underlined above, for the options that include a revised labelling scheme an increased price reduction rate for heat pump driers was assumed. The price reduction for heat pump driers is assumed to be 2%/a (for other driers 1%) starting from 800 EUR purchase price in 2011.

In accordance with Commission Impact Assessment Guidelines, the discount rate was set at default value 4% (this is including inflation).

The product life of tumble driers is on average 13 years. The electricity rate is € 0.158/kWh (household tariff including taxes) with an annual increase of 4% over the scenario-period. Combined with a discount of 4% this gives zero net price increase for future discounted cost projections.

If the price decrease through rationalisation is included then the projected average purchase price in the option 1 and 2 in 2020 is estimated to be 22-27% higher than in the business as usual scenario (€ 518 - 539 vs. € 425); for this money the consumer should get an appliance that uses 23-26% less energy (339-350 versus 455 kWh/year) in 2020 during its entire product life.

Annual maintenance and repair costs were set at €5.5/unit per year, equivalent to one or two repairs over product life.

The trend in consumer expenditure (inflation corrected) shows a steady increase up to 2017 due to the increase of the stock. After that the discounted costs decrease because the combined increase of product price and growth of stock, do not weigh up against the effects of a 4% discount rate. The policy options show on the short run, i.e. until 2017 for option 1 and 2, a somewhat higher expenditure because of higher purchase prices.

As of 2020 the policy scenarios start to catch up on the baseline and the EU households as a whole will experience that the extra energy saving also pays off economically. This effect will even be stronger in 2030.

Figure 10: Development of average purchase price - Vented driers (2005 prices)

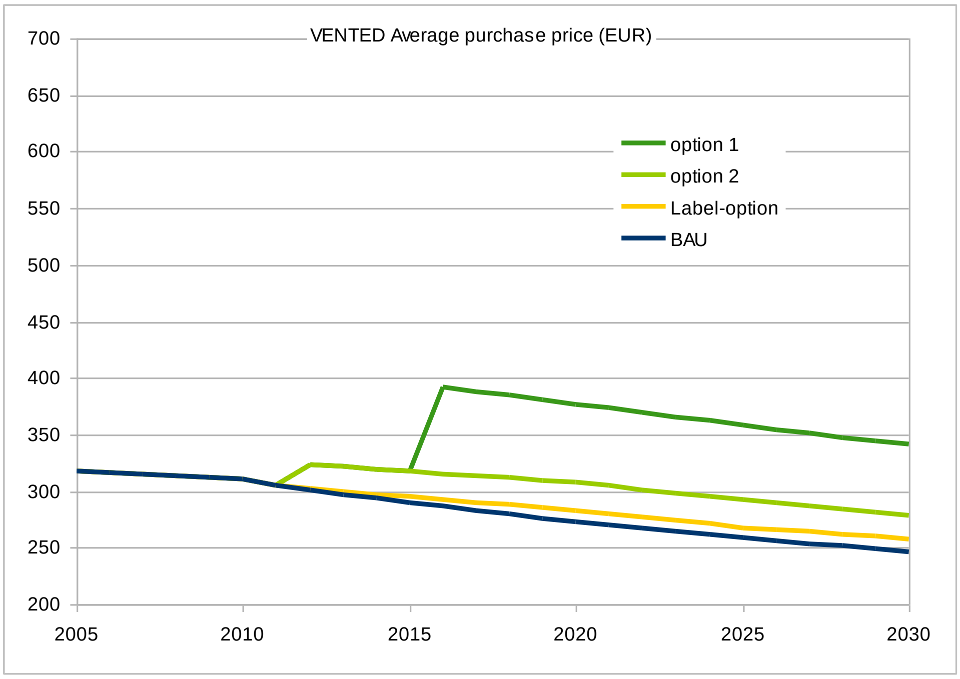


Figure 11: Development of average purchase price - Condenser driers (2005 prices)

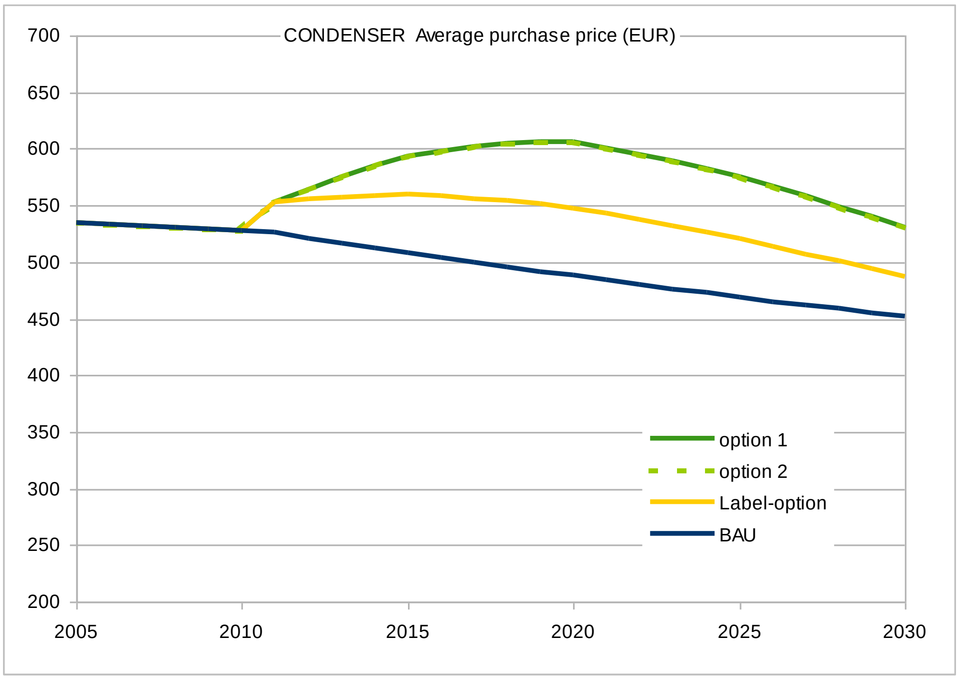
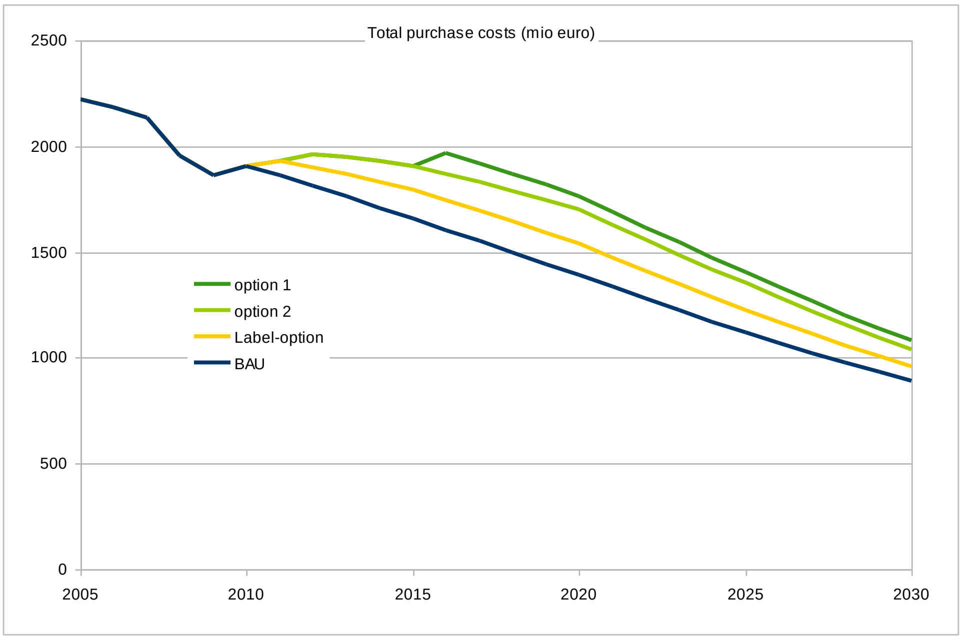


Figure 12: Development of average purchase costs (net present value / inflation corrected) - all driers

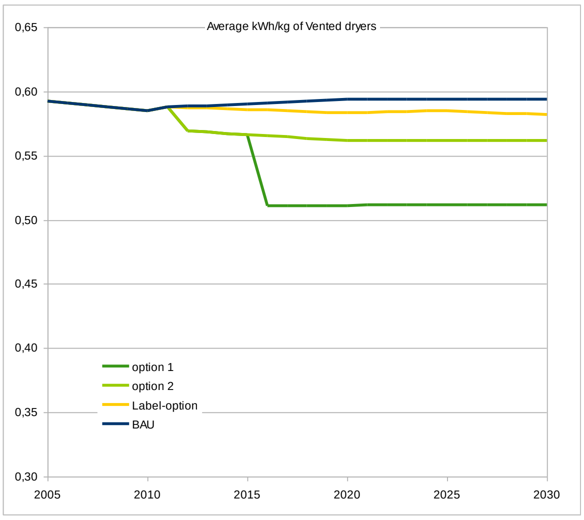


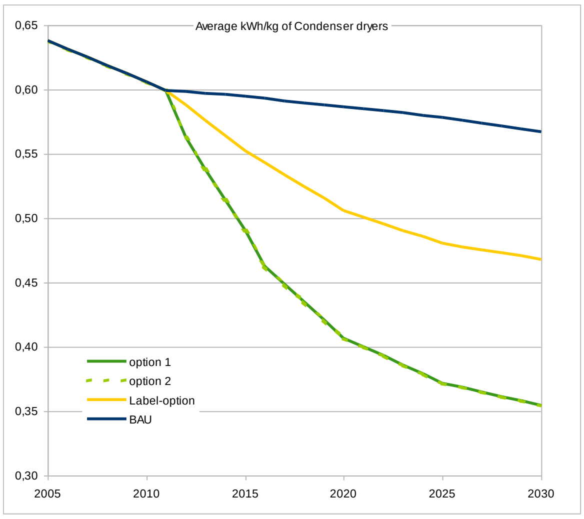
The key uncertainty is the expected price decrease of heat pump dryers, following the introduction of a revised energy label. The relevant industry expressed a very confident stance in realising significant price reductions for especially heat pump dryers through the combined effects of mass production and increased competition in especially the heat pump dryer market. The industry expected that most tumble dryer manufacturers will have one or more heat pump dryer models available in the short term (around 80% of manufacturers should produce heat pump driers in 2020 according to CECED). The impact assessment tried to take these opinions into account and applied the cost reduction as presented. It would have been unrealistic to expect that, with a changing market, the prices of heat pump dryers will remain at their current premium price levels.

Running costs

The running costs comprise the costs of electricity (and gas for gas driers) and maintenance costs. These costs are primarily driven by the energy efficiency of the driers and all options show a reduction of running costs, compared to the baseline.

Figure 13: Development of average specific energy consumption, for both vented and condenser driers

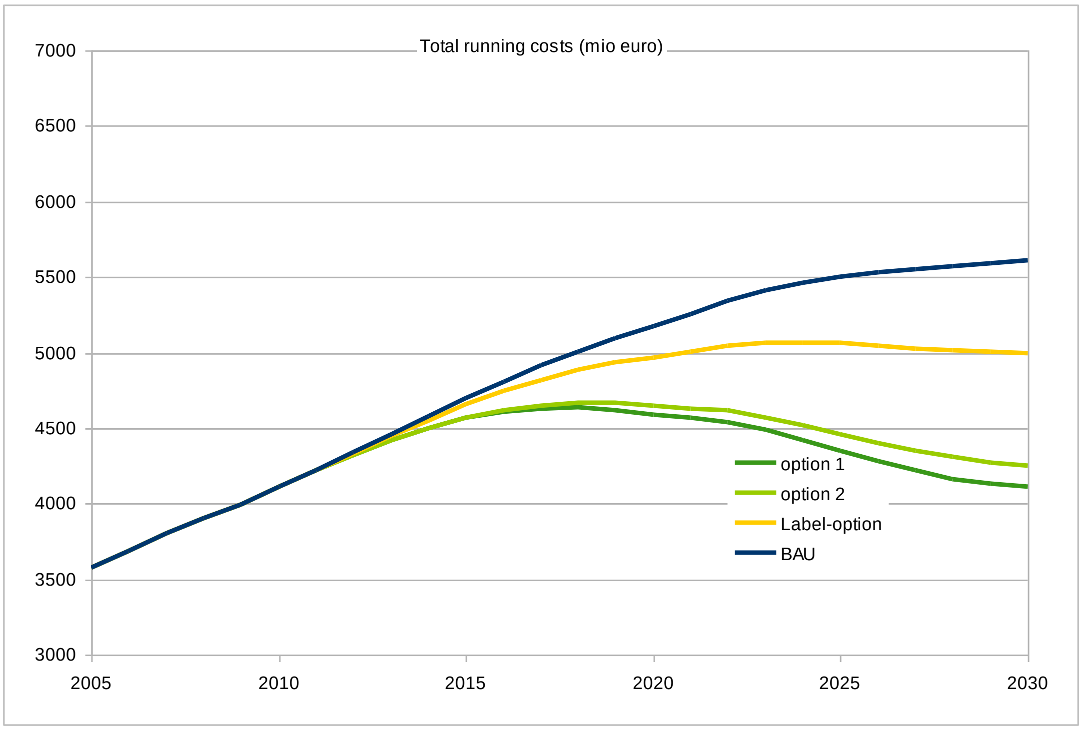




The development of energy efficiency, as indicated in the graphs above, is more gradual for condenser driers since these options assume a more gradual increase of class A driers. For vented driers no such gradual increase of efficiency is witnessed, and the efficiency is primarily dictated by the removal of efficiency classes.

The total running costs (corrected for inflation and energy price increase) are reduced by maximum 12% for option 1, the same savings are achieved by energy consumption.

Figure 14: Running costs (mio EUR)



5.1.3 Impact on manufacturers

Most manufacturers have currently access to the heat pump technology and vented and condenser driers are produced by all manufacturers. Some South European manufacturers however, have a higher share of their sales in vented driers. The policy option 1 "removing class B, including vented driers" would therefore affect these manufacturers more heavily than the others, while option 2 should have the same impact on manufacturers/suppliers.

The preparatory study did not raise any further significant differentiation between manufacturers (eg. on distribution of classes, size of appliances etc.).

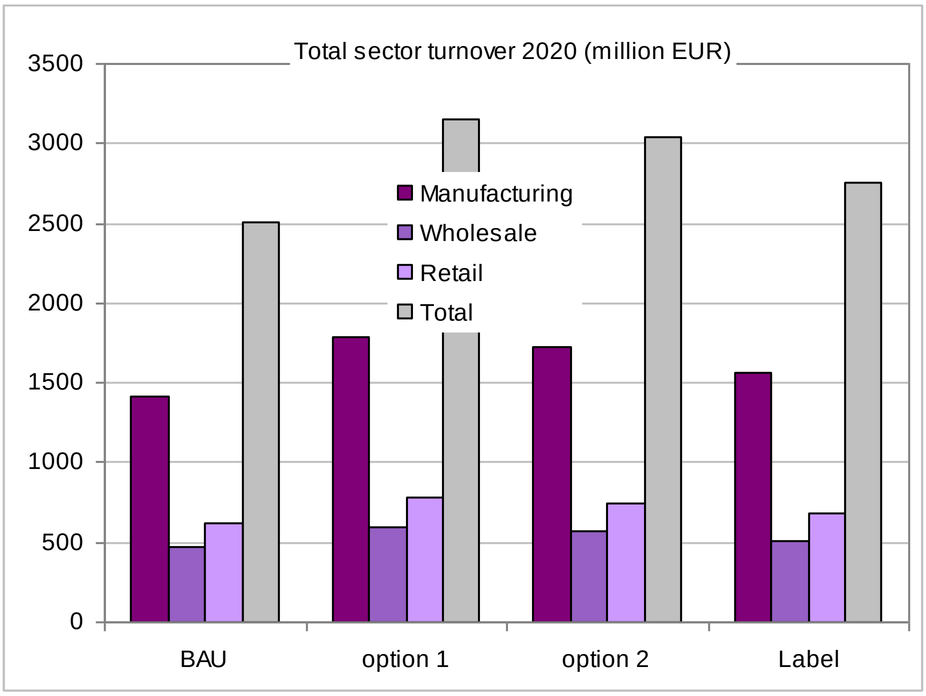
Impact on turnover

The impact of BaU and Policy scenarios on the turnover of stakeholders has been calculated from the (increase in) product prices and partitioned as follows:

- The manufacturing selling price (MSP, excl VAT) is estimated to be 57% of the consumer price (excl VAT).
- Wholesalers add a mark-up of 33% on the MSP.
- Retail margin is estimated at 33% on the wholesale price.
- VAT (Value Added Tax) is estimated at 19%.

Local levies and recycling contributions were not taken into account for lack of specific and recent data. The turnover of the total tumble drier market per sector is presented below.

Figure 15: Turnover according the scenarios



The first option leads to the highest turnover because the purchase price increase is the largest of all options.

SMEs are considered to represent 50 % of manufacturer related employment (mainly OEMs, i.e. suppliers of components like motors, electronics, etc.) and 100 % of retailers. The analysis shows that the policy options will have no negative impact on them. On the contrary, they will benefit from stronger demand for new technologies and higher turnover.

Costs of testing

Energy efficiency will be tested according to EN61121, based on current practice of a system of self-declaration in combination with spot-checks by the authorities. Since tumble driers already have to be tested according to the current existing labelling scheme, no significant extra costs are expected.

Impact on product portfolio

As discussed under the previous section on "**Purchase costs",** option 1 has significant effects on the product portfolio of vented driers: The phase out of class C leaves only some 5-10% of the current vented driers on the market. It is to be expected that such a scenario has significant negative impacts on the competitiveness of the industries involved (there could be effects as regards the production capacity for vented driers).

Option 1 is therefore considered as against the requirement set out in Article 15 (5) (d) of the Ecodesign Directive according to which ecodesign requirements shall not entail "significant negative impact on industry's competitiveness".

For condenser driers, these negative impacts are much smaller since already today some 50% of condenser driers are class B rated. The revised label scheme may reduce this share somewhat as larger models are treated less favourably, but the remaining share is large enough to allow such a measure in due time. Furthermore, the condenser drier has the benefit that appliances are present in class A and better, which means there is enough differentiation in the model range as regards efficiency classes. (Sub)-option 2 is therefore considered the most appropriate option.

5.1.4 Impact on trade

The preparatory study identified minimum energy performance standards in the USA and Canada, combined with voluntary labelling (Energy Star). A mandatory Energy Label exists in Australia and the EU and a voluntary labelling scheme in the UK, Australia, Taiwan and Hong Kong, besides the USA and Canada.

The requirements proposed are based on a technical, environmental and economic analysis, which was carried out in preparation of the draft regulation in full transparency with participation of stakeholders from around the world (reports available on http://www.ecodriers.org). In addition, the most important EU-manufacturers are global players so that their consultation has ensured that EU ambition is in line with global developments. Before the proposed Regulation on ecodesign is adopted by the Commission a notification under WTO-TBT will also be issued.

Competitive disadvantages for EU manufacturers exporting household tumble driers to third countries are not expected (on the contrary, leadership in efficient appliances would be reinforced). The revised labelling Directive, which is proposed for adoption simultaneously to the ecodesign requirements, will improve the competitiveness of the industry by giving value to more energy efficient appliances on the market: it will enable the industry to get better return on their investments on energy efficiency. In addition, the dates set for the implementation of mandatory requirements take into account the design cycle of the appliances and transition period are set to leave manufacturers enough time to adapt their production to the requirements.

The requirements of the regulation apply to all equipment independent from the origin of the equipment, thus ensuring that a level-playing field is achieved.

As regards gas driers the major difference will be the inclusion of gas driers in the revised Energy Label, allowing consumers a transparent comparison across energy platforms.

5.1.5 *Administrative burden*

The form of the proposed ecodesign legislation is a Regulation which is directly applicable in all Member States. The costs for national and EU administrations for transposition of the implementing legislation into national legislation are therefore limited. The use of a Regulation also ensures a timely and harmonized entry into force in the internal market.

In terms of conformity assessment, there are no extra costs with respect to the current situation, where market surveillance has already to be performed to check compliance with the Commission Directive 95/13/EC.

The revised Energy Label entails a slightly different calculation of the reference consumption of the most popular tumble driers and may require some extra market surveillance in the first years after entry into force to ensure that the market follows the new rules correctly, but this should remain marginal compared to the current situation.

5.1.6 *Impact on innovation*

The impact on innovation of all three options will be positive as the energy labelling scheme enables manufacturers to get return on their investments in research and development on energy efficiency. The energy labelling scheme allows indeed manufacturers to gain market share compared to competitors by emphasising the energy efficiency of their products and allow them to charge a price premium for better than average products thereby increasing security of investments in innovation.

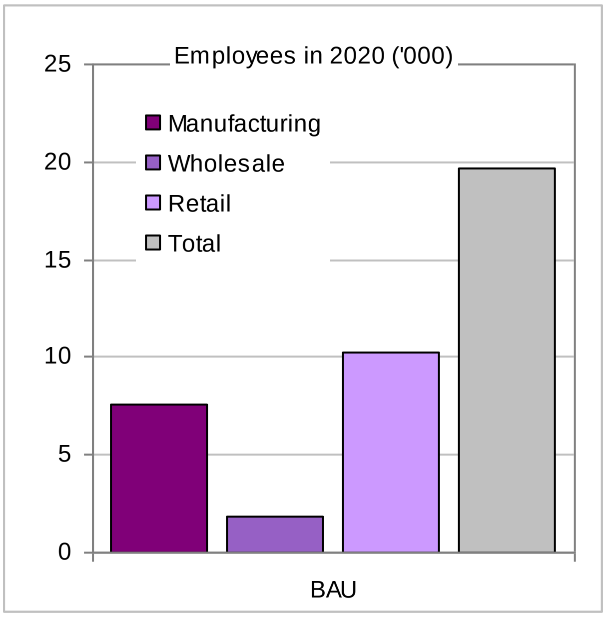
5.2 Social impacts

Employment impacts are normally calculated on the basis of the average turnover per employee in the sector. The applicable rate for manufacturing industry is a turnover of €188.000/employee and an OEM share (Original Equipment Manufacturer, i.e. the suppliers of compressors, foam, etc) that is equal to manufacturing.

In the wholesale sector a rate of €250.000,-/employee was applied and for white good retailers €60.000 per employee was taken as a basis. The number of jobs created then follows from the expected product price increase and the overall increase in turnover.

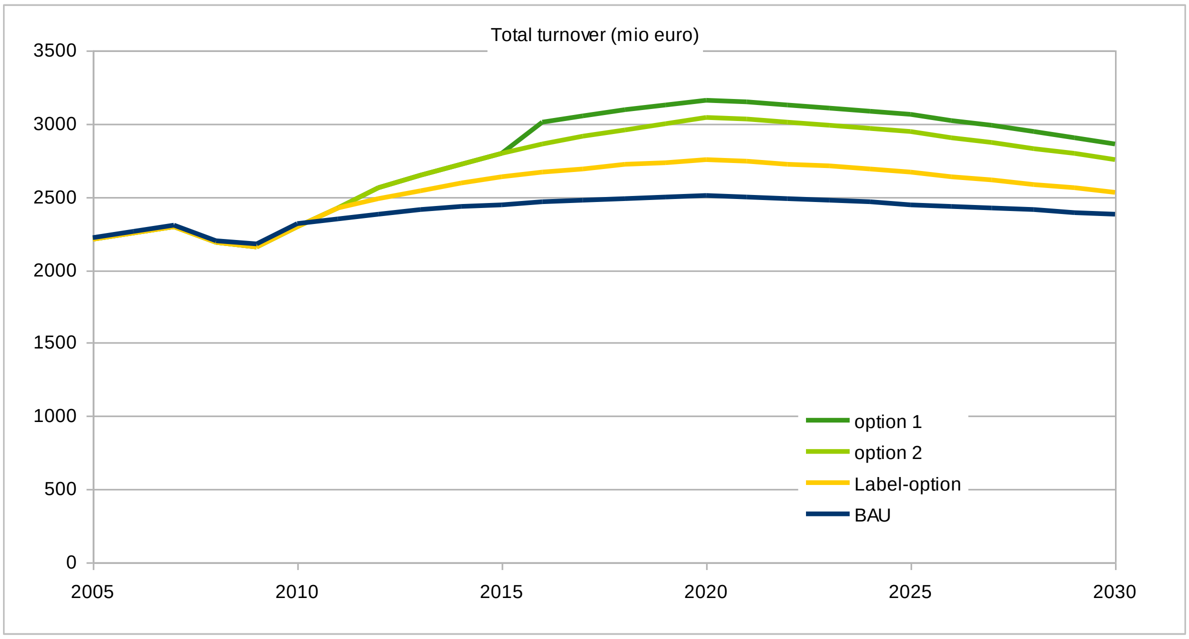
This results in an overall number of jobs of some 20 thousand in 2020 for the whole sector. Of these some 2/3 (over 16 thousand) are expected in SME sized businesses (the wholesale, retail and 50% of manufacturing jobs). Manufacturing is some 37% of jobs, and wholesale + retail are 63% of jobs. Some 19% of jobs are believed to be at OEM suppliers.

Figure 16: Employment according the BAU scenario



The number of jobs created differs per scenario, but all options show an increase of jobs over time due to an increase in turnover, both from higher purchase prices (no direct job creation) and higher sales (job creation expected). This impact assessment assumes that most of the employment is directly related to sector turnover which in turn is related to sales volume and unit price. The sales are expected to rise between 2010 and 2015. Beyond 2015 the sales are assumed to level off, since in many countries the maximum penetration rate of tumble dryers in households is approached. The employment effects are therefore expected to be mainly driven in the short term by sales increase and in the long term by unit prices (MSP, wholes or purchase price).

Figure 17: Total turnover



Non quantified effects on affordability of vented driers

As can be seen from the figures 10 to 12 on purchase costs in the previous section for vented driers the option 1 results in a steep price increase of vented driers, once stage 2 (phase out of class C) is reached.

According to the 2008 database of drier models some 90-95% of vented driers will not be able to reach this level (the lower value applies if tolerances are taken into account) and all driers above 6 kg will be phased out. The effect on the market share of vented driers could not be quantified, but it is clear that such a measure would seriously change not only consumer costs, but also the ratio of vented versus condenser driers sales as their relative price difference decreases.

This impact assessment concludes that a complete phase out of class C vented driers could have a significant negative impact on consumers in particular as regards affordability and life cycle cost of the product, although no full quantification of these impacts can be given (see figures 10 and 11 for a comparison of the average purchase price between vented and condenser driers). Option 1 is therefore considered as incompatible with the requirement set out in Article 15 (5) (c) of the Ecodesign Directive according to which ecodesign requirements shall not entail "significant negative impact on consumers in particular as regards the affordability of the product".

5.3 Environmental impact

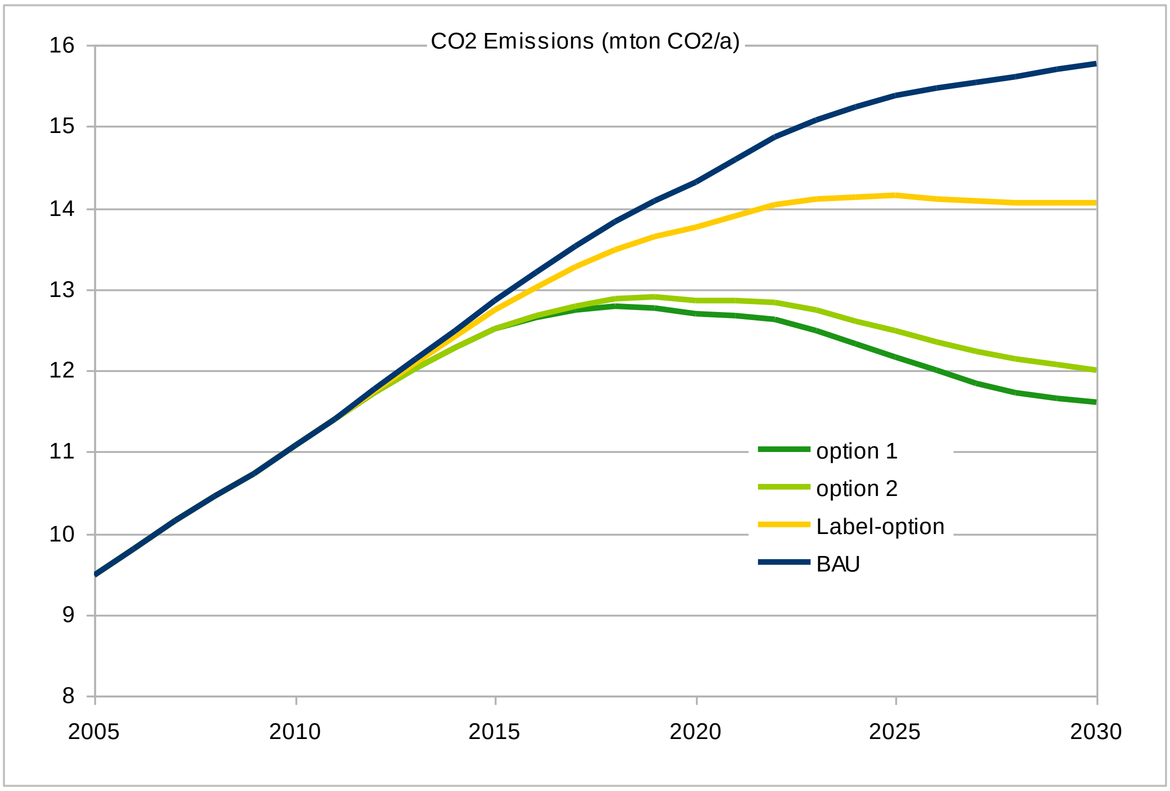
5.3.1 Greenhouse gas emissions

The environmental impact in terms of greenhouse gas emissions is illustrated in the table and figure below.

Table 11: Overview of CO_2 emissions and savings vs. baseline

Total indirect+direct CO_2 emissions (mt CO_2/a)	2005	2010	2015	2020	2025	2030
BAU	9.5	11.1	12.9	14.3	15.4	15.8
option 1	9.5	11.1	12.5	12.7	12.2	11.6
option 2	9.5	11.1	12.5	12.9	12.5	12.0
sensitivity option 3	9.5	11.1	12.5	12.8	12.4	12.0
Label-option	9.5	11.1	12.7	13.8	14.1	14.1
CO_2 savings (mt CO_2)	2005	2010	2015	2020	2025	2030
BAU						
option 1	0.0	0.0	-0.4	-1.6	-3.2	-4.2
option 2	0.0	0.0	-0.4	-1.5	-2.9	-3.8
sensitivity option 3	0.0	0.0	-0.4	-1.5	-2.9	-3.8
Label-option	0.0	0.0	-0.1	-0.6	-1.2	-1.7
CO_2 savings (%)	2005	2010	2015	2020	2025	2030
BAU						
option 1	0.0%	0.0%	-2.8%	-11.3%	-20.9%	-26.4%
option 2	0.0%	0.0%	-2.8%	-10.2%	-18.8%	-23.8%
sensitivity option 3	0.0%	0.0%	-2.8%	-10.4%	-19.1%	-24.2%
Label-option	0.0%	0.0%	-0.9%	-4.0%	-8.0%	-10.8%

Figure 18: Environmental impact (CO_2 emissions)



The reduction of carbon emissions achieved by the options is reflecting the reduction in energy consumption, as the latter determines over 98% of carbon emissions.

The most effective option 1 reaches a saving of around 1.6 Mt CO_2 equivalent with respect to the business as usual scenario in 2025 (11% saving)[26].

Most of the savings are achieved by switching from conventional heating elements in driers to heat pump driers. The issue of refrigerant gases for heat pump household tumble driers is not considered as significant, as it is kept in a sealed environment until the final disposal of the appliance. Leakage is in practice very limited during the life time of the product.

5.4 Sensitivity analysis

A limited sensitivity analysis was performed for a fourth option within the option MEEPS+ LABELLING. This option involves the introduction of a revised labelling scheme and the introduction of ecodesign requirements in two stages: The first stage requires the removal of class D driers and worse. The second stage requires the removal from the market of 50% of class C driers, for both condenser and vented driers.

Through this, the objections to the first option are partly taken away. Furthermore it treats vented and condenser driers identically.

This fourth option results in slightly higher savings than for option 2, but the difference is minimal. The savings are almost the same as for option 2 (the difference is only +0.4% in 2025, 2030.

Table 12: Overview of energy consumption and savings vs. baseline

Electricity (TWh/a)	2005	2010	2015	2020	2025	2030
BAU	20.7	24.2	28.1	31.3	33.6	34.4
option 1	20.7	24.2	27.3	27.6	26.3	24.9

[26] At 0,458 kg CO2 eq/kWh electricity (source: VHK, MEEUP Report, Nov. 2005)

option 2	20.7	24.2	27.3	28.0	27.0	25.8
sensitivity option 4	20.7	24.2	27.3	27.9	26.9	25.7
Label-option	20.72	24.19	27.84	30.00	30.79	30.56

As regards Expenditure, option four shows slightly higher expenditure than option 2, which is most likely caused by higher purchase costs. This is due to the fact that the price increase from class C to class B is relatively higher for vented driers than for condenser driers.

Table 13: Overview of expenditure and savings vs. baseline

Total expenditure (bio EUR/a)	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**
BAU	5803	6011	6354	6562	6624	6503
option 1	5803	6011	6475	6355	5759	5190
option 2	5803	6011	6475	6343	5816	5289
Label-option	5803	6011	6446	6504	6287	5952
sensitivity option 4	5803	6011	6475	6361	5821	5287
Expenditure savings (%)	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**
BAU			0.0%	0.0%	0.0%	0.0%
option 1			1.9%	-3.3%	-15.0%	-25.3%
option 2			1.9%	-3.4%	-13.9%	-23.0%
Label-option			1.4%	-0.9%	-5.4%	-9.3%
sensitivity option 4			1.9%	-3.2%	-13.8%	-23.0%

This is also reflected in the slightly higher turnover realised in this scenario, as presented in the table below.

Table 14: Overview of turnover

Turnover manufacturer (mio)	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**
BAU	1257	1310	1387	1418	1387	1346
option 1	1250	1302	1585	1788	1733	1621
option 2	1250	1302	1585	1720	1667	1558
Label-option	1250	1302	1491	1559	1510	1432
sensitivity option 4	1250	1302	1585	1749	1694	1584

It is therefore concluded that this fourth option is not better than option 2 presented above.

5.5 Comparison of the two options for ecodesign and labelling at the same time

Option 1 gives the highest energy and CO_2 emissions savings, but has negative impacts on:

- Consumers: Removal of class C would remove 90-95% of vented driers from the market. This will undoubtedly increase the purchase costs of vented driers, normally considered as the low-cost option. Furthermore, the vented driers that might remain on the market (the 2008 database indicates some 5% could stay) are all in the smaller capacity range. The option 1 will therefore negatively affect the affordability of low-cost driers of large capacities. Vented driers are also the most economic appliance for some categories of consumers, in particular consumers from South European countries who do not use their driers frequently.
- Manufacturers including SMEs: For some manufacturers, class C vented driers are the current most successful products (in terms of market share). Removal of these appliances in 5 years would have major effects on the economics of several production lines.

Option 2 gives only slightly lower energy savings, but avoids the problems described above for option 1. It ensures that the criteria set out in points (c) and (d) of Article 15 (5) are complied with: the ecodesign requirements will not entail significant negative impacts on industry's competitiveness and on consumers in particular as regards the affordability.

There appear to be no significant differences between the two options in terms of administrative burdens or innovation. Option 2 is therefore the preferred option.

6. CONCLUSION

The Label_only option gives the lowest savings of all options. In this option the market push (by removal of least efficient appliances) is diminished because these models continue to exist on the market. Furthermore the ‘pulling’ effect is diminished since customers may still perceive an C-class, or even an B-class, as average efficiency or above, whereas in reality, based on the 7 scales of efficiency the class A appliance is the ‘new average’. In short, by leaving the least efficient models on the market the attractiveness of the more efficiency models is reduced and of the less-than-average models is increased.

The analysis demonstrates that the appropriate policy option for realizing the environmental improvement potential of tumble driers is the combined introduction of a revised labelling scheme and ecodesign requirements (option 2) in two stages (one year and five years after entry into force). This approach ensures that:

– on-going energy improvements are maintained and fostered by setting a transparent legislative framework that will provide the industry with the long-term security they need to invest in innovative technology;

– fair competition and product differentiation continues to operate on energy improvements by providing consumers with an effective and reliable tool to compare energy consumption of products in a contest for strong market demand for energy efficient appliances;

– by 2020, a 11% absolute electricity saving can be achieved versus the Business-as-usual scenario in 2020. Due to the market inertia (i.e. full replacement of old models by new types takes about 15 years), the effects of the new measures up to 2020 will be limited with respect to the baseline scenario;

– the cost-effective level of energy consumption is reached, with a savings potential of some 3.3 TWh in 2020 compared to the BaU scenario increasing to 8.6 TWh in 2025;

– more energy consuming products are quickly removed from the market securing electricity and CO_2 savings in the EU, while reducing the life-cycle costs of these devices for consumers. Calculated in Net Present Value (Euro 2005) the consumer expenditure –i.e. the annual purchase and running costs of the EU27 population- will reduce by some 3% in 2020 and approximately 14% in 2025;

– a level playing field for all manufacturers is guaranteed, ensuring fair competition and free circulation of products;

– disproportionate burdens for manufacturers are avoided due to transitional periods which duly take into account redesign cycles;

– the criteria set out in points (c) and (d) of Article 15 (5) are complied with: the ecodesign requirements will not entail significant negative impacts on industry's competitiveness and on consumers in particular as regards the affordability.

7. MONITORING AND EVALUATION

The main monitoring element will be the tests carried out to verify correct rating and labelling. Monitoring of the impacts on appliances should be done through market surveillance carried out by Member State authorities ensuring that the rating declared is truthful. Effective market shift towards upper labelling band will be the main indicator of progress towards market take-up of more efficient refrigerators and freezers.

The appropriateness of scope, definitions, concept and possible trade-offs will be monitored by the ongoing dialogue with stakeholders and Member States. The main issues for a possible revision of the proposed labelling scheme are:

– improved test standards (mandate CEN/ CENELEC) and measurement accuracy;

– necessity to revise the energy efficiency classification scheme according to technological improvements;

– implementation of more demanding minimum requirements (possible inclusion of timer/sensor controlled cycles, sound power requirements).

Taking into account the time necessary for collecting, analysing and complementing the data and experiences related to the implementation of the labelling scheme and assess technological progress, a review of the main elements of the framework could be presented five years after entry into force of a labelling scheme.

<u>Annex I: FINAL MINUTES of the Consultation Forum on two implementing measures with regard to Ecodesign and Labelling for household tumble driers - 25/06/2010</u>

Centre Albert Borschette (CCAB), Brussels

Participants: see Annex A

The Chairman opened the meeting by recalling that the adoption of ecodesign and labelling measures are subject to meeting the requirements laid down in Article 15(2) of the framework Ecodesign Directive 2009/125/EC and Article 10(2) of the Energy Labelling Directive 2010/30/EU.

The **UK** underlined that, according to the rules of procedure of the consultation forum, the working documents should be circulated no later than one month prior to the meeting. The Chairman committed that Commission's services will do their best to comply with this timeline.

1. Household tumble driers (hereafter referred to as tumble driers)

1.1. Draft Ecodesign implementing Regulation

Ecodesign requirements

The **Commission** introduced the debate by recalling the requirements laid down in Article 15(2) of the Ecodesign Directive. While it is clear that the first two requirements of Article 15(2) (a) and (b) are met (significant annual sales and significant environmental impact), the third criterion of Article 15(2) (c) ("significant potential for improvement (...) <u>without entailing excessive costs</u>") is more problematic. Taking into account that the level of energy efficiency requirements set out in an implementing measure must "aim at the life cycle costs minimum to end-users for representative product models" (fifth paragraph of point 1 of Annex II of the Ecodesign Directive) and that the average household tumble driers (corresponding to current class C) is already at the least life cycle cost level (according to the preparatory study), Commission asked the stakeholders their position on the need to set ecodesign requirements on the energy consumption of tumble driers.

The participants to the consultation forum, including ENV NGOs, consumers and the industry (ANEC/BEUC and CECED), unanimously supported the setting of ecodesign requirements on the energy consumption of tumble driers in addition to a review of the Commission Directive 95/13/EC.

Ban of classes D to G

UK/FR/NL/DK/SP/AT/IT/CECED/ANEC/BEUC and ENV NGOs supported the ban of the current energy classes D to G. They emphasised that the sales of household tumble driers in the various energy classes remained constant over the past years so that a review of the labelling Directive alone might not be sufficient to support the market take-up of "top of the range" tumble driers. FR and SP underlined that the market of tumble driers is still a growing market (only 30 to 40% of French households for instance are equipped with tumble driers); there is therefore a risk (especially in a period of economic downturn) that the lowest energy classes D to G could gain in the future increasing market shares. The setting of energy efficiency requirement at current class C could guarantee that it does not take place.

The **NL** also highlighted that the setting of energy efficiency requirements will not impose additional testing costs on the industry nor on market surveillance authorities since they already have to test the products for the energy label.

Ban of class B

ENV NGOs supported the ban of class B in a second step with a safeguard clause allowing to suspend the application of this second step should the prices be too high to implement it without negatively impacting consumers.

IT emphasised that the ban of class B would imply the ban of all vented driers from the market. IT would strongly oppose such a requirement because the use of vented driers is more efficient in South European countries and benefit from very low entry price on the market. The **NL** pointed out that a slight change in the label classification might make it possible to keep some vented driers into a slightly less demanding new class B which would in turn allow banning class C without banning all vented driers.

ANEC/BEUC proposed to assess the possibility to ban class B five years after the entry into force of the ecodesign and labelling Regulations on the basis of the changes in products costs/purchase prices of household tumble driers.

ENV NGOs also called for condensation efficiency requirements and the mandatory setting of humidity sensors in tumble driers. On the later point, **CECED** emphasised that requirements should be based on the appliance's functionality alone (in this case achieving the most efficient drying time) as several technologies (e.g. weight sensor or temperature sensors) make it possible to reach the same objective. According to CECED, the inclusion of the energy consumption of half load in the appraisal of the energy efficiency of tumble driers will already put pressure on the market to use such sensors (in order to optimise their energy classification).

Calculation formula of the energy efficiency index (EEI)

The **Commission** recalled that there is a need to adapt the calculation formula of the EEI set out in Commission Directive 95/13/EC so as to align it to the approach of the revised delegated Regulations on the energy labelling of household washing machines and dishwashers.

The Commission's proposal was mainly opposed by **CECED** on one side who would like to see the reference line based on the energy consumed per kg of laundry dried (this approach favour larger appliances on the energy scale) and by the **UK** on the other side, taking the opposite view (the energy scale should be more stringent for larger appliances in order to discourage consumers from buying them). According to CECED, it is more efficient to dry the same amount of laundry on a larger tumble drier, it would therefore not make sense to make it harder for them (by means of the calculation formula of the EEI) to reach one class as compared to smaller capacity tumble driers.

IT and FR supported the Commission's proposal. DE and environmental NGOs would support the proposal of the Commission but without the 'bonus' made to smaller appliances. ANEC/BEUC would also support the proposal of the Commission but considered the “bonus” made to smaller appliances as too high..

1.2. Draft labelling delegated Regulation

Gas driers

Stakeholders generally supported the introduction of gas dyers into the energy label provided measurement standards are available (**DE**).

CECED would support the inclusion of gas driers into the label but opposes having the same classification for electric and gas driers. It emphasised that changes in the 'gas to electricity' correction factor may imply that gas driers will change classification over time which might confuse consumers.

Parameters to be included on the label

DE/ NL and ANEC/BEUC supported the display of the drying time in full load. **NL/DK** considered that the energy consumption should be given per year and not per cycle on the label so as to be in line with the energy labels on household washing machines and dishwashers. **CECED and AT** favoured the display of the energy consumption per cycle.

Further issues

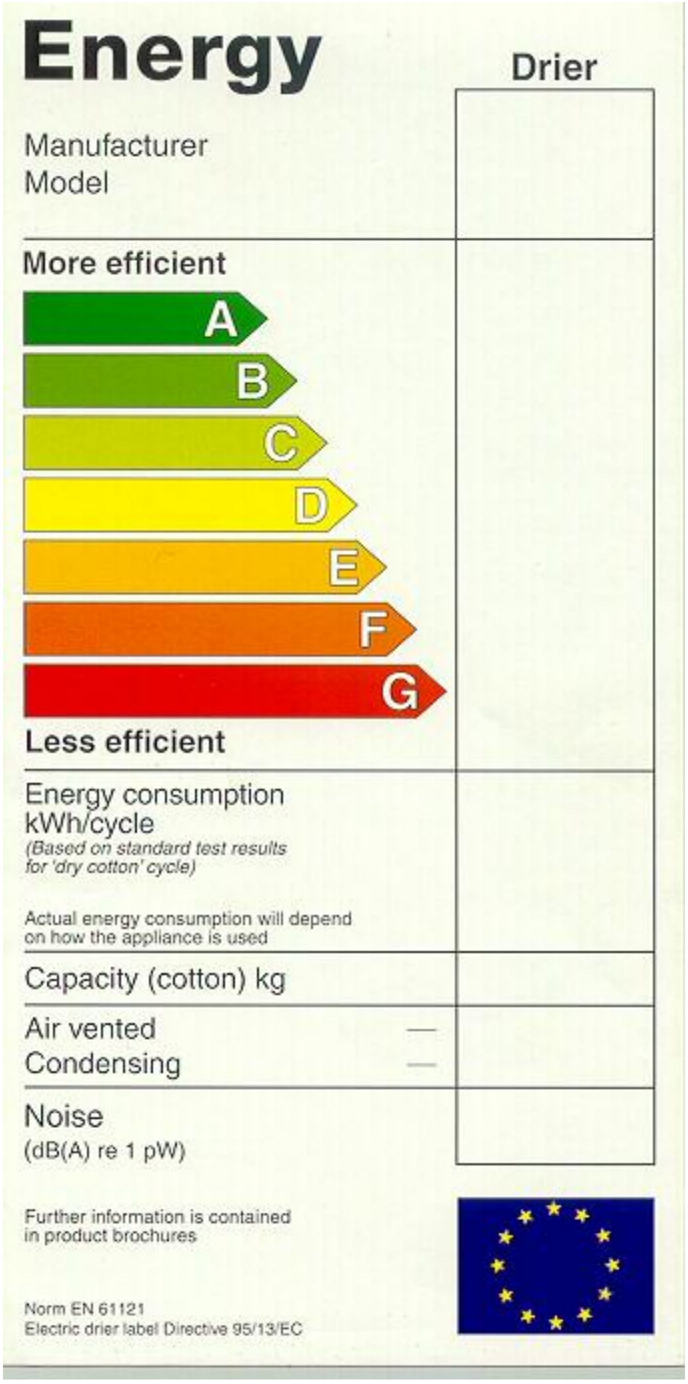
ANEC/BEUC requested that the flash sign for electricity is removed from the label as it should be kept for warning signals (safety). Commission agreed to replace this sign by a plug. ANEC/BEUC also requested that the 12 months transition period for the display of the label is reduced and that information on time and humidity controls are added on the fiche.

Annex A: List of participants:

MEMBER STATES OR COMPANY/ORGANIZATION'S NAME
FEDERAL PUBLIC SERVICE ECONOMY (BE)
FEDERAL INSTITUTE FOR MATERIALS RESEARCH & TESTING
European Environment Bureau EEB
FEDERAL MINISTRY OF ENVIRONMENT (GERMANY)
DELEGATION FRANCAISE
ANEC BEUC OKO INSTITUTE
EPEE
FEDERAL MINISTRY FOR ECONOMICS 1 TECHNOLOGY (GERMANY)
DEFRA (UNITED KINGDOM)
DEFRA (UNITED KINGDOM)
MINISTRY OF INDUSTRY
CECED
Hungarian Trade Licensing Office, Trade and Market Surveillance Authority
CECED
ENEA (ITALY)
ECOS
ECEEE
MINISTRY OF ECONOMY (SLOVAKIA)
DYSON

Ministry of Economy PL
SUSTAINABLE ENERGY AUTHORITY OF IRELAND
EUnited Cleaning
DANISH ENERGY AGENCY
BOSCH UND SIEMENS
DEFRA (UNITED KINGDOM)
FEDERAL PUBLIC SERVICE (BE)
ECOS
FEDERAL INSTITUT FOR ENVIRONMENT (DE)
INFORSE EUROPE
DANISH ENERGY AGENCY
ENEA
CECED
ORGALIME
FEDERAL MINISTRY OF ECONOMICS & TECHNOLOGY (DE)
EUnited Cleaning
DEFRA (UK)
ANEC BEUC OKO INSTITUTE
AUSTRIAN ENERGY AGENCY
CECED
SENTERNOVEM (NL)
DYSON
ECOS
ES
WWF
CECED
INFORSE EUROPE

Annex II: Household tumble drier Energy Label (957/13/EC)



Annex III: Baseline scenario

The Baseline scenario describes the impacts of the 'no action' policy. The Baseline scenario however shares a lot of main input values with the other policy scenario's. This Annex describes these shared assumptions and values.

Table 15: Sales and resulting stock

	1990	1995	2000	2005	2010	2015	2020	2025	2030
Sales (mio)	2.8	3.7	4.5	5.1	5.2	5.7	5.9	6.0	6.1
Stock (mio)	22.4	33.6	44.9	55.4	62.7	68.0	71.8	75.8	77.8

The calculation of the stock is based on a product life of 13 years.

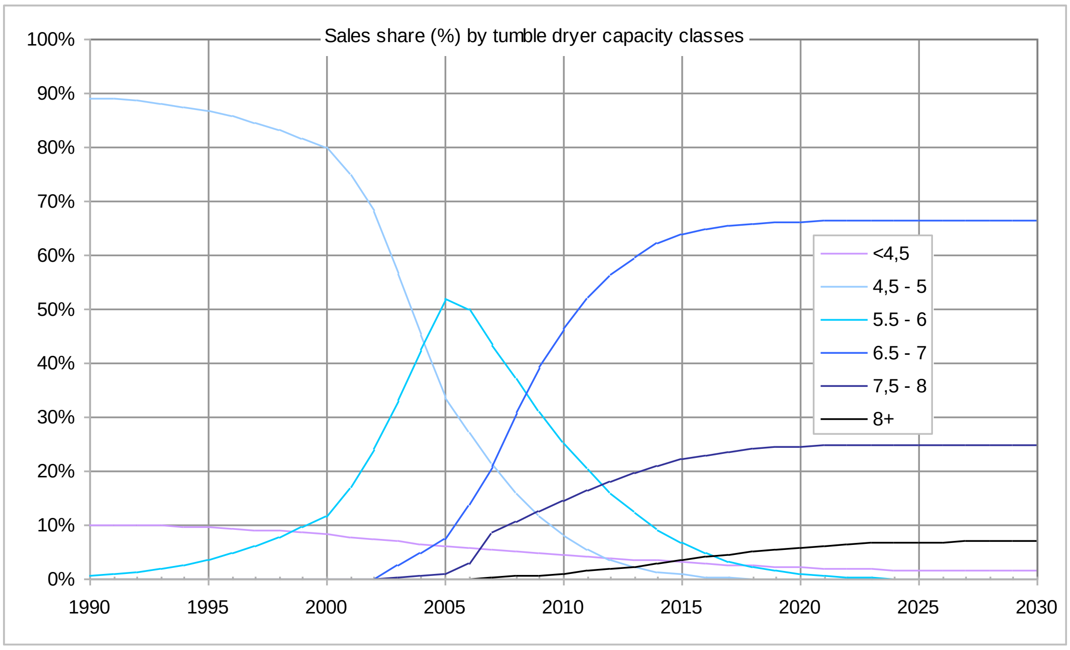
Table 16: Energy consumption of NEW sales appliances- recalculated to part load consumption

	1990	1995	2000	2005	2010	2015	2020	2025	2030
Vented (kWh/kg)	0.65	0.64	0.62	0.59	0.59	0.59	0.59	0.59	0.59
Condenser (kWh/kg)	0.72	0.69	0.66	0.64	0.606	0.59	0.59	0.58	0.57

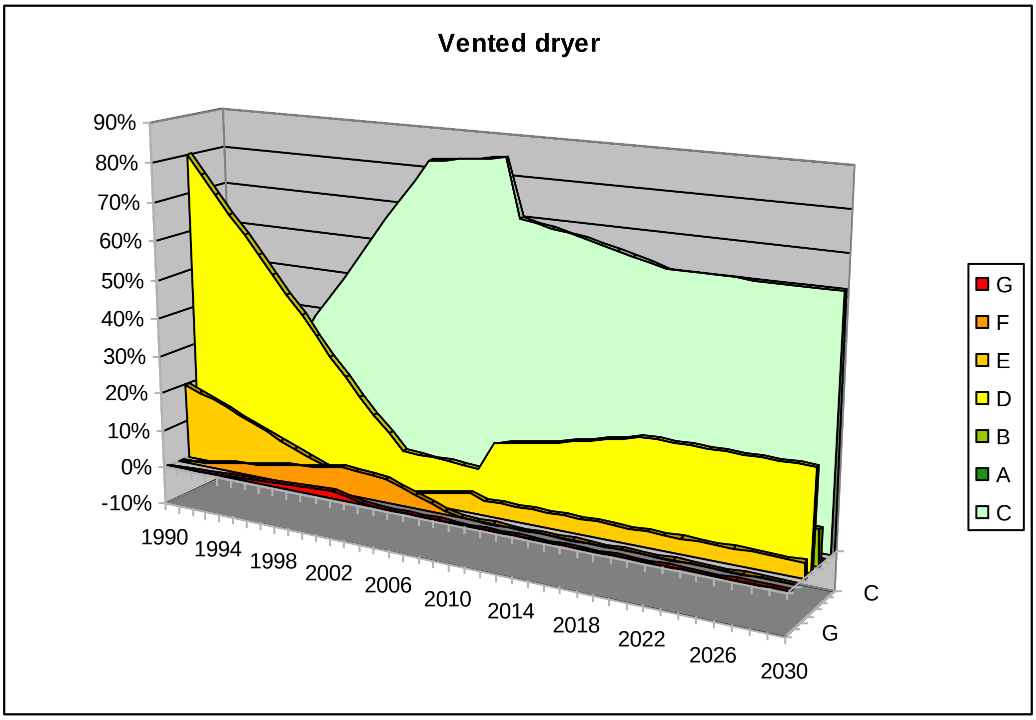
Assumed annual drying cycles: 154/year

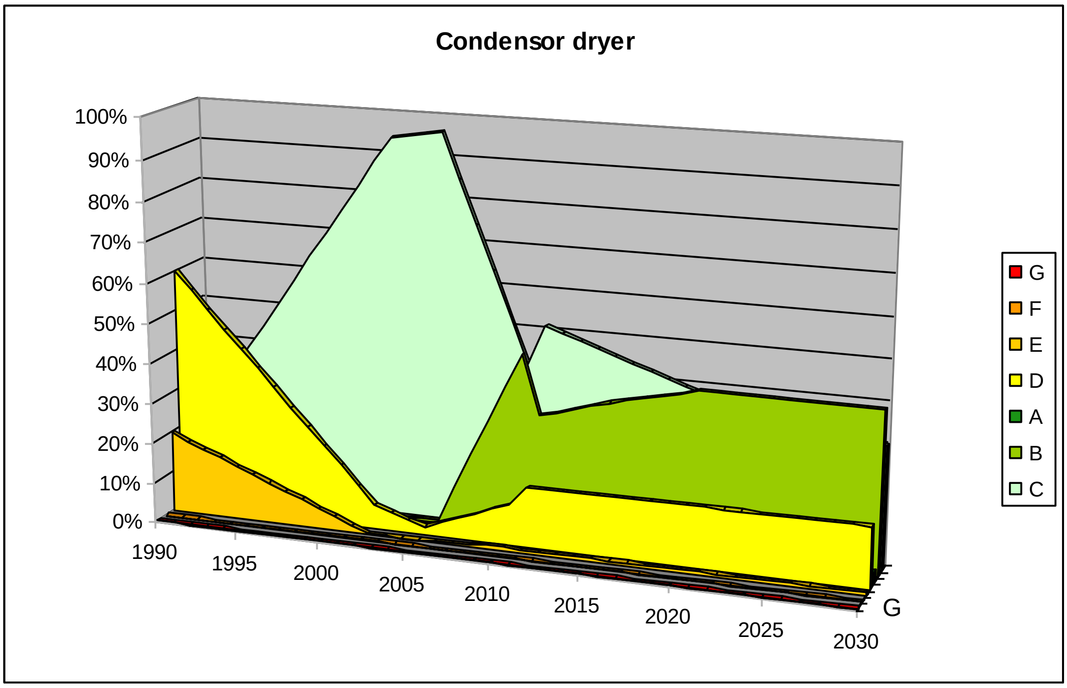
Assumed part load: 67.7% of max capacity.

Development of drier capacity:

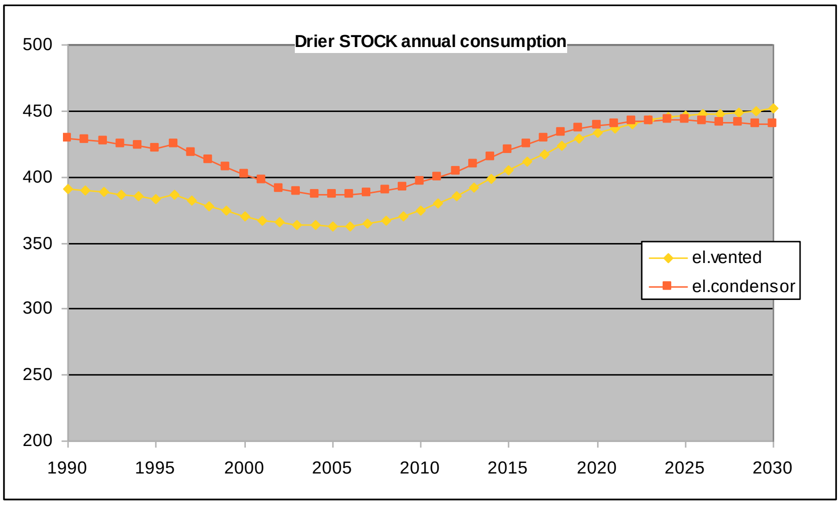


Energy label shares in NEW sales:


Vented dryer
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
-10%
1990
1994
1998
2002
2006
2010
2014
2018
2022
2026
2030
C
G
G
F
E
D
B
A
C


Condensor dryer
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1990
1995
2000
2005
2010
2015
2020
2025
2030
G
G
F
E
D
A
B
C

Drier stock annual consumption (including corrections for real-life consumption):



Purchase price:

VENTED Average purchase price (EUR)	2005	2010	2015	2020	2025	2030
BAU	318	311	290	272	259	246
option 1	318	311	317	377	358	341
option 2	318	311	317	307	292	278
Label-option	318	311	295	283	268	258
sensitivity option 4	318	311	317	336	320	304
CONDENSER Average purchase price (EUR)	2005	2010	2015	2020	2025	2030
BAU	535	527	508	488	469	452
option 1	535	527	593	607	576	531
option 2	535	527	593	607	576	531
Label-option	535	527	560	548	521	487
sensitivity option 4	535	527	593	607	576	531

Average A-class drier in 2011: 800 euro, annual price decrease 2%

Average B/C clas drier in 2011: 550 euro, annual price decrease 1%

Share of A-class condenser driers in option 1 and 2: