Policy recommendations for tumble driers

July 2016

1. Summary

The new Energy Label for driers with classes up to A+++ has been introduced in 2012. In November Ecodesign tier 1 banned driers less efficient than class C from the market. Since November 2015 tier 2 applies: only for classes B and better new models can be put on the market. The consumption differences are still huge: A+++ driers consume 65% less energy than class B driers. Class B driers have no heat pump, while driers in classes A and better all use the efficient heat pump technology.
Market data shows that in 2014, already 42% of all drier sales in Europe were heat pump driers (Michel, Attali Bush, 2015). Product lists on www.topten.eu show that there is a huge market offer of efficient heat pump driers: there are already 22 A+++ and 57 A++ driers on the EU market (A+ models also have a heat pump, but are not listed on Topten). 32 of these models also reach the best condensation efficiency class A.
The new label allows consumers also to see the large efficiency differences between different heat pump driers, which was not possible with the old label. The Ecodesign regulation bans only the worst performing non-heat pump driers from the market. There is a much higher saving potential, which should be tackled in a near revision of the regulations:

- **Energy efficiency: A+ as future requirement**

Driers without heat pump should be announced to be banned from the future market. Switzerland is going ahead and has banned driers less efficient than class A+ since 2015 .

- **More ambitious condensation efficiency requirements**

A condensation efficiency of 70% will be required from November 2015, meaning that still 30% of the humidity can be expelled to the room and cause damages. Thirteen models on Topten.eu reach condensation efficiency values of more than 90% (class A). In a future revision more ambitious condensation efficiency requirements should be announced.

- **Cover excluded tumble driers: washer-driers and professional driers**

With the current old Energy Label for washer-driers their efficiency cannot be compared to that of driers nor of washing machines. And in professional driers a large untackled saving potential lies. Ambitious minimum efficiency requirements and a (better) energy Label should apply also for combined washer-driers and for professional tumble driers.

- **General: Market monitoring**

The development of the markets should be assessed regularly and based on sound sales data. Such a market monitoring allows determining when a revision of the Energy Label and the Ecodesign requirements is due. It also serves as a basis for decisions on the design of a future labelling scale and minimum energy efficiency requirements.

2. Introduction

Electrical laundry drying accounts for a considerable share of a household's electricity consumption: a typical dryer (class B/C) consumes three times more energy per cycle than the washing machine.
The penetration of driers in European households is increasing: 3.8 million tumblers for residential use were sold in 2007 in the EU-27– 14% more than 2002 (data from GfK and Eurostat in PWC, 2008). Therefore it is crucial to implement effective measures limiting the electricity consumption of the increasing drier stock.
Since 2013 the new Energy Label with classes up to A+++ and Ecodesign requirements apply for tumble driers. The new Label allows consumers to detect efficiency differences between different heat pump driers (classes A to A+++), and the Ecodesign regulation bans the least efficient driers from the market (class D since Nov 2013, class C from Nov 2015).

3. Best available technology: high efficiency heat pump driers

Heat pump driers consume 50% less electricity than conventional condenser driers (class B/C). Only heat pump driers reach class A, but most of them are much better than the class limit and already reach the new classes A+, A++ and even A+++.
There is a large number of heat pump driers models on the EU market: in April 2012 there were more than 84 residential and 4 professional heat pump drier models from 18 different manufacturers on the European market (www.topten.eu, April 2012).
Since the new Label has become compulsory in 2013, Topten.eu only lists tumble driers reaching at least efficiency class A++ and condensation efficiency class B. By July 2016, there are 57 different models in class A++, and 22 models in the top class A+++ (www.topten.eu, July 2016).
The Best Available Technology driers have an EEI of 23. This corresponds to an efficiency according to the old label of 0.16 kWh/kg. An A+++ drier consumes 65% less energy than a conventional drier without heat pump.
32 of the totally 79 drier models on Topten.eu reach the best condensation efficiency class A (condensation efficiency = 90%). This means that less than 10% of the humidity removed from the laundry is expelled to the room. Too much humidity can cause building damages and the need for a room dehumidifier – resulting in additional electricity consumption.

4. Market

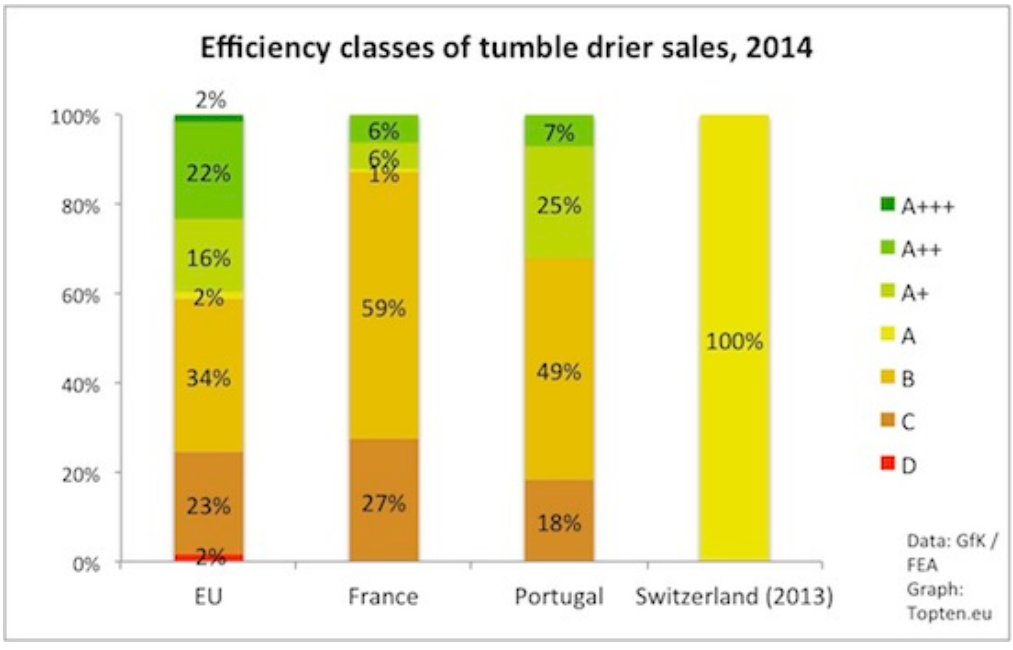

Fig 1: 2014 tumbler sales in the EU-21, France, Portugal and Switzerland. Note: In Switzerland, all driers are in class A, because the new label with classes up to A+++ was only introduced in 2015. Graph source: Michal, Attali, Bush, 2015.

Figure 1 shows that heat pump driers (classes A to A+++) already accounted for 42% of all drier sales in the EU in 2015. Differences between countries can be considerable, as the data for France and Portugal shows. Switzerland has banned driers in classes B or less efficient, thus all non-heat pump driers, from the market in 2012.

5. Switzerland: only heat pump driers on the market

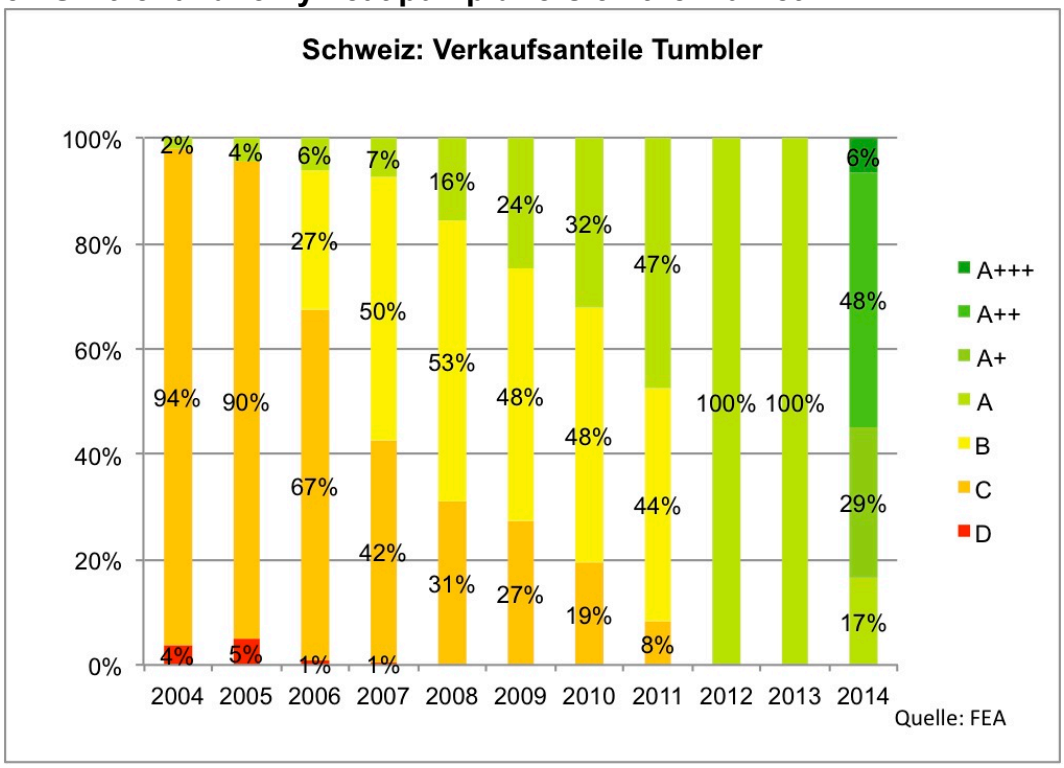

Fig 2: driers sales in Switzerland. Data source: FEA

In Switzerland, heat pump driers reached a market share of 47% in 2011. From 1st January 2012, non-heat pump driers have been banned from the Swiss market (Bush et al, 2013). In 2014, the new label with classes up to A+++ was introduced, and the MEPS level raised to A+. With the implementation of this strict and foresighted MEPS Switzerland can realise a big electricity saving potential.

6. Policy measures in the European Union

6.1. Energy label

Since June 2013 the new energy Label for tumble driers (regulation No. 392/2012) with classes up to A+++ is compulsory. The new label allows consumers to distinguish between less and more energy efficient heat pump tumble driers, which has not been possible with the old label. Despite large differences in efficiency, they all heat pump driers were in the old class A.

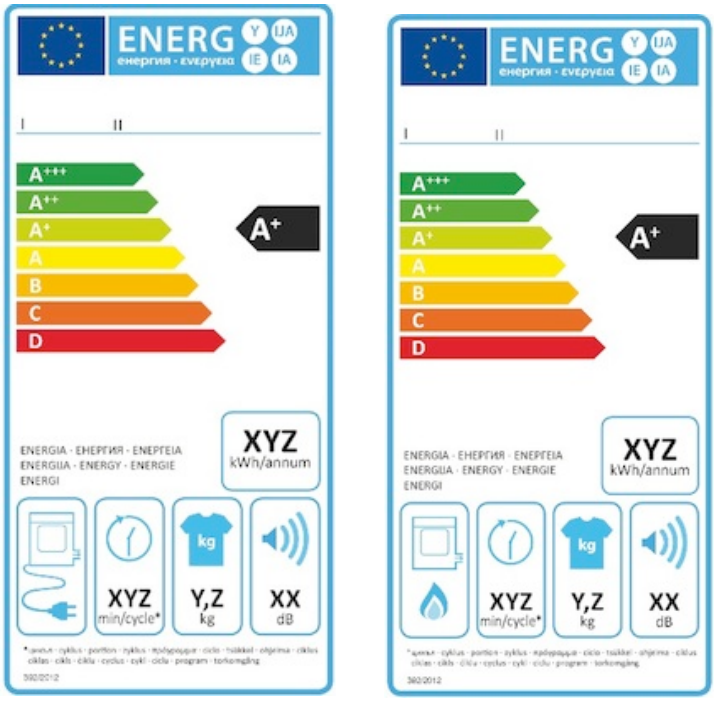

Fig. 3: Layout of the current Energy Label for electric (left) and gas driers (right).

While the old Label's classification was based on a simple kWh/kg (consumption per cycle divided by the capacity) efficiency at full load and with 60% initial moisture content, the new Label is based on a more complex Energy Efficiency Index (EEI). The EEI is the relation of a model's annual energy consumption to a reference model's (of the same capacity) energy consumption (in %). The EEI calculation formula assumes 160 drying cycles per year (around three per week), of which 4 out of seven are assumed to be operated with a half load filling. The table below shows how the new Label classes relate to the old specific energy consumption – more or less, because the new label also takes additional factors (half load performance, programme duration and power management) into account.

Energy label 2012		Ecodesign requirements	Old Energy Label from 1995	
Class	EEI		Specific consumption (kWh/kg)	Class
A+++	EEI< 24		0.18 / 0.19	A
A++	32		0.25	A
A+	42		0.32	A
A	65		0.5	A
B	76		0.59	B
C	85	Banned since Nov 2015	0.64	B
D	85 ≤ EEI	Banned since Nov 2013	> 0.64	C/D

Tab 2: Energy efficiency classification scale of the new Energy Label.

New is the declaration of the condensation efficiency of condenser driers on the label. The condensation efficiency classification scale is sensible and simple and provides an important consumer information (Tab. 3). As the energy consumption, also the calculation formula of the condensation efficiency assumes that 4 out of 7 cycles are operated with half load filling. A good condensation efficiency is important, because if too much humidity is expelled into the room instead of condensed and collected, building damages can be caused. In order to avoid these, an air dehumidifier might be needed – leading to additional electricity consumption.

Condensation efficiency class	Weighted condensation efficiency	Ecodesign requirements
A	C > 90	
B	80	
C	70	
D	60	Banned since Nov ‘15
E	50	Banned since Nov 2013
F	40	
G	C < 40	

Tab. 3: Condensation efficiency classification scale

Finally the tighter measurement tolerance of 6% is a considerable improvement which allows for a more precise declaration and avoids overlapping classes, while being technically attainable.

6.2. Ecodesign requirements

Tier 1 of the Ecodesign regulation for tumble driers No 932/2012 applied since 1st November 2013: tumble driers had to reach at least energy efficiency class C and condensation efficiency class D. Since November 2015 the requirements have been tightened, and drier models must reach the energy efficiency class B and condensation efficiency class C (see table 3). With class B there are still inefficient, high-consuming driers without heat pump left on the market.

Ecodesign requirements for driers		Minimum energy efficiency		Min. condensation efficiency
		New EEI	Class	
Tier 1	Nov. 2013	< 85	C	60%
Tier 2	Nov. 2015	< 76	B	70%

Tab. 4: Ecodesign requirements for driers adopted in October 2012.

7. Total costs costs

Analysis of data from France and Portugal in (Michel, Attali, Bush, 2015) shows that consumers are clearly better off with heat pump driers than class B (or C) driers. Even though heat pump driers have higher purchase prices, consumers can save costs during their use phase, because they save a lot of energy compared to inefficient driers.

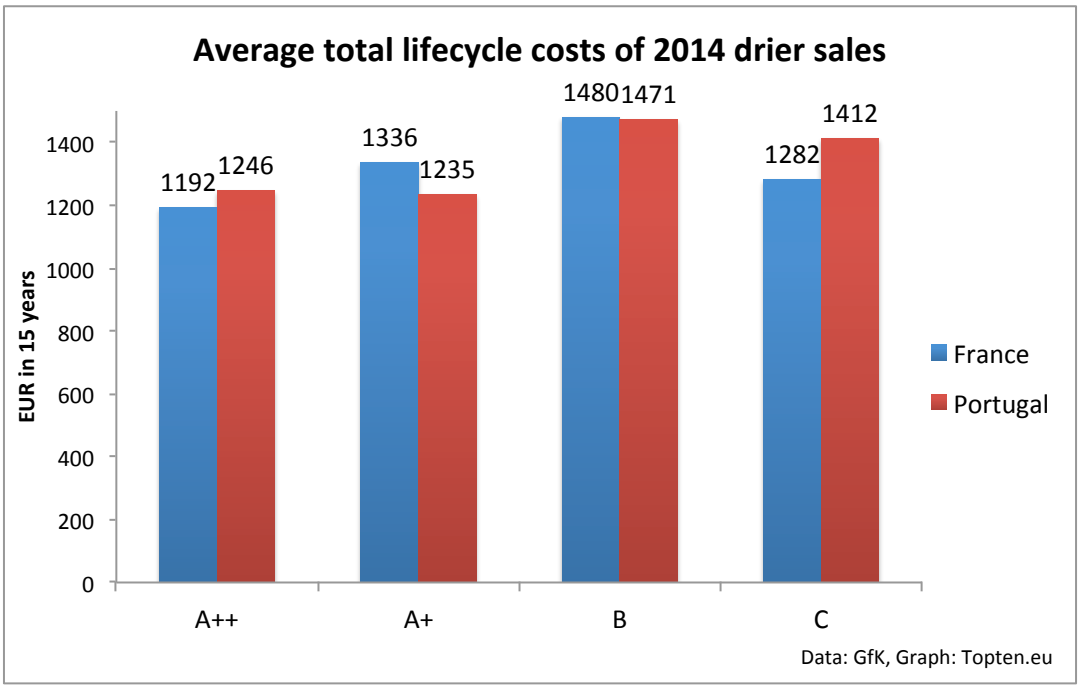

Fig 4: average total costs (purchase price and electricity costs) of tumble driers sold in 2014. Source: Michel, Attali, Bush, 2015. For the calculation of total costs, the following assumptions were used: 15 years of lifetime, 0.15 Euros/kWh.

Please note that electricity prices may be higher than 0.15 Euros/ kWh in many countries. This means that a low energy consumption is even more relevant, and efficient products even more favourable.

8. Policy recommendations

8.1. Market monitoring

The development of the markets since the introduction of the Energy Label (sales shares of efficiency classes) should be assessed regularly and based on sound sales data. Such a market monitoring allows determining when a revision of the Energy Label and the Ecodesign regulation is due. It also serves as a basis for decisions on the design of a future labelling scale and minimum energy efficiency requirements. After some years the data can further allow for precise stock models.

8.2. Near revision

Both the energy labelling and the Ecodesign regulation should be revised soon – before loosing effect due to the market development. Since there are already A+++ driers on the market, the revision should be planned now so that the Label continues posing an incentive for further development towards higher efficiency. A future energy label would ideally consist of the original A to G scale, with an A class reserved for the very best products.
The current Ecodesign regulation is not ambitious and leaves the inefficient class B driers (without heat pump) on the market even in tier 2. Class B driers consume three times as

much energy as the best heat pump driers (A+++). A revision of the Ecodesign regulation should phase out driers without heat pump and the least efficient heat pump driers. These ambitious minimum efficiency requirements would lead to considerable energy savings.

8.3. Ecodesign regulation revision: specific recommendations for ambitious MEPS with no loopholes

- **Energy efficiency: A+ as future requirement**

The Ecodesign regulation for driers does not phase out driers without heat pump; class B driers are left on the market even in tier 2 - with an energy consumption three times as high as that of the BAT. In classes A+++ and A++ there is a vast market offer of more than 90 highly efficient drier models from 14 different brands and of different sizes, for household, semi-professional and professional use (www.topten.eu, July 2016). 22 models today reach the top A+++ class, 15 of these also reach a high condensation efficiency corresponding to class A (topten.eu). A revision of the Ecodesign regulation should set a clear sign for the heat pump technology by announcing an A+ as minimum requirement soon. This would leave all heat pump driers except for the least efficient ones on the market and set an incentive to develop new more efficient products instead of less efficient ones (class A). Switzerland is going ahead and has banned driers below class A+.

- **More ambitious condensation efficiency requirements: class B / A**

The Ecodesign regulation sets new minimum requirements regarding condensation efficiency. This is important, as low condensation efficiency can lead to wet rooms and the need for additional room drying equipment and thus increase the need for electricity consumption. The values of 60% (tier 1) and 70% (tier 2) are however very low. A condensation efficiency of 70% means that 30% of the humidity remains in the room, which can still cause damages without drying measures. 36 models on Topten.eu reach condensation efficiency values of more than 90% (class A). In a revision more ambitious condensation efficiency requirements should be aimed at: class B (80%) as a first step, then class A (90%).

- **Cover excluded tumble driers: washer-driers and professional driers**

Washer-driers are neither covered by the Ecodesign regulation for washing machines nor by the regulation for driers, they are only covered by the old labelling regulation from 1993. Most washer-driers are inefficient, and experts expect their market share to rise in the future. In the UK for example washer-driers already account for 23% of the drier sales.
There is also a large untapped energy saving potential in the professional drier sector and we encourage the EU to take similar action. There are highly efficient driers for pro use (see examples below and on www.topten.eu), and Ecodesign requirements and an energy label could lead to more efficient products for this sector.

9. References and Links

A++ and A+++ heat pump driers on the European market: www.topten.eu

Swiss Association of the Domestic Electrical Appliances Industry (FEA)

Bush, Damino, Josephy, Granda: Heat pump tumble driers: New EU Energy Label and Ecodesign requirements in Europe, MEPS in Switzerland, Initiatives in North America. EEDAL, Portugal, September 2013.
www.topten.eu/uploads/File/EEDAL13_Eric_Bush_Heat_Pump_Driers.pdf

New energy labelling regulation for tumble driers 392/2012:
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:123:0001:0026:EN:PDF
Corrigendum to 392/2012:
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:124:0056:0056:EN:PDF

Ecodesign regulation for tumble driers 932/2012:
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:278:0001:0010:EN:PDF

Old labelling Directive: Commission Directive 95/13/EC

PriceWaterhouseCoopers (PWC), December 2008: Ecodesign of laundry dryers. Preparatory studies for Ecodesign requirements of Energy-using-Products (EuP) – Lot 16. Draft final report.

Anette Michel, Sophie Attali, Eric Bush: Energy efficiency of white goods in Europe: monitoring the market with sales data. June 2015.
http://www.topten.eu/uploads/File/WhiteGoods_in_Europe_June15.pdf

Labelling directive for combined washer-driers 96/60/EC:
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1996:266:0001:0027:EN:PDF

Coolproducts: www.coolproducts.eu/product/tumble-driers

July 19th 2016, Anette Michel, Topten International, Zurich