Policy recommendations on tumble driers

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1. Introduction

Electrical laundry drying accounts for a considerable share of a household's electricity consumption: a typical dryer (today's 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.

2. Best available technology: high efficiency heat pump driers

Heat pump driers consume 50% less electricity than conventional condenser driers. Only heat pump driers reach today's class A, but most of them are much better than the class limit.
In April 2012 there are more than 84 residential and 4 professional heat pump drier models from 18 different manufacturers on the European market (www.topten.eu, April 2012). Most heat pump driers consume around 0.3 kWh/kg (based on measurement with 60% initial moisture content), corresponding to an EEI of around 43. In recent years both more efficient and less efficient heat pump driers have emerged on the market. The least efficient heat pump driers consume 0.43 kWh/kg, the most efficient 0.19 kWh/kg. With the proposed EEI calculation these models reach an EEI of 61 and 29 respectively (calculations by Topten). According to an online research by Topten (April 2012), most heat pump driers cost around EUR 800.- to 1800.-, most around 1100.-. These purchase prices are still around 70% higher than those of comparable condenser driers without heat pump. The difference in purchase price however corresponds roughly to the electricity costs which are saved thanks to the higher efficiency: over its life time of 15 years a heat pump drier saves electricity costs of EUR 600.- to 800.- (from topten.eu; calculated with 1000kg laundry per year – a realistic usage intensity for countries of middle or Northern Europe, where drier penetration rates are high). So at the moment the life cycle costs for consumers are about the same for heat pump and non heat pump driers. With their market share continuing to increase in the future purchase prices will keep decreasing – especially if they are announced to become the future standard.

3. Switzerland: only heat pump driers on the market

In Switzerland, heat pump driers reached a market share of 32% in 2010. Since 1st January 2012, only class A tumble driers are allowed to be placed and sold on the Swiss market. The prices are decreasing and the number of efficient drier models on the market has been increasing. With the implementation of this strict and foresighted MEPS Switzerland can realise a considerable electricity saving potential.

4. European Union: new energy label adopted

In early March 2012 the European Commission has adopted the new energy label for driers. The draft regulation is now scrutinised by the Parliament during two months before it is published.
The new energy label proposal brings a vast improvement. The proposed new label allows consumers to distinguish between less and more energy efficient heat pump tumble driers, which has not been possible with the current label.

Draft regulation		Today's class	Specific efficiency (kWh/kg)*
A+++	EEI < 24	Future BAT	≈ 0.15
A++	32	BAT heat pump driers (A)	≈ 0.22
A+	42	Heat pump driers (A)	≈ 0.3
A	65	Low efficiency HP driers (A)	≈ 0.46
B	76	Class B	≈ 0.56
C	85	Class C and some B	≈ 0.64
D	85 < EEI	Class C and D	

Tab 1: New labelling scale according to the draft regulation. *Specific efficiency is (always) based on measurement with 60% initial moisture content.

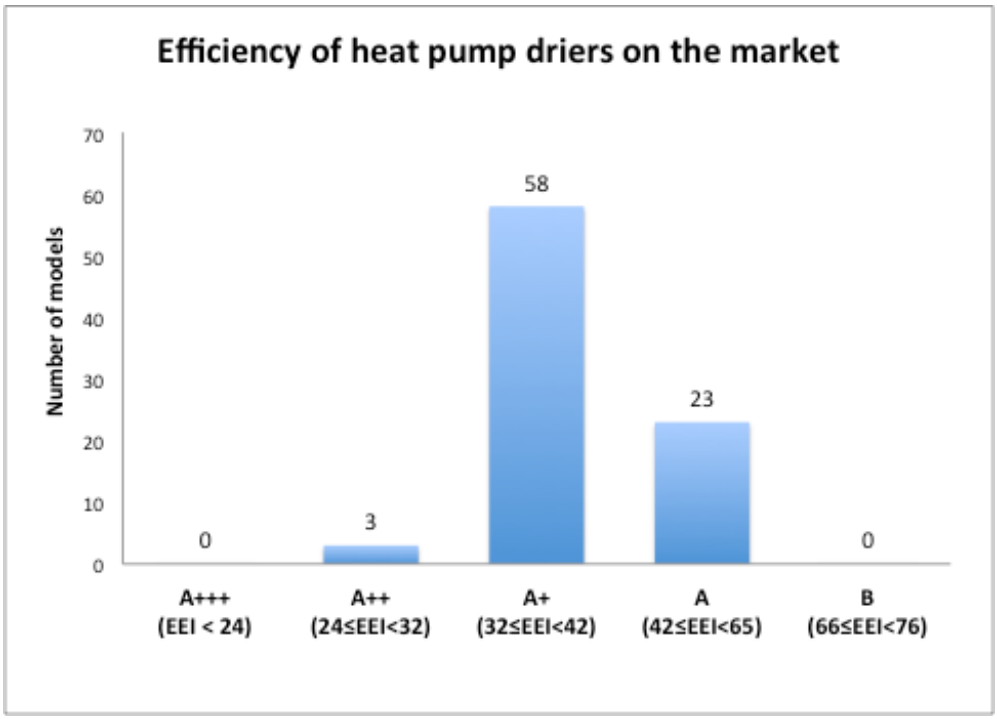

Fig 1. Data source: 84 residential heat pump driers from www.topten.eu, April 2012. Own EEI calculations.

The new A+++ class limit is currently not yet reached, so the class is reserved for the future BAT. Today's very best driers reach the A++ class. With an empty top class an incentive remains to develop even more efficient driers.
Another change is the new declaration of the condensation efficiency on the label. The condensation efficiency classification scale is sensible and simple and will provide an important consumer information. Finally the tighter measurement tolerance of 6% is a considerable improvement which will allow for a more precise declaration and avoid overlapping classes, but is still technically attainable.

5. European Union: ambitious ecodesign measures are possible

The ecodesign measure is yet to be discussed and voted on by the Regulatory Committee. The vote will take place in early May.
The implementation of ecodesign requirements is generally welcome. The current draft ecodesign regulation from March 2012 mainly corresponds to the last draft from April 2011.

The main change regards the measurement tolerance, which has been reduced from formerly 10% to 6% - corresponding to the labelling regulation.
Apart from that the draft is not enough ambitious regarding the requirements both on energy efficiency and on condensation efficiency, and excess energy use by over-drying by non-automatic driers is not tackled. Furthermore there are two loopholes which could undermine the measure unless they are closed: vented driers and combined washer-driers.
There is also a large untapped energy saving potential in the professional drier sector and we encourage the EU to take similar action. As long as there is no measure for this sector, professional driers for up to 16kg should be included in the regulation for household driers. There are highly efficient driers for pro use (see examples below), and the ecodesign regulation and an energy label could lead to more efficient products for this sector.

6. Specific recommendations for the ecodesign regulation

6.1 Energy efficiency: EEI=53 as tier 2 requirement

Tier one will phase out the least efficient conventional driers (class D) from 2013, Tier 2 will phase out class C from 2017. This does not mean a phase out of driers without heat pump; most of today's class B driers would be left on the market - with an energy consumption twice as high than that of heat pump driers. Leaving these driers on the market would mean a high missed saving potential. Heat pump driers consume 50% less energy than conventional driers, and already today there is a vast market offer of more than 80 models from 18 different manufacturers and of different sizes, for household, semi-professional and professional use (see www.topten.eu). Therefore it is important to set a clear sign for the heat pump technology by announcing an EEI of 53 as tier 2 requirement, but keep the long timeline to the tier 2 implementation. This would leave all heat pump driers except for the most inefficient ones (with more than around 0.38 kWh/kg) on the market and set an incentive to develop new more efficient products instead of less efficient ones. An EEI of 60 would also leave the least efficient heat pump driers on the market (0.43 kWh/kg).
Switzerland is going ahead and has banned driers not reaching the current class A since January 2012.

6.2 Require humidity sensors (auto-off)

Driers without humidity sensors switch off after a certain, long enough period of time and not at the end of the drying process. They can use a lot of excess energy by overdrying the laundry. Humidity sensors are common in efficient driers and can avoid excess energy use by stopping the drying process when the laundry is dry.
The measurement standard does not account for the problem of overdrying: non-automatic dryers are stopped manually at the end of the drying process, which does not correspond to real-life conditions. And accordingly overdrying is not included in the calculation of the EEI. This problem can be tackled in two ways: either the equipment with a humidity sensor is included in the Ecodesign regulation or the measurement standard is adapted in a way to measure the energy consumption of non-automatic tumble driers in a way closer to real life, letting the driers run until the end of the programme is reached instead of switching them off as soon as the drying process is finished.

- All driers should be equipped with a humidity sensor in tier 2
- Or: the measurement standard should be adapted so that the energy consumption of non-automatic driers is measured until the end of the programme is reached

6.3 Condensation efficiency: more ambitious requirements necessary

Setting minimum requirements for condensation efficiency is very welcome, 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 proposed values of 60% (tier 1) and 70% (tier 2) are however too low. A condensation efficiency of 70% means that 30% of the humidity remains in the room, which can still cause damages without drying

measures. There are models with condensation efficiency values of more than 90% on the market (see example of V-ZUG in the references).

- Set a condensation efficiency of 70% as tier 1
- and a condensation efficiency of 85% as tier 2 requirement

6.4 Close loopholes: no protection for vented driers and washer-driers

The proposed requirements would leave class C vented driers on the market. Such a protection of the less efficient technology would undermine the measures for condenser driers. Instead the generally less efficient vented driers should be treated exactly the same way as condenser driers: the same EEI calculation formula should be applied and the same minimum efficiency requirements should be set.

- Phase out class C vented driers in tier 2

Washer-driers are neither covered by the ecodesign regulation for washing machines nor by the draft 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. Excluding them from the measures could undermine the Ecodesign regulation.

- Include combined washer-driers until there are specific measures

7. References

Professional heat pump driers by Miele and Electrolux:
http://www.miele2011.co.uk/diagnostic/resources/pdfs/Larger_Heat_Pump.pdf
http://laundrysystems.electrolux.com/node350.aspx?productId=5673

V-ZUG heat pump driers with condensation efficiency > 90% (p. 27):
http://www.vzug.com/medias/sys_master/8804205330462/Waschen-Trocknen_2011_d.pdf

Heat pump driers on the European market: www.topten.eu

Class B and C driers are banned in Switzerland since 1. January 2012 (Rita Werle, EEDAL 2011): http://www.topten.eu/uploads/File/040_Rita_Werle_final_driers.pdf

Efficient heat pump driers in Austria:
http://www.topprodukte.at/index.php?pid=produktlisten&topproductscat1=23&topproductscat2=73&topproductscat3=197&topprodukte_sort_listing=x&topprodukte_sort_direction=x&topprodukte_how_many_ds=1

Heat pump driers in Germany: http://www.ecotopten.de/prod_trocknen_prod.php

Draft ecodesign and labelling regulations: http://env-ngo.eup-network.de/

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

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