

# Energy efficiency of White Goods in Europe: monitoring the market with sales data

Changes and trends regarding energy efficiency, energy consumption, size and price in the markets of refrigerators, washing machines and tumble driers in the EU, France and Portugal, 2004 to 2014

## Short summary version

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## Project objective: demonstrate the value of market monitoring

Understanding the market empowers policy makers to make orderly and well informed decisions about the optimal level for new minimum energy performance standards (MEPS) and Energy Label class limits, and their timing to achieve maximum effectiveness. While most economies have a system to monitor the markets of products that are covered by an Energy Label or MEPS, Europe has neither mandatory product registration nor does it monitor the markets with sales data. In the past, the lack of sound market data has led to sub-optimal MEPS and Energy Labels in some cases, and revisions that were performed too late –leaving the policies with less effect than possible.

The objective of this white goods market monitoring project is to demonstrate the value systematic market monitoring based on sound sales data can have for Europe. At the same time the data presented here supports the on-going revisions of the Ecodesign and Energy Labelling regulations for refrigerators and washing machines. National sales data from France and Portugal support these countries in defining national strategies and campaigns to support the market transformation towards higher energy efficiency and for their input to the Energy Label and Ecodesign revision process.

The project has been conducted by ADEME<sup>1</sup> (Agence française de l'Environnement et de la Maîtrise de l'Énergie) and WWF Switzerland<sup>2</sup> together with Topten<sup>3</sup>.

Sales data for household refrigerators, washing machines and tumble driers was obtained from GfK<sup>4</sup>, a professional market research company. GfK provided for each energy class (A+++ to G) sales, sales weighted average energy consumption, size, and for washing machines additionally water consumption. Specifications are based on the Energy Label declarations. The data covers the years 2004 to 2014, the EU-21<sup>5</sup>, plus, separately on country level, France and Portugal. Data for Switzerland is published annually by S.A.F.E.<sup>6</sup> and FEA<sup>7</sup>.

## Refrigerators: 25% energy consumption reduction in ten years

This chapter covers refrigerators with and without freezer compartment, but not separate freezers. Class A has been banned from the EU market in 2012 / 2014, and A+ has been dominating the markets since then. A++ refrigerators have lower sales shares in France and Portugal than across the EU (Fig. 1). In Switzerland, where A+ has been banned starting in 2013, A++ models accounted for more than 80% of the sales in that year.

In the EU, average energy consumption of refrigerators has been reduced by 25% in the last ten years (Fig. 2). Refrigerators sold in France consume 11 kWh/year more than the EU average, those sold in Portugal 15 kWh/year more. The main reason for the difference between the EU average and the two countries is assumedly the lower energy efficiency, while the higher energy consumption by Portuguese refrigerators is probably due to larger freezer compartments. Average volume of refrigerators has increased only by 8 litres (3%) in the EU in the past ten years. In France and Portugal refrigerators have not gotten larger.

Despite big efficiency improvements, the average nominal price paid for refrigerators only increased by 7% in the EU over the same period. French average prices are between those of the EU and Portugal. Average prices of energy efficient refrigerators (A+++ and A++) are however clearly higher in France. Total costs for consumers (purchase price plus electricity costs) were reduced by 13% to EUR 985 between 2004 and 2014<sup>8</sup> across the EU. In France, total costs decreased by 18%, in Portugal by 22%.

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<sup>1</sup> [www.ademe.fr/](http://www.ademe.fr/)

<sup>2</sup> [www.wwf.ch](http://www.wwf.ch)

<sup>3</sup> [www.topten.eu](http://www.topten.eu) : Best products of Europe

<sup>4</sup> [www.gfk.com](http://www.gfk.com)

<sup>5</sup> AT, BE, CZ, DE, DK, ES, FI, FR, GB, GR, HR, HU, IE, IT, NL, PL, PT, RO, SE, SI, SK.

<sup>6</sup> Swiss agency for efficient energy use [www.energieeffizienz.ch](http://www.energieeffizienz.ch)

<sup>7</sup> Swiss Association of the Domestic Electrical Appliances Industry [www.fea.ch](http://www.fea.ch)

<sup>8</sup> Assumptions: 15 years of lifetime, 0.15 Euro/kWh.

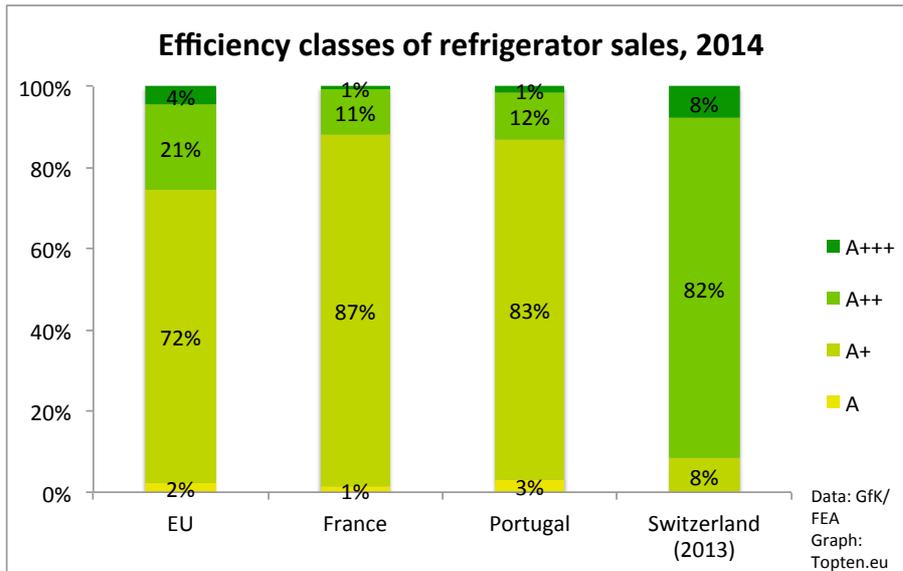


Figure 1: Efficiency classes of refrigerator sales in 2014 (Switzerland: 2013)

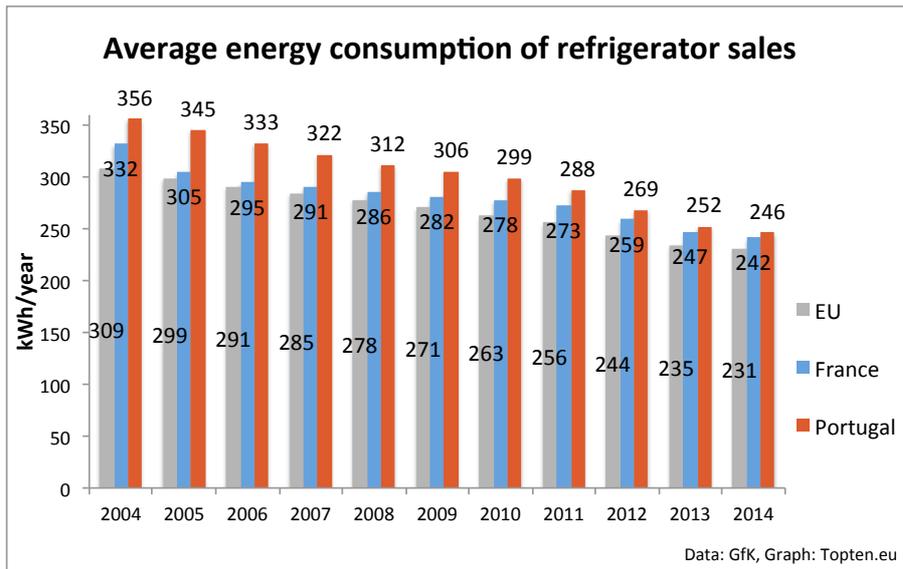


Figure 2: Average energy consumption of refrigerator sales in the EU, France and Portugal

Higher efficiency of refrigerators still holds a large electricity saving potential for Europe. Had all refrigerators sold in 2014 been in class A++, 7800 GWh could have been saved by these appliances over their lifetime, compared to the average refrigerator that was really sold<sup>9</sup>. These potential savings amount to 1800 GWh for France, and 194 GWh for Portugal.

## Washing machines: no clear correlation between good efficiency classes and low energy consumption

Also for washing machines, only classes A+ and better remain on the EU market (since December 2013). Switzerland implements the same MEPS as the EU. Since December 2011 the current Energy Label with classes up to A+++ is compulsory. Because also new calculation methods for efficiency and energy consumption and a new measurement standard were introduced, trends over time are difficult to quantify.

<sup>9</sup> We project the lifetime savings of the appliances to their year of sale. It is a simpler approach than estimating the savings if the entire stock was replaced, but this approaches the figure of annual stock savings (after full replacement). Assumed lifetime was 15 years.

In 2014, three years after the introduction of the new Label, close to half of all washing machines sold are in the top class A+++ (Fig. 3). Not only are new, better classes needed for the washing machines Energy Label, but also the EEI formula needs to be revised. With today's Label, there is no clear correlation between good efficiency classes and low energy consumption. It seems that A+++ washing machines are efficient because they are large rather than because they use less energy. Results in the full report support this thesis:

- Differences in average declared annual energy consumption between efficiency classes are small to inexistent.
- Washing machines sold in good efficiency classes (A+++, A++) are larger than in lower classes.
- With increasing efficiency, there is also a strong trend to larger washing machines.
- Portuguese washing machines have higher average declared energy consumption than machines sold in the EU and France, even though they are of higher efficiency. The reason is that Portuguese washing machines are larger.
- Analysis of the EEI calculation formula shows that it follows a strictly linear efficiency approach and seems to be favouring machines with larger capacities.

This does not necessarily mean that larger / more 'efficient' washing machines indeed have a higher energy consumption when actually washing laundry. The real energy consumption of a washing machine is defined by many factors, such as the number of wash cycles, the programme and water temperature choice, the amount and type of laundry. If large washing machines adapt their water and energy consumption in an optimal way to the amount and type of laundry for all programmes, they need not consume more energy than smaller washing machines. It is however not known how washing machines behave in situations different from the standard testing situations. If they do not adapt well to small loads in real conditions, large washing machines bear the risk of more energy waste than smaller ones.

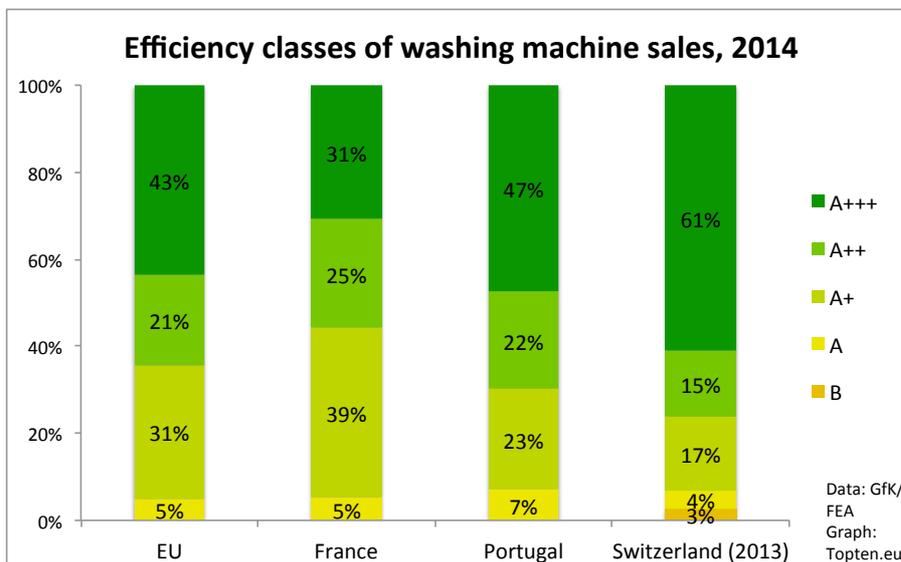


Figure 3: Efficiency classes of washing machine sales in 2014 (Switzerland: 2013)

If the Energy Label is to support energy savings and provide a basis for future MEPS that do not simply ban small washing machines from the market, its efficiency definition needs to be improved to be linked to absolute energy savings, not just per kg capacity.

### Tumble driers: 42% heat pump driers sold in Europe

Figure 4 shows a big surprise: the EU tumble drier market is characterised by high efficiency. Energy-efficient heat pump tumble driers (classes A and better, consuming around 50% less energy than conventional driers in classes B and C) accounted for a staggering 42% of the total sales across the EU in 2014. Differences between countries are still large: heat pump

driers accounted for only 13% of all drier sales in France, and for 32% in Portugal. Even more efficient is the Swiss market, where since 2012 only heat pump tumble driers are allowed. While on the old energy label they were all in class A, the new energy label makes efficiency differences between heat pump driers visible. MEPS in Europe are banning classes D (since November 2013) and C (from November 2015) from the market.

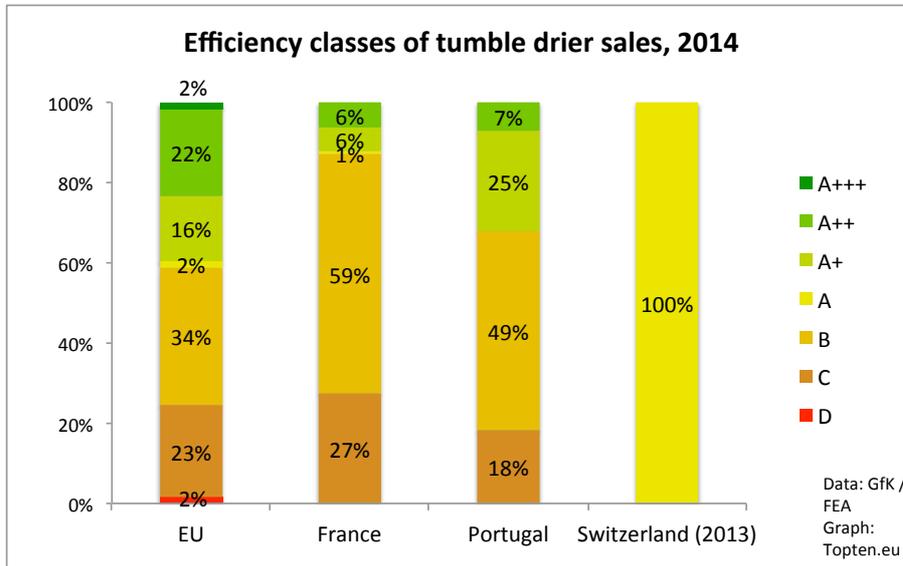


Figure 4: Efficiency classes of tumble drier sales in 2014 (Switzerland: 2013). Note: In Switzerland the revised Energy Label was introduced later than in the EU, and the new classes will show in the 2014 data only. On the new Label, class A is literally non-existent, because it is located in the 'efficiency gap' between conventional and heat pump driers.

Tumble driers sold in better efficiency classes (A+, A++, A+++) do have a clearly lower average declared energy consumption than less efficient driers – unlike for washing machines. Nearly no reduction in average energy consumption can however be seen from class C to B. Only an 11% efficiency improvement is needed to reach class B (A+: 35%), and B driers are larger than those sold in class C (while driers sold in classes B, A+ and A++ are of the same size). Consequently, it is questionable if Ecodesign tier 2, banning class C from November 2015, will result in any energy savings. The big savings potential clearly lies in heat pump driers: if all driers sold in the EU in 2014 had been in class A+, these would have saved 5600 GWh over their lifetime of 15 years compared to what was really sold. For France and Portugal, equivalent savings would have amounted to 1700 GWh and 90 GWh, respectively.

Prices of A+ heat pump driers are yet clearly higher in France (+100%) and Portugal (+64%) than of class B driers. High A+ prices in France are reflected in the low sales share of this class. The price increase to A++ is much lower – and the sales share the same as in Portugal. Despite the higher purchase prices, heat pump driers are cost-effective for consumers: when considering total costs (purchase price + electricity costs), A++ is the least costly drier choice for French consumers, while for Portuguese consumers it is A+. The average EU market will soon be mature enough for MEPS at class A+ level. In individual countries however, promotion programs might be needed to accelerate the market uptake of heat pump driers.