Systematic market monitoring: a pilot project on TVs demonstrates the value for policy design

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Abstract

The Ecodesign and Energy Labelling regulations, covering a long list of energy using products, can have a strong influence on the market towards higher efficiency. But several decisions on minimum requirements and labelling scales have been taken based on weak and outdated market data. Some of the regulations are assumed to have been missing their targeted energy savings because the policy instruments had not been appropriately designed. A systematic monitoring of the market evolution based on quality data - which does exist – would allow evaluating the effects of policies and serve as a basis for future policy design.

Using GfK market data and in collaboration with WWF Switzerland, Topten has undertaken a monitoring of the TV market in Europe. Market data from 2007 to 2012, covering the entire EU and at the country-level for six countries, has been analysed regarding developments in sales, screen size, price and On mode power. For the 2012 data also the crucial information on the energy efficiency class is included. The results show the market trends towards larger screen size and higher energy efficiency and how the Label and Ecodesign implementing measures (in combination with the new measurement standard) have influenced the TV market.

The results of the TV market monitoring provide a sound basis for decisions in the framework of the Ecodesign regulation for TVs' revision. In addition the project' results demonstrate the value of a systematic market monitoring, when it is based on sound data.

Introduction

Decisions on product policies: systematic market monitoring needed

Based on the Ecodesign Directive from 2005 [1], its recast [2] and the recast of the Energy Labelling Directive from 2010 [3] the European Commission has introduced Ecodesign requirements for 16 product groups and new or updated Energy Labels for 9 product groups since 2005. These implementing measures are estimated to lead to Energy Savings of about 430 TWh annually by 2020 [4]. In 2013 some 15 new implementing measures will be adopted, saving another 360 TWh annually by 2020 [4], and more are to come in the near future. In general, the Ecodesign and Energy Labelling process is a success.

In many cases however, higher energy savings could have been achieved with policy instruments better aligned to the market and technical development. Several of the new Energy Labels need to be revised shortly after their introduction to the market: many products are already in the top-A+++-classes of the new Labels for washing machines [5], dishwashers [6], and tumble driers [7]. In the case of TVs, the Ecodesign regulation is thought to have been of only little impact, because ‘the requirements are at a lower level than many products already on the market’ [8]. As a key reason for not setting adequately ambitious requirements, the Ecodesign evaluation study [8] identifies ‘the absence of up-to-date information on market developments’.

Today, market data is gathered by the authors of the preparatory study, based on which a Working Document is drafted, which is discussed by the Consultation Forum, before a draft regulation is voted. The whole process takes up to 7 years (in the case of the recently adopted Ecodesign and Labelling regulations for boilers and water heaters), and by the time of the application of a measure, the data the decision was based on was out-dated in many cases. Another problem is the quality of the market data: as the budget for the preparatory study does not cover expenses to buy quality market data, the authors have to rely on publicly available data –usually data provided directly by the industry. The data is often only a sample, not sales-weighted and quickly outdated, and is not comparable to data assessed at a later stage for evaluation reasons. The time-consuming task of data gathering is not

cost-effective, because it has to be repeated each time a market overview is of interest (preparatory study, impact assessment, evaluation of measures, revision of measures…), while the results are not comparable because different sources and methods have been used. In order to improve the availability of market data to adequately decide on Labels and requirements, Topten International suggests a systematic market monitoring activity in Europe, based on quality sales data. Sound sales data showing the market development in recent years can be bought from market research companies (e.g. GfK) [9]. If in the future a mandatory product registration database is set up, sales data could be linked to this and an annual report on (aggregated) sales development could be produced using the database. It would be more cost-effective to observe the market with a regular (e.g. annual) monitoring, based on sound data that is comparable over time and between countries, than to undertake isolated data gathering tasks whenever the state of the market is of interest. A regular market monitoring for all product categories with an Energy Label allows to react in time and start a revision of the Label before all models are in the top class, and to design new Ecodesign requirements and Energy Labels appropriately so that these instruments, the introduction of which goes hand in hand with high administrative costs before and during their implementation[1], have a maximum effect on the market towards higher energy efficiency. An example of how simple an effective market analysis regarding energy efficiency can be is shown in a recent publication covering Swiss appliances sales data [10 and11].

With the present paper, Topten demonstrates the value of a systematic market monitoring, through the example of a market monitoring on TVs. The study on TVs was realized based on GfK data, and thanks to the support of WWF Switzerland [12] and the European Climate Foundation [13],

The Ecodesign regulation on TVs [14] is the first Ecodesign implementing measure to be revised. The revision process started in 2012 with the publication of a discussion paper [15] and a Consultation Forum. The adoption of the revised Ecodesign and Labelling regulations is planned for the fourth quarter of 2013 [4]. The TV sales data analysed in the present study allows to draw conclusions on the effectiveness of the requirements on On mode power introduced by the 2009 Ecodesign regulation [14] and of the Energy Label adopted in 2010 [16]. At the same time the availability of sound market data will help to support decisions on appropriate minimum efficiency requirements for the revised regulations.

TVs: market development, standards and product policies

The preparatory study on TVs was started in early 2006. At the same time, the measurement standard was revised to introduce a different methodology to measure the TVs On mode power. The Ecodesign regulation on TVs was adopted in July 2009, the Energy Labelling regulation in September 2010. During these years and up to now the market changed dramatically: the formerly dominating Cathode Ray Tube (CRT) TVs completely disappeared from the market and were replaced by flat panel TVs – mainly by Liquid Crystal Display (LCD) TVs. This development was to a large extent drawn by the change from analogue to digital TV broadcasting, the trend to high resolution (HD) displays, and went hand in hand with a trend to larger screens [17]. In 2012 Light Emitting Diode (LED)-backlit LCD-TVs are dominating the market, and current driving forces to market development are trends towards internet connectivity, 3D or ultra high definition TVs [14]. It is expected that in the mid-term Organic Light Emitting Diode (OLED)-TVs will start the next fundamental market change. The most important steps in TV standardization and policy making since 2007 are briefly presented below.

a) August 2007: preparatory study finalised

Started in early 2006, the preparatory study on TVs was finalised in August 2007. Sales data used in the study was from 2003 and 2004, when CRT TVs were still clearly dominating the market. The authors of the preparatory study stated that a fast development was happening at the time of research and that it was 'difficult to give a precise evaluation of the mid to long term situation' [17]. LCD and Plasma TVs had newly entered the market and started to replace CRT TVs.

b) October 2008: Publication of IEC 62087:2008 standard

[1] According to the Evaluation of the Ecodesign Directive [8], 12.5 million Euros were spent between 2006 and 2011 by the European Commission for preparatory studies and a similar amount on staff and other costs.

Already since 2004 experts from major TV manufacturers and independent international experts were involved in the development of the new IEC dynamic test signal methodology [18]. IEC 63087:2008 [19], published in October 2008, was the first international test standard to introduce a test methodology based on a dynamic broadcast signal for measuring the average On mode power of TVs. The authors of the preparatory study recommended basing the Ecodesign and Labelling declarations on this methodology. Before 2008, according to IEC 62087:2003, a static three-bar black & white test pattern was used. Many manufacturers however also declared maximum power, established for safety testing [18].

c) October 2008: Consultation Forum
A working document (WD) on Ecodesign requirements for TVs was discussed at a Consultation Forum (CF). This was not the first WD but a version that had already been updated [20].

d) March 2009: Final Ecodesign draft
The Regulatory Committee approves the final draft Ecodesign regulation.

e) May 2009: Rejection of Energy Labelling draft
The energy labelling proposal is rejected by the European Parliament. The labelling scale in the proposal was based on the 'A-20%' format. The Parliament claimed that the Labelling format was confusing to consumers (the same day however the Parliament adopted a new Energy Label for refrigerators and freezers based on the same format) [21].

f) July 2009: adoption of the Ecodesign regulation
The European Commission adopts the Ecodesign regulation on TVs [14]. It enters into force in August 2009, and after one year the requirements regarding maximum On mode power apply. The requirements on Standby and Off mode power (max. 1W / 2W) apply already from January 2010.

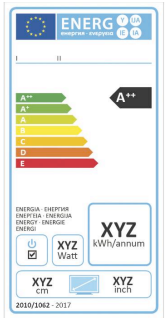


Fig 1: Energy Label for TVs

g) February 2010: new Energy Labelling draft
A new Energy labelling draft is circulated for stakeholders' comments. The labelling scale is now based on the A+ format, which is in line with the recast of the Energy Labelling Directive to be adopted in May 2010 [3]. The A class limit has been shifted to a 20% more ambitious level compared to the proposal from 2009. Soon after (in March), a classification scale with an even more ambitious class limit is circulated.

h) August 2010: tier 1 On mode power applies
New TV models put on the market after this date are required to have a power consumption in On mode corresponding to class F or better ('normal' resolution). Full HD TVs can have higher power, as defined in the regulation. Thus, class G is partly banned from August 2010.

i) September 2010: adoption of Labelling regulation
The new Energy Labelling regulation for TVs [16] is adopted by the Commission. The Energy Label with the classification scale proposed in March enters into force in December 2010. The classification scale of the Energy Label is based on the Energy Efficiency Index (EEI), which is also used in the Ecodesign regulation. The EEI expresses the power of a TV relative to the power of a reference model of the same screen size. The EEI and the Energy Efficiency class are thus indicators of the relative power (and energy consumption, as this is directly linked to power). Consequently, a large TV can be labelled with the same or even better Energy class despite consuming more energy than a small TV. The annual energy consumption is also indicated on the label (Fig. 1). It is however questioned whether consumers are responsive to this secondary information figure [24].

j) December 2011: the Energy Label applies
The transition phase of the Energy Labelling regulation is terminated and the declaration according to the Energy Label is compulsory.

k) April 2012: tier 2 On mode applies (class D)
The second step of the minimum efficiency requirement of the Ecodesign regulation applies: new TVs put on the market must be in class D or better.

Present / Future developments:

The Ecodesign regulation for TVs [14] asks for a review of the regulation in 2012. The revision process has started in 2012 with the publication of a discussion paper [15] and a Consultation Forum. The adoption of the revised Ecodesign and Labelling regulations is planned for the fourth quarter of 2013 [4].

Development of the Best Available Technology (BAT)

Topten [23] is an online tool to inform about the most energy efficient products. Topten selects its products according to official Labels and Standards. In 2009 the European Topten website started to list TVs according to the Energy Label draft. The rapidly increasing efficiency of the TVs listed on Topten.eu demonstrates the fast technological development that happened along the discussions and already before the introduction of the implementing measures. In September 2010, when the Labelling regulation was adopted, Topten already listed 60 class B and 5 class A TV models. One year later, when the Energy Label applied, there were 110 class A TVs and 17 A+ TVs on Topten.eu. By April 2012 the number of A+ TVs on Topten.eu has climbed to 99 and the lists showed that the first A++ TVs had emerged on the market [25]. At present, there are more than 170 A+ TVs and 21 A++ TVs on the lists of Topten.eu, despite additional selection criteria such as a strict maximum On mode power of 64W (the model numbers include all similar models on the market. Some might be of similar construction).

Data and Methods

Coverage

GfK [26] is a professional market analysis company present around the world. In Europe GfK covers over 90% of the markets in all 27 Member States. Sales data plus many product characteristics are obtained from retailers. For this market monitoring TV sales data were obtained from GfK, for the years 2007 – 2012. The data covers TV sales in the EU-24 plus additionally sales on country level for six countries (table 1).

Table 1: Countries covered and population

Country	Population[2]
EU-24*	499.3 Mio
Germany	81.7
France	64.7
UK (without Northern Ireland)	62
Spain	46
Poland	38.1
Denmark	5.5

* EU-24 includes Germany, Denmark, United Kingdom, Italy, Poland, Spain, Austria, Belgium, Bulgaria, Estonia, Finland, France, Greece, Hungary, Ireland, Latvia, Lithuania, Netherlands, Portugal, Czech Republic, Romania, Slovakia, Slovenia and Sweden.

For the years 2007 – 2011 sales numbers, price and annual energy consumption as declared for different size categories and TV technologies were retrieved. As power was not available, it was re-calculated from annual energy consumption. From 2008 - 2010 for about 80% of the TVs power was declared according to the IEC 62087:2008 standard. Annual energy consumption was declared according to the calculation formula that was included in the Energy Labelling regulation later (E= P*1.46) (for more details on measurement and calculation methods see below). After November 2011 the Energy Label for TVs became compulsory [16]. So, for the 2012 dataset also the energy efficiency class was included. No information on brands or models is included.

Sales of CRT TVs are included in the total sales and in the average price, but no detail information such as size, price or power/energy consumption is available for CRT TVs sold in Poland, Germany and Denmark. After 2010, CRT sales were 0 in these countries, and the missing information concerns only the years before. The details of the data gap are shown in [28].

[2] Data from Eurostat: http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/

On mode power – changing measurement methods

Between 2007 and 2010 the declaration of the TVs On mode power changed, because a new measurement methodology was introduced. IEC 62087:2008 was the first international measurement standard to introduce a testing methodology based on a dynamic broadcast signal for measuring the On mode power of TVs. The Ecodesign regulation [14] refers to a dynamic measurement method. Since 2010 On mode power of TVs on the European market is declared according to this measurement method.

Experts were developing the new test standard since 2004 already. Also the authors of the preparatory study recommended the new method based on the dynamic broadcast content signal to be referred to for the Ecodesign and Energy Labelling regulations in 2006/2007 [17]. At the same time it was decided that annual energy consumption would be declared, based on an assumed daily use in On mode of four hours and not considering low power modes. Major manufacturers started to apply this methodology from 2008 [18].

Which of the On mode power testing methods (static 3-bar signal of IEC 62087:2003, dynamic signal contained in IEC 62087:2008 or maximum On mode power as declared for safety testing) and annual energy consumption calculation methods were used in the declarations before 2008 is not known. Additionally before 2010 there was no obligation to declare a power or energy consumption value according to a given test standard. Therefore the power values before 2009 / 2010 should be interpreted with caution. It is assumed that for 2008 – 2009, about 80% of the TVs were declared according to the measurement and calculation methods used today in the Energy Labelling regulation for TVs [18].

Not included: Standby power and total energy consumption

Information on Standby and Off mode power is not included in the TV Monitoring project. These were certainly relevant modes for the energy consumption before the TVs Ecodesign regulation became effective in 2010, and which limited the power of these modes to maximally 2W. Before 2009 Standby and Off mode power were not declared in a standardised way, and since 2010 these low power modes are no longer crucial for the total energy consumption.

The monitoring project does not present total energy consumption values, even though this figure can be calculated from the On mode power and the sales – based on the calculation formula used in the Energy Label. The Labelling regulation assumes a daily On mode duration of 4 hours [16], based on the findings from the preparatory study [17]. The authors of the preparatory study expected that the On mode duration per day would rise to an average of 5 hours in the future. Daily viewing time may differ between countries, but also for different TVs. The DEFRA study 'Powering the nation' from 2012 for instance found an average daily TV watching time of six hours in UK, the average household possessing 2.3 TVs [27]. The study does not differentiate between different TV sets. Assuming that larger TVs are used in the living room than in the sleeping room and that average viewing times for the two TV types differ, this influences the total energy consumption. Considering this, the different methods used for declaring the On mode power over the years plus the decreasing importance of the low power modes (without having information on it) it was decided to only present On mode power figures instead of annual energy consumption. The data presented however allows deriving estimations on the evolution of TVs' energy consumption in Europe.

Results and interpretation

The graphs and results presented below represent a 'best of'-selection. The full results are publicly available in the full report: *European TV market 2007 – 2012: development of energy efficiency before and during the implementation of the Ecodesign and Energy Labelling regulations* [28].

From 2007 to 2010 the number of annually sold TVs increased by 50% - from 37 million to 56 million units per year (fig. 2). These figures impressively show the impact the introduction of new technologies have had – assumedly especially the switchover from analogue to digital TV. After 2010 the sales decreased at a similar pace – back to 47 million units in 2012.

Not only were more TVs bought, but also larger ones: Fig. 3 shows the on-going trend towards larger screens. Between 2007 and 2012 the sales have generally shifted to larger screen sizes. Fig. 3 shows a constant decrease of the sales proportion of very small TVs (screen diagonal < 20 inches)

and a constant increase for the two largest size categories (screen diagonal between 40 and 50 inches and 50 to 60 inches). The sales proportions of the intermediate sizes (20'' – 30'' and 30''- 40'') show less clear trends but some fluctuations over the observed years. This graph can be interpreted

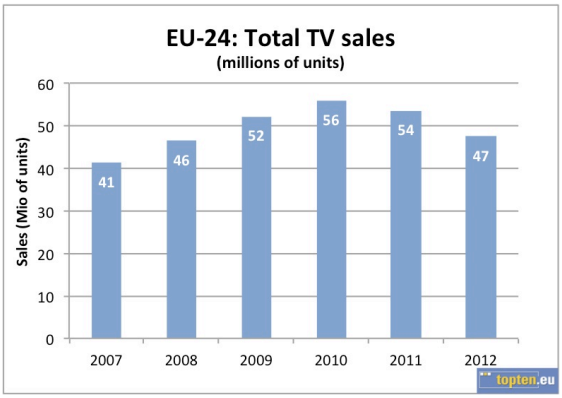


Fig. 2: Total annual TV sales in the EU-24

Data source: GfK

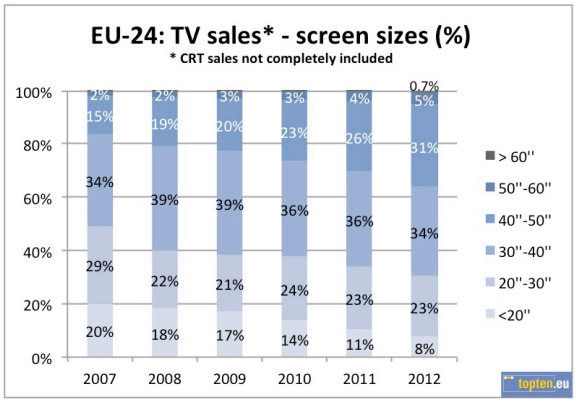


Fig. 3: TV sales in the EU-24: percentage of different screen size categories

'' = inches; 1 inch = 2.54 cm. Data source: GfK

with the trend towards two or more TVs per household in mind. While living room TVs are clearly getting larger, TVs bought to be placed in bedrooms will usually be smaller. Looking at the detail screen sizes and the 2012 EU sales, 32'' and 40'' – 43'' turn out to be by far the most popular screen sizes: these two categories together accounted for 53% of the sales in 2012 (32'': 29%; 40'' – 43'': 24%) (graph in [28]).

From 2007 to 2012 two interesting market transformations regarding technology happened: CRT TVs disappeared completely from the market and were replaced by flat panel TVs (LCD and Plasma), and the first generation of LCD-TVs (with Cold Cathode Fluorescent Lamps (CCFL)-backlight) was replaced by the next LCD-generation, using LED for the backlight (fig. 4). The Plasma technology never reached the breakthrough and the sales share always remained below 10%. Also Rear Projection TVs ('Rear Pro') do not reach a noteworthy market share.

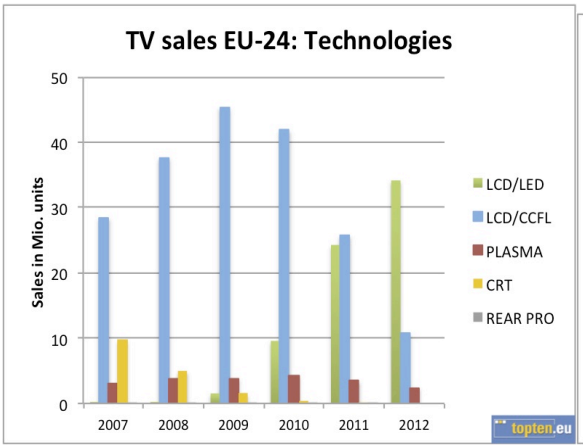


Fig. 4: EU-Sales of different TV technologies

Data source: GfK

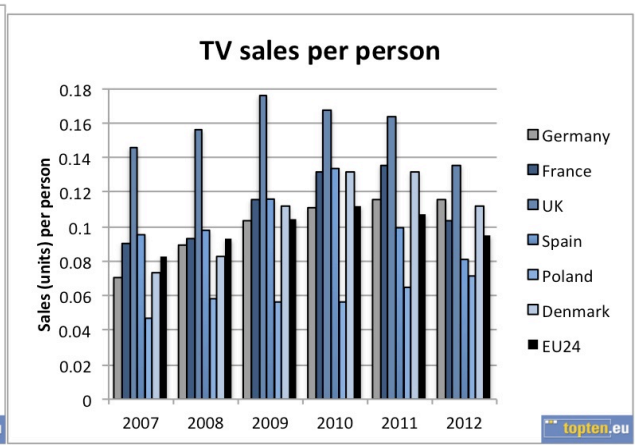


Fig. 5: TV sales per person

Data source: GfK

People do not show the same readiness to buy new TVs all over Europe; there are considerable differences between countries (fig. 5). Most striking is the buying behaviour of UK consumers: in 2007 the British bought almost twice as many TV sets per person as the EU average. At the other end of the scale is Poland: from 2007 to 2011 Polish were around 50% less likely to buy a new TV than the EU average. Contrary to the other countries however, sales in Poland continued to increase until 2012.

Fig. 5 cannot be interpreted without also looking at fig. 6, which shows the trends in average screen size in the countries. As fig. 3, also this figure impressively shows the strong and on-going trend towards larger screen sizes. Across the EU-24, the average screen diagonal increased from 29.3" (74.4cm) by 4.5 inches (+11.4 cm) to 33.7" (85.6cm) between 2007 and 2012 – equalling an increase of 15%.

Fig. 6 also shows that in the UK, where people buy most TVs, they buy smaller TVs than in other countries. UK is a very mature TV market with an average of 2.3 TV sets per household [27]. The smaller average size will be a result from a high sales percentage of secondary TVs, which are placed in the sleeping room or kitchen. These TVs are smaller than living room TVs. The contrary applies to Poland, where comparatively few but rather large TVs are sold. Are these mostly living room TVs, and therefore on average larger? The number of TVs Germans buy is close to the European average, but the average screen size is among the largest. In France the trend towards larger screen size stopped in 2008, the sales per person remained near the EU-average. Also in Spain TV sales per person were near the EU-average, but dropped to lower values in 2011 and 2012. The average screen size however was higher in these two years, after having been among the lowest before. Danish TV consumers compete with Germans and Polish for the largest average screen size, while sales per person increased to values a bit higher than the EU average. When dividing the sales by the number of households instead of persons and thus considering for different household sizes, the outcome is not changed much, but some of the differences between countries become smaller [28].

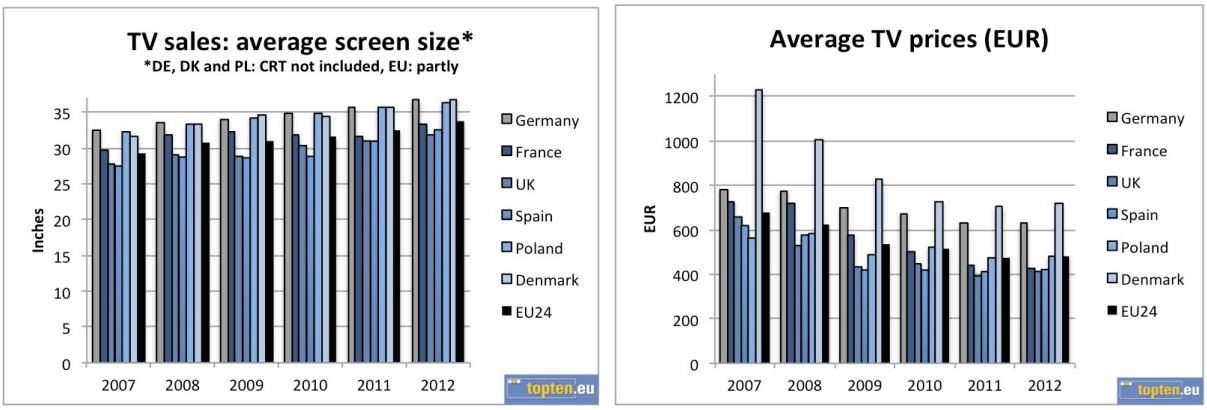


Fig. 6/7: TV sales– average screen size / Average TV prices in EU and countries

Data source: GfK

Despite growing screen sizes, average TV prices in general decreased from 2007 to 2012, at a slowing rate which seems to have stopped in 2011. Average price reduction in the EU was 29% from 2007 to 2012, but around 50% when looking at certain size categories and thus minimising the effect of increasing average screen size [28]. The price decrease over these years was smallest in Poland (-15%) and Germany (-19%), and strongest in Denmark (-42%) and France (-41%). Not surprisingly, the two countries with lower average screen size, UK and Spain, also pay the lowest average prices for their new TVs. Prices in Poland have been similarly low, probably mostly due to the rather low Purchasing Power (PP)[3]. French average prices decreased to be among the lowest after 2010, more or less in line with shrinking screen sizes. In Denmark, which has the highest PP of all EU Member States, the highest average TV prices are paid.

The analysis of the 2012 data in the full report [28] shows that TV prices are closely linked to screen size, but not to energy efficiency.

Larger TVs (of the same technology) have higher power in On mode [17] – this easy-to-understand rule which is also embedded in the EEI calculation formula of the Ecodesign and Energy Labelling regulations (larger TVs can have higher power), leads us to fearing that the strong trend towards

[3] Source: Eurostat

http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Comparative_price_levels_of_consumer_goods_and_services

larger screen sizes observed above goes hand in hand with higher average On mode power. Fig. 8 makes clear that this fear is not justified: despite the TVs getting larger, the declared average power in On mode has dramatically decreased, especially between 2008 and 2012.
As mentioned in the chapter 'Data and Methods', On mode power values before 2010 have to be interpreted with caution. Before 2010 manufacturers were not obliged to declare power values, and before 2009 different and changing measurement standards were used. Despite these restrictions there are no large discrepancies or jumps in the power values from 2007 – 2009. From 2007 to 2008 the declared average power values increased a bit – probably due to the application of the new measurement method IEC 62087:2008. When going more into detail and looking at certain sizes and technologies, the graphs in the full report [28] show a power 'jump' especially for Plasma TVs, while there was little change in the average power of LCD TVs. It is not known according to which measurement standards the On mode power was declared before 2008, and we'll only consider the information from 2008, when assumedly most manufacturers would use the same method as recommended later for the Energy Label, when looking at the development in On mode power,

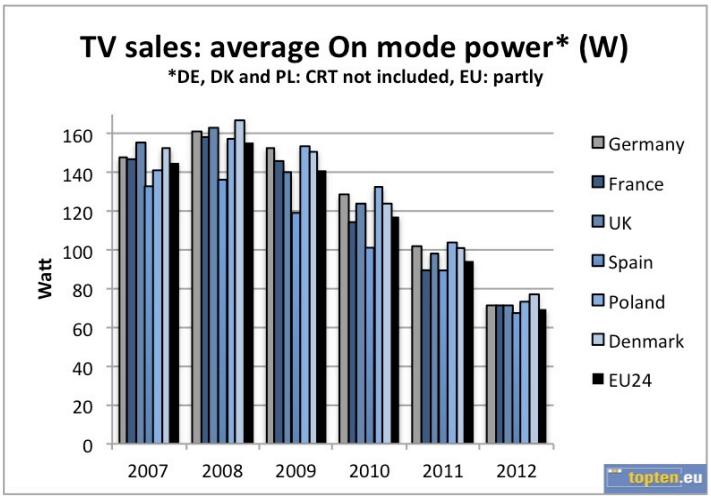


Fig. 8: Average TV On mode power

Data source: GfK

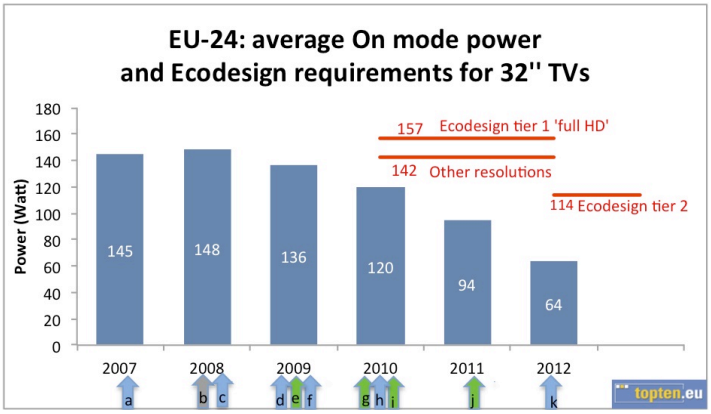
After 2008 the average power of TVs decreased continuously: from 2008 to 2012 the average On mode power of TVs sold in the EU-24 decreased by impressive 55% - despite an average screen diagonal increase of 10% over the same period. In 2008 the average TV sold in the EU reached an On mode power of 156W – by 2012 the average On mode power was 70W.

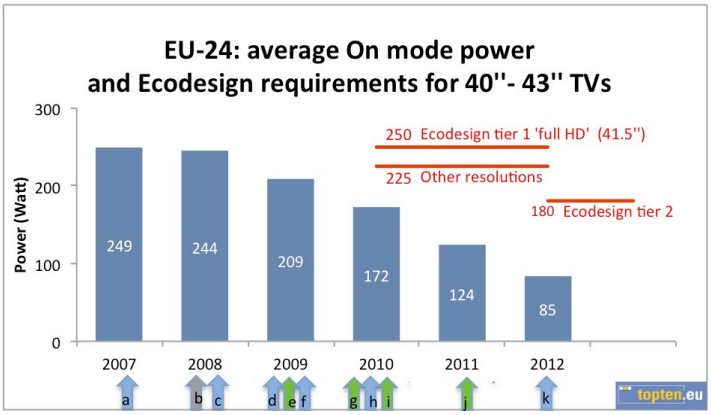
Not surprisingly, average power is higher in those countries with large average screen sizes: Germany, Denmark, Poland. In Spain and, from 2010, France, where consumers preferred smaller TVs, average On mode power is lower. The average power of TVs in UK was close to the European average, even though average TVs are smaller in UK than in the EU average. The differences between countries became smaller over the years. Especially in 2012, average power is much more levelled across the countries than before. Graphs 9 and 10 show that this cannot be the effect of the On mode power Ecodesign requirements (because their level was clearly above the average power). Was it the effect of the newly compulsory Energy Label, leading manufacturers to design their models along the energy class limits? Another factor is certainly the number of market players that was reduced: the number of different TV brands available on the EU market declined from 746 in 2007 to 480 in 2012 (minus 36%; source: GfK). It is thinkable that the market transformation process towards flat panel and especially LED-backlit LCD TVs eliminated a number of market players, who could not keep up with the pace of development and dropped out of the competition. The reduction of competitors may have lead to a reduction of product 'diversity' on the market and thus contributed to a more uniform market also regarding average power in different countries.

The reduction in average On mode power is impressive. But the graph does not answer the question on the role of the Ecodesign regulation in this development. Obviously most of the trends leading to higher efficiency (e.g. flat panel TVs, LED-backlight) had started a long time before the implementation of the Ecodesign regulation. So, does the graph above show a 'natural' market

development that would have equally happened without implementing measures, or did the Ecodesign regulation lead to the product improvement? Toulouse et al. [24] state that the On mode power requirements of the Ecodesign regulation had practically no impact on the market, because both tier 1 and 2 requirements were already met by most main manufacturers. Also the Evaluation of the Ecodesign Directive from 2012 [8] concludes that the Ecodesign requirements for TVs were at a lower level (in terms of energy efficiency) than many products already on the market, while more ambitious requirements could have been introduced.

The detail market data on power for specific screen sizes here allows to investigate this question further. In order to find out more about the effect of the Ecodesign regulation we need to look at certain screen sizes, since the 'cut-off' level of the Ecodesign regulation is dependent on the screen size. The two most popular screen sizes (32" and 40" – 43") are selected for the detail analysis regarding On mode power development. The arrows in the figures 9 and 10 indicate the progress in standardisation and policy making and implementation. It should be noted that before decisions were taken, yearlong discussions including the industry (and some other stakeholders) took place. Many manufacturers were aware of the standards' and regulations' content some time before their publication.





a) August 2007: preparatory study finalised

b) October 2008: Publication of IEC 62087:2008

c) October 2008: Consultation Forum

d) March 2009: Final Ecodesign draft

e) May 2009: Rejection of Energy Labelling draft

f) July 2009: adoption of Ecodesign

g) February 2010: new Energy Labelling draft

h) August 2010: application of tier 1 On mode power

i) September 2010: adoption of Labelling regulation

j) December 2011: application of Energy Label

k) April 2012: application of tier 2 On mode power (class D)

Figs. 9 + 10: Average On mode power and Ecodesign requirements for 32'' and for 40"-43"TVs

Data source: GfK

For the 40'' – 43'' TVs, the Ecodesign limits were calculated for a screen size of 41.5 inches. Between 2008 and 2012 the average On mode power decreased by 57% to 64W for 32'' and to 85W (-65%) for 40'' – 43'' TVs.

Tier 1 of the Ecodesign requirements on On mode power applied from August 2010. For both screen sizes considered here the level of tier 1 was close to the average power from 2008, but clearly higher than the average power in 2010. For 32" TVs the limits were 31% (full HD) and 18% (other resolutions) above the average power, for 40" – 43"-TVs 45% (full HD) and 31% (other resolutions). The percentage of full HD TV sales was not assessed in this study.

In April 2012 the tier 2 On mode power requirement applied, corresponding to class D. A quick glance forward at fig. 11 shows that class D had almost entirely disappeared from the EU-market in 2012, and that this measure must have been of very little impact: only 1% of the TVs sold in the EU in 2012 were class D TVs – the least efficient class still allowed on the market. For both screen size categories in figs. 9 and 10 the average power of the complete 2012 sales was even more below the Ecodesign limit than for tier 1: for 32'' TVs the average On mode power was 78% lower than the second Ecodesign limit, for 40'' – 43'' TVs the average was even 113% lower. The average power of this latter size category was below the tier 2 limit in 2010 already.

Based on these figures we can agree with the studies mentioned above [24 and 8] and conclude that, for the two most important screen sizes, all On mode power limits of the Ecodesign regulation had practically no impact on the market. The efficiency development was happening anyway, the Ecodesign regulation did not have any effect on it. The discussions about energy efficiency may however have supported the technological development to focus also on this aspect, and not only on increasing screen size and additional functions.

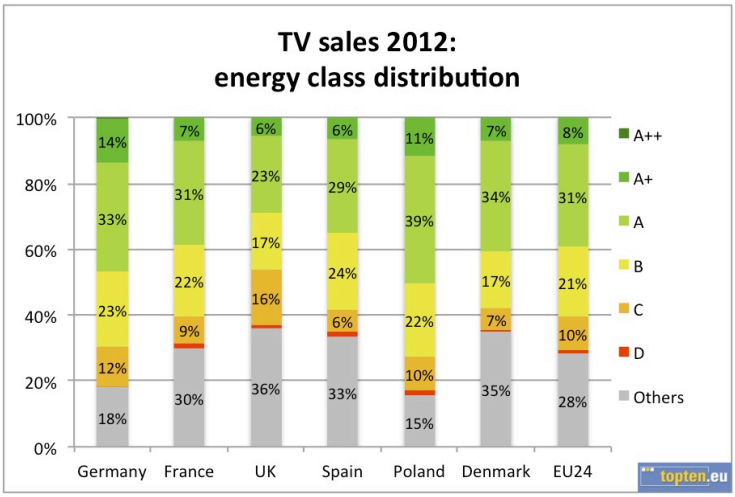


Fig. 11: Energy efficiency of TV sales, 2012

Data source: GfK

Fig. 11 comes close to the simple type of graph we are suggesting to update and publish on an annual basis for all products with an Energy Label in place: evolution of the efficiency, shown in the classes, over the years (as in [10]). Because for TVs the Energy Label was only compulsory after November 2011, such 'dynamic' graphs for the different countries will only be possible from next year. Figure 22 shows the distribution of the 2012 sales on the Energy Classes in the countries and the EU-24. 'Others' include sales of models that were marketed before December 2011 and were not required to have a label, and new models, for which the label information was missing. Fig. 11 lets us draw interesting conclusions:

- In the first full year of the new Energy Label, between 29% (UK) and 50% (Poland) of the sold TVs were in class A or better. Across the EU 39% were in class A or better.
- Class D is no longer visible on the market (EU: 1%). Class D corresponds to the tier 2 power limit enforced in April 2012.
- 6% (UK) to 14% (Germany) of the sales were of class A+, across the EU A+ accounted for 8% of the sales. This class was not expected to appear on the market before 2014; only then will this class have to be shown on the Energy Label.
- For many models the information on the Energy Class was missing: between 15% (Poland) and 36% (UK) of the sold TVs were not labelled. The EU-average is 28%. These figures also include models that were marketed before December 2011 and do not need to have the Label. A figure containing only data on 2012 models in [28] shows that also many of the new models were sold without Energy Label (21% across the EU).
- The most important class regarding sales share in 2012 is class A: class A has the largest sales share in all countries observed. Across the EU, 31% of all TV sales were class A TVs.
- Once again, differences between countries are considerable. Quite surprising is the high sales share of A and A+ TVs in Poland. The explanation might be linked to the findings above

that consumers in Poland buy larger (but fewer) TVs than in other countries and that larger TVs reach better efficiency classes.

- The possibility to provide an overview on the efficiency of the market with simple graphs like fig. 11 is one of the strengths of a compulsory Energy Label. The opportunity to observe the market development on a regular and systematic basis should not be missed.

Conclusions

General

The reduction in average declared On mode power of 55% between 2008 and 2012 is impressive. The gains in efficiency on a power per screen area basis have been clearly stronger than the trend to larger screen sizes. What this means for the effective electricity consumption by TVs is however not clear. Several factors drive the electricity consumption to higher values than declared for single TVs or to higher values than some years ago for the entire EU (more details in [28]):

- The real average TVs use duration in On mode, and of primary and secondary TVs, is not known and has most likely become longer than before the market transformation to flat panel TVs.
- Real On mode power is in most cases higher than what is declared, up to 30% according to [30].
- Only in 2012 the average declared On mode power was back at the level of the On mode power the old CRT TVs [28]. The sales peak in 2009 – 2010 occurred before the efficiency gains through technological development made up for the increased functionality and screen size of the flat panel TVs. These 'energy hungry' TVs remain installed for the next decade or so.

Evaluation of Ecodesign requirements and Energy Label

Ecodesign requirements on On mode power

The results show that the development towards lower power in On mode has started in 2008 / 2009 and that the development was much faster than anticipated. The development towards better efficiency seems mainly to be linked to the new technologies that were introduced, especially LED-backlit LCD-TVs. The efficiency development clearly outran the Ecodesign regulation, which was left without any impact.

According to the Ecodesign Directive [1] the minimum requirements should be placed at a level which aims at the Least Life Cycle Cost (LLCC) for consumers. Because the question on the credibility of the data provided by the industry lead to intense discussions and because it was difficult to predict the market development based on the data at hand, the Commission decided to define cautious minimum requirements but to include an early revision date [23].

However, when the Ecodesign regulation was adopted in mid-2009, even the availability of sound data on average On mode power like the one presented here would not have much helped the Commission to define more appropriate power limits. The trend towards lower power started only in that year, and because of changing measurement standards and no obligation to declare standardised power values, also the data up to 2008 would not have allowed to predict the fast development of the years to come. Only manufacturers might have been able to make more adequate estimations.

Energy Label

With the Energy Label for TVs, a brand new Label was designed. Since there was no existing older Label, there was no resistance about possible downgrading of existing products, and clearly the original A to G scale should have been aimed at. This is what the Energy Labelling Directive [3] stipulates: "The format of the label shall retain as a basis the classification using letters from A to G (…)". And only the next paragraph adds the possibility to go beyond A if needed: " Three additional classes may be added (…) if required by technological progress. Those (…) will be A+, A++ and A+++ …". However, already in the first year of the Label being compulsory, 8% of the products were in class A+ across the EU. A+ was not expected to be reached before 2014 and therefore does not

have to be displayed on the Label. Obviously the development towards higher efficiency has been faster than anticipated when the Energy Label was designed in 2010.

However, also when the Energy Label was adopted, the rate of improvement to come was difficult to be predicted – even with more up-to-date data at hand. With data up to 2009, only the beginning of the efficiency development could have been observed, and the sales share of LED-LCD-TVs was only 3% in that year and just starting to grow. The number of TV models on the product lists of Topten.eu [25] shows that a rising number of models met the class B limit, but only very few the class A limit at the time of adoption.

A positive point is that, contrarily to the situation for most Labels that have been revised (refrigerators, washing machines, dishwashers, tumble driers), the top class of the TV energy Label is still empty [6]. Also the A++ limit seems yet to require a lot of technological efforts and the use of the discount granted for Automatic Brightness Control (ABC) [30]. The current Energy Label continues to provide an incentive for further efficiency developments.

In addition the Label now provides a basis for a continuous and easy market monitoring, and it will be interesting to see if the market continues to evolve at the current pace – or even faster, now that the Label is in place.

Combined effect

The Ecodesign regulation and Energy Label did have only a faint influence on the trend towards higher efficiency of TVs. It can however be questioned whether without power and energy consumption of TVs being a topic of interest, information obligation, minimum requirements, and the possibility to market high efficiency TVs with a good label class, manufacturers would have used the new technologies to the same extent. The improved measurement standard combined with the introduction of the implementing measures has certainly supported the market development towards better efficiency.

Recommendations for revision

The revised Ecodesign regulation on TVs must avoid setting requirements that would not be ambitious enough and only leading to administrative efforts without effect. The market overview provided in the present paper can be used for more precise prognoses about the future market development. The insights gained here can support the setting of ambitious minimum requirements. Today's class A should be defined as minimum requirement from 2015, A+ announced as second step.

At the same time the Energy Label should be revised to restore the original A to G scale. Class A could be the 'incentive' to be reached by future, even more efficient TVs, and correspond to today's class A+++. Today's best TVs are in A++ [6]. Considering the fast efficiency development of the last few years and the even more efficient OLED technology, which is expected to enter the market in the future, a future-oriented labelling scale is appropriate.

Another point that should be tackled is the strictly linear relative efficiency approach. The current EEI formula and Labelling classification scale allow large TVs to reach a good Energy Class despite consuming more energy than smaller TVs (which can get a worse classification). This approach does nothing to stop the continuing trend towards larger screen sizes, as shown in fig. 6. Up to now, the increasing efficiency of the products has the stronger effect on average power than the growing screen sizes, and average power has been decreasing dramatically in the last few years despite TVs getting larger. At some point however the efficiency potential will become smaller, and a Labelling / Ecodesign approach favoring large TVs will impede reaching the targeted energy savings. Therefore a digressive or even capped approach (like Energy Star Version 5.0 for TVs, which introduced a maximum power in On mode of 108W in 2011 [31]) should be considered for this revision, for both the Ecodesign requirements and the Energy Label.

Systematic market monitoring is essential

Whether the European Commission would have been able to define more appropriate Ecodesign requirements and Energy Label, had there been market data at hand the way it is presented here is not clear because there were changes in the measurement standards, no declaration obligation and a

very fast technological development. With the present situation with an Energy Label in place, it is however easy to track the market. The chance for a systematic market monitoring must not be missed. The data exists - professional market analysis companies like GfK collect the data anyway – mainly for their primary costumers, the industry and retailers. The data is not too expensive, and it is more cost-effective to buy it and analyze aggregated figures, which needs not consume much time, on a regular basis than to hire consultants to search for freely available data whenever a revision or an impact analysis is due. The data presented here is up-to-date, complete (covering all countries, manufacturers, technologies, …), sales-weighted and the assessment method remains the same. Therefore it can be compared between countries and over time, which is not true for the data now collected for preparatory studies and impact assessments. On a longer term sound, aggregated sales data could also be provided by a mandatory product registration database – if such a system is set up in the future. A systematic market monitoring based on sound data allows seeing in advance if the Ecodesign and Labelling regulations need to be revised. It allows evaluating the effect of implementing measures, and it serves as a sound basis for the decision on the level of the revised Ecodesign requirements and Labelling scales. After some years (equaling the average lifetime of a product) the data can serve as a basis for quite precise models on the development of the energy consumption by the stock of the monitored products across the EU. With high quality data at hand, the time-consuming task of data collection and discussions about the credibility of the data are unnecessary. The policy making process can be sped up, and the resulting regulations will be of higher impact. Therefore, a systematic market monitoring - based on sound market data – in Europe is a need, for all product categories with an Energy Label.

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