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PART 2/3

COMMISSION STAFF WORKING DOCUMENT

IMPACT ASSESSMENT

Accompanying the document

COMMISSION REGULATION (EU) .../...laying down ecodesign requirements for electronic displays pursuant to Directive 2009/125/EC of the European Parliament and of the Council,
amending Commission Regulation (EC) No 1275/2008,
and repealing Commission Regulation (EC) 642/2009

and

COMMISSION DELEGATED REGULATION (EU) …/... supplementing Regulation (EU) 2017/1369 of the European Parliament and of the Council with regard to energy labelling of electronic displays

and repealing Commission Delegated Regulation (EU) No 1062/2010

{C(2019) 1796 final} - {C(2019) 2122 final} - {SEC(2019) 339 final} -
{SWD(2019) 355 final}

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ANNEXES

Annex 1 Procedural information

1. LEAD DIRECTORATES GENERAL (DG), DECIDE PLANNING/CWP REFERENCES

DG GROW and DG ENER are Co-Chef de File for Ecodesign. DG ENER is the lead DG for this product group. DG ENER is Chef de File for energy labelling.

The Decide number of the underlying initiative for the review of ecodesign requirements for electronic displays is 2014/ENER/011 (no inception impact assessment because this is initiative predates the requirement).

The Decide number of the underlying initiative for the review of energy labelling for electronic displays is 2013/ENER/066 see above for the IIA & OPC.

The following DGs (Directorates General) were invited to contribute to this impact assessment: ENER (Energy), SG (Secretariat-General), GROW (Internal Market, Industry, Entrepreneurship and SMEs), ENV (Environment), CNECT (Communications Networks, Content and Technology), JUST (Justice and Consumers), ECFIN (Economic and Financial Affairs), REGIO (Regional policy), RTD (Research and Innovation), CLIMA (Climate Action), COMP (Competition), TAXUD (Taxation and Customs Union) EMPL (Employment), MOVE (Mobility and Transport), TRADE (Trade) and the JRC (Joint Research Centre) were consulted on the draft IA in May 2018.

2. ORGANISATION AND TIMING

The review of the ecodesign and energy labelling for televisions and television monitors started in 2012 and a review study was conducted for this purpose. This evaluated the impact of the current legislation, as reported in Annex 9, also looked at the technological and economic evolution of the sector and at stakeholders' views. Results from the study have been used directly as input to the analysis model of Annex 4.

The review process ran far longer than usual, with four Ecodesign Consultation Forums (in October 2009, October 2012, December 2014 and in July 2017; see Annex 5), while usually only one is needed. This happened largely because of political scrutiny at College level which led to long delays and the subsequent need to take into account technology evolution, market changes and new features introduced for TVs and displays.

The last Ecodesign Working Plan 2016-2019, adopted in November 2016, confirmed that televisions and electronic displays continue to be a priority product group. Furthermore, the recent Energy Labelling Regulation (EU) 2017/1369 stipulated that televisions are one of the five priority subjects for which the Commission should adopt a new energy label regulation in accordance with the said overall regulation by 2 November 2018.

Article 19 of the Ecodesign Directive foresees a regulatory procedure with scrutiny for the adoption of implementing measures. Article 17 of the Energy Labelling Regulation foresees consultation of the energy labelling expert group before the adoption of a delegated act. Subject to qualified majority support in the Regulatory Committee and after scrutiny of the European Parliament and of the Council, the adoption of the measures by the Commission is planned for the end of 2018.

3. CONSULTATION OF THE RSB

The Regulatory Scrutiny Board (RSB) delivered a negative opinion on a draft of the Impact Assessment on 18 June 2018 after the meeting on 13 June. The draft report was subsequently improved, based on the Board's Opinion and the "Horizontal issues for discussion" sent to DG ENER on 8 June 2018, and was resubmitted to the Board. A positive 2nd opinion with reservations was issued on 4 July 2018, containing further recommendations for improving the report The table below shows how those two sets of recommendations are addressed in this revised Impact Assessment report.

RSB Opinion	**Where and how the comments have been taken into account**
(B) Main considerations	
(1) The report does not clearly draw conclusions from the evaluation(s) to support the problem definition.	Information has been added to section 1.1 and to the problem definition which gives more information on how the evaluation process fed into the problem definition. Information has also been added to section 6. In Annex 2 a description of the full review process, started in 2012, with even preliminary discussion in 2009, is now presented. The results of the preparatory study/evaluation are summarised as well as the evolution of the need to act
It is unclear about the success of the previous measures and the discontinuity in projections.	Information on the savings achieved has been added to the introduction, see pages 3-4, as well as at the end of the new section 1.5 on need to act and in Annex 9. Sections 1 and 2 in particular have been enriched and content partially reorganised to better describe the success of the current Regulations in reducing energy consumption and the need to act to capture the relevant future potential savings that, otherwise, would be missed in a BAU scenario.
(2) The report is not precise enough on the content of the options and does not sufficiently explain future developments in prices and energy savings.	Section 6.1 illustrates the methodology and key assumptions in respect to prices. A graph in this same section (Figure 18) illustrates the expected progress in terms of populating the highest energy classes. In the specific market sector of electronic displays, the evolution of prices has no demonstrated correlation with energy efficiency improvements. Moreover, for the same efficiency class, the cost of new products tends to decrease. This is clarified in sections 6.4, 6.6.1 and in Annex 6.
It contains factual and numerical errors, which do not provide the necessary guarantees for the choice of the preferred option.	The values in the tables related to the Ambi scenario have been corrected (see Annex 4, tables 4.4 and 4.5), however no change in future projections resulted for inputs.
(3) The report does not integrate circular	See new information added to sections 2.3, 6.2.3 and

economy aspects comprehensively and in a way which is consistent across ecodesign products. It does not impact assess them either**.**	Annex 15. It is also explained that while circular economy aspects were not specifically impact assessed, they were discussed at the Consultation Forums (2012 – 2017).
(C) Further considerations and adjustment requirements	
(1) The report should clarify whether horizontal and/or product specific evaluations were conducted to prepare this initiative. In addition, it should clarify what the expectations were of the original legislation, to what extent the results deviate from them, and what are the lessons to draw for this. Key conclusions should directly feed the scope and problem definition. In particular, the report should explain very clearly why the predicted savings on energy consumption in 2025 are now 27% lower than what was predicted in previous impact assessment from 2007.	The 2012 Review study was specifically on TVs and also covered monitors and signage. Additional details evaluations and discussion with stakeholders along a process lasting over 6 years (including 4 Consultation Forums, a previous impact assessment approved by the IAB, a public consultation and WTO notification–Ecodesign only on a previous draft proposal) have been added to Annex 2.1. Clarifications have been introduced in section 1.1 with a graph extended beyond 2025, better showing that the predicted and now achieved savings exceed predictions by about 7%)). It has been clarified how the lack of accuracy in the previous preparatory work was due to an unprecedented evolution of the sector during the preparatory work and in the lack of sales/stock data (now available and reliable). Section 1.1 now better illustrates the situation and explains that real savings calculated on more reliable 2017 data show that projections to 2020 are in fact 7% better than predicted.
(2) The report should better explain the scope of the initiative and why it adds (only) signage displays. The description of the options should become more precise. The report should be clearer about what elements that have already been agreed upon and how stakeholder views shaped the options and influenced the choice of the preferred option. Any divisive issues between stakeholders should be better explained.	Information has been added to section 2.2 “problem of outdated scope” to better explain the current scope and the proposed future scope, which covers computer monitors and signage displays as well as TVS. Text has been added to section 5.2 to give more details on the options. Annex 5 gives information on what aspects were discussed, and possibly agreed upon, by stakeholders in the Consultation Forum meetings (also summarised in Annex 2). Stakeholder views have been added throughout section 5, see also Annex 2 section 4.
(3) The report should provide a more thorough analysis of the circular economy dimension of the initiative. The limits to the approach need to be more transparent. The report should in particular	See answer B 3 above. A new section on “Effects on health” has been added to Annex 15, also summarised in section 6.2.3. Stakeholder views are set out in 5, measure 5.

expand on the impacts on the health and safety of the use of flame-retardants. The report should present the views of the different stakeholders and explain how it addressed them.	
(4) The report should explain the evolution of the baseline in more detail. In particular, it is currently not clear why the ongoing trend of increasing energy efficiency seems to stop in 2024.	See new text in section 5.2.1. Figure 1 (previously in Annex 8) shows a comparison between the projections in the preparatory study of 2007 (up to 2025) and current projections (up to 2030). The trend to increasing energy use continues beyond 2025 but no prediction is available which is why the graph appears to stop.
Errors in the impact analysis need to be corrected. In particular, inconsistencies across tables on the energy efficiency of the ambitious scenario need to be resolved. Assumptions around this scenario should be better substantiated.	The tables have been corrected to avoid any incorrect data interpretation. The two values spotted in table 4.4 were the result of the retroactive application of the modelling, with no consequence on the forecast for 2020
The international comparison of ecodesign limits gives the impression that the proposed EU ecodesign limits are less ambitious than those of US, India and Korea. This issue should be better explained and the figure, if necessary, revised	The previous graph for comparison of eco-design limits has been replaced by 3, more relevant graphs: see figures 11 (Proposed EU Ecodesign limits for 2020, 2022, 2024 compared to best performance grades in the US, India and Korea), 12 (Proposed Labelling top class compared with non EU energy efficient top class displays) and 14 (Proposed label classes compared with non-EU labelling schemes for a 40" (44dm2) HD display). These show that the proposed ecodesign limits are not less ambitious than those of US, India and Korea
(6) The monitoring and evaluation section should be strengthened to reflect how progress in this specific product group will be assessed.	The section has been integrated, particularly answering the question on "main indicators" to proof the success of the measure.
(7) This report should be streamlined as far as possible with the impact assessments accompanying the other proposals in this package of proposals for implementing legislation regarding ecodesign and energy labelling. It requires in particular that the specific characteristics of the product come out more clearly in the different sections of the impact assessment.	The structure of the report and the annexes has been harmonised as far as possible with the other impact assessments and further explanations of the specificities of TVs and monitors have been added to Annexes 6 and 14.
Horizontal Issues	
1) Evaluation of how product regulations have worked is not systematic.	See answer to B1

2) The need to act is not always clear.	A new section 1.5 has been added.
3) The approach to defining energy labelling bands for specific products does not seem consistent.	Information has been added to section 1.2.
4) The reports are not transparent about what elements have already been agreed upon (and on what basis), and what is left open for political decision, i.e. what is to be assessed in an impact assessment.	See information added to section 5.1.
5) The addition of circular economy requirements appears artificial	See answer B.3 above.
6) There is no critical discussion whether the applied methodological approach (MEErP) is consistent with the extension of the framework	See new information in section 6.1 on the methodology used.
7) The approach to a range of issues going beyond energy efficiency as such – new testing methods, scope, exceptions – is not explained for all product groups	See for example problem definition 2
8) The assessment of some impacts is unclear, e.g. as regards the employment effects, potential cash-flow problems and business revenues	See section 6 on assessment of options
9) The choice of the preferred option is not always sufficiently well justified with the presented analysis.	See section 8.1
10) As the ecodesign and energy labelling proposals are to be adopted in a package, information about contributions from particular product groups need to be presented systematically and in ways that allow for comparisons.	See section 8.1
RSB Overall (second) Opinion 04.07.2018 – Positive with reservations	**Where and how the comments have been taken into account**
(B) Main considerations	
The Board acknowledges the improved coverage of circular economy aspects and a better description of the consultation process. However, the report still contains significant shortcomings that need to be addressed. As a result, the Board expresses reservations and gives a positive opinion only on the understanding that the report shall be adjusted in order to integrate the Board's recommendations on the following key	

aspects. (1) The report does not sufficiently distinguish between energy savings from technological changes that were the result of the current regulation and those that would likely have happened without it. Because of a similar issue in the analysed future scenarios, the effects of the proposed measures is likely to be overestimated. (2) There are inconsistencies and errors in data in the report and annexes. Although this does not undermine the choice of preferred option, it puts into doubt the evidence supporting the intervention.	Additional text has been included in section 1.1. The modelling has been checked and modified, and the revised data has been added to the report and the annexes where appropriate, in particular in Sections 6 and 7 of the main report and Annex 4.
(**C) Further consideration and recommendations for improvement**	
(1) The report should present more evidence or analysis to distinguish the effects of autonomous technological progress from those of the current regulation. This is also of importance to establish an appropriate baseline. The current baseline assumes that energy savings for monitors will stop in 2018 and for televisions in 2027. The report should justify this assumption in a sector with strong technological progress (which is the argument to leave classes A and B of the proposed energy label empty).	Additional text has been added to Sections 1.1 and 5.2.1 on the baseline option.
(2) Numerical errors persist. The energy saving potential and greenhouse gas reductions presented in the graphs in the report are not consistent with the data in annex 4. Moreover, the corrected figures in the annex are not internally coherent. This should be fixed with adequate explanation for the non-expert reader to understand. Solid justification for the initiative depends on robust energy savings estimates.	The modelling has been checked and modified, and the revised data has been added to the report and the annexes where appropriate, in particular in Sections 6 and 7 of the main report and Annex 4.
(3) The report presents the options in more detail. However the report should be clearer on the rationale between the ecological option ('Eco') and the ambitious option ('Ambi'). The report should be more transparent on the implications on health and safety of maintaining flame retardants in the 'Eco' option, despite their serious toxicity, ecotoxicity and threat to the health of workers in the recycling industry. The report should explain the necessity of an option excluding signage displays from the scope of Energy labelling given the large consensus among	Additional justifications have been added to section 5.2.2, page 33 on signage displays and section 5.2.2, page 34 on halogenated flame retardants.

stakeholders on the need to address signage displays.	
(4) More specific indicators have been identified regarding monitoring. The report should provide information on how often progress will be assessed and it should also refer to the next review or evaluation planned or required by the parent legislation.	Text of Section 9 in the main IA report has been updated.
(5) The attached quantification tables of the various costs and benefits associated to the preferred option of this initiative need to be adjusted to reflect changed estimations of costs and benefits.	The relevant tables have been adjusted where appropriate as per the updated modelling results. See Annex 3.

4. EVIDENCE, SOURCES AND QUALITY

This impact assessment builds on the previous version that had been approved by the Impact Assessment Board on 4/9/2013. For this deep review and update, the main supporting studies were as follows:

- Review study 2012[1]
- Study assessing consumer understanding of a draft energy label for electronic displays[2] (2017)
- Evaluation of the Energy Labelling and Ecodesign Directives SWD(2015) 143 final[3]

JRC studies were also relevant I particular on "circular economy" aspects such as durability, recyclability and flame retardants (see References in Annex 17). An external consultant was used to examine specific technical aspects.

Energy-relevant data about over 400 televisions on the market and other displays was also analysed[4].

The Commission also established a dataset (see Annex13 for last dataset used) containing information about the environmental performance of electronic displays in support of the possible ecodesign and energy labelling measures, to support a proper ambition level and to reflect recent technology developments. The dataset was based on energy data been provided by industry representatives and integrated with additional data collected from official documentation of industry on the WEB. The different data sources have been compared to fine tune technology progress evolution and trends and update the impact assessment.

Based on these studies and this preparatory work, the Commission drafted the policy options presented in this Impact Assessment.

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1 Centre for Strategy & Evaluation Services CSES, Evaluation of the Ecodesign Directive (2009/125/EC), Final Report, March 2012. available from http://ec.europa.eu/smart-regulation/evaluation/search/download.do;jsessionid=Xsj8RodUb9p9C8bLidTO3m64uBmXJ0VY-fA9bvU7oDTxQpMpnajH!781246111?documentId=1228634

2 Study assessing consumer understanding of a draft energy label for electronic displays, available from https://www.centerdata.nl/en/projects-by-centerdata/energy-label-electronic-displays

3 http://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A52015SC0143

4 Data from DigitalEurope, analysed by Commission and VHK.

Stakeholder input received during the above review studies, the four Consultation Forums and the consultation on the Inception Impact Assessment for the Energy Label were also been taken into account.

Annex 2: Stakeholder consultation

This Annex gives a brief summary of the consultation process. Details are given of how and which stakeholders were consulted. In addition, it explains how it was ensured that all stakeholders' opinions on the key elements relevant for the IA were gathered.

There has been extensive consultation of stakeholders during the review studies, and before and after the Consultation Forum meetings. Further external expertise was collected and analysed during this unusually long process. The results of four stakeholder consultation forums are further described in this section.

1. Review study, evaluation and stakeholder consultations

In the period observed by the original preparatory study of 2006/2007 for the 2009 regulations and until 2008, the average energy consumption of displays did not decrease (see figure 2.1, from the 2012 preparatory study) and new technologies such as LCD panels with LED backlighting were considered just only a niche market. Since that time, the rapid development and market adoption of this technology and other energy saving technologies resulted in industry-led energy efficiency improvements faster than had been originally anticipated, with not efficient technologies voluntarily abandoned (such as "plasma" technology) by industry.

The new process of reviewing the ecodesign and energy labelling regulations on televisions and television monitors started in 2012 when stakeholders in the Consultation Forum agreed with the Commission that the existing regulations needed to be revised. EU and international stakeholders and Member State experts were consulted from the very beginning of the review work. Furthermore, displays other than televisions and television monitors, such as computer monitors or digital photo frames were included in the first Ecodesign Working Plan 2009-2011 (as ENER Lot 3) and possible measures were discussed at a Consultation Forum meeting on 8 October 2009.

The Review study was completed in August 2012. It provided the Commission with technical and market data used to evaluate the existing 2009 television regulations and to support the development of the new ecodesign and energy labelling proposals for electronic displays. Furthermore, market and technical data was acquired through several bilateral and multilateral meetings with stakeholders (in particular with DigitalEurope and EERA) from 2013 to 2017.

The review work included:

- analysis of power consumption of the products per unit of screen size for the various levels and label classes, in order to reassess minimum energy performance standards (MEPS) and energy classes and comparison with other non EU legislation for MEPS or voluntary labelling;
- discussion of the impact of the Ecodesign and Energy Labelling Regulations to that date, with a historical review of the market changes over the previous five years;
- an overview of the key issues that required consideration in the context of reviewing and revising the Regulations;
- discussion of scope of coverage and definitions, technology trends and product features (i.e., screen size, LED back lit LCD displays, 3D, smart products, automatic brightness control, fast start and stand-by);
- an overview of the existing ecodesign requirements and an analysis on test data for televisions;

- a brief discussion of the measurement methods.

Among the different aspects that emerged from the data collection, studies and review , the following are the most relevant in this context:

- test standards and possible “defeat devices” (gaming);
- Signage displays, a new market and out of scope starting to emerge on the market;
- Auto Brightness Control (ABC) started to emerge as a feature; unprecedented technology progress in the area of display panels was observed;
- Ultra High Definition (UHD) was starting to come to the market in "premium" products, possibly involving a higher energy use; Monitors without "an included tuner" were increasingly used to watch video content;
- a linear limit, as in the current Regulations, provides an advantage to the biggest displays; (the weight of components not depending from the display size is smaller) and a misleading signal to customers;
- additional needs to for justifying the urgency of update the existing test standard and compliance control methods in order to prevent "defeat devices" in new "smart" products;
- need to provide a more realistic energy efficiency calculation for the biggest displays, in light of the trend to increase size and eliminating what appearing as a kind of privileged treatment;
- need to improve treatment of displays under the WEEE Directive form displays, by making disassembling/dismantling quicker and more effective and improving the yields of recyclable materials;
- the existing test standard IEC 62087, based on measuring the energy use of a television or other display when inputting from an external player a video test loop made of a collection of typical broadcast content from broadcasters worldwide, appeared already as possibly prone to "gaming", i.e. "smart" displays could detect the typical luminance test pattern and modify their energy use patterns to give misleading results.

2. Working document and Consultation Forum

The Commission services prepared Working Documents with ecodesign and energy labelling requirements which were circulated to the members of the Ecodesign Consultation Forum for the meeting on 8 October 2009. New working documents, based on the results of the Review Study 2012, were circulated to the members of the Ecodesign Consultation Forum for the meetings on 8 October 2012 and 10 December 2014. The last version was circulated and discussed at the Ecodesign Consultation Forum meeting of 6 July 2017. The Ecodesign Consultation Forum represents all EU Member States and EEA countries, together with industry associations and NGOs in line with Article 18 of the Ecodesign Directive. The Working Documents and the stakeholder comments received in writing before and after the Consultation Forum meetings were posted on the Commission’s CIRCA system. Minutes of the Consultation Forum meetings can be found in Annex 5.

3. Results of stakeholder consultation during and after the Consultation Forums

The 2012 review study was first discussed with stakeholders during a Consultation Forum on 8 October 2012 (see minutes in Annex 5.3).

The proposal then presented was based on the findings that had already emerged at that stage: a rapid evolution of TV technology, the introduction of new types of TVs, demand for improved picture quality, as well as strong competition between manufacturers.

A majority of stakeholders, including Member States, were in favour of a review of the Regulations, with increased stringency in Ecodesign, the use of the same formula in the Labelling regulation, widening the scope to include computer monitors and signage displays, and not providing an advantage to the biggest displays. Some Stakeholders already asked for the introduction of "non-energy" requirements in Ecodesign and the use of flame retardants was signalled as hindering recycling.

An overwhelming majority of Member States and NGOs agreed on a proposed extension of the requirements to electronic displays other than TVs, including but not limited to computer monitors and digital photo frames, with manufacturers requesting exceptions for specialised displays with distinct characteristics.

The majority of stakeholders accepted the proposed approach for regulating on-mode power demand of electronic displays and were in favour of a proposal that was based on a logarithmic regression line[5].

A majority of stakeholders were in favour of including in the proposal requirements on non-energy related aspects, including recyclability. At the same time they noted a need for proper measurement methods and questioned the enforceability of such requirements.

Results of the CF of 2014: The proposed ecodesign requirements for electronic displays were generally supported by Member States and stakeholders. A new C**onsultation Forum** was held on **10 December 2014 (**Minutes in Annex 5.2) with an improved ecodesign proposal including a first set of material efficiency requirements in the light of the "Circular Economy" strategy[6] adopted in the meantime. Stakeholders, however, suggested in the meeting to suspend the preparation of the labelling proposal because of the ongoing review, at that time, of the Energy Labelling framework Directive[7].

Proposed resource efficiency requirements were supported by the overwhelming majority of stakeholders. Some specific requirements, however, criticized by industry representatives, were withdrawn from the draft proposal to avoid non-cost-effective burdens on the industry.

The working documents fully took on board comments expressed by Member States and stakeholders at and after the Consultation Forum meetings of 8 October 2012 and of 10 December 2014 (and thus differs in a number of aspects from the Commission's original proposal as contained in the original working documents prepared for the consultation process).

Based on these inputs the Commission **started reviewing the already approved 2013 Impact Assessment** (see Annex 10) for the Ecodesign Regulation of electronic displays. Shortly after, the internal procedure was stalled again until the Commission adopted its Ecodesign **Working Plan 2016-2019**[8] where the revision of **the implementing act for electronic displays is mentioned as one of the priorities.** It also reports the situation that indeed the Ecodesign measure had been through the inter service consultation (ISC) and WTO notification and that a primary energy saving of 83 TWh was expected. In accordance with

5 Requirements laid down in Regulation 642/2009 were based on a linear regression line

6 Closing the loop - An EU action plan for the Circular Economy, COM/2015/0614 final

7 Regulation (EC) /2017/1369

8 COM(2016) 773 final, Brussels, November 2016.

the “default” primary energy factor (PEF) of 2.5 set in the Energy Efficiency Directive (2012/27/EU) this means a saving of (at least) 33 TWh/year in electricity for the year 2030.

Public consultation

A previous version of the proposed ecodesign measure was notified in the "better regulation" web portal on 21 December 2016. 16 comments were received, mostly from manufacturers' representatives. A number of "position papers" were sent by manufacturer representatives to the Commission and members of the Consultation Forum as well.

Result of public consultations, WTO opinions and manufacturers positions expressed:

- the draft proposal included in the scope electronic displays "integrated" in a number of products subject to the WEEE Directive and possibly having a wide diffusion in future, such as computers refrigerators, vending machines, etc. however all manufacturers expressed concern about having different eco-design regulations on different components of the same product and clearly voiced a preference for "vertically" regulating the products (i.e. by including in the review of Ecodesign for a specific product the requirements for integrated displays, if any).
- Industries and associations of the chemical industry were against the specific wording in the draft proposal, referring to specific technology or techniques to glue components: this was mostly due to an unclear wording that has been corrected.
- Mandatory labelling of displays for presence or absence of mercury or cadmium was criticised, voicing for a mandatory requirement only for signalling "presence" of such dangerous substances.
- Environmental NGOs and recycling industries welcomed the proposal possibly banning use of welding or firm gluing for components to be removed at the recycling plant.

A further Consultation Forum was held on 6 July 2017 (Annex 5.1) where a new labelling proposal, in line with the new Energy Labelling framework Regulation 2017/1369 was discussed. The meeting also discussed a possible new label layout and the indicators to include, following the results of an on-going consumer understanding survey[9].

During the Consultation Forum, the "disputed" aspects of the Ecodesign proposal were discussed with stakeholders and in particular:

- "vertical" regulation: the Commission announced to stakeholders the clear preference of industry for regulating displays in the context of the product where they are integrated into;
- Use of glue: the Commission presented a new wording for the dismantling requirement that found industry relieved but the recycling industry disappointed;

Plastic marking and flame retardants: the Commission proposed to set a limit for marking of plastics parts only above 50 grams; the comments of the main stakeholders on key features of the Commission services’ Working Document received during and after the Consultation Forum can be summarised as follows:

- **Scope:** stakeholders agreed that integrated displays should not be covered, but agreed to the inclusion of signage displays.

[9] The final report of the study is available here

- **Energy Efficiency Index:** stakeholders were concerned that the label be easily understood and support for the proposed double scale showing the energy efficiency in HDR mode was therefore mixed;
- **Energy label classes:** as the consumer study was still on-going discussion was to some extent limited, but DE, IT, NL, SE, ANEC/BEUC, DIGITALEUROPE, ENEL, and EED said it would be complicated to explain to consumers the relevance of the standardised EPS;

  Circular economy aspects: EURIC, supported by EERA and FEAC, stressed the need for better design to facilitate recycling and fully capture the 'circular economy' potential.

4. Open public consultation

An *online public consultation (OPC)*[10] took place from 12th February to 7th May 2018, with the aim to collect stakeholders' views on issues such as the expected effect of potential legislative measures on business and on energy consumption trends.

The OPC contained a common part on Ecodesign and Energy labelling, followed by product specific questions on (i) refrigerators, (ii) dishwashers, (iii) washing machines, (iii) televisions, (iv) electronic displays and (v) lighting.

1230 responses were received of which 67% were consumers and 19% businesses (of which three quarters were SMEs and one-quarter large companies). NGOs made up 6% of respondents, and 7% were "other" categories. National or local governments were under 1% of respondents, and 0.25% came from national Market Surveillance Authorities.

The countries of residence of the participants were predominantly the UK (41%) and Germany (26%), with a second group of Austria, Belgium, France, the Netherlands and Spain comprising together some 17%. Nine other Member States comprised another 9.5% of replies, but residents in 12 EU Member States gave either zero or a negligible number of responses. Non-EU respondents comprised around 5% of replies.

It should be noted that of the 1230 respondents, 719 (58%) replied only to lighting related questions as part of a coordinated campaign related to lighting in theatres. This was considered to significantly distort the replies, and for some questions the “lighting respondents” were removed from the calculation. Furthermore, as respondents did not have to reply to all questions, a high rate of “no answer” was observed (from 5% - up to 90%), in addition to those who replied “don’t know” or “no opinion”. To reflect better the actual answers, the number of “no answers” was deducted and the remaining answers treated as 100%.

4.1. Overall results

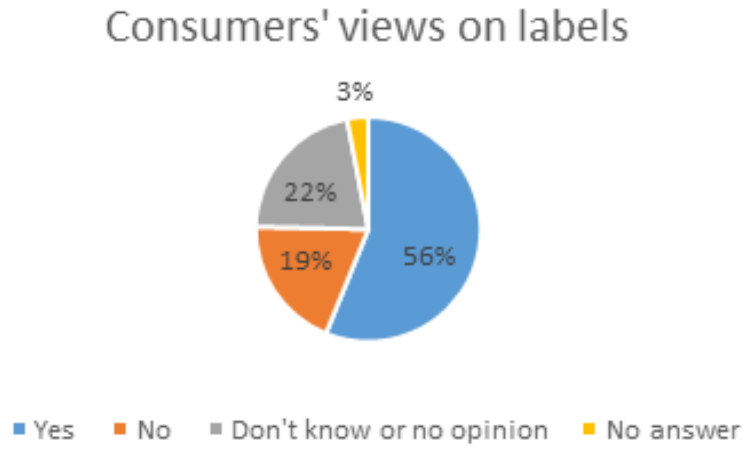
The first part of the questionnaire asked general questions aimed at EU citizens and stakeholders with no particular specialised knowledge of ecodesign and energy labelling regulations.

When asked regarding whether their professional activities related to products subject to Ecodesign or Energy Labelling, two-thirds (67%) of business respondents replied in the positive, and one-third (33%) in the negative, with no "no answer" replies. Almost the same percentages for "yes" (63%) and "no" (37%) were given when the business entities were asked whether they or their members knew of the Ecodesign requirements for one or more of

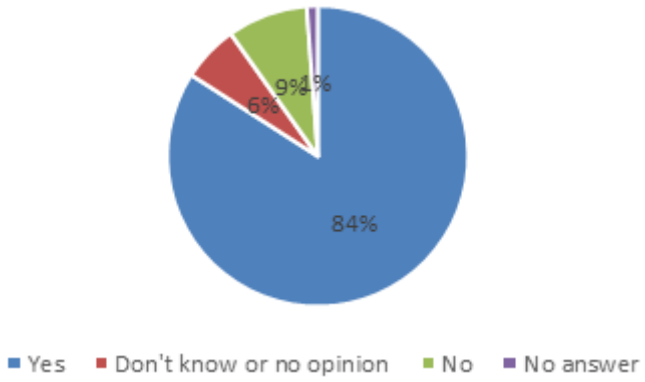
[10] https://ec.europa.eu/info/consultations/public-consultation-ecodesign-and-energy-labelling-refrigerators-dishwashers-washing-machines-televisions-computers-and-lamps_en

the product groups concerned by the questionnaire, although this was reduced to 50% "yes" and 50% "no" when asked about Energy Labelling.

In reply to the question: "In your opinion, does the EU energy label help you (or your members) when deciding which product to buy?" 56% of the total respondents to the OPC gave a positive answer. Of the remainder, around 22% cited "don't know or no opinion", 3% did not reply and 19% responded negatively.



However, looking only at the 'lighting respondents' (526 of the total 1230), 73% of them replied 'No', 'Don't know or no opinion', or 'no answer'. Given that the 'lighting respondents' mainly focused their comments on a narrow issue related to the current exemption for theatre lighting under ecodesign, the replies of these respondents to the earlier questions cannot necessarily be considered representative. Therefore, the calculation was also done with "lighting respondents" removed. Then, 84% of the respondents to the OPC agree that the EU Energy Label helps when deciding which product to buy. Of the remainder, around 7% cited "don't know or no opinion" or did not reply and 9% responded negatively.



When asked where they would look to find additional technical information about a product, respondents listed the following (more than one response permitted), ranked by the options provided: manufacturer's website (82%), the booklet of instructions (50%), [the Ecodesign] product information sheet (47%), internet user fora (39%), the retailer's website (18%), and consumer organisations (10%).

Some 63% of the participants were in favour of including Ecodesign requirements on reparability and durability, and 65% of respondents considered that this information should be on Energy Labels.

Regarding the reparability of products, participants valued mostly as "very important" to "important" (in the range 62%-68%)[11] each of the following: a warranty, the availability of spare parts, and a complete manual for repair and maintenance. The delivery time of spare parts was rated as 56% "very important" to "important".

Small and Medium Enterprises (SME) Consultation [SMEs < 250 employees]

One of the aims of the OPC was to gather specific information on SMEs' roles and importance on the market, and to acquire more knowledge on how the aspects related to the environmental impacts of these six product groups were considered by SMEs.

The quali-quantitative evaluation of the effect on SMEs of potential regulatory measures for the environmental impact of all six product categories gave the following results. Approximately 10.5% or replies were from SMEs. These SMEs were involved in the following activities (most popular cited first): (i) product installation, (ii) rent/ leasing of appliances, (iii) repair, (iv) retail of appliances or spare parts, (v) final product manufacture/ assembly, (vi) sale of second-hand appliances, (vii) "other" activities, and (viii) manufacture of specific components.

In the OPC responses, SMEs reported that they were aware of the Ecodesign and EU Energy Label requirements applicable to the products they were involved in. Nevertheless, SMEs mostly declined to respond (90%) or replied in "don't know/ no opinion" (6%) when asked about the potential impact on their businesses per se, or potential impacts on SMEs compared to larger enterprises, of the introduction of resource efficiency requirements in the revised Ecodesign and Energy Labelling regulations. Of those SMEs who gave an opinion, some 3-4% considered that the impacts could be negative, and around 1% thought that the effects would be positive.

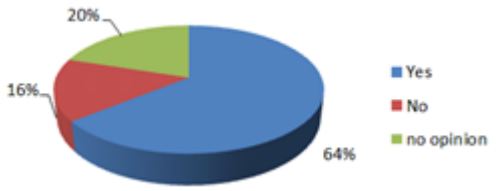
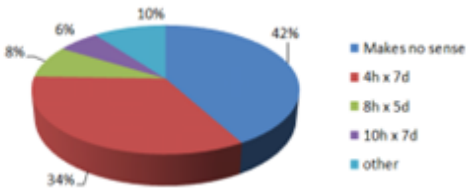
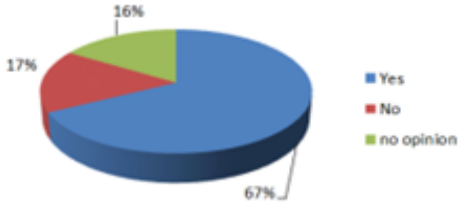
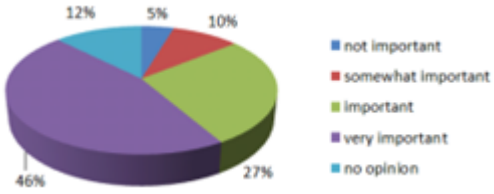
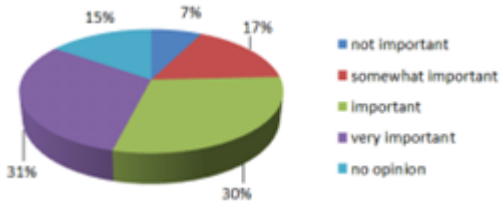
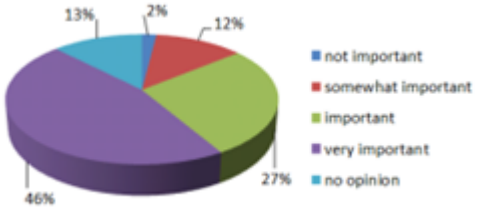
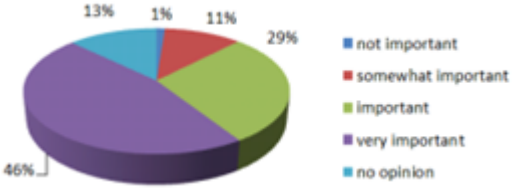
4.2. Responses relating specifically to electronic displays

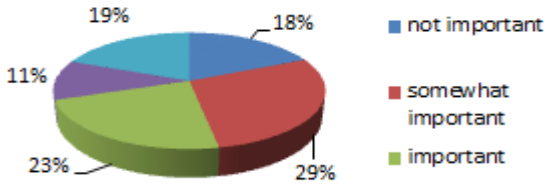
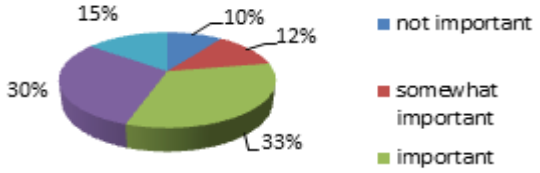
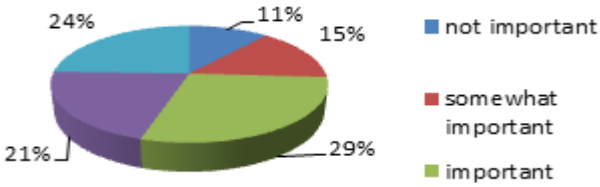
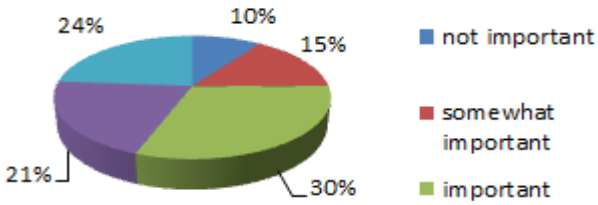
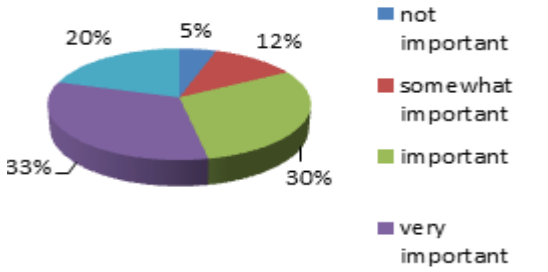
The consultation was mainly intended to gather opinions about information to be included on a redesigned energy label for displays regarding energy efficiency and durability, intended to be clear, self-explanatory and helpful to consumers making purchase choices.

Electronic displays are a relatively complex product. The label has to be designed in order to make instantly comparable different products with possibly very different technical characteristics. The power use of a display is influenced by its screen area, its resolution level, its backlighting technology, possibly the use of high dynamic range (HDR), refresh frequency and more. The label needs to be clear and not excessively crowded by information not crucial for comparison (more complete information can be found in an associated information sheet).

To help assess the user relevance of the information to be put on the label, the following questions where asked and the responses are illustrated below:

[11] Scale ranging from not important, somewhat important, important, very important, don't know or no opinion and no answer

A new standard for improving image quality is HDR (High Dynamic Range). A display may even double its power use when displaying content filmed and broadcast in HDR. Would the indication of the power consumption in HDR mode be a relevant information for your purchase choice?	
The current energy label for televisions indicates the "annual" energy consumption of the television. What assumptions should be used if the same indication will be provided in the new label (for televisions, computer monitors or other displays)?	
One of the components more likely to fail in electronic products is the power supply (e.g. because of electric surges). Would you prefer a display with a standardised external power supply (as a USB with type-C connector) that you could easily buy and replace yourself?	
What information would you like to have clearly provided when you buy an electronic display (television, computer display or similar)?: Measured average power used when "on" in normal mode (Watt)	
What information would you like to have clearly provided when you buy an electronic display (television, computer display or similar)?: Measured average power used when "on" in HDR mode (Watt)	
What information would you like to have clearly provided when you buy an electronic display (television, computer display or similar)?: Diagonal size (cm/inches)	
What information would you like to have clearly provided when you buy an electronic display (television, computer display or similar)?: Resolution (horizontal x vertical) in pixels	

What information would you like to have clearly provided when you buy an electronic display (television, computer display or similar)?: Nickname of the resolution level (e.g. UHD, WQHD, …)	
What information would you like to have clearly provided when you buy an electronic display (television, computer display or similar)?: The power supply is external and standardised (e.g. USB Type-C)	
What information would you like to have clearly provided when you buy an electronic display (television, computer display or similar)?: Presence of a TV tuner (i.e. to distinguish a TV from another display)	
What information would you like to have clearly provided when you buy an electronic display (television, computer display or similar)?: Presence of a processor (i.e. to distinguish a smart TV)	
What information would you like to have clearly provided when you buy an electronic display (television, computer display or similar)?: Network interfaces (i.e. WiFi, RJ45, etc.)	

5. Impact Assessment (IA)

An IA is required when the expected economic, environmental or social impacts of EU action are likely to be significant.

The data collected in the review studies, see Annex 1.4, served as a basis for the IA. Additional data and information was collected and discussed by the IA study team with industry and experts, and other stakeholders including Member States.

This impact assessment builds on the previous version that had been approved by the Impact Assessment Board on 4/9/2013 (see Annex 10). In light of the rapid technology evolution, an update of the Impact Assessment was then deemed necessary, based on updated data, provided by industry and representing the market situation in July 2014. This new database of energy data was the evidence basis for re-visiting the draft Commission proposals, in particular the energy efficiency index calculation and the parameters to be set as minimum requirements and for establishing the energy class boundaries.

Annex 3: Who is affected and how?

This annex explains the practical implications of a potential ecodesign and energy labelling measures based on implementation of the preferred policy option, see Section 6.

1. PRACTICAL IMPLICATIONS OF THE INITIATIVE

The ecodesign regulation will apply to the manufacturers, importers and authorised representatives of displays (televisions and monitors) in the scope of the regulation.

The energy labelling regulations will apply to the suppliers and the dealers of displays (televisions and monitors) and signage displays in the scope of the regulations

They will need to with comply the ecodesign requirements summarised in the table below:

Summary of the Ecodesign requirements

Who	What	When
Manufacturers, importers and authorised representatives	EEI limits according to the new metrics and new global standard	Application in 3 tiers: - One year after entry into force - Three years after entry into force - Five years after entry into force
Manufacturers, importers and authorised representatives	Disassembly requirements, prohibition of halogenated flame retardants for non-electric components	1 April 2021
Suppliers	Provide Energy labels rescaled from A to G and based on the new metrics and new global standard	1 December 2020
Dealers	Display Energy labels rescaled from A to G and based on the new metrics and new global standard	1 April 2021

2. SUMMARY OF COSTS AND BENEFITS

For the preferred option, Tables 3.1 and 3.2 present the costs and benefits that were identified and assessed during the impact assessment process.

Table 3.1: Overview of Benefits (total for all provisions) as compared to the baseline– Preferred Option

I. Overview of Benefits (total for all provisions) – Preferred Option		
Description	***Amount***	***Comments***
Direct benefits		
Energy efficiency savings	39 TWh by 2030	See Section 6.2.1
GHG-emissions savings	13 Mt CO_2eq/a by 2030	See Section 6.2.2
Circular economy improvements	Estimated additional 36 kt bulk-plastics and 40 kt technical plastics recycled	See Section 6.2.3
Additional business revenue	No quantification	See Section 6.3.1
Support of innovation, R&D and improved competition	No quantification	See Section 6.3.2
Decreased consumer expenditure	EUR 15 billion less by 2030	See Section 6.4
Increased Employment	No quantification	See Section 6.6.3

Table 3.2: Overview of the additional costs as compared to the baseline – Preferred option

II. Overview of costs – Preferred option		
What	***Amount***	***Who***
For the first 6 months provide a second label and supply extra labels on request to dealers	EUR 3 300 000 one-off	Suppliers
Relabelling of the products	EUR 600 000 one-off	Dealers
Database	EUR 90 000 annual	Supplier
	EUR 90 000 one-off	EU
Market surveillance	EUR 330 000 annual	Member States

Annex 4: Analytical model used

1. GENERAL INTRODUCTION

General data availability for the scenario analyses of electronic displays is not good. For sales, stock and prices of displays there are GfK-studies periodically acquired by e.g. NGOs such as TopTen. For energy efficiency, however, data have been compiled ad-hoc, either by DigitalEurope or by researchers such as Intertek, Bob Harrison, CLASP and VHK.

For the impact analysis the dataset for 2017 was added. The reliability of most data could be checked by various sources and ultimately the data were confirmed by stakeholder consensus in various stakeholder meetings, bilateral and plenary. Employment impacts are derived from revenue per employee, again checked against reported revenue totals for the sector and anecdotal information from annual reports of individual manufacturers.

As regards the various monetary rates, the impact assessment study conforms to the MEErP. This means e.g. that (industrial) energy prices were assessed from Eurostat data and for future projections an escalation rate of 4% was used. All prices and costs are expressed in Euro 2010, calculated with historical inflation rates and a 2% inflation for future projections. For investment-type considerations, a discount rate of 4% is used.

In addition, a sensitivity analysis was carried out that calculates energy costs and consumer expenditure at an escalation rate of 1.5%. In short, this means that electricity tariffs in 2030 are not €0.36/kWh, but €0.24/kWh (all in Euro 2010).

For greenhouse gas emissions, the emission rate (in kg CO2 eq./kWh) does vary over the projection period in line with overall EU projections as indicated in MEErP.

2. MAIN CHARACTERISTICS OF THE MODEL

The impact assessment uses a stock model developed by VHK first in the context of the MEEuP 2005 methodology and then further developed in the MEErP 2011 and the VHK EIA-studies for the Commission. It has been used successfully, i.e. to the satisfaction of stakeholders and Commission, in over 20 impact assessment studies for Ecodesign and Energy Labelling studies where VHK assisted the Commission.

The stock model has been specifically developed and paid for by the Commission (DG GROW and DG ENER) and is thus subject to the same intellectual property provisions as other contract work for the Commission.

Over the years, as it was part of various Commission contracts it has been scrutinised by many Commission officials of various DGs as well as experts from various stakeholder groups (industry, Member States and NGOs).

3. MODEL STRUCTURE

The general structure of the model follows the format and conventions as laid down in the VHK EIA-study[12]. The following figure gives an illustration of the parameters used. The parameters with extension BAU are used for the baseline scenario. The parameters with extension ECO are used for one or more policy options (ECO1, ECO2, etc.).

[12] VHK, Ecodesign Impact Accounting – status May 2015, for EC, DG ENER, November 2015. Download: https://ec.europa.eu/energy/sites/ener/files/documents/Ecodesign%20Impacts%20Accounting%20%20-%20final%2020151217.pdf

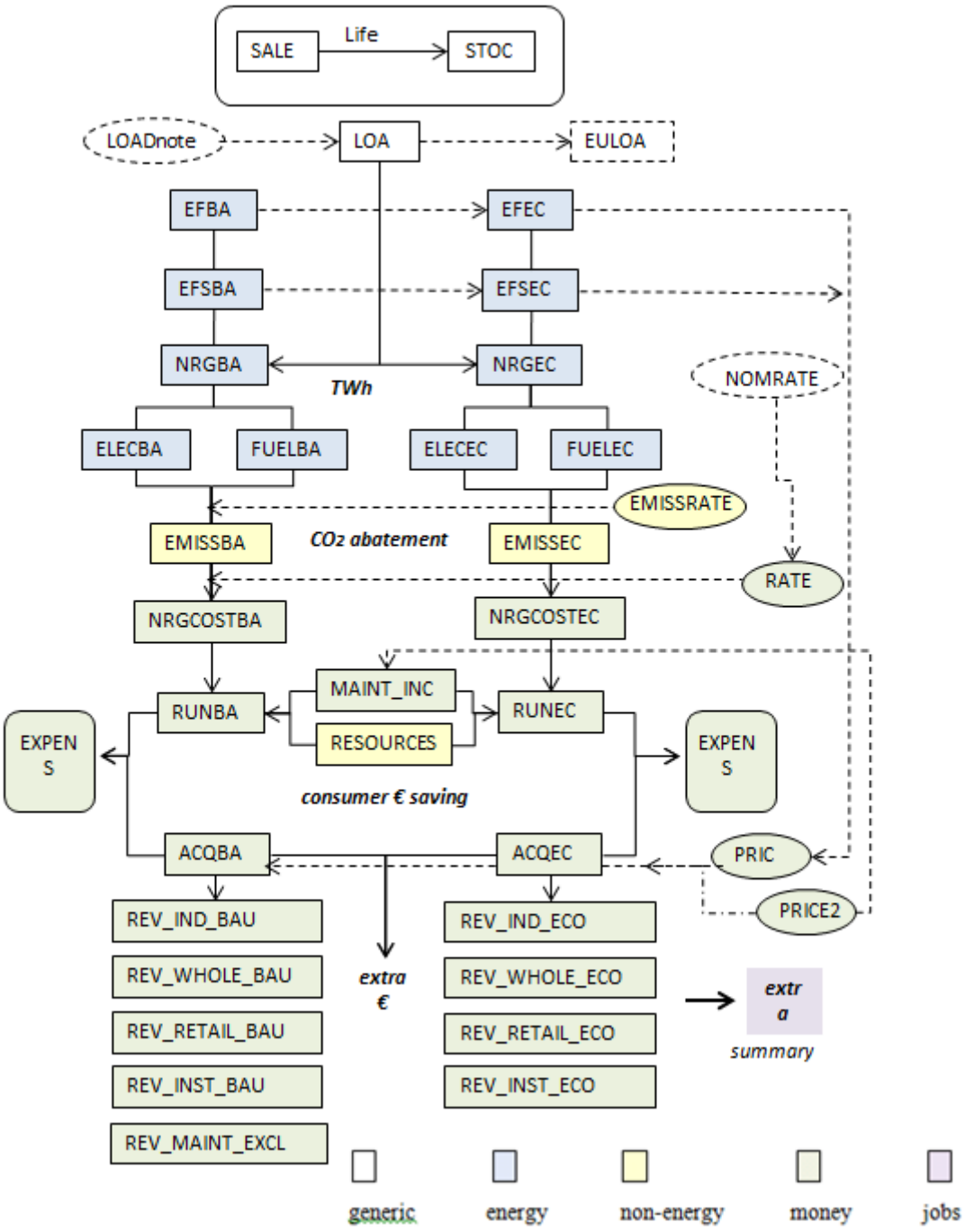


Figure 4.1: Structure of core calculation

The model is built in a spreadsheet, using a 1 year time step. Every parameter name corresponds to an Excel sheet. Auxiliary sheets are added for the calculations.

In the case of electronic displays, 4 scenarios are calculated: BAU, ECO, Leni(ent) and Ambi(tious) scenarios all with televisions, monitors and signage displays in the scope.

The tables hereafter give the details of main inputs and outputs of the model.

4. INPUTS

Table 4.1. Inputs scenario calculation

Economic and energy data split-up by display type in scope

SALES, in million units	***1990***	***1995***	***2000***	***2005***	***2010***	***2015***	***2020***	***2025***	***2030***	***2040***
TV No NA ('standard')	26	29	34	46	56	0	0	0	0	0
TV LoNA	0	0	0	0	9	21	13	0	0	0
TV HiNA ('Smart')	0	0	0	0	9	21	39	60	69	70
subtotal TV	*26*	*29*	*34*	*47*	*74*	*42*	*52*	*60*	*69*	*70*
PC Monitor	10	13	17	22	25	14	14	14	14	14
Signage display	0	0	0	0	0	2	4	3	3	3
total	*36*	*42*	*51*	*69*	*99*	*58*	*70*	*77*	*86*	*87*

STOCK, in million units	***1990***	***1995***	***2000***	***2005***	***2010***	***2015***	***2020***	***2025***	***2030***	***2040***
TV No NA ('standard')	215	259	323	356	327	231	92	0	0	0
TV LoNA	0	0	0	0	18	98	164	109	27	0
TV HiNA ('Smart')	0	0	0	0	19	98	241	411	581	700
subtotal TV	*215*	*259*	*323*	*357*	*364*	*426*	*497*	*520*	*608*	*700*
PC Monitor	13	69	100	129	172	130	98	98	98	98
Signage display	0	0	0	0	1	7	21	31	31	30
total	*443*	*586*	*745*	*842*	*901*	*990*	*1114*	*1169*	*1345*	*1528*

SURFACE/UNIT, in dm²/unit	***1990***	***1995***	***2000***	***2005***	***2010***	***2015***	***2020***	***2025***	***2030***	***2040***
TV average all types	10	11	13	19	28	43	51	59	68	92
PC Monitor average	5	6	8	10	11	13	16	18	20	25
Signage display average	16	18	21	32	46	71	84	97	113	151
sales wt.'d average	*9*	*10*	*11*	*16*	*24*	*37*	*46*	*53*	*62*	*83*

SURFACE EU28, in km²	***1990***	***1995***	***2000***	***2005***	***2010***	***2015***	***2020***	***2025***	***2030***	***2040***
TV all types	21	29	40	69	102	185	253	306	415	642
PC Monitor	1	4	8	12	20	18	16	18	20	24
Signage display	0	0	0	0	0	5	18	30	34	45
total	*22*	*33*	*48*	*82*	*122*	*207*	*287*	*353*	*469*	*711*

On-mode specific electric power consumption of SALES in W/dm2										
TV HD:	**1990**	**1995**	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**
BAU	8,85	7,69	7,71	5,56	3,70	1,27	0,97	0,79	0,65	0,44
Leni/ECO/Ambi	8,85	7,69	7,71	5,56	3,70	1,27	0,96	0,60	0,35	0,35
TV UHD/3D:										
3D/UHD% stock	0%	0%	0%	0%	4%	20%	50%	75%	100%	100%
BAU	8,85	7,69	7,71	5,56	3,78	1,40	1,21	1,08	0,97	0,66
Leni	8,85	7,69	7,71	5,56	3,78	1,40	1,20	0,83	0,53	0,53
ECO/Ambi	8,85	7,69	7,71	5,56	3,78	1,40	1,06	0,69	0,42	0,42
Monitor HD:	**1990**	**1990**	**1990**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**
BAU	8,85	7,69	7,71	5,56	3,70	1,27	1,16	1,05	0,95	0,78
Leni/ECO/Ambi	8,85	7,69	7,71	5,56	3,70	1,27	1,16	0,74	0,41	0,35
Monitor UHD:										

UHD% stock	*0%*	*0%*	*0%*	*0%*	*2%*	*10%*	*25%*	*38%*	*50%*	*50%*
BAU	8,85	7,69	7,71	5,56	3,74	1,33	1,30	1,24	1,19	0,97
Leni	8,85	7,69	7,71	5,56	3,74	1,33	1,31	0,88	0,51	0,43
ECO/Ambi	8,85	7,69	7,71	5,56	3,74	1,33	1,22	0,80	0,45	0,38

Signage displays	as TVs multiplied by 2.

Standby mode electric power consumption of sales in W										
	1990	**1995**	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**
TV No NA ('standard')	8,00	6,25	4,50	2,75	1,00	0,23	0,10	0,05	0,05	0,05
TV LoNA	0,00	0,00	0,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00
TV HiNA ('Smart')	0,00	0,00	0,00	0,00	0,00	6,39	5,00	4,50	4,00	3,00
PC Monitor	9,00	7,07	5,14	3,20	1,27	0,41	0,25	0,15	0,15	0,15
Signage display	15% of on-mode energy use									

Standby mode hours per day										
All scenarios	**1990**	**1995**	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**
TV	6,00	9,50	13,00	16,50	10,00	10,00	10,00	10,00	10,00	10,00
PC Monitor	4,00	4,00	4,00	4,00	4,00	4,00	4,00	4,00	4,00	4,00
Signage display	15% of on-mode energy use									

Note 1: For TVs and monitors average viewing hours are 4h/day. For signage 12h/day (average with wide spread). 365 d/yr.

Note 2: Until 2009 the non-viewing hours are considered standby-hours are considered a mix of passive standby (No NA) and hard off-switch (0W); in 2010 and later networked standby is considered significant and the power values are a mix of passive standby and networked standby.

Note 3: Signage displays have a high share of networked standby. It is considered that larger sizes have added complexity in that respect and thus standby is calculated as a percentage of on-mode.

Note 4: Meeting (networked) standby test data is not critical for display makers. That is why all scenarios have the same values in the model (although small differences can exist, but no specific information could be found). Networked standby can be problematic at the level of service providers overriding power management

Retail prices (incl. VAT, in euros 2010 per unit)										
	1990	**1995**	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**
TV	800	800	800	500	450	450	450	450	450	450
PC Monitor	200	200	200	200	170	170	170	170	170	170
Signage display	1600	1600	1600	1000	900	900	900	900	900	900
sales wt'd average	*633*	*615*	*604*	*405*	*383*	*408*	*445*	*434*	*435*	*435*

Electricity Rates applied for displays (residential rates), in €/kwh elec (inflation corrected to euros 2010)

	1990	**1995**	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**
Default (4% escalation)	0,18	0,18	0,16	0,15	0,17	0,20	0,25	0,30	0,37	0,55
Sensitivity (1,5% escalation)	0,18	0,18	0,16	0,15	0,17	0,19	0,21	0,23	0,24	0,28
escalation rate applies from 2014 onwards (before 2014 historical prices)										

5. OUTPUTS

Table 4.2. Outputs scenario calculation

OUTPUTS	**per year**									
-										
On-mode specific electric power consumption of STOCK in W/dm2										
TV HD:	**1990**	**1995**	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**
BAU	8,83	8,32	7,93	7,22	4,72	2,52	1,64	0,93	0,77	0,52
Leni/ECO/Ambi	8,83	8,32	7,93	7,22	4,72	2,52	1,64	0,87	0,57	0,35
TV UHD/3D:										
3D/UHD% stock	0%	0%	0%	0%	4%	20%	50%	75%	100%	100%
BAU	8,83	8,32	7,93	7,22	4,82	2,78	2,05	1,28	1,15	0,79
Leni	8,83	8,32	7,93	7,22	4,82	2,78	2,05	1,20	0,85	0,53
ECO/Ambi	8,83	8,32	7,93	7,22	4,82	2,78	1,80	1,00	0,68	0,42
Average TVs										
BAU	8,83	8,32	7,93	7,22	4,73	2,57	1,84	1,20	1,15	0,79
Leni	8,83	8,32	7,93	7,22	4,73	2,57	1,84	1,12	0,85	0,53
ECO/Ambi	8,83	8,32	7,93	7,22	4,73	2,57	1,72	0,97	0,68	0,42
Monitor HD:	**1990**	**1995**	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**
BAU	9,51	8,25	7,64	7,26	5,06	2,93	1,25	1,11	1,01	0,83
Leni/ECO/Ambi	9,51	8,25	7,64	7,26	5,06	2,93	1,25	1,00	0,59	0,35
Monitor UHD:										
UHD% stock	*0%*	*0%*	*0%*	*0%*	*2%*	*10%*	*25%*	*38%*	*50%*	*50%*
BAU	9,51	8,25	7,64	7,26	5,11	3,08	1,40	1,32	1,26	1,03
Leni	9,51	8,25	7,64	7,26	5,11	3,08	1,40	1,18	0,74	0,44
ECO/Ambi	9,51	8,25	7,64	7,26	5,11	3,08	1,31	1,07	0,65	0,39
Average Monitors										
BAU	9,51	8,25	7,64	7,26	5,06	2,95	1,28	1,19	1,13	0,93
Leni	9,51	8,25	7,64	7,26	5,06	2,95	1,28	1,07	0,66	0,40
ECO/Ambi	9,51	8,25	7,64	7,26	5,06	2,95	1,26	1,02	0,62	0,37

Signage displays	as TVs multiplied by 2. Leni and ECO follow TV BAU. Ambi follows TV ECO									
Stock wt'd avg of the above, all types of displays										
	1990	**1995**	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**
BAU	8,87	8,30	7,86	7,23	4,84	2,69	1,82	1,25	1,20	0,83
Leni	8,87	8,30	7,86	7,23	4,84	2,69	1,82	1,17	0,89	0,55
ECO	8,87	8,30	7,86	7,23	4,84	2,69	1,71	1,02	0,70	0,43
Ambi	8,87	8,30	7,86	7,23	4,84	2,69	1,51	0,87	0,62	0,39

OUTPUTS	**per year**								**accumulative**	
EU electricity consumption (in TWh/a, of stock)										
	1990	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**	**2021-'30**	**2021-'40**
BAU	36	92	92	98	94	90	98	98	927	1922
Lenient	36	92	92	98	94	86	82	75	863	1619
ECO	36	92	92	98	92	80	76	73	813	1538
Ambi	36	92	92	98	83	64	59	53	651	1178
EU GHG emissions (in Mt CO2 eq./a)										
	1990	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**	**2021-'30**	**2021-'40**
BAU	16	39	38	39	36	32	33	29	332	648
Lenient	16	39	38	39	36	31	28	23	309	550
ECO	16	39	38	39	35	29	26	22	291	522
Ambi	16	39	38	39	31	23	20	16	233	401
Consumer expenditure (in bn Euros 2010)										
	1990	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**	**2021-'30**	**2021-'40**
BAU	30	43	54	43	53	60	73	90	619	1448
Lenient	30	43	54	43	53	59	67	78	598	1316
ECO	30	43	54	43	53	57	65	77	581	1285
Ambi	30	43	54	43	50	52	58	66	531	1144
Acquisition costs (in bn Euros 2010, incl. VAT)										
	1990	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**	**2021-'30**	**2021-'40**
All scenarios	23	28	38	23	29	32	36	37	325	691
Energy costs (in bn Euros 2010)										
	1990	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**	**2021-'30**	**2021-'40**
BAU	6	14	16	20	23	27	36	53	289	747
Lenient	6	14	16	20	23	26	30	41	268	615
ECO	6	14	16	20	23	24	28	40	251	585
Ambi	6	14	16	20	21	19	22	29	201	443

Note that the running costs include, apart from the energy costs, 0,5 bn euro annually in repairs. Accumulative 5 bn in 10 years, 10 bn in 20 years

6. BUSINESS IMPACTS

BUSINESS IMPACTS (All scenarios, revenues in bn Euros 2010.)

	1990	2005	2010	2015	2020	2025	2030	2040	2021-'30	2021-'40
EU industry	4,0	2,5	1,5	1,0	1,0	1,0	1,0	1,0	10	20
Importers/ distributors	8	12	18	11	14	15	17	18	158	166
Retails	7,8	9,5	12,9	7,8	10,0	10,9	12,3	12,4	112	124
Total business revenue	19,4	23,8	32,2	19,4	25,0	27,3	30,7	31,1	280	310

Employment (All scenarios, in 1000 jobs)

	1990	2005	2010	2015	2020	2025	2030	2040
EU industry	60	20	15	5	5	5	5	5
Importers/ distributors	15	15	15	17	19	21	21	21
Retails	155	190	258	155	200	218	246	249
Total business revenue	230	225	288	177	224	244	272	275

na=not applicable

Figure 4.2 below illustrates the rapid improvement in average efficiency, expressed in W power input per dm² viewing surface area. The names illustrate typical technologies, starting from CRT (8 W/dm²) and plasma (9 W) before 2005. The LCD TV with CCFL backlight (around 6 ±2 W) was the dominant technology during the preparation of the current measures and indeed the 2012 Ecodesign limit (3W) was ambitious at the time. Today, for LED LCD TVs a level of 1 W/dm² is typical.

The graph shows that the efficiency improvement is expected to slow down because technologies that thus far achieved the large efficiency improvements are nearing their limits. Experts have doubts whether Moore's law, predicting a doubling of the number of transistors per surface area every 2 years, will keep up now that chips are nearing a form factor of 5 nanometres, which is about as small as you can get with electricity. The next step could be light chips, but there is still a long way to go. The LED-backlight at efficacies of 200 lm/W could maybe still bring some 20% more, but then it is nearing its limit.

The main area where a step-change in innovation could still take place is in eliminating the loss of light in all the filters and LCD-polaroids that are blocking the LED backlight. If we could directly look at the LED-subpixels, similar to OLED but at a much higher lighting efficiency, the efficiency could probably more than double. The problem is that the flawless mass-manufacturing of millions of LED subpixels is a huge technological challenge and requires massive investments. At the moment Samsung, calling it 'microLED', has produced a modular video-wall product for the professional market, but energy efficiency is not (yet) impressive and pricing is obviously nowhere near consumer market pricing.

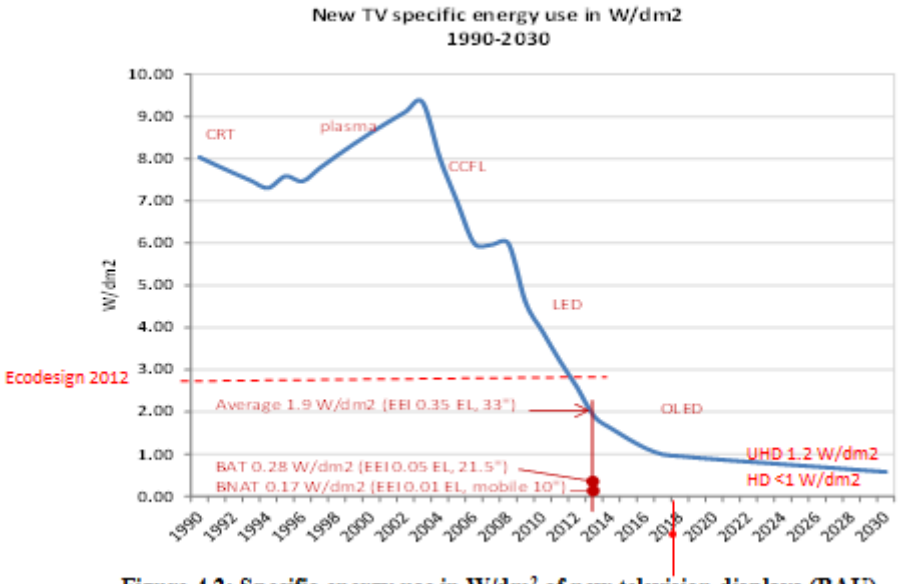


Figure 4.2: Specific energy use in W/dm^2 of new television displays (BAU)

Annex 5: Minutes of the Ecodesign Consultation Forums

5.1 Minutes of the Ecodesign Consultation Forum on 6 July 2017

MEETING OF THE CONSULTATION FORUM UNDER ARTICLE 18 OF THE ECODESIGN DIRECTIVE 2009/125/EC ON ENERGY-RELATED PRODUCTS – ELECTRONIC DISPLAYS

BRUSSELS, 6 JULY (10.00 - 17.30)

Participants: see "Attendance List" in Annex

1. Welcome and introduction

The **Chair** welcomed the participants to the Consultation Forum on the review of measures for electronic displays.

He gave a brief explanation of the current state of Ecodesign and energy labelling. He noted the adoption on 30 November 2016 of the Ecodesign Working Plan for 2016-2019, and the adoption of the energy labelling Regulation, which would be published on 28 July in the Official Journal of the EU and enter into force on 1 August. He noted the consequences of the new Regulation in particular as regards the rescaling of existing labels and the product registration database.

BE asked whether the Commission was considering updating the data on televisions so that requirements would not become obsolete after a short period of time. The Chair replied that the requirements were based on the most recent data available (mid 2016), and agreed that with a fast-moving product group there would always be a question about how up-to-date the data was. The Commission may further verify the data before the proposal is voted in the Regulatory Committee.

The **UK** asked whether the Commission could come forward with tentative dates on future meetings, noting that at least twelve remained for the rest of the year. The Chair responded that the Commission was in the process of confirming the dates and would contact Consultation Forum members as soon as they were set.

ORGALIME asked about the progress of the Steering group and sub-groups working on the product database which would have to be in place by 1 January 2019. The Chair replied that the first meeting of the steering group had been on 4 July and preliminary ideas where presented. The Commission plans to have regular meetings of the steering group to keep stakeholders involved.

2. Adoption of the Agenda

The agenda was adopted with no changes.

3. Approval of the minutes of previous meetings

The **Chair** noted that the minutes of the Consultation Forum of 27 March 2017 on water heaters and vacuum cleaners had been revised to include some written comments. The draft minutes were adopted.

4. Presentation of the proposal for possible Energy Labelling requirements for electronic displays

The **Commission** policy officer responsible for electronic displays gave a presentation on the proposals.

On the scope, he noted that the proposed size lower threshold for displays was the same as for Ecodesign measures (i.e. 100 cm^2 or about 6 inches) but that this was up for discussion given that in very small displays the difference in energy use for different classes may be negligible. Displays with very specific uses, for example medical products that are covered by other legislation, would be entirely out of scope. Displays integrated into any other product would be out of scope as well.

CLASP suggested that increasing the minimum size requirements from 100 cm^2 would prevent substantial energy savings as it would exclude 7 or 8 inches displays which are already on the market.

IT and **BE** noted some of the difficulties of regulating and testing smaller-sized or specialised types of screens.

AT inquired as to why digital signage displays had been excluded from the scope, and whether displays integrated into desktop computers were also excluded.

NL noted the difficulty of assessing integrated displays for energy labelling purposes, as their energy use is difficult to be isolated but encouraged the Commission to consider ways in which for Ecodesign they should be kept into scope, particularly for non-energy requirements. NL also cautioned against introducing loopholes when exempting standalone displays sold with the intention to integrate them into another product, noting that it was possible that any screen could hypothetically fall under that definition. **CECED** offered in response to explain to NL how loopholes could be avoided while making the exemption clear.

DIGITALEUROPE expressed their support for a limitation of the scope to include only televisions and computer displays, but suggested that the exemptions in the scope were not clear enough. They requested a general exemption to exclude integrated displays. **ORGALIME** expressed similar reservations on the comprehensiveness of the exemptions.

UK, and subsequently **CECED**, agreed that integrated displays should not be in scope of the energy labelling Regulation under discussion, both suggesting that integrated displays should be regulated through vertical measures in each relevant product file.

AT and **SE**, supported by **ECOS**, suggested that the work on signage displays had not progressed sufficiently over the course of three years, and noted that a list of next steps and a study would be welcome. SE added that it was desirable to see signage products referred to in a review clause with a date for a final proposal, arguing that difficulties relating to measurements could be overcome.

In response the **Commission**, citing the difference in use and characteristics of signage displays, noted that signage displays would be addressed through a separate measure and study. The Commission added that although no specific date had been set for a review, signage displays were cited in the current Ecodesign Working Plan, which meant that they would need to be considered within the 2016-2019 period. Integrated displays should be not labelled separately. Finally, the Commission noted that it will consider improving the wording relating to business-to-business screens intended to be integrated into another product after the sale, e.g. by considering **CECED** suggestions.

DIGITALEUROPE stated that their position continues to be that signage displays should be tackled though a separate Regulation, and that many purchasers of signage displays already took energy efficiency into account, rendering a label less useful.

In response, **SE** argued that many smaller businesses that bought signage displays would be assisted by an energy label. Procurement would be facilitated as well.

The **Chair**, noting the comments made, committed to launching a dedicated study on signage displays.

IT asked the Commission to clarify at what point it intended to review the electronic displays measure, noting that the new energy labelling Regulation indicated that labels should be set to be applicable for ten years.

The **Commission** explained that the framework provisions did not necessarily mean that a given Regulation could not be revised within the ten years, just that rescaling could not happen within that time. Moreover, if signage displays were to be given an energy label, this could be done as well.

The discussion moved to the Energy Efficiency Index with a specific indication for High Dynamic Range (HDR) mode. The **Commission** outlined the proposed formula, noting that the new framework for energy labelling establishes a clear relation between Ecodesign and Energy Labelling, as the bottom class(es) in the label have to be greyed out when Ecodesign tiers come in force and exclude from the market the less performing products.

AT noted that an energy label should be as transparent and easy to understand as possible and suggested that the Commission's proposal with a two-scale label, one for normal screen use and one for HDR, now that HDR is unknown to most, may result confusing to consumers and asked about the pace of uptake. Similarly to vacuum cleaners or to washing machines, a less prominent scale at the bottom of the label could be considered.

IT, DE, UK, DK, and **NL** made interventions agreeing with **AT**, and were supported by **ANEC/BEUC**, variously expressing concern about the complexity of a two-scale label, the lack of current consumer knowledge of HDR technology, the potential future developments in technology (meaning HDR technology could be surpassed), and asking for the results of consumer testing on the proposed label.

BE questioned the figures on HDR doubling the energy consumption of displays, argued that quantum dot TVs and possibly OLED technologies should be kept in scope, and suggested that the Automatic Brightness Control (ABC) compliance allowance could be increased from 10% to 15% .

NL, supported by the **UK**, further suggested that an option for HDR would be to have a simple identifier on the label rather than a second scale, and to incorporate HDR into the general formula for determining efficiency.

DIGITALEUROPE advised caution on assuming a high rate of technological improvements in the future, stating that without a "breakthrough" in technology, the current classes A and B being proposed would not be filled by products in the next ten years. Digital Europe supported the double scale showing the energy efficiency in HDR mode. The alternative of having to use a common formula for ecodesign and labelling with an arbitrary share of HDR (based on insufficient data availability) may exclude new products from the market.

The **Korean Electronics Association** (KEA) made several points, arguing firstly that the requirement to put a label on the box packaging was unnecessary; secondly, that the year of manufacture requirement ought to be removed; that the requirement to include HDR mode power consumption be removed; that the criteria for efficiency classes A-C criteria were extremely difficult to delivery; and that the proposed QR code on the label be removed as causing delays for producers. Finally, it proposed removing several symbols from the label, given the need for the simplest possible design to assist consumer understanding.

The **Commission** explained that consumers needed to be informed accurately about energy consumption in real usage. HDR technology is just emerging onto the market (standardisation was completed in 2016) with a still unknown pace; it is likely that sometime between 2020 and 2030 HDR will become "the" standard mode of operation. The uneven impact of HDR on energy consumption in displays, because of different algorithms used, makes it important to include it in the label. Without an indication of the impact of HDR on energy consumption, there is a risk that customers would feel misinformed about consumption in "real usage". Conversely, it is impossible at this stage to predict the share of HDR and non-HDR in typical consumption both in time (pace of uptake of the technology) and use (in a computer display for office applications it would be never used but would be used about 100% of the time with gaming applications). The Commission expert consultant added that HDR is already a standardized EU broadcast standard and is very unlikely to fade after a few years. The power usage of some televisions barely changed when in HDR mode, while it more than doubled for others. The consumer, the Commission argued, therefore has a right to know the consumption and a double scale is already used in other product groups (e.g. tyres, heating/cooling products). The Commission also explained that the label needed to be on the box for situations where retailers do not display the product outside of the box, such as in hard-discount shops (common situation for cheap computer monitors or small TVs). The Commission agreed that year of manufacturing in the information sheet could be an issue. The Commission reassured KEA that the inclusion of a QR code would not delay production.

CLASP noted that there was substantial evidence to suggest that some screen models show increased energy demand in HDR mode (some up to 130%) and argued that it was very important for the Commission to take it into account. Furthermore, the shift to quantum dot technology provides huge potential for efficiency gains. Supported by **ECOS**, CLASP argued that the timelines of the Regulation are not ambitious enough, now that the Commission will have to adopt a delegated act by the end of 2018.

DIGITALEUROPE suggested that variation in energy use was down to some of the products having additional functionalities rather than being inefficient, and argued against including HDR in a single formula because a regulation possibly blocking products from entering the market should be based on currently available and well known technologies.

IT, BE, and **DIGITALEUROPE** supported the notion that labels were not needed on packaging. **PT** suggested that having them on both sides may seem excessive, while NL was in favour of the proposal as it stood, arguing that shops needed to stack packaging boxes so that the label would be visible to the consumer. The UK expressed concerns about possible confusion during the rescaling period.

SE noted the importance of ensuring consumers were informed about HDR and proposed three options: firstly, the two-scale approach proposed by the Commission; secondly, weighting the formula to reflect the HDR factor; and thirdly, a secondary "scale-behind-the-scale" approach. SE argued that the wide discrepancy in efficiency of HDR technology meant that the label deserved more than simply an identifier.

BE was in favour of two different labels, one for normal mode and one for HDR when available.

DIGITALEUROPE suggested that, for boxes printed in one colour and for on-line sales, there was confusion as to where the "coloured arrow" is intended to be displayed.

The **Commission** argued that it was perfectly possible that consumers might buy a boxed product without first looking at the product itself, particularly for cheap products, making labels on the box important: because of the quick sales of products in "promotion", compliance control would be difficult and training of staff unsuitable. It noted SE's suggestions of options relating to HDR.

The **Commission** continued its presentation, outlining the proposed physical design of the label, noting various different options and potential icon designs. The understanding of pictograms by consumers and the general understanding of the label is being tested. The Commission explained some of the pictograms proposed in the label below the A-G scale, namely: presence of auto brightness control (ABC), presence of movement sensor and standardised external power supply.

On the physical design of the label, **AT** suggested that it may be complicated to explain to consumers the relevance of the standardised EPS, given priority on other aspects. Also the screen size measurements are too large. **DE, IT, NL, SE, ANEC/BEUC, DIGITALEUROPE, ENEL**, and EED held similar positions, noting that pictograms could be removed or replaced with more useful information and that the screen size measure was too large.

The **UK**, supported by **ANEC/BEUC**, noted that it was only going to comment on the label design only once the results of the consumer survey were known.

IT asked the Commission to confirm that it was testing a one-scale label with consumers.

NL asked more prominence for the crucial section of the label, i.e. the coloured scale and dimension of the class and appreciated the option of using the displays itself to show the label, recalling the possibility of apps to get additional information from the database.

DE, ECOS, ANEC/BEUC were in favour of including annual consumption figures on the label, suggesting that measurement difficulties could be overcome.

However **DIGITALEUROPE** urged caution, citing the difference in usage patterns between TVs and computer monitors and, should annual energy use be included, it may mislead consumers. DIGITALEUROPE stated also that it is in favour of the double scale with HDR on the label as it is the best way of communicating to the consumer and requested tolerances in the design, as printing or displaying in different media may involve some fractions of millimetres of differences in respect to the label template. On the QR code, it stated that if it was placed on the label then it should not cause production issues.

BE suggested that the QR code on the label, intended to be linked to the product registration database, could be codified to incorporate extra information, such as for example language information.

EEB asked to shrink information such as display size and resolution and to add information about durability, such as extended warranty and availability of spare parts.

DE, IT, and **ANEC/BEUC** warned against the risk that EPS allowances meant that the same model of display could bear two different label classes, which was undesirable. **FAIRPHONE** offered to provide data on EPS, recommended earlier user testing in the future, and suggested that increasing consumer understanding was partly down to industry.

There was some discussion on market surveillance considerations for software updates, with **DE** seeking clarification, **NL** suggesting that market surveillance authorities could use their public warning function, and **CLASP** arguing that keeping a product in the same class as when it was bought, despite software updates, seemed reasonable.

CECED asked about a better differentiation of the label, to better communicate the rescaling done and not have consumers puzzled by the lack of A-plusses. **SE** recognised the relevance of ABC, movement sensors and external EPS but argued that in the Ecodesign measure, if maintained as communicated to the WTO, they get an allowance, so producers have already an incentive to provide the features.

The **Commission** stated that the consumer survey would be wide-ranging, and that some minor adjustments may still be possible. It noted the positions of the various participants, explaining that the most critical task was to choose a design that reflected what the consumer needed to choose between comparable displays. The Commission explained that diagonal size and resolution are relevant for energy use and should be indicated not to mislead consumers. As for a possibly overcrowded label, the Commission explained that the goal would be to have all crucial information in one place, thereby better attracting the attention of the consumer who may otherwise be distracted by additional retailer's labels. As regards additional or different features to be displayed on the label, the Commission added that a part of the ongoing survey is to verify if consumers consider that other information is missing that may be necessary for making an informed choice, including the annual energy consumption or extended warranty. So the final label layout may include different information that consumers deem relevant and the shrunk screen size and resolution section. It further stated that the QR code would lead to the database where a wide range of information is available in all EU languages (with the local language automatically proposed). As regards the pictogram for the EPS, the goal is not only material savings, but, potentially, enhancing durability, as a standardised EPS would be cheaper and more easily available as a spare part.

5. Presentation of the proposed changes to the Ecodesign requirements for electronic displays

The **Chair** stated that the Commission had taken note of comments received so far (including through the WTO), and that it would present some of the changes it was considering introducing to the measure. In terms of timing, the ecodesign process would then be realigned with the labelling process.

The **Commission** explained that the bulk of comments so far related to the scope of the provisions, in particular to displays integrated into other products, but also to dismantling and disassembling provisions. The remaining remarks related to the ambition levels of the proposal, which risked excluding products from the market. The Commission elaborated that the aim with the scope as drafted was to avoid loopholes and to ensure alignment with the provisions of the WEEE Directive. An alternative proposed approach would be to narrow the scope to include only televisions and certain kinds of computer displays – namely, only those without processors (i.e. excluding integrated desktops). For the standby provisions, the aim was to include professional products too, although the wording would need to be adapted, including introducing a distinction between off mode and standby. It could also be considered to cover displays integrated into products "vertically" within the measure for each separate product.

DE expressed support for the "horizontal" provision in the display Regulation for displays integrated into other products as is now, provided it did not delay the Regulation. This was supported by **NL, SE, EURIC, FEAD, and EEB**, who noted that a horizontal measure would not overburden industry given that the requirement is limited to the extractability of a limited list of components. Moreover, the existing WEEE Directive already requires that LCD panels integrated into an appliance have to be separated.

IT gave support for horizontal measures, provided that the integrated display is clearly separable from other electronics.

BE suggested that a vertical approach may be better if more focus was put on reparability aspects.

EHI, ORGALIME, EGMF, and **DIGITALEUROPE** preferred a vertical, product-by-product regulatory approach, the latter noting their satisfaction with the revised scope.

EURIC, supported by **EERA** and **FEAC**, stressed the need for better design to facilitate recycling and fully capture the 'circular economy' potential: products are more and more difficult to be recycled, with

less and less design for recycling taking place. EURIC defended a horizontal approach as any display has to be treated in the same way during dismantling for recycling, irrespective of the product into which it is integrated.

DIGITALEUROPE defended a vertical approach as giving more opportunities for product-specific requirements. It also requested more clarity on terminology such as welding and soldering. DIGITALEUROPE also asked the Commission to change its approach to network standby, which it argued would cause the industry to change its approach to network products.

IT argued that the energy threshold proposed for off-mode mode was not verifiable. Moreover, **IT** expressed support for the more recent text, although the previous text was acceptable if gluing was better defined. **IT** argued that requirements on time limits would be not verifiable by authorities. **IT** asked for clarification as to why functionality and safety provisions would be not be included in a new proposal.

The **Chair** requested examples from industry of where a safety exemption from the provisions was necessary. **DIGITALEUROPE** cited tumble driers as one example.

IFIXIT stressed that there is no confusion as welding means melting substrates of two components together, whilst soldering or brazing is a process to add a melted material to join two components. So soldering or brazing is rightly not mentioned in the current proposal. It also stressed a contradiction on Digital Europe's defence of a vertical versus a horizontal approach for the welding/gluing requirement: if tumble driers are used as the example for the need of firmly glued/welded integrated display (i.e. vertically regulated), then for televisions and computer displays this would not be necessary and hence gluing/welding should be prohibited.

TIE asked for confirmation that toys would not be in scope of the Regulation, noting that they were covered by other legislation.

The **Commission** continued its presentation, explaining that the proposed provisions on disassembling and dismantling derive from the WEEE Directive, which requires such requirements to be tackled 'upstream'. It noted that the wording of the proposal relating to welding and gluing was an attempt to have an easily verifiable requirement in the absence of a standard. The goal was to express the fact that the components must be quickly and easily removable from a product but an alternative wording referring to a "measurable/verifiable" effort may be more appropriate to avoid loopholes.

DE remarked that from a market surveillance perspective the regulation would need to do more than simply indicate what level of pressure needed to be applied in disassembly, but also which temperature to apply for how many seconds, which commonly available tools, which skills are needed by staff, etc.

IFIXIT expressed a preference for the original wording referring to the banning of glue and welding as necessary, arguing that it was very clear what "gluing" meant and is less clear and more difficult to verify what "reversible" or "easily reversible" means. It challenged the industry to suggest thresholds allowing for a distinction between products glued in such a way that they can be taken apart easily and those that cannot. More emphasis on dismantling is necessary as components harvesting is crucial for reuse. Gluing frequently makes repair unfeasible such as when it is used for the housing (not infrequent).

EURIC intervened in support, noting that the original proposal seemed preferable as gluing and welding pose problems for the recycling process for the safety of workers, the environment and the increasing of contamination of the waste stream, particularly PMMA boards.

FAIRPHONE, **EERA Recyclables**, **EEB** and **ECOS** also asked for gluing and welding to be explicitly mentioned in the text as being forbidden for the mentioned components, also because glue pollutes the recycled plastics and is an obstacle for recyclers to reach the imposed quotas of recycled materials. Welding and gluing are seen as options for "cheap", poorly designed products. Moreover, instead of asking the Commission to assess the consequences of regulating integrated displays as regards end-of-life requirements under ecodesign, the industry should itself assess the impacts on their recyclability of using integrated displays in products covered by the WEEE Directive.

NL, supported by **ECOS**, asked for a differentiation between disassembly and dismantling in the text, and stressed that a balance would need to be struck between making sure the product was safe while

keeping it easy to disassemble and dismantle. **ECOS** also stated that a vertical standardisation mandate for displays is necessary, or an amendment of the horizontal M/453.

EGML expressed their support for the new Commission proposal. **FEICA** intervened in defence of use of glue and mentioned that research is ongoing for more compatible glue compositions making depollution and debonding possible.

BE asked more focus on reparability and argued for different requirements for integrated displays, depending on the type of equipment in which the display is integrated.

VHI supported vertical regulation for similar reasons (the core functionality and purpose of the display is relevant).

Continuing the presentation, the **Commission** explained some of the considerations relating to the marking of plastics and that it had mainly received requests for clarification rather than objections on the proposals relating to mercury and cadmium. It noted that it would attempt to align the requirements between the ecodesign and the energy labelling measures.

DE urged caution in setting requirements on plastic marking given the ISO standard and the difficulty of enforceability for market surveillance authorities, and suggested that "fingerprinting" for flame retardants was a possibility.

IT suggested that plastic marking needed to be "rethought", and asked the Commission to clarify where the technical documentation would be published and to consider whether it wanted mercury and cadmium content to be discouraged or simply highlighted.

BE expressed its support for plastic marking, but argued in favour of a different testing approach, noting the possibility of conducting a study on the matter in 2018.

EERA Recyclables, supported by **EURIC**, stated its support for complete prohibition of the use of flame retardants, noting that they largely reduce the recyclability of plastics from electronic equipement.

DIGITALEUROPE said that in principle they were not opposed to plastic marking, if it follows international standards.

Both **FEAD** and **EURIC** supported plastic marking and were in favour of provisions on mercury and cadmium.

EEB recalled that the review of the display regulation was mentioned in the communication for the circular economy in 2015, then in the Communication about the current work plan there was emphasis on the need of strengthening ecodesign in electronic products to implement the circular economy, with displays highlighted and finally the Council of environmental ministers urged the Commission to act on ecodesign, addressing resource efficiency. Besides repair, reuse and recycling are crucial for jobs creation in Europe.

As the discussion came to a close, the **UK** noted that its domestic industry preferred an implementation of the Regulation that was not on 1 January given the complications with sales, and **EED** made an appeal for the timely adoption of the Regulation.

The **Chair** noted that the Commission would allow until 1 September for written comments to be sent in, after which they would be analysed, the proposals and impact assessments would be finalised and taken through the Regulatory Scrutiny Board and Inter-Service Consultation, notified to the WTO, brought to the Regulatory Committee (ecodesign) and expert group (energy labelling), to be adopted on time. He committed to sending out a timetable for future meetings.

6. AOB

Not applicable.

Commission Services
Austria
Belgium
Bulgaria
The Czech Republic
Denmark
Finland
France
Germany
Hungary
Italy
The Netherlands
Portugal
Spain
Sweden
The United Kingdom
Switzerland
ANEC / BEUC
CECED
CLASP
DIGITALEUROPE
ECOS
EEB
EERA RECYCLABLES
EGMF
EHI
EuRIC
FAIRPHONE
FEAD
FEICA
IFIXIT
KATS
KEA
Lighting Europe
MUNICIPAL WASTE EUROPE
ORGALIME
TIE
TOPTEN.EU
VHK

5.2 Minutes of the Ecodesign Consultation Forum of 10 December 2014

Meeting of the Consultation Forum under Article 18 of Directive 2009/125/EC on energy-related products

Review of the

Commission Regulations on ecodesign of televisions (No 642/2009)

and energy labelling of televisions (No 1062/2010)

Brussels, 10 December 2014 (10.00 – 17:30)

Participants: See "Attendance List" in Annex

EC PARTICIPANTS: STAFF MEMBERS OF ENER C3, JRC AND ENV.

WELCOME AND PRESENTATION

The Chair welcomed the participants and introduced the previous steps in the process reviewing the Ecodesign and Energy Labelling Regulations on televisions.

2. ADOPTION OF THE AGENDA

The agenda was adopted without changes.

3. APPROVAL OF THE MINUTES FROM PREVIOUS CF MEETINGS

The Chair invited participants to provide comments, if any, on the minutes of the Consultation Forum meetings on Commercial Refrigeration held on 2 July 2014 and on Electric Motors held on 29 September 2014. No comments were expressed and the minutes are adopted.

4. WORKING DOCUMENTS ON ECODESIGN AND ENERGY LABELLING OF ELECTRONIC DISPLAYS, INCLUDING TVS (ENER LOT 3 AND 5)

The **Commission services** presented the draft ecodesign requirements, after which the documents were discussed by Member States and stakeholders.

BE expressed doubts on excluding PDP, OLED and Quantum Dot displays from tier 1. Although PDP is a declining market, OLED and Quantum Dot are predicted to be more energy efficient than LCD displays. Status displays that are very little should be completely out of scope.

UK criticised inclusion in scope of picture frames, a declining market where the same functions are increasingly performed by tablets.

NL proposed not to set requirements on Tier 3, as too far in the future; a revision in four years should set further requirements.

Digital Europe (DiEu) recalled that OLED displays are only available in classes B and A. Between 2012 and 2014 CCFL displays disappeared, so the largest potential for improvement for EE has been already exploited. The industry is uncertain about the possibility of further big improvements. On status displays, DiEu highlighted the risk of overlapping measures, e.g. tackling status displays embedded in equipment already covered by other legislation.

CECED suggested to exclude status displays from the scope, as vertical regulation on several domestic appliances already covers them. For example in a fridge, a status display may avoid opening the fridge, so the energy used by a display would be largely compensated by the savings from avoiding the opening of the door.

AT commented that PDPs have far higher energy use, however OLED and Quantum Dot are emerging technologies so we should not undermine their development.

ECOS welcomed the scope extension to different displays, in particular for resource efficiency requirements. It criticized the exclusion of PDPs from Tier 1 as this could reproduce a situation similar to the halogen lamps that invaded the market and are slowing down the switch to more efficient LEDs.

Moreover, **ECOS** would support resource efficiency and information requirements on signage displays. ECOS would recommend also not repeating the mistake of the consultations in 2008, when industry was too cautious on EE improvement potential that finally led to unambitious targets.

ANEC/BEUC supported inclusion of PDPs from tier 1 and highlighted a possible misalignment of scope for mobile equipment (recital 9 and scope).

DiEu suggested to remove the coverage of displays into integrated desktop computers as they may be covered by the review of the computer regulation in a couple of years. Ambiguous wording, such as "including but not limited to" should be eliminated. Signage displays are b2b products, therefore not to be considered in this regulation focusing on consumer products. On network stand-by, there is no justification for tightening requirements in respect to what is already in place. Finally, the APD requirement of 4 hours since last user interaction is already fully satisfactory, so changing it is not necessary. About the easily visible switch, the details put in the draft regulation would be better placed in transitional methods and/or in a mandate for standardisation. The scope should be limited to consumer products and the scope of resource efficiency requirements should match that of the energy efficiency requirements, as in the draft text for energy labelling. Given the limited market penetration of products such as broadcast or enhanced displays, the environmental impact could be not cost-effectively addressed.

AT expressed doubts on the inclusion of medical or enhanced performance displays in the scope of information and resource efficiency requirements. Information should be limited to standard criteria as used in the past.

UK highlighted a possibly inconsistent approach when excluding OLEDs because of lack of data on energy efficiency but including them for resource efficiency requirements. The explanatory memorandum mentioned the advantages of the draft Regulations but not the cost. A **UK** analysis suggests there are no clear benefits compared to costs, so a robust analysis will be needed, particularly for the new resource efficiency requirements.

NL suggested a minimum area below which displays such as status or picture frames could be excluded from the scope. Although big signage displays for outdoor use are not comparable to displays in scope, the group of signage displays using PDP or LCD panels, and physically resembling a television display, should be put in scope at least for information and resource efficiency requirements. NL agreed with DiEu on integrated displays, but disagreed on the restriction to non-consumer products as the market will not be able to regulate itself. Information requirements on energy use should be provided in the same way as for other products in scope. NL suggested that signage displays should be addressed both for information and resource efficiency requirements and be covered by the labelling regulation, although the scope should be limited to indoor displays of limited size.

BE formulated a detailed suggestion for defining the scope and simplifying certain definitions. BE also expressed concerns about the risk of cheap and inefficient plasma signage displays invading the EU market, if energy efficiency is not regulated and supported the proposal of NL for labelling them.

SE supported information requirements for signage displays and invited the Commission to investigate on existing standards to gather information for enforcing requirements in a future regulation.

AT also supported information gathering on signage displays and to integrate them in the current regulation, although with different, specific requirements. On the Auto Power Down (APD) requirement, AT recommended movement sensors to shorten the too long interval of 4 hours.

DiEu recalled that the data collected and provided for analysis do not include signage displays, so inclusion of them, as requested by some stakeholders, would not be based on a factual data.

PO expressed no strong position on the scope, however expressed strong interest and support for including resource efficiency requirements, as necessary steps in this direction.

PT referred that though understanding the importance of resource efficiency requirements as a way to ensure availability of critical materials, is still reflecting if the proposed scope ((2), article1) is the better approach to tackle such concerns.

AT confirmed that, for signage displays, they would only support energy information requirements.

EEB supported the draft proposal to not give allowances for a quick/fast start option. However there is a risk of a loophole: because of the testing standards, quickstart will only be captured if it is part of the initial set-up. But if the user changes the set up later, this is not captured. So a fine tuning of the language and of the standard is suggested. Tier 2 is less stringent that the current ENERGYSTAR, so if a tier 3 is not kept, then tier 2 should be closer to tier 3 compared to what is proposed now.

DE formulated a slight simplification in the formula. Tier 3 should be relaxed, as an improvement of 50% seems too ambitious.

DiEu pointed out that, comparing the 2012 and the 2014 data, an average improvement of 15% was observed. The proposed requirements are too ambitious and would push too many products out of market. DiEU proposed alternative formulas with progressive jumps from tier to tier, going beyond 15%. UHD should be specially considered, as broadcasters are referring now to UHD phase 2, with high definition ratio and higher frame rates. If these improvements, now used in cinema, come to the consumer market, more energy will be needed. DiEu noted that ENERGYSTAR draft version 7 has an allowance of 55% for UHD for two years. Taking out Tier 3 should be considered.

EEB considered that Tier 3 is a proposal for 2021 and adopts requirements of ENERGYSTAR v.7 in force from 2015, so seems not so ambitious. On UHD, EEB pointed out that there are already some 55" UHD TV in the US market using 75 Watt and the US EPA is already envisaging to remove the allowance in two years. EEB pointed out that resolutions beyond UHD should be included in the scope.

CEA considered that it is critical to have test procedures keeping pace with the market changes and policies keeping pace with consumer patterns. A regulatory approach has to keep allowances for innovation features, including those we cannot anticipate today. **UK** stated that it does not want a review scheduled before tier 3 comes into force.

KEA argued that as UHD displays use a higher number of pixels needing higher energy consumption, the Commission should devise a different formula for UHD displays, until a new technology becomes available.

BE supported a third tier and expressed scepticism to give an allowance for increased definition.

DiEu considered that without allowances there is a high risk of excluding new technologies. The Energy Label should be used to let consumers chose the most efficient displays.

ECOS stated that Tier 3 is crucial for giving a long term perspective to industry. Allowances should not be given, unless scientific evidence shows they are needed. If new functionalities will be added, this could be addressed in a review before Tier 3 comes into force.

SE supported ambitious targets, no allowances for UHD and a review before tier 3 comes into force.

AT also supported Tier 3, subject to a revision before it comes into force. A review 'package' should also look at developments on OLEDS, Quantum Dots, 8K etc. AT declared scepticism on the need to introduce allowances for UHD/4k displays.

DE considered that tier 3 (reviewed as necessary) is important as a signal to industry of the targets to aim for with their next products. DE also considered that a minimum value on peak luminance may be necessary.

DiEu stressed that the regulation for displays should be aligned with those for stand-by and on-mode. APD on computer displays should be not applied as this would require major IT changes.

CLASP recalled that the tier 3 curve does not go beyond best available technologies for small screens, as the 2014 data shows.

ECOS solicited stricter requirements for simple stand-by, i.e. 0.3 W or less. ECOS drew attention to the fact that the ComplianTV project has shown that, by reducing on-mode volume in testing

situations, some manufacturers are claiming results that appear far below reality. As solution, ECOS suggested a peak-sound volume ratio in testing.

DiEU considered that any changes to tests should be made in the standard and not in the regulation.

Both **DiEu** and **BE** requested clarifications on the text about 3D testing, whilst **NL** questioned the need for this text as 3D television has so far remained a niche market.

Commission services presented the resource efficiency aspects in the draft text, illustrating the following:

- The WEEE Directive, requires (Article 8) that Member States, ensure separate collection and proper treatment[13] for a number of materials listed in Annex VII, some of which are typically found in televisions, computer displays, integrated desktops, etc. such as: mercury (used in CCFL backlighting), plastics containing flame retardants (e.g. BFR), LCDs and casing greater than 100 cm^2 (about 6 inches), batteries, printed circuit boards (PCB), cables, capacitors, etc.
- Recital 11 of the WEEE Directive and Article 4 mention that Ecodesign requirements facilitating the re-use, dismantling, treatment and recovery of WEEE should be laid down in the framework of measures implementing the Ecodesign Directive.
- The draft measure includes a set of requirements aimed at enhancing the safe and efficient dismantling of hazardous substances and recovery of recyclable materials, assuming that a possibly marginal increase of cost at the design phase may result in a far cheaper and more effective treatment of the display at its end of life. Although future best available technologies may enable a safe removal of dangerous substances and an effective recovery of precious materials, such technologies are likely to be not affordable by most of the SMEs involved in the collection and treatment of WEEE all around Europe. Additionally, as studies by JRC have documented, a hybrid treatment, including partially manual operations before shredding, provides a far higher quality of recovered materials compared to pure shredding. The requirements proposed, consequently, aim at facilitating manual or robotized pre-treatment, to compensate the additional costs with a better recovery of the embodied energy and materials in the waste equipment.
- When, at end of life, an electronic display is disposed (so switched off and possibly broken), it is very challenging for any worker at the collection or processing site, to distinguish a television from a computer display, a medical display, a broadcast display or an integrated desktop. This will become virtually impossible once unified high-speed data/video connectors will replace the current different ones. For this reason, the ecodesign proposal widens the scope of resource-efficiency requirements to equipment not in scope for energy-efficiency aspects, assuming that no specific regulations will cover energy efficiency requirements for these products within at least the next few years.
- Extraction of key components should be possible in an cost-effective way. Information must be provided on disassembling, content of critical substances, presence of mercury, of flame retardant plastics and possibly other substances. The proposal focuses on recovery of materials with high embodied energy content (e.g. rare metals requiring increasingly enormous energy to be extracted) and aims at facilitating the development of a market of secondary materials, expectedly triggering the creation of jobs within the EU[14] and decreasing costs for disposal paid by citizens (externalities).

The **Commission services** presented the draft requirements on resource efficiency, after which the proposals were discussed by Member States and stakeholders.

AT welcomed the proposed resource efficiency requirements, but cautioned against overly ambitious requirements,

EERA (European Electronic Recyclers Association) considered that brominated flame retardants (BFRs) should disappear from plastics as they pose risks to health of workers and to the environment.

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13 including recovery, recycling and preparing for re-use (Article 8.5.)

14 The production phase of electronic displays, of any kind, is almost entirely outside the EU (i.e. Asian countries)

MWE welcomed the introduction of the measures to facilitate end-of life treatment. Producers' responsibility is important, in particular because displays are fast-moving consumer goods that become waste only a few years after having been placed on the market. The manufacturers need to be involved and collaborate with the recycling sector, to assure that collection and extraction of valuable materials is done in a proper way, as high costs are involved otherwise.

BE also supported requirements on resource efficiency but encouraged a better formulation of the recyclability index and suggested that this information is made accessible in a centralised "products registration database", where recyclers could retrieve the relevant information many years after the product was placed on the market.

SE also welcomed the requirements, recalling that all requirements put on producers would have to be correctly used and exploited by the recycling industry. SE suggested treating cadmium and lead in the same way as mercury.

EEB strongly welcomed these requirements as an important step forward and supported the establishment of a "product registration database" to make recycling information easily available. EEB suggested to simplify certain requirements, e.g. by better defining what is recyclable.

DiEu considered that end-of-life requirements should be proportionate and should follow agreed standards. Moreover, information requirements should only cover those issues requested by recyclers and information should only be made available to qualified users.

ECOS recalled that the attempt by the Commission to establish a standardisation mandate on material efficiency was refused by CEN/CENELEC.

IT recommended a thorough analysis of these requirements against costs from the perspective of producers, recyclers and market surveillance authorities. On BFRs, IT also requested that the logo should be required even for a minimal quantity of BFR in very small parts. Finally, labelling for the presence of fluorescent lamps would be confusing and the logo should be applied to the lamps containing mercury and not to the entire display.

UK welcomed in principle the introduction of resource efficiency and end of life requirements, but cost-effectiveness needs to be kept in mind. The UK supported mercury labelling (possibly extended to cadmium) and considered that additional work on BFR labelling was needed.

CEA considered that, based on the experience of IEEE 16802 (green purchasing standard), relevant information should be agreed with recyclers to ensure the added value of the information provided and avoid overloading them with useless data

EERA pointed out that a video would not be used by recyclers.

DE welcomed the resource efficiency requirements and recommended to verify coherence with the WEEE Directive to avoid overlap. Care has to be taken that any requirements are enforceable at limited cost. DE questioned the usefulness of the recyclability index and suggested that on mercury a limit could be introduced in line with what is already foreseen in the RoHS Directive. On BFR labelling, DE supported the IT position.

AT welcomed the information requirements, which should be tailored to the different target groups (e.g. recyclers, manufacturers, consumers, authorities). Standardisation of the information is a crucial aspect.

NL also welcomed the resource efficiency requirements and endorsed previous comments on recyclability index and size of parts containing flame retardant plastics. NL disagreed with Italy on the mercury logo as it must be applied to the display as CCFL lamps are fully integrated in LCD panels. Disassembly instructions should be required by model family and not for individual models.

ECOS echoed DE, AT and NL comments on the need to provide targeted information, ideally from a centralised source such as a "product registration database" and would welcome a standardised format.

BE provided a presentation showing a higher yield, quality and purity of recovered materials when "disassembly" is used as compared to "shredding". Incentives for design for disassembly may be appropriate to stimulate a market for recycled plastics. As regards labelling, comprehensive

information on additives could be added in the mould (using the relevant ISO standards) could be considered.

EEB highlighted the importance of providing information not only to recyclers and authorised repairers but also to customers/consumers.

ANEC/BEUC welcomed the resource-efficiency requirements and stressed the need of not limiting the information to professionals only.

ORGALIME expressed concerns about the resource-efficiency requirements, particularly related to enforceability and measurability.

CECED stated that it has to be ensured that additional design and information requirements on manufacturers is used by recyclers, bearing in mind that freely provided information could be sensitive.

BE supported the compulsory indication of disassembling time and plastics content. Next to the recyclability rate, a limitation on the number of different polymers, at least in big plastic parts, could be considered.

DiEu mentioned that some new displays use up to 25% of recycled plastics and recyclers have the technology to differentiate different kind of plastics, without using logos. Freely providing disassembly information to end-users may pose safety and liability risks. DiEu considered that limiting the number of plastics to be used was unacceptable.

CECED recommended that the impact assessment should include projections on which technology would be used by recyclers in 15-20 years from now.

EURIC expressed support for the resource efficiency requirements.

The **Commission services** presented the draft Labelling Regulation, after which the document was discussed by Member States and stakeholders.

DE recalled that today the vast majority of televisions sold are in the classes A or above, with less than 1% in classes below B. This situation is unsustainable for an additional 4 to 5 years. Moreover, computer displays would get, for the first time, an energy label and overpopulating the top classes would give the wrong signal to consumers. Therefore, DE recommended rescaling the label to A to G (with an updated formula, also for ecodesign) so that consumers would have a label that provided useful information.

NL supported the DE proposal to avoid overcrowding of the highest classes.

AT proposed to include the display labelling regulation in a package with the revision of all relevant labelling regulations in line with the outcome of the revision of the Energy labelling Directive.

DiEu supported Commission proposal as a compromise-solution, but would prefer an alignment of the labelling with the revised Directive and label format.

ANEC/BEUC endorsed the DE proposal. If not acceptable, the compromise solution proposed by the Commission would prolong the life of a label that is already "dead".

CEA mentioned that in the US the energy label is considered a success story, with a clear impact on efficiency. CEA suggested the possibility of 'dematerialising' labels by replacing them in shops with information shown on electronic displays.

EEB supported the DE proposal and recommended a formula that would provide a clear signal to consumers about the higher energy use of bigger displays. EEB also supported a "digitalisation" of the label.

SE suggested to agree on the principles of a new label lay-out now and adapt if a layout different from A-G is finally chosen. To ensure technology neutrality, no allowances should be included in the labelling proposal.

BE supported the DE proposal, without any allowances. BE asked to assess the impact of the labelling Regulation for displays on the ENERGYSTAR label for the same product group.

UK endorsed previous comments about rescaling and simplification using a single formula and aligning the display labelling with the new Directive.

IT opposed any rescaling, preferring to wait for the revision of the Labelling Directive and requested this approach to be adopted also for any other products for which a revision of labelling is in the pipeline (refrigerators, washing machines, etc.).

The **Commission** concluded the discussion, outlining the timeline for next steps and requested written comments to be sent to the Commission at the latest by 20 January 2015.

5. AOB

Presentation from Sweden on results of testing clear, non-directional LED lamps

SE presented a market study on LED lamps, undertaken together with BE, CLASP and ECEEE, in view of the upcoming Regulatory Committee on the draft amending Regulation of Regulation 244/2009 and 1194/2012 to postpone the coming into force of the stage 6 requirements to 1 September 2018. The main findings were that the prices of LED are falling faster than predicted while the technological development is happening faster than previously expected. Furthermore, the main obstacles such as dimmability are already addressed by some products on the market and new products such as LED-filament lamps are also appearing. SE stressed the importance of these findings for the decision on the stage 6 postponement.

The **Commission** thanked SE for the presentation and opened the floor for comments, noting that a discussion on the draft amending Regulation was not foreseen.

IT welcomed the study and asked for more data on the individual test results rather than just the averages. IT requested further clarifications on the three models that would have failed market surveillance testing according to the energy labelling requirements, and on products with high lumen output above 500lm on which the study contained little data.

SE agreed to provide the individual testing data. The market study was not a market surveillance exercise and so any non-compliance issues were not followed up. Products above 500lm were not chosen because these are not very common on the market.

AT reported on its PremiumLight testing project and confirmed the observation that LEDs of well-known brands performed quite well. Nonetheless, the LED-filament lamps show novel problems such as a changed light distribution compared to an incandescent light bulb. In addition, problems such as flicker remain an issue.

CLASP added that in the appendix of the market study photometric plots are shown, given an indication of the light distribution also of LED-filament lamps.

DK welcomed the study and mentioned that the results are in line with similar testing undertaken in Denmark.

The **Commission** requested DK to share these results with the Consultation Forum.

EEB questioned why "D"-class halogen lamps are allowed to be marketed and sold as 'eco-saving lamps'. Moreover, in the USA high lumen output bulbs (e.g. 60W equivalent bulbs) are available on the market, and testing data from the Energy Star programme could be used as additional data source for this discussion.

EuroCommerce stated that they invest heavily in LED and retailers such as IKEA have decided to only sell LEDs from 1 September 2015 to support energy efficient lighting technologies.

BE asked for the date of the Regulatory Committee meeting and asked LightingEurope about their knowledge on LED-filament lamps.

Presentation from Lighting Europe

LightingEurope responded by presenting remarks on the report: according to their understanding, 46% of all tested lamps were not in compliance with regulatory requirements, and, given that the switch to LEDs is happening anyway, argued that no phase-out of halogen lamps is necessary. The

testing of a halogen lamp for 240V from the British market with 230V raises questions about the correct testing. The focus on low-lumen output lamps does mean that data on replacements for many high-lumen halogen lamps is missing. Furthermore, there are many specific halogen lamps for which no LED replacement exists, e.g. because of the external dimensions. LED-filament lamps are still not mature and many manufacturers experience problems. Hence, mainly 'no-brand' manufacturers are bringing them on the market, because the well-known brands do not want to impose low quality products on their customers. Overall, LEDs cannot yet fully replace halogen lamps.

SE assured that it will re-check the halogen lamp testing (230V/240V) and informed the Consultation Forum that members of LightingEurope would visit the Swedish testing lab in the following week.

IT reminded LightingEurope not to use an 'eco' branding for halogen lamps, because they are only "D"-class lamps.

EEB stated that there are also LED-filament lamps with a heat sink and that this technology is maturing fast.

BE reiterated that the market study did not fully resemble a market surveillance test, hence one should be cautious about drawing conclusions on compliance from the study. In the one case where the labelling was clearly wrong, the study team informed the respective national market surveillance authority.

EEB asked whether halogen lamps do not have premature failures.

DE added that according to their experience halogen lamps do not perform significantly better in overall compliance tests than LEDs.

LightingEurope replied that every product can fail prematurely but its manufacturers guarantee that the failure rate is within the legal limit.

IT informed the Commission of problems with the Italian language version of the energy labelling regulation, and the templates on the Commission's website do not correspond to the requirements in the regulation.

VHK informed participants that a preparatory study on lighting is ongoing and the project's website is www.ecodesign-lightsources.eu where interested parties can find the task reports and register for stakeholder meetings. Another study on fans can be found on www.fanreview.eu.

The **Commission** stated that no date has yet been fixed for the Regulatory Committee meeting. Furthermore, it will keep stakeholders informed about the start of new studies and adoptions through the Consultation Forum.

The **Chair** thanked the Members of the Consultation Forum for their participation and closed the meeting.

Commission Services
Austria
Belgium
Bulgaria
Czech Republic
Germany
Denmark
France
Ireland
Italy
The Netherlands
Poland
Portugal
Sweden
Slovakia
The United Kingdom
Switzerland
ANEC
ANEC/BEUC
CEA (Consumer Electronics Association, USA)
CECED
CLASP
Digital Europe
ECEEE
ECOS (European Environmental Citizens' Organisation for Standardisation)
EEB (European Environmental Bureau)
EERA (European Electronic Recyclers Association)
EURIC (European Recycling Industries' Confederation)
Eurocommerce
Fead
KEA (Korean Electronics Association)
Lighting Europe
MWE (Municipal Waste Europe)
Orgalime
Harrison ASSC Ltd
VHK

5.3 Minutes of the Ecodesign Consultation Forum of 8 October 2012

MINUTES OF THE ECODESIGN CONSULTATION FORUM MEETING ON TELEVISIONS AND DISPLAYS

SUBJECT: ECODESIGN CONSULTATION FORUM ESTABLISHED UNDER ARTICLE 18 OF ECODESIGN DIRECTIVE 2009/125/EC

VENUE: CENTRE A. BORSCHETTE, BRUSSELS

Chair: ENER C3

Participants representing the EC from: ENER C3, DG ENTR and DG ENV

Participants representing stakeholders: Annex I

Abbreviations: Ecodesign (ED), Energy Labelling (EL), Energy Efficiency (EE), ENERGY STAR (ES)

1. Agenda points 1 & 2 - Welcome of participants and approval of the agenda

CHAIR welcomed participants and apologised for Paul Hodson's (Head of C3 Unit) absence. Minutes from the previous CF meeting on online labelling (held on 10 July) were adopted without changes. An agenda of the meeting was adopted without changes.

The Commission services (EC) distributed the updated information on a) responsibilities within the EC's Ecodesign Team and b) the ongoing and future legislative work.

2. Agenda point 3 - Discussion about the review of EL and ED Regulations on televisions (*presentation on CIRCA*)

The **EC** draw attention of the participants to the *'Discussion paper on the review of the Ecodesign and Energy Labelling Regulations for televisions and on the draft Regulation on electronic displays, including computer monitors'* that had been distributed on CIRCA and thanked stakeholders for their position papers that had also been uploaded on CIRCA.

The **EC** reviewed the application of the ED and EL Regulations. It pointed at trends and developments that had taken place since the entry into force of the Regulations, including a rapid development and market adoption of energy efficient technologies, a higher number of display devices per household, an overall increase in the average size of television screens and computer monitors, longer daily use of display devices, and the introduction of new features. The EC also noted that despite these developments, the total energy consumption by TVs has decreased, mainly because of their increased energy efficiency.

Moreover, the EC stressed that available data and experts indicated that ED and EL Regulations have had a limited impact on the TV market. The rapid evolution of TV energy efficient technology exceeded expectations of both Regulations. The introduction of new types of televisions was mainly driven by the availability of relevant technologies, a demand for improved picture quality and design, as well as a competition between manufacturers and thus it happened largely independently of the ED and EL requirements.

The **EC** concluded that there was a need for a revision of the two TV Regulations and that it would present a proposal for new measures.

SWEREA IVF supported the need for a revision and noted that industry had realised the importance of EE. It also mentioned that the revised Regulation should include requirements on recycling.

IT did not agree that there was a need for a revision of EL Regulation but noted that some minor modifications would be necessary.

DE stated that a full-scale revision of EL Regulation would be premature. It noted however, that some modifications were required, e.g. the earlier introduction of top three EE classes (A+, A++, A+++).

ECOS agreed that the market development had not been correctly predicted and that the requirements were not sufficiently stringent. ECOS supported a full revision of EL Regulation. Should the latter not be possible, the top three EE classes should be introduced earlier.

BE agreed with comments made by IT and DE that it would be too early to proceed with a full revision of EL Regulation.

DIGITAL EUROPE expressed its major concern about the scope of the new proposal to be discussed later during the day (i.e. TVs and other displays).

NL agreed that the predictions in the preparatory study were wrong, and future studies should prevent this happening again. It pointed at a need to receive reliable information also on non-energy related aspects of displays. It supported a full EL revision in a few years but recommended faster entry into force of the top three EE classes.

UK supported a revision of ED Regulation which should also include non-energy related aspects. It objected to a full revision of EL Regulation.

CLASP agreed with the proposal to revise both Regulations and to apply the same formula/equation for ecodesign and energy labelling. It also stressed the need to set out the requirements at a proper level of stringency.

SE was in favour of a full revision of both ED and EL Regulations. The future ED should also include some requirements on non-energy related issues.

FR was of the opinion that it was too soon for a full revision of EL Regulation.

ANEC supported the revision of EL and ED Regulations.

CECED disagreed with a view that the development of TVs has not been influenced by the existing EU Regulations. It explained that industry had been working on new energy efficient technologies already during the consultation phase preceding the adoption of the Regulations. It also proposed that the EU Regulations should contain a mechanism allowing for an automatic adjustment of the requirements without a need for a revision.

DIGITAL EUROPE pointed out that the sample size of 412 TVs currently on the market was quite small. Furthermore, it stressed that improvements in 2011 and 2012 slowed down and thus the curve was more flat than in the previous years. It was in favour of keeping the current A-G scale.

DK supported the proposed revisions, particularly of ED Regulation.

AT expressed its opinion that EL Regulation can be improved but it should not be subject to full revision. The A+++ class should be introduced earlier to use the current EL in an efficient way.

NL agreed that the average EE index was flattening out, but further improvements would be achievable. It pointed out that larger screens could obtain a better EE rating more easily than small screens.

DIGITAL EUROPE pointed out that computer displays were already governed by the ENERGY STAR.

*The **EC** summarised the discussion and concluded that stakeholders were in favour of the full revision of ED Regulation and of the introduction of a new set of ecodesign requirements. Furthermore, stakeholders were in favour of specific modifications of EL Regulation (e.g. earlier entry into force of the top three EE classes) but they (with the exception of NGOs, SE and DK) had not supported the idea of a full revision Regulation.*

3. Agenda Point 4 - New proposal for the Commission Regulation laying down ecodesign requirements for electronic displays and a new proposal for the Commission Delegated Regulation laying down energy labelling requirements for electronic displays (*presentation on CIRCA*)

3.1 Ecodesign

The **EC** presented the scope of a draft proposal for a new ED Regulation on electronic displays and justified the merger of TVs (lot 5) with computer monitors (lot 3). In principle, the draft Regulation would apply to all displays, including TVs, computer monitors and digital photo frames. Certain categories of products, e.g. high performance electronic displays, products covered by the computers Regulation and projectors may however have to be excluded from the scope of the Regulation.

AT supported the proposal to regulate TVs and computer monitors together. AT asked whether a manufacturer or a retailer should decide on a classification of a product as a TV or a computer monitor.

The **EC** clarified that the manufacturer or retailer should not decide on the product classification. Such decision should stem directly from the Regulation and provided definitions. Under the draft Regulation, the classification of products will not be as relevant as it is under the current legal regime, because the same requirement will apply to all electronic displays (including TVs and computer monitors).

DIGITAL EUROPE did not agree on laying down one set of requirements for TVs and computer monitors. It stressed that ES applied in the EU to computer monitors. Consequently, two separate Regulations should be prepared.

SE supported the EC's proposal, and noted a need for precise definitions of exemptions.

NL supported the EC's proposal and pointed out voluntary aspect of ES.

IT argued for two separate Regulations for TVs and computer monitors.

ECOS supported the EC's proposal. It proposed that the EC should ask CENELEC to prepare measurement methods that could be used for all displays. ECOS also suggested that, if necessary, the entry into force of the requirements for computer monitors could be postponed (compared to TVs).

DK supported the EC's proposal to review EL and ED, and asked the EC to provide more information on high-performance products and to consider a decision of including them in the scope.

UK supported the EC's proposal provided that common measurement methods would be established. Precise definitions of products exempted from the draft Regulation should be provided.

DE supported the EC's proposal. It stressed, however, that different criteria should apply to special-use displays.

ANEC supported the EC's proposal.

BE informed that it was not against the EC's proposal. It proposed that the draft Regulation should contain two chapters, one on TVs and the second one for computer monitors.

Hewlett Packard stressed that ES has been successful for many product groups including computer monitors. Therefore, its requirements on computer monitors could be included in the draft Regulation. It objected to merging TVs and computer monitors.

Hewlett Packard informed that computer display manufacturers were not involved in the standardisation work and that the mandate 477 should be broadened.

The **EC** clarified that it would amend the mandate 477 given to CENELEC so that the latter could prepare a new measurement method applicable to all electronic displays (including TVs and computer monitors).

LG stated that the design of TVs and computer displays was different. This fact should be taken into account when developing harmonised measurement methods.

ECOS noted that new technologies (for example internet-enabled TVs which have a huge stand-by power consumption) were not covered by current test standards. A particular TV model was mentioned as an example.

DIGITAL EUROPE explained that the TV model mentioned by ECOS was old and no longer available on the market.

LG pointed out a difference in testing methods for TVs and computer monitors, which could result in unfair treatment of certain models. It promised to submit its own testing data.

Bob Harrison (the EC's expert) clarified that following the receipt of the amended mandate 477, CENELEC would start the work on harmonised measurement methods that could be applied to TVs and computer monitors. According to BH, establishment of the harmonised method ('dynamic test

loop') seems feasible. So far, luminance has been identified as a major issue in the standardisation work.

*The **EC** concluded that a majority of stakeholders supported the EC's proposal to prepare one set of ecodesign requirements for TVs and computer monitors. Furthermore, the EC explained that it would request industry to provide more test data particularly on computer monitors and that it would consider changes to mandate 477 so that CENELEC could prepare proper measurement methods.*

The **EC** presented the requirements on on-mode power consumption. The draft Regulation proposes two new equations/formulas (for displays below and above 16.5 dm²). The equations were established on a logarithmic regression line that is technologically neutral and does not favour any product group or technology. Three Tiers were proposed.

DIGITAL EUROPE informed that the EE index should follow (as in the current Regulation) a linear curve. It also proposed to lower the stringency of requirements and to introduce separate sets of requirements for plasma TVs and LCDs. Finally, it stressed that plasma TVs and small screens would have problems to meet the proposed requirements, what could have an impact on jobs.

IT stated that the linear regression line should be maintained.

EEB supported the EC's proposal and proposed that a review clause could be introduced before the entry into force of Tier 3 (T3) requirements. The proposal should also include non-energy related aspects.

ECOS/NRDC supported the EC's proposal and noted that year 2017 would be very different from today, mainly because of the development of EE technologies such Organic LEDs. It supported the application of the logarithmic regression line. Furthermore, it noted that the requirements might be too stringent for small displays.

UK supported the proposal to set out less stringent requirements for small displays.

NL supported the EC's proposal and assessed **DIGITAL EUROPE**'s predictions as unrealistic. It noted the issue of the stringency of the requirements for small displays.

SE supported the EC's proposal including the application of the logarithmic approach, but pointed out that the proposal could have been even more ambitious.

ANEC supported the application of the logarithmic approach, but asked for more ambitious requirements on large screens. It noted an issue of the stringency of requirements for small displays.

DE expressed a view that T3 requirements might be too stringent.

PANASONIC stated that the proposal would have a negative impact on plasma TVs which would struggle to meet T2 requirements. It noted that industry has not yet managed to recover the R&D and fabrication costs. The plasma technology is especially important for large screens.

UK stated that the assessment of the requirements should be linked with an assessment of the costs.

The **EC** replied that this issue would be addressed in the impact assessment.

DK supported the EC's proposal with its logarithmic approach, and asked the EC to consider more stringent requirements.

LG confirmed the willingness of industry to develop EE TVs - however, the proposed requirements were too stringent.

AT noted that additional data on computer monitors would be very useful. Furthermore, it informed that T1 and T2 requirements seemed reasonable, but T3 needed further discussions.

INTEL stressed the need to lower the stringency of requirements, particularly for T1, and raised the issue of signage products.

CLASP informed that foreseen future developments of the LED technology would drive the EE of displays.

EEB proposed that if no compromise can be reached, a solution could be to establish the requirements for computer monitors on the basis of ES version 6.

ECOS stressed that more data should be made available to stakeholders. California is going in a promising way with its legislation, and uses test methods working with recent developments such as 3D TV and 4K.

*The **EC** summarised the discussion and concluded that a majority of stakeholders supported the proposal. However, further considerations should be given to small displays (including computer monitors) and plasma televisions. The EC informed that it would request industry to provide more test data to ensure that the requirements (particularly in T3) are set out at the right level.*

EC presented the requirements on off-mode, standby mode, availability of off & standby modes, Auto Power Down (APD), home mode, peak luminance ratio and networked standby.

ECOS pointed out that the off-mode should also include features such as internet-TV.

DE commented that APD appeared not to be included in the case of quick start.

NL stated that the possibility for disabling APD should not be applied; some exemptions could, however, be foreseen in special purpose TVs.

LG mentioned that APD may be an issue for signage products. This function should be removed from signage products.

*The **EC** summarised the discussion and concluded that majority of stakeholders supported the proposed requirements. APD in signage products will be further considered.*

The **EC** presented non-energy related aspects, including dismantlability, recyclability and an information requirement that could be considered for a new Regulation. The EC explained that these aspects originate from a recent JRC study and that the potential requirements would come into force only in T2. The EC invited all stakeholders to provide comments on the results of the JRC study.

NL asked for the inclusion of non-energy related aspects in the new Regulation.

SE stated that non-energy related aspects should be included in the draft Regulation and that it would be happy to provide comments on a concrete proposal.

ANEC/BEUC was in favour of including non-energy related aspects in the draft Regulation.

IT stressed the importance of resource efficiency and its enforceability. IT expressed its doubts whether the requirements on non-energy related aspects could be enforced by market surveillance authorities.

DE agreed with IT regarding market surveillance and enforceability of such requirements.

ECOS mentioned the issue of flame retardants in TVs.

DIGITAL EUROPE informed the meeting about the industry's problems with the implementation of WEEE Directive and with the re-use of plastics from TVs.

CECED informed the meeting that industry was ready to accept requirements on recycling provided that the enforcement of the provisions would be strengthened. Otherwise, this would be harmful to industry playing by the rules.

NL agreed that enforceability of the requirements was of great importance.

ANEC informed about challenges faced by recyclers in the application of WEEE Directive.

ORGALIME pointed out that ED requirements should not create excessive costs and raised an issue of manual dismantling.

DIGITAL EUROPE disagreed with the figures from the JRC study. It also found it difficult to accept the situation where legal provisions (binding industry) on non-energy related aspects are proposed without a proper methodology or verification mechanisms.

3.2 Energy labelling

The EC presented a draft proposal for a new EL Regulation on electronic displays. It clarified that EL Regulation would apply to TVs and other displays including computer monitors. Furthermore, the EC informed that the draft Regulation would include new equations/formulas (the same as in ED Regulation).

UK supported the EC's proposal to cover both TVs and other displays, including computer monitors, and to introduce a new equation that would not however result in changing the distribution of EE classes among products available on the market.

IT proposed that current equations were maintained and no other changes resulting in different distribution of EE classes were made.

DE agreed that a full revision of the Regulation would be too early. It supported the EC's proposal as regards the scope of the draft Regulation, and the introduction of the new equation.

DK supported all aspects of the EC proposal, including the scope and the new equation. It was of the opinion that changes in the distribution of EE classes were necessary.

SE also supported all aspects of the EC proposal.

NL supported the EC's proposal regarding the scope and the new equation. It was not in favour of changing the distribution of EE classes. However, it pointed out that top EE classes could enter into force earlier than foreseen in the current Regulation.

DIGITAL EUROPE did not support any changes in the distribution of EE classes.

ECOS agreed that the top EE classes should enter into force sooner.

BE agreed with ECOS's comment. It was not, however, in favour of changing the equation and any changes in the distribution of EE classes.

AT agreed with the extension of the scope of the new Regulation to other displays. It also proposed that changes to the distribution of EE classes should be considered taking into account the market data.

ANEC was strongly in favour of changing the distribution of EE classes.

ECOS was in favour of applying the EL requirements to computer monitors.

DIGITAL EUROPE pointed out at the success of the ES, and restated its disagreement on a merger of TVs and computer displays. It also re-stated that an 18 month period between the Tiers was too ambitious.

The **CHAIR** asked stakeholders for additional written comments (if any) on the EC's proposal. These should be submitted within 30 days after the meeting. The CHAIR closed the meeting.

Commission Services
Austria
Belgium
Bulgaria
Czech Republic
Germany
Denmark
Estonia
Finland
France
Ireland
Italy
Luxembourg
Latvia
The Netherlands
Portugal
Spain
Sweden
The United Kingdom
ANEC/BEUC
APPLE
CECED
CLASP
Digital Europe
ECOS (European Environmental Citizens' Organisation for Standardisation)
EEB (European Environmental Bureau)
HP
Intel
LG
Orgalime
Panasonic
Philips
Samsung
SWEREA IVF

5.4 Minutes of the Ecodesign Consultation Forum of 8 October 2009

Subject: Ecodesign of EuPs Consultation Forum – Computers and Displays

Place: Centre de Conférence Albert Borchette, Brussels

EC Services: TREN/D3, ENTR/B1, ENV/G1

Consultation Forum – Computers and Displays

1. **Welcome and introduction**

The **Chairman** welcomed the participants and presented the agenda and the participants from the Commission.

2. **Adoption of the agenda**

The agenda was adopted without changes.

3. **Working document on possible ecodesign requirements for Computers**

The Commission services presented the main aspects of the working document and the rationale of the approach for discussion (see presentation circulated together with these draft minutes). It was explained that the aim would be to align as much as possible minimum ecodesign requirements with Energy Star. Practically, it is suggested to introduce requirements in two steps, with a first tier based on Energy Star 4.0 and a second tier based on Energy Star 5.0 entering into force in 2013 (with several adjustments).

Scope

At the request of **ANEC** the **Commission services** clarified that no size limit was included in the definition of netbooks, which are covered under the notebook definition.

AT indicated that Energy Star did not include provisions regarding notebook screens, and asked whether these should be included in the Commission's proposal. **The Commission services** and **MTP** (The UK Market Transformation Programme providing support on this project) acknowledged that important work would be needed on furthering Energy Star test-methods for notebook screens. It was suggested that this element should be driven by Energy Star.

Workstations and thin-clients were not included in the initial study and workstations have a very limited compliance rate with Energy Star at the moment. These two product group should be excluded from the scope given that it would be difficult for such high-end products to comply with the proposed requirements and also considering that these represent less than 10% of the computers market. The effect might be that high-end products will be assembled by the consumer from parts bought separately (**DIGITALEUROPE**).

ECOS enquired about a potential preliminary study on servers. The **Commission services** indicated that it is still being considered what additional studies could be launched. In the short term however it should be considered to include servers in the measure on computers with a requirement on the efficiency of the internal power supply. This would be technically feasible, cost-effective and would capture the majority of the energy-saving potential for this product group. **AT** supported such an approach in the short term but further work on the other aspects should be done in the future.

Although it is necessary to harmonise possible ecodesign requirements as much as possible with Energy Star simply importing the specifications from one of the Energy Star versions would lead to a situation where requirements for some product categories would be much less stringent than others therefore further adjustments would be needed (**DK**).

At the request of **BE** the **Commission services** indicated that it was legally possible to have a higher level of stringency of ecodesign requirements than those specified in Energy Star but that this will be further consulted with the Commission Legal Service.

Definitions

The **Commission services** suggested that definitions be drawn directly from Energy Star albeit with the necessary adjustments.

The product group should be taken out of the scope of the 'Standby regulation' as the definitions of 'standby' and 'off mode' in the 'Standby regulation' are not suitable for computers. The mode definitions should be drawn from Energy Star. It is acknowledged that the presence of two different definitions of 'off mode' in two regulations within one single framework directive might prove problematic (**Commission services**).

'Off mode' as defined in Regulation 1275/2008 is suitable for computers and the other operating modes which don't correspond to the definitions laid out in Regulation 1275/2008 should be clearly defined in the product-specific legislation. The definitions that will be drawn-up in a future measure on 'networked standby' should be anticipated. The definitions of the 'off mode' proposed in the Working Document were inspired from the 'old definitions' of the IEC standard which gives a lot of scope for interpretation and which is currently being revised towards an approach where 'off mode' means 'no function provided' (**NL**). The definitions under Regulation 1275/2008 are horizontal and, in line with the approach in standardisation can be adapted for product-specific needs. It is important to be coherent in that respect with the Energy Star Programme since it relates to exactly the same product (**IT**). With 'wake-on-lan' (WOL) disabled 'off mode' as defined in Regulation 1275/2008 is suitable for computers (**DIGITALEUROPE**). If 'off mode' for computers is defined as in Regulation 1275/2008 WOL would need to be treated as a separate functionality (**Commission services**).

The computer measure should be harmonised as much as possible with Regulation 1275/2008 and this product group should not be taken out of the scope of the Regulation. This should be complemented with additional product-specific definitions in the product-specific regulation (**DK, UK, DE**). WOL should be switched off as default (**DK**).

AT enquired about the possibility to extend the scope of Regulation 1275/2008 to office equipment. **AT** remarked that standby levels for computers as described in the horizontal regulation would be equivalent to 'S4' according to SCPI, which is not yet covered by either Energy Star or the horizontal regulation. **DIGITALEUROPE** clarified that 'domestic' did not mean 'at home' per se, but rather, relates to levels of radiations acceptable in offices and at home, as opposed to computer rooms for example.

Having all product-specific requirements in product-specific regulations gives legal clarity (**NL**). **The Chairman** stated that the goal was to provide a legislation that is both comprehensive and user-friendly.

In line with the comments provided by Member States definitions taken from Energy Star will need to be adjusted and any requirements should be included in the annexes of the regulations (**Commission services**).

Timeline

The **Commission services** presented the proposed timeline for the entry into force of the requirements as well as the underlying assumptions regarding the levels of compliance with the Energy Star criteria.

DIGITALEUROPE asked for clarification on the expected future Energy Star compliance rates included in the Working Document and asked whether non-standard equipment configurations were factored in these figures. **NL** asked for a clarification whether these figures factored in the fact that office equipment (i.e. the one registered under Energy Star) might have different configurations than home equipment. The **Commission services** and **MTP** clarified that the said figures originated from the Environment Protection Agency data and a survey by IDC. These were partially based on sales percentages therefore included also home (i.e. higher specification) equipment.

Tier 1 requirements should be applicable 12 to 18 months after entry into force of the regulation, so as to give the industry enough time to redesign products (**DIGITALEUROPE)**

The second tier should be introduced earlier than proposed in the Working Document (**AT, NL, UK, SE, DK**). It would be preferable to base first tier requirements on Energy Star 5.0. These should be applicable 1 year after the entry into force of the regulation followed by a tier 2 based on Energy Star

6.0 requirements when these are released (**ECOS, ANEC**). The revision should be carried earlier than proposed and be harmonised with the entry into force of Energy Star 6.0 (**SE**).

Ecodesign requirements

The **Commission services** outlined the content of the proposal.

Requirements on product components such as the internal power supplies (IPS) should be avoided. Furthermore seeking improvements on internal power supplies energy efficiency was not always necessary, considering that certain products already achieve targets without requiring modified internal power supplies. In the case of low-end computers forcing a requirement on internal power supplies' energy efficiency would result in higher prices for SMEs and marginal energy efficiency gains. This should be factored in the impact assessment of the proposal (**DIGITALEUROPE**). **The Chairman** remarked that IPS represent a significant and cost-effective saving potential and applying specific requirements on components makes sense for equipment assembled by users.

In this particular case there is a strong rationale for placing a requirement on IPS. The price difference between efficient and inefficient IPS is small and is expected to decrease to almost null once these requirements become mandatory (**SE, DK, DE, AT, UK, NL, ANEC**).

Requirements for the different operating modes should be maintained beyond the first tier. The TEC approach for ecodesign might be not appropriate as usage-patterns vary greatly (**AT**).

The introduction of idle limits (be in n the mode approach or through the TEC) would be problematic especially for the segment of high-performance PCs. This was supported by the findings of the preparatory study (**DIGITALEUROPE**). A first assessment indicates that cost-effective solutions to limit the idle consumption across the whole range of products do exist but this matter will be investigated further as part of the impact assessment (**Commission services**).

Other environmental impacts

This measure should be complement by specific limits related to the content of mercury under the RoHS Directive by establishing requirement on according information (in mg) at the point of sale and marketing materials. Cold cathode-fluorescent lighting (CCF) used for LCD screens should be removed from the exceptions list under the RoHS Directive, as they offer energy efficiency and other environmental advantages. This should be done in coordination with the specific committee working in the framework of the RoHS Directive (**SE, BE, UK, EEB**).

Issues related of waste and dangerous materials should be dealt with under the relevant legislation, and not Ecodesign. The problem doesn't originate from the design of computers but from the way the recycling industry handles the products (**DIGITALEUROPE**).

RoHS and WEEE requirements are not sufficient. Other environmental impacts of computers, including PVC, plastics, use of metals, upgradeability of computers, energy embedded in production processes could be addressed through generic ecodesign requirements (**ECOS, ANEC**). There exist standards that could be used as a basis for it (**UK**). Since the Article 4 of the WEEE draft recast refers no longer to recycling, but to recovery, there is a need to include requirements linked to recycling in the Ecodesign regulations (**EEB**).

Information requirements

The **Commission services** introduced the elements related to information requirements.

There will be always a difference between benchmark models and market average therefore there is a rationale for informing consumers about energy consumption. Even though an 'A to G label' might not be feasible basic information (TEC or mode consumption) could be displayed at the point of sale and websites (**ECOS**). The TEC might be misleading as the usage patterns very greatly (**AT**).

The **Chairman** reminded the participants about the Council Decision of 18 December 2006 on the coordination on energy efficiency labelling programs for office equipments between the EC and the US. This agreement does not prevent the setting-up of new schemes in addition to Energy Star. It should be however considered whether a new scheme for such equipment would add value and would not undermine the current scheme. It is uncertain if an Energy label would be justified in terms of the differences in the energy consumption of equipment on the market (especially for displays).

Energy Star and a possible Energy label have different target groups. It has to be also noted that Energy Star is also moving in the direction of a comparative label with a 'golden star' for the best 10% (**NL**). The **UK** and **AT** supported in principle the introduction of a possible Energy label for displays.

An accumulation of labels would entail a risk of confusing consumers (**DIGITALEUROPE**).

Revision

The **Commissions services** acknowledged that is should be brought forward. The revision date should be harmonised with the work on new Energy Star criteria (**NL**).

Benchmarks

Eco-label criteria should be introduced for the other environmental aspects in the benchmark (**SE, ANEC**).

4. **Working document on possible ecodesign requirements for Displays**

The Commission services presented the main aspects of the working document and the rationale of the approach for discussion (see presentation circulated together with these draft minutes). The aim is to align the requirements with Energy Star as much as possible. Tier 1 requirements (based on Energy Star 4.1) would enter into force six months after entry into force of the directive. Second stage would kick-in from October 2013 based on Energy Star 5.0. The requirements for 'off mode' would be aligned with Regulation 1275/2008.

Scope

Screens above 30 inches to be included in the scope as such monitors (e.g. signalling screens) are already present on the market and there is no technical justification for excluding them notwithstanding what kind of requirements are suitable for such screens (**NL, ECOS**).

Definitions

'Off mode' should be defined as in Regulation 1275/2008 and this should be used consistently across product-specific implementing measures (**NL**).

DE enquired about the relationship with the television product group, notably whether a display with an HDMI interface would be considered as a TV set. The **Commission services** acknowledged that this issue needs further analysis.

The **Chairman** asked the participants for suggestions on how to best differentiate displays from TV sets. This could be solved by placing an upper limit for the size of displays falling under the draft measure (**DIGITALEUROPE**).

Timeline of requirements

Tier 1 requirements should start to apply twelve months after the entry into force of the Regulation to allow for redesign (**DIGITALEUROPE**).

While harmonization with Energy Star would be a positive move, strictly following each and every specification would not be the best approach (**DK, ANEC**).

The deadline for the implementation of Tier 1 should be set earlier (**ANEC**). Tier 1 should be removed and Tier 2 deadlines to be advanced (**ECOS**).

Moving from a voluntary scheme (Energy Star) to mandatory requirements would entail serious consequences on the market, leading potentially to the exclusion of some types of products and functions from the market (**DIGITALEUROPE**). Consistency between these two tools would reinforce both of them (**Chairman**). It can be envisaged to move straight to the current Tier 2 and a second tier possibly based on Energy Star 6.0 when the latter is available (**UK**).

87% of the monitors in EU Energy Star database consume less than 1 watt in sleep mode so it would be possible to make this mandatory in the first tier (**DK**). This figure to remain at 2W as some monitors would have difficulties to meet this threshold (**DIGITALEUROPE**).

Specific requirements

The auto-power down (APD) of digital photo frame could be set after 2 hours of user inactivity, instead of 4 as proposed in the Working Document. This should be preceded by warning message (**ANEC**). The APD should be set as default and it should be impossible to disable it (as in the regulation on simple set-top boxes). It should be ensured that consumers are informed about the energy consumption of these devices (**ECOS**). Retailers need to have digital photo frames on for several hours therefore there has to be a possibility to disable this function (**DIGITALEUROPE**).

Energy Star 5.0 includes provisions for automatic brightness control and that option should be included in the regulation (**DIGITALEUROPE**). Tests had shown that this option provided for limited savings only (**Commission services**, **MTP**).

Other environmental impacts

SE reiterated its comments from the morning session related to mercury and cold cathode-fluorescent lighting in displays.

DIGITALEUROPE stated the industry would discuss these issues internally and suggest possible options for better design in that respect.

Information requirements

Adding new labels o existing ones would add cost and would not be beneficial for the consumer (**DIGITALEUROPE**). **ECOS** pointed out that DIGITALEUROPE was supportive on the Energy label for TVs. The introduction of an Energy label for displays would be useful, also taking into account the similarity of this product group with TVs and the fact that that TVs and displays are evolving in the same direction (**NL, SE, ECOS, ANEC**).

The Energy Efficiency Index (EEI) under the Energy labelling measures should have a progressive component which would make it more difficult for bigger devices to have the highest energy classes (**SE**). The formula used under Energy Star 5.0 makes it rather difficult for big screens to achieve high energy efficiency indexes (**NL**). In the labelling measure on TVs it was decided to have a linear, as opposed to a progressive approach **(Chairman**). A progressive approach is not needed as consumers understand the difference between different size products (**IT**). This discussion cannot be applied to displays because for practical reasons (e.g. size of the desk) there will not be a move towards eve-bigger displays (**DIGITALEUROPE**).

At the request of **SE, DIGITALEUROPE** reported a 10% to 15% increase in energy efficiency of notebooks following a replacement of backlighting by LEDs.

Participants

FEDERAL INSTITUTE FOR MATERIAL RESEARCH AND TESTING
ADEME
European Environmental Bureau
FEDERAL MINISTRY OF THE ENVIRONMENT
Ministère écologie énergie et developpement durable
MINISTRY OF ECONOMIC ENERGY TOURISM
INFORSE Europe
DEFRA
Ministry of Environment Belgium
FEDERAL MINISTRY OF ECONIMICS AND TECHNOLOGY
WWF European Policy Office (EPO)
NORVEGIAN WATER RESOURCES AND ENERGY DIRECTORATE
BEUC
FEDERAL ENVIRONMENT AGENCY
Swedish Energy Agency
Ministry of Economy Slovakia
EFTA
AMD (digitaleurope)
MINISTRY OF ECONOMIC AFFAIRS & COMMUNICATIONS

TEST ACHAT
Ministry of Environment Romania
Swedish Energy Agency
INTEL (digitaleurope)
ANEC/BEUC
DEFRA
Ministerio dello Sviluppo Economico
DELL (digitaleurope)
DANISH ENERGY AGENCY
ENEA
ANEC
ÖKOPOL (ECOS)
AUSTRIAN ENERGY AGENCY
Ministry of Environment Belgium
HP (digitaleurope)
SENTERNOVEM
Enterprise Ireland
ECOS
DANISH ENERGY AGENCY
ATUITIVE
DEFRA

Annex 6: The market of electronic displays

1. SALES

Overview

Figures hereafter summarise the historic sales and stock data for electronic displays (TVs and computer monitors) for the period between 1990 and 2016, as well as the baseline projections for the period between 2017 and 2030. The graph shows a peak in sales in 2009 with 105 million units, and a rise of the stock to 700 million units by 2030.

The 2017 EU market value of electronic displays in consumer prices is estimated at around €19bn (€16bn TV, €3bn monitors).

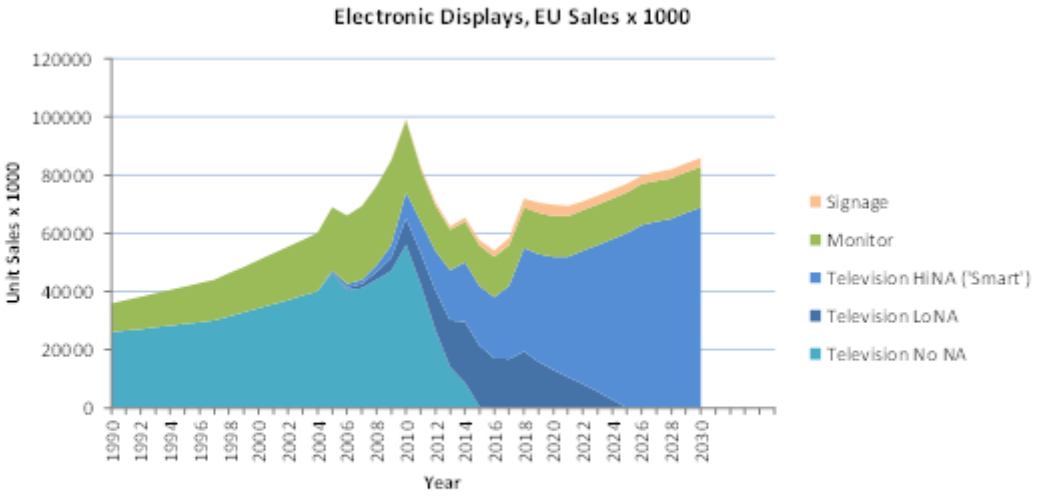

Figure 6.1: EU-28 sales for electronic displays (BAU)

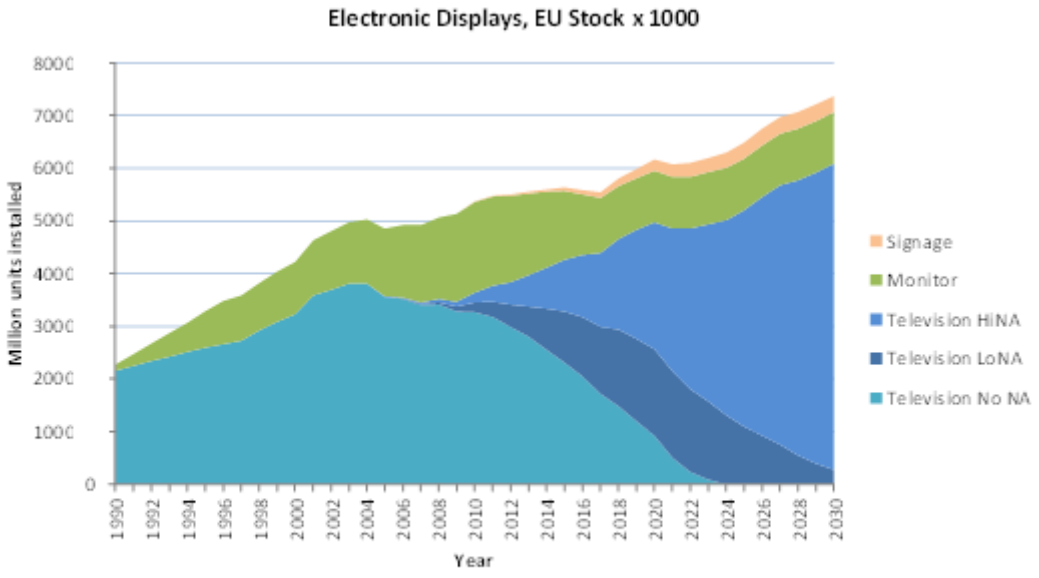

Figure 6.2: Stock of electronic displays in the EU (BAU)

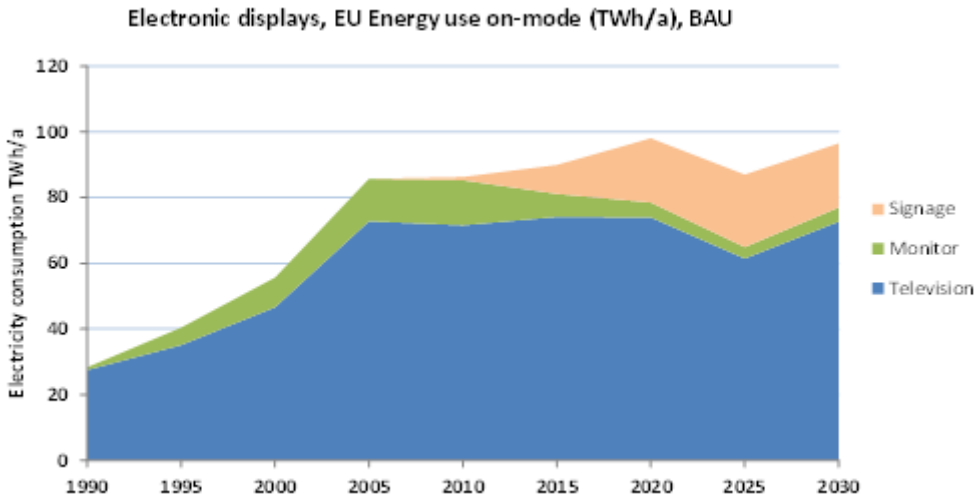

Figure 6.3: Energy use electronic displays in the EU (BAU, including signage)

In the previous 2013 impact assessment digital photo frames (DPFs) were included in the intended scope[15], but today the market for DPFs is almost non-existant and considered too small to be rgulated.

The figure below, also included in the main IA, gives an overview of the total surface of electronic displays in 2020, both within and outside the scope of the proposed policy measures. Notebooks and tablets, status displays, mobile devices, projectors and partially "public" displays are not in the scope (i.e. about 12-15% of total surface).

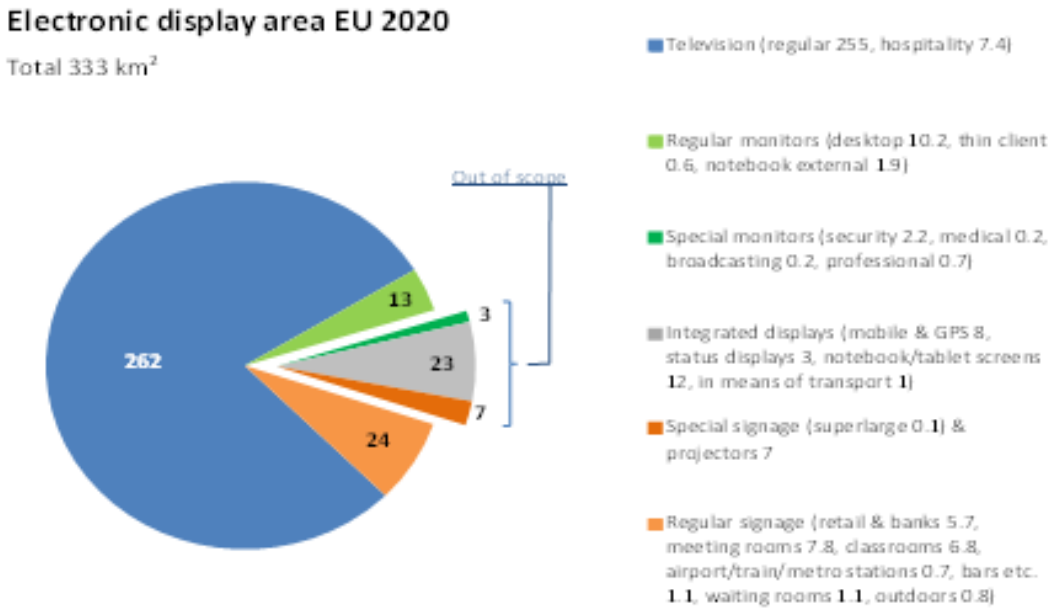

Figure 6.4: Share of electronic display surface per product group (EU 2020, source VHK)

[15] The 2011 EU market for digital photo frames (DPFs) was estimated at approximately 4 million units, at a value of 0.3 million euros in consumer prices. This was the last year in which GfK reported on the DPF market in Europe.

Table 6.2. Forecast of electronic display surface area in EU 2020 (VHK estimate)

Display	Surface		Stock	Total area	Note
	diag.	area	units		
	inch	*dm²*	*million*	*km²*	
Television	**44**	**53**	**494**	**262.4**	
Regular TV	**44**	**53**	**477**	**255**	EIA, stock 2020 [Note 1]
Hospitality TV	**36**	**36**	**16.7**	**7.4**	
hotel rooms & other lodgings	40	44	14	6.2	11.6 m beds (MEErP)
hospital beds	40	44	2.7	1.2	2.7 m curative beds (MEErP)
Regular monitors	**24**	**16**	**81**	**12.7**	
desktop PC	24	16	64	10.2	EIA, stock 2020
thin client	21	12	4.8	0.6	EIA, stock 2020
notebook external	24	16	11.7	1.9	remainder
Special monitors	**24**	**16**	**8.5**	**3.3**	
security monitors	33	60	3.7	2.2	[Note 2]
medical displays (incl. integrated)	27	20	0.8	0.2	[Note 3]
broadcasting displays	27	20	0.8	0.2	[Note 4]
professional displays (CAD, Graphics)	28	22	3.2	0.7	EIA, stock 2020
Regular signage display	**55**	**83**	**30**	**24.4**	
retail & banks (indoor, excl. ATM)	43	50	11	5.7	[Note 5]
meeting rooms (incl. video conference)	75	155	5	7.8	5 m meeting rooms (169 million m² floor area)
classrooms (incl. smart boards)	70	135	5	6.8	5 m class rooms (93 m students + vocational)
airport/train/metro stations	55	83	1.2	1.0	[Note 6]
bars, hotels (public area), restaurants	44	53	2	1.1	0.2m hotels, 0.8 m restaurants, 0.7m bars
waiting rooms (e.g. healthcare)	44	53	2	1.1	10k hospitals, 2 m doctors
outdoors	55	83	1.1	0.9	estimate (10% of retail)
Special signage display			**4**	**7.1**	
superlarge (>100", video-wall)	110	333	0.02	0.07	estimate
projectors	80	176	4	7	EIA, stock 2020
Integrated displays			**1605**	**23.2**	
Mobile devices	5.5	0.8	**1000**	**7.6**	EIA, stock 2020
cell phones	5	0.6	500	3.2	estimate (>100% penetration)
GPS (incl. car-systems)	7	1.3	250	3.2	estimate (number of cars)
(video) cameras	4	0.4	150	0.6	estimate (3/4 of households)
other mobile display (games, MP3, etc.)	5	0.6	100	0.6	estimate
Integrated status (pixel) display	7.2	1.35	**198**	**2.9**	[Note 7]
ATMs (banks)	30	25	1	0.3	0.42m ATMs (source: EAST)
pro (EP colour) copier/printer	6	1	14.2	0.1	10% of 145 m imaging equipment
premium vending machines	9	2	0.38	0.01	10% of 3.77 m units (www.vending-europe.eu)
commercial & pro refrigeration	6	1	2.1	0.02	10% of 21 m units
Industrial tools/ovens/laundry	9	2	10	0.2	maximum estimate VHK

heating boilers/thermostats	6	1	12.8	0.1	10% of 128 m boilers
central air conditioners	8	1.6	2.3	0	30% of 7.5 m units
smart meters/domotique	8	1.6	45	0.7	30% of 150 m meters/dedicated panels
ventilation units	6	1	5.6	0.1	10% of 56 m units
hh el. ovens	6	1	21	0.2	10% of 209 m electric household (hh) ovens
hh microwave	6	1	10	0.1	10% of estimated 100 m units
hh refrigeration	9	2	30.8	0.6	10% of 308 m units
hh (dish) washing, drying	6	1	39.5	0.4	10% of 395 m units
hh audio systems (fixed)	6	1	4	0.04	2% of 200 m units in use
Integrated computer displays			**401**	**12.2**	
all-in-one PC	24	16	2	0.3	2.4% share of desktop (DigiTimes 26.8.2014)
notebook	14	5	62	3.1	EIA, stock 2020
tablet (incl. E-book readers)	10	2.6	337	8.8	EIA, stock 2020
Integrated in means of transport				**0.5**	
traffic info & advertising display	24	16	1.37	0.2	[Note 8]
passenger TV (plane, train)	15	6.2	4.5	0.3	long-haul train carriages 25k; planes 20k; 100 displays per carriage or plane
TOTAL			**2222** m	**333.1** km²	[Note 9]

[1] Source: European Commission, Ecodesign Impact Accounting (EIA) - Part 1, prepared by VHK, 2014 (EIA). Stock data for the year 2020.

[2] Security monitors: Estimate based on 30 m security cameras with monitor, 1 monitor/8 cameras, (average 42" per 15 cameras and one 21" spot monitor --> average 60 dm²-->33")

[3] Medical displays (high resolution, grayscale-calibration option): Total annual sales is around 40 000 units of medical imaging equipment, of which 1000 MR, 2000 CT, 10000 X-Ray, 500 NM (e.g. PET), 25000 Ultrasound ('echo').[source: COCIR 2011]. Assuming 12-13 years life, 0.5 m units are in stock. There are around 0.4 m medical practices (of which 0.16 m in hospitals), 0.16 m dental practices, 0.05 m veterinary practices, which may not all need medical grade monitors. Total EU-stock for medical monitors is thus estimated at 0.8 m units.

[4] Broadcasting displays (colour-calibration option) 0.1 m video/TV enterprises in EU (VHK, MEErP-Part 2, 2011) at assumed 80 screens/enterprise

[5] Retail & car showroom displays: 3.5 m retail companies, 0.8 m car showrooms; 0.22m bank offices (ATM-displays not included here). Average 2-3 displays/outlet (varies between 50 per consumer electronics store and 0 for specialist food stores). Size is the area average between large (>55") and small (<24").

[6] 0.15 m displays at 10k train- & 2.8k subway stations (3-4 platforms/station, 3 displays per platform), 1 m displays at busstops (1 display/busstop), 0.05 m displays at 350 larger and ca. 2000 small airports (100 displays/large airport, 8 displays/small airport). Average size of 55" (83 dm²).

[7] Stock 2020 data from EIA, size & share estimated by VHK. Only pixel-based displays are included. It is assumed that the other 3 billion status displays in the EU that are pilot lights (0.1-0.2W, 16h/d, 80% share) or LCD segment displays (0.3, 16 h/d, 10% share), LED segment displays (0.5-1W, 4h/d with APD, 10% share) and other non-pixel based displays are not intended to be included in the scope. Calculating with above data in brackets, they represent an energy use of (very) approximately 3 bn x 365 days x (0.1 x 16 x 80% + 0.3 x 16 x 10% + 0.7 x 4 x 10%) = 2.2 TWh/yr or --given the uncertainties of the estimate-- between 1 and 4 TWh per year.

[8] 0.37m displays in 7k metro trains (35 k carriages, 2 displays/carriage) and 30k railway trains (150k passenger train carriages), 1 m displays in 0.5m buses (2 displays/bus). Average size 24" (16 dm²) in vehicles.

[9] According to EIA (EFSBAU sheet), the Business-as-Usual (BAU) efficiency in the 2020 stock is 1.1 W/dm² (TV) and 2.4 W/dm² (monitor), so on-mode average is 1.43 W/dm² (basis 75% TV). Total 4 h/d for 365 d -->1460h/yr. Total 1 dm²=2.1 kWh/yr and 1 km2=0.21 TWh/yr. Hence the BAU 2020 electricity consumption is 0.21*340= 71 TWh/yr in approximately on-mode. For an ECO-scenario EIA estimates (EFSECO-sheet) 0.6 W/dm² (TV) and 0.57 W/dm² (monitor), so on-mode average 0.6 W/dm². Total 4 h/d for 365 d -->1460h/yr. Total 1 dm²=0.88 kWh/yr and 1 km2=0.09 TWh/yr. Hence the ECO 2020 electricity consumption is 0.09*340= 31 TWh/yr in approximately on-mode. This figure, based on the original IA-study 2012, needs to be verified/updated here.

Note that this is the first time a comprehensive overview of electronic display surface area was made. Results are partially based on estimates and should be treated with caution.

Screen size

The accumulated EU viewable surface area of electronic displays grew from 21 km² in 1990 to 125 km² in 2010. This growth is comparable to moving from the surface of a suburb of 40'000 inhabitants such as Vilvoorde in 1990 to the surface of a town of one million inhabitants (e.g. 20% the surface of the Brussels region-161 km² for 1.2m inhabitants is just 20% higher).

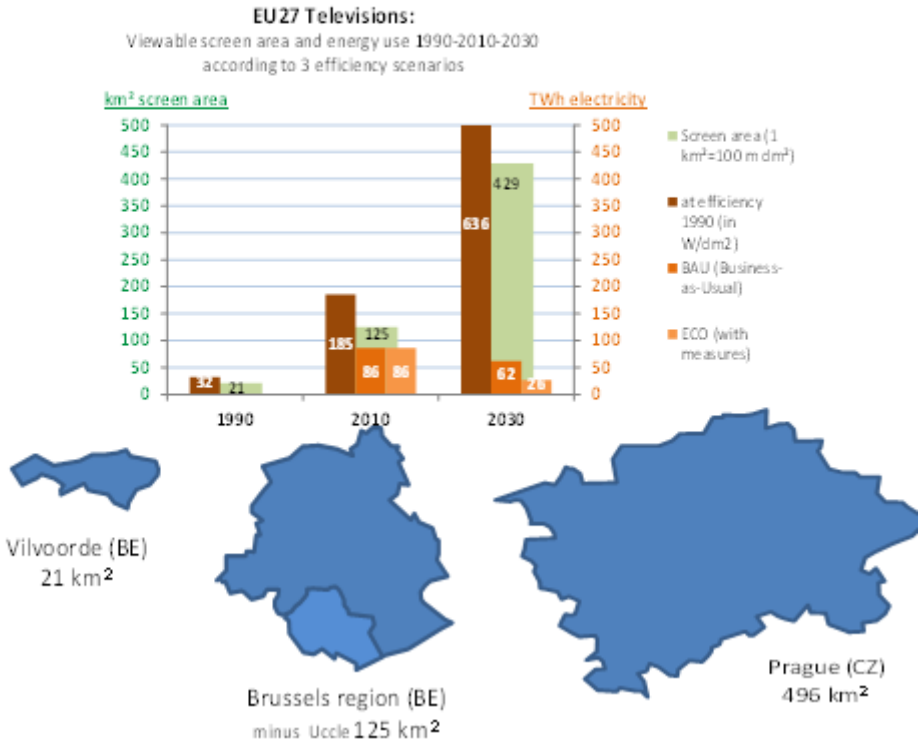

Figure 6.5: EU television screen area and energy use 1990-2010-2030 .

This is a factor 5 growth. Because of the simultaneous energy efficiency improvement, the electricity consumption of televisions 'only' tripled. At its peak, in 2010, the EU electricity consumption for televisions and other electronic displays was more than 102 TWh/yr. This is comparable to the final electricity consumption of the Netherlands, a country with 17 million inhabitants.

In 2030 the total viewable surface area of electronic displays in the EU is projected to be 429 km²,a surface comparable to that of cities like Vienna (414 km², 1.76m inhabitants) or Prague (496 km², 1.25m inhabitants). With the new efficient technologies and the proper Ecodesign and Energy Label measures it is possible to get the electricity consumption and associated greenhouse gases, back to the pre-1990 level.

The next graph illustrates how the industry is pushing for larger sizes, whereas the consumer is hesitant. Sales data are based on an extrapolation of GfK 2015 and 2016 data. The distribution of TV-sizes on offer on the internet stems from the VHK research (see Annex 13). Note that the average diagonal size on offer was 50", while the average size sold is about 36".

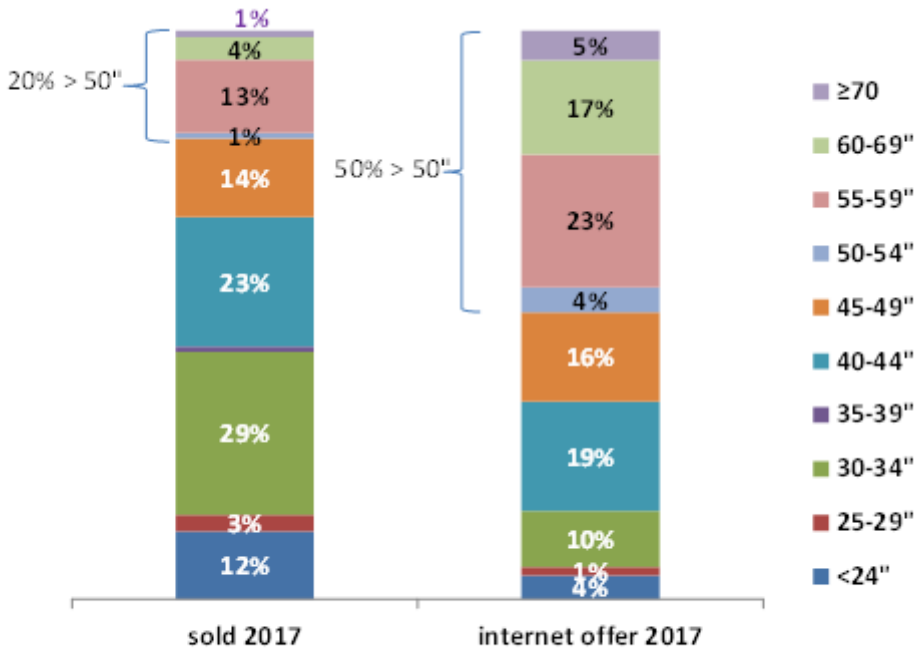

Figure 6.6 : EU television screen sizes sold and on offer on the internet in 2017

Drivers to better, bigger and lighter, cheaper displays

Most consumers desire a product that is i) better, ii) bigger but lighter and iii) cheaper. For a product that plays such a big part in people's life during –on average 4 viewing hours per day - the energy bill may be a secondary consideration at best and difficult to monetise.

i. ***Better:*** The step-changes in display-technologies, from CRT to Flat Panel Display (FPD), from plasma to LCD and from Cold Cathode Fluorescent Lamp (CCFL) to LED backlight, were unprecedented and unpredictable. Furthermore, there is a very noticeable difference in picture quality between PAL and full HD, especially increasing size. However the latest technologies improving picture quality are much less spectacular than those during the 2005-2010 period. As regards the resolution, the consumer associations state that less than half of the test persons detect the difference between HD and UHD at a normal viewing distance and seriously question whether it is worth it. On the higher contrast ratio and colour gamut they are more positive, but still detect some flaws in settings and again there are test persons –especially when viewing 'normal' (not super colourful) video content—that don't see the difference. In addition, and unlike the situation with the jump from PAL to HD, questions could be raised whether UHD and HDR will become the new broadcasting standard within a television lifetime cycle, because of the huge investments required by the networks. Finally, there is the

commercial failure of 3D-television to illustrate that the consumer is not following every technology trend that the industry proposes.

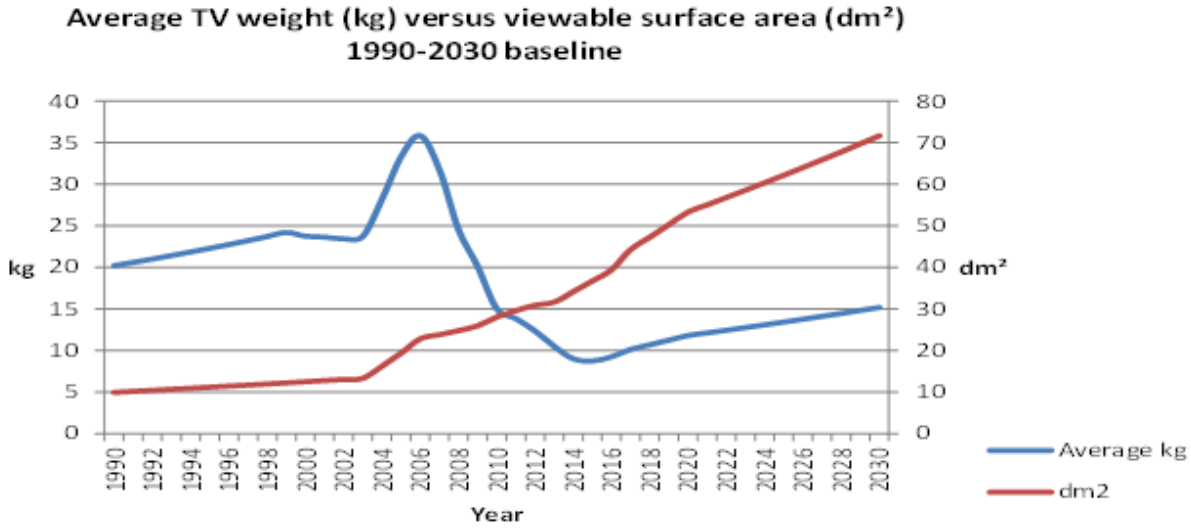

Figure 6.7: Average European Union TV weight (in kg) and viewable surface area (in dm²) over the 1990-2012 period with baseline projections for 2013-2030. (Source VHK)

ii. ***Bigger:*** In 2003, when the first flat displays came to the market, what was considered a'big' residential television had a diagonal of 76 cm (30 inches), weighed over 60 kg and had a PAL-resolution of ~540 horizontal lines. In 2010, the average television was 84 cm (33 inch, 30 dm²) had a vertical resolution that was double (1080 pixels) and weighed only 15 kg. A CRT version of that TV display would not have passed most doors in the average EU home and needed strong men or a small forklift to get into the house. It is clear from the above that without the new lightweight and high-resolution products it would have been very difficult to trigger an ever increasing TV screen size. And of course a bigger TV display in the living room is many people's wish, but consumer demand is not the only driver for a bigger display-size.

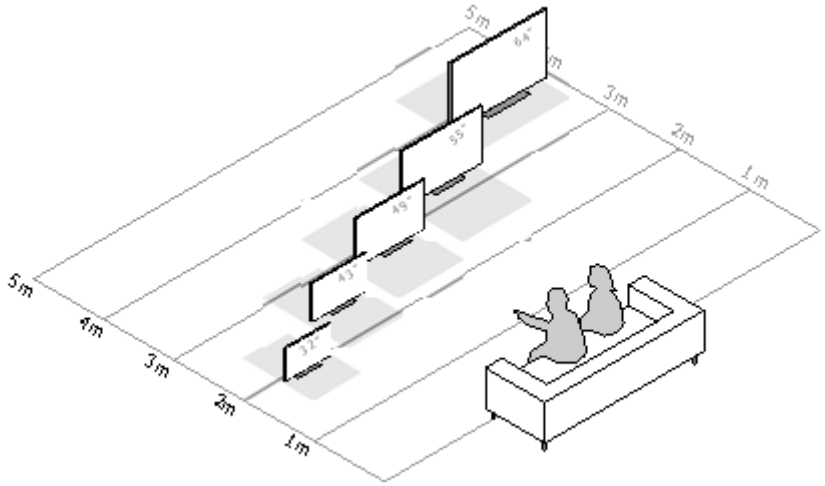

Figure 6.8: Recommended display size per viewing distance (data source: Consumentenbond 2018 [27])

There is a very strong push from the Asian industry to advertise and display on the internet and in showrooms only the largest models. Huge investments are needed for manufacturing sites, of the order of 10 billion dollars that remain profitable only for a few

years. There are no more than half a dozen of such plants worldwide, mostly in China. In 2017, the average size of televisions offered on-line in the Benelux was 51" (75 dm^2 surface)[16], whereas market research by GfK indicated that the average size actually sold in the same period was 33" (30 dm^2 surface). From the discrepancy between the size of models on offer and the size of models actually sold, the limits of 'bigger is better' are becoming clearer.

Consumer associations such as Stiftung Warentest (DE) and Consumentenbond (NL) are increasingly critical about the added value of the latest trends in panel size, resolution and HDR[17]. Figure 3 shows the advised ('ideal') size for panels, depending on the viewing distance, which raises the question of how many households actually have a living room with a distance of 4 metres between the front of the couch to the TV thus justifying a 65" TV (a diagonal of 1.65m). Apart from the TV in the living room, there is of course the matter of the second and third television set in the house. Putting a 55" TV in the kitchen or bedroom is usually not very practical in the average household. A format between 32" and 42" is much more evident

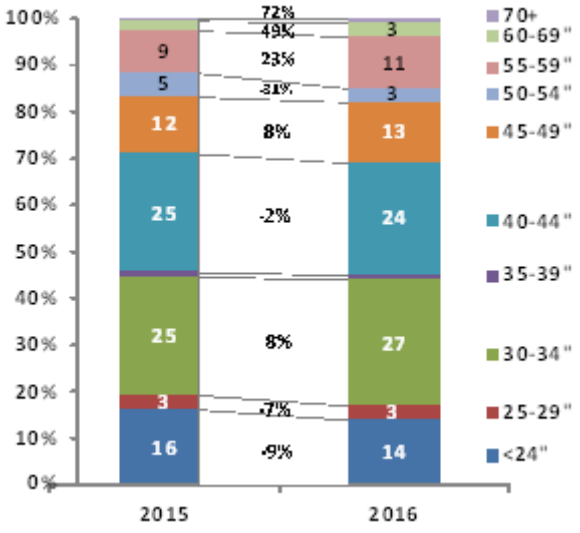

Figure 6.9: TV unit sales Europe by diagonal size in inch, 2015-2016 (source: GfK POS, April 2017).

iii. ***Cheaper***: The global competition immediately led to a price war that eventually almost halved EU TV-prices. As an illustration: in 2002 a 30" (80cm diagonal) Liquid Crystal Display (LCD) TV sold retail for 3500 euro, whilst in 2018 it can easily be bought at less than 300 euro. A 2013 UHD television of e.g. 55" was priced at around 3500 euro, while today's version, even with HDR and curved panel, costs less than 800 euros. Overall, the average price of a TV-set in 2003 was 800 Euro18, while in 2017 the average global price decreased to 448 euro. In the price war, the last EU display-panel manufacturer (Philips) was driven out of the TV-business19 and Japanese market share in the EU shrunk considerably, in favour of the South-Koreans and Chinese20 21. As far as the display-panel

16 VHK inventory of NL and BE on-line catalogues Dec. 2017-Jan. 2018. See Annex 13

17 https://www.consumentenbond.nl/tv/ideale-kijkafstand

18 Nominally. Corrected for inflation ca. € 1000 in Euro 2017.

19 In 2014 Philips (NL) rendered its share in the joint venture to its Taiwanese partner TP Vision, thus 'officially' giving up TV-manufacturing.

20 Samsung and LG have together a 50% market share. Sony is the only active Japanese TV-maker (manufacturing panels not in Japan). The only TV-panel manufacturing on Japanese soil is by Sharp, which has been bought in 2017 by the Taiwanese Foxconn. Foxconn also made a controversial deal with the US administration to build a heavily subsidised display-panel factory in Wisconsin. Panasonic recently stopped TV production. Other Japanese brands such

is concerned, i.e. the part of TVs and monitors relevant for energy efficiency, all worldwide manufacturing is now in Asia, mainly in China and South-Korea. Legacy European brand-names like Philips, Grundig, Telefunken, Thomson, Brionvega, Séleco and also several Japanese names are just brand-names for which the rights have been bought by Chinese producers/merchants or Turkish assemblers22. Iconic brands such as Bang&Olufsen, Loewe and Metz are now partially or wholly Asian owned; they may still add some manufacturing value to Asian display-panels (e.g. audio, cabinet aesthetics) but in total account for less than 1000 EU-jobs for that activity. The Asian importers employ around 15-20k people in their distribution centres. Most jobs are in logistics (transport, packaging, relabelling, distribution); perhaps a few thousand EU jobs in these centres are in assembly, amongst others to avoid the 14% EU import duties on fully assembled televisions and computer monitors.23 Most distribution centres of Asian industries are in Eastern Europe (Poland, Slovakia).

2. ENERGY LABELLING TRENDS

Current situation

As can be seen from the Figure below the development of the energy efficiency index over the last 3 years (2015-2017) is stagnating. [24] The cause is most likely the introduction of HDR in the market, in combination with the earlier UHD resolution. It takes time for R&D to 'absorb' these developments through smarter local dimming and the usual pace of improvement in electronics ('Moore's law'). Nonetheless, especially with the 2018 world soccer championships, it is believed that in 2018 energy efficiency improvement will pick up at the pace of before 2015. The lower energy use of the bigger screens could be the perfect excuse for soccer fans to invest in a new TV model.

Having said that, it is clear that the current Energy Label scheme, with 44% in 'A' and 40% in 'A+', does not have a large impact in moving the market, nor does it effectively inform consumers. The competition is fierce and investments are huge, and industry recognises the commercial benefits of having a better Energy Label classification.

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[21] For more background: Sea-Jin Chang, Sony vs Samsung: The Inside Story of the Electronics Giants' Battle For Global Supremacy, Wiley & Sons, Singapore, 2008.

[22] Turkish TV-assemblers include Koç Holding (e.g. Grundig, Arçelik, BEKO brands), Vestel (misc. Brand names) and Profilo holding (Telefunken). They import South-Korean or Chinese display-panels, then make and mount casing and non-display electronics, then export (also) to the EU. Vestel claims to be the largest producer on the EU-market with 8 million units sold under various brand names.

[23] Commission Implementing Regulation (EU) 2017/1925 in EU Official Journal L 282 of 31 October 2017. This version applies from 1 January 2018. In Europe the import duties for (LCD) televisions are, and have been for over a decade, 14%. This probably one of the reasons why many Asian companies have screwdriver factories in the European Union, because import tariffs on the panels and other assemblies are 0% or at the most (e.g. for OLED panels) 3%.

[24] Energy Label classes of EU sales of electronic displays were estimated from various sources Over the period 2013-2017 various databases were compiled by researchers from Intertek, CLASP, GfK, DigitalEurope and VHK. None of these databases are perfect in a sense that they give a 100% representative, unbiased, comprehensive, sales-weighted picture of the EEI of EU sales. Nonetheless, it is believed that they represent the best information currently available. Note that the classification is absolute and does not take into account when certain classes were available

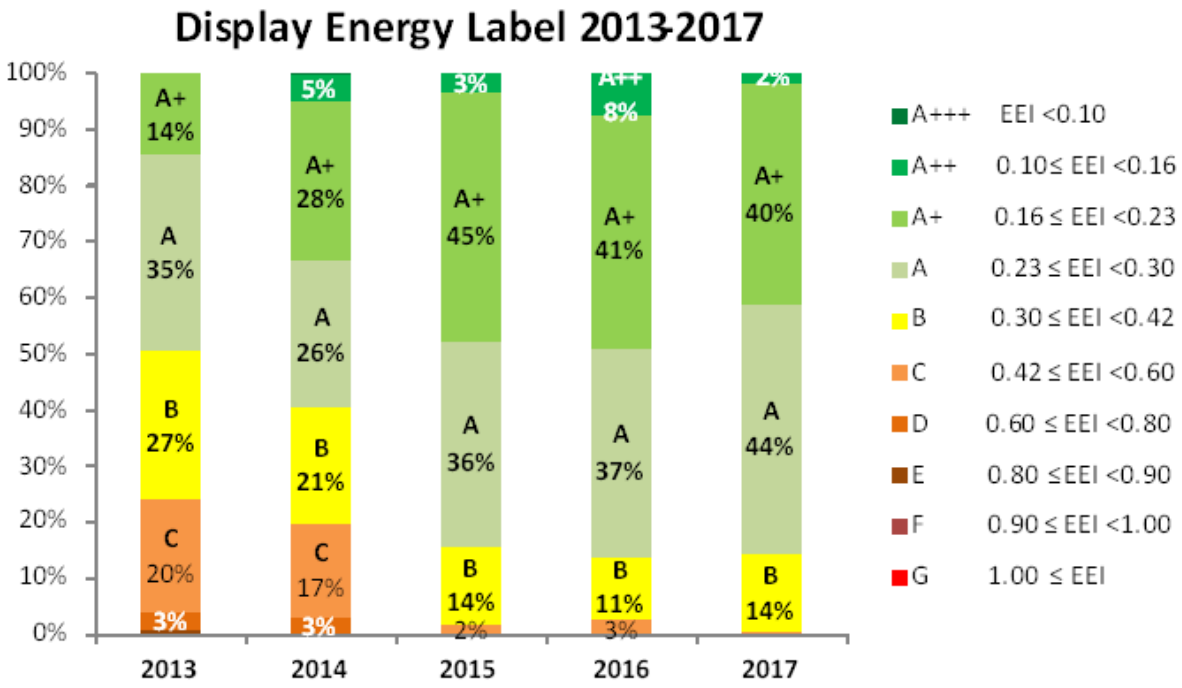


Figure 6.10: EU television unit sales by EU Energy Label classes 2013-2017 .

Future with measures

Figure 6.11 illustrates the expected trend in energy labelling under the ECO-scenario (only TVs and monitors in the scope). Under the Lenient scenario (with a credit of 1.5 instead of 1.2 for HDR) the lower classes will include more products (as more products are allowed on the market under Ecodesign). In the Ambitious scenario, where inefficient signage displays are in the scope, it is also expected that the lower energy label classes will be more populated.

This projection assumes a progression of 7.5% per annum improvement in energy efficiency – thus, each model in the 2018 database is improved by 7.5% for 2019, and a further 7.5% for 2020 and so-on. This rate of technology progression matches the levels observed in the market from 2011 through 2017 and also takes into account some new technology being introduced to televisions including quantum dots and logical pixels. Moreover, it assumes that half the models in the database adopt Automatic Brightness Control, which offers a power allowance of 15%.

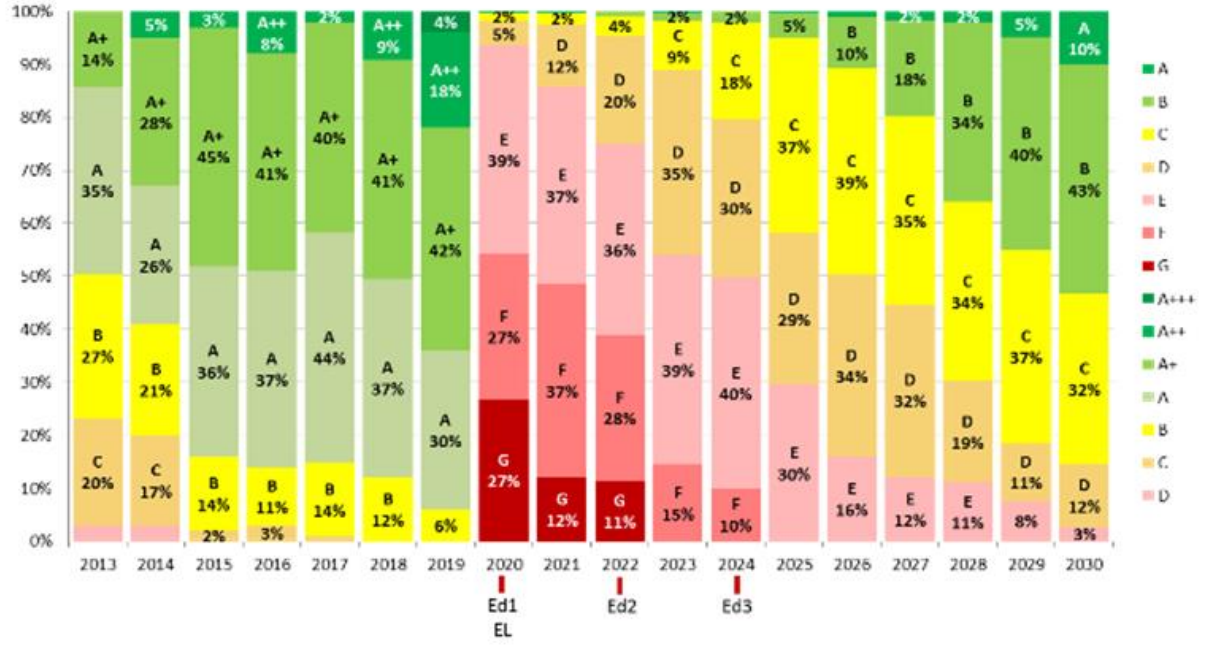


Figure 6.11: Energy label class distribution of standard electronic display models available in the EU over the period 2010-2030 (actual 2013-2016 and projections 2017-2030) with proposed Ecodesign and Energy Labelling measures.

3. MARKET DATA PER DISPLAY TYPE

Televisions

Sales of TVs, both in units and in value, have been declining since 2010 at a rate of 8-10% per year, except for the year 2014 when they went 5% up, but in 2015 they dropped again and are more or less stable at about 50% below the 2010 level. By contrast, in the period between 2006 and 2010, sales rose by 8 to 15% annually. Even in the first years of the economic crisis, i.e. 2008-2010, the high sales numbers continued, but it also explains in part the steep decline in sales since 2011. The replacement rate (apparent service life) of TVs was reduced from 9-11 years in the 1990s to 5-6 years between 2003 and 2010, but is now again rising to 8-9 years.

No CRT or plasma TVs were sold in the EU-2017[25]. Most (98.5%) are LED-backlit LCDs, with or without quantum-dots ('QLED') to enhance the colour range, and 0.5 million are OLED-TVs. GfK reports that in 2017 some 59% of TVs sold were 'Smart TVs'[26], 2.9 million (9%) are 'curved' and one-third have UHD resolution. TVs larger than 60" are 4% of the 2017 market volume.

Stock calculations indicate on average 2.0 TVs installed per household in 2010 (from 1.3 TVs in 1990). In 2030, an average ownership of approximately 3 TVs per household is expected.

[25] . CCFL-backlit (Cold Cathode Fluorescent Lamp) TVs and very little rear-projection TVs being produced.
[26] Made to be connected to the Internet.

Computer monitors

In 2016 the apparent consumption (EU market) of computer monitors amounted to 9.6 million units (in 2010 around 25 million units). The average msp of imported and 'produced' units is around 170 euro/unit, which –with a multiplier of factor 2, suggesting an average consumer price (incl. VAT) of 340 euros/unit. The decline in sales was caused by the economic crisis and by the sharp fall of sales of desktop computers (with monitors) versus All-in-One computers, notebooks and –more recently—tablet and slate computers.

At the beginning of the 1990s the average (CRT) computer monitor size was 13-14" (5 dm² surface area). In 2012, the average monitor had a 21" diagonal (10 dm² surface area), a number that is expected to grow to at least 24" in 2020 and to 27" (20 dm²) in 2030. For computer monitors, where high resolution is especially attractive, the market share of UHD in 2015, 2020 and 2030 is estimated at 20%, 50% and 100% respectively.

Table 6.3. Characteristics TVs and computer monitors

Display	Surface		Stock	Total area	Note
	diag.	area	units		
	inch	*dm²*	*million*	*km²*	
Television	**44**	**53**	**477**	**255**	[Note 1]
Monitor, of which	**24**	**16**	**98**	**16**	
Desktop displays (minus all-in-one)	24	16	73	11.6	[Note 1]
Thin client displays	21	12	4.8	0.6	[Note 1]
Workstation displays (CAD, Graphics)	28	22	3.2	0.7	[Note 1]
Security monitors	33	60	3.7	2.2	[Note 2]
Medical displays (incl. integrated)	27	20	0.8	0.2	[Note 3]
Broadcasting displays	27	20	0.8	0.2	[Note 4]
Other (notebook external monitors)	24	16	11.7	1.9	remainder

[1] Source: European Commission, Ecodesign Impact Accounting - Part 1, prepared by VHK, 2016(EIA). Stock data for the year 2020.

[2] Security monitors: Estimate based on 30 m security cameras with monitor, 1 monitor/8 cameras, (average 42" per 15 cameras and one 21" spot monitor --> average 60 dm²-->33")

[3] Medical displays (high resolution, grayscale-calibration option): Total annual sales is around 40 000 units of medical imaging equipment, of which 1000 MR, 2000 CT, 10000 X-Ray, 500 NM (e.g. PET), 25000 Ultrasound ('echo')[source: COCIR 2011]. Assuming 12-13 years life, 0.5 m units are in stock. There are around 0.4 m medical practices (of which 0.16 m in hospitals), 0.16 m dental practices, 0.05 m veterinary practices, which may not all need medical grade monitors. Total EU-stock for medical monitors is thus estimated at 0.8 m units.

[4] Broadcasting displays (colour-calibration option) 0.1 m video/TV enterprises in EU (VHK, MEErP-Part 2, 2011) at assumed 80 screens/enterprise

Signage displays and hospitality TV

Public/signage display panels are generally large electronic displays, either used indoor or outdoor, alone or in a composition called "video wall", to show content to many persons at once. In train stations and airports they are increasingly replacing mechanical signage technologies, such as the split flaps (also known as "Solari-boards").

Other typical applications are in meeting rooms, museums, churches, or in retail applications. Compared to residential TVs, signage displays offer a higher luminance/ contrast ratio--up to 2500 cd/m2 or more- to clearly display images in bright ambient conditions. A higher luminance increases the energy consumption. Although market information is scarce, it is believed that signage displays are a fast expanding market in the EU. European manufacturers, i.e. integrating nowadays Asian-produced panels, are Barco (BE) or Solari (IT). A US-based Taiwanese competitor is DynaScan. Samsung and LG are also major players in the signage display market.

Hospitality TV is the term used for TVs in hotels or hospitals. Compared to residential TVs, these displays offer additional connectivity interfaces (welcoming to the hotel, activation of services via a remote command). But many televisions in hotels and hospitals, however, are just normal residential TVs, possibly without a tuner. The table below gives an estimate of the typical size, the installed stock and the total display surface area per market segment of signage and hospitality in the EU 2020. The total 2020 stock is estimated at 51 million units. At an average replacement rate of 7 years this means sales in the order of 7-8 million units per year. In order to be complete also the stock data of projectors are added in the table.

Table 6.4. Characteristics signage displays and hospitality TV

Display	Surface diag. *inch*	Surface area *dm²*	Stock units *million*	Total area *km²*	Note
Public ('signage') display, of which	**55**	**83**	**30**	**25**	
Retail (indoor displays)	43	50	11	5.5	[Note 5]
Meeting rooms (incl. video conference)	75	155	5	7.8	5 m meeting rooms (169 million m²)
Classrooms (incl. smart boards)	70	135	5	6.8	5 m class rooms (93 m students + vocational)
Public transport (stationary & vehicles)	43	50	2.5	1.3	[Note 6]
Hotels (public area), bars, restaurants	44	53	2	1.1	0.2m hotels, 0.8 m restaurants, 0.7m bars
Healthcare (waiting rooms, care centres)	44	53	2	1.1	10k hospitals, 2 m doctors
Banking (ATMs, advertising)	30	25	1	0.3	0.22 m bank offices, 5 displays/office
Outdoors & trade fairs	55	83	1.1	0.9	estimate (10% of retail)
Hospitality TV	**36**	**36**	**21**	**8**	
Hotel rooms & other lodgings	40	44	14	6.2	11.6 m beds (VHK, MEErP-Part 2, 2011)
Hospital beds	40	44	2.7	1.2	2.7 m curative beds
Passenger TV (plane, train)	15	6.2	4.5	0.3	long-haul train carriages 25k; planes 20k; 100 displays/carriage or plane
Projectors	**80**	**176**	**4**	**7**	EIA, stock 2020

[5] Retail & car showroom displays: 3.5 m retail companies, 0.8 car sales; average 2-3 displays/outlet (varies between 50 per consumer electronics store and 0 for specialist food stores). Size is the area average between large (>55") and small (<24").

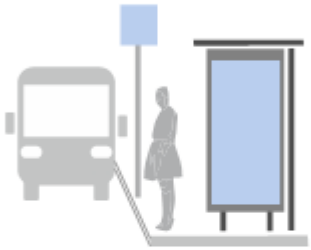
[6] Public transport displays: 0.15 m displays at 10k train- & 2.8k subway stations (3-4 platforms/station, 3 displays per platform), 0.37m displays in 7k metro trains (35 k carriages, 2 displays/carriage) and 30k railway trains (150k passenger train carriages), 1 m displays in 0.5m buses (2 displays/bus), 1 m displays at bus-stops (1 display/bus-stop), 0.05 m displays at 350 larger and ca. 2000 small airports (100 displays/large airport, 8 displays/small airport). The size of 43" (50 dm²) is the average of 55" (83 dm²) in stations and 24" (16 dm²) in vehicles.

Digital signage displays: emerging markets

Illustrations © VHK 2018, for the European Commission

meeting room - class room – home theatre

passenger information – train station - airport



passenger information – advertising – tourist information

advertising – tourist information – subway – train station

cinema – video wall display

interactive shopping

indoor advertising – pharmacy

waiting room– hospital – doctor - public offices

Figure 6.12: Modular signage displays for cinema (right) and home-cinema (left) applications (source: Samsung, ISE 2018 fair)

4. MARKET ACTORS

Manufacturers

Information on manufacturers is contained in sections 2.1 and 2.5.2. In addition, the following key figures on the global market leaders can be supplied:

Samsung reports a 2017 revenue of €181bn euros and €40.5bn euros in profit, achieved with 320k employees in 84 countries. LG (revenue 45bn euros and 1.8bn euros profit. Japanese Sony 2016-2017 revenue was just below 60bn euros; for the 2017-2018 Sony business year ending 31 March 2018, the company expects an operating profit of 4.5bn euros, the highest since 1998. Sony employs 128k people. Japanese Panasonic (250k employees) reports a revenue of €52bn and profit of €1.2bn euros. In 2016 the world's largest electronics contractor, the Taiwanese Foxconn, took a controlling interest in Japanese Sharp and the joint venture (Sakai Display Products) is building a new 10.5G factory in China. In 2017 Foxconn made a controversial deal with US President Trump to build a $10bn flat screen factory in Wisconsin in exchange for $3bn in tax-payer incentives. Foxconn has 1.3 million employees and a revenue of €107bn euros (2016) and an operating income of close to €5bn euros.

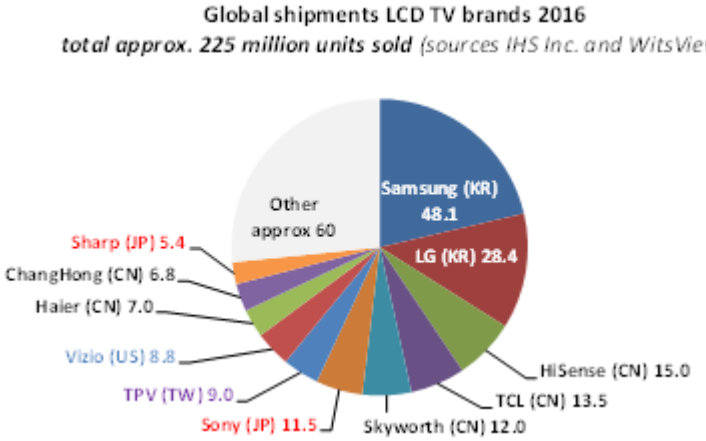


Figure 6.13: Global shipments LCD TVs by brand 2016.

The EU monitor market, also not a sector with EU manufacturing, is characterised by a significant number of importers and vendors. Market leaders are South-Korean Samsung and LG, each with 15-16% of the global, and probably also the European monitor market. Furthermore, computer monitors are manufactured by Japanese, US, Chinese and Taiwanese companies, such as: *Philips NEC, EIZO, Iiyama Envision, ViewSonic, AOC, HannsG HP, Dell, Apple, Fujitsu, Acer ('Packard Bell', 'eMachines', 'Gateway', 'Acer'), Lenovo, Asus, BenQ.* EU-resellers with their own monitor brands include computer manufacturer *Wortmann*

(DE), panel-assemblers, such as *Qbell* (IT) and *EWE* (RS), whole-sellers *Maguay* (RO) and service companies, such as *S&T-Maxdata* (AT).

Importers and distribution centres

Information on importers and distribution centres is mainly contained in section 2.5.1, including footnote 5.

As mentioned, Eurostat data on extra-EU exports and imports are unreliable and confusing. The following serves only as an illustration of that fact and is by no means to be taken as a representation of reality.

Eurostat's Prodcom statistics state an apparent EU consumption (production+imports minus exports) of 38 million TVs in 2016. In 2010 this was almost twice as high, i.e. 74 million TVs. In both cases, the average manufacturer's selling price ('MSP') of the produced units was listed by Eurostat as around €222 euros/ unit.

The official Eurostat data shows that TV imports in 2016 amounted to 69 million units (20 million in 2010), with mostly Turkey (using Asian panels) and China as the countries of origin. TV exports in 2016 amounted to 56 million units (6 million units in 2010) to Turkey and the Middle East in that same year. As mentioned before, these figures are confusing; in reality all panels are imported into the EU.

Retailers

Section 2.5.4 gives information on retailers, mainly for TVs.

Additional information: Market leader Mediamarkt-Saturn reports a gross margin of 19%. This implies that they purchase e.g. televisions for €28bn and sell for €34m. The €6bn gross margin goes to employees (around €40-50k/employee), capital investments and profit.

5. DOES EFFICIENCY OF ELECTRONIC DISPLAYS LEAD TO HIGHER PRICES?

No clear correlation has been identified between energy efficiency class and retail cost of electronic displays and of televisions in particular.

Topten published a report on the European TV market 2007-2013[27] where it analysed this specific aspect. Although the report is not very recent, no market revolution happened in this respect, so the findings can still be considered valid.

As figure 6.14 shows, there is a clear correlation between price and display diagonal size, but the retail price is also related to a number of additional features, such as definition level, support of HDR, "smart features" such as processor type and memory, interfaces, etc.

[27] http://www.topten.eu/uploads/File/European_TV_market_2007%E2%80%932013_July14.pdf

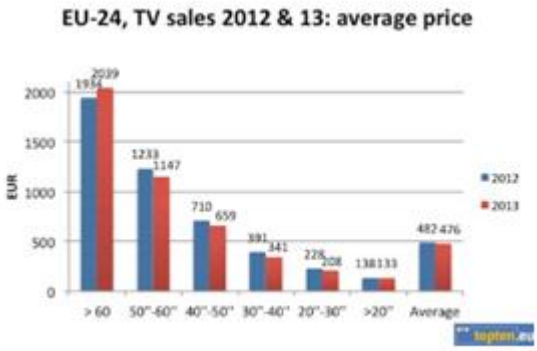


Figure 6.14: correlation between display size and cost (Topten on GfK data)..

However figure 6.15 shows that no evident relation appears when comparing prices and energy class, with the average class of the most efficient TVs less expensive of the second highest class or comparable to the third highest even. The same report goes further in the analysis and the correlation of price with size is confirmed when comparing displays of the same class, with a general tendency to lowering the cost year after year.

Figure 6.15: Average price according to energy classes for TVs in the range from 30 to 50 inches (Topten on GfK data).

Annex 7: The Ecodesign and Energy Labelling Framework

The Ecodesign Framework Directive and Energy Labelling Framework Regulation are framework rules, establishing conditions for laying down product-specific requirements in regulations adopted by the Commission. The Commission's role in the implementation of delegated and implementing acts is to ensure a maximum of transparency and stakeholder participation in presenting a proposal, based on generally accepted data and information, to the European Parliament and Council for scrutiny. The figure below gives an overview of the legislative process.

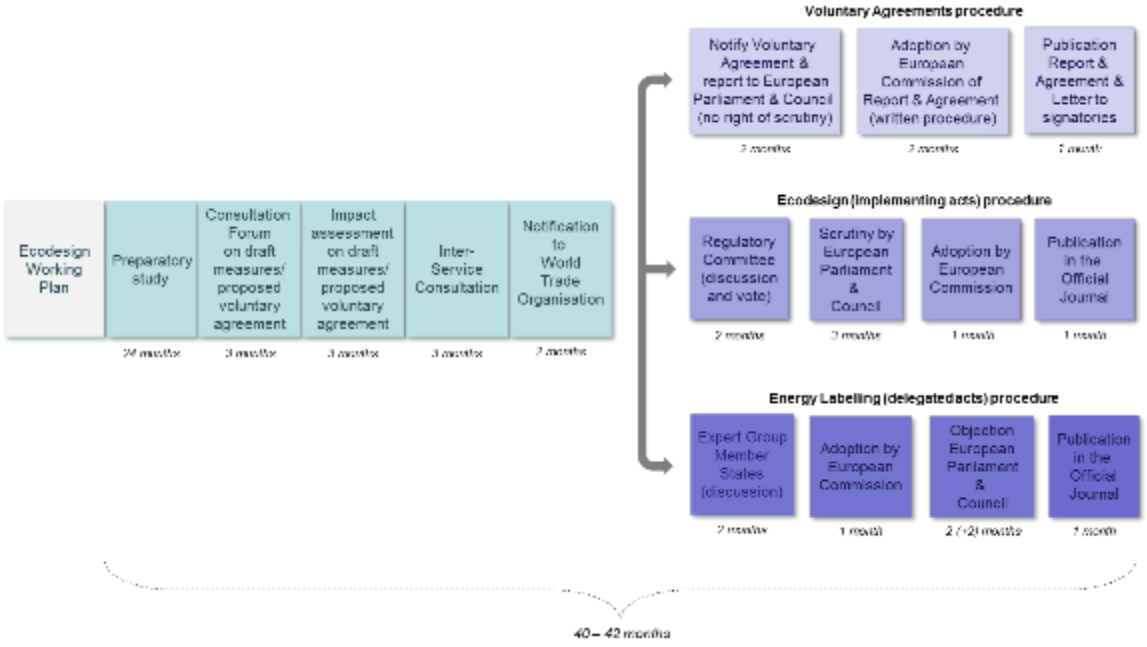


Figure 7-1: Overview of the legislative process

Energy labelling delegated acts are usually adopted in parallel with ecodesign implementing measures laying down minimum energy efficiency requirements for the same product group. This is done to ensure a coherent impact of the two measures: energy labelling should reward the best performing products through mandatory rating, while ecodesign should ban the worst performers.

The process starts with establishing the priorities for Union action in this area. Priority product groups are selected based on their potential for cost-effective reduction of greenhouse gas emissions and following a fully transparent process culminating in working plans that outline the priorities for the development of implementing measures.

A first list of priority product groups was provided in Article 16 of the Ecodesign Framework Directive in force at that time[28]. Subsequently, the (first) Ecodesign Working Plan 2009-2011[29], the (second) Ecodesign Working Plan 2012-2014[30] and the Ecodesign Working Plan 2016-2019 were adopted by the Commission after consultation of the Ecodesign Consultation Forum (composed of MS and stakeholder experts).

[28] Directive 2005/32/EC of the European Parliament and of the Council of 6 July 2005 establishing a framework for the setting of ecodesign requirements for energy-using products and amending Council Directive 92/42/EEC and Directives 96/57/EC and 2000/55/EC of the European Parliament and of the Council. OJ L 191, 22.7.2005

[29] Communication from the Commission to the Council and the European Parliament - Establishment of the working plan for 2009-2011 under the Ecodesign Directive. COM/2008/0660 final. 21 October 2008. (Ecodesign Working Plan 2009-2011)

[30] Commission Staff Working Document Establishment of the Working plan 2012-2014 under the Ecodesign Directive - SWD(2012)434/F1 (Ecodesign Working Plan 2012-2014)

The products listed in the three plans (1st working plan: 1-10; 2nd working plan: 11-18; 3rd working plan: 19-25) can be found in Table 7-1 below.

Table 7-1: Overview of products listed in the 3 Working plans

1. Air-conditioning and ventilation systems (commercial and industrial)	14. Enterprises' servers, data storage and ancillary equipment
2. Electric and fossil-fuelled heating equipment	15. Smart appliances/meters
3. Food preparing equipment (including coffee machines)	16. Lighting systems
4. Industrial and laboratory furnaces and ovens	17. Wine storage appliances (c.f. Ecodesign regulation 643/2009)
5. Machine tools	18. Water-related products
6. Network, data processing and data storing equipment	19. Building automation control systems
7. Refrigerating and freezing (professional)	20. Electric kettles
8. Sound and imaging equipment (incl. game consoles)	21. Hand dryers
9. Transformers	22. Lifts
10. Water-using equipment	23. Solar panels and inverters
11. Window products	24. Refrigerated containers
12. Steam boilers (<50MW)	25. High-pressure cleaners
13. Power cables	

There were also a number of conditional products listed in the 2nd Working Plan that the Commission committed to study closer before deciding to launch full preparatory work (such as thermal insulation, power generating equipment). In the 3rd Working Plan, the Commission committed to assess certain ICT products in a separate track to determine the best policy approach for improving their energy efficiency and wider circular economy aspects and a potential inclusion in the Ecodesign working plan.

Once the product group has been selected, a preparatory study is undertaken by an independent consultant, also involving extensive technical discussions with interested stakeholders. The preparatory study follows the MEERP. Subsequently, the Commission's first drafts of ecodesign and energy labelling measures are submitted for discussion to the Consultation Forum, consisting of Member States and other stakeholders' representatives.

After the Consultation Forum, the Commission drafts an impact assessment, which after approval of the IAB is taken forward to the inter-service consultation together with draft implementing measures. In this and subsequent steps, the Parliament's functional mailboxes for delegated/implementing acts are copied on each message from the Commission services. After the inter-service consultation, stakeholders are alerted when the draft measures are published in the WTO notification database.

After the WTO notification phase is completed, the two procedures follow different paths. The draft energy labelling delegated act is discussed in a Member State Expert Group where opinion(s) are expressed and consensus is sought but no vote is taken. The draft ecodesign measure is submitted for vote to the Regulatory Committee of Member State experts.

The European Parliament and Council have the right of scrutiny for which a period of up to four months, if requested, is foreseen. Within this time the co-legislators can block the adoption process by the Commission. Parliament committees sometimes discuss draft objections to measures (light bulbs and fridges in 2009) or vote to reject a measure (vacuum

cleaners in 2013[31]). On one occasion an objection was even adopted in plenary, blocking the measure for televisions in 2009[32].

Today, 30 Ecodesign Regulations, 17 Energy Labelling Regulations, 3 voluntary agreements and 2 tyre labelling regulations have been implemented. An overview of these measures can be found in the Table below.

Table 7-2: Overview of applicable measures

Framework legislation	
2017/1369	Energy labelling Framework Regulation
2009/125/EC	Ecodesign Framework Directive
1222/2009/EC	European Parliament and Council Regulation on the labelling of tyres with respect to fuel efficiency and other essential parameters
30 Ecodesign implementing regulations	
1275/2008	Standby and off mode electric power consumption
107/2009	Simple set-top boxes
244/2009	Non-directional household lamps (amended by 859/2009/EC)
245/2009	Fluorescent lamps without integrated ballast, for high intensity discharge lamps and for ballasts and luminaires (amended by 347/2010/EU)
278/2009	External power supplies
640/2009	Electric motors (amended by regulation 4/2014/EU)
641/2009	Circulators (amended by regulation 622/2012/EU)
642/2009	**Televisions and television monitors**
643/2009	Household refrigerating appliances
1015/2010	Household washing machines
1016/2010	Household dishwashers
327/2011	Fans
206/2012	Air conditioning and comfort fans
547/2012	Water pumps
932/2012	Household tumble driers
1194/2012	Directional lamps, light emitting diode (LED) lamps and related equipment
617/2013	Computers and servers
666/2013	Vacuum cleaners
801/2013	Networked standby electric power consumption
813/2013	Space heaters
814/2013	Water heaters
66/2014	Domestic cooking appliances (ovens, hobs and range hoods)
548/2014	Power transformers
1253/2014	Ventilation units
2015/1095	Professional refrigeration
2015/1188	Solid fuel local space heaters
2015/1189	Local space heaters
2015/1189	Solid fuel boilers
2016/2281	Air heating products, cooling products, high temperature process chillers and

[31] This objection was defeated in ENVI committee by 43 votes against and 4 in favour.

[32] The motivation of the objection was that the EP wanted to delay the discussion of the draft labelling measure so that it would have to become a delegated act under the recast post-Lisbon Energy Labelling Directive in 2010. The measure was indeed subsequently adopted as a delegated act.

	fan coil units
2016/2282	Use of tolerances in verification procedures
17 Energy labelling supplementing regulations	
1059/2010	Household dishwashers
1060/2010	Household refrigerating appliances
1061/2010	Household washing machines
1062/2010	**Televisions and television monitors**
626/2011	Air conditioners
392/2012	Household tumble driers
874/2012	Electrical lamps and luminaires
665/2013	Vacuum cleaners
811/2013	Space heaters
812/2013	Water heaters
65/2014	Domestic cooking appliances (ovens and range hoods)
518/2014	Internet energy labelling
1254/2014	Domestic ventilation units
2015/1094	Professional refrigeration
2015/1186	Local space heaters
2015/1187	Solid fuel boilers
2017/254	Use of tolerances in verification procedures
3 Voluntary Agreements (Report to the EP & Council)	
COM (2012) 684	Complex set top boxes
COM (2013) 23	Imaging equipment
COM(2015)178	Game consoles
2 tyre labelling amending regulations	
228/2011	Wet grip testing method for C1 tyres
1235/2011	Wet grip grading of C2, C3 tyres, measurement of tyres rolling resistance and verification procedure
Previous legal acts still in force	
92/42/EEC	Hot-water boilers efficiency Council Directive (Ecodesign)
96/60/EC	Household combined washer-driers (Energy labelling)
2002/40/EC	Household electric ovens Commission Directive (Energy labelling) – will be repealed on 1/1/2015

MSAs, designated by the Member States, will verify the conformity of the products with the requirements laid down in the implementing measures and delegated acts. These can be done either on the product itself or by verifying the technical documentation. The rules on Union market surveillance and control of products entering the Union market are given in Regulation (EC) No 765/2008[33]. Given the principle of free movement of goods, it is imperative that MSs' market surveillance authorities cooperate with each other effectively.

[33] Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products and repealing Regulation (EEC) No 339/93**.** OJ L 218, 13.8.2008, p. 30

Annex 8: Existing Policies, Legislation and Standards on electronic displays

A number of directives and regulations affect electronic displays.

1. EU ECODESIGN AND ENERGY LABELLING REGULATIONS

The current Ecodesign Regulation and Energy Label Regulation set some generic requirements and minimum energy efficiency requirements for televisions and television monitors.

Horizontal ecodesign regulations - In addition to those requirements, some horizontal aspects of energy using products are regulated. Horizontal measures are:

- Electric power consumption standby and off mode (Ecodesign Regulation (EC) No 1275/2008[34]);
- Networked standby (Ecodesign Regulation (EU) No 801/2013[35]).

Currently electronic displays not covered by the Ecodesign requirements on televisions and television monitors are subject to such horizontal requirements. Following Commission policy, the stipulations of these regulations are integrated vertically here, i.e. in the proposed new regulations for any electronic display in scope of the proposed Ecodesign Regulation.

2. OTHER EU POLICIES

The **EU Ecolabel** for televisions[36] exists since 2009 and, with the latest amendment is now valid till 31.12.2019. In fact, the Ecodesign regulation (EC) No. 642/2009 points to the indicative energy efficiency index (EEI) in the Ecolabel regulation as the benchmark values[37]. For 31.12.2010 the Ecolabel regulation gives a minimum energy efficiency index of 0.64 (compare class D-limit 0.6). For 31.12.2018 the Ecolabel limits for HD televisions are indices of 0.3/0.23/0.16 and for UHD televisions 0.3/0.3/0.23 pertaining to screen diagonals of <90/90-120/≥120 cm. This indicates that, even with new features, the efficiency improvement is at least a factor two and for large HD screens around a factor three over the 2010-2018 period.

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[34] Commission Regulation (EC) No 1275/2008 of 17 December 2008 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment. OJ L 339, 18.12.2008, p. 45.

[35] Commission Regulation (EU) No 801/2013 of 22 August 2013 amending Regulation (EC) No 1275/2008 with regard to ecodesign requirements for standby, off mode electric power consumption of electrical and electronic household and office equipment, and amending Regulation (EC) No 642/2009 with regard to ecodesign requirements for televisions**.** OJ L 225, 23.8.2013, p. 1.

[36] Commission Decision 2009/300/EC of 12 March 2009 establishing the revised ecological criteria for the award of the Community Eco-label to televisions (notified under document number C (2009) 1830) (Text with EEA relevance). OJ L 80, 28.3.2009, p. 3; [validity prolonged until 31.12.2019 by Commission Decision (EU) 2018/59 of 11 January 2018]

[37] Commission Decision of 12 March 2009 establishing the revised ecological criteria for the award of the Community Eco-label to televisions (notified under document number C (2009) 1830) (Text with EEA relevance) (2009/300/EC). OJ L 80, 28.3.2009, p. 3; [validity prolonged till 31.12.2019 by Commission Decision (EU) 2018/59 of 11 January 2018]
Commission Decision (EU) 2016/1371 of 10 August 2016 establishing the ecological criteria for the award of the EU Ecolabel for personal, notebook and tablet computers (notified under document C(2016) 5010) (Text with EEA relevance) OJ L 217, 12.8.2016, p. 9–37 [valid till 9 August 2019]

The **Low Voltage Directive**[38] regulates health and safety aspects including e.g. mechanical, chemical, noise related or ergonomic aspects. Apart from this, the directive seeks to ensure that the covered equipment benefits fully from the Single Market. The LVD covers electrical equipment operating with a voltage between 50 and 1000 V for alternating current and between 75 and 1500 V for direct current. Falling under this category, electronic displays are covered by the scope of the LVD, but there is no overlapping in terms of the type of requirements.

The **WEEE Directive** set requirements on e.g. recovery and recycling of Waste of Electrical and Electronic Equipment to reduce the negative environmental effects resulting from the generation and management of WEEE and from resource use. The WEEE Directive applies directly to household refrigerating appliances. Ecodesign implementing measures can complement the implementation of the WEEE Directive by including e.g. measures for material efficiency, thus contributing to waste reduction, instructions for correct assembly and disassembly, thus contributing to waste prevention and others.

The **RoHS Directive**[39] restricts the use of six specific hazardous materials and four different phthalates found in electrical and electronic equipment (EEE). Electronic displays are directly covered by the RoHS Directive. There is no overlapping requirement with a proposed ecodesign regulation.

The **REACH Directive**[40] restricts the use of Substances of Very High Concern (SVHC) to improve protection of human health and the environment. The REACH Directive applies directly to household refrigerating appliances. There is no overlapping requirement with a proposed ecodesign regulation.

The **EMC Directive**[41] sets requirements for the Electro-Magnetic Compatibility performance of electrical equipment to ensure that electrical devices will function without causing or being affected by interference to or from other devices. The EMC Directive applies directly to household refrigerating appliances. There is no overlapping requirement with a proposed ecodesign regulation.

The **ETS** sets a cap on the total amount of certain greenhouse gasses that can be emitted by installations. This cap reduces over time, so that the total emissions fall. Within this cap companies receive or buy emission allowances which they can trade with one another as needed. They can also buy a limited amount of international credits. The ETS does not directly apply to household refrigerating appliances, however, it does apply to electricity production. Hence, if the electricity consumption of electronic displays reduces, the electricity

[38] Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits**. OJ L 96,** 29.3.2014, p. 357. (LVD)

[39] Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment**.** OJ L 174, 1.7.2011, p. 88. (RoHS Directive)

[40] Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC. OJ L 396, 30.12.2006, p. 1–849 (REACH Regulation)

[41] Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility. OJ L 96, 29.3.2014, p. 79 (EMC Directive)

companies will have to trade less or the price of carbon will reduce under the cap system. Consequently, the price of electricity will drop.

3. POLICIES AT EU MS LEVEL

At Member State level there are only voluntary endorsement labels for all environmental aspects, including energy.

BLUE ANGEL (Germany)

Blue Angel Criteria were issued in 2012[42]. TVs smaller than 50" (diagonal 127cm) should have at least EU Energy Label class 'A'. When they are larger than 50" they should be at least classified as 'A+'. In all cases they should use less than 100W in on-mode. In off-mode and passive standby the power should be 0.3W or less. The TV must have ABC. Luminance should be controllable through regulation of the backlight intensity (e.g. not through a shutter-like construction which does not diminish energy use). There should be no mercury. The use of cancerogenous and other harmful substances under the CLP Regulation as well as the use of halogenated flame retardants, etc. are not allowed to obtain this voluntary label.

NORDIC SWAN (Scandinavia)

Criteria for the Nordic Ecolabel on TVs (and Projectors) were introduced in 2013 and are valid till 2020.[43] They require at least an 'A+' EU Energy Label classification. The non-energy requirements are more extensive than those for the Ecolabel, e.g. they require that *'The LCD panel must be produced in such a way that the greenhouse gases NF3 and SF6, if part of the production process, are abated by a system that is an integrated part of the production process. It is the responsibility of the manufacturing company to ensure that the abatement system is installed, operated and maintained in accordance with the manufacturers (of the abatement system) specifications. The manufacturer of the LCD shall declare the amount of NF3 and SF6 purchased in relation to amount of LCD (m2) produced over one year. Also the abatement system must be described in detail.'*

4. NON- EU POLICIES

Hereafter details of the most recent energy efficiency limits for televisions outside Europe are given. It is a small selection. The Standards & Labelling database www.clasponline.org distinguishes 47 countries with 135 TV-efficiency measures, most of which are now mandatory, such as minimum efficiency requirements, comparative energy labels and

[42] https://www.blauer-engel.de/de/produktwelt/elektrogeraete/fernsehgeraete/fernsehgeraete. RAL-UZ 145 Ausgabe Juli 2012

[43] http://www.nordic-ecolabel.org/product-groups/group/?productGroupCode=071. Version 5.5, 20 June 2013 - 30 June 2020

endorsement labels. In 2004 there were just 21 countries with 41 voluntary measures. Countries with active energy efficiency policy tend to address televisions and other displays.

UNITED STATES (2018)

Televisions

Energy Star is an endorsement label managed by US EPA. It aims to award the top-25% of the market and is renewed every 3-4 years.

The final version 8.0 specification for TV and HTD was published 23 Feb. 2018 and the effective date will be 1 March 2019.[44]

The scope is TVs with ('TV') or without ('Home Theatre Display' HTD) tuner, as well as hospitality TV/HTD with download facilities. Signage displays and computer monitors are covered by a different Energy Star specification.

Maximum On Mode Power requirement Pon_max, in Watts, for products where the native vertical resolution is smaller than 2160 lines

Pon_max= 78.5* tanh(0.0005* (A-140) + 0.038]+14

where A is viewable area in square inches (1 square inch=0.254 x 0.254= 0.0645 dm^2; 1 dm^2=15.5 square inches)

Maximum on mode power requirement, in Watts, for products where the native vertical resolution is s greater than or equal to 2160 lines (in other words UHD or more) is 1.5*Pon_max.

The passive standby limit is 0.5W. The active standby, low mode limit is maximum 3.0W.

For products with a luminance in the Brightest Selectable Preset Picture Setting (the greater value of L DEFAULT_RETAIL or L BRIGHTEST_HOME) less than 350 cd/m2 -->65% luminance. If more than 350 cd/m2 the setting will be 228 cd/m2

ABC average luminance at 3,12,35,100 lux is 50% of Brightest Selectable Preset Picture Setting.

Download Acquisition Mode (DAM) Requirements for Hospitality TV/HTDs: Wake up from standby is allowed for DAM and energy use should be less than 0.04 kWh/day

TV/HTDs with Standby-Active, Low Mode shall use the following method to demonstrate that they continue to meet the ENERGY STAR requirements after software updates.

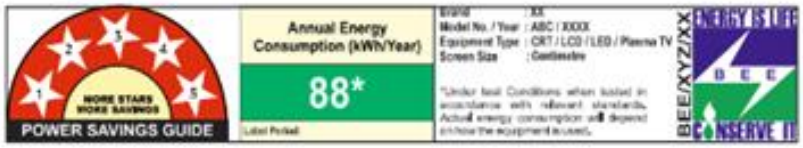
Monitors and signage

The most recent US Energy Star Monitor criteria v7.0 were effective from 2015. For most electronics products the Energy Star criteria are ambitious in the beginning (<25%

[44] https://www.energystar.gov/products/spec/televisions_specification_version_8_0_pd

compliance) but after 4 years some 70-80% of the models comply. This goes not only for displays but also for computers and imaging equipment. The figure below gives the v7.0 limit values not only for computer monitors but also for signage displays and televisions.

INDIA (2016-2018)



India has a star rating that is used for MEPs (1-star) and label rating, i.e. a 5 star rating (1=worst, 5=best), managed by BEE. Latest update for televisions is from 26.5.2016 (validity recently prolonged till 31.12.2018).

The television rating is based on Annual Energy Consumption AEC in kWh/year, calculated from 6h 'on mode' power use Pa (in Watts) and 12h 'standby mode' power use Ps (in Watts) per day over 365 days per year. In formula:

AEC= (6*Pa + 12*Ps)*0.365

The star-rating for an LCD/LED TV for the period 26.5.2016 till 31.12.2018.
1-star: AEC<3A+2.63
2-star: AEC<2.7A+2.63
3-star: AEC< 2.4A+2.63
4-star: AEC<2.2A+2.63
5-star: AEC<1.9A+2.63

Where A is viewable surface in dm^2. The first term relates to on-mode energy. For instance at 28 dm2 (diagonal 32") the 5-star limit is~24.3W (per year 1.9 x 28 =53.2 kWh=53200 Wh → per day 53200/365=145 Wh → per hour 145/6=24.3W). For 100 dm2 (diagonal 60") the 5-star limit is ~87W.

The second term relates to the maximum standby-use of 0.6W (2.63=0.6W x 12h x 365) .

SOUTH KOREA (2013→now)

South-Korea uses energy efficiency grades (1=best, 5=worst). Per 1.1.2013 there are 5 grades plus a superlative 'Energy Frontier' grade (best). MEPS and labelling are managed by KEMCO. Between 2012 and the current 2013 grades there has been a 50-60% increase in efficiency levels required.

Korea regulation on TV efficiency and standards and labels (TVs without network features)

On-mode power R≤		Standby power (passive-standby mode)		Grade
July 1, 2012	January 1, 2013	July 1, 2012	January 1, 2013	
R ≤ 91 & on-mode power 90 W	R ≤ 35 on-mode power 25 W	1.0 W	0.5 W	ENERGY FRONTIERb
R ≤ 130	R≤ 60	1.0 W	0.5 W	1
R ≤ 165	R ≤ 75	N/A	N/A	2
165 ≤ R 205	75 R≤ 100	N/A	N/A	3
205 ≤ R 260	100 R≤ 205	N/A	N/A	4
260 ≤ R 440	205 R≤ 440	N/A	N/A	5

R=On Mode Power Consumption (Watts)/Square Root of Screen Area (sq. Metres)
b=Energy Frontier for products with 50 cm (~20 in.)<screen size in diagonal <180 cm (~70 in.)
Source, MKE 2012

CHINA (2013→now)

China MEPS and and energy label for flatscreen TV since 2013[45]

The Chinese energy label classifies TVs on a scale from grade 1 (most efficient) to 3 (just above the minimum allowed efficiency level) (CNIS, 2010). The Chinese energy efficiency standard and label defines TV efficiency as luminous intensity relative to the power (cd/W): the most efficient TV is the one that is brightest relative to its power. To assess the efficiency of a Chinese TV the luminance, the screen area and the On mode power are considered. (Cd = Cd/m2 * m2). In Europe brighter TVs need to be more efficient than darker ones in order not to get a worse classification (because higher brightness usually requires higher power input), while in China, additionally to larger TVs, also brighter TVs can use higher power without getting 'punished' with a bad grade.

The Chinese Energy Efficiency Index EEI for LCD TVs is[46]

$EEI_{LCD}=Eff/Eff_{LCD,ref}$

where

- $Eff_{LCD,ref}$ =1.1 cd,
- $Eff=(L*S)/(P_K-P_S)$, in cd,

with

- L: average brightness of the screen, in cd/m2;
- S: Screen size, in m2;
- P_K: On-mode power, in W;
- P_S: Power consumption for signal processing, in W. P_S has different values when the interface is different.

[45] Based on Michel, A. et al., Finding the most energy efficient TV in China and in Europe: not such an easy job, ECEEE 2013 SUMMER STUDY proceedings, 2013.

[46] Hu Bo/Zhao Feiyan, Energy-efficientTV panels, Wuppertal Institute for Climate, Environment and Energy, Appliance Guide, bigee.net, 12/2014.

For on-mode power testing the new version of <GB 24850> (GB 24850-2013) was implemented in October 2013. The grade limit values for EEI_{LCD} are 2.7 (Grade 1, MEPS), 2.0 (Grade 2) and 1.3 (Grade 3).

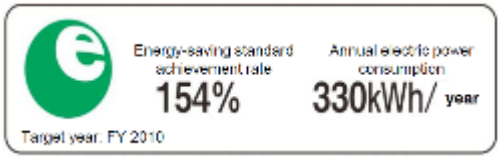
The IEC 62087 standard is used and the average On mode power over 10 minutes is considered in both the EU and CN label. However, the brightness and contrast settings are different for the On mode power test and the luminance measurement: In the Chinese energy label brightness and contrast settings are adjusted to a 8-greylevel-signal (EU; factory setting 'out of the box' or 'home mode' if a forced menu is applicable). Automatic Brightness Control (ABC) is off, as in the EU.

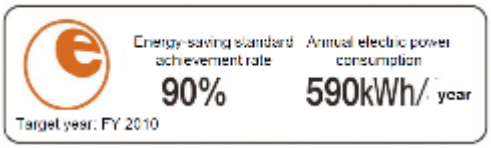
Apart from the different brightness and contrast settings, different signal input terminals are used (GB 24850: RF; EU: HDMI) and different voltages are applied (220 V in China, 230V in the EU).

To conclude, the limit values of Chinese Televisions are not comparable to those of other parts of the world.

JAPAN

Japan Top Runner 2012, Energy Conservation Centre Japan (ECCJ)





TopRunner is a relatively simple labelling to promote consumers understanding for energy-efficiency products. The path to achieve the target until the target year depends on the corporate decision. Unlike MEPS-based regulations, less efficient products under the target value could be sold if many more efficient products above the target value were sold.

(source: Presentation by Tadashi Mogi, Director of Energy efficiency and conservation division, METI, Tokyo, IEA-4E conference, 8/11/2012)

The formula used in assessing the energy efficiency is:

$$E = \{(P_O - P_A/4) \times t_1 + P_S \times t_2\}/1000$$

where E = Annually consumed electricity (kWh/year)
P_O / P_S = Consumed watts in working/idle time (W)
P_A = Saved watts by power saving functions (W)
t_1 / t_2 = Standard working/idle time (4.5/19.5 hours per day)

Source: Nina Zheng, Nan Zhou and David Fridley, *Comparison of Test Procedures and Energy Efficiency Criteria in Selected International Standards & Labeling Programs for Copy Machines, External Power Supplies, LED Displays, Residential Gas Cooktops and Televisions*, China Energy Group, Environmental Energy Technologies Division Lawrence Berkeley National Laboratory, Berkeley (CA), US, March 2012.

GLOBAL TELEVISION POLICIES

Table 8.1 – Overview of policies relating to televisions for economies investigated

Economy	Policy type*	Year published	Policy reference source	Metric(s) used
	APEC economies			
Australia and New Zealand	Mandatory MEPS and comparative efficiency label	2012	ANZ 62087.2.2-2011	Annual energy consumption calculated from on power and standby (active, passive), compared against reference TV energy of same screen area.
Canada	Mandatory MEPS	2011		Standby power only
China	Mandatory MEPS and comparative efficiency label	2013	GB24850-2013	On power compared against reference TV of same screen area, screen technology and luminance
Hong Kong, China	Voluntary comparative efficiency label	2013	Hong Kong Voluntary Energy Efficiency Labelling Scheme for Televisions August 2013	Same as EU with minimum standby power requirements
India	Voluntary comparative efficiency label (mandatory from January 2015)	2014	Schedule No. 11 Color Televisions, Revision 4.	Annual energy consumption calculated from on power and standby, compared against reference TV energy of same screen area and screen technology.
Japan	Mandatory MEPS	2010		On power compared against reference TV of same screen area, screen resolution, number of additional functions, screen technology and screen refresh rate
Malaysia	Mandatory MEPS and comparative efficiency label	2013	Electricity (Amendment) Regulations 2013	Energy efficiency calculated from screen area per kWh annual energy consumed, compared against reference TV energy efficiency. Annual energy consumption calculated from on power and standby (active, passive).
Mexico	Mandatory MEPS	2013	NOM-032-ENER-2013 Limits for electric power equipment and appliances that require standby power. Test methods and labelling	Standby Only
New Zealand	Mandatory MEPS and comparative efficiency label	2013	ANZ 62087.2.2-2011	See Australia
Russia				
Korea	Mandatory MEPS and comparative efficiency label	2012	MKE 2012-320, Regulation on energy efficiency standards and labelling	Energy efficiency index calculated as on-mode power per square root of screen area.

Economy	Policy type*	Year published	Policy reference source	Metric(s) used
Singapore	Mandatory comparative efficiency label	2013	Singapore Statute 557	On mode power requirement based on screen area
Chinese Taipei	Voluntary high efficiency endorsement label	2009		On mode power requirement based on screen area. Standby power requirement.
The Philippines				Still being developed
Vietnam	Mandatory MEPS and comparative efficiency label	2013	TCVN 9536:2010	Energy efficiency compared against reference TV of same screen area. Includes passive standby limits.
USA	Voluntary high efficiency endorsement label	v6 2014 v7 2015 expected	ENERGY STAR® Program Requirements Product Specification for Televisions and Displays (including monitors and Signage displays)	On mode power requirement based on screen area. Includes standby power and Download Acquisition Mode energy requirements.
USA - California	Mandatory MEPS	2012	CEC-400-2012-019-CMF 2012 Appliance Efficiency Regulations	
	Non-APEC economies			
EU	Mandatory MEPS and comparative efficiency label	2009 MEPS 2010 Label		Energy efficiency compared against reference TV of same screen area. Includes passive standby limits.

**Policy types: MEPS = Minimum Energy Performance Standards; CL = Mandatory Comparative Labels; VL = Voluntary Comparative Labels; VE = Voluntary Endorsement Labels; VC = Voluntary Certification; VS = Voluntary Specification; F = Financial Incentive; P Government Procurement; FA = Fleet Average.*
Note: No data was found for Indonesia and Thailand so they are not included in the table.

Table 8.2 – Observations on similarities between TV policy approaches

Economy	MEPS efficiency threshold	Lowest efficiency class	Highest efficiency class	Comments
APEC economies				
Australia	Low	Low	Very high	Ambitious criteria and the highest number of efficiency levels (fifteen).
Canada				Standby only.
China	High	High	Medium	Comparison is based on IEC 62087 testing of on-mode power, however China uses a different test standard which means comparison may not be representative.
Hong Kong, China		Very low	Low	Largely based on EU efficiency metric ranging from the labelling class G to B.
India		Medium	Low	Staggered metric with specification of future efficiency criteria for 2014, 2015 and 2017.
Japan	Low			The large number of variables creates 20 CRT

Economy	MEPS efficiency threshold	Lowest efficiency class	Highest efficiency class	Comments
				TV efficiency categories and 64 LCD and plasma TV categories
Malaysia	Low	Low	Low	Energy efficiency measured in screen area per unit energy - the inverse of the more common power/energy per unit screen area.
New Zealand		Low	Very High	See Australia
Russia				No mandated efficiency metric
Korea		Very Low	Very High	Power per square root of screen area (unique).
Singapore		Low	High	Based on EU efficiency classes from C to A++
Chinese Taipei			Medium	Based on ENERGY STAR v5
The Philippines				Not yet published
Vietnam		Low	Low	Largely based on EU efficiency metric ranging from the energy class D to B.
USA			High	ENERGY STAR is based on a revised ABC calculation which greatly reduces the TV on-mode power declared by manufacturers. One of the most ambitious criteria.
USA - California	Medium			Baseload allowance is high, allowing a high number of small screens to qualify
Non APEC economies				
EU	Very low	Very low	High	New mandatory higher efficiency classes to be introduced. One of the most ambitious criteria at the higher end.

5. COMPARISON

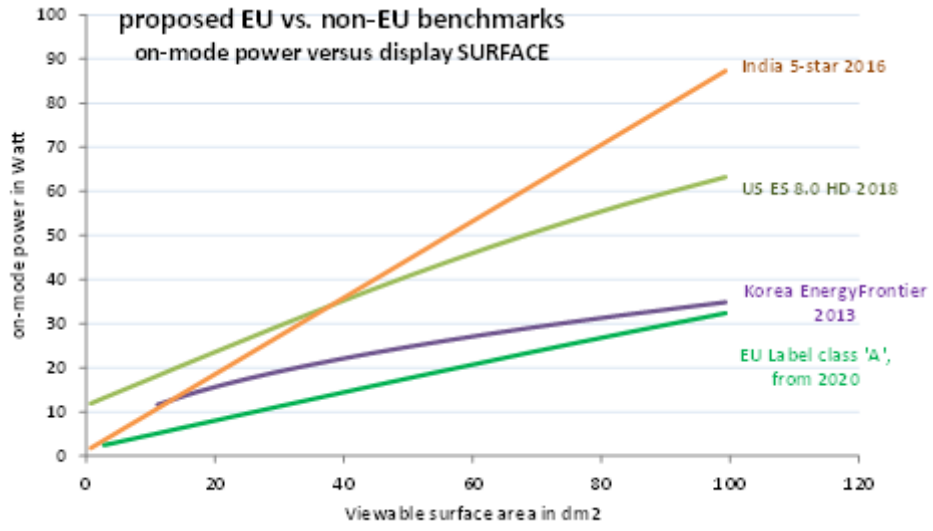


Figure 8.1: Comparison of benchmarks ('best') for energy efficiency televisions in the EU and non-EU

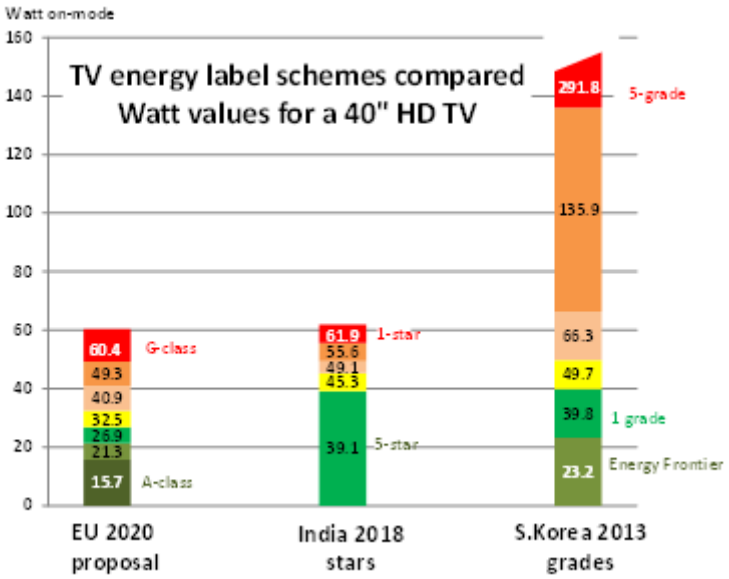


Figure 8.2: Comparison of proposed EU labelling scheme vs .some existing non-EU schemes for a 40”(44 dm²) HD TV. The values are the class limits, in Watt electric power input

Annex 9: Evaluation of current regulations (REFIT)

In the context of the Regulatory Fitness and Performance programme (REFIT)[47] and its Better Regulation policy[48], the Commission is committed to evaluate in a proportionate way all EU activities intended to have an impact on society or the economy. This should be done on the basis of the life cycle of the intervention. Many evaluations are triggered by individual clauses in legislation formulated as requiring a review. For the review of an existing Ecodesign measure, three out of the five standard evaluation criteria foreseen by Better Regulation need to be addressed, i.e. whether the measure has been effective, efficient and relevant. Indeed, the coherence and EU added-value criteria have already been addressed at the framework level, i.e. in 2012, when the Ecodesign Directive has been reviewed[49]

This annex presents the information collected during the review work that allows evaluating the existing regulations (EC) No. 642/2009 and (EU) No. 1062/2010.

1. EFFECTIVENESS

This section focuses on two key objectives of the current regulation: ensuring a transition towards more energy-efficient televisions, and achieve significant energy savings. Other impacts are quantified but are not analysed in depth.

The previous preparatory study and the previous IA were performed in a period of "technology revolution" triggering unprecedented sales, which were not predicted. The improvement potential was estimated at "20-30%, impact of new display technologies not know yet" (SEC(2009)1012 final, pag 3). Expected electricity consumption was 132 TWh by 2020 (BAU, 27 MSs) and 87 TWh (132 -43 -2) as a result of Ecodesign+Energy Labelling. Unexpected decline of some technologies (i.e. Plasma) and unexpected improvements in others (i.e. backlighting in LCD), with the stimulus from the policy instruments, is leading to a better-than predicted 2020 situation (i.e. 73.8 TWh/yr in 2018 compared to 81.7 predicted in 2009 based on 2007 data, decreasing to 77 TWh/yr in 2020). Comparison of targets and results is complicated also by the reference scenarios (25 countries in the 2005 analysis, 27 in the 2020 prospects, 28 in all current calculations). Overall the 2020 targets are exceeded by about 5 TWh.

1.1 Market transformation and innovation

Recital (6) of Regulation (EC) No 642/2009 on the Ecodesign requirements of televisions says that "Annual electricity consumption related to televisions was estimated to be 60 TWh in 2007 in the Community, corresponding to 24 Mt CO2 emissions. If no specific measures are taken to limit this consumption, it is predicted that electricity consumption will increase to132 TWh in 2020. The preparatory study shows that use-phase electricity consumption can be significantly reduced."

Figure 9.1 below is taken from the impact assessment report from July 2009[50]. It shows the BAU-scenario (orange line) with electricity consumption of indeed 60 TWh in 2007, 132

[47] https://ec.europa.eu/info/law/law-making-process/overview-law-making-process/evaluating-and-improving-existing-laws/reducing-burdens-and-simplifying-law/refit-making-eu-law-simpler-and-less-costly_en

[48] https://ec.europa.eu/info/law/law-making-process/better-regulation-why-and-how_en

[49] COM(2012) 765 final, REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL, Review of Directive 2009/125/EC establishing a framework for the setting of ecodesign requirements for energy-related products (recast)

[50] SEC (2009) 1011 final

TWh in 2020 and 148 TWh in 2025. The chosen scenario ‘Min+Lbl’ there is a conservative projection (brown line ‘Min+Lbl cons.’) and an optimistic projection (red line ‘Min+Lbl opt.’). So electricity consumption for the chosen scenario varies between 79 and 87 TWh/yr in 2020 and between 73 and 86 TWh in 2025. The saving versus the BAU-scenario is thus between 43 and 51 TWh in 2020.

Please note that this relates only to televisions, i.e. not monitors or signage displays.

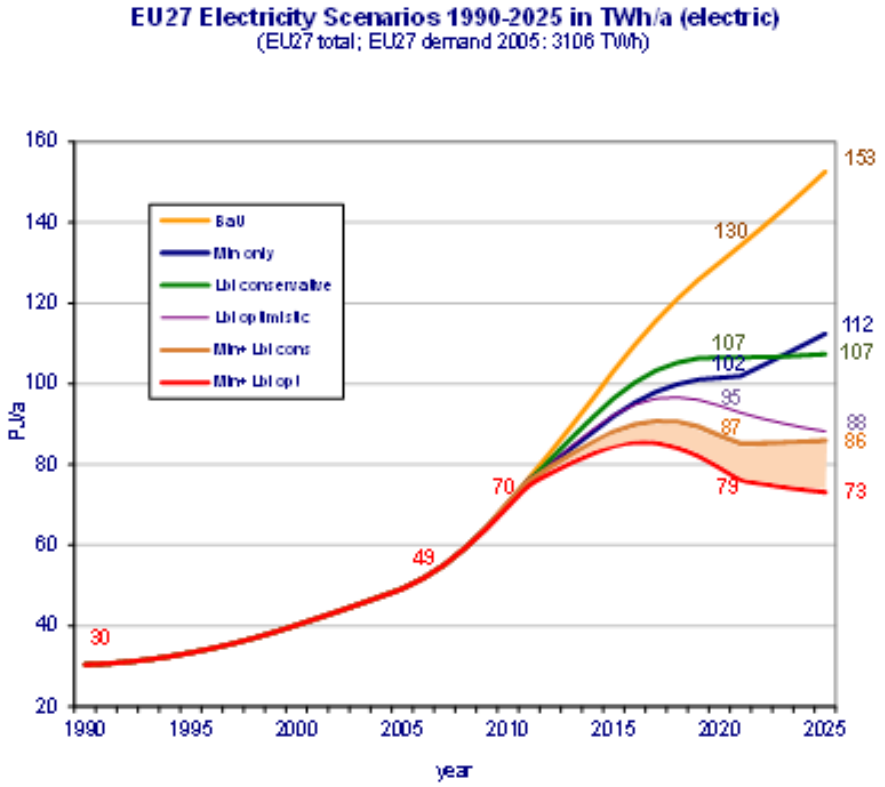


Figure 9.1: Development of on-mode electricity consumption of TV for several scenarios until 2025, where "BaU" is the baseline and "Min + Lbl opt" (lowest red line) the scenario that led to the current measures (source: SEC(2009)1011 impact assessment published 2009 but based on market data 2006-2007)

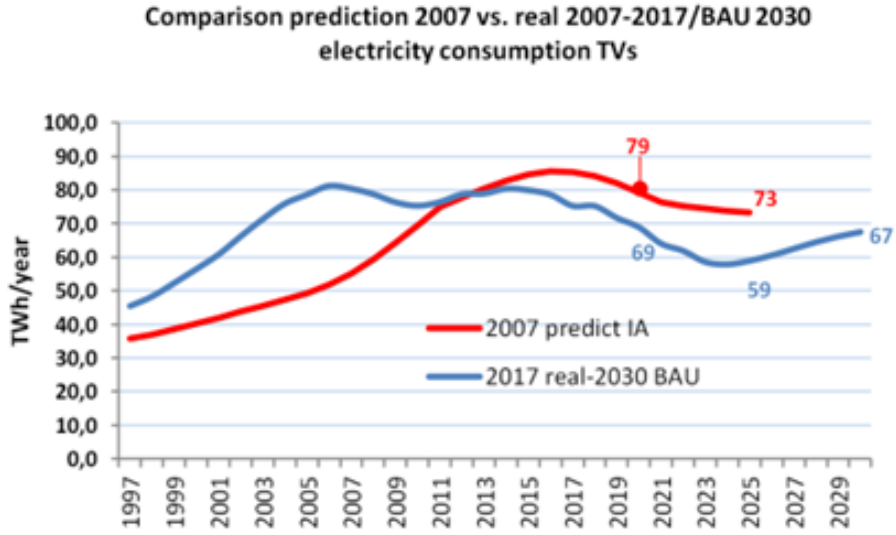


Figure 9.2: Electricity consumption of electronic displays 1990-2025, according to 2009 impact assessment(based on best data 2007) and real data 2017 as assessed in this study.

In figure 9.2, the red 'optimistic' line, which represents the 2007 IA scenario 'accompanying' the current regulations (available up to 2025), is compared to the blue line that gives the actual electricity consumption that could be established in this impact assessment for the period 2007-2017. From 2018 until 2030, the blue line represents the estimated projection in a 'Business-as-Usual'(BAU) scenario without new policy action.

For reasons of better comprehension this blue line has been made to match the 'BAU' energy on-mode consumption scenario for televisions as presented in Annex 4 (Table 4.1) with standby energy use added. Projections were made with the mathematical stock model in that Annex.

Making accurate projections for a fast-changing technology operating in what has proven to be an unpredictable TV market is complex. Nevertheless, the bandwidth projection in figure 9.2, which has been condensed in a single line in Annex 4, is the best that can be done.

However, in 2017 the energy savings were more than was expected for that year in 2007 and are moving downward faster than expected. The main reason is that the first generation of flat-screen televisions of 2005-2010, with efficiencies of 4 W/dm2 or more (see main report, chapter 2), is now being replaced by TVs that are almost twice as big (in dm^2 surface, e.g. switching from 30 to 40" diagonal) but with an efficiency of around 1 W/dm2 (i.e. on average four times higher). Counting an average 8-10 year product life, that stock substitution will last until about 2023-2024. As explained in chapter 2 of the main report, in a BAU-scenario with no or little commercial (Energy Label) or regulatory (Ecodesign) incentives to improve energy efficiency, the energy consumption will go up again because the average size and number of TVs in Europe will continue to go up. After the lowest point in 2025, where the energy saving is an estimated 59 TWh, the energy consumption of TVs in 2030 may (in a conservative scenario) even be higher than in 2020.

The first conclusion can be that, despite the unexpected surge in sales and ever-increasing display sizes, the measures (together with the autonomous market trend) have been successful and have even exceeded expectations. For 2025 the EU will be nowhere near the predicted 148 TWh from the 2007 BAU scenario. It will not even consume the 71 TWh/yr predicted in the chosen policy scenario but instead 59 TWh; 25% lower than predicted.

A second conclusion is that policy intervention is needed to ensure that energy efficiency improvement continues, because otherwise there is a real risk that energy consumption of TVs will go up again before 2030.

2. EFFICIENCY

How efficient has the regulation been in delivering the above mentioned benefits?

Already in the 2009 impact assessment it was predicted that the average price per television would hardly be effected by energy efficiency requirements. In fact, due to the fierce global; competition the price went further down with respect of the period before the measures.

In that sense there is no payback period or a need for calculating the Least Life Cycle Costs.

Of the €45 that the consumer pays extra –compared to BAU— €7.5 goes to VAT(20%), €17 to retail, €3.5 to wholesale and €17% to industry. At almost 20 million unit sales per year this means an extra revenue of €150m for the tax office, €340m for retail, €70m for wholesale and another €340m for industry.

The administrative burden of the current regulations ('BAU' in section 6) was calculated at less than €0.4m annually, divided over the various stakeholders. This is a negligible fraction compared to revenues in the electronic display business.

Overall the 2020 energy efficiency targets are exceeded by about 5 TWh.

3. RELEVANCE

Is the current regulation (still) relevant?

The review study and the Impact Assessment have shown that the regulation is effectively supporting a transition towards more energy-efficient electronic displays, and that it is on track to deliver substantial savings. The results also indicate that higher savings could be achieved by revising the requirements and correcting imperfections in the regulation. This forms the basis of the proposal for an updated regulation. It is made possible and necessary by technical progress and international developments: development of more efficient components and systems.

The review study also revealed that the regulation can play a major role in reducing halogenated flame retardants, thus contributing to the Circular Economy package.