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COMMISSION STAFF WORKING DOCUMENT

Accompanying document to the

Commission Regulation implementing Directive 2005/32/EC with regard to ecodesign requirements for televisions

FULL IMPACT ASSESSMENT

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Lead DG: DG TREN

Associated DG: DG ENTR

Other involved services: SG, LS, DG ENV, DG COMP, DG ECFIN, DG INFSO, DG MARKT, DG SANCO, DG TRADE

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EXECUTIVE SUMMARY

The Ecodesign Framework Directive 2005/32/EC lists products which have been identified by the Council and the European Parliament as priorities for the Commission for implementation. The list is based on the ECCP which has identified products offering a high potential for cost-effective improvements of energy performance and reductions of CO₂ emissions. It includes consumer electronics (Article 16), and televisions are one of the most important consumer electronics product categories in this respect.

The Spring Council 2007 called for thorough and rapid implementation of the five priorities¹ set by the Energy Council on 23 November 2006², based on the Commission's Action Plan on Energy Efficiency. The priorities include to "dynamically and regularly improve and expand the scope of minimum efficiency requirements for energy-using products" [...], by "fully utilising the Eco-Design Directive". The strategy of adopting minimum energy performance standards for equipment and appliances was welcomed by the European Parliament³.

The approach for developing the ecodesign implementing regulation for televisions and this impact assessment was structured in four steps:

Step 1: assessment of the criteria for ecodesign implementing measure as laid out in Article 15(2a)-15(2c) of the Ecodesign Directive, taking into account the ecodesign parameters identified in Annex I of the Ecodesign Directive;

Step 2: consideration of relevant Community initiatives, market forces and environmental performance disparities of the equipment on the market with equivalent functionality as laid out in Article 15(2) of the Ecodesign Directive;

Step 3: establishing policy objectives including the desirable level of ambition, the policy options to achieve them, and the key elements of the ecodesign implementing measure as required by Annex VII by the Ecodesign Directive;

¹ Brussels European Council 8/9 March 2007, Presidency Conclusions, 7224/07.

² TTE (Energy) Council on 23 November 2006, 15210/06.

³ European Parliament resolution of 31 January 2008 on an Action Plan for Energy Efficiency

Step 4: environmental, economic and social assessment of the impacts on environment, consumers, with a view to the criteria on implementing measures set out in Article 15(5) of the Ecodesign Directive.

The analysis carried out in the framework of Steps 3 and 4 has been extended to a possible energy efficiency labelling scheme pursuant to Council Directive 92/75/EEC of 22 September 1992 on the indications by labelling and standard product information of the consumption of energy and other resources by household appliances⁴.

Step 1 Assessment of the criteria for eco-design implementing measures

In order to assess the criteria for eco-design implementing measures as laid out in Article 15(2) of the Ecodesign Framework Directive, the Commission has carried out a technical, environmental and economic study for TVs ("preparatory study") following the provisions of Article 15(4a) and Annex II of the Framework Directive.

With regard to the criteria established by Article 15(2) of the Ecodesign Directive, the preparatory study concludes that the most significant environmental impact is electricity consumption during the use-phase, and the following results were established for the EU:

Article 15 (2a):	Annual sales volume in the Community of TVs:	approx. 32 mln
Article 15 (2b):	Environmental impact, in particular use phase electricity consumption	54 TWh in 2005 for EU-25, and an expected electricity consumption of 132 ⁵ TWh by 2020 in EU-27
Article 15 (2c):	Improvement potential for on-mode power consumption	20%-30% respectively by optimisation of conventional LCD and PDP respective display technologies (impact of new display technologies not known yet)

The volume of sales of approx 32 million units per year is far above the indicative 200000 units provided for in the Ecodesign Directive. It is expected that the annual sales will increase to approx. 45 mln units by 2020.

The annual electricity consumption of TVs for EU-27 in 2007 approx. corresponds to the electricity consumption of the Czech Republic, and the expected electricity consumption by 2020 corresponds approx. to the electricity consumption of Sweden.

Assuming that the average on-mode power consumption is improved by 20%-30%, the annual electricity consumption of TVs would be reduced by approx. 30 TWh by 2020, which corresponds approx. to the electricity consumption of Hungary, and is considered to be significant. Further significant environmental impacts are lead, mercury and brominated flame

⁴ OJ L 297, 13.10.1992, p. 16.

⁵ of which 130 TWh related to on-mode, and 2 TWh standby/off-mode

retardants contained in TVs (hazardous substances), and waste, which are targeted by policies on restrictions of the use of certain hazardous substances⁶ ("RoHS") and waste⁷ ("WEEE") from TVs.

The improvement potential is due to the fact that technical solutions exist which yield reductions of the electricity consumption of TVs with equivalent functionality, compared to the market average. These technical solutions lead to a wide disparity of electricity consumption of the TVs available on the market.

The improvement potential leads to a reduction of life cycle costs (cost-effective) without significantly increasing the purchasing price for a TV, because it is related to technical solutions which do not involve significant additional costs.

Step 2 Analysis of relevant initiatives at Community and Member State level

Further to Articles 15(2) and 15(4c) of the Ecodesign Directive, relevant Community and national environmental legislation is considered. Related (voluntary) initiatives both on Community and Member State levels are taken into account, and barriers preventing for market take up of technologies with improved environmental performance are analysed.

Several market failures have been identified to explain that cost-effective technologies leading to energy efficiency improvements are not penetrating the market to a satisfactory extent by market forces alone. The environmental performance of TVs, including the use-phase energy consumption, has not been a decisive factor for the purchasing decision of consumers and no easily accessed and understood information on running costs/energy savings is available, and there is little awareness of the energy consumption and the associated costs (asymmetric information). Furthermore not all environmental costs are included in electricity prices. As a result consumer (and producer) choices are made on the basis of lower electricity price not reflecting environmental costs for the society (negative externality). Therefore little incentives exist for manufacturers to optimise the environmental performance of TVs, in particular the energy consumption, and cost effective improvement potentials are therefore often not realized. Several initiatives on Community level and on MS level aim/aimed at improving the environmental performance of TVs. The RoHS, WEEE and ecodesign for standby/off-mode initiatives have improved – and/or are expected to improve in the future – the environmental performance of TVs as related to hazardous substances, waste and electricity consumption in standby/off-mode. However, the initiatives have not improved – and are not expected to improve – the on-mode power consumption to a satisfactory extent. Therefore additional legislative action pursuant to the Ecodesign Directive based on Article 95 of the Treaty should be taken on Community level, and Member States expect that a harmonized legislative framework is set.

Conclusion of Steps 1 and 2

The analysis carried out in Steps 1 and 2 shows that

- the volume of sales and trade of TVs in the Community is significant;

⁶ Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, OJ L 37, 13.2.2003, p. 19.

⁷ Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment, OJ L 37, 13.2.2003, p. 24.

- the environmental impact of TVs is significant, the main environmental aspect being the electricity consumption of TVs in on-mode;
- significant cost-effective improvement potentials for the on-mode electricity consumption exist, which are linked to a wide disparity of the environmental performance of TVs on the market with identical functionality;
- initiatives on Community and Member State level, and market forces alone do not capture the improvement potential for on-mode power consumption to a satisfactory extent.

It is concluded that the criteria for ecodesign implementing as set out in Article 15(2) of the Ecodesign Directive are met, and TVs shall be covered by an ecodesign implementing measure pursuant to Article 15(1) of the Ecodesign Directive.

Step 3 Policy objectives and options

Further to Annex II of the Ecodesign Directive, the level of ambition for improving the electricity consumption of TVs should be determined by an analysis of the least life-cycle cost for the user. Furthermore, benchmarks for technologies yielding best performance, as developed in the preparatory study with additional input from the Consultation Forum, are considered. The results are reflected in the objectives that the ecodesign regulation and the complementary energy labelling Directive aim to achieve.

Several policy options for achieving a market transformation realizing the appropriate level of ambition are considered, including the business as usual case, self-regulation, energy labelling for TVs, an ecodesign regulation on TVs, and combinations of the latter two.

However, due to the clear mandate of the Legislator for establishing ecodesign requirements for TVs, the depth of the analysis for options other than an ecodesign implementing measure is proportionate for an implementing legal act, and the focus is on the assessment of the implementing regulation, complemented by the additional impacts of an energy labelling scheme.

Step 4 Impact assessment

An assessment of the implementing measure is carried out. In particular, sub-options for the timing of ecodesign requirements for on-mode power consumption are analysed, taking into account the criteria set out in Article 15(5) of the Ecodesign Directive, and the impacts on manufacturers including SMEs:

- Sub-option 1: ecodesign requirements becoming effective in two stages one year after entry into force of the regulation, and on 1 April 2012, respectively; the second stage corresponds to an improvement of 20%-30% of today's average on-mode power consumption;
- Sub-option 2: as sub-option 1, but stage 2 becomes effective on 1 April 2013;
- Sub-option 3: ecodesign requirements corresponding to an improvement of 20%-30% of today's average on-mode power consumption, becoming effective one year after entry into force of the regulation;
- Sub-option 4: ecodesign requirements corresponding to today's average on-mode power consumption, becoming effective two years after entry into force of the regulation.
- Sub-option 5: as sub-option 2, but ecodesign requirements of the second stage for on-mode power consumption as currently (status November 2008) under discussion in California.

- Sub-option 5 was discarded because the economic implications are in contradiction to Article 15 of the Ecodesign Directive (levels not achieved by any of the current models).

The following accumulated electricity and cost savings, and avoided CO2 emissions for the products placed on the market from Jan 2009 through December 2014 during their lifetime of 10 years are expected:

	Accumulated electricity consumption (TWh)	Accumulated electricity savings (TWh)	Accumulated electricity cost savings ⁸ (billion EURO)	Accumulated avoided CO2 emissions ⁹ (Mt)
Baseline	674	-	-	-
Sub-option 1	591	83	12.5	34.0
Sub-option 2	614	60	9.0	24.6
Sub-option 3	550	124	18.6	50.9
Sub-option 4	665	19	3.2	7.8

The assessment of the economical, environmental and social impacts of sub-options 1-4 can be summarised on a relative scale from 1 (bad) to 4 (good):

	Costs	Electricity/CO2/electricity cost savings	Risk for Job losses in SMEs
Sub-option 1	3	3	3
Sub-option 2	4	2	3
Sub-option 3	2	4	2
Sub-option 4	4	1	4

The impacts of a complementary energy labelling scheme pursuant to Council Directive 92/75/EEC¹⁰ are also considered.

Conclusion on Step 3 and Step 4

After a comparison of those options it became clear that the appropriate policy option for realizing the improvement potential is a combination of a regulation setting ecodesign

⁸ Assumption: 0.15 €/kWh, based on Eurostat data

⁹ Assumption: 0.410 kg CO2/kWh for electricity generation (European Energy and Transport, Trends to 2030 – update 2007); however, if further effects as e.g. distribution/transmission losses, emissions of non CO2 greenhouse gases etc. are taken into account, the specific CO2 emissions are approx. 50 g/kWh higher.

¹⁰ Council Directive 92/75/EEC of 22 September 1992 on the indication by labelling and standard product information of the consumption of energy and other resources by household appliances, OJ L 297, 13.10.1992, p. 16.

requirements and a directive establishing an energy labelling scheme pursuant to Council Regulation 92/75/EEC with the following main characteristics:

Based on assessment of costs and benefits sub-option 1 is the preferred option which optimally fulfills the requirements of the Ecodesign Directive. Therefore ecodesign requirements for on-mode power consumption are set in two stages becoming effective one year after entry into force and on 1 April 2012, respectively; with a view to the expected introduction of new display technologies the ecodesign requirements should be reviewed not later than 3 1/2 years after entry into force of the regulation.

A complementary energy labelling scheme establishes mid-term benchmarks for on-mode power consumption.

This combination of ecodesign requirements and energy labelling implies the following:

- the ecodesign requirements realise cost-effective improvement potentials for on-mode power consumption;
- the labelling scheme creates market transparency for consumers and provides incentives for manufacturers for innovations/investments in energy efficiency;
- the combined effects lead to market transformation yielding significant annual energy savings of 43 TWh by 2020 related to on-mode power consumption (more than the electricity consumption of Romania), assuming an annual improvement triggered by energy labelling of 4%, corresponding to 15 Mt CO₂ emissions, compared to a business as usual scenario with an expected on-mode electricity consumption of 130 TWh by 2020;
- anticipating the standby/off-mode power consumption requirement foreseen for the second stage of the standby/off-mode regulation (effective 2011 instead of 2013) leads to additional aggregated electricity consumption savings of approx. 2 TWh;
- a clear legal framework is created which ensures fair competition;
- the requirements for on-mode power consumption in the Community are harmonised, leading to a minimization of administrative burdens and costs for the economic operators;
- that no disproportionate burdens and small additional costs for manufacturers are created due to transitional periods which duly take into account re-design cycles, speed of innovation and return of the associated investments.

Monitoring of the impacts will mainly be done by market surveillance carried out by Member State authorities ensuring that the requirements for ecodesign and energy labelling of TVs are met, whereas the appropriateness of scope, definitions and concepts will be monitored by the ongoing dialogue with stakeholders and Member States.

SECTION 1: PROCEDURAL ISSUES AND CONSULTATION OF INTERESTED PARTIES

Organisation and timing

This action is one of the priorities of the Action Plan on Energy Efficiency¹¹ for adoption by the Commission for the year 2009¹².

The ecodesign implementing regulation is based on the Directive 2005/32/EC of the European Parliament and of the Council establishing a framework for the Commission to set ecodesign

¹¹ COM(2006)545 final.

¹² COM(2008)11 final.

requirements for energy-using products¹³, in the following abbreviated as "Ecodesign Directive". An energy-using product (EuP), or a group of EuPs, shall be covered by ecodesign implementing measures, or by self-regulation (cf. criteria in Article 19), if the EuP represents significant sales volumes, while having a significant environmental impact and significant improvement potential (Article 15). The structure and content of an ecodesign implementing measure shall follow the provisions of the Ecodesign Directive (Annex VII).

The proposed energy labelling implementing directive is based on Council Directive 92/75/EEC of 22 September 1992 on the indications by labelling and standard product information of the consumption of energy and other resources by household appliances¹⁴.

The Commission has carried out a technical, environmental and economic analysis in preparation of these initiatives, in the following called "preparatory study". The preparatory study was carried out by a consortium of external consultants¹⁵ on behalf of the Commission's Directorate General for Energy and Transport (DG TREN). The preparatory study has followed the structure of the "Methodology Study Eco-design of Energy-using Products"¹⁶ (MEEuP) developed for the Commission's Directorate General for Enterprise and Industry (DG ENTR). MEEuP has been endorsed by stakeholders and is used by all ecodesign preparatory studies.

On 16 October 2008 a meeting of the Ecodesign Consultation Forum established under Article 18 of the Ecodesign Directive was held (details are provided below).

Article 19 of the Ecodesign Directive, amended by Directive 2008/28/EC¹⁷, foresees a regulatory procedure with scrutiny for the adoption of ecodesign implementing measures. If the Article 19 Committee gives a favourable opinion on a draft measure, and neither European Parliament nor Council oppose adoption, the measure can be adopted by the Commission in 2009.

Impact Assessment Board

The opinion of the Impact Assessment Board was given on 20 January 2009. This final version of the impact assessment report reflects its recommendations as follows:

- The evolution of the specific CO2 emissions and electricity prices was included in the scenarios.
- The added value of standby requirements becoming effective earlier than foreseen by Commission Regulation (EC) No 1275/2008 on standby/off-mode power consumption was further addressed.
- The role of international measurement standards was clarified.

Transparency of the consultation process

External expertise on TVs was gathered mainly in the framework of the preparatory study. The study has been developed in an open process, taking into account input from relevant stakeholders including manufacturers and their associations, environmental NGOs, consumer

¹³ OJ L 191 of 22.7.2005, p. 29.

¹⁴ OJ L 297, 13.10.1992, p. 16.

¹⁵ "EuP preparatory Studies 'Televisions' (Lot 5)", Fraunhofer Institute for Reliability and Microintegration, IZM, Berlin, final report of 2 August 2007; documentation available on the DG TREN ecodesign website http://ec.europa.eu/energy/demand/legislation/eco_design_en.htm

¹⁶ Methodology Report, final of 28 November 2005, VHK, available on DG TREN and DG ENTR ecodesign websites

¹⁷ OJ L 81 of 20.3.2008, p. 48.

organizations, EU Member State experts, experts from third countries and international organizations as e.g. the International Energy Agency (IEA). The preparatory study provided a dedicated website¹⁸ where interim results and further relevant materials were published regularly for timely stakeholder consultation and input. The study website was promoted on the ecodesign-specific websites of DG TREN and DG ENTR. An open consultation meeting for directly affected stakeholders was organised in the Commission's premises in Brussels on 3 May 2007 for discussing the preliminary results of the study.

During the meeting of the Ecodesign Consultation Forum on 16 October 2008 the Commission staff presented a "working document" with suggestions for ecodesign requirements and an energy labelling scheme for TVs¹⁹, which are based on the results of the preparatory study. The working document was published on DG TREN's ecodesign website, and stakeholder comments received in writing before and after the meeting are included in the Commission's CIRCA system.

In addition, the initiative was discussed in meetings of Commission staff with third country government representatives as e.g. Japan, Korea, USA, Australia etc.

Outcome of the consultation process

The positions of main stakeholders on crucial features of the Commission services' working document presented in the meeting of the Consultation Forum meeting on 16 October 2008 can be summarised as follows.

The **Member States** support in general the suggested content of ecodesign and energy labelling legislation. The level of ambition for ecodesign power consumption requirements and the approach for an energy efficiency grading for the label were in general considered appropriate, and the suggested time scales – approx. 4 years for ecodesign, approx. 8 years for the energy label – are supported, but the intervals for upgrades of the energy labelling scheme may be too small and could be extended. A requirement on the picture settings used for conformity assessment is in general supported, and a requirement on automatic power down to standby/off mode should be considered.

The general approach to set mandatory requirements in the framework of ecodesign is in general supported by **Industry**²⁰ associations. The European Information & Communications Technology Industry Association (EICTA) welcomes ecodesign and labelling legislation on TVs, supports the suggested 1st stage requirement for on-mode power consumption, but suggests to keep the 1st stage for 4 years and not foreseeing a 2nd stage. Instead, a 2nd stage should be developed on the basis of future data and market developments. The bandwidth of the grading system for the label should be decreased, and no rescaling of the labelling classes should be foreseen, but should be based on a future analysis of market developments. This approach is not supported by Member States and other stakeholders. The design of the labelling scheme should be compatible with the time needed for designing new models, and should consider the return on investments for developing and manufacturing them. A requirement on the picture settings used for conformity assessment is not needed because the risk of abuse is small. Automatic power down may be difficult to implement in practise.

¹⁸ www.ecotelevision.org

¹⁹ Available on DG TREN's ecodesign website

²⁰ See e.g. contributions of ORGALIME and CECED to the consultation of Directive 92/75/EEC, available on http://ec.europa.eu/energy/demand/legislation/domestic_en.htm#consultation; "CECED vision on Energy Efficiency" of 1st July 2007, available on www.ceced.eu; letter of EICTA to DG TREN of 28 March 2007 related to the termination of the industry self-commitment of consumer electronics (cf. footnote 21)

Environmental NGOs in general welcome ecodesign and energy labelling legislation. The suggested time scales and the timing for upgrades of ecodesign requirements and energy efficiency classes are supported. The level of ambition for ecodesign power consumption requirements is not demanding enough and should be more aggressive. Ecodesign requirements related to material efficiency should be considered. Requirements on the picture settings used for conformity assessment and on automatic power down are supported.

Consumer NGOs underline that the consumer should be able to choose a TV suitable for individual needs. A requirement on the picture settings used for conformity assessment and on automatic power down is supported. The size of the label as suggested in the working document is welcomed.

Further details on these issues are given below.

SECTION 2: PROBLEM DEFINITION

Introduction

The underlying problem can be summarised in the following way: cost-effective and energy efficient technologies for TVs do exist on the market but the market penetration of TVs with improved "on-mode" efficiency is lower than it could be. Furthermore, the market for TVs is tending to TVs with large screens and enhanced functionality (full HD resolution), and penetration of TVs in households is increasing.

As requested by Article 15 of the Ecodesign Directive, the preparatory studies identified the environmental aspects in relation to TVs. In order to carry out the technical, environmental and economic analysis the preparatory study has considered representative models for both LCD and PDP display technology. In particular the study has, amongst others, provided the following key elements:

- power consumption of the "on-mode" and the standby/off mode conditions;
- typical usage patterns;
- the bill of materials, weight, packaging etc.;
- the installed base ("stock") and the annual sales for the period until 2020, and the typical life time;
- technologies yielding reduced electricity consumption and the costs effects for applying them compared to the current "market average".

The structure of the methodology of the technical, environmental and economic analysis is displayed in Annex II.

The study concludes that

- they have a significant environmental impact within the Community
- they present significant potential for improvement without entailing excessive costs
- the following environmental aspects are relevant:
 - energy consumption in the use phase – on-mode power consumption and standby/off mode energy consumption;
 - hazardous substances – mercury of backlights for LCD display TVs, lead for PDP displays, flame retardants;
 - waste;

In addition, some stakeholders argued that general material/resource efficiency was a significant environmental aspect, and it was suggested to require the use of certain types of plastics (recycled, bio) and limit the use of the precious materials. However, it is not known how important a particular precious material will become for TVs in the future, and, furthermore, such requirements would be disproportionate because the expected improvement of the life-cycle environmental impact is very low, while, on the other hand, the requirements could not be verified on the product itself, implying risks for unfair competition. It is concluded that ecodesign requirements on material efficiency are not appropriate and such requirements will not be discussed further. This conclusion should be verified in a review.

The most significant aspect for improving the environmental performance of TVs is the energy consumption in "on-mode". Further significant aspects are related to hazardous substances, waste, and the energy consumption in standby mode. Those aspects are already addressed by related Community legislation (see below). The environmental impact is determined by the two important criteria of TVs: the type of display technologies and screen size.

MARKET FAILURES

Major barriers for the market uptake of TVs with low energy consumption exist which are largely due to the following market failures:

- Incomplete information on running costs/cost savings: information on running costs/cost savings is not explicit and can be obtained only with difficulties. The power consumption of on-mode is sometimes included in the user's manual or in the data sheets which are accessible on manufacturer's websites. However, such information is difficult to obtain, and it is often unclear under which conditions the power consumption has been measured. Furthermore, no scheme exists which would allow to compare the energy efficiency of TVs with similar features, in particular screen size.
- Energy efficiency of TVs until now has not been an important purchasing criterion, and the awareness for the implications of the energy consumption for the electricity bill are limited. This is due to the fact that the product features and performance are, arguably, much more important for TVs than, e.g., white goods.
- Moreover, energy consumption until now has played only a minor role for TV design, and innovations for picture quality, the most important feature, often imply trade-offs with the energy consumption, as e.g. full HD resolution of PDP display TVs. Due to little demand for TVs with improved energy efficiency, little incentives exist for manufacturers to optimise the energy consumption of TVs. Furthermore, due to a missing scheme for providing comparable information, it is difficult for manufacturers to advertise energy efficient models, and efforts to design for energy efficiency are difficult to communicate.
- Negative externality related to energy use: not all environmental costs are included in electricity prices. That is why consumer (and producer) choices are made on the basis of lower electricity price not reflecting environmental costs for the society. **Related initiatives on Community and Member State level**

Both on Community and on Member State level initiatives have been launched which aim at improving the environmental impact of TVs. These initiatives include Community legislation

on waste ("WEEE")²¹, on hazardous substances ("RoHS")²², on standby/off-mode power consumption²³, and the eco-label for TVs²⁴, the "TopTen" initiative²⁵ carried out in several Member States, a partnership between government and retailers in the UK, and a fiscal incentive ("bonus/malus") system in France.

- WEEE addresses the TVs' environmental impact of waste. It provides incentives/obligations for manufacturers to facilitate design for recycling by setting a minimum reuse/recycling rate for TVs of 65% and a minimum recovery rate of 75%. The actual approach to recycling, reuse and recovery and organisation of the material flows – such as thermal treatment, automatic shredding with subsequent material separation and recycling, manual disassembly or reuse – depends on national specificities.
- No particular difficulties for the implementation of WEEE for TVs are reported in the 2008 WEEE review²⁶, which could be relevant for possibly complementary ecodesign requirements. The recycling percentages analysed in this review²⁷ show that the recycling, reuse and recovery rates are fulfilled for TVs. Even though CRT recycling is the actual TV recycling issue, it can be assumed that the targets under the WEEE directive will further encourage TV manufacturers to take that into account in their business strategy and perform LCD and PDP recycling and reuse whenever feasible from a business perspective. The review also shows that think patterns on electronic waste have changed over the last ten years. For example, manual disassembly is rather replaced by effective shredding and separation technologies or the economic focus has shifted from design for recycling costs to the cost-efficient maximization of the overall environmental performance²⁸.
- RoHS sets restrictions on the content of mercury, lead and brominated flame retardants in TVs, which are periodically under review.
- The ecodesign implementing regulation on standby/off-mode power consumption sets ecodesign requirements for standby/off-mode electricity consumption of TVs. The 2nd stage of this regulation becomes effective in the first quarter of 2013 and requires that the power consumption in standby/off-mode does not exceed 0.5 Watt/1.0 Watt, without/with information display function respectively. Furthermore, an automatic power down function is required. The preparatory study indicates that power consumption levels could be set at more demanding levels for TVs, leading to a further reduction of life-cycle costs from the

²¹ Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE); OJ L 37, 13.2.2003, p. 24.

²² Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment; OJ L 37, 13.2.2003, p. 19.

²³ 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.

²⁴ Commission Decision of 12 March 2009 establishing the revised ecological criteria for the award of the Community Eco-label to televisions, OJ L 82, 28.3.2009, p. 3.

²⁵ EURO-TOPTEN: Reducing energy consumption: making efficient products the normal and best choice for consumers, retailers and manufacturers, initiative co-funded by the Intelligent-Energy Europe programme; www.topten.info

²⁶ See 2008 Review of Directive 2002/96 on Waste Electrical and Electronic Equipment (WEEE), Final Report, United Nations University, Bonn, Germany et al., Contract No: 07010401/2006/442493/ETU/G4, ENV.G.4/ETU/2006/0032, 05 August 2007, http://ec.europa.eu/environment/waste/weee/studies_weee_en.htm ("WEEE review")

²⁷ Table 120 of [26].

²⁸ Section 5.9 "Times have Changed" of [26]

user perspective. Furthermore, requirements for automatic power down could be made specific for TVs.

- The Community eco-label is awarded on a voluntary basis to "best performing" products, and complements as benchmark possible ecodesign requirements for the on-mode power consumption, the ecodesign requirement for standby/off-mode, and requirements set in WEEE and RoHS legislation.
- TopTen is an initiative co-funded by the Intelligent Energy - Europe programme and carried out in several Member States, which lists on national websites several individual models with "best performing" energy consumption. The covered product categories vary from country to country, and some of the national TopTen projects cover TVs.
- In the UK a partnership between the government and retailers aims at supporting retailers to offer energy efficient models of several product categories, including TVs. Furthermore, the TESCO retailer chain has announced an unilateral energy labelling for TVs.
- In France a fiscal incentive system is considered for several product categories, including TVs, giving a tax reduction/increase for products with low/high energy consumption respectively. However, the plans have been postponed.

Conclusions

- The most significant aspect for improving the environmental performance of TVs is the energy consumption in "on-mode". Significant cost-effective energy saving solutions exist on the market.
- Because of identified market failures cost-effective technologies leading to energy efficiency improvements are not penetrating the market to a satisfactory extend by market forces alone.
- Ecodesign requirements aiming at design for recycling and reuse to reduce the waste impact of TVs are not appropriate, because these environmental aspects are covered by legislation under WEEE. Furthermore, no particular difficulties for the implementation of WEEE for TVs are reported in the 2008 WEEE review, which could be relevant for possibly complementary ecodesign requirements.
- Ecodesign requirements aiming at a further reduction of the use of hazardous substances are not appropriate, because the use of hazardous substances in TVs is covered by legislation under RoHS.
- Some of the ecodesign requirements for standby/off-mode and automatic power down set out in the standby/off-mode regulation should be re-formulated specific to TVs. The additional savings are described below.
- Initiatives on Community and Member State level are not expected to correct the identified market failures related to the cost effective improvement potentials for the on-mode energy efficiency, and additional Community action is required.

Baseline Scenario

The preparatory study estimates that the electricity consumption of TVs was 54 TWh in 2005 in EU-25. For 2007 the electricity consumption is estimated to be 60 TWh in EU27 of which

54 TWh are related to on-mode power consumption, and 6 TWh are related to standby/off-mode power consumption²⁹.

Without taking dedicated measures, the evolution of the electricity consumption of TVs can be described by a scenario which is based on the following predictions and assumptions.

- it is predicted that sales of TVs will shift towards larger screen sizes (see figure 1), so that the shares of small/medium/large screen size segments in the installed base ("stock") will shift from 78%/20%/2% in 2005 to 22%/52%/26% in 2020;
- the preparatory study predicts that the sales/installed base of TVs in households increases from 35 mln/303 mln in 2005 to 47 mln/429 mln in 2020 (assuming a life-time of 10 years);
- it is assumed that the time an individual TV is operated in on-mode is 4 hours per day; as concluded by the preparatory study;
- it is assumed that the energy efficiency of the on-mode power consumption will remain constant, because efficiency gains for the basic set-up of TVs are expected to be outweighed by the trend to full HD resolution and possibly other features requiring more energy like for example several tuners, integrated hard disc etc.;
- the impact of the energy consumption of new display technologies cannot be estimated and is therefore not considered;
- the sales of Cathode ray tube (CRT) and rear projection (RP) TVs are neglected, although the requirements on power consumption can be achieved by CRT and RP TVs.

²⁹ Taking into account improved accuracy of power consumption measurements implied by the revision of standard IEC 62087 for measuring the power consumption of TVs (see discussion below), and extrapolating the figures of the preparatory study for EU-25 to EU-27, and assuming an average of 3 W for the standby/off-mode power consumption of the installed base. The extrapolation by 3% is based on the comparison of the electricity demand in EU-25 and EU-27, showing that electricity demand in EU27 is only 2,8% higher than in EU25; extrapolation according to population would lead to a correction by 6%.

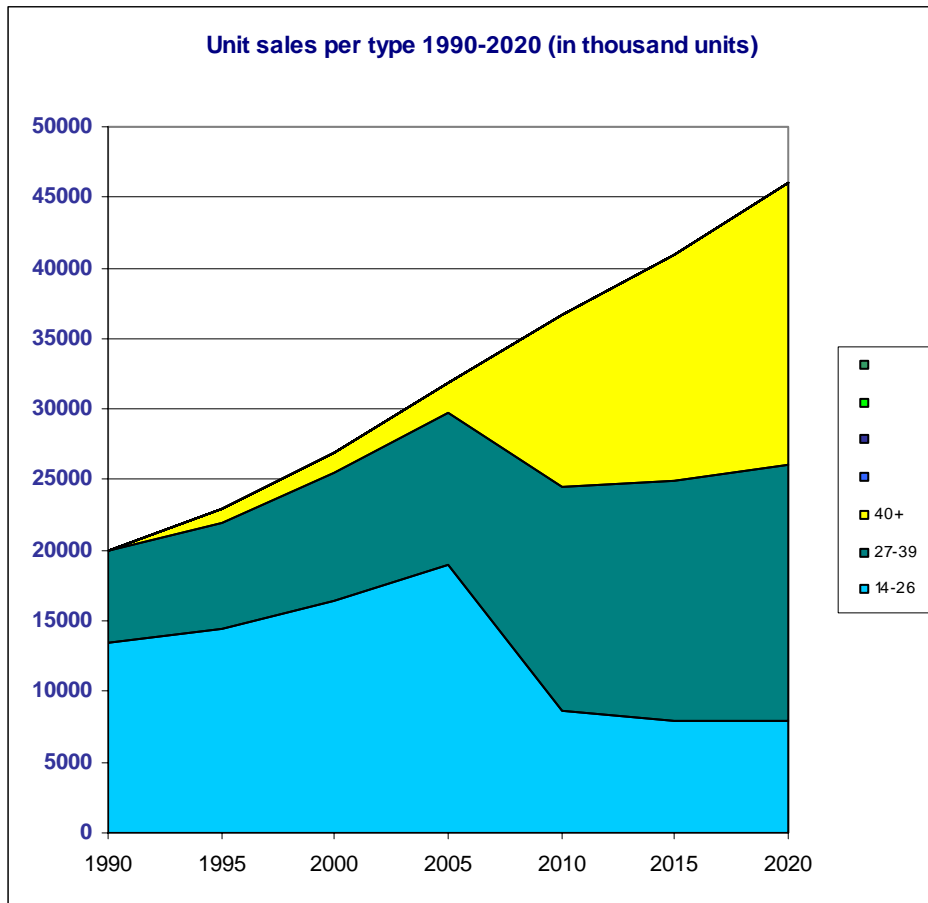


Figure 1: Development of TV sales according to screen sizes (in inch)

In this scenario it is expected that the on-mode electricity consumption of TVs will increase from 55 TWh in 2007 to 130 TWh by 2020 in EU-27, see figure 2 in Section 6 which presents the number of TVs in the installed base multiplied with the annual operation time (4 hours on-mode on 365 days per year), summed over the average on-mode power consumption in the three screen size segments.

The standby/off-mode regulation sets requirements on standby/off-mode power consumption (1 Watt effective in 2010, 0.5 Watt effective in 2013). As a consequence, the standby/off-mode power consumption of TVs is expected to decrease from 6 TWh in 2007 to approx 2 TWh by 2020, and the total electricity consumption is estimated to be 132 TWh by 2020.

Comparison with more recent data

Comparison with recent data

In the beginning of 2008 EICTA provided data for the on-mode power consumption of models on the market in late 2007, complementing the data of the preparatory study. The data is displayed in Annex II. The data covers liquid crystal display (LCD) and plasma display panel (PDP) technologies, which together currently account for the largest part of TV sales, and which are predicted to dominate the market almost completely in the near future³⁰, both for "HD ready" and "full HD" resolution.

³⁰ E.g. TV sales in Germany in 2008: 76% LCD TVs, 9% PDP TVs, the remaining part being Cathode Ray Tube TVs (13%) and others (2%, including Rear Projection TVs); the share of CRT TVs decreased sharply from 24% in 2007, and is predicted to decrease further rapidly.

The dataset was scrutinised by Member State experts, and it was concluded that, based on a statistical analysis, the relation between on-mode power consumption and the screen area A (in dm²) for an average TV can be expressed as

$$P_{\text{on}} (\text{average}) = 20 \text{ W} + 4.3224 \cdot A \text{ (Equation 1)}$$

For a 32 inch (1 inch = 2.54 cm) TV the resulting power consumption is 143 Watts, which corresponds very well to the "average" 32 inch "base case" of the preparatory study (150 Watts, LCD TV). For a 42 inch TV the resulting power consumption is 231 Watts, which is lower than the "average" 42 inch "base case" of the preparatory study (275 Watts, average of a LCD TV and PDP TV). The difference for the 42 inch TV is due to the fact that the base cases of the preparatory study build on data for PDP TVs measured with an obsolete measurement standard, while the EICTA data was measured with the new version of the measurement standard, which assesses the power consumption of PDP TVs more accurately, and, for the same model, the resulting power consumption is lower. It is concluded that the "market average" as defined by the base cases of the preparatory study are coherent with the market average determined on the basis of the 2008 EICTA dataset, when differences for power consumption measurements for PDP TVs stemming from the updated measurement method are taken into account.

The obsolete measurement method for assessing the on-mode power consumption of TVs over-estimates the power consumption of PDP TVs, and, as a consequence, the electricity consumption scenario of the preparatory study should be corrected. The figures quoted in the sub-section "baseline scenario" take this correction into account.

Furthermore, the analysis of the preparatory study covers PDP TVs with full HD resolution only to a very limited extent, because only very few models were available when the study was carried out, because this technology is not yet fully mature. The analysis of the EICTA data shows the "average" full HD PDP TV may be represented by ...

$$P_{\text{on}} (\text{average, full HD PDP}) = 20 \text{ W} + 1.12 \times 4.3224 \times A \text{ (Equation 2)}$$

However, it is expected that technology improvements will result in improvements in the power consumption of PDP TVs with full HD resolution such that the market average for PDP with full HD resolution can be described by equation (1) in a few years from now as well.

Sensitivity analysis

In order to check the sensitivity of the baseline scenario on the assumptions for the on-mode operating time and potential improvements, the following alternative assumptions are considered:

1. In the light of increasing penetration of TVs in households, it may be that the time an individual TV is operated in on-mode may be lower than 4 hours per day, because the daily viewing time may remain the same, but is "distributed" to more individual TVs. Assuming an on-mode operating time of 3 hours daily, the resulting electricity consumption is 98 TWh for EU-27 by 2020.
2. Improvements in energy efficiency may lead to a decrease in energy consumption, despite of new functionalities, e.g. as a consequence of measures taken in other parts of the world. Assuming an annual energy efficiency improvement of 1% for on-mode power consumption, the resulting electricity consumption by 2020 is 123 TWh for EU-27.

Conclusion

It is concluded that the on-mode electricity consumption of TVs will significantly increase if no dedicated action targeting the on-mode power consumption is taken. Depending on the assumptions, the predictions range from 100 TWh to 125 TWh when the more accurate assessment of PDP TVs and the extrapolation to EU-27 are considered. The figures are summarized in table 1.

	2005	Electricity consumption in 2007 with correction for PDP and extension to EU-27	Scenario for 2020 for EU-27
Preparatory study	54 TWh	-	-
Corrected assessment of PDP TVs, using eq. (1), and extension to EU-27	-	54 TWh on-mode, 60 TWh total	130 TWh on-mode, 132 TWh total
Reduced time of on-mode operation	-	-	98 TWh on-mode, 100 TWh total
Improvement by 1% per year	-	-	123 TWh on-mode, 125 TWh total

Table 1: summary of baseline scenario, comparison with recent data and sensitivity analysis

Improvement potential, level of ambition and benchmarks

Improvement potential

The preparatory study has shown that existing cost effective technical solutions allow for improvement of the on-mode power consumption of LCD and PDP TVs, and it is stated that potential for reducing the on-mode power consumption by applying cost effective technical solutions is about 20% (LCD TV) to 30% (PDP TV) compared to the base case representing the market average. The preparatory study also concluded that, from an end-user perspective, those technologies, are cost-neutral, that is, no price increases are to be expected.

No further improvement potential has been identified for TVs with cathode ray tube technology, which is a mature technology. For very large screen sizes rear projection technology is also available on the market, with a power consumption being much lower than those of the best performing PDP TVs. However, the market share of rear projection TVs is marginal in the EU.

The most recent EICTA data set of products on the market late 2007 shows that, for LCD TVs, additional improvements can be achieved, leading to on-mode power consumption which is reduced by approx. 40%-50% compared to the market average. Furthermore, PDP manufacturers have announced that new technologies for PDP with full HD resolution will result in improvements of the on-mode power consumption. However, it is not known if the additional energy savings lead to a further reduction of the life-cycle costs for end-users.

Furthermore, the additional improvements may be achievable with a certain proprietary technology only.

It is expected that new display technologies such as light emitting diode (LED) backlight for LCD displays or organic LED (OLED) displays will enter the market in the near future. However, to date these new technologies are not yet introduced in the market in large scale, and the impact of the energy consumption in on-mode can not be quantified yet for mass market models, although it is expected that the energy efficiency will, as a general tendency, be improved.

Level of ambition of ecodesign requirements

According to Annex II of the Ecodesign Directive the level of energy efficiency or consumption should be set aiming at the least life-cycle cost minimum to end-users. As laid out above the cost-effective improvement potential for LCD and PDP is 20%-30% compared to the current market average, and ecodesign requirements for on-mode power consumption should be set accordingly.

The appropriate level of ambition for ecodesign requirements for the on-mode power consumption is therefore a 20% and 30% reduction of the on-mode power consumption for LCD and PDP TVs respectively, as compared to the current market average. The level of ambition can be expressed as

$$0.8 \cdot (20 W + 4.3224 \cdot A), \text{ (equation 3)}$$

where A is the screen area in dm^2 . This energy level is achieved by approx. half of the models in the EICTA dataset. It is coherent with Article 15 (5a) of the Ecodesign Directive, because it is not expected that functionality of TVs will significantly differ from what is expected from the perspective of the user, because no particular technology will be banned from the market, and no negative impacts e.g. on picture quality are expected. This is further discussed below.

However, the appropriateness of the level of ambition should be re-assessed in short term, because

- new technologies for further improving the on-mode power consumption of LCD and PDP TVs may be introduced into the market on large scale (e.g. as a consequence of the incentives provided by energy labelling);
- it is expected that new display technologies will enter the mass market TVs soon.

The corresponding impact for on-mode power consumption and the life-cycle costs should be analysed and, if appropriate, the level of ambition should be revised. After consultation of stakeholders and Member States, the appropriate timing for such a revision is considered to be four years.

For standby/off-mode, the level of ambition should be more demanding than the requirements set in standby/off-mode regulation, because for TVs cost-effective technologies yielding power consumption levels foreseen for stage 2 of the standby regulation have been already introduced in the market.

Requirements for on-mode power consumption of TVs are currently discussed in Australia and in California. For comparison, the level of ambition is comparable with the plans of the Australian Government for minimum performance requirements for TV on-mode.

A study of "PG&E" for the Californian Energy Commission (status November 2008) suggests minimum performance requirements for TV on-mode which are more demanding.

$$25W + 1.86 \cdot A \text{ (screen size A expressed in } \text{dm}^2\text{);}$$

Such a level of ambition would contradict Article 15 (5a) of the Ecodesign Directive, because, according to the EICTA data, none of the models currently on the market could comply with such requirements (see Annex II). Furthermore, the validity of the data of the PG&E study has been doubted by experts, because the data may correspond to settings for the luminance which are unrealistically low, leading to unrealistically low values for the on-mode power consumption.

Benchmarks

The EICTA dataset shows that the power consumption of TVs with "HD ready" resolution can be approx. 50% below the average defined by equation (1) (LCD TVs with smaller screen sizes), while for TVs with full HD resolution the power consumption can be approx 40% below the average. These benchmarks are used for defining the "best class" of the energy labelling scheme.

In general, the revised ecolabel for TVs, which is complementary to ecodesign, RoHS, WEEE requirements and to the energy labelling scheme, sets benchmarks as a "label of excellence" for energy consumption and for hazardous substances, as described in the Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan³¹ (SCP/SIP Action Plan).

Legal basis for EU action

The Ecodesign Directive and, more specifically, its Article 16 provides the legal basis for the Commission to adopt an ecodesign implementing measure for TVs. The Energy labelling Directive and, more specifically, its Article 1, provides the legal basis for the Commission to adopt an energy labelling Directive for TVs.

SECTION 3: OBJECTIVES

The preparatory study has confirmed that a cost effective potential for reducing use phase electricity consumption of TVs exist. This potential is not tapped, as outlined above. The general objective is to develop a policy framework which

- ensures that products which have an on-mode power consumption higher than 20% and 30% for LCD and PDP respectively of the current market average are not placed on the market anymore,
- creates incentives for manufacturers to design energy efficient models,
- provides market transparency on energy efficiency of TVs fosters the awareness for energy efficiency of TVs,

thereby

- transforming the TV market towards products with improved energy performance,
- inducing significant reductions of the environmental impact related to electricity consumption of TVs,
- inducing cost savings for the end-user,
- ensuring the free movement of affected products within the internal market.

³¹ COM(2008) 397/3

Furthermore, the objective is to satisfy the provisions of the Ecodesign Directive, and in particular its Article 15 (5), which requires that ecodesign implementing measures meet all the following criteria:

- a) there shall be no significant negative impacts on the functionality of the product, from the perspective of the user;
- b) health, safety and the environment shall not be adversely affected;
- c) there shall be no significant negative impact on consumers in particular as regards affordability and life cycle cost of the product;
- d) there shall be no significant negative impacts on industry's competitiveness;
- e) in principle, the setting of an ecodesign requirement shall not have the consequence of imposing proprietary technology on manufacturers;
- f) no excessive administrative burden shall be imposed on manufacturers.

SECTION 4: POLICY OPTIONS

The rationale for the key elements of the ecodesign regulation and the energy labelling directive is established on the basis of the preparatory study and the input from stakeholders. This is discussed in the second part of Section 4.

Option 1: No EU action

This option would have the following implications:

- The barriers for realizing the potentials to improve the energy efficiency of TVs would persist.
- It is to be expected that Member States would want to take individual, non-harmonized action. This would hamper the functioning of the internal market and lead to high administrative burdens and costs for manufacturers, in contradiction to the goals of the Ecodesign Directive.
- The specific mandate of the Legislator would not be respected.

Therefore this option is discarded from further analysis.

Option 2: Self regulation

This option is discarded for the following reasons:

- No initiative for self-regulation on TVs pursuant to Annex VIII of the Ecodesign Directive has been brought forward.

Option 3: Energy labelling for TVs only

- This option means that an energy labelling scheme for TVs would be set up pursuant to the Energy labelling Directive specifically TVs, without setting ecodesign requirements for TVs. In general two main objectives of labelling schemes are to increase the market penetration of, in this case, energy efficient products by providing incentives for innovation and technology development, and to help consumers to make cost effective purchasing decision by addressing running costs.

This option would imply the following:

- Energy labelling pursuant to the Energy labelling Directive creates market transparency, fosters awareness of consumers and creates incentives for manufacturers for innovation.

- However, a labelling scheme alone does not ensure that cost effective improvement potentials are realised for all products on the market, implying that the full energy and cost savings potential is not captured.
- As in Option 1, Member States could set minimum requirements individually, and the administrative burdens for manufacturers would be higher when compared with the burdens associated to ecodesign requirements.
- The specific mandate of the Legislator would not be respected.

Therefore the option to establish only an energy labelling scheme without setting ecodesign requirements is discarded, but the effects of labelling will be discussed in the analysis of Option 5.

Option 4: Ecodesign requirements only

This option means that ecodesign requirements would be set in an implementing measure pursuant to the Ecodesign Directive, without establishing an energy labelling scheme for TVs pursuant to the Energy labelling Directive. This option would imply the following:

- By setting maximum levels for energy consumption, which have to be fulfilled by all TVs placed on the market, the "worst performing" TVs would be banned from the market, leading to an improvement of the energy consumption of TVs;
- Information requirements pursuant to Annex I, part 2 of the Ecodesign Directive, which are addressed to manufacturers, could contribute to market transparency, consumer awareness and incentives for innovation.
- However, the retail sector plays a crucial role for providing relevant information to the end-user, and the Ecodesign Directive does not provide the appropriate legal framework for ensuring that the relevant information is available for the end-user when purchasing decision is made.
- Therefore market transparency, consumer awareness and incentives for innovations would be created to a limited extent only, and improvements/innovations of energy efficiency would take place at a lower rate.

Therefore the option to establish only ecodesign requirements without establishing an energy labelling scheme is discarded, but the impact of ecodesign requirements will be discussed in the analysis of Option 5.

Option 5: combination of ecodesign requirements and energy labelling

This option means that ecodesign requirements would be set in an implementing measure pursuant to the Ecodesign Directive, in combination with an energy labelling scheme for TVs established by an implementing directive pursuant to the Energy labelling Directive. This option would imply the following:

- Ecodesign requirements ban the "worst performing" TVs from the market by ecodesign, and cost effective improvement potentials are realised for all products on the market, leading to an improvement of the energy consumption of TVs.
- The specific mandate of the Legislator is respected.
- The energy labelling scheme creates market transparency, fosters awareness of consumers and creates incentives for manufacturers for innovation.
- The combination of the two instruments implies that improvements which can be achieved with currently available cost-effective technology are fully captured, while incentives are

created to invest into new energy efficient technologies and their market penetration is fostered, thereby ensuring rapid market transformation.

- The functioning of the internal market is ensured by harmonised ecodesign requirements and a harmonised labelling scheme, and administrative burdens and costs for manufacturers are reduced compared to individual Member State action.

The following sub-section contains details of the rationale for the key elements of the corresponding ecodesign regulation and energy labelling directive, taking into account the provisions of Annex VII of the Ecodesign Directive and Article 12 of the Energy labelling Directive. The rationale is established on the basis of the preparatory study and the input from stakeholders. The ecodesign requirements correspond to sub-option 1 discussed in Section 5, which optimally fulfils the requirements of the Ecodesign Directive.

Definition of the TVs covered by ecodesign and energy labelling

The scope of the ecodesign implementing regulation and the energy labelling directive covers TV "sets" (display and tuner placed on the market together) and TV monitors (display only), while computer monitors are not included. The definition of computer monitor used to distinguish TV monitors from computer monitors is based on the "uniform application of the combined nomenclature"³².

Staged implementation of ecodesign requirements for TVs

Energy Efficiency levels

Minimum requirements for the on-mode power consumption and the standby/off-mode power consumption are set which are scheduled to come into force in two stages, as shown in the following table, where A is the screen area (in dm²)

<i>On-mode power consumption</i>	<i>Standby/off-mode</i>
<p><i>1 year after entry into force of regulation</i></p> <p>Resolution lower than full HD: $\leq 20 \text{ Watts} + A \cdot 4.32 \text{ Watts/dm}^2$</p> <p>Full HD resolution: $\leq 20 \text{ Watts} + A \cdot 1.12 \cdot 4.32 \text{ Watts/dm}^2$</p>	<p><i>1 year after entry into force of regulation</i></p> <p>Standby: $\leq 1.0 \text{ W}$ without display</p> <p>$\leq 2.0 \text{ W}$ with display</p> <p>Off-mode: 1.00 W</p>
<p><i>from April 2012</i></p> <p>all resolutions: $\leq 0.8 \cdot (20 \text{ Watts} + A \cdot 4.32 \text{ Watts/dm}^2)$</p>	<p><i>2 years after entry into force of regulation</i></p> <p>Standby: $\leq 0.50 \text{ W}$ without display</p> <p>$\leq 1.0 \text{ W}$ with display</p> <p>Off-mode: 0.50 W/0.30 W with/without "hard off-switch"</p> <p>Power management</p>

³² OJ C 332 of 30.12.2006, p. 7

These requirements aim at realizing the cost-effective electricity consumption improvement potential/level of ambition discussed in Section 2 for all TVs, while fulfilling the criteria for ecodesign implementing measures set out in Section 3. The requirements are set independent from the basic display technology, because

- the basic functionality of TVs does not depend on the display technology;
- the revised measurement standard assesses power consumption in a "fair" way for all display technologies;
- if requirements would be set for individual basic display technologies, the new display technologies such as OLED should be exempted, since no data is available for such technologies yet, which is not appropriate.

The first stage sets requirements for on-mode power consumption which do not correspond to the level of ambition outlined in Section 2 in order to avoid negative impacts on industry's competitiveness. This is further discussed in Section 5. The first stage foresees a distinction between the characteristics of the feature "resolution", which is a measurable indication of the picture quality. For resolutions lower than full HD, the requirements for on-mode power consumption are set at the current market average, but for full HD resolution is set at the market average of the full HD PDP TVs. This approach avoids, as required by Article 15 (5a) of the Ecodesign Directive, negative impacts on the functionality from the perspective of the user, while inducing significant savings in the first stage.

The second stage sets requirements for on-mode power consumption which correspond to the level of ambition. However, for full HD PDP TVs the stage 2 requirements cannot be achieved by current generation products, but, according to recent communications from manufacturers, substantial energy efficiency improvements for next generation TVs are expected in the short term.

The regulation sets requirements on the standby/off-mode power consumption, which replace the requirements set out in Regulation (EC) No 1275/2008 on standby/off-mode power consumption. The requirements have been introduced with a view to Recital (11) of Regulation (EC) No 1275/2008 on standby/off-mode power consumption, in order to further reduce the power consumption in standby/off-mode of televisions. The first stage of standby/off-mode requirements fully correspond to the requirements set out in the latter regulation. The second stage requirements become effective 2 years after entry into force of the regulation and largely correspond to the second stage requirements of the standby/off-mode regulation, but become effective approx. 1 ½ years earlier, and require a lower off-mode power consumption for TVs which do not have a "hard off-switch".

The schedule aims at providing appropriate transition periods for manufacturers to design/re-design models, while ensuring that TVs placed on the market during the time span between the first stage and the second stage realise a certain environmental performance.

In addition to the energy efficiency requirements for on-mode and standby/off-mode power consumption, a requirement for automatic power down is foreseen for stage 1, which is a TV specific equivalent to the requirement foreseen for stage 2 of the standby/off-mode regulation.

Measurements

Measurement methods

The appropriate method for measuring on-mode power consumption was developed by the International Electrotechnical Commission (IEC 62087), with subsequent adoption by CENELEC (EN 62087). The revised version of IEC 62087 was published recently.. It

provides an accurate measurement procedure for all display technologies (see discussion above). A mandate to the European Standardisation Bodies for a corresponding harmonised European standard will be given to the European Standardisation Organisations.

A mandate for the method for measuring standby/off-mode power consumption was given to the European Standardisation Bodies in the context of the standby regulation, and a corresponding standard is currently under development. It is expected that the result will build on the revised version of IEC 62301 to be published soon.

Verification procedure for market surveillance purposes

A verification procedure for market surveillance purposes has to be specified. Measurement uncertainties are foreseen which are lower than those provided in the current EN 62087, because it has been argued by several Member States that the tolerance foreseen for the first test leaves room for product design which could be systematically overstepping ecodesign requirements. The verification procedure should eventually be part of the European standard for measurement.

Information to be provided by the manufacturers

In order to facilitate compliance checks manufacturers are requested to provide information in the technical documentation referred to in Annexes IV and V of Directive 2005/32/EC on the on-mode and standby/off-mode power consumption.

Date for evaluation and possible revision

As argued above the appropriateness of ecodesign requirements should be re-assessed in short term. The main issues for a possible revision of the ecodesign regulation are

- the appropriateness of the levels for the ecodesign requirements for on-mode power consumption in the light of new technologies entering the market, and further development of "conventional" LCD and PDP technologies;
- the appropriateness of the product scope, in particular with a view to market developments such as "merging" of TVs and computers, and panels for non-consumer applications such as information displays in airports;
- the appropriateness of the environmental aspects covered by ecodesign requirements.

Taking into account the time necessary for collecting, analysing and complementing the data and experiences related to the second stage in order to properly assess the technological progress on the one hand, and the need to ensure timely entry into force of a revised measure, if appropriate, on the other hand, a review should be presented to the Consultation Forum beginning mid 2012 (3 years after entry into force of the regulation).

Interrelation with the ecodesign regulation for standby/off-mode

The ecodesign TV regulation sets requirements for the on-mode power consumption, thereby complementing requirements on standby/off-mode set out in Regulation (EC) No 1275/2008 on standby/off-mode power consumption. As argued above, it is appropriate to set requirements for televisions which are more ambitious than those set in the latter regulation. In order to ensure legal clarity televisions are exempted from the standby/off-mode regulation, and all requirements related to standby/off-mode power consumption are formulated in this regulation.

Dynamic energy labelling

Dynamic labelling is a key element of the SIP/SCP Action Plan. The label displays energy efficiency classes characterising the on-mode power consumption, an energy efficiency

ranking and numerical values for relevant parameters. The energy efficiency classes are defined on the basis of the ratio between the on-mode power consumption of an individual product, and the power consumption of the "market average model" with corresponding screen area, as described by equation (1). The ranking uses a bandwidth of 20%.

For the first stage the reference equation (energy efficiency index equal to one) corresponds to the step from energy efficiency class "E" to energy efficiency class "D". The A-G energy efficiency classes are updated two times by one class in steps of 3 years by one class. This approach is setting evolving benchmarks, which provide dynamic incentives for improving the energy performance and a mid-term legal framework for investment decisions of manufacturers.

The label is "language neutral", so that manufacturers may provide the complete label together with the individual product. This approach has been suggested by the manufacturers, and it reduces the burden for the retail sector. The size of the label has been chosen such that the label can be affixed to the front of the television without disturbing/annoying the customer.

SECTION 5: ANALYSIS OF THE IMPACTS

Given that options 1-4 have been discarded in Section 4, this option looks into the impacts of option 5. To this end an assessment of possible sub-options as regards the "intensity" of the ecodesign measure – the combination of the levels of requirements and the timing for the levels pursuant to Article 15(4f) of the Ecodesign Directive – is carried out, and the impact of a complementary energy labelling scheme is analysed.

The assessment is done with a view to the criteria set out in Article 15(5) of the Ecodesign Directive, and the impacts on manufacturers, including SMEs.

The aim is to find a balance between the quick realization for achieving the appropriate level of ambition and the associated benefits for the environment and the user (due to reduction of life-cycle costs) on the one hand, and potential burdens related e.g. to unplanned redesign of equipment for achieving compliance with ecodesign requirements on the other hand, while avoiding negative impacts for the user, in particular as related to affordability and functionality.

In a first step several sub-options for the intensity of ecodesign requirements for on-mode power consumption are considered, and the appropriate intensity which optimally fulfils the requirements of the Ecodesign Directive is identified. In a second step, the expected impact of the preferred sub-option by 2020 is analysed. The ambition of the ecodesign requirements for stages 1 and 2 has been defined above.

The following sub-options are considered:

- Sub-option 1: Stage 1 – effective one year after entry into force of the regulation; Stage 2 – effective on 1 April 2012; this sub-option corresponds largely to the scenario suggested in the working document presented to the Consultation Forum, but anticipating the effective date of the second stage by 9 months. The effective date of 1 April instead of 1 January better matches product cycles, because new models are typically placed on the market either in spring or in autumn.
- Sub-option 2: Stage 1 – effective one year after entry into force of the regulation; Stage 2 – effective on 1 April 2013; this sub-option corresponds largely to the scenario suggested in the working document presented to the Consultation Forum, but postponing the effective date of the second stage by three months in order to better match product cycles.

- Sub-option 3: ecodesign requirements of Stage 2 as shown in the table above becoming effective one year after entry into force of the regulation, without providing for a 2nd stage; this sub-option foresees that the level of ambition would be implemented with a transition period of one year.
- Sub-option 4: Stage 1 – effective two years after entry into force of the regulation, without defining a stage 2 in the first edition of the regulation; a second stage will be defined on the basis of updated data during a revision of the regulation approx. 4 years after entry into force of the regulation; this sub-option corresponds largely to the suggestion of EICTA expressed in the Consultation Forum, and foresees no stage 2.
- Sub-option 5: Stage 1 – one year after entry into force of the regulation; Stage 2 – beginning 2013, with Stage 2 setting ecodesign requirements for on-mode power consumption as under discussion in California for 2013 (25W + 1.86 A; screen size A expressed in dm²); this sub-option corresponds to suggestions made by Environmental NGOs in the Consultation Forum.

The impact of these sub-options will be considered both with and without an energy labelling, in order to

- verify that the requirements of the Ecodesign Directive are fulfilled,
- assess the impact of ecodesign, energy labelling, and the combination thereof.

As discussed above, it is foreseen to present a review to the regulation not later than 3 years after entry into force, and it may be that a revision sets ecodesign requirements which become effective before 2020. The aim is to analyse the impact the sub-options for those products affected by the ecodesign requirements set in the first edition of the regulation, because the impact of a revision cannot be quantified. The following approach is used to compare the sub-options:

- it is assumed that the regulation will enter into force in January 2010;
- in order to have a clear reference for the calculations, the scenarios are calculated for calendar years;
- it is assumed that revised ecodesign requirements become effective two years after presenting a review to the Consultation Forum;
- it is assumed that new ecodesign requirements become effective one year after stage 2 has become effective;
- the accumulated electricity consumption is considered for TVs placed on the market from January 2009 through December 2014, assuming a product lifetime of 10 years, and revised ecodesign requirements become effective in 2015; it will be argued in the next section that sub-option 2 should be implemented, and the electricity consumption of TVs in 2020 is estimated for sub-option 2, assuming that the tier 2 requirements are valid through 2020; this is a "worst case" estimate, because revised ecodesign requirements are expected to be more demanding than the requirements of tier 2, leading to a lower electricity consumption in 2020.
- the impact of the energy labelling scheme will be illustrated assuming an "optimistic" impact of 7% annual improvement of the average energy efficiency, and a "pessimistic" impact of 4% annual improvement of the average energy efficiency. This range corresponds roughly to the improvements observed for household appliances which are subject to energy labelling since the mid 90s.

In order to assess the impact of the sub-options, the following factors are taken into account:

Economic impacts

Costs:

- costs related to improved technology (e.g. for additional and/or more expensive components) and production, re-design of models not complying with the requirements, and supply chain
- assessment of conformity with ecodesign requirements and re-assessment of conformity with further requirements (safety etc.)

Savings:

- accumulated electricity cost savings until 2020
- annual electricity cost savings by 2020

Social impacts

- jobs related to the production of affected equipment and impacts on SMEs
- affordability of equipment

Environmental impacts

- accumulated electricity savings and reductions of CO₂ emissions until 2020
- annual electricity savings and reduction of CO₂ emissions by 2020

Economic impacts

TVs sold in the Community are largely produced by manufacturers based in Japan, Korea and the Community, which sell TVs produced both inside and outside the Community. All Community based manufacturer are SMEs (several thousand employees in total) which produce TVs in smaller volumes. The main components of TVs, the panels, are produced by six LCD panel and three PDP panel manufacturers. The panels are used by TV manufacturers both with and without own panel production. The European based manufacturers do not produce panels on their own, but acquire panels from panel manufacturers.

Costs related to improved technology and production, re-design and supply chain

In the following a semi-quantitative analysis is given. A fully quantified analysis cannot be given, because manufacturers, despite requested to do so, do not disclose cost figures. The following impacts are expected for the sub-options.

Sub-option 1

As shown by the preparatory study, the power consumption levels of stage 1 are achieved by readily available technologies, which lead to a reduction of the life-cycle cost of televisions from the end-user perspective for all current technologies, including full HD resolution technology for LCD TVs.

The additional allowance for full HD televisions for the first stage is introduced on the following grounds:

- the requirements of stage 1 without additional allowance cannot be achieved by current (1st generation) technology for full HD PDP technology;
- full HD PDP technology, which is the standard technology for large screen sizes, could disappear from the market, which would imply a negative impact on the functionality of TVs in contradiction to Article 15 (5a) of the Ecodesign Directive;

- therefore an additional allowance as contained in equation (2) is introduced (the rationale for the value has been discussed above).

The stage 1 requirements are not expected to require a generational change of technology, and the transition period of one year allows for adaptation the requirements within planned cycles of model changes. Therefore no significant additional costs are expected.

The stage 2 requirements correspond to the level of ambition for LCD TVs both with HD ready and full HD resolution, and for PDP TVs with HD ready resolution. The transition period is expected to be sufficiently long to allow for integrating possible adaptations to product design, supply chain and production lines into planned new generation design. No specific additional costs for complying with ecodesign are expected.

On the other hand, next generation full HD PDP panels are currently under development, According to manufacturers, the new generation panels will deliver important energy efficiency improvements, which achieve the levels of the stage 2 requirements without an additional allowance. One manufacturer has announced the market introduction for 2009/2010. The impact on the cost of full HD PDP TVs is not disclosed by manufacturers.

However, it may happen that not all of the three plasma panel manufacturers achieve compliance with the requirements during the foreseen transition period. Those manufacturers may choose to focus future investments on alternative technologies instead of further investing into PDP technology.

For CRT TVs, both the requirements of stage 1 and stage 2 are achieved by products on the market mid 2008 (see Annex II).

Sub-option 2

This sub-option implies that the second stage becomes effective one year later than foreseen in sub-option 1. Compared to sub-option 1 it is expected that it provides additional transitional time for PDP manufacturers to achieve compliance with the requirements. Furthermore, investments done in the past may provide a larger return, because "old" generation PDP technology could be placed on the Community market one year longer. However, this would affect a very small part of the market only.

Sub-option 3

Setting ecodesign requirements at the level of ambition with a transition period of one year would imply the following.

For LCD based TVs it is expected that un-planned generational re-design is required to some extent, because approx. half of the models do not achieve the requirements. In particular, there is a risk of shortages of LCD panels which ensure compliance with the requirements, which could lead to price increases for panels/TVs. It is to be expected that manufacturers which do not produce panels, but who do acquire panels from panel manufacturers, face difficulties with the supply of panels with required technology. This is particularly relevant for Community based SMEs, which produce in rather small volumes, and which, according to stakeholder feedback, expect competitive disadvantages because panel manufacturers may choose to use the panels required to achieve compliance preferably for their own brands and/or producers acquiring large batches of panels.

Current full HD PDP technology would not achieve the requirements. It is not known if the next generation full HD PDP technology would be available in time for complying with the requirements, which would imply losses of turnover/market share in the Community for the affected manufacturers.

Sub-option 4

This sub-option implies that no un-foreseen re-design is required, and no shortage of any component is expected.

Sub-option 5

This sub-option implies that ecodesign requirements for power consumption are approx 30%-40% below the level of ambition set out in Section 2, and almost all the models contained in the EICTA dataset would not comply with such a requirement, and no model with full HD technology (both LCD and PDP) would comply, see Annex II, in contradiction to Article 15, points (5a) and (5d) of the Ecodesign Directive. Therefore this sub-option is excluded and will not be further analysed.

Impact of requirement on standby/off-mode power consumption and automatic power down (prevailing over the requirements of the standby/off-mode regulation) The power consumption requirement for standby/off-mode corresponds to the power consumption requirement foreseen in stage 2 of the standby/off-mode ecodesign regulation. As underlined in the corresponding impact assessment, the power consumption level reduces life-cycle cost for the end-user, and the additional costs for manufacturers for improved technology are of order 1€. No additional costs for re-design are expected, because compliance can be achieved by a minor modification which can be accommodated into planned re-design cycles for TV models.

According to manufacturer feedback implementing automatic power down ahead of stage 2 of the standby/off-mode regulation does not imply additional costs because it involves a simple adaptation of software programming only.

Labelling

Feedback from Member States and manufacturers on the working document discussed in the Consultation Forum indicates a two-year period for upgrade of energy efficiency classes may be too short, and investments in design/production of a model achieving a certain energy efficiency class may not pay off, because a chassis/model is "downgraded" and, as a consequence, may lose market share too quickly. Therefore the frequency of upgrades is reduced and the period of validity of an energy efficiency ranking is extended to three years, in order to allow time for return on investment.

The mid-term target for the energy efficiency improvement to be achieved to qualify for the "best in class" A energy efficiency class remains unchanged as compared to the working document.

Costs related to assessment of conformity with ecodesign requirements and re-assessment of conformity with further requirements

In general assessing the conformity with ecodesign requirements implies costs for manufacturers. Based on stakeholder feedback it is estimated that the cost for assessing the conformity with ecodesign requirements (power consumption, ratio home/shop mode setting, standby/off-mode) of order 500€ (self-certification as foreseen by the applicable conformity assessment procedure) to 1000€ (external laboratory) per sample product/model.

In the case model has to re-designed to achieve compliance with ecodesign requirements, Furthermore, conformity with further applicable requirements ("Low Voltage Directive"³³, "EMC Directive"³⁴) may have to be re-assessed. It is estimated that assessing conformity with all requirements applicable to TVs (ecodesign, low voltage/safety, EMC) implies costs of order ten thousand EURO (external laboratory).

On the other hand, TVs are produced in large batches of thousands of products for each model, and the cost for assessment of conformity is insignificant compared to other cost-factors.

As far as energy labelling is concerned, the cost for manufacturers for attaching the energy label to a product is estimated to be of order 0.1€ per product. Some further costs related to the requirements for providing a fiche foreseen in the Labelling Directive may arise, but which are expected to be negligible (e.g. an additional page in the manual). No additional costs for conformity assessment arise because the data required for energy labelling has to be provided under ecodesign.

Accumulated electricity cost savings through ecodesign requirements

The accumulated electricity cost savings for the products placed on the market from January 2010 through December 2014 triggered by ecodesign requirements for on-mode power consumption only, depend on the timing of first and second stage. Qualitatively, the sooner ecodesign requirements become effective, and the sooner energy labelling is introduced, and the shorter the delay between first and second stage, the higher the accumulated electricity cost savings.

³³ Directive 2006/95/EC of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits, OJ L 374, 27.12.2006, p. 10.

³⁴ Directive 2004/108/EC of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC, OJ L 390, 31.12.2004, p. 24.

Table 2 gives an overview of on-mode electricity savings, the corresponding cost savings and avoided CO2 emissions:

	Accumulated electricity consumption (TWh)	Accumulated electricity savings (TWh)	Accumulated electricity cost savings ³⁵ (billion EURO)	Accumulated avoided CO2 emissions ³⁶ (Mt)
Baseline	674	-	-	-
Sub-option 1	591	83	12.5	34.0
Sub-option 2	614	60	9.0	24.6
Sub-option 3	550	124	18.6	50.9
Sub-option 4	665	19	3.2	7.8

Table 2: accumulated electricity and cost savings, and avoided CO2 emissions for the products placed on the market from Jan 2009 through December 2014 during their lifetime of 10 years for sub-options 1-4. Sub-option 5 has been discarded, see above.

Anticipating the effective date for requiring 0.5 Watt power consumption for standby/off-mode and power management compared to the standby/off-mode regulation will trigger additional electricity consumption savings. Assuming that the requirement of 0.5 Watt becomes effective in 2011 (TV regulation) instead of 2013 (standby/off-mode regulation), TVs placed on the market from 2010 through 2012 will consume approx. 3 TWh less electricity during their lifetime (assuming 20 hours in standby/off-mode per day). However, considering that some models are placed on the market already today with standby/off-mode power consumption lower than 1 Watt, the actual savings are somewhat lower and are assumed to amount to 2 TWh.

Additional electricity consumption savings are expected from anticipating the automatic power down requirement to become earlier than foreseen in stage 2 of the standby/off-mode regulation. An estimate of the electricity consumption savings cannot be given, because the impact depends on the consumer behaviour (no impact for users who usually always switch off the television when not viewing, energy savings expected for users who usually do not switch off the television when not viewing).

Administrative costs for Member States

The form of the legislation is a regulation which is directly applicable in all Member States. This ensures no costs for national administrations for transposition of the implementing legislation into national legislation.

The costs for carrying out the verification procedure for market surveillance purposes depends on the product price (assuming that an authority purchases the product sample), and the possible need for a second test on a sample of three additional products in the case that the

³⁵ Assumption: 0.15€/kWh (estimate for 2007 based on Eurostat data); assuming falling real electricity costs (see footnote 39) the resulting figures are slightly lower.

³⁶ see footnote 9; however, the specific CO2 emissions are predicted to decrease somewhat during that period and the resulting figures are slightly lower, see footnote 40.

power consumption levels established in the first test are excessive. The resulting costs are expected to be of order 10000 € maximum for testing conformity with ecodesign requirements only.

Social impacts

Jobs and impacts on SMEs

For sub-options 1 and 2 the risk of job losses is expected to be very low, because the staged approach is expected to allow manufacturers to adapt timely to ecodesign requirements. If PDP manufacturers choose to abandon PDP technology no job losses are expected, because all affected PDP manufacturers offer alternative technologies, which would replace PDP. In particular, no competitive disadvantages are expected for Community based SMEs, because no SME-specific disadvantages related to the supply of LCD panels providing characteristic required for compliance are expected.

Sub-option 3 implies the risk of competitive disadvantages for SMEs, and the risk that job could be lost cannot be excluded, because SMEs may not be able to achieve compliance with ecodesign requirements in time, and non-complying cannot be sold any more in the EU market.

Sub-option 4 does not imply any risk for job losses, including SMEs, because transition periods are sufficiently long to allow for timely adaptation to requirements for all models.

Affordability of equipment

In principle significant price increase due to technology required to achieve ecodesign requirements are not expected, and sub-options 1, 2 and 4 do not imply risks of shortages in the supply chain. Sub-option 3 may lead to shortages in LCD panel supply, and some price increase may occur. However, the TV market is very competitive, and prices are not expected to be change to an extent that affordability could be negatively affected.

Environmental impacts

The accumulated electricity savings and the reduction of CO₂ emissions depend on the timing. Qualitatively, the sooner the requirements become effective and the shorter the delay between first and second stage, the higher the accumulated electricity savings and the related CO₂ emissions. Therefore the positive impact of the sub-options is becoming lower for longer delays. The accumulated CO₂ savings for sub-options 1-4 are shown in Table 2 above.

Comparison of the sub-options

The following table summarizes the considerations on the impacts of the sub-options compared to the baseline scenario, and assesses them on a relative scale from 1 (bad) to 4 (good):

	Costs	Electricity/CO ₂ /electricity cost savings	Risk for Job losses in SMEs
Sub-option 1	3	3	3
Sub-option 2	4	2	3
Sub-option 3	2	4	2
Sub-option 4	4	1	4

Table 3: summary and assessment of sub-options 1-4 (sub-option 5 was discarded, see above)

It is concluded that sub-option 1 is the preferred option for the intensity of ecodesign requirements, achieving the appropriate balance between positive environmental impacts and electricity cost savings, and possible risks related to jobs and additional costs. Sub-option 2 would lead to lower electricity/CO₂/electricity cost savings, while implying somewhat lower burdens on manufacturers (in particular PDP). Sub-option 3 would lead to an increase of accumulated Electricity/CO₂/electricity cost savings, but would impose higher burdens on manufacturers with a risk of job losses of EU based SMEs. Sub-option 4 would impose lower burdens on manufacturers, while leading to low accumulated electricity/CO₂/electricity cost savings.

Annual electricity, electricity cost and CO₂ emission savings by 2020

Electricity savings

Figure 2 shows the development of the electricity consumption of TVs until 2020/2025:

- Implementing only ecodesign requirements according to sub-option 2 *only* would lead to an on-mode electricity consumption of 102 TWh by 2020, which is a reduction by 28 TWh compared to the baseline scenario (assuming that the stage 2 ecodesign requirements remain in force through 2020, see discussion above).
- Implementing energy labelling *only* would lead to an on-mode electricity consumption of 107 TWh/95 TWh by 2020 assuming an annual improvement of 4%/7%, respectively, which is a reduction by 23 TWh/35 TWh compared to the baseline scenario (assuming that the stage 2 ecodesign requirements remain in force through 2020).
- Implementing ecodesign requirements according to sub-option 2 *and* energy labelling would lead to an on-mode electricity consumption of 87 TWh/79 TWh by 2020, assuming an additional annual improvement of 4%/7% triggered by energy labelling, respectively. This is a reduction by 43 TWh/51 TWh compared to the baseline scenario (assuming that the stage 2 ecodesign requirements remain in force through 2020).

EU27 Electricity Scenarios 1990-2025 in TWh/year

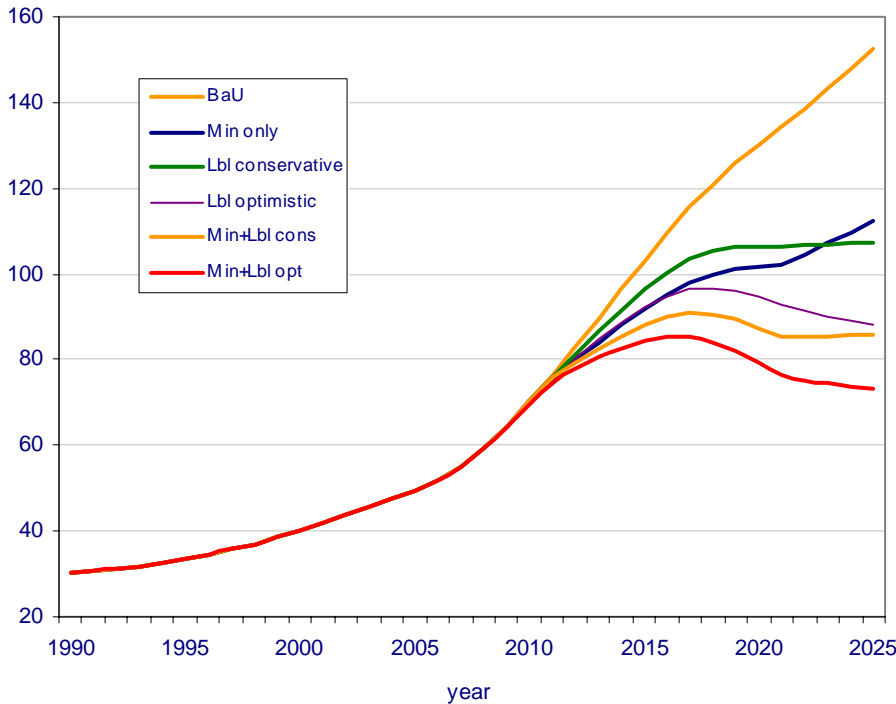


Figure 2: development of on-mode electricity consumption of TV for several scenarios until 2025: "BaU" - baseline; "Min only" – ecodesign requirements as in sub-option 2 only; "Lbl conservative" – energy labelling only, annual improvement 4%; "Lbl optimistic" – energy labelling only, annual improvement 7%; "Min + Lbl cons" – ecodesign requirements as in sub-option 2 and energy labelling with additional annual improvement 4%; "Min + Lbl opt" – ecodesign requirements as in sub-option 2 and energy labelling with additional annual improvement 7%.

Electricity cost savings by 2020

The annual electricity savings of 43 TWh/51 TWh expected by 2020 for the combination of ecodesign requirements and energy labelling correspond to savings of electricity costs of approx. 5.6 bln EURO/6.6 bln EURO, corresponding to annual savings of approx. 30€ per household.³⁷

Annual reduction of CO₂ emissions by 2020

The annual electricity savings expected of 43 TWh/51 TWh expected by 2020 for the combination of ecodesign requirements and energy labelling correspond to annual CO₂ emission savings of 15 mln/18 mln tons³⁸, and reductions of further electricity production-related environmental impacts (e.g. SO₂, NO_x, heavy metals).

³⁷ 210 mln households in EU-27, household electricity price 13 Cent/kWh (*European Energy and Transport, Trends to 2030 – update 2007*)

³⁸ assuming specific CO₂ emissions of 351 g/kWh in 2020, corresponding to a reduction by 14.3% from 410 g/kWh (see footnote 9), which approx. corresponds to the predicted decrease of CO₂ emission intensity of power generation (*European Energy and Transport, Trends to 2030 – update 2007*)

Impacts on trade

The process for establishing ecodesign requirements for TVs has been fully transparent, and after endorsement of the regulation by the Regulatory Committee a notification under WTO-TBT was issued.

Manufacturers affected by the regulation, in particular Community based SMEs, have not pointed out any risks of competitive disadvantages for exporting affected products to third countries.

SECTION 6: CONCLUSION

Following the principle of proportionality in the analysis effort, policy options 1 to 4 were discarded at an earlier phase of the analysis. The analysis of several sub-options for the intensity of an ecodesign regulation on the power consumption shows that sub-option 1 optimally fulfils the objectives as set out in Section 3. In particular, the regulation/sub-option 1 implies

- cost-effective reduction of electricity consumption related to on-mode power consumption, leading to a reduction of the electricity consumption by 43 TWh (more than the electricity consumption of Romania) to 51 TWh (approx. the electricity consumption of Greece) by 2020 compared to the baseline scenario, corresponding to electricity cost savings of 6-7 billion EURO, and 15-18 mln tons avoided CO₂ emissions;
- a quicker reduction of the electricity consumption related to standby/off-mode power consumption yielding additional accumulated savings of approx. 2 TWh, compared to the impact of the standby/off-mode regulation;
- correction of market failures and improvement of the functioning of the internal market;
- no significant administrative burdens for manufacturers or retailers;
- insignificant, if any, increase of the purchasing cost, which would be largely overcompensated by savings during the use-phase of the product;
- that the specific mandate of the Legislator is respected;
- incentives for manufacturers to innovate and invest into technologies with improved on-mode power consumption by the energy label;
- market transparency and easily accessible information provided by the energy label, fostering consumer awareness and facilitating consideration of electricity consumption when making the purchasing decision;
- a clear legal framework for product design which leaves flexibility for manufacturers to achieve the energy efficiency levels of the 2nd stage either in two steps, or earlier (before the 2nd stage comes into effect);
- costs for re-design and re-assessment upon introduction of the regulation, which are limited in absolute terms, and not significant in relative terms (per product);
- fair competition by creation of a level playing field;
- no significant impacts on the competitiveness of industry, and in particular SMEs due to the small absolute costs related to product re-design and re-assessment;
- a low risk for having negative impacts employment, in particular in SMEs.

SECTION 7: MONITORING AND EVALUATION

The appropriateness of scope, definitions and limits will be reviewed after maximum 4 years from the adoption of the measure (as required by Annex VII.9 of the Ecodesign Directive and laid down in the implementing measure). Account will be taken also of speed of technological development and input from stakeholders and Member States. Compliance with the legal provisions will follow the usual process of "New Approach" regulations as expressed by the CE marking.

Compliance checks are mainly done by market surveillance carried out by Member State authorities ensuring that the requirements are met. Further information from the field as e.g. complaints by consumer organisation or competitors could alert on possible deviations from the provisions and/or of the need to take action.

Input is also expected from work carried out with international partners, e.g. in the framework of the IEA Implementing Agreement for Energy Efficiency End-Use Equipment.

Annex I
Structure of the methodology used for establishing the technical, environmental and economic analysis

Following the "Methodology Study Eco-design of Energy Using Products" ("MEEuP"), the tasks listed below are carried out for developing the technical, environmental and economic analysis referred to in Annex II of the Ecodesign Directive:

Task 1: Product definition, existing standards and legislation

Task 2: Economics and market analysis

Task3: Analysis of consumer behaviour and local infrastructure

Task 4: Technical analysis of existing products

Task 5: Definition of base case ("average" model) and related environmental impact

Task 6: Technical analysis of best available technology

Task 7: Improvement potential

Task 8: Policy, impact and sensitivity analysis

Annex II
Power consumption vs screen area (EICTA data)

