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Accompanying document to the

Commission Regulation implementing Directive 2005/32/EC with regard to ecodesign requirements for simple set-top boxes

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EXECUTIVE SUMMARY

The Ecodesign Directive 2005/32/EC¹ establishes a framework for the setting of eco-design requirements for energy-using products. Eco-design requirements are legal requirements (under the Article 95 legal basis) to be met by products for being put on the market with the aim of improving their environmental performance while ensuring their free movement within the internal market. In accordance with the framework Directive, the Commission (assisted by a regulatory committee) shall adopt implementing measures setting eco-design requirements for those energy-using products which have significant sales volumes, a significant environmental impact and significant improvement potential.

These criteria are fully met by the simple set-top boxes (hereafter SSTBs) which have the primary function of converting digital input into analogue output signals. During the ongoing transition for analogue to digital broadcasting TV sets not adapted to receive digital signals will need to be accompanied by these devices. Up to 2015 when analogue broadcasting will be switched off in the EU the sales and aggregated energy consumption of SSTBs will dramatically increase.

The need to quickly come up with minimum energy performance requirements for these devices has been emphasised by the European Parliament².

The approach for developing the proposed regulation on SSTBs and this impact assessment was structured in the following four steps:

Step 1: assessment of the criteria for eco-design implementing measure set out in Article 15(2a)-15(2c) of the Ecodesign Directive, taking into account the eco-design 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 eco-design implementing measure as required by Annex VII by the Ecodesign Directive;

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

¹ Directive 2005/32/EC of the European Parliament and of the Council of 6 July 2005 establishing a framework for the setting of eco-design requirements for energy-using products and amending Council Directive 92/42/EEC and Directives 96/57/EC and 2000/55/EC of the European Parliament and of the Council, OJ L 191, 22.7.2005, p. 29.

² European Parliament resolution of 31 January 2008 on an Action Plan for Energy Efficiency

Step 1

In order to assess the criteria for ecodesign implementing measures set out in Article 15(2) of the Ecodesign Directive, the Commission has carried out a technical, environmental and economic study for SSTBs ("preparatory study") following the provisions of Article 15(4a) and Annexes I and II of the Ecodesign Directive.

With regard to the criteria set out in Article 15(2) of the Ecodesign Directive, the preparatory study³ has established the following results for the EU for SSTBs:

Article 15 (2a):	Annual sales volume in the Community:	90 million units in 2010 177 million units in 2014
Article 15 (2b):	Environmental impact: energy consumption of Simple STBs:	6 TWh in 2010 14 TWh in 2014
Article 15 (2c):	Improvement potential (applying cost effective existing technology)	0,5 TWh in 2010 9 TWh in 2014

The improvement potential is due to the fact that existing cost-effective technical solutions allow reducing significantly the electricity consumption of these devices. This is underpinned by the lack of correlation between the prices of different SSTBs having the same functionalities and their energy consumption.

The aggregated energy-saving potential for the years 2010-2020 exceeds the annual residential electricity consumption of Sweden and is therefore considered to be significant.

Step 2

As set out in Articles 15(2) and 15(4c) of the Ecodesign Directive, relevant Community and national environmental legislation are considered. Related voluntary initiatives both on Community and Member State level are taken into account, and barriers preventing market take up of technologies with improved environmental performance leading to a market failure are analysed.

At Community level the Joint Research Center (Ispra) of the Commission is running a voluntary Code of Conduct which sets energy efficiency criteria for SSTBs. This initiative has been very useful in providing the technical data for SSTBs but had a limited impact on the market due to a limited adhesion of manufacturers to this voluntary code.

At the level of Member States, the UK has been running an endorsement label programme for SSTBs managed by the Energy Saving Trust. This voluntary labelling scheme has had a limited impact on the market with few products meeting the criteria set under the scheme.

³ "Preparatory studies for Eco-design Requirements of EuPs –Simple Digital TV Converters (Simple Set Top Boxes)", MVV Consulting GmbH, final report of 17 December 2007; documentation available on the DG TREN ecodesign website http://ec.europa.eu/energy/demand/legislation/eco_design_en.htm

The Regulation implementing the Directive 2005/32/EC with regard to ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment⁴ would realise only a part of the energy-saving potential of SSTBs. This is due to the fact that this horizontal regulation would address only the power consumption of SSTBs in the standby mode and the timing for the entry of the different requirements set out in the 'standby' regulation would not allow capturing the biggest energy-saving potential linked to the use of SSTBs.

No other EU or national initiatives addressing the energy consumption of SSTBs have been reported.

Although the aggregated energy consumption of SSTBs at EU level is considerable, at the level of individual households they contribute only to a limited degree to the energy bill. For that reason consumers are focusing on the upfront price of SSTBs, and do not take into account their energy consumption throughout the life cycle. As a result, manufacturers have no incentive to reduce the energy consumption of these devices, even though this could be done at marginal additional cost (if any) to the manufacturer and would bring significant savings to the consumer and reduced CO₂ emissions. An additional element leading to the excessive power consumption of these devices is the fact that consumers have the tendency to leave them permanently in the 'active mode', even after having switched off the TV set.

Conclusion of Step 1 and Step 2

Over the coming years the amount of SSTBs sold in the EU and the associated energy consumption will grow rapidly. Existing cost-effective solutions that would allow reducing the energy consumption of these devices are not applied because of the market failure outlined above. The existing policy initiatives will have only a very limited impact on the environmental performance of SSTBs. In the absence of Community action, there is a risk that future initiatives at Member State level could hamper the free circulation of these products within the internal market.

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

Step 3

Annex II of the Ecodesign Directive stipulates that the level of ambition for improving the environmental performance of SSTBs, and in particular their use of resources such as energy should be determined by an analysis of the least life-cycle cost for the user of equipment. Furthermore, benchmarks for technologies yielding best performance, as developed in the preparatory study and the discussions with stakeholders during the meeting of the Ecodesign Consultation Forum⁵ on 22 February 2008 are considered. The results are reflected in the objectives that the implementing measure aims to achieve.

The objective of the proposed Regulation is to trigger the market transformation that would realise the improvement potential. In that context several policy options were considered, including self-regulation, mandatory energy labelling and mandatory minimum energy performance requirements. This is discussed in Section 3.

⁴ OJ L 339 of 18.12.2008, p. 45

⁵ The Consultation Forum is a balanced formation of the Member States representatives and of affected parties such as the industry, consumer and environmental NGOs called to express their views.

Due to the clear mandate of the Legislator for establishing ecodesign requirements for consumer electronics, 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 its key elements taking into account the preparatory study and the input from stakeholders. This is discussed in the second part of Section 4.

Step 4

An assessment of the proposed implementing measure is carried out. In particular, options for the timing of ecodesign requirements in several stages are analysed, taking into account the criteria set out in Article 15(5) of the Ecodesign Directive, and the impacts on manufacturers including SMEs. This is discussed in Section 5.

Conclusion on Step 3 and Step 4

A comparison of policy options and the input provided in the preparatory study and through the consultation process indicates that the appropriate option for realizing the improvement potential of SSTBs is a regulation setting ecodesign requirements for their power consumption and power management. The requirements of the regulation should be set in two stages, which become effective one year and three years, respectively, after the regulation has entered into force. This approach ensures:

- that cost-effective potentials to improve the electricity consumption of SSTBs are quickly realized, leading for the Community to important electricity and CO₂ savings, while reducing the life-cycle costs of these devices for consumers;
- The accumulated electricity consumption of SSTBs is reduced by approx. 47 TWh until 2020 compared to a business-as-usual/no-action scenario which translates into 7.2 billion EURO saved and 17 Mt of CO₂ abated ;
- The life-cycle cost of SSTBs is reduced by approx. 30%;
- a clear legal framework providing a level playing field for manufacturers, ensuring fair competition and free circulation;
- requirements for SSTBs are harmonized in the Community, leading to a minimization of administrative burdens and costs for the economic operators;
- that disproportionate burdens for manufacturers are avoided due to transitional periods which duly take into account re-design cycles;
- additional energy savings will be triggered outside the Community as these devices are traded globally and will be produced to identical specifications for other markets.

As indicated in out in Section 6, the monitoring of the impacts will mainly be done by market surveillance carried out by Member State authorities ensuring that the requirements are met. 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

The proposed implementing measure 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 requirements for energy-using products, 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).

External expertise on SSTBs was gathered in particular in the framework of a technical, environmental and economic analysis carried out by an external consultant on behalf of the Commission's Directorate General for Energy and Transport (DG TREN). On 22 February 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/EC⁶, foresees a regulatory procedure with scrutiny for the adoption of ecodesign implementing measures. If both the Article 19 Committee and the European Parliament give a favourable opinion on the draft implementing measure the adoption of the measure by the Commission is planned at the beginning of 2009.

Impact Assessment Board

The opinion of the Impact Assessment Board on the draft version of this impact assessment was issued on 19 June 2008 and stated the following:

- The impact assessment follows the requirements set out in the directive.
- The impact assessment needs to upgrade its appraisal of savings to be yielded and expected economic impacts, including effects on administrative burden.
- The impact assessment should provide clear evidence that the proposed timeline for implementation will deliver the identified saving potential.
- The interaction with the other policy instruments, such as the implementing measure on stand-by/off mode and WEEE/RoHS directives needs to be clarified.
- The impact assessment needs to provide a rationale for excluding more advanced set top boxes.

The re-drafted impact assessment took these recommendations into account as follows:

- The assessment of the benefits and costs has been further developed and substantiated. The impact on different cost factors and the expected administrative burden linked to market surveillance have been assessed.

⁶ OJ L 81 of 20.3.2008, p. 48.

- A detailed rationale for the timing and level of ecodesign requirements has been provided. The impact assessment explains the underlying methodology for the estimation of savings.
- The impact assessment provides additional information on the interaction of the regulation on SSTBs with other pieces of legislation, notably the WEEE Directive and the 'standby' implementing regulation under the Ecodesign Directive.
- The impact assessment indicates the reasons for excluding more complex set-top boxes from the scope of the regulation.

Transparency of the consultation process

The preparatory study has followed the structure of the ecodesign methodology⁷ (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. The SSTB preparatory study has been developed in an open process, taking into account input from relevant stakeholders including manufacturers and their associations, environmental NGOs, consumer 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 website⁸ 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 on 17 October 2007 for discussing the preliminary results of the study.

On 22 February 2007 a meeting of the Consultation forum was held. The Commission staff presented a working document suggesting ecodesign requirements related to SSTBs. One month before the meeting the working document was sent to the members of the Consultation Forum and to the secretariat of the European Parliament for information of ENVI and ITRE committees. The working document was published on the TREN ecodesign website, and it was included in the Commission's CIRCA system alongside the stakeholder comments received in writing before and after the meeting.

Outcome of the consultation process

The positions of the main stakeholders, as expressed before, during and after the Consultation Forum meeting on 22 February 2008 as a reaction to the Commission services' working document can be summarised as follows.

There was broad support for setting ecodesign requirements for SSTBs. Virtually all stakeholders indicated that the requirements proposed by the Commission should quickly enter into force (while taking into consideration the manufacturing and design cycle) in order to capture the energy-saving potential of these devices. During the study the industry confirmed that the technology for reducing the power consumption of SSTBs is available for integration by the planned deadline into these devices without additional cost.

⁷ Methodology Report, final of 28 November 2005, VHK, available on DG TREN and DG ENTR ecodesign websites

⁸ www.ecostb.org (not accessible anymore)

It was stressed that in order to ensure maximum compliance at an early stage, the measure should be kept simple and should focus on the key environmental impact of SSTBs which is the energy consumption in use.

There was broad support for the limit values proposed in the working document, although environmental and consumer NGOs indicated that these values should be even lower, and some Member States requested that the feasibility of attaining these levels should be carefully analysed⁹. Environmental and consumer NGOs claimed that requirements for both stages should be set sooner than as proposed in the working document; this was challenged by some of the experts and by the industry, which indicated that the legislator has to take into consideration the time needed for re-design, manufacturing, and shipment.

Several stakeholders pointed to the need of having a clear definition of these devices, differentiating them from devices performing more complex functions (complex set-top boxes/CSTBs) which may be regulated later in a separate implementing measure under the Ecodesign Directive.

Given the fact that consumers tend to permanently leave the SSTBs in the on mode, the proposed 'auto-power down' function was considered by stakeholders as an essential element of ecodesign requirements for this product group. The application of alternative design options, such as remote controls that turn off simultaneously both the TV set and the SSTB should be considered, if technically feasible and cost-effective.

NGOs claimed that the proposed requirements should include provisions on labelling, the mandatory installation of a 'hard-off switch' as well as design option improving the recyclability of these devices. Further details on these issues are given in Section 4.

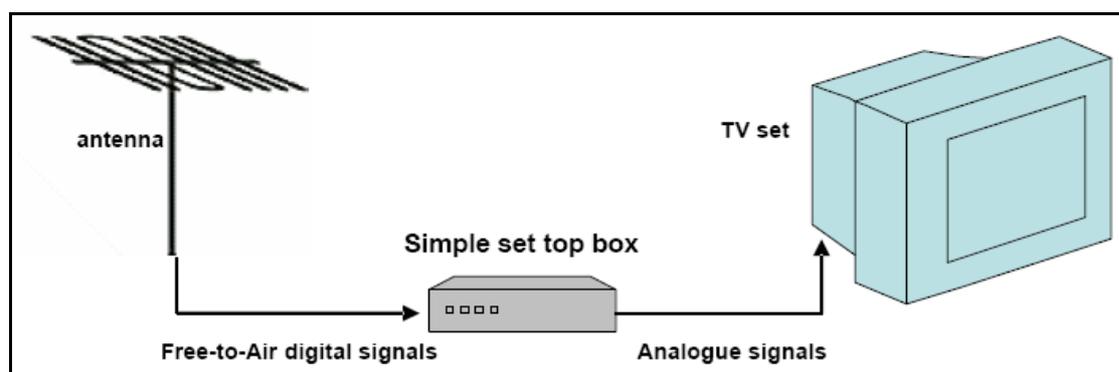
⁹ This has been done both in the framework of this particular preparatory study as well as the study on "EuP Lot 6 Standby and Off-mode losses", Fraunhofer IZM, final report of 2 October 2007; documentation available on the DG TREN ecodesign website http://ec.europa.eu/energy/demand/legislation/eco_design_en.htm

SECTION 2: PROBLEM DEFINITION

The underlying problem can be summarized in the following way: although technical solutions exist on the market leading to low power consumption of SSTBs without negatively affecting their functionality or cost, the market penetration of such equipment remains limited.

Market failure

The ongoing transition from analogue to digital broadcasting will bring several benefits to the consumers and businesses in the EU. Recognising these merits, the European Commission recommended that analogue signals be switched off in all EU Member States by 2012¹⁰. The current schedules indicate however that in several Member States, especially those that joined in 2004 and 2007, this process will not be finished before 2015. This process bears certain costs, such as the energy consumption of SSTBs. During the transition period and beyond, TV sets adapted solely to receiving analogue signals will need to be accompanied by special digital adapters, the so-called “simple set-top boxes”, which have the primary function of converting digital input to analogue output signals, but can also perform some additional functions such as the recording of broadcast into an integrated hard disk. As Member States will be successively switching off analogue broadcasting over the coming years, the amount of these devices will grow sharply until 2015. Beyond this date this number will start to decline and will probably go off the market after 2020, as old TV sets will have been replaced by new ones, capable of receiving digital signals.



Graph 1. Scheme of a simple set top box connected to an antenna and a TV set.

Because these devices have a simple functionality and relatively short lifetime consumers are focussing on purchase price while disregarding the running costs (energy consumption of SSTBs). Consequently over the past few years manufacturers have focused on driving down the cost of manufacturing, even though technical solutions to decrease the energy consumption of SSTBs could be applied at virtually no additional cost. Additionally, as consumers are not aware of the power consumption of SSTBs, they tend to leave them permanently switched on which leads to a substantial waste of energy.

¹⁰ COM(2005) 204 final

Baseline scenario for the electricity consumption of SSTBs

In order to carry out a technical, environmental and economic analysis the preparatory study had to provide above all the following elements:

- a set of definitions which would clearly differentiate SSTBs from other product groups, especially the Complex STB which shares several of its features;
- the installed base ("stock"), the annual sales, and the typical lifetime. Since EUROSTAT doesn't provide separate statistics for this particular product group, the figures have been established on the basis of data gathered from manufacturers and retailers. Estimates of market trends have been based on the EU analogue TV product stock that will need conversion to digital TV to access normal broadcasting services and data on the Community digital switchover programme;
- electricity consumption of SSTBs and usage patterns of these devices. The usage patterns are a key element for determining the gross electricity consumption of SSTBs, since consumers have the tendency to leave these devices permanently in the active mode. The figures in this impact assessment are based on the following assumption regarding the operating conditions of SSTBs: 14 hours/day in active mode, and 10 hours/day in standby¹¹;
- technologies yielding reduced electricity consumption and the additional costs for applying them compared to the current 'market average'
- potential trade offs between electricity consumption and material related environmental impacts. No such trade offs were identified;

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

On the basis of the above it has been established that the electricity consumption of SSTBs will sharply rise over the coming years as EU Member States will be switching from analogue to digital broadcasting. It is forecasted that the number of SSTBs in EU households will rise from 60 million in 2008 to 178 million in 2014 (table 1)¹². At this point the amount of SSTBs will start decreasing as old TV sets will be gradually replaced by new ones, capable of receiving digital signals.

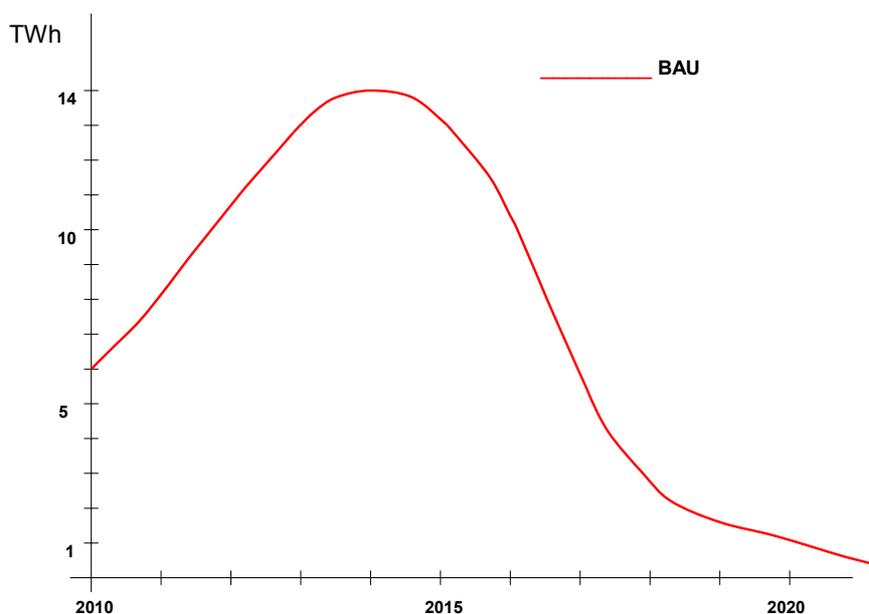
¹¹ These figures are an estimated average. Although it was impossible to establish the exact numbers, some consumer surveys showed that the majority of SSTBs are left 24h/day in the active mode. In that context that above figures have been estimated as a conservative, but realistic average.

¹² Here and in the following the aggregated EU figures are for EU-25 (data basis of the preparatory study); the figures for EU-27 are slightly higher.

Digital Terrestrial STBs EU 25 Totals			
	Sales	Replacement	Stock
Start			2.1
2000	1.0	0.0	3.1
2001	1.5	0.0	4.6
2002	2.5	0.0	7.1
2003	4.2	0.0	11.3
2004	6.2	1.0	16.5
2005	9.7	1.5	24.7
2006	12.5	2.5	34.7
2007	16.5	4.2	47.0
2008	19.7	5.2	60.5
2009	23.0	7.7	73.8
2010	28.5	9.0	89.8
2011	36.5	11.5	109.8
2012	35.0	13.2	125.1
2013	48.0	15.0	150.1
2014	56.0	17.5	177.6
2015	14.0	21.0	155.1
2016	12.0	15.0	132.1
2017	6.0	8.0	90.1
2018	2.0	6.0	36.1
2019	1.0	4.0	23.1
2020	0.0	2.0	11.1

Table 1. Expected market trends for Simple STBs in EU25.

Without taking appropriate policy measures the annual electricity consumption of SSTBs will grow from 6 TWh in 2010 to 14 TWh in 2014, when it will peak. From 2015 onwards the stock of SSTBs and the associated electricity consumption will sharply decrease, as old TV sets unsuitable for the reception of digital signals will be gradually replaced with new models. Beyond 2020 the electricity consumption of Simple STBs will be negligible (graph 1).



Graph 2. Baseline scenario for electricity consumption of Simple STBs

Improvement potential, level of ambition and benchmarks

The study identified that the best available technology allows limiting the power consumption of SSTBs with an integrated hard drive to 10 W in the on-mode and to 0.25 W in standby. In terms of energy efficiency this level is the benchmark for SSTBs. Fixing the requirements at these levels would however put excessive cost/price pressure on manufacturers and consumers without bringing proportionate environmental benefits. It has to be noted that the proposed limit values, 11 W for a SSTB with integrated hard disk decoding SD signals in on-mode and 1 W in standby (0.5 W in second tier) are just slightly higher than the identified benchmarks. This is possible thanks to the specificity of the consumer electronics sector, where design and innovation cycles are relatively short and the quality and price of technology is constantly improved. For example, low-energy hard disks which are for the moment too expensive for the SSTBs market will be massively integrated to these devices as of 2012 (when the requirements of their energy consumption are set to enter into force) due to decreasing prices. These levels and timing will allow to significantly cutting the energy consumption of these devices and their life-cycle cost (for details see Section 6). The timing for the introduction of requirements is therefore determined, on the one hand, by the availability of the technology necessary to significantly increase the energy efficiency of these devices without increasing their cost, and, on the other hand, by the need to capture the biggest saving potential which will occur between 2012 and 2016. The following table illustrates the saving potential by comparing the projected average power consumption of SSTBs placed on the market in 2012 with and without policy.

	No-policy (2012)		Policy (2012)	
	On-mode	Standby	On-mode	Standby
Simple STB	7 W	6 W	5 W	0,5 W
Simple STB with hard disk	25 W	6 W	11 W	0,5 W

Table 2. Projected electricity consumption of Simple STBs in 2012.

As the preparatory study demonstrated these 14 TWh in 2014 could be reduced in a cost-effective manner by a set of ecodesign requirements by 9 TWh, which represent a reduction potential of 64%, a saving of EUR 1.4 billion at today's electricity prices, and the abatement of 4 Mt of CO₂¹³.

It has to be stressed that out of the above 9 TWh, about 6 TWh would stem from reducing the power consumption in the 'standby' mode¹⁴. Although some of this saving potential would be realised through the horizontal Ecodesign implementing measure on standby which covers also these devices, the horizontal measure would have only a limited impact on SSTBs. This is mainly due to the fact the 'automatic power down' function, which is a key element for reducing the power consumption of SSTBs will be made mandatory under the 'standby' regulation only in 2013, whereas the regulation on SSTBs makes it mandatory already in 2010.

The estimated total energy reduction potential until 2020, when SSTBs will go off the market is 47 TWh More details are given in Section 5.

¹³ This is based on the following assumptions – 0.153 Eurocents per KWh 0.37 kg CO₂/KWh.

¹⁴ Calculations based on the assumption of an average 14 h/day in on-mode, and 10 y/day in standby.

The study indicated that there is potential for further reducing the environmental impact of SSTBs in what regards their recyclability, but at this stage due to the unavailability of appropriate technology, it is premature to set ecodesign requirements in that respect. It has to be also noted that this aspect is already addressed by the WEEE Directive¹⁵ which encourages manufacturers to reduce the weight of such devices and gives provisions for their collection and recycling.

Legal basis for EU action

The Ecodesign Directive 2005/32/EC and, more specifically, its Article 16 provides the legal basis for the Commission to adopt an implementing measure addressing the environmental impact of SSTBs.

SECTION 3: OBJECTIVES

The preparatory study has confirmed that a large cost effective potential for reducing the electricity consumption of SSTBs exists. This potential is not tapped due to market failure, as outlined above. The general objective is to develop a policy which

- leads to significant reduction of electricity consumption of SSTBs, improving the environmental performance of the affected equipment throughout its life cycle;
- ensures the free movement of affected products within the internal market.

The Ecodesign Directive, Article 15 (5), requires that ecodesign implementing measures meet all the following criteria:

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

¹⁵ 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.24-39.

SECTION 4: POLICY OPTIONS

Option 1: No EU action

This option is discarded for the following reasons:

- The market failure would persist as there are no existing or planned measures that would address it. Although the horizontal ecodesign implementing measure on standby/ off mode would address a significant part of the energy-saving potential of SSTBs, the remaining part would be left untapped.
- It that been signalled that in the absence of Community action, some Member States would want to take individual, non-harmonized action. This would hamper the functioning of the internal market and add administrative burdens for manufacturers and costs for consumers, in contradiction to the goals of the ecodesign framework Directive.
- The specific mandate of the Legislator would not be respected.

Option 2: Self regulation

This option is discarded for the following reasons:

- No initiative for self-regulation has been brought forward by the manufacturers of SSTBs¹⁶.
- The specific mandate of the Legislator would not be respected

Option 3: Energy labelling of simple set-top boxes

This option is discarded for the following reasons.

Two of the main objectives of labelling schemes (e.g. pursuant to 92/75/EEC) are to provide incentives for innovation and technology development, and to increase the market penetration of energy efficient products.

- The first aspect is not relevant, because technologies for reducing the energy consumption of SSTBs are largely available.
- As regards the second aspect, the impact of labelling could only be very limited. As was indicated before, consumers are not driven in their purchasing decisions of SSTBs by the energy consumption levels of these devices. With an ecodesign measure taking off the market the least performing products, there will be little variance between products in terms of their energy consumption, hence little room and sense of establishing a labelling scheme with different energy classes. Finally, the existing labelling schemes for SSTBs, such as the one run under the UK Energy Saving Trust proved that labelling of SSTBs had only a very limited impact on the market¹⁷.

The specific mandate of the Legislator would not be respected.

¹⁶ The Code of Conduct on the energy efficiency of Digital TV Service Systems, proposing energy efficiency performance levels also for Simple STBs has a very limited impact on the manufacturers of these devices. Additionally this cannot be considered as self-regulation.

¹⁷ www.energysavingtrust.org.uk

Option 4: Ecodesign implementing measure on simple set top boxes

This option aims at setting maximum power consumption levels for SSTBs and a requirement to install the 'automatic power down' function. This option would

- ensure cost-effective reduction of power consumption of SSTBs and related CO₂ mitigation
- correct a market failure and ensure proper functioning of the internal market
- not entail administrative burdens for manufacturers or retailers
- decrease the life-cycle cost of SSTBs for the consumer without reducing the profit margins of retailers/producers
- the specific mandate of the Legislator would be respected.

1. Definition of the EuPs covered and scope

The devices covered have the primary function of converting digital broadcast signals to analogue broadcast signals suitable for analogue TVs. The devices can have an integrated hard disc performing the functions of time shift and recording. The SSTB is fundamentally differentiated from other devices by the lack of the Conditional Access function. This function requires a paid broadcasting subscription and allows multiple interactive services associated with digital broadcasting, and entailing greater energy consumption. Devices having this function, the complex set-top boxes, may be covered under a separate implementing measure as the reduction of their environmental impact has to be achieved through a different set of ecodesign requirements, addressing namely the issue of the 'networked standby' power consumption.

2. Staged implementation of ecodesign requirements

Power consumption levels and their timing

The core element of the measure is the introduction, in two stages, of minimum energy performance requirements. The preparatory study has shown that the levels displayed in the tables below are cost-effective and can be achieved with current or expected state-of-the-art technology.

The requirements look as follows:

- a) One year after this Regulation has come into force, SSTBs placed on the market shall not exceed the following power consumption limits; SSTBs with an integrated hard disk and/or second tuner are exempt from that requirement:

	Standby mode	Active mode
Simple STB	1.00 W	5.00 W
Allowance for display function in standby	+ 1.00 W	–
Allowance for decoding HD signals	–	+ 3.00 W

- b) Three years after this Regulation has come into force SSTBs, placed on the market shall not exceed the following power consumption limits:

	Standby mode	Active mode
Simple STB	0.50 W	5.00 W
Allowance for display function in standby	+ 0.50 W	–
Allowance for hard disk	–	+ 6.00 W
Allowance for 2 nd tuner	–	+ 1.00 W
Allowance for decoding HD signals	–	+ 1.00 W

The energy consumption maximum limits are based on the function performed by a SSTB, with a basic allowance for decoding digital signals in standard definition (SD), and additional allowances for the integrated hard disk, second tuner (allowing to record and view programs at the same time), and the decoding of digital signals in high definition (HD), which requires more energy than decoding SD signals.

The proposed minimum energy performance requirements and the timing for their introduction have been set taking into consideration:

- The least life-cycle cost of the product in accordance with Annex II of Directive 2005/32/EC.
- The expected market and technology developments. The first requirements will be applicable one year after the measure has entered into force and will correspond to the availability of technologies (above all the higher integration of silicone) allowing for decreased energy use. The second tier requirements, set to apply three years after the measure has come into force, correspond to the expected entry into the market of technologies allowing reducing the energy consumption of and SSTB as well as the availability of low-cost, low-energy consuming hard disks which are integrated into SSTBs for recording.

- The time needed for manufacturers for re-design and manufacturing of new devices. This cycle is typically 18 months - although the first tier requirements will be applicable already 12 months after the entry into force of the measure. This is considered as realistic since the necessary technology will be available and cheap. It should also be considered that discussions with the affected industry started in 2007, and that by the time the Commission will have adopted the implementing measure, there will be additional delays stemming from translations, reinforced scrutiny procedure and notification to the WTO (to ensure that no barrier to trade is introduced). This timing allows capturing the biggest energy-saving potential, which will occur between 2012 and 2016.
- The requirements laid out in the horizontal ecodesign implementing measure on standby. The proposed second tier requirements for standby of SSTBs are set to be applicable one year earlier than in the horizontal measure on standby, as the re-design cycle of these devices is relatively short and the necessary technology will be readily available. Moreover SSTBs will have to be equipped with an 'automatic power down' function already in 2010, whereas this requirement will be applicable for the different product groups covered by the 'standby' regulation only three years later.

Further to the comments of several Consultation Forum members that the limit values could be more stringent, a second inquiry with manufacturers of SSTBs has been carried out. The inquiry has shown that the additional power allowance in the second tier for decoding HD signals can be reduced from 2 W (as proposed in the preparatory study) to 1 W, and the additional power allowance for integrated hard drive can be reduced from 7 W (as proposed in the preparatory study) to 6 W. These values, representing the least life-cycle cost and based on the availability of the necessary technology have been put forward in the draft implementing measure. Furthermore an inquiry into the recent developments has shown the necessity to introduce an requirement for the decoding of HD signals already in the first tier, as some EU countries will be providing free-to-air digital broadcasting already in 2010.

Automatic power down

Given the fact that consumers tend to leave the SSTB permanently in the on-mode the measure provides for the mandatory installation of the 'automatic power down' function one year after the entry into force of the measure. This requirement is strongly backed by both the findings of the preparatory study, and by stakeholders. As there are no cost-effective solutions allowing the set-top boxes to detect the operating mode of the TV set, the measure provides for the automatic switch to the standby mode 3 hours after the last user interaction with the device. A similar solution is also envisaged/used in other parts of the world (China, Australia) which should ensure greater compliance of these products with this particular ecodesign requirement.

Information to be provided by the manufacturers for the purposes of consumer information

The measure stipulates that manufacturers shall ensure that consumers of SSTBs are provided with the power consumption of SSTBs in order to allow them to make informed purchasing choices.

"Hard off switch"

In general a "hard off switch"¹⁸ can help to reduce the overall energy consumption of a particular product. This ecodesign option has not been however integrated into the measure due to its limited potential impact; users tend not to use the switch and the trend to miniaturise simple set-top boxes and locate them at the back of TV sets will only increase this tendency. Therefore the potential energy saving of this option could be only very limited and would hardly justify the additional hardware costs.

3. Ecodesign parameters for which no ecodesign requirements are necessary

In accordance with Directive 2005/32/EC and the methodology used in the preparatory studies, all environmental impacts of SSTBs have been considered. It has been concluded that the energy consumption in the use phase is, by far, the biggest environmental impact of these devices.

Other than energy-use, an environmental aspect of SSTBs which has to be considered is their recyclability. Indeed, beyond 2020 these devices will be no longer in use, and it can be assumed that due to their small size they may not be properly disposed. This aspect is to some extent covered already under the WEEE Directive. In accordance with this Directive, the main target of SSTB distributors/manufacturers is to reduce weight of these devices. Furthermore the Directive provides a labelling scheme which indicates with a pictogram how the SSTBs should be disposed (the 'crossed bin' symbol).

At this moment the possibilities to enhance the recyclability of SSTBs through better design are very limited. Although new, more environmentally-friendly PCB materials are very promising in that respect, they are in a development stage and, due to the length of the innovation cycle in the PCB sector, they will not be available in sufficient quantities over the next years for timely effects under this planned measure.

4. Measurement standard

Measurement methodology

Standard EN 62087 defines a method for measuring the power consumption levels of SSTBs. The underlying standard IEC 62087 is currently being revised and further improved, and its final version is not available yet. The regulation sets requirements on the measurement method to be used for conformity assessment, and the mandate to the European Standardisation Bodies will be issued within the shortest possible timeline.

Verification procedure for market surveillance purposes

It has been argued by several Member States that the procedure in EN 62087 (and EN 62301 in what regards the measurement of power consumption below 1 W as well as similar standards for energy labelling under Directive 92/75/EEC) leaves room for product design which could be systematically overstepping prescribed maximum consumption levels (energy efficiency grades in the case of labelling) by several percent. The tolerance for the first test of the verification procedure is therefore reduced from 15% to 10% for power consumption larger than 1 watt, and from 0.15 watt to 0.1 watt for power consumption equal to, or smaller

¹⁸ A switch on the product facilitating to disconnect it from the mains power source

than, 1 watt. The mandate for the measurement method mentioned above also addresses measurement uncertainties.

5. Information to be provided by the manufacturers in the technical documentation

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 in so far as they relate to the requirements laid down in this implementing measure. The mandate for the measurement method mentioned above also addresses a template for reporting relevant data.

SECTION 5: ANALYSIS OF IMPACTS OF THE PROPOSED ECODESIGN IMPLEMENTING REGULATION ON SIMPLE SET TOP BOXES

Given that options 1-3 have been discarded in Section 4, this Section looks into the impacts of option 4.

Intensity of the measure

The proposed ecodesign requirements aim at finding 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 for e.g. to 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.

Due to the specificity of the market for SSTBs which will peak between 2012 and 2016, the options available for the policy maker are limited. If the saving potential is to be captured, the relevant ecodesign requirements have to be introduced before this peak. It has been showed that the shortest possible deadlines for the introduction of such requirements are determined by the length of the design and manufacturing cycle, which for this product group is short, and by the availability and affordability of relevant technologies. The timing for the proposed requirements is based on these considerations. In what regards the second tier requirements, additional considerations were the expected entry into the market of low-cost, low-power consuming hard disks.

Levels of requirements are close to the current best available technology, but due to technological developments allowing reducing their energy consumption at virtually no additional cost, they will be possible to be met within the proposed deadlines.

Economic impacts

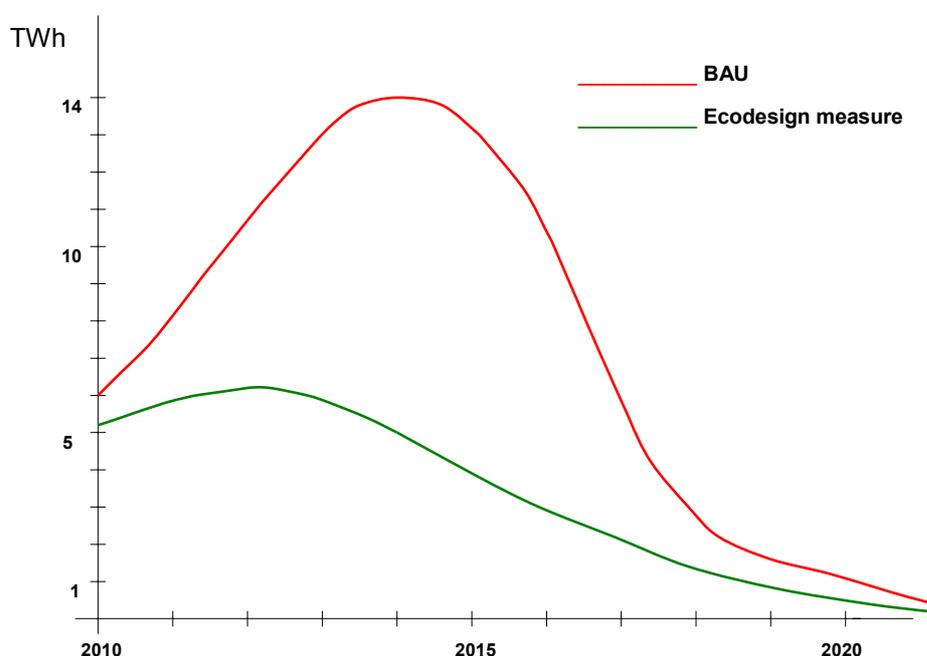
Life-cycle cost and additional costs related to the improved technology

As shown by the preparatory study, the timing and levels of proposed ecodesign requirements will allow manufacturers to minimise their cost. In fact, due to the availability of ever-cheaper technology the implementation of options to reduce power consumption are not necessarily connected with additional costs. Most importantly, the requirements laid down in the regulation will result in a significant reduction of the life-cycle cost for the affected equipment. While the purchasing prices of a SSTB would remain the same with or without regulatory intervention (typically EUR 50 for a SSTB and EUR 150 for a SSTB with an integrated hard disk), a set of ecodesign requirements could reduce the life-cycle cost

resulting from a reduced energy bill. For an individual consumer on average this will mean a lifecycle cost of EUR 58 compared to EUR 83 with no policy measure (EUR 175 instead of EUR 216 for SSTBs with integrated hard drives).

Accumulated electricity cost savings

Without taking appropriate policy measures the annual power consumption of SSTBs will peak in 2014 to attain 14 TWh. As the preparatory study demonstrated this could be reduced in a cost-effective manner through an ecodesign implementing measure targeting these devices by 9 TWh which together represents a reduction potential of 64% and a saving of EUR 1 400 million at today's electricity prices. Over 10 years following the entry into force of the measure the savings will have a normal (Gaussian) distribution with gradually increasing savings until 2014-15, and gradually decreasing ones beyond this period¹⁹. It can be foreseen that beyond 2020 the impact of this implementing measure will be negligible (Graph 2) with ultimately a likely repeal of the measure.



Graph 3. Scenarios for electricity consumption of Simple STBs

Cost– assessment of conformity with ecodesign requirements and re-assessment of conformity with further requirements

With the entry into force of new requirements, manufacturers need to adapt the design of products which do not yet comply. This in general implies the need for re-assessing the conformity of products with the legal requirements. The conformity assessment is usually part of the normal internal design control of the manufacturer (or management system as in Annex V of the Directive) to ensure that the product will meet the legal requirements. Only in exceptional case (to be justified as laid down in Annex VII of the Directive) can the

¹⁹ In 2010 when the measure is foreseen to enter into force to energy consumption is foreseen to be reduced from around 6 TWh to 5.5 TWh. In 2020 the reduction will be still considerable in relative terms (from around 1 TWh to 0.3 TWh), but in absolute terms, as the stock of these devices sharply decreases, the savings will be relatively low.

implementing measure require third party testing. The cost of assessing conformity of SSTBs is relatively small as this is a rather simple product group. Manufacturers have quoted the cost to be between EUR 500 and EUR 2000 depending whether the testing is limited to the power consumption or also includes all the other features of the SSTB. For the purpose of the requirements considered under this IA, a range between 500 and 800€ for conformity assessment of the power consumption can be considered realistic. Moreover:

- all manufacturers are affected by the need for a conformity assessment, because the regulation creates a level playing field;
- costs for assessing conformity as a consequence of re-design are occurring only once upon introduction of the regulation;
- manufacturers/importers of SSTBs already now have to assess conformity of SSTBs, compile technical documentation and affix "CE" marking therefore this particular measure will only marginally increase the cost of conformity assessment;
- cost of assessing conformity is not a direct function of the volume of production, therefore the cost for assessing conformity is proportionally higher for SMEs with lower sales. However the order of magnitude of the cost involved cannot be considered as affecting their competitiveness vis-à-vis high volume producing manufacturers;

Costs – re-design of products not complying with requirements

For products which do not comply with ecodesign requirements costs may arise for re-design due to additional costs for adapting production or administrative costs for re-assessment of conformity. The other cost factor – the cost of additional components – is not important in that case as within the indicated timelines the technology necessary to meet the requirements (software and silicon) will be available at virtually no additional cost.

It has to be noted that the redesign cycle in this product group is short therefore the changes in product design due to ecodesign requirements will be factored into the normal manufacturing cycle. Furthermore the re-design necessary to meet the requirements is not complex and costly. Manufacturers already now producing equipment complying with the requirements may have a, albeit small, competitive advantage.

Impacts on trade

The process for establishing ecodesign requirements for SSTBs has been transparent. Before the proposed regulation is adopted by the Commission a notification under WTO-TBT²⁰ will be issued. Competitive disadvantages for EU manufacturers exporting affected products to third countries are not expected due to the fact that the manufacturing of SSTBs in the EU is limited and addressed to the internal market. At the contrary, better performing devices at similar cost can give advantages also on third country markets.

²⁰ The Technical Barriers to Trade Agreement under the World Trade Organisation aims at ensuring that regulations, standards, testing and certification procedures do not create unnecessary obstacles.

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 for this product group can be estimated to be between 400 and 800€. In any case, it is to be expected that a product is tested not only for its conformity with ecodesign requirements, but also with further applicable requirements, and the part of the costs required for testing the power consumption of standby/off mode is expected to be small because the measurement is straightforward.

Conclusion

The proposed ecodesign requirements for SSTBs

- take into account the re-design and manufacturing cycle as well as the expected technology developments. This will guarantee that compliance with the regulation will not generate excessive costs to the manufacturers/importers;
- provide for a significant reduction of their life-cycle cost for consumers;
- ensure fair competition by creating a level playing field;
- have no impact on employment or trade.

Social impacts

Impact on the industry

In 2004 approx. 70% of SSTBs sold in the EU were imported, mainly from China, Thailand and Turkey. European manufacturing was concentrated in Portugal, Ireland and France, with the number of employed ranging in hundreds. This trend will continue, as EU manufacturers switch their production lines to more high-end products, and it is expected that by 2010 over 90% of manufacturing will be in East/South-East Asia. The proposed ecodesign regulation is not expected to have any effects on these trends. Furthermore the process for the setting of the legal requirement is very transparent, and provides time for adapting.

Impact on consumers

It is expected that the proposed regulation will have a positive impact on consumers reducing the cost of SSTBs over their life cycle by approx. 30%, with no loss of functionality and no impact on price/affordability.

Environmental impacts

The implementing measure on SSTBs is expected to lead in 2014 to a reduction of energy consumption from 14 TWh to 5 TWh (3 TWh stemming directly from this implementing measure and 6 TWh from the horizontal measure on standby). This equals to the abatement of 4 Mt of CO₂, and reductions of further electricity production related environmental impacts (e.g. SO₂, NO_x, heavy metals, nuclear waste). These benefits will peak together with the stock of SSTBs and will gradually decrease to vanish completely when these devices will be discarded beyond 2020.

As the vast majority of SSTBs sold on the EU market are imported it can reasonably be assumed that the requirements set in this regulation will impact on the design of equipment shipped to markets other than the EU, and the resulting reductions of environmental impact will be much higher than those estimated for the EU alone.

The fact that these devices will be discarded beyond 2020 presents a challenge with regard to their disposal, but there will be no options available to improve that through a better design within the timeframe considered for this measure and for the bulk of sales for this product. SSTBs are covered by the WEEE Directive which provides requirements for the collection and recycling of such devices.

SECTION 6: MONITORING AND EVALUATION

The main monitoring element will be the tests carried out for new product conformity. Products placed on the Community market have to comply with the requirements set by the proposed regulation, as expressed by the CE marking. Monitoring of the impacts is mainly done by market surveillance carried out by Member State authorities ensuring that the requirements are met.

The appropriateness of scope, definitions and concepts will be monitored by the ongoing dialogue with stakeholders and Member States. Input is also expected from work carried out in the context of upcoming ecodesign activities on further product categories, in particular the study on complex set-top boxes. Contributions are also expected from international cooperation as e.g. in the framework of the IEA Implementing Agreement for Energy Efficiency End-Use Equipment.

The main issues for a possible revision of the proposed regulation are

- the appropriateness of the levels for the specific ecodesign requirements
- the appropriateness of the product scope
- the possibility to enhance other environmental impacts than energy in the use phase

The second stage of the specific ecodesign requirements is proposed to become effective three years after entry into force of the Regulation. 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, a review can be presented to the Consultation Forum no later than 5 years after entry into force of the regulation.

Annex I

Minutes of the meeting of the Ecodesign Consultation Forum of 19 October 2007 as related to ecodesign requirements for Simple STBs

The Commission services presented the main aspects of the working document and the rationale of the approach for discussion (see presentation circulated together with these draft minutes). That was followed by a short overview of the written comments.

Definitions/scope

The definition should indicate that devices converting radio signals are also covered by the implementing measure (DE). The definition of standby will be aligned with the one laid down in the implementing measure on standby; the decision as to include or not the reactivation function (timer for recorder) in the power allowance for standby is still being considered (Commission services). According to NL this function should be included in the power allowance for standby. Simple STBs integrated into TV sets are not part of subject matter (Commission services). The definition should cover all Simple STBs irrespective of the interfaces used (SCARD, HDMI etc...) (MVV, authors of the preparatory study on Simple STBs).

Timing of implementation and staged requirements

There is a need to set first tier requirements as soon as possible, as of 2010 (FR, ENV NGOs). The proposed timing for requirements applying to Simple STBs decoding high definition (HD) signals and for Simple STBs with recording functions is based on the expected entry into the market of such devices (MVV, Commission services). Furthermore, requirements for standby are aligned with those laid down in the working document on possible ecodesign requirements for standby and off-mode. The fact that power consumption thresholds proposed in the working document are already fulfilled by products on the market indicates that the timing for power consumption requirements can be ambitious as the necessary technology is available at low cost (ANEC).

Limit values

There is a need to clearly formulate requirements for limit values, preferably in a table, with basic power consumption limit for SD (standard definition) and additional allowances for HD, second tuner and hard disk (DE, FR). Power allowance for hard disk should be 3 to 5 W, and not 7 W (FR). Even if 0 W in off-mode is not technically feasible at this stage, we should be aiming at achieving it at some point (DE). 0 W in off-mode is unrealistic as the function of electromagnetic compatibility always consumes a certain amount of energy (EICTA). Simple STBs are low-price devices, therefore the cost-effectiveness and simplicity of any ecodesign requirements has to be considered in order to avoid delay of the process; the implementing measure should focus on a limited number of requirements with the biggest potential (UK).

Automatic power down

The implementing measure should explicitly indicate that the automatic power down function is not optional (DE).

Technical solutions to reduce the 4 hours period before the device goes automatically into standby should be sought (ANEC). Such solutions do exist but are not cost-effective (Commission services, MVV). EICTA to provide information of the availability and cost-effectiveness of remote controls that switch off/on simultaneously both the TV set and the Simple STB. The automatic power down function should be active already when the box is delivered to the consumer (SE).

Hard-off switch

An ecodesign requirement to include a hard-off switch in Simple STBs would be cost-effective (ANEC). This technical solution would bring a significant increase of the prices of Simple STBs (ORGALIME), and its effect on consumer behaviour has so far been very

limited. Another argument against prescribing this particular solution is the tendency to miniaturize Simple STBs (Commission services).

Environmental aspects other than energy use

As many Simple STBs will be disposed soon after purchase, the measure should include provisions on recyclability and end-of-life (ENV NGOs). Some of these aspects are already covered under the waste legislation, particularly the WEEE Directive but improved recyclability through better design is always considered under the EuP process. The preparatory study did not provide evidence on the availability on the market of materials which would improve the recyclability of Simple STBs beyond the provisions laid out in existing Community legislation (Commission services). There should a coherence between the different policy instruments- requirements on information on waste should be set under WEEE, and on design under EuP (EICTA, ORGALIME).

Information to the consumer

Energy labelling is not the most appropriate policy option in this case due to the miniaturization of Simple STBs and the need to act fast (Commission services). Consumers should be provided information above all on how to dispose these devices (ANEC, ENV NGOs). If the current provisions in that respect are ineffective they should be reviewed, but as part of the WEEE process, and not EuP (ORGALIME).

Revision

There was a broad support for fixing the review date of the measure at 'no later than 5 years after its entry into force'. It was indicated that the ongoing preparatory study on Complex STBs will feed information also into this process. Revision may not be needed if simple STB would disappear from the market with the function being integrated in the TV set.

Consistency with Complex STBs: There is a need to ensure consistency between the two measures (NL, DE).

Annex II

List of stakeholders having participated in the Consultation Forum on 22 February 2008

- Austria
- Belgium
- Bulgaria
- Cyprus
- Czech Republic
- Denmark
- Estonia
- Finland
- France
- Germany
- Ireland
- Italy
- Lithuania
- Netherlands
- Poland
- Romania
- Netherlands
- Poland
- Romania
- Spain
- Sweden
- United Kingdom
- ANEC/BEUC
- CELMA
- Eceee
- ECOS
- EEB
- EICTA
- EPTA
- ECOS
- ORGALIME
- CELENEC

Annex III

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