

RICARDO-AEA

Impact Assessment Study for Sustainable Product Measures

Lot 3 – Sound and Imaging Equipment

(Reference: 84/PP/ENT/IMA/11/111131)



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Intertek

Report for DG Enterprise and Industry

Ricardo-AEA/R/ED57346:

Issue Number 1

Date 27/03/2013

Customer:

European Commission

Customer reference:

84/PP/ENT/IMA/11/111131

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Ricardo-AEA reference:

Ref: ED57346:- Issue Number 1

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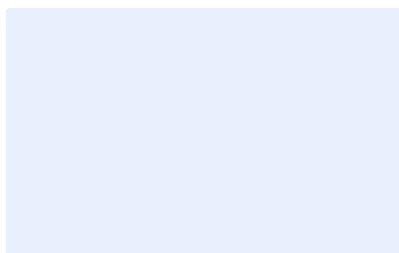
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Executive summary

The Ecodesign Working Plan for 2009-2011 identified "sound and imaging equipment" as one of the ten priority product groups. The Commission carried out a technical, environmental and economic analysis in preparation of these initiatives, via an earlier preparatory study¹. It identified three product subgroups: video players and recorders, projectors, and game consoles. The study concluded in 2010 that these products meet the criteria of Article 15 of the directive. They present a significant sales volume, have significant environmental impacts and energy consumption and present a significant potential for improvements.

Although efficient equipment and technical solutions exist within the sound and imaging product market, the market penetration of such products remains limited.

Barriers to the market uptake of more efficient sound and imaging products are largely due to the following problems:

- Market prices for electricity do not reflect the real costs and benefits to society
- Environmental performance has not typically been a decisive factor in purchasing decisions
- Incomplete information is provided on running costs and savings of energy efficient products
- Regulatory failure through poorly defined targets and objectives

In light of these problems, the Commission has identified a number of policy options, aiming to enhance market uptake of energy efficient sound and imaging equipment across the EU. The overarching objective is to develop a policy that corrects the market failures, and which reduces energy consumption and related CO₂ and pollutant emissions due to sound and imaging equipment. This needs to be achieved in a proportionate and cost-effective manner in line with the EU's environmental priorities, including those set out in Decision 1600/2002/EC and in the Commission's European Climate Change Programme (ECCP). Another objective is that the option promotes energy efficiency and hence contributes to security of supply in the framework of the EU's objective of saving 20% of the EU's energy consumption by 2020.

The sound and imaging group is composed of three different products: Games Consoles, Video Recorders/Players and Projectors. After a comprehensive consultation process, the following options were analysed for each product group:

Option 1 – Business as usual

Option 2 – Industry proposal (for Games Consoles)

Option 3 – Regulation

Option 4 – Energy Labelling

For games consoles, two additional options of Option 5 (Internationally Recognised Agreement) and Option 6 (EU Energy Star) were also assessed. The options were then subject to analysis to identify which are the most cost effective options.

The impact assessment analysis shows that for video recorders/players and projectors Option 1 (the business as usual approach) is the preferred option, since the sales and stock profiles for these products are in decline, and any intervention such as labelling or regulation comes with additional costs. For games consoles, Option 2 (the industry proposal) is the preferred option, subject to the proposal being compliant with Annex VIII of the Directive.

¹ See <http://www.ecomultimedia.org/>

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1 PROCEDURAL ISSUES AND CONSULTATION

1.1 Organisation and timing

In this work, the impacts of potential policy measures for sound and imaging products are assessed in line with Directive 2009/125/EC of the European Parliament and of the Council establishing a framework for the Commission to set Ecodesign requirements for energy-related products², hereafter referred to as the "Ecodesign Directive". An energy-related product (ErP), or a group of ErPs, shall be covered by Ecodesign implementing measures, or by self-regulation (cf. criteria in Article 19), if the ErP 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 legal framework governing the energy consumption of energy related products includes the Energy Labelling Directive, 2010/30/EU. The Directive builds on the assumption that the provision of accurate and comparable information regarding product energy consumption is a useful vehicle for informing consumer choices such that consumers select and buy better performing products. In turn manufacturers will respond by producing products with reduced environmental impacts. Compliance with the Energy Labelling Directive is mandatory.

The Commission has carried out a technical, environmental and economic analysis in preparation of these initiatives, hereafter referred to as the "preparatory study". The preparatory study was carried out by a consortium of external consultants³ on behalf of the Commission's Directorate General for Energy and Transport (DG ENTR). This study followed the structure of the "Methodology Study Ecodesign of Energy-using Products"⁴ (MEEuP) developed for the Commission's Directorate General for Enterprise and Industry (DG ENTR).

On 9 November 2012 a meeting of the Ecodesign Consultation Forum to discuss Sound and Imaging Equipment was held (details are provided below). This was preceded by a public consultation exercise from 5 October 2012 to 5 November 2012 to gather views and opinions concerning potential policy options.

1.2 Transparency of the consultation process

Stakeholder insights on sound and imaging products were previously gathered via the Lot 3 preparatory study. The study was developed in an open process, taking into account input from relevant stakeholders including manufacturers and their associations, environmental NGOs, consumer organisations, EU Member State experts, experts from third countries and international organisations for e.g. the International Energy Agency (IEA). The preparatory study provided a dedicated website⁵ where interim results and further relevant materials

² OJ L 285 of 31.10.2009, p. 10.

³ EuP Preparatory study "Building on the Ecodesign Directive, EuP Group Analysis (I), ENTR Lot 3 Sound and Imaging Equipment, Task 1-7 Report", AEA/Intertek, November 2010 documentation available on the DG TREN Ecodesign website http://ec.europa.eu/energy/efficiency/studies/ecodesign_en.htm

⁴ Methodology Report, final of 28 November 2005, VHK, available on DG TREN and DG ENTR Ecodesign websites

⁵ www.ecomultimedia.org

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. Open consultation meetings for directly affected stakeholders were organised in the Commission's premises in Brussels on 2 April 2009, 18 December 2009 and 14 June 2010 to discuss the preliminary results of the study.

At the Ecodesign Consultation Forum meeting held on 9 November 2012, the impact assessment approach, results of the written impact assessment consultation, and preliminary modelling results were presented. The games console industry also presented the "Industry Proposal" for a voluntary approach for game consoles. There were no working documents or industry agreements available to present for the video player/recorder and projector product groups. Stakeholder comments received in writing before, during and after the meeting are included in the Commission's CIRCA system.

1.3 Outcome of the consultation process

A public Stakeholder Consultation exercise, inviting the views of stakeholders on the Sound and Imaging Equipment Impact Assessment went live on 5 October 2012 and was open for four weeks, with individual product surveys for the three different sound and imaging product groups. The surveys included an assessment of policy options. A Consultation Forum meeting also took place at the European Commission's offices in Brussels on 9 November 2012.

Video recorders/players

The vast majority agreed with the policy options assessed, and agreed with those policy options that were discarded from further analysis. Just over half of respondents preferred the policy route of no action (but to re-evaluate the market in 3 to 4 years). Just under half the respondents preferred a regulatory mechanism. The exemption for high-end products was supported by the majority. There was general agreement in the consultation of a downward trend in the video recorder/player market overall.

Projectors

Nearly all respondents agreed that it was appropriate for the impact assessment to dismiss certain policy options. Overall, views on the need for policy action were mixed. Respondents' preferred policy route, by a slight margin, was mandatory ecodesign requirements (regulation). The next preferred route was the no action option. Labelling was not deemed appropriate. There was general agreement in a downward trend in the sales market for projectors reflecting a market shift towards large screen televisions.

Games consoles

The vast majority of respondents agreed that certain policy options could be dismissed. The need for policy action in Europe was questioned, with nearly three quarters of respondents stating there was no need. The preferred policy options, supported by the consultation, were the industry proposal, the International Agreement and Mandatory Ecodesign Requirements (Regulation). Industry respondents were, naturally, supportive of the industry proposed approach and levels, whereas NGO respondents suggested that regulation would deliver results more quickly and cost effectively.

Further details on the public consultation exercise and the Consultation Forum are contained in Annex IX.

2 PROBLEM DEFINITION

2.1 Introduction

Although efficient equipment and technical solutions exist within the sound and imaging product market, the market penetration of such products remains limited.

Sound and imaging equipment meet the criteria of Article 15 of the Directive. It presents a significant volume of sales on the market, has a significant environmental impact and energy consumption, and presents a significant potential for improvements. The preparatory study identified an estimated energy saving potential of around 15 TWh/year in 2020 for this product group. As requested by Article 15 of the Ecodesign of Energy Related Products (ErP) Directive, the Sound and Imaging Equipment preparatory study⁶ identified relevant environmental considerations. In order to carry out the technical, environmental and economic analysis the preparatory study considered representative models for a video player and a video recorder for home use, an LCD projector for office/school use, and a game console.

In particular the study provided the following key elements (amongst others):

- Power demand in the different operating modes (e.g. active/idle modes and low power modes) – although some updates to these figures has been necessary for the updated analysis;
- Typical usage patterns (also updated, in light of more recent industry and expert feedback);
- The bill of materials, weight fractions, packaging etc.;
- The installed base ("stock") and the EU27 annual sales for the period until 2020, and the typical life time (due to changes in the market, further updates were necessary for this analysis);
- Technologies yielding reduced electricity consumption and the costs effects for applying them compared to the current "market average".

The methodology structure of the technical, environmental and economic analysis for the Preparatory Study is displayed in Annex 1.

The study concluded that:

- These products have a significant environmental impact within the European Union
- There is potential for improvement without entailing excessive costs
- The following environmental aspects are relevant:
 - a. Energy consumption in the use phase; power management, and power demand in the different operating modes including fast-start functionality in Blu-ray players.
 - b. Production materials (Integrated Circuits, solder, copper wire etc. particularly in game consoles).
 - c. End of life waste.

The most significant aspect for improving the environmental performance of sound and imaging equipment is the in use energy consumption associated with the different operating

⁶ See <http://www.ecomultimedia.org/>

modes and power management. Further significant aspects are related to production materials and waste. Those aspects are already addressed by related EU legislation.

2.2 Product scope

Sound and imaging equipment is broadly defined as the range of products that allow the presentation of video images. To facilitate manageability of this study, three product groups are incorporated, covering video players/recorders, video projectors and video game consoles.

A **video player/recorder** is a standalone device that:

- Decodes video to an output audio/video signal
- Has no tuner unless it records on a removable media in a standard library format
- Is mains powered
- Does not have a display for viewing video

A **projector** is a mains powered, optical device, for processing analogue or digital video image information, in any, broadcasting, storage or networking format to modulate a light source and project the resulting image onto an external screen. Audio information, in analogue or digital format, may be processed as an optimal function of the projector.

A **game console** is a mains powered stand-alone device which is marketed as a product providing video game playing as its primary function through an external screen and which has the following features: mains powered, computer based hardware architecture, input devices (such as hand-held controllers), and optional secondary functions (such as media playback).

2.2.1 Preparatory study scope

More specifically, the preparatory study included the following products within the scope of Sound and Imaging equipment:

- **Video players / recorders:** including DVD players / recorders, Blu-ray (BD) players / recorders and hard disc drive (HDD) based devices.
- **Projectors:** including school projectors, office projectors and home cinema projectors
- **Game consoles:** including the following game console products:
 - Current generation consoles – Xbox360, PS2&3, Wii
 - Future game consoles 2012 launch,
 - Future game consoles 2017 launch.

2.2.2 Market developments impacting scope

Since the time of the preparatory study, developments in the **game console** market include changes to the expected launch date of the eighth generation of game consoles. Nintendo have confirmed the release of a new game console, the Wii U, to the EU market in late 2012. Sony announced the new PlayStation 4 in February 2013 whilst Microsoft is not expected to release a new console until late 2013 or early 2014. This delay in launching a new generation of game consoles has meant that sales of existing consoles have not tailed off as quickly as previously thought. There has been a continued growth in the usage of game consoles for functionalities other than gaming, such as video streaming, which is assumed will impact future use profiles. In addition the availability of motion-detecting peripheral devices (Kinect, Move etc.) is likely to have been responsible for expanding the potential audience for game consoles.

For **video players / recorders** the shift from disc-based systems to internet-connected systems⁷, means that a significant proportion of mains-powered devices are being replaced by battery-powered mobile devices. These are out of scope of this impact assessment, and are addressed under the Ecodesign Directive by the external power supply regulation. Any impacts of such a shift in terms of internet communication infrastructure power demand would not currently be picked up in ErP analyses. In addition, HDD-based systems are shifting from internal to external HDDs that could for example be USB powered. These are out of the scope of this impact analysis.

For **projectors**, more recent research has suggested that a large share of projector sales is now being replaced by sales of more affordable and equally bright LED backlit TVs – addressed via Commission Regulation (EC) No 642/2009. There is also a trend toward small mobile devices, potentially battery or USB powered, and therefore out of scope of this analysis. In addition, it is important to note that the highest efficiency lamps (mercury vapour UHP) are under pressure from eco-labelling schemes due to their mercury content. The RoHS Directive provides an exemption permitting the continued market presence of these lamps which remain amongst the most energy efficient in this application.

2.3 Market failures

Barriers to the market uptake of more efficient sound and imaging products are largely due to the following market failures:

PROBLEM	DRIVER
Market prices for electricity do not reflect the real costs and benefits to society ('externalities')	Not all environmental costs are included in electricity prices – therefore consumer (and producer) choices that are made on the basis of lower electricity prices do not reflect the environmental costs to society, meaning less than optimal social welfare may result.
Information failure - incomplete information on running costs/cost savings	Information on running costs/cost savings is not explicit and can be obtained only with difficulty. Generally, there is little awareness of the energy consumption and the associated costs. Power demands of computing components, such as CPUs and GPUs, are closely correlated to levels of computing performance. The higher power demanding products provide significantly more processing power and therefore require more power to deliver the higher level of gaming functionality.
Regulatory failure - Poorly defined targets and objectives	Sound and imaging products are included in the Standby and Off Mode Regulation (1275/2008/EC). An amendment to develop requirements for networked standby is underway by the Commission ⁸ . A draft Regulation proposing requirements was circulated 11 January 2013. Some of the proposed overarching standby requirements could provide disproportionately large allowances to game consoles – in particular for the high network and low network availability requirements. The current draft of the revised Standby Directive does not adequately distinguish between the type of network connections that would be considered “high network availability” and “low network availability” for game consoles. This

⁷ The transition to internet-based content will be limited due to infrastructure constraints in most regions of Europe. Whilst able to handle video-on-demand (VOD) in standard definition (SD) quality, these networks are unable to handle the bandwidth demands of high definition (HD) and 3D content. New (fourth-generation) terrestrial technologies such as LTE-A could fill this gap, but the potential level of uptake would depend on demand and availability of finance.

⁸ http://ec.europa.eu/enterprise/tbt/index.cfm?fuseaction=Search.viewDetail&Country_ID=EU&num=86&dspLang=en&nextpage=1&basdatedeb=&basdatefin=&baspays=&baspays2=&basnotifnum=86&basnotifnum2=&bastypepays=CE%20&baskeywords=&fromform=viewBasic

	<p>uncertainty and lack of stringency results in a risk that the revised measure will fail to have any impact on the networked standby modes of these products.</p>
<p>Efficient products carry a substantial additional price, yet environmental performance has not typically been a decisive factor for purchasing decisions</p>	<p>For projectors, whilst more efficient lamp systems exist (e.g. Modulated UHP) or are in development (e.g. LED/Laser) that could result in a step change in product energy efficiency, these efficient lamp systems would require an increase in product price that is disproportionate to the cost of energy that would be saved during the lifetime of the product. Typically a modulated mercury vapour UHP lamp system will have a lamp three times as expensive to buy as the metal halide or halogen discharge lamps they replace (e.g. €330 as opposed to €108 for a schools or office conference room projector). Their efficiency is of the order of 0.07 W/lumen whereas that for the market average product 0.13 W/lumen.</p> <p>For games consoles the key purchase driver is functionality (gaming experience) rather than environmental performance.</p> <p>Therefore there are insufficient drivers to support such a step change in energy efficiency and insufficient incentives exist for manufacturers to optimise the environmental performance of sound and imaging equipment.</p> <p>¹ See Section 5.1</p>

2.4 Related initiatives on European Union and Member State level

EU-level initiatives aiming to improve the environmental impact of products such as game consoles include legislation on waste ("WEEE")⁹, on hazardous substances ("RoHS")¹⁰, on standby/off-mode power consumption (Commission Regulation (EC) No 1275/2008), and on the power consumption of external power supplies (Commission Regulation (EC) No 278/2009).

The standby/off-mode Regulation requires that products within its scope (including sound and imaging equipment) have to comply with a maximum of 1 Watt in standby/off mode as of January 2009, decreasing to a maximum of 0.5 Watts in January 2013 (with some additional allowances available for extra functionalities). As noted above, a revision to address network standby is currently in-progress. For game consoles, the potential to remove these products from the standby regulation and address them in a console-specific initiative is considered.

For games consoles, including Network Standby requirements in the baseline has the effect of lowering total energy consumption of the product group from 2016. This reduction ranges from 10% to 15% compared to a future scenario that excludes network standby requirements. Including Network Standby requirements in the baseline is therefore reducing the overall energy consumption of the baseline, and is a noteworthy driver that is reducing baseline energy consumption. It is not however, having a highly significant impact on its own, and further policy measures can achieve more. Network standby accounts for estimated savings of 2.2 GWh per annum by 2025.

For projectors, the energy efficiency improvements created by Network Standby requirements would be expected to prevail in a baseline that excludes the requirements, due to existing lamp technology and movement towards 1W standby. Therefore, a baseline considering Network Standby achieves little improvement to energy efficiency than would be expected to prevail without Network Standby.

⁹ Waste Electrical and Electronic Equipment Directive, 2012/19/EU

¹⁰ Restriction of Hazardous Substances Directive, 2011/65/EU

The regulation setting requirements for the energy efficiency of external power supplies is less relevant to current products, as most power supplies used in these products are internal. However, future products may use external power supplies, so it is still taken into account in discussions.

Initiatives in related product areas involving industry include:

- EC code of conduct on energy consumption of broadband equipment
- Proposed voluntary industry agreement to improve the energy consumption of complex set top boxes within the European Union and the European Code of Conduct for Digital TV Services
- EICTA Industry self- commitment to improve energy performance of DVD equipment

In related product areas, there are also the following initiatives to consider:

- Draft regulation on Ecodesign requirements for computers and servers
- Simple Set Top Box regulation (EC No 107/ 2009)
- EU ENERGY STAR label addressing the energy efficiency of computers

In addition, there are also some requirements in national eco labels such as Blue Angel, TCO and the Nordic Eco-label addressing products such as video player /recorders and projectors.

2.5 Who is Affected and How

The parties who would be affected by new policy for sound and imaging equipment are business, consumers and policymakers.

Business would be affected because of the need to comply with policy requirements entailing possibly product redesign. There would be a need to provide documentary proof of compliance entailing product testing.

Consumers would be affected by any price increase associated with redesigned products – although they may realise a benefit from improved energy efficiency over the life time of the product's use.

Policymakers would be affected in the transposition of any regulatory changes. They would also be involved in the setting up and monitoring of any energy labelling scheme.

2.6 Baseline scenario

For the purposes of conducting the impact analysis, a baseline scenario (also commonly known as “No New Policy Action” or “Business As Usual” [BAU]) has been estimated for each product area within the Sound and Imaging Group. For projectors and game consoles the baselines are modelled separately but both include assumed mandatory Network Standby power demand requirements.

The combined electricity consumption of sound and imaging equipment is estimated to have been approximately 8,541 GWh in 2010 in the EU-27 (comprising of 3,947 for video players/recorders and projectors, and 4,594 for games consoles). By 2020 the electricity consumption for the three product groups is estimated to increase to 12,819 GWh in EU27 (comprising of 1,803 GWh for video players/recorders and projectors, and 11,016 GWh for games consoles). The assumptions for these figures are provided in Annex VIII; some of the figures on sales supporting these estimates are provided below.

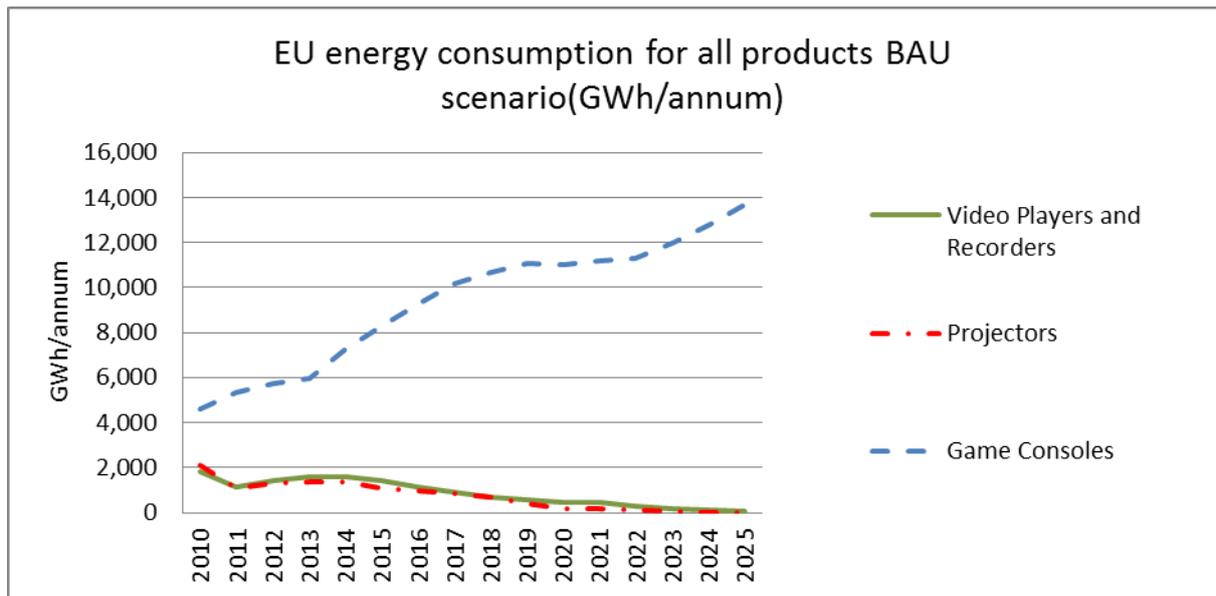


Figure 1: Business as Usual EU Energy Consumption for all Products

This baseline scenario is based on the following assumptions.

Sales:

- In 2010, game console sales were estimated to be around 17.7million. By 2025 it is predicted that this figure will reduce to around 9.8 million. Sales of the seventh generation of game consoles are starting to decline. However, this decline is not as rapid as previously thought due to new innovations such as motion controllers and improved video on demand technologies continuing to capture consumers’ interest.
- Predictions suggest that by 2025, there will be no new sales of Blu-ray players and recorders with 2 million Blu-ray players in stock. There are assumed to be no new sales of HDD or DVD players.
- Projector annual sales are expected to drop off to 1.62 million.

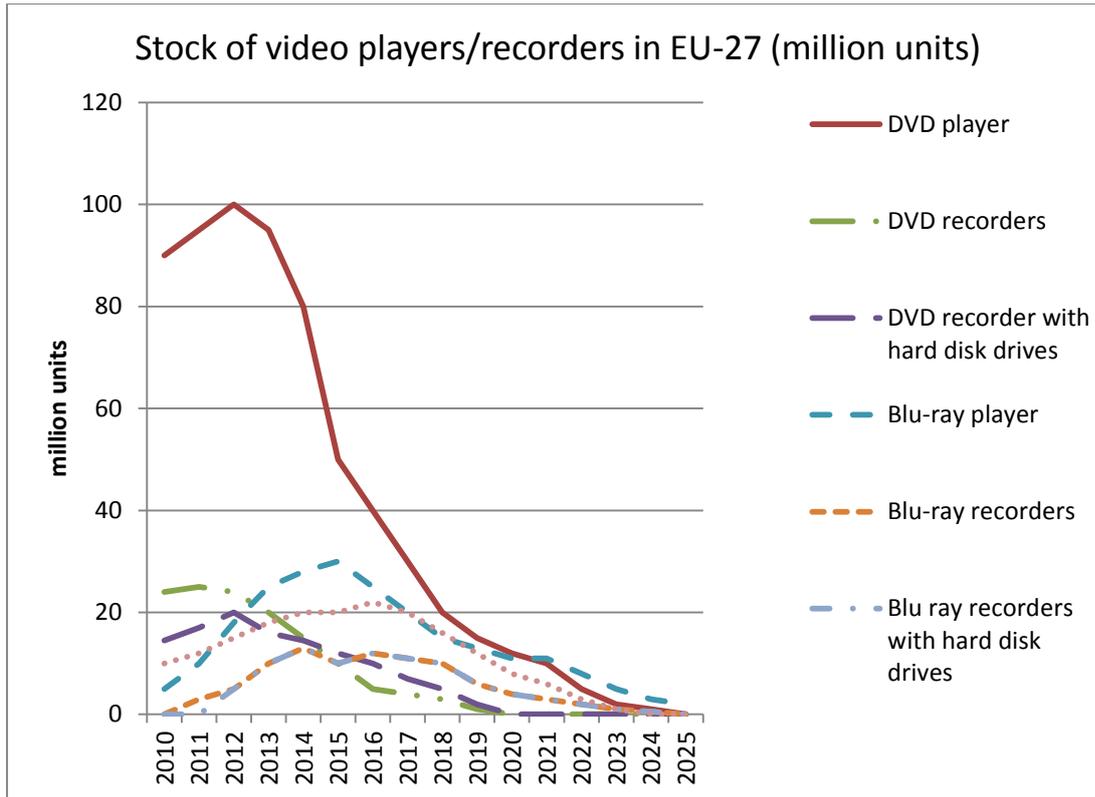


Figure 2: Stock of video players/recorders in EU-27 (million units)

In contrast to the Preparatory Study, there is now predicted to be a marked decrease in the market for video players and recorders. New services such as on-line streaming are rapidly replacing the ‘traditional’ products.

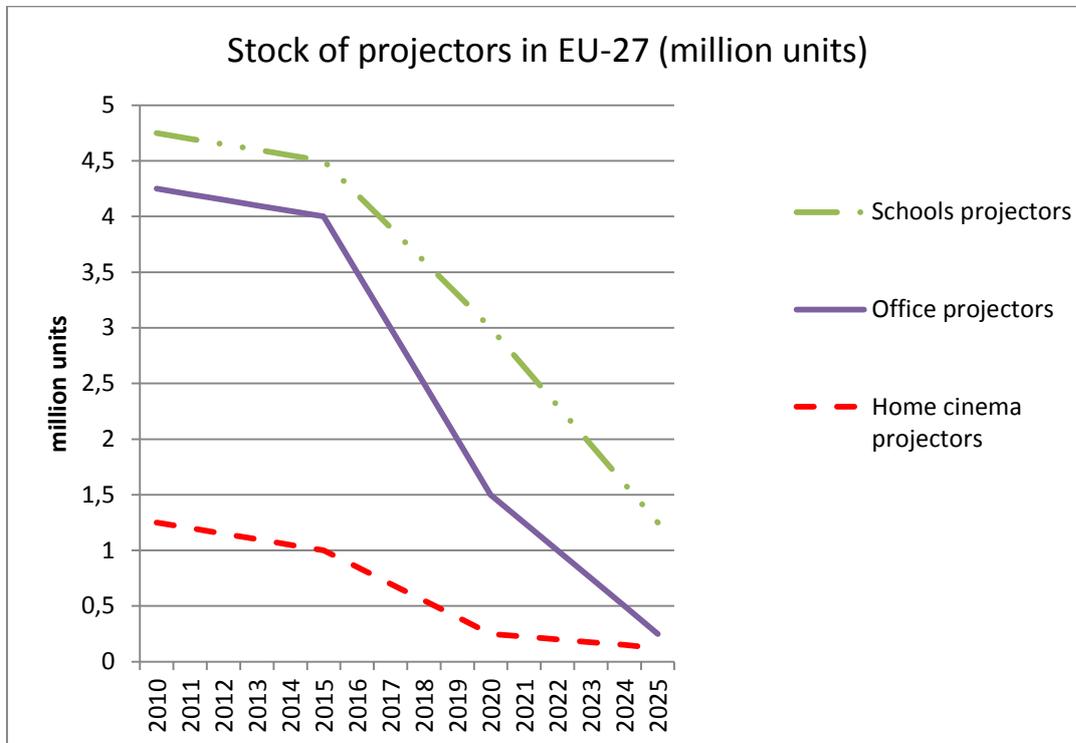


Figure 3: Stock of projectors in EU-27 (million units)

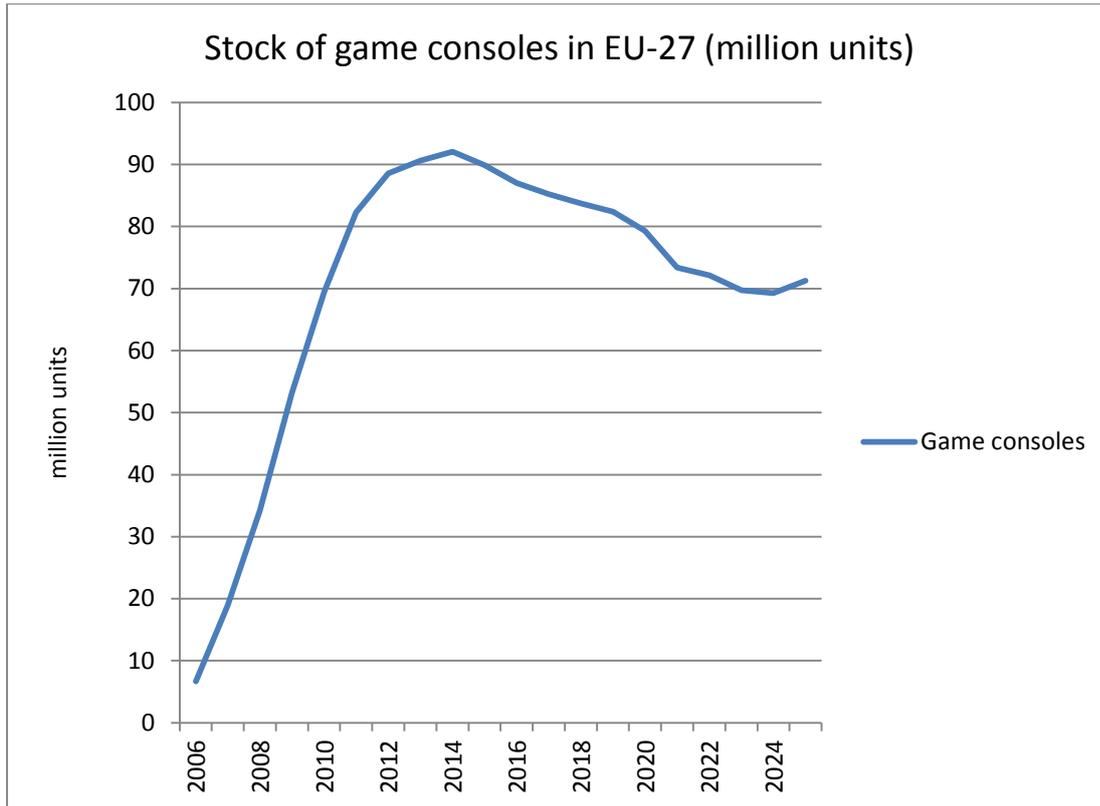


Figure 4: Stock of games consoles in EU-27 (million units)

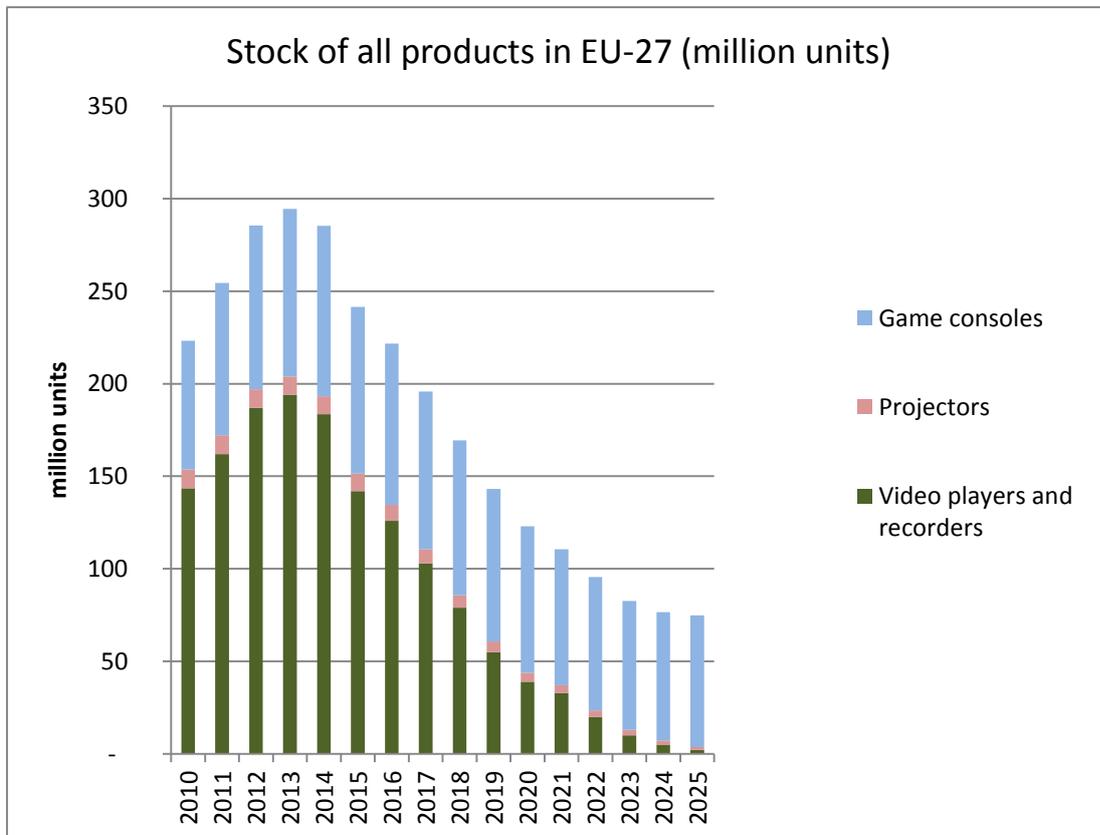


Figure 5: Stock of all products in EU-27 (million units)

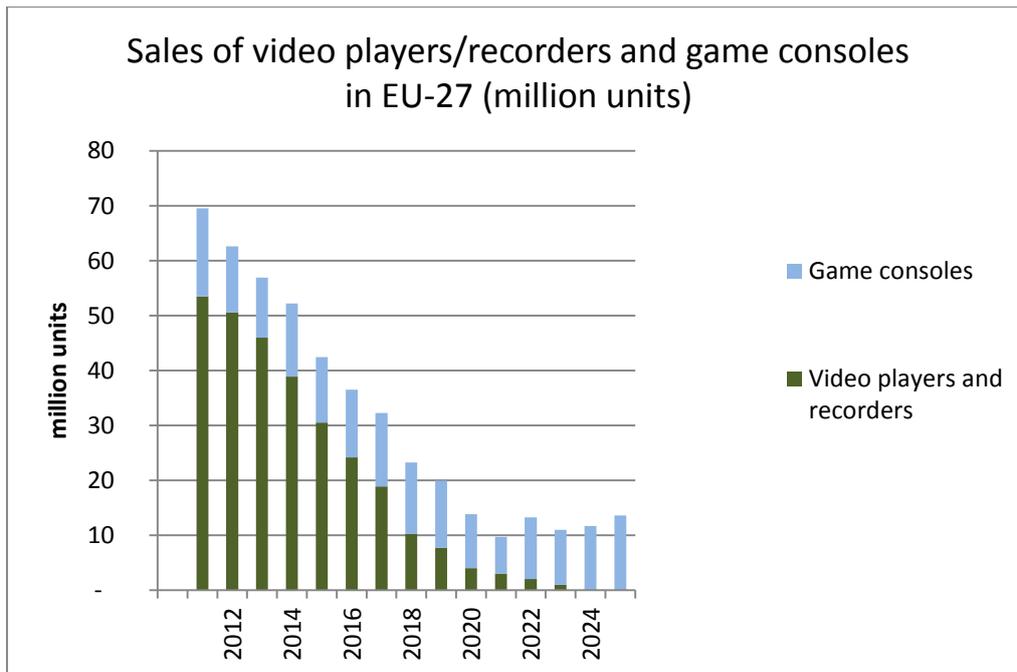


Figure 6: Sales of video players/recorders and games consoles in EU27 (million units), from 2011

**** Please note this diagram excludes sales of projectors as no future sales figures for projectors are available from industry experts, however experts note that projectors are expected to follow the same downward trend as video players/recorders**

Lifetime: The average economic lifetime is assumed to be 6 years for video players and recorders, projectors and game consoles. The main driver for replacement of game consoles is the release of a new generation of products (although the original console may still be retained for some time subsequently). For low-cost projectors, the replacement driver can often be lamp failure, although higher value projectors are often refurbished and have a secondary life of around 2 years (dictated by lamp life). For video players / recorders the main driver for replacement includes fashion and new technology trends.

Use: Game consoles with power management settings in place are assumed to spend on average around 22.0 hours per day in standby (or networked standby), 1.4 hours per day in active use and 0.60 hours per day in idle/inactive states. For non-power-managed consoles, an additional 0.4 hours in idle are assumed, with a corresponding reduction in time spent in standby¹¹. DVD/Blu-ray video recorders are assumed to spend 0.75 hours per day in a play mode, 0.25 hours per day in a record mode, 18 hours in standby, and the remaining time between on-idle and fast start modes. Projectors are assumed to spend different times in on- and standby- modes depending upon application (Home cinema 0.5 hours on, 20 hours standby, Office (portable) 1.5 hours / 0.8 hours, School 3 hours on-play mode / 4-6 hours standby).

Efficiency: It is assumed that the unit efficiency of the products covered will be increasing due to the Ecodesign regulation on standby/off mode and to a lesser extent external power supplies.

Materials: As no measures currently considered in this impact assessment place requirements on material aspects of products, material considerations are not included in the baseline scenario.

Auto Power Down (APD): This is a standard feature for projectors and video players and recorders and is included in the BAU usage profile. For game consoles, there is some potential for improvement in APD in the policy scenarios considered with shorter periods of inactivity before power down envisaged. APD functionality is expected to be included in all new generations of consoles launched to the market from 2012 onwards and is included in all current game consoles that support high definition media play back.

2.7 Justification for EU action

The Ecodesign Directive and, more specifically Article 16 provides the legal basis for the Commission to adopt an ecodesign implementing measure for sound and imaging products. Subsidiarity is the organising principle that a matter ought to be handled by the least centralised authority capable of addressing that problem. It is one of the central principles in the EU context, and it is therefore necessary to determine the rationale in this instance for intervention at an EU level. The market failures outlined above in section 2.3 are not specific to one individual country in the EU and are pan-European in scope; therefore it is proportionate and just for interventions at the EU level in this instance.

The subsidiarity test within pages 22 and 23 of the IA guidelines has been assessed.

2.8 Improvement potential

Approaches to reduce in-use electricity consumption of sound and imaging equipment include:

Game Consoles
<ul style="list-style-type: none"> – Reducing the power demand - standby, inactive/idle, or active use. – Increasing hardware flexibility to perform less computationally intensive tasks with some of the processing resources disabled – e.g. media playback is often much higher in game consoles than in standalone media devices. – Reducing the duration and frequency of auto-wake events such as in Wii- Connect24¹². – Implementing and improving auto power down functionality, to enable the console to automatically enter a low power state (normally standby or networked standby) if there is no user input for a predefined time.
Video Players / Recorders
<ul style="list-style-type: none"> – Changing the architecture to make the hard disk drive (HDD) external to the product (attached by USB). This reduces power consumption and enables sourcing of efficient HDDs. – Using energy-optimised chip sets (mass market only – not high end, which have multi-chip configurations). The highest integrated chip solutions (system on chip or similar) integrate all components of an electronic device into a single chip. This assists with lightweighting but may result in some waste implications as repair of single chip solutions is not possible. – Offering energy efficient quick-start modes, and quick-start not enabled as default.
Projectors
<ul style="list-style-type: none"> – Offering eco mode as standard available feature – Using more efficient lighting modules – Using optimised lens solutions – Using efficient light path beam splitting optics

¹² WiiConnect24 currently keeps a Wi-Fi data link active even when in standby, but this could be replaced by an intermittent connection.

The cost-effective improvement potential for sound and imaging products is complex to calculate. For example, the large variation in power demand during active use amongst the current game consoles on the market is primarily due to the amount of processing power provided by each product. Power demand is closely correlated to computing performance of the GPU and CPU due to factors such as increasing transistor numbers and frequency of operation. Higher power demanding game consoles (PlayStation and X-Box) offer significantly more processing capability and therefore require more power to deliver the higher level of gaming functionality.

For game consoles the variability in functionality and power demands through iterations of each model of game console needs to be considered, as well as future models of game console coming to market with unknown technical functionalities and power demands. This makes it difficult to identify an appropriate level of ambition for ecodesign requirements on power demand in the different operational modes. However, it is recognised that any requirements which force changes to hardware would have a disproportional impact on the current generation of Game Consoles on the market (if requirements were applied to those products).

Requirements on future game consoles are likely to have less of an economic impact if they are implemented prior to finalisation of the product design. At the same time it should be ensured that there is no negative impact on the functionality of the products in line with Article 15 (5a) of the Ecodesign Directive. To this end a solution, which optimally satisfies the provisions of the Ecodesign Directive is sought, taking into account any need for capability adjustments. Moreover, the appropriateness of the level of ambition should be reassessed in the short term, because new technologies may come onto the market that may drive the power demand of these devices up and may offer possibilities for additional power reductions.

In particular for projectors, the cost effective improvement potential may be minimal. Based upon a current assessment of available technology, whilst improvements in efficiency from current levels are possible, they are not possible within a low lifecycle cost solution.

2.9 Market Situation for Sound and Imaging Group

There are no EU manufacturers of game consoles, projectors or mass-market video players / recorders, although there is some small SME involvement in the supply chain and in high end video/audio products.

The estimated share of the EU market of the various game console manufacturers is as follows:

Manufacturer	2012 sales	2012 stock
Sony	40%	45%
Microsoft	33%	22%
Nintendo	27%	33%

The current generations of game consoles were previously manufactured in a range of locations such as Hungary, Mexico, Japan and China. However, virtually all console manufacturing (i.e. assembly) has now moved to mainland China. Manufacturers are currently moving towards the inclusion of more energy and cost efficient components. Of particular interest is the move towards architectures based on system-on-chip (SoC) solutions. The SoC solutions see the CPU, GPU, memory, and logic all placed on one piece of silicon and cooled by one heat-sink. This design results in less energy being used by the console during use and reduces costs for the manufacturer.

For projectors, the main brands are Epson, Sony Toshiba, Dell, Canon and Hitachi. Design is carried out mainly in America and Europe, by Japanese owned companies. Research and

development into DLP light engines is headed by Texas Instruments, whilst LCD light engine development is led by Canon and Sony.

Almost all mass-market video players/recorders (DVD/Blu-Ray), projectors and game consoles are assembled in China. High end video player/recorder products are made in Europe by SMEs, and there is some small assembly of pre-manufactured projector parts in Belgium and Germany. Integrated circuits and other components are produced mainly in South East Asia. Most components are manufactured in the following locations:

	Video player / recorders	Projectors	Game consoles
Component manufacture location	<ul style="list-style-type: none"> • Myanmar and China (Lenses) • China and Korea (trays) • China and USA (chips) 	<ul style="list-style-type: none"> • China 	<ul style="list-style-type: none"> • Canada, China, Singapore, South Korea, Taiwan, Thailand, USA (Microsoft Xbox 360) • Canada, China, Japan, Singapore, South Korea, Taiwan (Sony PlayStation 3) • Canada, China, Singapore, Taiwan (Nintendo Wii)

Video recorder manufacturing is declining. There is a shift toward separation of the hard/optical drive from the product – as has been observed in new generations of products released recently (which would no longer be classified as video recorders as a result).

In terms of the involvement of EU SMEs:

- There may be a small amount of EU based SME involvement in the game console manufacturing business. However, this involvement is minimal and so impacts on SMEs are also expected to be minimal. There may be more impacts on SME game developers in the EU if any power management requirements cause changes to be made in software coding.
- The main SME involvement related to projectors is in terms of installation for specialist applications, such as in schools and offices. However, these SMEs would not be impacted by the shift from projectors to televisions, as they would simply shift to installing the new product instead.
- High-end, high-quality video player / recorder products are made in Europe by a small number of SMEs for niche markets. The price level of these products is above €1,000 per device with no upper price limit. Manufacturing in Europe is below 5,000 units per year. Due to the small volumes, it is difficult for these SMEs to procure energy efficient chips (minimum order is 1 million pieces per lot), plus there are issues regarding the quality of energy efficient single chip solutions for the high-end market.

3 OBJECTIVES

The preparatory study confirmed that based upon the information available in 2009/2010, a cost-effective potential for reducing electricity consumption of sound and imaging equipment existed. The saving potential needs to be regularly assessed and updated for the years 2020 and 2025, since this product group is fast evolving. The overarching objective is to develop a policy that corrects the market failures, and which:

- Reduces energy consumption and related CO₂ and pollutant emissions due to sound and imaging equipment, in a proportionate and cost-effective manner in line with the EU's environmental priorities, such as those set out in Decision 1600/2002/EC or in the Commission's European Climate Change Programme (ECCP);
- Promotes energy efficiency and hence contributes to security of supply in the framework of the EU's objective of saving 20% of the EU's energy consumption by 2020.

The policy should specifically aim to:

1. Create incentives for manufacturers to design energy efficient models, thereby transforming the sound and imaging market towards products with improved energy performance,
2. Induce significant reductions of the environmental impact related to electricity consumption of these devices,
3. Induce cost savings for the end-user.

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

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

Focusing specifically on sound and imaging products, the objective is to consider how to implement cost effective improvement options while ensuring that:

- There is no negative impact on the functionality of the product (i.e. that a high-end product can still meet the requirements)
- The industry has sufficient time to redesign the products and place them on the market.

The chosen requirements will aim at realising the cost-effective electricity consumption improvement potential/level of ambition for all sound and imaging products, while fulfilling the criteria for ecodesign implementing measures set out earlier.

Monitoring of the objectives and the appropriateness of a self-regulation or of the requirements set out in any Ecodesign or Energy Labelling Measure will be regularly assessed. This monitoring assessment will be carried out by regular reviews.

4 POLICY OPTIONS

This section presents the range of policy options available per product group, after a short discussion regarding definitions, measurements and interrelation with other Directives.

Detailed technical definitions and specifications, drafted by the technical experts for the relevant modes for policy options are discussed further in Annex 2.

4.1 Definition of sound and imaging products covered by Ecodesign

The definitions of the preparatory study are assumed as follows:

For **game consoles**, these include mains powered stand-alone devices providing video game playing as the primary function through an external screen. Products with integrated screens, conventional PC operating systems or internal batteries for powering products over extended periods of time are excluded.

For **video player/recorders**, these are considered mains powered stand-alone devices whose primary function is to decode video to an output audio/video signal from recorded or recordable media via a powered or integrated media interface such as an optical drive, USB or HDD interface. Video recorders have no tuner unless it records on a removable media in a standard library format. Products with displays for viewing video or designed for a broad range of home or office applications are excluded as are products using external HDDs.

For **projectors**, these include mains powered, optical devices, for processing analogue or digital video image information in any broadcasting, storage or networking format to modulate a light source and project the resulting image onto an external screen. Audio information, in analogue or digital format, may be processed as an optional function of the projector.

4.2 Measurements

Game consoles: There are no internationally harmonised measurement methods for game consoles. There are two draft test approaches that have been discussed to date:

- The draft ENERGY STAR test method last circulated 10th December 2012: This methodology has not yet been formally agreed upon. Stakeholders were able to comment on the test methodology until the 11th January 2013. Latest indications suggest that the methodology will be finalised early in 2013.
- The NRDC authored test method circulated 15th October 2010. This has some level of industry support, and the PS3 and Xbox 360 console versions from spring 2011 have been tested using the procedure. However, this procedure was only intended as a basic precursor to the ENERGY STAR test method¹³.

Video player/recorders: The following measurement methods apply:

- EN/IEC 62301:2005. "Household Electrical Appliances, Measurement of Standby Power" provides a test method to measure the power consumption of a range of appliances in stand-by mode. Aside from the stand-by mode the test method is also applicable to other low power modes where the mode is a steady state or provides a background or

¹³ http://www.energy.ca.gov/appliances/2012rulemaking/documents/2011-08-31_workshop/proposals/Proposal_Information_for_Game_Consoles_TN-62462.pdf

secondary function. IEC 62087 (see below) specifies a range of modes for VCRs and similar equipment.

- IEC 62087:2008 “Methods of measurement for the power consumption of audio video and related equipment” specifies methods of measurement for the power consumption of equipment such as VCRs, DVDs, Set Top Boxes (STBs). It also defines the different modes of operation, which are relevant to power consumption.

For on mode and standby mode, the conditions and methodology quoted in IEC 62087 should be used. For metering both on mode and standby mode the methodology in IEC 62301 should be used.

Projectors: There are the following internationally harmonised measurement methods for projectors:

- IEC 61947-1 ed1.0 (2002-08): “Electronic Projection Measurement and documentation of key performance criteria Part 1 - Fixed resolution projectors” specifies requirements for measuring and documenting key performance parameters for fixed resolution projectors.
- IEC 61947-2 ed1.0 (2001-09): “Electronic Projection Measurement and documentation of key performance criteria Part 2 – Variable resolution projectors” specifies requirements for measuring and documenting key performance parameters for CRT and laser-based projectors and other variable resolution projectors that are capable of multiple variable resolutions and in which the image is raster-scanned.

4.3 Interrelation with other Ecodesign regulations

4.3.1 Ecodesign Regulation 1275/2008 for standby and off mode

Commission Regulation (EC) No 1275/2008 set minimum requirements for the standby and off mode electric power consumption of electrical and electronic household and office equipment. Requirements that when accepted will form an amendment to Regulation 1275/2008/EC covering network standby are under discussion and have progressed to the point whereby a draft amended Regulation was published 11th January 2013.

Game Consoles:

It is proposed to leave the scope and timing as in Regulation (EC) No 1275/2008.

- The off mode and standby limits already apply to game consoles and are suitable¹⁴.
- The network standby draft requirements will also apply to game consoles. There is less certainty whether game consoles will be covered by the “High Network Availability” or “Low Network Availability” requirements. The “High Network Availability” power demand requirements in network standby are likely to be significantly higher than the requirements for “Low Network Availability”. The Commission have provided some further guidance on the functionality that needs to be offered by equipment during network standby to be considered “High Network Availability”¹⁵. These functionalities include:

¹⁴ It is assumed that the off mode (when no network is active, no information display is present and no reactivation is available other than the physical pressing of a button) of game consoles likely meets the definition of “off mode” in the Commission Regulation No 1275/2008. Where a reactivation function is available (e.g. via the remote controllers) then this would be considered a “standby” in the Commission Regulation No 1275/2008. Therefore the off mode and standby mode of game consoles is likely already covered by an ecodesign regulation and so no further power requirements would be deemed necessary.

¹⁵ Explanatory Memorandum to COMMISSION REGULATION (EU) amending Commission Regulation (EC) No 1275/2008 with regard to Eco design requirements for standby, off mode electric power consumption of electrical and electronic household and office equipment and amending Commission Regulation (EC) No 642/2009 with regard to ecodesign requirements for televisions

- *Networked equipment with high network availability' (HiNA equipment): Equipment with one or more of the following functionalities but no other, as the main function(s): router, network switch, hub, modem, wireless network access point (not being a terminal), VoIP telephone, video phone;*
- *Networked equipment with high network availability functionality' (equipment with HiNA functionality): Equipment with the functionality of a router, network switch, hub, wireless network access point (not being a terminal) or combination thereof included, but not being HiNA equipment; (e.g. a Complex Set Top Box with integrated router)*

The "High Network Availability" requirements are unlikely to apply to current game consoles on the market which will more likely be covered by the "Low Network Availability" requirements. It is unclear whether or not future models of game consoles will include functionalities that would be considered to provide "High Network Availability". Given this uncertainty, all IA modelling assumes that current and future game consoles will use network functionality that meets the "Low Network Availability" definition.

Video Players and Video Recorders

- The off mode and standby limits likely already apply to these products and are suitable.
- The network standby draft requirements are likely to apply to these products and are likely to be suitable¹⁶.

Projectors

- The off mode and standby limits already apply to these products and are suitable.
- For network standby, the allowances in the current (11th January 2013) re-draft of the regulation may result in some design changes being required of projectors. The applicability of high or low network availability requirements will depend on the projector. It is unlikely that high network availability would be necessary based upon current designs - there is little necessity for these devices to wake rapidly due to the constraint of lamp warm up times of 15 to 30 seconds. However, in order to meet the potential low network availability requirements, manufacturers may be required to source more efficient power supplies, which from consultation industry has indicated they do not consider feasible. Therefore, a preferable approach may be to include a network interface that would enable projectors to retain existing power supplies but operate in a slightly higher networked mode that would be considered as high network availability, thus providing additional power demand allowance. Therefore, the network standby requirements may actually encourage manufacturers to make their products less energy efficient in networked standby modes.

Projectors are currently meeting the standby directive. Once networked modes are addressed, projectors would not be able to meet the currently proposed low network availability requirements without changes to power supplies that the industry claims it cannot feasibly make.

4.3.2 Ecodesign Regulation 278/2009 for external power supplies (EPS)

278/2009 would apply to sound and imaging products with external power supplies unless the external power supply is rated over 250W (which is possible, but unlikely, in future game consoles) as this is the cut-off power rating in 278/2009.

¹⁶ There are some players with network connection that source some data from an internet movie database, when the Blu-ray disk is playing. Energy consumption is very limited but network standby is not applicable as the process occurs in on-mode.

4.4 Game Console Policy Options

This section presents the range of policy options available for the games console product group. Included is a discussion of the purpose and motivation behind each option, before analysing the options in detail in section 5. A brief assessment of the option's likely impacts is also included, in order to screen the options and discard any that are non-viable at this stage from further analysis. This is a proportionate and best-practice approach to Impact Assessment.

4.4.1 Option 1: No new EU action/Baseline

Taking no new action at an EU level, would mean that the following barriers to improved energy efficiency would likely persist:

- Continued growth in game console usage for functionalities other than gaming, such as video streaming.
- Continued high power demands during use and inactive modes.
- Game consoles persist in a paused / idle / inactive state rather than entering sleep modes after a short delay time.
- Game consoles operating less efficiently than other products offering similar functionality (e.g. gaming notebook computers).
- The high-energy consumption of game consoles might receive media attention, and therefore Member States would want to take individual, non-harmonized action (such as Blue Angel requirements for game consoles). 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 provisions of the Directive would not be respected.

This option is included in the analysis for comparison purposes, in order to fairly compare policy options against one another. However, it is also a viable option in its own right, if other options are seen to be less desirable than the expected baseline.

4.4.2 Option 2: Industry Proposal

At the beginning of August 2012, the three game console manufacturers presented to the Commission a "Draft Outline proposal to further improve the energy consumption of Games Consoles". This draft industry proposal is silent on its purpose, and is not considered by the Commission as a 'Voluntary Agreement' ready for immediate recognition. However, it is sufficient to commence the evaluation of the admissibility of this initiative as an alternative to an implementing measure. The outline proposal can be found at the following weblink:

http://ec.europa.eu/enterprise/policies/sustainable-business/ecodesign/product-groups/sound-imaging/files/console_maker_proposal_en.pdf

The energy impacts of game consoles are not currently addressed through either self-regulation or mandatory requirements anywhere in the world, although there are discussions regarding self-regulation in Australia and New Zealand. Unlike European agreements, Australian agreements usually include penalties to manufacturers leaving the agreement.

The rationale for addressing the environmental impact of game consoles through self-regulation is underpinned by the following characteristics of this product group:

- The energy consumption of these devices is impacted not only by their design but also by the way that software interacts with the devices. There is potential to achieve additional improvements in the energy efficiency of game consoles through a close cooperation of hardware and software providers.
- The functions of these devices evolve in product generations released every seven years or so. Prior to launch of a new product generation, there is little information

- openly available regarding product attributes and energy performance – therefore a self-regulatory approach would provide a flexible means of defining the addressed parameters and setting applicable requirements.
- There are only three main console manufacturers (at the time of writing), which potentially facilitates monitoring and decreases the risk of 'free-riding' by a significant part of the sector.
 - There may be the opportunity to introduce requirements that would not be possible through more formal measures such as a regulation – for example, material-related requirements such as requiring active manufacturer engagement with the supply chain to ensure that minerals sourced (including gold, tantalum/coltan and tin) for use in game consoles are conflict-free.
 - Any industry proposal needs to be consistent with Annex VIII of the Directive.

4.4.2.1 Main elements

The document only applies to products consuming more than 20 watts in Active Game mode. The Auto Power Down requirements are similar to those discussed under ENERGY STAR, with a number of exceptions to allow leniency in various areas. To note, there would be no costs associated with changes to power management, a change would simply require a change to the power management settings. The specific requirements in the various operational modes are specified as follows:

Industry proposal	Tier 1 2013	Tier 2 2017
<i>Media Playback mode</i>	90.0W	70.0W
<i>Navigation mode</i>	90.0W	70.0W
<i>Networked Standby</i>	As ErP horizontal requirements (6W est)	As ErP horizontal requirements (3W est)
<i>Standby (only reactivation and indication of enabled reactivation)</i>	0.5W	0.5W
<i>Standby (information and status display)</i>	1.0W	1.0W
<i>Additional functionality allowance (NUI)</i>	20.0W	15.0W

The industry proposal includes a comprehensive approach to tackling the power demands of some of the main power modes found in game consoles. However, there are several aspects of the proposal which require additional investigation. For example, the power demand requirements on media playback are limited to certain media formats. It is of particular importance that any media playback offered at formats more advanced than 1080p would not be covered by the proposed industry power demand limits. This issue is especially important for future generations of game console which may offer media playback above 1080p as a standard feature.

4.4.2.2 Assessment against Annex VIII of the Directive

In line with Article 17 of the Ecodesign Directive “Voluntary agreements or other self-regulation measures presented as alternatives to implementing measures in the context of this Directive shall be assessed at least on the basis of Annex VIII”. As a basic condition, voluntary agreements under the Ecodesign Directive need a high level of environmental ambition and need to demonstrate that they are likely to deliver the policy objectives faster or in a less costly manner than mandatory requirements.

The industry proposal as it stands is not fully compliant with the following criteria annexed to the Directive (more details are contained in Annex VII of the Directive):

Added value: It is difficult to assess whether this requirement would be met as industry have been unable to provide power demand data for their next generation of game consoles.

Quantified and staged objectives: The industry proposal meets many of the requirements of the “qualified and staged objectives” criterion in that it covers a long time span, includes interim targets, and would facilitate relatively straightforward compliance monitoring. However, some important aspects of this criterion would not be met by the industry proposal. For example, it is difficult to assess whether or not the proposal is based on “scientific and technological background data” as no details are provided about how the power demand levels were decided upon. This criterion would not be met without further scientific and technological background data being provided to support the power demand limits listed in the proposal.

Monitoring and reporting: The proposal does not contain a “well-designed monitoring system” and so this criterion would not be met at present. It is likely that monitoring systems used in other voluntary agreements could be adopted, and if necessary altered, for use in any agreement on game consoles. Potentially there is a role for the newly formed CEN/CENELEC TC 100X committee to be involved in the definition of new measurement standards that themselves could form the basis of an international agreement.

There are a number of risks with this non-formalised industry-led approach as an alternative to ErP legislation. These include:

- The European voluntary approach is not legally binding (unlike the Australian approach to voluntary agreements) and does not apply penalties to manufacturers failing to comply or leaving the agreement. Manufacturers can choose to leave the agreement at any time. Particularly for game consoles – one manufacturer leaving or defaulting upon the agreement would mean a failure rate of 33.33% with clear implications for the agreement’s credibility.
- There is a risk that the requirements specified in the document do not result in any change in the market. As it is currently drafted, there is no clear commitment from manufacturers to meet the levels specified, with no legal structure for manufacturer representatives to sign. The text also allows for a number of innovation-related conditions in which requirements would not apply – for example:
 - There is a statement that if “it can be demonstrated that a specific requirement does not provide energy savings in the context of a new innovation” then requirements do not need to be met.
 - Another statement specified “To avoid stifling such innovation, any unanticipated additional functionality which consumes significant energy but which is not listed in this document shall be deactivated during the measurement process”.
 - There is an option to expand additional allowances for new features as these are developed.
- The Commission has less control over the mechanism if it is not Commission recognised. Under normal voluntary agreement arrangements, the appropriateness of the requirements would need to be re-assessed in the short term. The main drivers for a possible revision of requirements would be:
 - The appropriateness of requirement levels in light of new technologies entering the market.
 - The appropriateness of the product scope, in particular with a view to market developments such as increasing use of game consoles as media hubs.
 - The appropriateness of the environmental aspects covered by ecodesign requirements.

4.4.2.3 Conclusions

It is unclear whether it is the intention of the game console industry for this proposal to be upgraded to a voluntary agreement/self-regulation to be officially recognised by the Commission. The current proposal does not meet the criteria listed in Annex VIII of the Ecodesign Directive, including monitoring and reporting. However, this option is still considered as an option for the purposes of this impact assessment as compliance issues with Annex VIII could be discussed further if the option was seen as a desirable one from the impact analysis.

This option is retained and discussed in more detail in the impact analysis - Section 5.

4.4.3 Option 3: Mandatory Ecodesign requirements (Regulation)

This option aims at improving the environmental impact of game consoles by setting mandatory maximum power demand limits for a range of power modes.

The aim is to set power demand limits at a level that provides the highest energy savings while ensuring no negative impact on the functionality and affordability of the products. Levels suggested are largely based (for the first tier) on what is achievable by current product models, under the assumption that future designs will not perform worse than this level. Future, power demand requirements for the second tier are based on power demand levels noted in other products that provide similar functionalities (i.e. many gaming notebook PCs could already meet the tier II levels whilst providing gaming performances higher than those found in the current generation of game consoles. Other products on the market such as some video players/recorders could also already meet the tier II media power demand requirements). The aim regarding implementation timing is to ensure that the cost-effective potential is realised as early as possible while ensuring that the industry has sufficient time to redesign the affected products.

4.4.3.1 Main elements

There have been no draft regulations on which to base requirements. The preparatory study concluded that ecodesign requirements for 2014 could be specified as follows:

- Auto power down requirements (based upon a joint industry/NGO proposal)
- TEC requirements from 2014; or as an alternative to TEC requirements, sleep/standby mode power limits and idle power limits; or as an alternative to idle power limits, a requirement that system idle represents a significant (formula-defined) reduction from active game play power demand.

Based upon the preparatory study options, additional information, stakeholder comments and technical analysis, an assessment of the various potential criteria for inclusion in a regulatory measure has been carried out (see matrices of options for ecodesign criteria for games consoles in Annex 6). Three potential sub-options with varying thresholds for power demand/energy consumption¹⁷ and timings have been explored. One technically robust sub-option has been taken forward for assessment (see Annex 3 for detailed options for games consoles regulations).

The sub-option used for modelling purposes is outlined below. TEC based requirements have not been suggested as there is no agreement on the potential use profiles necessary to define this. In addition, use profiles of game consoles are likely to continue to change into the future as more functionalities are added to the products - making any chosen use profiles obsolete.

This option can be summarised as follows:

¹⁷ According to documentation from Australian discussions with industry, there is industry alignment on definitions of the following modes and ways to measure power use in each mode: navigation, media, active gaming, network standby, standby mode.

- Requirements that are considered feasible within a least life cycle cost (LLCC) approach, including on mode requirements for which an internationally approved test method is not yet available (although draft test methods for all measurements are available).
- Limit values for the various accepted idle modes (navigation idle and video stream play) in two tiers – 2014 and 2017¹⁸
- Requirements for Network Standby in two tiers.
- Requirements in off mode in one tier.
- Power supply efficiency requirements
- Power management requirements around industry proposal to enter a sleep state in 1 hour.

Regulatory sub option X	Tier 1 2014	Tier 2 2017
<i>Media Playback mode</i>	70.0W	50.0W
<i>Navigation Mode</i>	70.0W	50.0W
<i>Networked Standby</i>	6.0W	3.0W
<i>Standby (only reactivation and indication of enabled reactivation)</i>	0.5W	0.5W
<i>Standby (information and status display)</i>	1.0W	1.0W
<i>Additional functionality allowance (NUI)</i>	7.0W	5.0W
<i>Internal power supply</i>	85% minimum efficiency at 50% of rated output and 82% minimum efficiency at 20% and 100% of rated output, with Power Factor > 0.9 at 100% of rated output.	
<i>Power management</i>	Power down to network standby after 1 hour of inactivity.	

As previously mentioned, the tier I power demand value of 70W for media playback and navigation mode has been suggested for use within a mandatory measure as at least some of the current generation of game consoles can already meet this requirement. The tier II limit, of 50W for media playback and navigation mode was included as it was clear that other products on the market which offered similar functionalities could already meet the requirements. For example, there are notebook gaming PCs on the market that provide gaming performances higher than those found in the current generation of game consoles that can already meet the tier II power demand requirements for media play. In addition, many single function products offering media playback can do so at power demands significantly below 50W. For example, some tablet computers can provide full high definition playback for less than 10W. Other products such as standalone video players can also provide full HD media playback for under 20W. It was considered reasonable that by 2017 game console manufacturers could include energy efficient architectures into their products so that media playback could be offered at 50W or less.

The network standby and off mode requirements were based on the expected requirements within the forthcoming revised ErP Standby Directive. Requiring more stringent power demand levels than those in the ErP Standby Directive would provide only small additional savings. In addition, during the Sound & Imaging Preparatory study, at least one game

¹⁸ A TEC approach could be just as easily taken incorporating the suggested modal levels with assumptions on usage times.

console manufacturer proposed lower power demand levels for sleep mode than are expected to be enforced under the ErP Standby Directive. No other manufacturers objected to these lower power demand levels. As such, these more ambitious power demand levels are used within the IA models (discussed later in the report).

The above suggested mandatory measure also includes an additional allowance for natural user interfaces (NUI). These values are more stringent than those proposed in the industry proposal. Given NUIs are a relatively new addition to game consoles, future iterations of these products are predicted to follow the same path as most other electronics based products and become more efficient over time. Given uncertainties over how the NUIs would be treated during testing (i.e. it is not certain what percentage of products would have an NUI shipped with the game console on initial purchase) they are not considered during the IA modelling.

A suggested requirement on power supply units (PSU) efficiency was also included in the proposed mandatory requirements. These efficiency ratings are the same as those currently included under the ENERGY STAR programme for internal power supply units. Given the very high market coverage of ENERGY STAR qualified internal PSUs on the market this requirement would add little or no cost to game consoles. The PSU efficiency requirement is not included in the IA modelling as most of the current generation of game consoles already have relatively efficient PSUs. It is also suggested that, given the relatively small cost of meeting the above PSU requirement, future game consoles would also include efficient PSUs that would meet the above requirement.

The potential risks with mandatory Ecodesign requirements include:

- Overly stringent requirements may incur excessive cost to manufacturers (there is a need to consider proportionality) and limit innovation.
- Game console manufacturers could choose to sell de-featured game consoles to the EU market if legal requirements are too stringent. This may encourage “grey market” imports of fully functional game consoles from other regions where no energy efficiency measures exist.

4.4.3.2 Procedural considerations

A verification procedure for market surveillance purposes would need to be specified in mandatory requirements, with measurement uncertainties adapted for the specific requirements. In order to facilitate compliance checks manufacturers would also be requested to provide information in the technical documentation referred to in Annexes IV and V of Directive 2005/32/EC on power demand in the applicable power modes and the efficiency on any power supplies. In addition, for the purposes of providing consumer information manufacturers would be requested to publish the above information in an openly available website.

The appropriateness of ecodesign requirements should be re-assessed in the short term (after three years). The main issues for a possible revision of an ecodesign regulation are similar to those listed for a voluntary agreement. A review should be presented to the Consultation Forum around three years after entry into force of any regulation, taking into account the following:

1. 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
2. The need to ensure timely entry into force of a revised measure

This option is retained and discussed in more detail in the impact analysis - Section 5.

4.4.4 Option 4: Mandatory energy labelling for Game Consoles under Directive 2010/30/EC

The mandatory EU Energy Label usually aims to categorise products by efficiency class, applying an A to G categorisation. Energy labelling has advantages in terms of transparency, consumer information and consistency with approaches for other products.

However, there are a number of issues in applying this approach to game consoles:

- There are currently only three main product types/models, one produced by each of the three main manufacturers.
- The product architectures vary widely between the three different products. This means considerable differences in functionality and power consumption between the products of each manufacturer that may make application of an across-the-board categorisation unrepresentative.

Despite these issues, a mandatory energy label offers a means of encouraging the market toward more energy efficient game consoles.

The level of energy efficiency exhibited by a game console is unlikely to be the most important purchasing criteria for most consumers. However, providing clear labelling indicating the energy efficiency of each model of game console may stimulate increased awareness of energy efficiency during purchasing decisions. This may lead to future changes in power demands although these are not expected to occur in the immediate future.

The tables below illustrate an example of how an energy label for game consoles could be developed. The first table shows how the power demand requirements in media playback and navigation mode found within the two previously described policy initiatives could be used to derive an average power value.

	Media Playback mode (W)	Navigation mode (W)	$\Sigma/2 = \text{SEC}$ (W)
Industry Proposal Tier 1 (2013)	90	90	90
Industry Proposal Tier 2 (2017)	70	70	70
Mandatory Eco design requirements Tier 1 (2014)	70	70	70
Mandatory Eco design requirements Tier 2 (2017)	50	50	50

These average power demand values could then be used to derive the A-G levels found in a mandatory energy label (as shown in the table below).

Label Class	SEC Tier 1 (2014) < (W)	SEC Tier 2 (2017) < (W)
A	30	15
B	40	25
C	50	35
D	60	45
E	70	55
F	80	60
G	90	70

The formula to calculate the label class that each game console could fit into would be:

$$\text{Specific Energy Consumption Index (SEC)} = (0.5 \times (\text{Media Playback (W)} + \text{Navigation (W)}))$$

The main information requirement would be to provide the SEC plus the Media Playback and Navigation mode power demand levels, measured in watts, within the product information.

The power demand levels in each tier and label class reflect different levels of efficiency seen in products already on the market. For example, in the first tier the “G class” reflects the power demand requirement requested in the industry proposal. The “A class” in the first tier reflects a power demand slightly better than that seen in a recently released game console. The tier II requirements are based on similar thinking in that the “G class” is based on the tier II requirement proposed by industry but with the “A class” based on an aspirational target deemed technically feasible by 2017 (i.e. there are currently products on the market, such as tablet computers, that are able to support full high definition (HD) media playback with power demands far less than 15W). The B to F classes within each tier are based on incremental differences between the A and G classes.

- With only three game consoles currently on the market the influence of an energy label may be weak as this one aspect (i.e. energy use) may be seen as significantly less important than other technical features such as game play functionality for example. On the other hand, a mandatory labelling scheme may help increase consumer awareness of energy efficiency in game consoles over the longer term.
- In the context of a regulatory labelling approach, robust definitions become an important foundation. There are likely to be new products coming to the market which blur the boundaries between products considered “gaming PCs” and “game consoles”. It would be necessary to carefully consider how these new products would fit into a labelling system.
- Given that there are only three game consoles on the market the influence of a label may be diminished if there were separate classes for each game console model.
- If game consoles are considered as one product type and a single set of labelling metrics are developed then game consoles offering the highest gaming performance levels may find it difficult to reach the higher labelling categories. That is, power demand and gaming performance are strongly correlated and whilst media playback and navigation modes are not as strongly correlated with power demand these modes may be delivered via the same componentry which supports active gaming mode. Manufacturers of higher specification game consoles would therefore likely have to make additional architecture changes to their products.

This option is retained and discussed in more detail in the impact analysis - Section 5.

4.4.5 Option 5: Internationally recognised agreement

The potential for an international agreement on game console energy efficiency (brokered by the Australian DCCEE under the IEA banner within the 4E implementing Agreement) is under exploration. An international agreement could involve as a minimum for example the EC, the Australian DCCEE and the Californian Energy Commission.

The chosen requirements could be the most robust of the requirements from the EC and Australian industry initiatives. There are advantages in this approach for manufacturers, as there will be less variation in requirements placed upon them among countries so that impacts on competitiveness of EU firms will be minimised. There would need to be active input from the European Commission and other collaborating countries to ensure that the end agreement complied with the principles of effectiveness, efficiency, and consistency.

This option however is not within the full control of the European Commission, and the form and stringency included in any such policy would depend on other developments and stakeholder opinions. It is therefore an important option to consider that could potentially be progressed in parallel to the preferred option in this IA but is not analysed further here.

4.4.6 Option 6: EU ENERGY STAR coverage

The EU ENERGY STAR programme follows an Agreement between the United States Government and the European Union to co-ordinate office equipment energy labelling. In

Europe, ENERGY STAR is managed by the European Commission. The US partner is the Environmental Protection Agency (EPA) who started the US scheme in 1992.

The voluntary EU ENERGY STAR label currently covers office equipment, whilst the US programme covers a wider range of products, including a draft game console specification. Historically in the ICT area, the ENERGY STAR label has transformed the market toward energy efficiency through repeated specification revisions. ENERGY STAR usually aims to qualify the top performing 25% of the market at the time the specification becomes active, and often in the space of a year or two much of the market shifts to meet these levels. A new specification is then agreed and the process begins again.

The EU ENERGY STAR agreement is currently in the process of being re-negotiated (the most recent redraft was circulated April 2012) and this revision could provide the opportunity to widen the product scope to include certain consumer electronics devices if it were proven that this approach would be coherent with the goals of the Ecodesign Directive. If this were done, the Commission would become more involved in the specification development process for these products.

The game console specification is still at the draft stage. Revised requirements (final draft) were released in December 2012. It is likely that the US EPA will take a less formal approach than with other product groups, aiming to “recognise” those manufacturers that pledge to meet ENERGY STAR requirements. The US EPA and individual game console manufacturers would sign an agreement reflecting a companywide commitment to meeting the final efficiency criteria with current or next generation boxes. The US EPA would recognize game consoles that meet the energy efficiency criteria, measured by the ENERGY STAR test method, as they become available on the market.

Involvement in ENERGY STAR would be optional for manufacturers. Without the incentive of public procurement (as for other IT products) there is less motivation for manufacturers to become involved.

Again, as with Option 5, this option is not under the full control of the European Commission, and depends on other developments and stakeholders. It is therefore an important option to consider, that could be progressed in parallel to the preferred option in this IA but is not analysed further here.

4.4.7 Conclusion of games console policy options

A number of policy options for games consoles have been briefly considered and assessed. Options 5 (Internationally Recognised Agreement) and option 6 (ENERGY STAR) have been discarded from further analysis. Options 2 (Industry Proposal), Option 3 (Regulation) and Option 4 (Labelling) will be taken forward for investigation, and analysed in more detail in Section 5. The baseline will also be further examined.

The table below summarises the energy efficiency requirements included within each modelled policy option.

Requirements	Policy Options						
	Industry proposal		Mandatory Measure		Mandatory Energy Labelling		
	Tier 1 2013	Tier 2 2017	Tier 1 2014	Tier 2 2017	Label Class	SEC Tier 1 (2014) < (W)	SEC Tier 2 (2017) < (W)
Media Playback mode	90.0W	70.0W	70.0W	50.0W	A	30	15
					B	40	25
					C	50	35
Navigation mode	90.0W	70.0W	70.0W	50.0W	D	60	45
					E	70	55
					F	80	60
Networked Standby	As ErP horizontal requirements (5W est)	As ErP horizontal requirements (3W est)	6.0W	3.0W	G	90	70
					As ErP horizontal requirements (5W est)		
					As ErP horizontal requirements (5W est)		
Standby (only reactivation and indication of enabled reactivation)	0.5W		0.5W		0.5W		
Standby (information and status display)	1.0W		1.0W		1.0W		
Additional functionality allowance (NUI)	20.0W	15.0W	7.0W	5.0W	n/a		
Internal power supply	n/a		85% minimum efficiency at 50% of rated output and 82% minimum efficiency at 20% and 100% of rated output, with Power Factor > 0.9 at 100% of rated output.		n/a		
Power management	Power down to network standby after 1 hour of inactivity.		Power down to network standby after 1 hour of inactivity.		n/a		

(Note: NUI is Natural User Interface)

4.5 Video Player and Video Recorder Policy Options

This section presents the range of policy options available for the video players and recorders product group. It includes a discussion of the purpose and motivation behind each option, before analysing the options in detail in section 5. A brief assessment of the option's likely impacts is also included, in order to screen the options and discard any non-viable

options at this stage from further analysis. This is a proportionate and best-practice approach to Impact Assessment.

4.5.1 Option 1: No new EU action/ Baseline

With no new action, it is probable that the downward trend in sales will continue, with the following additional observations expected:

- A continued shift from disc based systems to internet connected TVs and other systems, resulting in a significant proportion of mains powered devices being replaced by battery powered mobile devices. These are out of scope of this impact assessment.
- Hard disk drive (HDD) based systems would continue to shift from internal to external HDDs that could, for example, be USB powered. These are considered out of scope for this impact analysis. In addition, there would be a shift toward streaming clients, removing the need for a hard disk altogether (with a resultant potential energy impact in terms of network standby of routers). These are also out of scope of the current analysis.
- There will drivers toward energy efficiency: a continued shift to mobile devices readily connected by Wi-Fi or standard digital links to video and audio monitoring equipment will drive devices to become smaller (this drive toward mobile devices may also be influenced by increased electricity tariffs). As more compact designs create barriers to heat dissipation, manufacturers are likely to focus on higher energy efficiency to reduce undesirable heat.
- Most mass market devices comply with the limits suggested in the ErP preparatory study (see question 4) and are likely to continue to do so. Non-compliant products would be likely to be “high end” Blu-ray players, requiring additional power in order to provide higher quality video processing and audio (through multiple chip solutions).
- It is likely that there will be no new sales of optical disc based video recorder / player products by 2025 (except for small volumes of niche high end products / modules for repair purposes).

An energy-related product (ErP) shall be covered by ecodesign implementing measures if the ErP represents significant sales volumes, while having a significant environmental impact and significant improvement potential (Article 15). Taking into account the general tail-off in the market as a whole, and the lack of options for further improvement in efficiency above the BAU, it appears that this option could be a consideration, depending upon the potential impacts and costs of other policy approaches.

This option is included in the analysis for comparison purposes, in order to fairly compare policy option against one another. However, is also a viable option in its own right, if other options are less desirable than the expected baseline.

4.5.2 Option 2: Self-regulation via voluntary agreement

There have been no discussions between the European Commission and the video player / recorder industry regarding the option of self-regulation. There does not appear to be a desire or willingness from industry to take forward such an approach and it is unclear what form a voluntary agreement would take. Therefore, this option is discarded from further analysis.

4.5.3 Option 3: Mandatory Ecodesign requirements

There are no draft regulations on which to base requirements. The preparatory study suggested ecodesign requirements that are now met by the majority of products on the market (with the exception of niche high-end products). These have been re-assessed in

light of new technical information, and industry feedback, and the need to update timelines and a revised proposal has been considered for purposes of this analysis. For clarity, both the original ErP preparatory study proposal and the revised proposal as informed by the current work are shown in the table below. The original proposal is included for comparative purposes, and is not intended as an option here.

Operating mode	Product	Original ErP proposal (BAU)		Revised proposal
		Tier1 (2012)	Tier 2 (2014/15)	(2014)
On play	Video player	SD <=10W HD <=20W	n/a	SD <= 8W HD <=15W
	Video recorder	<=30W	<=20W	<=20W
Live pause	Video recorder	<=30W	<=20W	<=20W
Fast start	Video players and recorders	<=8W	n/a	<=8W
Off mode or standby equivalent power condition	Video players and recorders	<=0.5W with hard on switch <=0.3W without		<=0.5W with hard on switch <=0.3W without
Fast start enabling	Video player	Disabled by default. Description of the increase in power demand compared to standby mode provided.		As previous
	Video recorder	Fast start mode restricted to 4 hours or only when the TV is on.		As previous
Auto power down (APD) enabling	Video players and recorders	APD requirements enabled by default.		As previous
Time to enter standby / off / equivalent from conditions not providing on-mode functions ¹⁹ after no user interaction	Video players	0.5 h		As previous
	Video recorders	3.0 h		As previous

High-end products would not be able to meet these levels, and can reasonably be expected to require greater power consumption due to the niche high performance nature and electronic (multi-chip) design of these products. Therefore, if a mandatory measure was applied, it would be necessary to develop a means for identification and a clause for exemption of high-end products from the measure (see preparatory study page 167 for details).

¹⁹ i.e. menu navigation, live pause, fast start

The risk with mandatory ecodesign requirements is that overly stringent requirements may incur excessive cost to manufacturers. There is the need to consider proportionality, the apparent natural shift toward efficiency, potential decline in the video recorder market etc.) and the potential limits to innovation.

This option is retained and discussed in more detail in the impact analysis - Section 5.

4.5.4 Option 4: Mandatory energy labelling for Video Players / Recorders under Directive 2010/30/EC

The mandatory EU Energy Label usually aims to categorise products by efficiency class, applying an A to G categorisation. Energy labelling has advantages in terms of transparency, consumer information and consistency with approaches for other products.

However, the low level and lack of variability of power demand in these products means that an energy efficiency label would display “A” for almost all of the mass market devices. If products were forced into the wider A to G categories, differences in labelling classes would be in one-watt-steps or similar which would be difficult for consumers to understand. Also, small bandwidth labelling classes could result in products jumping class because of small manufacturing variations in chips, or measurement errors in testing.

Because of this issue, it can be concluded that a mandatory energy label would not be an effective means of transforming the market toward more energy efficient video players / recorders. This option is therefore discarded from further analysis.

4.5.5 Option 5: EU ENERGY STAR coverage

Please refer to Section 4.4.6 for background on ENERGY STAR. The US ENERGY STAR label currently includes a “Home Audio & DVD” specification, which could be included in the scope of the EU voluntary label if it were proven that this approach would be coherent with the goals of the Ecodesign Directive.

If this were done, the Commission would become more involved in the specification development process for these products and may see a greater influence of the label on video players and recorders within Europe. The label may also provide a low-cost mechanism to influence market transformation toward greater energy efficiency in Europe. To note, wider products than just the sound and imaging products addressed in this impact assessment would be covered by the home audio and DVD specification.

However, the strength of the current EU ENERGY STAR label is its use in public procurement. As public procurement is not a major driver for the video player / recorder market it is unlikely that there would be sufficient incentive for industry to qualify products. In addition, as the difference between the worst and best performing products on the market can be only 2 to 3W, notable savings would be unexpected in the event that a label did see uptake in Europe.

Energy Star is also not a policy lever in the hands of the European Commission, so for all these reasons, this policy option is not considered further.

4.5.6 Conclusion of video recorder/player policy options

A number of policy options for video recorders/players have been considered and assessed. Options 2 (Self-Regulation), option 4 (Labelling) and option 5 (Energy Star) have been discarded from further analysis. Option 3 (Regulation) will be taken forward for investigation, and analysed in more detail in Section 5. The baseline will also be further examined.

4.6 Projector Policy Options

This section presents the range of policy options available for the projectors product group. It includes a discussion of the purpose and motivation behind each option, before analysing the options in detail in section 5. A brief assessment of the option's likely impacts is also included, in order to screen the options and discard any non-viable options at this stage from further analysis. This is a proportionate and best-practice approach to Impact Assessment.

4.6.1 Option 1: No new EU action/Baseline

With no new action, it is probable that:

- Mains powered projectors will continue to be replaced by widescreen televisions (which can now be as bright as projectors) in applications such as small to medium office conference rooms and schools.
- Projector products using ultra high-pressure (UHP) discharge lamps will continue to perform at the average efficiency levels predicted by the ErP preparatory study, with little scope for cost effective step changes in efficiency levels.
- Solid State Lamp (SSL) systems (LED/Laser) will continue to improve in efficiency at a slower rate than predicted in the ErP preparatory study, performing in line with home cinema projectors.
- Expected sales of projectors will continue to decrease until there are no new sales of projector products other than those required for large auditoria and E-Cinema by 2025.

Taking into account the lack of potential for energy efficiency improvements, and the general tail off in the projector market as a whole, it appears that this option could be a consideration, depending upon the potential impacts and costs of other policy approaches.

Therefore, this option is included in the analysis for comparison purposes, in order to fairly compare policy option against one another. However, it is also a viable option in its own right, if other options are less desirable than the expected baseline.

4.6.2 Option 2: Self-regulation via voluntary agreement

There have been no discussions between the European Commission and the projector industry regarding the option of self-regulation. There does not appear to be a desire from industry to take forward such an approach and it is unclear what form a voluntary agreement would take.

Therefore, this option is discarded from further analysis.

4.6.3 Option 3: Mandatory Ecodesign requirements

Based upon an assessment of available technology, it appears that whilst improvements in efficiency from current levels are possible, they are not possible within a least life cycle cost (LLCC) solution. More efficient projector lamps cost around three times more than standard lamps, but do not save proportionately on consumption. Costs would have to be passed onto the consumer, and as energy savings would not be very large, consumers are unlikely to be willing to pay the extra for a more efficient projector – especially when there are alternative, and more affordable products available such as large screen TVs.

The proposals in the preparatory study assumed that the projected light output efficiency could be increased to 0.05 W/lumen through claims associated with recent solid-state illumination developments. However, it now appears that this may not be possible. To take this into account, the levels proposed in the preparatory study have been reassessed ("revised proposal" in the table below), and it is unlikely that these can require an improvement from the BAU. The original proposal is included for comparative purposes, and is not intended as an option here.

Operating mode	Original ErP proposal		Revised proposal	
	Tier1 (2012)		(2014)	
Off mode	0.5W		0.5W	
Standby mode	1.0W		1.0W	
Network standby (with status display)	1.0W		1.0W	
On mode	Total projected light output (lm)	Efficiency requirement W/lm	Total projected light output (lm)	Efficiency requirement W/lm
	$X^{20} < 2,500$	0.105	$X^{21} < 1,500$	0.150
	$2,500 \leq X < 4,000$	0.095	$1,500 \leq X < 2,500$	0.120
	$4,000 \leq X < 5,000$	0.085	$2,500 \leq X < 4,000$	0.110
			$4,000 \leq X < 5,000$	0.100
$5,000 \leq X$	0.080	$5,000 \leq X$	0.090	

Correction coefficients would apply to those efficiency limits depending on the projector specifications (product categories, lamp technology) as follows:

Projector specifications	Correction Coefficients
Wide aspect	1.1
Multi lamp and Xenon lamp	1.3
Solid state light source	2.0
Home theatre projectors	2.0
Short throw projectors	1.3

The main risk with mandatory Ecodesign requirements for projectors is that overly stringent requirements may incur excessive cost to manufacturers and limit innovation. Requiring further improvements in the already declining projector market could result in an excessive cost being passed on to the consumer, so it is unrealistic that any MEPS could require much greater efficiency than the BAU.

As this option has possible merit however, it is retained and discussed in more detail in the impact analysis - Section 5.

4.6.4 Option 4: Mandatory energy labelling for Projectors under Directive 2010/30/EC (the Energy Labelling Directive (ELD))

An energy label for projectors is feasible, but to date there have been no detailed discussions regarding the possible form such a label might take. A label would be

²⁰ X = Effective Flux (total projected light output) X lm

²¹ X = Effective Flux (total projected light output) X lm

technically complex to define - requiring modification of the co-efficients listed previously for each class of product through definition of indices. Different formulae would need to be defined for different types/applications of projectors. A label could be based on the requirements suggested in the previous preparatory study proposal, listed in the table in section 4.6.3.

However, a label could usefully assist in identifying low quality poor performance products coming to the market. It could reasonably be assumed for modelling purposes in this analysis that as products are improved over time in order to reach the higher labelling classes, a label would result in 5% per annum improvement in efficiency from 2016 onward. Some consumer confusion may result from the labelling approach necessary for projectors, as the kWh per year values associated with the labelling classes would vary depending upon the application the projector was designed for. However, this could be dealt with to some extent by including the application type (home cinema, office etc.) on the label itself.

There may also be additional complexities regarding the legal implementation of a label for projectors – a regulation may need to be put in place first in order to provide the platform for the labelling mechanism (via a modification to the regulation as for TVs for example) – otherwise it may not be possible for the Commission to regulate the labelling approach.

In the context of a regulatory labelling approach, robust definitions become an important foundation. Whilst industry accepted definitions for the various types of projector exist, these are often based upon subjective criteria which would need to be assessed by a test panel, causing problems for market surveillance purposes, as different test panel opinions may vary.

This option however is retained and discussed in more detail in the impact analysis - Section 5.

4.6.5 Conclusion of projector policy options

A number of policy options for projectors have been considered and assessed. Options 2 (Self-Regulation) has been discarded form further analysis. Options 3 (Regulation) and Option 4 (Labelling) will be taken forward for investigation, and analysed in more detail in Section 5. The baseline will also be further examined.

4.7 Summary of policy options for Sound and Imaging Equipment

The table below summarises the policy options that are discarded at this stage and those that are taken forward for subsequent analysis in section 5.

Games Consoles		Video Recorders/Players		Projectors	
Discarded options	Options taken forward	Discarded options	Options taken forward	Discarded options	Options taken forward
5) Internationally Recognised Agreement 6) EU Energy Star	2) Industry Proposal 3) Regulation 4) Labelling	2) Voluntary Agreement 4) Labelling	3) Regulation	2) Voluntary Agreement	3) Regulation 4) Labelling

5 IMPACT ANALYSIS

The overarching aim of this section is to assess the overall energy and carbon savings against other parameters such as economic and social impacts, and thereby identifying the possible trade-offs. This helps ensure that consideration of environmental, economic and social impacts are all factored in to the options analysis.

This section compares the impacts of the following options against the baseline.

Game consoles	Video players / recorders	Projectors
<ul style="list-style-type: none"> • Option 2 Industry Proposal • Option 3 Mandatory Eco design Requirements (Regulation) • Option 4 Mandatory energy labelling 	<ul style="list-style-type: none"> • Option 3 Mandatory Eco design Requirements (Regulation) 	<ul style="list-style-type: none"> • Option 3 Mandatory Eco design Requirements (Regulation) • Option 4 Mandatory energy labelling

The assessment is implemented in line with the criteria set out in Article 15(5) of the Ecodesign Directive, taking into account the impacts on manufacturers, including SMEs. The aim is to find a balance between achieving the appropriate level of ambition and associated benefits for the environment / user on the one hand, and the potential burdens on the other. Throughout, it should be ensured that negative impacts to the user are avoided - in particular in relation to affordability and functionality.

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

Economic impacts

- Costs related to re-design of models not complying with the requirements e.g. for additional and/or more expensive components.
- Assessment of administrative burdens, namely the assessment of conformity with ecodesign requirements, for Member States and Industry.
- Accumulated electricity cost savings
- Impacts on trade and competitiveness

Social impacts

- Impacts on jobs and SMEs
- Affordability and functionality of equipment

Environmental impacts

- Energy-in-use impacts - electricity savings and reductions of CO2 emissions until 2025
- Wider environmental impacts

In order to assess the impacts outlined above, several sources of guidance from the European Commission have been consulted, considered and used as appropriate. These are highlighted here for clarity:

- Impact Assessment Guidelines (latest update 15 January 2009)
- Commission Staff Working Document: Operational Guidance on Assessing Impacts on Sectoral Competitiveness within the Commission Impact Assessment System. A "Competitiveness Proofing" Toolkit for use in Impact Assessments (27 January 2012)

- SME Test. Section 8.4 of the Annexes to the IA Guidelines²².
- Guidance for Assessing Social Impacts within the Commission IA System²³
- IA Guidance on Risk and Uncertainty Analysis, Annex 12 to IA guidelines.

5.1 Economic impacts

5.1.1 Costs for SMEs

Projectors – The structure of the manufacturing industry for projectors is international and based on large OEMs. There should be no competitive advantage to, or negative impact on, any of these players as a result of the suggested minimum requirements. Where SMEs are involved in projector manufacturing, their market niche is the higher specification, more advanced products that are invariably part of an installation.

Games consoles – There are currently no games console manufacturers head quartered in the EU. There are a significant number of games developers and games publishers in the EU however. These game developers and game publishers will be impacted by the proposed power down requirements in that they will need to ensure that future games support auto-save. Impacts on these companies are expected to be small as the proposed requirements are only applicable to future games where programming can be more easily tailored to support auto-save. There is a potential that importers into the EU could be disadvantaged if ecodesign requirements were set with excessive stringency so as to require the development of different models of games console for the EU market.

Video players/recorders - There are a few smaller manufacturers designing specialist devices, however, since their market niche comes from higher specification, more advanced products requiring higher levels of product research and development, they are expected to be able to maintain that niche. It may also be the case that if a high end product is defined and excluded then many of the SMEs will be exempt so there will be no impact upon them.

5.1.2 Impact of Innovation

Projectors – In contrast to the earlier preparatory study, the stock of projectors is expected to decline in all market sectors as the stock is replaced by large screen TVs particularly for the large market sector of school classroom interactive displays. Whilst innovation in lamp technology can be envisaged, the cost increment due to such lamps, which may be three times that of volume market halogen types, is not justified on the basis of energy cost savings.

Games consoles - The proposed requirements are expected to have a largely positive impact on games console innovation as manufacturers will be required to consider energy efficiency of their products in more detail. The added research on energy efficiency could result in fewer resources being available for other research areas though. The greater share of research budget given to energy efficiency is likely to be minimised as the proposed requirements are largely based on technologies already available in the market place.

Video players/recorders – As is the case for projectors, innovation will affect video players and recorders in the sense that the product is being replaced by a service – that of on-line streaming.

²² http://ec.europa.eu/governance/impact/commission_guidelines/docs/ia_guidelines_annexes_en.pdf

²³ <http://ec.europa.eu/social/main.jsp?catId=760&langId=en>

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

These costs will accrue to manufacturers, although the scale will depend on each individual option and the product scope (the type of exemptions applied). The costs are described in more detail below. It has not been possible to quantify the costs to manufacturers in all cases, although some indicative figures are provided that could illustrate the magnitude of these.

5.1.3.1 Game consoles:

The three policy options assessed for game consoles would have the following supply-chain related cost implications:

The **industry proposal** (Option 2) would not incur anything more than negligible additional costs, as the proposals are highly similar to the business as usual scenario and industry will have time to adopt to the changes needed minimising the detrimental impacts and downtime costs.

The **mandatory ecodesign requirements (Regulation, Option 3)** may require changes to products.

The main improvement options as identified by the preparatory study are reducing the power demand in operational modes, increasing hardware flexibility to perform less computationally intensive tasks with some of the processing resources disabled – e.g. media playback power demand is often much higher in game consoles than in standalone media devices, reducing the duration and frequency of auto-wake events such as Wii-Connect24, and implementing auto power down functionality. A discussion of the different improvement options is presented in 2.8.

Some of the game console manufacturers have claimed that the first tier requirements would necessitate significant product changes. Costs could therefore be high. However, to suitably assess costs additional information is required from manufacturers about the power demand values for new iterations or planned iterations of current generations of game consoles between now and 2014. The proposed second tier in 2017 may require slightly more efficient components. However, it is difficult to anticipate what changes would be needed in future game consoles as manufacturers have been unable to supply any additional data. It is assumed that 60% of the market would require changes (based on the fact that the new Nintendo Wii U console is expected to already meet most of the 2017 proposed requirements). Separate componentry will be required under business as usual in order to run navigation and media playback functions more efficiently – but in order to achieve improved levels of performance, more efficient components would need to be sourced. It is assumed that the cost would be reflected to the consumer.

Manufacturers have suggested that the costs of including separate efficient componentry to support media playback functionality would be up to approximately €40.

This could represent a significant proportion of manufacturing costs per unit but expert insights indicate that the maximum price added to the consumer would be lower as discrete high performance media players are already available on the market for around the same price mark (the discrete product price mark would also cover manufacturers' profits as well as additional components not required in the game console such as casings, power supply units etc). Assuming that €360 is the retail price, as given in the preparatory study, and assuming that the manufacturers can absorb part of the additional costs, this change will represent an increase of less than 10% in final price to consumers. In terms of electricity savings, the saving to a consumer amounts to around €1.30 per year, approximately €8 over the product's six year lifetime. That the saving is so small may appear counter intuitive. The reality is that whilst more efficient components are being used, to provide the enhanced functionality, more components are required. The trend towards more complex games

involving high definition graphics for example, to enhance the gaming experience, will continue to drive the need for additional product componentry with associated demands on energy consumption.

From the video game industry perspective, the increase in manufacturing cost of around €40 (see Section 5.1.3.1) roughly represents the price of one additional video game. From www.game.co.uk the price of video games (for consoles) in the UK varies considerably from around €25, up to €80/100, but with an average of around €40/50. There is no reason to suggest that UK prices are out of line with the rest of Europe.

This is an important consideration in order to put the €40 manufacturing cost increase into context. Over 80% of gamers purchase between 1 and 20+ video games per year, with only 18% buying none. Over 50% buy between 5 and 20+ games. <http://www.avforums.com/forums/xbox-360/poll-4078-average-how-many-video-games-do-you-buy-year.html>

On the other hand, consumers may save energy from more efficient components (refer to section 5.1.3). A study conducted by Hittinger, Kimberley & Azevedo (2011) in the US estimated that the most efficient energy-saving modification (incorporation of a default auto-power down feature) could reduce electricity consumption of game consoles by 75% saving US consumers over \$1 billion annually in electricity bills²⁴. It should be noted, however, that these savings would only be achievable under ideal circumstances.

Mandatory labelling (Option 4): If game consoles are considered as one product type and a single set of labelling metrics are developed then game consoles offering the highest gaming performance levels may find it difficult to reach the higher labelling categories. That is, power demand and gaming performance are strongly correlated and whilst media playback and navigation modes are not as strongly correlated with power demand these modes may be delivered via the same componentry which supports active gaming mode. Manufacturers of higher specification game consoles would therefore likely have to make additional architecture changes to their products. This could have significant costs implications.

Consultation has revealed that a regulation focusing on energy caps could jeopardise the ability of industry to develop new products. On the other hand, it is probable that the next generation of game consoles will be released before tier 2 requirements come into place in 2017 and Tier 1 is not expected to lead to major product changes in all game console models. Industry will have three years to adapt the products to the new requirements. Therefore manufacturers will need to move quickly to be able to integrate necessary changes into the next generation devices which may impact the redesign cycle as new generation consoles only come out every five to six years (iterations of the same model of game console, where smaller product changes are made, occur more frequently as manufacturers seek to secure components that offer the same functionality but at reduced costs).

5.1.3.2 Video players / recorders (Option 3, Regulation)

Even with a regulatory option being implemented in 2014, negligible additional supply chain costs are assumed as the levels suggested for a regulation would not require substantive changes to mass market products (there is little scope for improvement as previously discussed). The main improvement options identified in the preparatory study were:

- Changing the architecture to make the hard disk drive (HDD) external to the product

²⁴ Electricity consumption and energy savings potential of videogame consoles in the United States, available at: http://www.andrew.cmu.edu/user/kmullins/VG_energy_savings_potential.pdf

(attached by USB). This reduces power consumption and enables sourcing of efficient HDDs. This trend is already underway, and would actually save manufacturers costs of integrated HDDs.

- Using energy-optimised chip sets. This could be an option for the mass market but only within current product price constraints and development cycles – and there are no new generations of products expected, so any opportunity for changes of this kind will be minimal and low/no cost.

If regulatory requirements were also applied to high-end products, there is a risk that the costs would be disproportionate and the limits would constrain innovation and quality. Therefore, in the regulatory scenario assessed, it has been assumed that high-end products are exempt.

5.1.3.3 Projectors

The two policy options assessed for projectors would have the following supply-chain related cost implications:

The **mandatory ecodesign requirements (Regulation, Option 3)** are currently set at business as usual levels. The improvements in efficiencies considered feasible during the preparatory study no longer appear to be achievable (due to the removal of mercury vapour discharge lamps from the market), meaning that any step changes in efficiency such as those proposed in the preparatory study (sub option 3) are unlikely to be realised.:

No design changes would be necessary to achieve the requirements currently included in the regulatory scenario as described in section 4.6.3, so there is no associated cost. This is because the products are developing along the same trajectory as envisaged in the regulatory scenario.

The **mandatory energy labelling (Option 4)** would not be expected to incur significant supply chain costs, as the manufacturers are able to set the pace of efficiency improvements they wish to implement. They may experience competitive disadvantage if they did not implement improvements. The extent of the disadvantage would depend on customers' willingness to pay for higher efficiency projectors.

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

Costs will differ depending on the policy option being considered:

5.1.4.1 Mandatory Eco design requirements / regulation (assessed for all product types)

Administrative costs will include human resources dedicated to follow initial developments and to make changes across the firm, establishing and maintaining technical files and other documentation, the creation and operation of testing facilities, possible involvement in standardisation activities; and writing and/or communicating ecodesign features into supplier terms and conditions. Additional testing and reporting impacts for game consoles should be minimal given the small number of games console models placed on the market and the fact that some energy efficiency testing is already undertaken by manufacturers. For the other product categories these costs could be more significant.

The recent evaluation of the Ecodesign Directive included a survey that covered administrative costs (CSES and Oxford Research, 2012)²⁵. The survey responses provided rather limited information concerning the specific nature and extent of these costs. One manufacturer suggested that administrative costs were very high whilst another producer indicated that administrative costs were negligible and could well have been incurred

²⁵ Evaluation of the Ecodesign Directive (2009/125/EC), Final Report , March 2012.

anyway in responding to global market conditions. Most associations of producers of EuPs also considered that the costs for development and management of the technical and other relevant documentations can be rather significant occupying substantial human resources. Finally stakeholders were asked to indicate whether the costs were high in comparison with those incurred with other environmental legislation. The responses of six individual manufacturers were balanced (three say that they were higher and three that they were less or the same). This suggests that the experience of firms can vary depending on the product concerned and their own situation. It is important to note however that the evaluation only covered the 11 products covered by Implementing Measures in force by the end of 2010²⁶.

In general assessing conformity, including product testing, with ecodesign requirements implies costs for manufacturers. Costs estimates developed for the impact assessment from ecodesign requirements for televisions range from €500 (self-certification) to €1000 (external laboratory) per sample product/model. The costs of assessing conformity for set-top boxes have been estimated to be between €500 and €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.

There may be a need to reassess compliance with other applicable requirements ("Low Voltage Directive" and "EMC Directive") so although the costs may increase, the test could be undertaken conjunctively to minimize the costs.

It is not expected that the costs for game consoles and projectors would exceed the estimates produced for TVs and set-boxes. Similarly, because game consoles and projectors are produced in large batches to the same specifications, conformity assessment costs are not expected to represent a significant proportion of the total running costs. Equally, administrative costs for these products (in terms of the costs of providing information to meet legal obligations) are expected to be absorbed over the manufacturing cycle.

However, for high-end video player/recorder equipment manufactured in small volumes, costs may be more significant. Again, however, high-end products are exempt from this assessment.

Administrative costs to manufacturers (defined as the cost of providing information in order to meet legal obligations) are expected to be negligible.

5.1.4.2 Mandatory energy labelling (assessed for projectors and games consoles)

Product testing will also have to be undertaken in order to attach a label under the mandatory energy labelling option. The costs are expected to be similar to those under the regulation.

The Impact Assessment on ecodesign requirements for televisions estimated the cost for manufacturers for attaching the energy label to be of order €0.1 per product. The costs of attaching a label to projectors or games consoles are not expected to be greater than €0.1 per product either. Assuming that the costs of a projector are €800 per unit (retail price; based on the information from the preparatory study), the costs will be fairly negligible.

²⁶ i.e. Stand by and off mode electric power consumption (horizontal measure); Circulators in buildings; Televisions; Domestic refrigerators and freezers; Simple set-top boxes; Domestic lighting (general lighting equipment); External power supplies; Tertiary lighting; Electric motors 1-150 kW; Domestic washing machines; and domestic dishwashers.

5.1.4.3 Voluntary agreements (assessed for game consoles)

There will be costs of certification under a voluntary agreement also but industry would minimise the costs by adapting existing measurements or certification processes that are fit for purpose. Moreover, under a voluntary agreement industry would be expected to factor changes to the product design into the normal manufacturing cycle so the need for re-assessment of conformity will be minimised.

5.1.5 Accumulated electricity cost savings through Ecodesign requirements

The accumulated electricity cost savings for the products placed on the market from 2010 until 2025 triggered by the policy measures assessed depend on the timing of implementation. For regulatory requirements, the sooner ecodesign requirements become effective, the shorter the delay between first and second stage, and the more stringent they are, the higher the accumulated electricity cost savings.

Electricity cost savings and carbon savings for all product groups were analysed and estimated through a modelling exercise, with model development advised by technical experts within the product groups. These models are based on best estimates and assumptions, and should therefore be assumed to be indicative of the potential savings that can be achieved through the various policy scenarios. Changing these assumptions may affect the overall absolute impact of the options but the relative ranking of the options would not expect to be significantly affected. The carbon savings are presented in the section describing the environmental impacts (Section 5.3).

The detail and assumptions behind these models is contained within Annex VIII.

The charts below indicate the EU energy consumption of the different policy options from 2010 to 2025. These are a useful precursor to the following sections outlining the potential energy and carbon savings under the different policy options.

It is important to consider that for game consoles, all policy options (including the baseline) involve increased energy consumption over time. The increase is due to an expected increase in the power demand and usage of new game consoles. This is in stark contrast to the other two products whose total energy consumption is expected to decrease over time as sales decline. This is an important point to consider when assessing policy options.

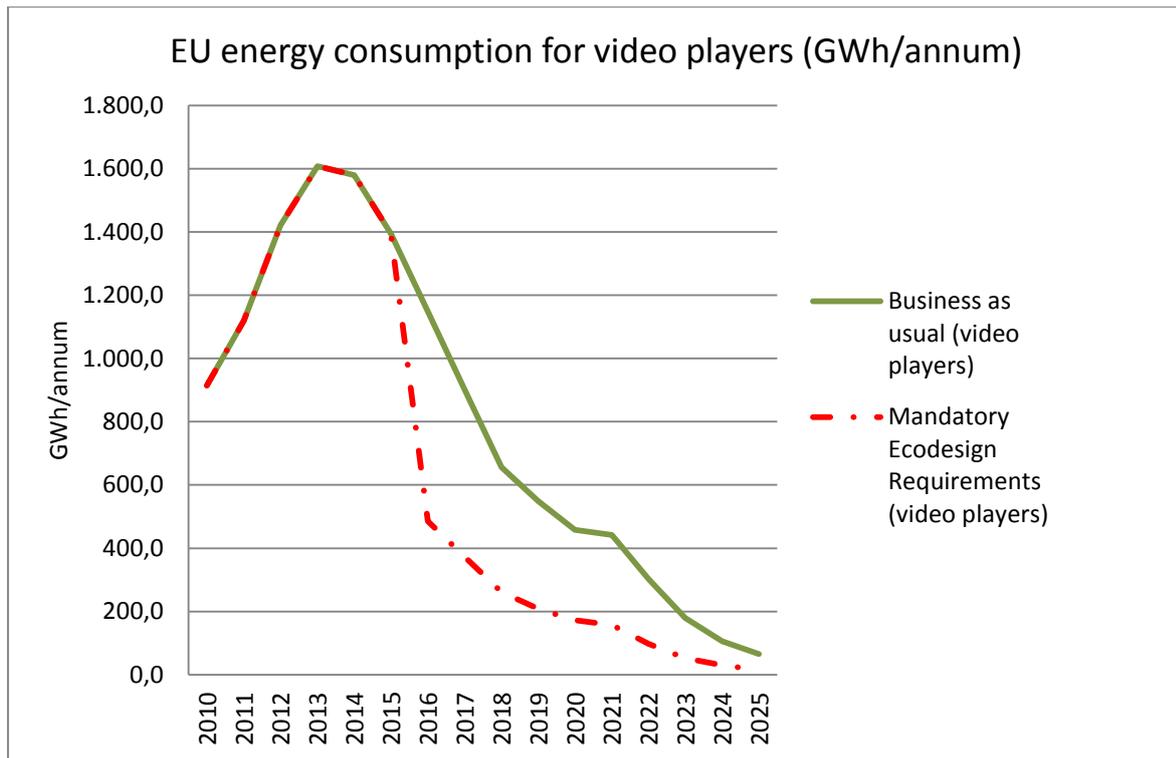


Figure 6: EU Energy Consumption of Video Players (GWh/year)

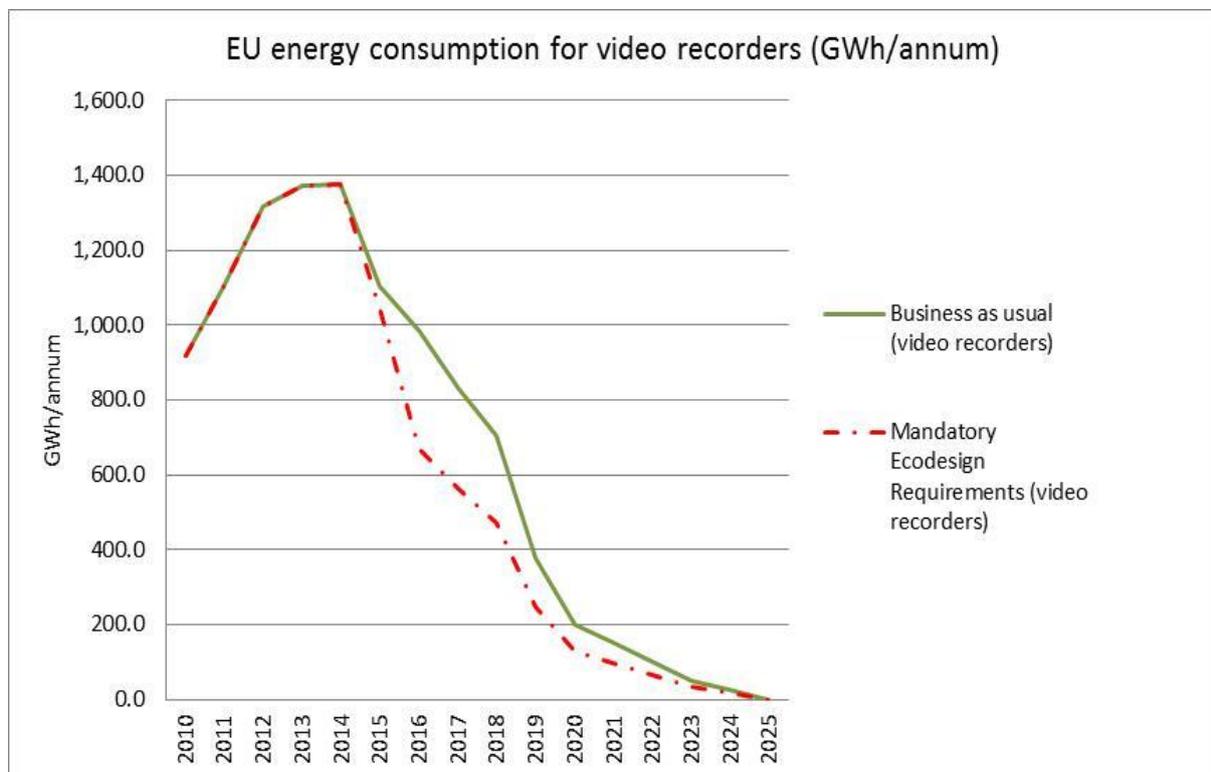


Figure 7: EU Energy Consumption of Video Recorders (GWh/year)

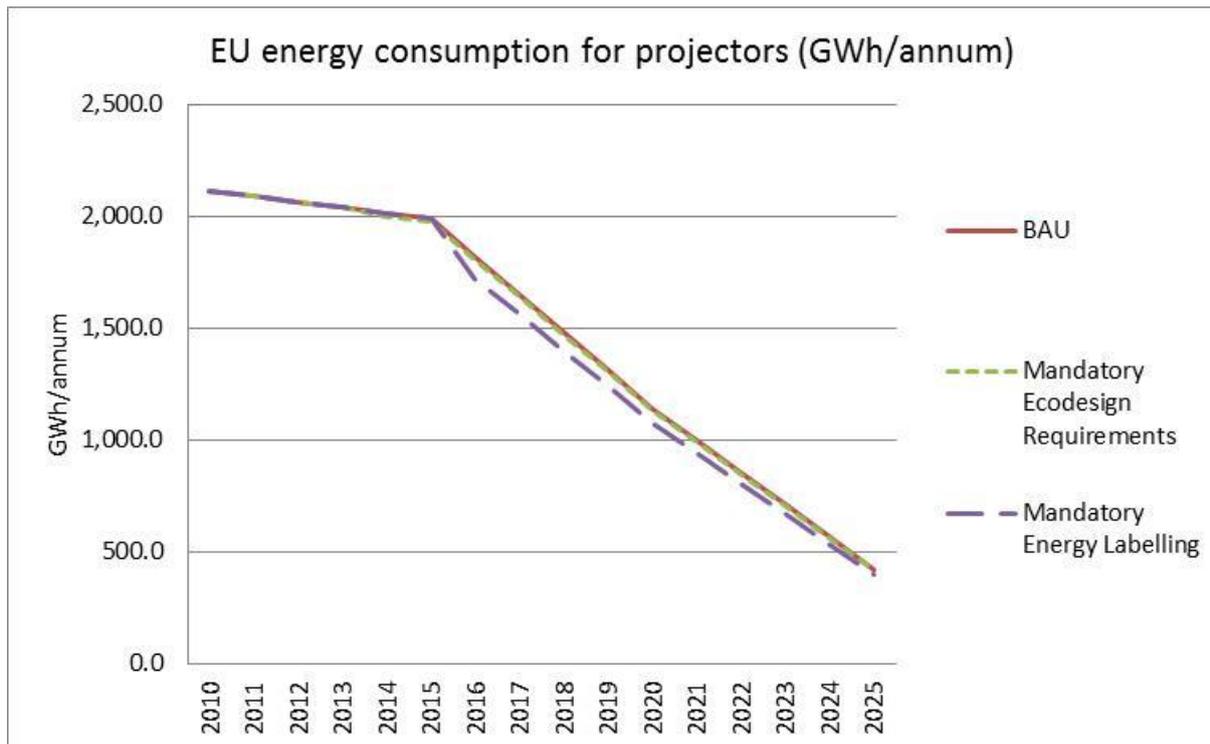


Figure 8: EU Energy Consumption of Projectors (GWh/year)

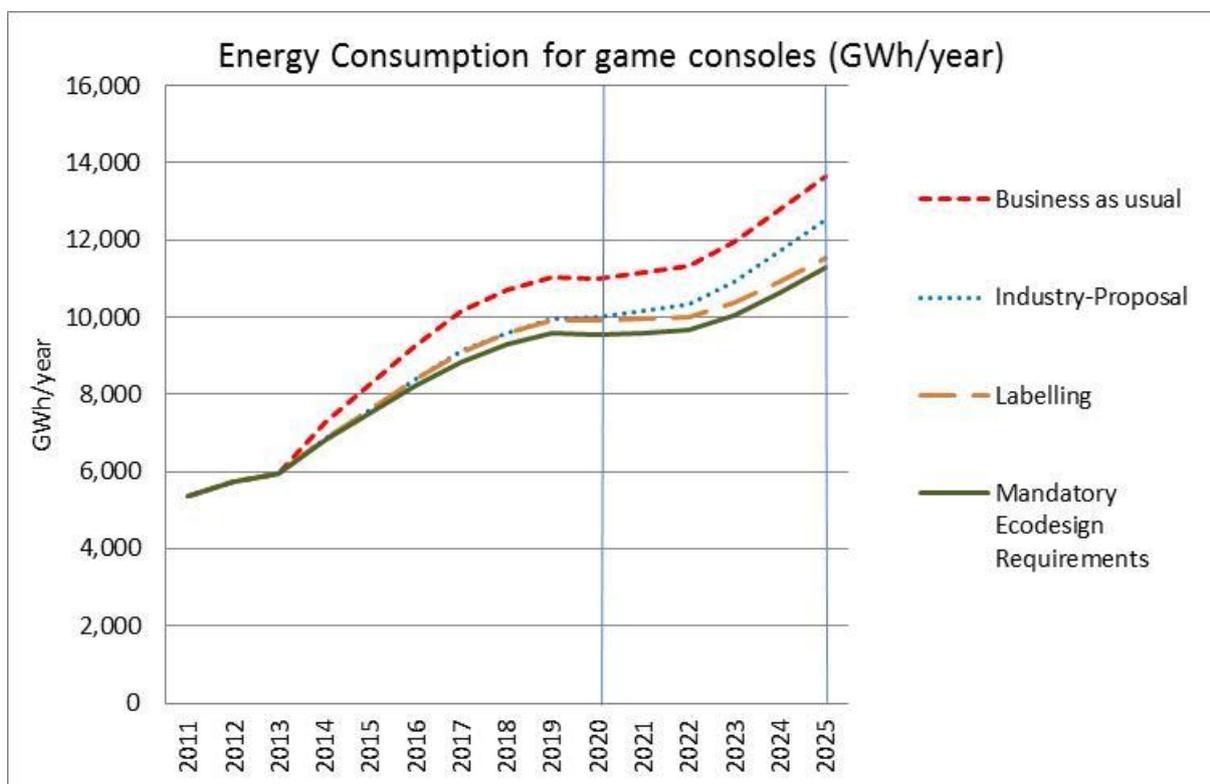


Figure 9: EU Energy Consumption of Games Consoles (GWh/year)

The table below gives an overview of the accumulated electricity savings, the corresponding cost savings and avoided CO2 emissions over a period between 2010 and 2025. These

savings are in comparison to the accumulated energy consumption as outlined in the baseline per product.

	Accumulated electricity consumption (GWh)	Accumulated electricity savings compared to BAU (GWh)	Accumulated avoided CO2 emissions ²⁷ compared to BAU (Mt)	Price of Electricity savings ²⁸ (Million €)	Price of Avoided CO2 emissions (Million €) ²⁹
Games consoles					
Business as usual (BAU)	150,280				
Policy Option 2 -Industry Proposal	138,807	11,472	4.59	2,060	69
Policy Option 3 -Mandatory Ecodesign Requirements (Regulation)	132,641	17,638	7.06	3,170	106
Policy Option 4 -Labelling (Regulation)	135,694	14,585	5.83	2,630	87
Video recorders/players					
BAU	23,465				
Policy Option 3 - Mandatory Ecodesign Requirements (Regulation)	19,314	4,151	1.66	750	25
Projectors					
BAU	23,287				
Policy Option 3 - Mandatory Ecodesign Requirements (Regulation)	23,190	97	0.039	20	1
Policy Option 4 - Mandatory Energy Labelling	22,684	603	0.241	110	4

Table 1: Accumulated Savings 2010 - 2025

²⁷ Assumption: 0.4 kg CO2/kWh (This assumption is taken from a similar Impact Assessment on Computers)

²⁸ Electricity price taken from MEErP, Part 1 study report as €0.18 per kWh for EU27 (<http://www.meerp.eu/downloads/MEErP%20Methodology%20Part%201%20Final.pdf>)

²⁹ Based on 15 €/tonne average market value 2008-2012. Actual market value has fluctuated between €7 and €30 over this time. The State of the European Carbon Market in 2012 COM(2012)652

For game consoles the above table indicates that options 2, 3 and 4 have the potential to create electricity savings and carbon savings, compared to the baseline. As expected, the most ambitious scenario is the regulatory one, which creates the most savings.

For video recorders/players, only the regulatory scenario (option 3) has been modelled, relative to the baseline, and both electricity and carbon saving are also observed.

For projectors, options 3 (regulation) and 4 (labelling) are modelled relative to the baseline. Regulation is expected to achieve very small savings relative to the baseline. For the labelling scenario, electricity consumption is expected to decrease and therefore carbon emissions savings are also expected.

Energy savings over time can come from two sources: a decreasing product stock or more energy efficient products. It is important to consider from which source is dominating. For projectors and video players/recorders, the energy savings are mainly coming from a decreasing stock. For game consoles, it is clear that stocks are increasing over time, and that overall energy consumption is increasing over time. However, incentivising the market towards more energy efficient consoles will help reduce the energy consumption compared to the BAU scenario, albeit still following an upward trajectory over time.

As these energy savings will be experienced by consumers, through usage of more efficient game consoles, they will experience the benefits of these energy savings, in terms of medium to long term reduced energy costs. However, this will come at the short term upfront expense of purchasing the more energy efficient consoles. The magnitude of these savings will depend on individuals' game console usage and energy prices, which are historically volatile.

5.1.6 Administrative costs for Member States

5.1.6.1 Mandatory Ecodesign requirements / regulation (assessed for all product types)

A regulation 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 which is not a probable scenario for games consoles), and the possible need for a second test on a sample of three additional products in the case that the power consumption levels established in the first test are excessive. The resulting costs are expected to be in line with those identified in the television ecodesign impact assessment of order €10000 maximum. The costs for carrying out the verification procedure for market surveillance purposes for set-top boxes have been estimated to be between €400 and €800.

It is not expected that the costs to Member States of checking compliance will be significantly greater than the estimates produced for televisions or set-boxes and because MS will be checking for compliance with other applicable regulation, the marginal costs will be minimised.

5.1.6.2 Mandatory energy labelling (assessed for projectors and games consoles)

The costs for Member States under a mandatory energy labelling schemes are expected to be of similar magnitude to those under a regulation.

5.1.6.3 Voluntary agreements (assessed for game consoles)

There will be no costs implications for Member States under a voluntary agreement.

In conclusion, there are not expected to be significant admin costs on Member States.

5.1.7 Impacts on trade and competitiveness

5.1.7.1 *Mandatory Eco design requirements / regulation (assessed for all product types)*

Most of the manufacturers of the products considered in this impact assessment are based outside the EU. The regulations will apply to all manufacturers equally so in that sense, there would be no expected impacts on their competitiveness, except that smaller manufacturers (SMEs) might find it relatively harder to compete. Consultation has however highlighted the following:

- For game consoles: 10 out of the 12 consultees responding to the questionnaire have noted that a regulation will impact their competitiveness with some highlighting that it will affect their ability to import to Europe.
- For video players and recorders: 5 out of the 7 consultees responding noted that a regulation will impact their competitiveness with particular regards to European SMEs as the high end sector of the Audio/Video industry. It is worth reiterating that the high-end sector is exempt from action.

Due to the lack of costs estimates, however, it is difficult to reconcile the above statement from game console producers with the costs presented in the earlier sections (section 5.1.1 and 5.1.3) as the costs of compliance appear not to be a significant proportion of the total manufacturing costs. Moreover, due to the large volume of products sold in the EU (in 2008 the EU27 imported approximately €5.5 billion of video game consoles and video games) it is not expected that the regulation will deter manufacturers from stopping imports into Europe. On the other hand, it needs to be acknowledged that there may be a delay in the introduction of new products into the EU markets, so EU retailers may be affected by time to market delays.

The impacts on SMEs from requirements on high-end sector of the audio/video industry may be more significant, and hence high-end products are exempt from this study. The preparatory study however raises some doubts on the legal possibilities to exempt so-called 'high-end products' (quality expensive models) if they have similar functions to mass-market products, but For the regulatory scenario under this Impact Assessment it has been assumed that high-end products are exempt; so there will be no impacts on their competitiveness.

5.1.7.2 *Mandatory energy labelling (assessed for projectors and games consoles)*

The impacts on trade as a result of an energy label for projectors and games consoles are expected to be similar to those under a regulation. In 2008 the EU27 imported approximately €1.3 billion of projectors. As all projectors imported into the EU will have to carry such labelling, the option is not expected to lead to relocation of economic activity or have significant impacts on trade.

5.1.7.3 *Voluntary agreements (assessed for game consoles)*

The main risk with a voluntary agreement relates to industry's uptake of it. In other words, if 100% of industry subscribes to the agreement, the impacts on trade will be minimal. If, on the other hand, one manufacturer reneges, then impacts on trade and their competitive position may be more likely. The consultation undertaken for this impact assessment revealed a 100% support of the agreement however. Thus, the impacts on trade are not expected to be significant.

As such, there are no anticipated significant impacts on trade and competitiveness.

5.2 Social impacts

5.2.1 Jobs and impacts on SMEs

For the regulatory policy options assessed, the risk of job losses is expected to be very low, because the staged approach and timings allow manufacturers to adapt in a timely manner to ecodesign requirements. There may be expected to be larger impacts on small retailers, as these may not be able to bear the costs if manufacturers increase their prices; whilst high volume retailers may be able to support the price increases so that consumers are not affected. However, prices increases are not expected to be significant, so these costs are expected to be negligible. More importantly, there are only a small number of SMEs involved in the manufacturing of products under consideration.

The main SME impact would be in the area of high-end video players / recorders. Manufacturing of such products in Europe is below 5,000 units per year. Whilst product prices are high, quality is also a very powerful driver in this segment and it may be a struggle to find a balance between energy efficiency requirements and performance. This could place such companies at a disadvantage as compared to the mass market OEMs, which is why it has been assumed that these products will be allowed an exemption from any policy measures introduced. As noted in 5.1.5.1, the earlier preparatory study noted potential legal difficulties with such an exemption which the European Commission will need to consider. In addition, if Blu-ray requirements are overly stringent there is a risk of loss of jobs in Europe due to the closure of existing Blu-ray manufacturing (potentially 6,000 posts).

In conclusion, there are no significant anticipated impacts on SMEs.

5.2.2 Affordability of equipment

In principle significant price increases to achieve the assessed policy options are not expected. Prices are not expected to change to an extent that affordability could be negatively affected, especially in declining markets such as projectors and video players. In the case of game consoles the maximum price mark-up is estimated by technical experts at €5, which should be offset by electricity cost savings. This is unlikely to represent more than 2% increase of the total price (assuming a game console purchase price of €360, in line with the Preparatory study). The calculations given for electricity savings (in Section 5.3.2.2) show a cumulative saving in electricity of around 6% up to 2020 (from 2010 as base year). Thus, it can be estimated that the additional costs to the consumer will be recouped (in terms of electricity savings) in around three years, which is half of the estimated life-time of a game console.

5.2.3 Impact on the functionality of equipment

As has been mentioned previously, the products that could have difficulties in meeting regulatory requirements are high-end video players / recorders used for professional applications. It was therefore considered necessary to allow exemptions for these products to ensure that their functionality is not negatively affected. For all other products, impacts are expected to be negligible.

5.3 Environmental impacts

5.3.1 Non Energy-in-use Impacts

Life cycle analysis conducted for the Lot 3 Sound and Imaging Equipment preparatory study identified that the most significant environmental impacts of video recorders, projectors and game consoles are a consequence of energy consumption in the use phase, the related energy generation emissions, their impact on air and water quality, and the resulting depletion of energy resources. That analysis, which is common to most products using energy in the use phase, remains true. However, there are a number of other environmental impacts associated with the production materials and waste. Those aspects are already

addressed by related EU legislation such as the Waste Electrical and Electronic Equipment Directive, 2012/19/EU (WEEE)³⁰ and the Restriction of Hazardous Substances Directive, 2011/65/EU (RoHS)³¹. The former sets targets for the collection and recycling of WEEE products. The latter prohibits the use of certain hazardous substances in electronic and electrical products.

The preparatory study³² identifies the following impacts as significant beyond the energy in use phase (predominantly at end of life and during the production of materials):

- Hazardous waste generation / incineration;
- Persistent organic pollutant emissions;
- Heavy metal emissions to air; and
- Particulate matter and dust emissions.

Most of these impacts are associated with the incineration of disposed devices and their component parts at end of life.

Resource scarcity

Impacts on material extraction and resource scarcity will be similar for the three products as they share many similar components, with the exception of the optical elements of a projector. The printed circuit boards of each product contain elements such as indium, platinum and other rare earth metals which have restricted supplies globally. By designing products with fewer scarce resources and increasing durability, manufacturers can reduce the impact of resource depletion.

For projectors, the lens assembly has a much longer lifespan than the rest of the device. Therefore, upon disposal, the lens is suitable for reuse in a new casing. Its disposal constitutes a missed resource saving opportunity.

Plastics recyclability and disposal

Video recorders, projectors and games consoles fall under the Waste Electrical and Electronic Equipment (WEEE) Regulations i.e. there are established collection and disposal systems for these items. However, consumers may be unaware of these systems and the products, due to their small size can end up in the municipal waste stream (up to 75%³³). If not controlled properly, these products can have soil quality, air quality and resource scarcity impacts upon disposal.

Disposal of plastics through landfill implies the loss of valuable materials of high reuse and recycling potential. The disposal of plastics through incineration, where it occurs, contributes to air quality impacts through the emission of embedded carbon and particulate matter. These impacts are particularly significant for games consoles which have a high plastics content by weight, predominantly of ABS (Acrylonitrile butadiene styrene). Therefore, plastics used within these components need to have a high recyclability potential to avoid these impacts. Design that aids dismantling and polymer identification would facilitate recycling.

5.3.2 Annual electricity, electricity cost and CO2 emission savings by 2025 (Energy-in-use Impacts)

Electricity production causes substantial environmental and human health damages, which vary widely depending on how and where the electricity is generated. In 2005 the average external costs of electricity production in the EU were between €0.18–0.59/kWh. The external costs are based upon the sum of three components associated with the production

³⁰ Official Journal, 24 July 2012

³¹ Official Journal, 1 July 2011

³² AEA, 2010

³³ Sound and Imaging Preparatory Study (2010)

of electricity: climate change damage costs associated with emissions of CO₂; damage costs (such as impacts on health, crops etc) associated with other air pollutants (NO_x, SO₂, NMVOCs, PM₁₀, NH₃), and other non-environmental social costs for non-fossil electricity-generating technologies³⁴.

5.3.2.1 Electricity savings

The table below demonstrates the potential electricity savings, as estimated from the modelling exercise. These are snapshots pictures for the years 2020 and 2025, whereas the earlier table demonstrated the accumulative energy savings from 2010 to 2025.

Table - Electricity Use and Savings vs. BaU:						
	2020			2025		
	Use	Savings	%	Use	Savings	
	GWh/a	GWh/a		GWh/a	GWh/a	%
Game consoles						
BAU	11,016			13,662		
Policy option 2 - Industry Proposal	9,997	1,020	9.3	12,540	1,122	8.2
Policy option 3 - Mandatory Ecodesign Requirements (Regulation)	9,555	1,461	13.3	11,267	2,395	17.5
+Policy option 4 - Mandatory Labelling	9,902	1,115	10.1	11,538	2,124	15.5
Video players / recorders						
BAU	660			65		
Policy option 3 - Mandatory Eco design Requirements (Regulation)	298	360	54.5	15	50	76.9
Projectors						
BAU with network standby	1142			423		
Policy option 3 - Mandatory Eco design Requirements (Regulation)	1137	6	0.5	421	2	0.5
Policy option 4 - Mandatory energy labelling	1081	62	5.4	401	23	5.4

Table 2: Electricity use and Savings Compared to Business as Usual (for 2020 and 2025)

The above table demonstrates, again that the greatest potential for energy savings comes from the most ambitious options, i.e. regulation and labelling. Of course, these benefits might come at a disproportionate cost so should not be considered in isolation, but the results are indicative of the potential energy savings from regulation and labelling.

The greatest potential for energy savings (as a proportion of the baseline) stem from video players/recorders regulation, followed by games consoles regulation. In proportionate terms

³⁴ i.e. external cost of nuclear accidents. Nuclear external costs are in the range €0.05–0.07/kWh. Information available at: www.eea.europa.eu/data-and-maps/indicators/en35...costs.../file

there appears to be little benefit from moving towards regulation or labelling for projectors as the margins are negligible.

It is worth noting that the regulatory scenario for projectors is assumed to be very close to the BAU scenario, so there are minimal energy savings achieved.

5.3.2.2 Annual reduction of CO₂ emissions by 2020 and 2025

The table below demonstrates the potential carbon savings, as estimated from the modelling exercise. Again, these figures are presented as a snapshot for the years 2020 and 2025.

Table - Carbon (Mt CO ₂) Savings vs. BaU:						
	2020			2025		
	Use	Savings	%	Use	Savings	
	CO ₂ eq/a	CO ₂ eq/a		CO ₂ eq/a	CO ₂ eq/a	%
Game consoles						
BAU	4.406			5.465		
Policy option 2 - Industry Proposal	3.999	0.408	9.3	5.016	0.449	8.2
Policy option 3 - Mandatory Ecodesign Requirements (Regulation)	3.822	0.584	13.2	4.507	0.958	17.5
Policy option 4 - Mandatory Labelling	3.961	0.446	10.1	4.615	0.849	15.5
Video players / recorders						
BAU	0.264			0.0260		
Policy option 1 - Mandatory Eco design Requirements (Regulation)	0.119	0.145	54.9	0.006	0.020	76.9
Projectors						
BAU with network standby	0.457			0.169		
Policy option 2 - Mandatory Eco design Requirements (Regulation)	0.455	0.002	0.4	0.168	0.001	0.6
Policy option 3 - Mandatory energy labelling	0.0.432	0.025	5.5	0.160	0.009	5.3

Table 3: Carbon Savings Compared to Business as Usual (for 2020 and 2025)

The above table demonstrates the potential carbon savings from policy intervention in these product groups. The results are the same as the energy savings above, since the carbon savings are directly linked to energy savings.

5.4 Comparison of the policy options

The following table summarises the estimated electricity and carbon savings attributable to the preferred policy options compared to the business as usual scenario.

Table – Electricity and Carbon (Mt CO ₂) Savings vs. BaU:				
	2020		2025	
	Electricity Savings (GWh/a)	Carbon Savings (Mt CO ₂ eq/a)	Electricity Savings (GWh/a)	Carbon Savings (Mt CO ₂ eq/a)
Game consoles				
Policy option 2 -Industry Proposal	1,020	0.408	1,122	0.449
Policy option 3 -Mandatory Ecodesign Requirements (Regulation)	1,461	0.584	2,395	0.958
Policy option 4 -Mandatory Energy Labelling	1,115	0.446	2,124	0.849
Video players / recorders				
Policy option 3 - Mandatory Eco design Requirements (Regulation)	360	0.145	50	0.020
Projectors				
Policy option 2 - Mandatory Eco design Requirements (Regulation)	6	0.002	2	0.001
Policy option 3 - Mandatory Energy Labelling	62	0.025	23	0.009

Table 4: Electricity and Carbon Savings Compared to Business and Usual (2020 and 2025)

The following multi-criteria analysis table summarises the potential impacts of the policy options compared to the baseline scenarios. Both economic and social impacts are considered in terms of relative negative impact compared to the baseline, whereas environmental (energy-in-use) impacts are considered in terms of relative positive impact compared to the baseline.

Note that for game consoles, all policy options experience an upward trajectory in energy usage and emissions over time, but for the purposes of ranking policy options it is important to consider the proportion of energy saving achieved compared to the baseline. For game consoles, despite the upward trajectory, the policy options all achieve savings (i.e. positive energy-in-use environmental impact) when compared to the baseline. That is the key point.

The table assesses the impacts on a relative scale from 1 (relatively low impact) to 3 (relatively high impact), with 0 (neutral impact). Note that positive impacts (environmental) are given a positive score, whereas negative impacts (economic and social) are given a negative score. This is a Multi-Criteria Analysis approach to ranking the options.

Finally, note that these scorings are all relative to the baseline, hence the baseline is given a zero score.

For clarity the preferred options are highlighted in bold below and discussed thereafter.

	Economic impact (costs)	Environmental impact (electricity / CO2 savings)	Social impact (risk for Job losses and SMEs)
Game consoles			
BAU	0	0	0
Policy option 2 – Industry Proposal	-1	+1	0
	Negligible costs as driven by industry and minimising downtime. Minimal impacts on consumer.	Savings in electricity and CO2 of around 9.3% to 8.2% for 2020 and 2025 respectively.	Minimal impacts expected (also due to limited number of SMEs).
Policy option 3 – Regulation	-3	+3	-1
	Changes to design will be required, perhaps including separate componentry to support playback at a costs of €40 per unit, a high proportion of this is likely to be passed on to consumer (max. of a 10% increase in price). Electricity savings could be estimated at nearly 7% up to 2020; thus net impacts on consumers are expected to be low to moderate. There could be administrative costs to companies from additional testing (but testing facilities likely to be available)	Savings in electricity and CO ₂ of around 13.3% to 17.5% for 2020 and 2025 respectively	No significant impacts (due to limited number of SMEs in supply chain) Impacts could be more noticeable to small retailers that may not be able to absorb costs
Policy option 4 - Labelling	-2	+2	0
	May be delivered via changes in one componentry but costs may be higher for higher specifications video consoles. No significant costs to consumers expected.	Savings in electricity and CO ₂ of around 10.1% to 15.5% for 2020 and 2025 respectively	No significant impacts (due to limited number of SMEs in supply chain)
Video players / recorders			
BAU	0	0	0
Policy option 3 - Regulation	-1	+1	-1
	Some technical solutions already being applied so costs are not expected to be significant (also assumes	Savings in electricity and CO ₂ of 54.5% to 76.9% for 2020 and 2025 respectively	Exemption for high-end products will minimise impacts

	exemptions for high end products)		
Projectors			
BAU	0	0	0
Policy option 3 - Regulation	0	0	-1
	As MEPS will not differ significantly from the BAU scenario	Negligible reductions in electricity and CO ₂ emissions (<1%)	No significant impacts (because of minimal costs on manufacturers)
Policy option 4 - Mandatory energy labelling	-1	+1	0
	Could result in 10% increase in manufacturing costs	Savings in electricity and CO ₂ of around 5.4% to 5.4% for 2020 and 2025 respectively	No significant impacts (because of insignificant costs)

Video players/recorders

Regulation achieves energy savings, but at a potential cost to the economy, albeit with a medium term potential for savings. The BAU is the preferable and proportionate option for this scenario, but with the acceptance that energy savings are slightly less than could be achieved under the regulatory scenario. The small additional savings from a regulatory scenario are not worth the medium-size additional costs, especially given the stagnating future market for these products.

Projectors

The analysis shows that there is little environmental benefit from any of the policy options, which gives no weight to the argument of pursuing anything other than the BAU scenario. Furthermore, as this product group is expected to experience a dying market, plus the large anticipated costs to manufacturers of any regulation, adopting the BAU approach appears the most proportionate option.

Games Consoles

For games consoles, the preferred option from the evidence outlined above is that the industry proposal is accepted with a view that it is used as the main policy option until at least 2016/2017. However, from 2020, the energy savings achieved from the labelling option (option 2) begin to out-pace the savings achieved by the industry proposal, and once the timeframe reaches 2025, this difference between the industry proposal and the labelling option is significant. This graph (presented earlier in section 5.1.5) is presented again below for ease of reference. The Commission could therefore consider developing the EU mandatory energy label classes in parallel to the requirements in the voluntary industry proposal. This is because there are unlikely to be significant savings from the tier I EU energy label (compared to the industry proposal) but the IA modelling clearly shows that the tier II of the mandatory energy labelling could encourage significantly more savings than the industry proposal alone.

This approach would provide the Commission with enough time to develop the game console label classes. Any shortcomings in the industry proposal (e.g. no requirements on media playback above 1080p) would not have a major impact as it is not expected that

media playback beyond 1080p would be common place before 2017. The energy label could resolve this issue post 2018. There are caveats which apply to this approach. For example, to realise savings from an energy label it is suggested that all game consoles would need to be assessed in the same table of classes. It is also important to note that the power demand requirements laid out in the industry proposal are arguably likely indications of the energy efficiency levels that can be seen in future game console. Also, for an energy label to be effective, then it must be the case that consumers are willing to pay for energy efficient games consoles, which is a risk when often the most important factor in purchase decisions is functionality. Finally, and possibly most importantly, for the industry proposal to be adopted in full then further work would be necessary immediately to ensure the proposal is compliant with Annex VIII of the Directive. There is a shortcoming at present, around Monitoring and Reporting, as discussed in section 4.4.2.2 and in Annex 7.

A secondary option (especially if it is difficult to ensure that the industry proposal is compliant with Annex VIII) is to move forward more quickly with the mandatory labelling approach. This policy option provides manufacturers with some flexibility whilst also providing a structure for NGOs and consumers to encourage more energy efficiency in game consoles. The effectiveness of any mandatory energy label will depend on both the level of interest from stakeholder groups, such as NGOs and consumers, but more importantly on the way the label is developed. If separate classes are developed for different types of game console then the ability of the label to stimulate improved energy efficiency across the media playback and navigation modes would be severely impacted.

As previously mentioned, there are some risks that an EU mandatory energy label on games consoles may not drive the market towards energy efficient products as consumer preference for energy efficiency may be outweighed by the preference for functionality and other considerations such as purchase price. It must however be highlighted that any regulatory measure, although achieving more notable energy savings, would also create additional economic costs, as outlined in the table above, and is therefore the least preferred policy option. Therefore the above hierarchy of policy options is proposed.

5.5 Sensitivity analysis

The modelling exercise was based on assumptions and best judgments from our technical experts. These assumptions are included in ANNEX VIII for more information. The modelling derives point estimates for the potential energy and carbon savings, which could arguably be subject to sensitivity analysis; however it is not believed that any one assumption is driving the results, so we feel that sensitivity analysis would not change the ranking of the policy options, although it may impact on the absolute values.

Below we have listed some considerations on the model sensitivities.

For **video players / recorders** there is a shift from disc-based systems to internet-connected or external drive systems. This means that the power demand of the actual product is being driven downward and toward battery powered devices, with energy consumption shifting to external drives and internet infrastructure.

For **projectors**, cost effective lamp improvement potential may be minimal as whilst step improvements in efficiency from current levels are possible, they are not possible within a low lifecycle cost solution. This, combined with the rapid decline expected in the market means that savings from policy measures are expected to be minimal.

For **game consoles**, any projections linked to the evolution of such a dynamic product group as game consoles have to be treated with caution. The variability in functionality and power demands through iterations of each model of a game console needs to be considered, as well as future models of game console coming to market with unknown technical functionalities and power demands. Requirements on future game console will have less of an economic impact if they are implemented prior to finalisation of the product design. New

technologies may come onto the market that both drive the power consumption of these devices up or may offer possibilities for additional power reductions.

In summary, the following assumptions are those most important to our analysis:

- Assumed rate of decline of the video player / recorder market
- Assumed rate of decline of the projector market
- Assumed energy efficiency of future generation game consoles

6 CONCLUSION

Following the principle of proportionality in the analysis, various policy options were discarded at an earlier phase through an iterative screening process regarding how feasible and realistic the options might be in practice. This ensures proportionality, and that the majority of effort is focused on potentially workable options keeping the analysis more meaningful.

The analysis shows that the above suite of policy options optimally fulfil the objectives as set out in Section 3. In particular, the policy option suite implies:

- cost-effective reduction of electricity consumption
- compatibility and complementarity with existing policy instruments, namely the ENERGY STAR Programme, the ecodesign regulations on standby/off mode and external power supplies (energy-efficiency), and the RoHS Directive (mercury) is achieved
- 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
- a clear legal framework for product design
- no significant impacts on the competitiveness of industry and employment, and in particular in the SMEs sector due to the small absolute costs related to product re-design and re-assessment

7 MONITORING AND EVALUATION

It is important to consider the need to monitor and evaluate any action, whether it is regulation, labelling or an industry proposal.

For any regulation, it is appropriate to review the scope, definitions and limits after a maximum of three 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 would 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 would mainly be implemented by market surveillance carried out by Member State authorities ensuring that the requirements are met. Further information from the field as for example, complaints by consumer organisations or competitors could alert on possible deviations from the provisions and/or of the need to take action.

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

The main issues for a possible revision of any proposed regulations are:

- the appropriateness of the levels for the specific ecodesign requirements, especially tier 2 for game consoles (based on the consultation responses concerning competitiveness)
- the appropriateness of the product scope (in particular exemption for high-end video players)
- the possibility to enhance other environmental impacts than energy in the use phase.

For an energy label, the monitoring and evaluation arrangements will be similar to those of the regulation. In addition, data could be collected to reflect changes in demand according to the product information displays. This will help evaluating whether labelling has been successful in influencing consumer demand.

For a voluntary industry agreement, the signatories would nominate a body to carry out monitoring and reporting on a quarterly basis, which could then inform the Commission position on the agreement as the dynamics of the market and efficiency of products changes over time.

8 ANNEXES

Annex 1: Structure of the methodology used for establishing the technical, environmental and economic analysis

Annex 2: Definitions for game console modes addressed in this analysis

Annex 3: Detailed overview of the sub-options for a game console ecodesign regulation

Annex 4: Detailed overview of the sub-options for a video player / video recorder ecodesign regulation

Annex 5: Detailed overview of the sub-options for a projector ecodesign regulation

Annex 6: Matrices of Options for ecodesign Criteria for Game Consoles

Annex 7: Assessment against Annex VIII of the Directive

Annex 8: Modelling Assumptions and Graphs

Annex 9: Summary of Public Consultation

8.1 Annex 1

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

Following the "Methodology Study Ecodesign 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

Task 3: 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

8.2 Annex 2

Definitions for game console modes addressed in this analysis

Idle/Inactive modes:

The modes in which the game console is interactively manipulated by the user in response to prior or concurrent user input. The following idle sub-modes are defined:

(1) Navigation Mode (aka Home Menu, System Menu, Cross Media Bar, or Dashboard):

The Home Menu includes the screen(s) initially displayed for user navigation to selected game features for the selected game.

(2) Game Play Pause: A game otherwise being played is paused after receiving user input.

(3) Game Play Idle/Inactive: A game is idled while awaiting user input. The game may have just loaded or game play has ended, but the game's software is in control of the unit.

(4) Video Stream Play/Media Playback: The Game Console is playing a video stream through a network connection.

(5) Video Stream Pause: The video player is paused during active streaming of the video.

Sleep modes:

The mode that the console is capable of entering automatically after a period of inactivity or by manual selection. The console is not engaging in game play or content delivery in this mode. The console may wake from sleep mode in one of two ways:

- a) User-Initiated: Game Consoles shall wake within 120 seconds of initiation of wake event; or
- b) Automatic: This ability to automatically wake is typically independent of user interaction and does not require concurrent user input.

The console is capable of automatically waking from sleep mode to perform "System Maintenance and Download," and/or perform other system-level functions. When a Game Console wakes from sleep mode without user input, it must automatically re- enter sleep after any maintenance activity or download is complete. Game Consoles shall spend no more than 10 minutes per day automatically checking into a central server and 1 hour per week of automatic System Maintenance and Download (not withstanding paid content) on average over the course of 1 year. These times assume a 100 kb/s data rate.

The following sleep sub-modes are defined:

(1) Sleep (Wireless AP /router): A sleep mode where the game console is acting as a wireless access point or router. In this mode other products connect to the internet through the game console.

(2) Sleep (WoWLAN)/Network Standby: A sleep mode with an active wireless network connection and the ability to be woken through the network ³⁵

(3) Sleep (WoL)/Network Standby: A sleep mode with an active wired network connection (e.g. Ethernet connection) and the ability to be woken through the network ³⁶

(4) Sleep (no network): A sleep mode with neither wired nor wireless network connection activated.

Off mode:

The mode where the console is plugged into a power source but is not providing any primary or secondary function and has no saved hardware state. The console has no active network link and although may be capable of charging devices in this mode. Not all consoles may have this mode.

The following off sub-modes are defined:

(1) Off mode (no network): means a condition in which the equipment is connected to the mains power source and is only providing minimal functionality such as an optional an optional 'reactivation function' where the console may be woken via user input through the remote controllers.³⁷

^{35,9} These modes are likely to be considered as offering low network availability under the Standby Directive 1275/2008. However, where more complex functions, other than simply wake up commands, are available in sleep mode then the mode would likely to be considered as offering high network availability under the Standby Directive 1275/2008.

³⁷ It is assumed that the off mode (when no network is active, no information display is present and no reactivation is available other than the physical pressing of a button) of game consoles likely meets the definition of "off mode" in the Commission Regulation No 1275/2008. Where a reactivation function is available (e.g. via the remote controllers) then this would be considered a "standby" mode in the Commission Regulation No 1275/2008. Therefore the off mode and standby mode of game

(2) Off mode (network): means a condition in which the equipment is connected to the mains power source and is only providing minimal functionality such as an optional 'reactivation function' where the console may be woken via user input through the remote controllers. Low network availability may remain supporting functionality such as Wake on Local Area Network (LAN) (WoL) or Wake on Wireless LAN (WoWLAN) which allows a game console to transition from an off mode (or another similar low power mode) when directed by a network request via Ethernet or wireless network.³⁸

8.3 Annex 3

Detailed overview of the sub-options for a game console ecodesign regulation

Option 1 – Alternative Measures		Option 2 – Higher Ambition			Option 3 – Lower Ambition																											
1. Idle Power Demand																																
Tier 1 – 2014		Tier 1 – 2013			No Requirements																											
<table border="1"> <thead> <tr> <th>Mode</th> <th>All Game Consoles</th> </tr> </thead> <tbody> <tr> <td>Navigation Mode</td> <td>70.0W</td> </tr> <tr> <td>Game Play Pause</td> <td>No requirements</td> </tr> <tr> <td>Video Stream Play/Media Playback</td> <td>70.0W</td> </tr> <tr> <td>Video Stream Pause</td> <td>No requirements</td> </tr> </tbody> </table>	Mode	All Game Consoles	Navigation Mode	70.0W	Game Play Pause	No requirements	Video Stream Play/Media Playback	70.0W	Video Stream Pause	No requirements	<table border="1"> <thead> <tr> <th>Mode</th> <th>SD</th> <th>HD</th> </tr> </thead> <tbody> <tr> <td>Navigation Mode</td> <td>15.0W</td> <td>75.0W</td> </tr> <tr> <td>Game Play Pause</td> <td>15.0W</td> <td>75.0W</td> </tr> <tr> <td>Video Stream Play/Media Playback</td> <td>15.0W</td> <td>75.0W</td> </tr> <tr> <td>Video Stream Pause</td> <td>10.0W</td> <td>60.0W</td> </tr> <tr> <td>Game play idle All products</td> <td colspan="2">maximum = 80.0W</td> </tr> </tbody> </table>	Mode	SD	HD	Navigation Mode	15.0W	75.0W	Game Play Pause	15.0W	75.0W	Video Stream Play/Media Playback	15.0W	75.0W	Video Stream Pause	10.0W	60.0W	Game play idle All products	maximum = 80.0W				
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Tier 2 – 2017		Tier 2 – 2014																														
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Game play idle All products	maximum = 80.0W																															

Game consoles are likely already covered by an ecodesign regulation and so no further power requirements would be deemed necessary.

³⁸ This mode is likely to be considered as offering low network availability under the Standby Directive 1275/2008. The low network availability requirements under 1275/2008 are likely too lenient for game consoles in this power mode.

Tier 3 – 2016		
Mode	SD	HD
Navigation Mode	10.0W	25.0W
Game Play Pause	10.0W	25.0W
Video Stream Play/Media Playback	10.0W	30.0W
Video Stream Pause	10.0W	25.0W
Game play idle All products	maximum = 80.0W	

2. Sleep mode/Network Standby		
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Tier 1 – 2014		Tier 1 – 2014		Tier 1 – 2014	
Mode	All	Mode	All	Mode	
Network Standby	6.0W	Sleep (Wireless AP /router)	12.0W	Sleep (Wireless AP /router)	
		Sleep (WoWLAN)	4.0W	Sleep (WoWLAN)	
		Sleep (WoL)	4.0W	Sleep (WoL)	
		Sleep (no network)	2.0W	Sleep (no network)	

Tier 2 – 2017	
Mode	All
Network Standby	3.0W

3. Off Mode³⁹		
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Tier 1 – 2014		Tier 1 – 2012		Tier 1 – 2012	
Mode	All	Mode	All	Mode	
Standby (only reactivation and indication of enabled reactivation)	0.5W	Off (network)	n/a	Off (network)	
Standby (information and status display)	1.0W	Off (no network)	1.0W	Off (no network)	

Tier 2 – 2013		Tier 2 – 2013	
Mode	All	Mode	
Off (network)	n/a	Off (network)	
Off (no network)	0.5W	Off (no network)	

³⁹ Baselines 2 and 3 assume: levels in line with current standby regulation - 1W off (no network) 2012, 0.5W off (no network) 2013.

		Tier 3 – 2014		Tier 3 – 2014	
		Mode	All	Mode	
		Off (network)	1.7W	Off (network)	
		Off (no network)	0.5W	Off (no network)	
4. Internal power supply efficiency					
Tier 1 – 2014					
Mode		All			
Internal power supply	85% minimum efficiency at 50% of rated output and 82% minimum efficiency at 20% and 100% of rated output, with Power Factor > 0.9 a				
5. Power management					
Tier 1 – 2014		Tier 1 – 2013		Tier 1 – 2013	
Power down time 1 hour after inactivity in game play mode		Industry suggestions with changes to power down time to 30 minutes in game play		Industry suggestions	

8.4 Annex 4

Detailed overview of the sub-options for a video player / video recorder Eco design regulation

		Revised proposal		
		Sub option 1 <i>Assessed in more detail as a potential regulation</i> BAT	Sub option 2 BAU	Sub option 3 BNAT
Operating mode	Product	(2015)	(2014)	(2016)
On play	Video player	SD <= 8W HD <=15W	SD <=10W HD <=20W	SD <= 6W ⁴⁰ HD <=10W
	Video recorder	<=20W	<=30W	<=18W
Live pause	Video recorder	<=20W	<=30W	<=18W
Fast start	Video players and recorders	<=8W	<=8W	<=5W
Off mode or standby equivalent	Video players and	<=0.5W with hard on switch	<=0.5W with hard on switch	<=0.5W with hard on switch

⁴⁰ The power consumption of the drive's motor is about 5 Watts in on-mode. Since the disc speed varies depending on the position of the pick up (read head) the motor is connected with a controller with its own power demand. Under the assumption there would be any further development of SD devices, playing a video straight from the disc would not be possible. It would be possible to read the video data from the disc, store it locally in the device and play it from the internal memory.

power condition ⁴¹	recorders	<=0.3W without	<=0.3W without	<=0.3W without
Fast start enabling	Video player	Disabled by default. ⁴² Description of the increase in power demand compared to standby mode provided.	As previous	As previous
	Video recorder	Fast start mode restricted to 4 hours or only when the TV is on.	As previous	As previous
Auto power down (APD) enabling APD is part of the Standby Regulation Tier 2 from January 2013	Video players and recorders	APD requirements enabled by default.	As previous	As previous
Time to enter standby / off / equivalent from conditions not providing on-mode functions ⁴³ after no user interaction	Video players	0.5 h	As previous	As previous
	Video recorders	3.0 h ⁴⁴	As previous	As previous

⁴¹ The savings per device would be 1.752 kWh per year, which would be €0.5 per year.

⁴² Disabling the fast start mode by default would be an easy to use option for all devices purchased online. In store shelf mode would switch to "fast start" for presentation purposes.

⁴³ i.e. menu navigation, live pause, fast start

8.5 Annex 5

Detailed overview of the sub-options for a projector ecodesign regulation

	Sub option 1 (Regulation in line with JBMIA proposal and network standby amendment) <i>Assessed in more detail</i>		Sub option 2 (Regulation in line with JBMIA proposal, but with more ambitious network standby requirements)		Sub option 3 (Previously proposed in ErP preparatory study)	
Operating mode	(2014)		(2014)		(2015)	
Off mode	0.5W		0.5W		0.5W	
Standby mode	1.0W		1.0W		1.0W	
Network standby (with status display)	In line with standby regulation requirements for network standby		1.0W		1.0W	
On mode	Total projected light output (lm)	Efficiency requirement W/lm	Total projected light output (lm)	Efficiency requirement W/lm	Total projected light output (lm)	Efficiency requirement W/lm
	$X < 1,500$	0.150	$X < 1,500$	0.150	$X^{45} < 2,500$	0.105
	$1,500 \leq X < 2,500$	0.120	$1,500 \leq X < 2,500$	0.120	$2,500 \leq X < 4,000$	0.095
	$2,500 \leq X < 4,000$	0.110	$2,500 \leq X < 4,000$	0.110	$4,000 \leq X < 5,000$	0.085
	$4,000 \leq X < 5,000$	0.100	$4,000 \leq X < 5,000$	0.100	$4,000 \leq X < 5,000$	0.100
	$5,000 \leq X$	0.090	$5,000 \leq X$	0.090	$5,000 \leq X$	0.080
	Correction co-efficient					
Wide aspect	1.1					
Multi lamp and Xenon lamp	1.3					
Solid state light source	2.0					
Home theatre projectors	2.0					
Short throw projectors	1.3					

Correction coefficients would apply to the efficiency limits depending on the projector specifications (product categories, lamp technology).

⁴⁵ X = Effective Flux (total projected light output) X lm

8.6 Annex 6

Matrices of Options for Eco design Criteria for Game Consoles

Mode / feature	Source cross reference	Comments	Take forward option for discussion?
Idle/Inactive	ENERGY STAR and industry input to preparatory study	ENERGY STAR previously referenced "idle", but definitions have shifted from "idle" in general to more specific idle modes such as video stream idle, navigation menu idle and game play idle. Industry is favouring the term "Inactive" as they claim game consoles have no "idle mode".	NO
Navigation Menu Idle	NRDC test method	There appears to be industry agreement on the definition and testing of this mode. However, focusing on this mode alone may fail to result in efficient game console performance, as time spent in this mode is likely to be minimal.	YES
Game Play (active)	NRDC test method	Whilst ENERGY STAR appears unlikely to develop a test approach for game play, the NRDC test approach contains a game play measurement, suggesting that addressing this mode is technically feasible. Absolute limits in game play mode would be unlikely to be acceptable to industry as they would be seen to be limiting capability of game consoles.	NO
Game Play Pause	ENERGY STAR	An ENERGY STAR test method is available for game play pause. The level of power demand in this mode should be much lower than in active game play. Placing requirements on this mode would encourage efficiency improvements such as power scaling.	YES
Game Play Idle/Inactive	Mode defined in ENERGY STAR discussions. Published data for levels.	As for game play pause, reduction in power use in this mode from active should be considerable (but is not in practice) as the console is required to do less (i.e. render and process less data). However, there is no detailed current test approach for this mode – although defining one may not be as problematic as for active game play (ENERGY STAR have a draft test procedure in place).	NO
Video Stream Play ⁴⁶	ENERGY STAR and NRDC test method	An ENERGY STAR test method is available for this mode. Dedicated devices perform the same function at much lower levels, suggesting that requirements in this mode could transform the market toward improved energy efficiency.	YES
Video Stream Pause	ENERGY STAR	An ENERGY STAR test method exists for this mode. Reduced levels to those proposed in video stream play could be proposed, to ensure the product is more efficient when not in active use.	YES
Video Stream Idle/Inactive	ENERGY STAR	Pause seems a good approximation of idle, therefore there does not seem much advantage in addressing this mode.	NO
System Maintenance	ENERGY STAR	Little advantage in addressing system maintenance as it represents a minimal proportion of operation time.	NO
Download	ENERGY STAR	Little advantage in addressing system download as it represents represent a minimal proportion of operation time.	NO
Sleep	ENERGY STAR	Various configurations and related requirements are possible, including WIRED and WIRELESS WOL and with or without network and wireless AP/router.	YES
Standby / off	ENERGY STAR	Various configurations and related requirements are possible, including with or without network connection	YES
Other functionality allowance	None	Additional features need not be active in idle, and so are currently considered only a concern for active mode measurements.	NO

⁴⁶ Referred to as "Video Playback DVD", "Video Playback Blu-ray disc", "Video streaming HD" or "Media Play / recording"

TEC approach	Preparatory study and ENERGY STAR computers	Include modes as part of a TEC approach to requirements (game play x time in game play + game play idle x time in idle + navigation idle x time in navigation idle etc). Consistent with computer approaches and could be achieved with modes considered robust ("YES" responses) in the assessment above.	NO
Formula approach for game play scaling	Preparatory study	Power requirements: Game play pause as a proportion of game play (active): 0.3433 x Game Play Power Demand + 16.068. Whilst the NRDC test approach contains a measurement for active game play, it does not include a mode equivalent to "game play idle". The ENERGY STAR draft test approach included "game play pause", that could be assumed equivalent to idle.	NO
Formula approach accounting for power demand vs performance		An active mode requirement of a certain number of gigaFLOPS (graphic processing power) per game play pause W power consumption. Could provide a flexible approach allowing for future console generations although would require considerable discussion about whether gigaflops were an accurate way of representing game console performance in active mode.	NO

Sub-Option Summary

Mode / feature	Take forward option for discussion?	Sub option 1
Idle	NO	NO
Navigation Menu Idle	YES	YES
Game Play (active)	NO	NO
Game Play Pause	YES	NO
Game Play Idle/Inactive	NO	NO
Video Stream Play ⁴⁷	YES	YES
Video Stream Pause	YES	NO
Video Stream Idle/Inactive	NO	NO
System Maintenance	NO	NO
Download	NO	NO
Sleep	YES	YES
Standby / off	YES	YES
Other functionality allowance	NO	NO
TEC approach	YES	NO
Formula approach for game play scaling	NO	NO
Formula approach accounting for power demand Vs performance	NO	NO

8.7 Annex 7

Assessment against Annex VIII of the Directive

In line with Article 17 of the Eco design Directive "Voluntary agreements or other self-regulation measures presented as alternatives to implementing measures in the context of this Directive shall be assessed at least on the basis of Annex VIII". As a basic condition,

⁴⁷ Referred to as "Video Playback DVD", "Video Playback Blu-ray disc", "Video streaming HD" or "Media Play / recording"

voluntary agreements under the Eco design Directive need a high level of environmental ambition and need to demonstrate that they are likely to deliver the policy objectives faster or in a less costly manner than mandatory requirements.

The industry proposal relates to the criteria annexed to the directive as follows:

- Openness of participation:
“Self-regulatory initiatives must be open to the participation of third country operators, both in the preparatory and in the implementation phases”.
Met: The industry proposal is open to any new members and so would meet the Eco design criteria of openness.
- Added value:
“Self-regulatory initiatives must deliver added value (more than ‘business as usual’) in terms of the improved overall environmental performance of the product covered”.
Met: The modelling exercise demonstrates that the Industry Proposal delivers greater environmental improvement than the BAU scenario.
- Representativeness:
“Industry and their associations taking part in a self-regulatory action must represent a large majority of the relevant economic sector, with as few exceptions as possible. Care must be taken to ensure respect for competition rules”.
Met: There are only three major game console manufacturer, all of whom would likely participate in a voluntary agreement.
- Quantified and staged objectives:
“The objectives defined by the stakeholders must be set in clear and unambiguous terms, starting from a well-defined baseline. If the self-regulatory initiative covers a long time-span, interim targets must be included. It must be possible to monitor compliance with objectives and (interim) targets in an affordable and credible way using clear and reliable indicators. Research information and scientific and technological background data must facilitate the development of these indicators”.
Met: The current industry proposal meets many of the requirements of the “qualified and staged objectives” criterion in that it covers a long time span, includes interim targets, and would facilitate relatively straightforward compliance monitoring. However, some important aspects of this criterion would not be met by the current industry proposal. For example, evidence to support the proposed power demand levels would be useful.
- Involvement of civil society:
“With a view to ensuring transparency, self-regulatory initiatives must be publicised, including through the use of the Internet and other electronic means of disseminating information. The same must apply to interim and final monitoring reports. Stakeholders including Member States, industry, environmental NGOs and consumers’ associations must be invited to comment on a self-regulatory initiative”.
Met: The industry proposal has been communicated to some stakeholder groups. It would be likely that wider communication would occur in future and so the “involvement of civil society” criterion would likely be met.
- Monitoring and reporting:
“Self-regulatory initiatives must contain a well-designed monitoring system, with clearly identified responsibilities for industry and independent inspectors. The Commission services, in partnership with the parties to the self-regulatory initiative, must be invited

to monitor the achievement of the objectives. The plan for monitoring and reporting must be detailed, transparent and objective. It must remain for the Commission services, assisted by the Committee referred to in Article 19(1), to consider whether the objectives of the voluntary agreement or other self-regulatory measures have been met”.

Not Met: The current industry proposal does not contain a “well-designed monitoring system” and so this criterion would not be met at present. It is likely that monitoring systems used in other voluntary agreements could be adopted, and if necessary altered, for use in any agreement on game consoles.

- Cost-effectiveness of administering a self-regulatory initiative:

“The cost of administering self-regulatory initiatives, in particular as regards monitoring, must not lead to a disproportionate administrative burden, as compared to their objectives and to other available policy instruments”.

It is unlikely that any agreement on games consoles would lead to disproportionate administrative burdens.

- Sustainability:

“Self-regulatory initiatives must respond to the policy objectives of this Directive, including the integrated approach, and must be consistent with the economic and social dimensions of sustainable development. The protection of the interests of consumers, health, quality of life and economic interests, must be integrated”.

Met: It is likely that the current industry proposal would meet most of the requirements behind the “sustainability” criterion.

- Incentive compatibility:

“Self-regulatory initiatives are unlikely to deliver the expected results if other factors and incentives — market pressure, taxes, and legislation at national level — send contradictory signals to participants in the self-regulatory initiative. Policy consistency is essential in this regard and must be taken into consideration when assessing the effectiveness of the initiative”.

Met: There are unlikely to be any other factors or incentives that would adversely affect a voluntary agreement approach on game consoles.

8.8 Annex 8

Modelling Assumptions and Graphs

Video Player/Recorder Model Assumptions

Two different scenarios modelled:

- Business as usual (do nothing) with the power and usage assumptions from the technical expert
- Mandatory Ecodesign Requirements with the power and usage assumptions from the technical expert. Coming into force from 2016 onwards.

Network Standby scenario was not modelled because these products are fading away and no regulation will be enforced in terms of NS. The variables in the model are Power consumption and hours of usage for the different modes and stock figures:

1. Use Patterns

Basecase (BAU)

	on-record (hr)	on-play (hr)	live-pause (hr)	fast start/on-idle (hr)	standby or off-mode (hr)
DVD player		0.75		0.50	22.75
DVD recorders	0.25	0.75		2.30	20.70
DVD recorder with hard disk drives	0.25	0.75	9.00	2.30	11.70
Blu-ray player		0.75		14.25	9.00
Blu-ray recorders	0.25	0.75		14.00	9.00
Blu ray recorders with hard disk drives	0.25	0.75	9.00	5.00	9.00

Scenario 1 (Mandatory Ecodesign Requirements)

	on-record (hr)	on-play (hr)	live-pause (hr)	fast start/on-idle (hr)	standby or off-mode (hr)
DVD player		0.75		0.50	22.75
DVD recorders	0.25	0.75		2.30	20.70
DVD recorder with hard disk drives	0.25	0.75	4.00	2.30	16.70
Blu-ray player		0.75		0.50	22.75
Blu-ray recorders	0.25	0.75		4.00	19.00
Blu ray recorders with hard disk drives	0.25	0.75	4.00	4.00	15.00

2. Power demand

Basecase (BAU)

	on-record (W)	on-play (W)	live-pause (W)	fast start/on-idle (W)	standby or off-mode (W)
DVD player		10.00		8.00	0.50
DVD recorders	20.00	20.00		15.00	0.50
DVD recorder with hard disk drives	30.00	30.00	30.00	20.00	0.50
Blu-ray player		18.00		5.00	0.50

Blu-ray recorders	25.00	20.00		5.00	0.50
Blu ray recorders with hard disk drives	25.00	25.00	20.00	5.00	0.50
Home cinema system					

Scenario 1 (Mandatory Ecodesign Requirements)

	on-record (W)	on-play (W)	live-pause (W)	fast start/on- idle (W)	standby or off-mode (W)
DVD player		8.00		6.00	0.50
DVD recorders	20.00	20.00		15.00	0.50
DVD recorder with hard disk drives	30.00	30.00	30.00	8.00	0.50
Blu-ray player		15.00		5.00	0.30
Blu-ray recorders	20.00	20.00		5.00	0.50
Blu ray recorders with hard disk drives	25.00	20.00	20.00	5.00	0.50
Home cinema system					

3. Sales and Stock

Product	EU-27 sales	EU-27 stock								
	[million units in 2010]	[million units in 2010]	[million units in 2011]	[million units in 2011]	[million units in 2012]	[million units in 2012]	[million units in 2013]	[million units in 2013]	[million units in 2014]	[million units in 2014]
DVD player	20.00	90.00	30.00	95.00	20.00	100.00	10.00	95.00	7.00	80.00
DVD recorders	6.00	24.00	8.00	25.00	5.60	24.00	4.00	20.00	2.00	15.00
DVD recorder with hard disk drives	3.90	14.50	4.50	17.00	5.00	20.00	5.00	16.00	3.90	14.50
Blu-ray player	1.50	5.00	4.00	10.00	8.00	18.00	12.00	25.00	10.00	28.00
Blu-ray recorders		-	1.00	3.00	2.00	5.00	4.00	10.00	5.00	13.00
Blu ray recorders with hard disk drives		-		-	2.00	5.00	4.00	10.00	5.00	13.00
Home cinema system	4.00	10.00	6.00	12.00	8.00	15.00	7.00	18.00	6.00	20.00

Product	EU-27 sales	EU-27 stock								
	[million units in 2015]	[million units in 2015]	[million units in 2016]	[million units in 2016]	[million units in 2017]	[million units in 2017]	[million units in 2018]	[million units in 2018]	[million units in 2019]	[million units in 2019]
DVD player	5.00	50.00	3.00	40.00	2.00	30.00	1.00	20.00	1.00	15.00
DVD recorders	1.00	10.00	0.70	5.00	0.40	4.00	0.10	3.00	0.10	1.00
DVD recorder with hard disk drives	1.50	12.00	1.00	10.00	0.50	7.00	0.20	5.00	0.10	2.00
Blu-ray player	10.00	30.00	8.50	25.00	7.00	20.00	5.00	15.00	4.50	13.00
Blu-ray recorders	4.00	10.00	3.00	12.00	2.50	11.00	1.00	10.00	0.50	6.00
Blu ray recorders with hard disk drives	4.00	10.00	3.00	12.00	2.50	11.00	1.00	10.00	0.50	6.00
Home cinema system	5.00	20.00	5.00	22.00	4.00	20.00	2.00	16.00	1.00	12.00

Product	EU-27 sales	EU-27 stock										
	[million units in 2020]	[million units in 2020]	[million units in 2021]	[million units in 2021]	[million units in 2022]	[million units in 2022]	[million units in 2023]	[million units in 2023]	[million units in 2024]	[million units in 2024]	[million units in 2025]	[million units in 2025]
DVD player	-	12.00	-	10.00	-	5.00	-	2.00	-	1.00	-	0.00
DVD recorders	-	-	-	-	-	-	-	-	-	-	-	0.00
DVD recorder with hard disk drives	-	-	-	-	-	-	-	-	-	-	-	0.00
Blu-ray player	4.00	11.00	3.00	11.00	2.00	8.00	1.00	5.00	-	3.00	-	2.00
Blu-ray recorders	-	4.00	-	3.00	-	2.00	-	1.00	-	0.50	-	0.00
Blu ray recorders with hard disk drives	-	4.00	-	3.00	-	2.00	-	1.00	-	0.50	-	0.00

Home cinema system	-	8.00	-	6.00	-	3.00	-	1.00	-	-	-	0.00
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Projector Model Assumptions

Three different scenarios modelled:

- Business as usual with Network Standby with the power and usage assumptions that the technical expert provided.
- Regulation. The requirements proposed in this scenario are the same as those that were included in the BAU with network standby but the standby value will decrease from 1W to 0.5W from 2014.
- Labelling. 5% improvement in efficiency of power demand from 2016 onwards and standby value as in the Regulation scenario.

The variables in the model are Power consumption for 3 different modes (on-play, standby and off-mode), hours of usage and stock figures. Stock for projectors has been assumed to be gradually decreasing. Both usage and stock remain the same for all 3 scenarios but power consumption varies depending on the scenario:

1. Power consumption

BAU and NS - Existing Lamp Technology and 1W standby

	on-play (W)	standby (W)	off-mode (W)
Schools projectors	275.00	1.00	0.50
Office projectors	250.00	1.00	0.50
Home cinema projectors	200.00	1.00	0.50

Scenario 1 – Regulation - Existing Lamp Technology and 0.5W standby (from 2014 onwards)

	on-play (W)	standby (W)	off-mode (W)
Schools projectors	275.00	0.50	0.50
Office projectors	250.00	0.50	0.50
Home cinema projectors	200.00	0.50	0.50

Scenario 2 – Labelling – 5% improvement in power demand and 0.5W standby (from 2016 onwards)

	on-play (W)	standby (W)	off-mode (W)
Schools projectors	261.25	0.50	0.50
Office projectors	237.50	0.50	0.50

Home cinema projectors	190.00	0.50	0.50
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2. Use Patterns

	on-play (hr)	standby (hr)	off-mode (hr)
Schools projectors	3.00	6.00	15.00
Office projectors	1.50	8.00	14.50
Home cinema projectors	0.50	20.00	3.50

3. Sales and Stock

Product	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Schools projectors (millions)	4.75	4.70	4.65	4.60	4.55	4.50	4.20	3.90	3.60	3.30	3.00	2.65	2.30	1.95	1.60	1.25
Office projectors (millions)	4.25	4.20	4.15	4.10	4.05	4.00	3.50	3.00	2.50	2.00	1.50	1.25	1.00	0.75	0.50	0.25
Home cinema projectors (millions)	1.25	1.20	1.15	1.10	1.05	1.00	0.85	0.70	0.55	0.40	0.25	0.23	0.20	0.18	0.15	0.12

Games Consoles Model Assumptions

4 different scenarios modelled:

- Business as usual (do nothing) with the power and usage assumptions from the technical expert
- Industry proposal with the power demand requirements listed by industry
- Mandatory Ecodesign Requirements with the power and usage assumptions from the technical expert. With two tiers the first in 2014 and the second in 2017.
- Mandatory Energy Labelling based on a A-G energy classes in two tiers.

The variables in the model are power demands (in various power modes), usage hours (across the various power modes) and sales/stock figures.

The first table below provides a summary of the main approaches taken in the IA for modelling game consoles. The table also contains a comparison against the modelling completed by industry to identify the savings potential from the industry proposal.

General Approach						
	Business as Usual (BAU)	Industry Proposal	Labelling Option	Ecodesign Measures	Industry Model	Differences in Approach
General Description	This scenario describes a business as usual case with the assumed Network Standby ErP requirements also added.	This scenario describes the power demands of game consoles expected under the industry proposal. Includes the assumed Network Standby ErP requirements.	This scenario describes the power demands of game consoles expected under a mandatory energy labelling option.	This scenario describes the power demands of game consoles expected under the higher ambition Commission Ecodesign measures proposal. Includes the assumed Network Standby ErP requirements.	This model, delivered in pdf format, was provided as industry evidence during the impact assessment project. The model provides industry suggestions on the savings that would be achieved if the Industry Proposal requirements were implemented as the preferred policy option.	There are some fundamental differences between the modelling approach developed for the impact assessment project versus the model developed by industry.

Power Mode	Active Mode (W)	All scenarios assume the same amount of power as no policy actions will impacts the power demand in these modes. It was decided that attempting to place power demand requirements on these modes could impact the functionality of the products.				Assumes power demand is the same across all scenarios.	The model used within the impact assessment includes power demand data for a wide range of game console models and iterations. The industry approaches only considers the power demand for a single game console model. The power data used in the IA model was obtained from manufacturers and other sources.	
	Game Play Idle (W)					n/a		The industry model does not consider these power modes. The IA modelling assumes little difference between these power modes and the active mode above.
	Game Play Pause (W)					n/a		
	Video Stream Play (W)	Assumes CPU scaling (i.e. the ability to control energy use in relation to demand on the CPU) is not used in future products and so power demand is the same as in Active mode.	Assumes all media playback to 1080p (high definition (HD)) provided at requested industry power demand requirements. Also assumes that in future products some media playback above 1080p functionality (e.g. 4K playback) will be provided at higher power values. This is in line with the industry proposal.	Assumes that labelling will not impact existing products (due to changes required would result in excessive costs – that could not be redeemed due to short life time of model on market) or new products launched in 2013 as these are already efficient. For new products it is assumed that there is a gradual improvement in the energy class rating achieved as manufacturers strive to “move up” the energy classes. Assumes that new products launched in 2014 start at 90W (level G) and move to 55W (revised level E) by 2023. Assumes that new products launched in 2022 start at 63.3W (67%	Assumes that all media playback will be completed at maximum power demand levels listed in the mandatory measure proposal. That is, any media playback above 1080p would also be required to meet the maximum power demand requirements listed under the mandatory measures. These levels were chosen as it is clear that other products on the market which offer similar functionality can meet these requirements with ease.	In BAU scenario assumes power demand the same as Assumes all media playback (to 1080p) provided at requested industry values.	The industry approach to savings calculations assumes that all media playback would be subject to the media playback requirements. The IA modelling recognises that some media playback may be offered above 1080p in future and would therefore not be subject to any power demand requirements.	

	Video Stream Pause/Idle (W)	Assumes power demand slightly lower than for Video Stream/Play. This was used because a lack of CPU scaling would mean that a reduction of power demand in this mode would not be possible.	Assumes power demand slightly lower than for Video Stream/Play. This has been assumed as it is expected that CPU and GPU will not be completely powered down during this power mode.	products at Tier II level F (60W) and 37% at Tier II level G (50W)) and move to 55W (Tier II level E) by 2025.	Assumes that power demand would be the same as in Video Stream Play as it is expected that the CPU and GPU would not be completely powered down in this mode.	n/a	The industry approach does not investigate power demand in this power mode. The IA modelling recognises that power demand in this mode can be lower than Video/Stream Play and so is modelled as a separate power mode.	
	Navigation Idle (W)	Power demand is deemed to be the same as Game Play Idle/Inactive because CPU power scaling not included in future products. This means that power demand cannot be easily reduced due to a reduction in computational requirements.	Assumes Navigation at 90W and 70W levels as chosen by industry.		Assumes Navigation at 70W and 50W levels as listed in the mandatory ecodesign policy measure. These levels have been chosen as it is clear that other products on the market which offer similar functionality can meet these requirements with ease.		Assumes Navigation at 90W and 70W levels as chosen by industry. Also assumes that this power demand will be used during general internet browsing.	The industry and IA approaches are similar when dealing with navigation mode.
	Network Standby Mode 1 (W)	Assumes that the normal ErP Network Standby power demand requirements are enforced.	Assumes normal NS values apply but with the industry proposed levels (proposed during the Sound & Imaging Preparatory study) coming in first.			The industry approach does not consider these power modes,		The industry model does not consider power demand in network standby. The IA model considers these power modes separately.
	Network Standby Mode 2 (W)	Assumes normal NS values apply.						
	Standby Mode (W)	All power demand levels are the same over time (with the exception of some power demand values for earlier game console models).				The industry model assumes a reduction in the power demand over time of a single mode called standby/off.		The IA model and Industry approach take slightly different approaches when dealing with standby/off mode power demand. These differences are unlikely to significantly impact overall energy use or savings due to the small amount of power demand.
	Off Mode (W)							
Usage	Active Mode (hrs/day)	Active mode time expected to increase over time as increasing functionality encourages more use.			There is no consideration of increases in active mode time.	The IA study model assumes increases in time spent in active mode whereas the industry approach does not.		

<p>Game Play Idle (hrs/day)</p>	<p>Increases slightly over time in line with active mode time.</p>	<p>These power modes are not considered in detail although time is allocated to a mode where the game console is in active mode but is deemed to be "inactive".</p>	<p>The IA model considers these power modes separately because power demand differences were noted. However, consideration of these "power modes" does not impact overall savings values.</p>
<p>Game Play Pause (hrs/day)</p>			
<p>Video Stream Play (hrs/day)</p>	<p>Expected to increase over time as more users take advantage of media functions built into game consoles.</p>	<p>Use in this power mode(s) is expected to remain constant over time within each scenario. There are small differences between the amounts of time allocated to this power mode(s) in the "industry proposal" scenario.</p>	<p>The IA model assumes that increasing functionality will cause more use in these power modes. Industry expect use to remain flat. Consideration of "Video Stream Pause/Idle" as a separate power mode in the IA model does not impact overall savings.</p>
<p>Video Stream Pause/Idle (hrs/day)</p>		<p>This power mode is not considered although time is allocated to a mode where the game console is in Video Stream/Play mode but is deemed to be "inactive".</p>	
<p>Navigation Idle (hrs/day)</p>	<p>Expected to increase over time in line with increases in active mode time and video stream/play time.</p>	<p>Use in this power mode(s) is expected to remain constant over time within each scenario. There are small differences between the amount of time allocated to this power mode(s) in the "industry proposal" scenario.</p>	<p>Again, the IA model assumes that increasing functionality will result in more time spent in the navigation mode whereas industry expect usage to remain flat across the years.</p>
<p>Network Standby Mode 1 (hrs/day)</p>	<p>Expected to significantly increase overtime as more functionalities are offered in network standby.</p>	<p>These power modes are not considered.</p>	<p>The IA model includes as assumption that use in this power mode(s) will increase considerably in the future as increasing functionality encourages users to leave products in this mode rather than to turn off completely.</p>
<p>Network Standby Mode 2 (hrs/day)</p>			
<p>Standby Mode (hrs/day)</p>	<p>Expected to decrease over time as game consoles spend more time in network standby mode.</p>	<p>Use in this power mode(s) is expected to remain constant over time within</p>	<p>Industry expects future game consoles to spend most time in</p>

	<p>Off Mode (hrs/day)</p>		<p>each scenario. There are small differences between the amount of time allocated to this power mode(s) in the "industry proposal" scenario.</p>	<p>standby/off rather than network standby. This is a considerable difference in approaches. However, any savings resulting from the network standby power demand requirements would occur as a result of the Network Standby Directive.</p>
	<p>Sales</p>	<p>Existing game console sales are based on world wide sales data published on manufacturers' websites. VG Chartz regional percentage data used to determine sales in the EU. Sales of current and past game consoles are calculated for each game console model and known iterations of each model (where power demand differences exist). All future sales are based on similar sales patterns seen in previous and current game consoles. New generations of game console were expected to be launched to the market in 2013, 2014 and 2022. Sales of the new game console released to the market in 2013 were based on the average sales seen for the current high definition game consoles on the market. Sales on the products expected to launch in 2014 and 2022 were based on the sum of the sales seen for current generation HD game consoles.</p>	<p>Console sales have been calculated using sales of all consoles between January 2nd 2005 and 1st January 2011 (indicating a 6 year product lifetime). It is not clear where these values were sourced from.</p>	<p>The IA model calculates sales for each game console model and each iteration of the models.</p>
	<p>Stock</p>	<p>Stock in the IA models is calculated using the sales values derived above in a matrix which calculates how much each product sold in each year contributes to an overall summed stock level. Stock decline is based on products having a 6 year lifespan with a standard deviation of 2.</p>	<p>Stock in the industry approach is based on cumulative sales which decline rapidly using the average yearly sales volume as the decay factor.</p>	<p>The stock calculations in the IA model are derived differently to the calculations provided in the Industry approach.</p>

The following tables provide detailed information about the variables included in the IA modelling.

1. Use Patterns

The table below illustrates the use profiles that are used in the IA model. In addition the table includes a compare and contrast analysis with the use profiles used in the industry proposal savings calculations.

		Existing Products					
		Business as Usual (BAU)	Industry-Proposal	Labelling Option	Ecodesign Measures	Industry Model	Differences in Approach
Usage	Active Mode (hrs/day)	Assumes usage of 1.13 hrs/d (HD) and 0.57 hrs/d (SD) for all years.			Assumes usage of 0.87 hrs/d for all years in all scenarios.		The IA model assumes a higher usage than that found in the industry approach. However, the industry approach does not consider all products in stock.
	Game Play Idle (hrs/day)	0.36 hrs/d (HD) and 0.18 hrs/d (SD) for all years.	0.31 hrs/d (HD) and 0.18 hrs/d (SD) for all years.		Assumes usage of 0.53 hrs/d for all years in BAU scenario and 0.27 hrs/d in all other scenarios.		The IA models assumes less time on an "inactive" mode than found in the industry approach.
	Game Play Pause (hrs/day)	Assumes no time					There is no difference between the approaches.
	Video Stream Play (hrs/day)	0.29 hrs/d (HD only)			Assumes usage of 0.25 hrs/d for all years in all scenarios.		The approaches do not diverge significantly.
	Video Stream Pause/Idle (hrs/day)	0.22 hrs/d (HD only)	0.12 hrs/d (HD only)		Assumes usage of 0.15 hrs/d for all years in BAU scenario and 0.08 hrs/d in all other scenarios.		The IA model assumes more time spent in "video inactive mode" than industry expect.
	Navigation Idle (hrs/day)	0.33 hrs/d (HD) and 0.17 hrs/d (SD) for all years.	0.28 hrs/d (HD) and 0.17 hrs/d (SD) for all years.		Assumes usage of 0.19 hrs/d for all years in all scenarios. Also assumes time in navigation inactive of 0.11 hrs/d for all years in BAU scenario and 0.06 hrs/d in all other scenarios.		The IA model assumes more time spent in "navigation mode" than industry expect.
	Network Standby Mode 1 (hrs/day)	11.5 hrs/d (SD only)	11.5 hrs/d (SD only)		These power modes are not considered.		The industry approach does not consider these power modes.
	Network Standby Mode 2 (hrs/day)	Assumes no time					
	Standby Mode (hrs/day)	21.66 hrs/d (HD) and 11.5 hrs/d (SD) for all years.	21.87 hrs/d (HD) and 11.5 hrs/d (SD) for all years.		Assumes usage of 21.80 hrs/d for all years in BAU scenario and 22.22 hrs/d in all other scenarios.		The standby/off mode times for HD game console are very similar. However, the industry model does not consider network standby and so the SD standby/off times are very different.
	Off Mode (hrs/day)	Assumes no time					

		Future Products					
		Business as Usual (BAU)	Industry-Proposal	Labelling Option	Ecodesign Measures	Industry Model	Differences in Approach
Usage	Active Mode (hrs/day)	Assumes usage of 1.36 hrs/d (HD) in 2013 increasing to 1.96 hrs/d (HD) by 2020. Usage flat until 2025.			Assumes usage of 0.87 hrs/d for all years in all scenarios.	The usage in the IA model is considerably higher as it accounts for increasing usage in the future.	
	Game Play Idle (hrs/day)	0.39 hrs/d (HD) in 2013 increasing to 0.56 hrs/d (HD) by 2020. Usage flat until 2025.	0.33 hrs/d in 2013 increasing to 0.47 hrs/d by 2020. Usage flat until 2025.		Assumes usage of 0.53 hrs/d for all years in BAU scenario and 0.27 hrs/d in all other scenarios.	The amount of time spent in this mode under the BAU scenario is similar in the IA and industry model. However, the thinking diverges in the other scenarios where the IA model assumes increasing use over time.	
	Game Play Pause (hrs/day)	0.03 hrs/d (HD) in 2013 increasing to 0.05 hrs/d (HD) by 2020. Usage flat until 2025.	0.03 hrs/d in 2013 increasing to 0.05 hrs/d by 2020. Usage flat until 2025.		Assumes no time	The industry approaches likely adds any time in a pause mode to the Active mode time.	
	Video Stream Play (hrs/day)	0.35 hrs/d (HD) in 2013 increasing to 0.50 hrs/d (HD) by 2020. Usage flat until 2025.	0.35 hrs/d in 2013 increasing to 0.50 hrs/d by 2020. Usage flat until 2025.		Assumes usage of 0.25 hrs/d for all years in all scenarios.	The IA model suggests that significantly more time will be spent in video stream/play than industry suggests in their approach,	
	Video Stream Pause/Idle (hrs/day)	0.27 hrs/d (HD) in 2013 increasing to 0.39 hrs/d (HD) by 2020. Usage flat until 2025.	0.14 hrs/d in 2013 increasing to 0.20 hrs/d by 2020. Usage flat until 2025.		Assumes usage of 0.15 hrs/d for all years in BAU scenario and 0.08 hrs/d in all other scenarios.	The IA model suggests that significantly more time will be spent in video stream/play idle/inactive than industry suggests in their approach,	
	Navigati on Idle (hrs/day)	0.38 hrs/d (HD) in 2013 increasing to 0.55 hrs/d (HD) by 2020. Usage flat until 2025.	0.33 hrs/d in 2013 increasing to 0.48 hrs/d by 2020. Usage flat until 2025.		Assumes usage of 0.19 hrs/d for all years in all scenarios. Also assumes time in navigation inactive of 0.11 hrs/d for all years in BAU scenario and 0.06 hrs/d in all other scenarios.	The IA model suggests that more time will be spent in navigation than industry suggests in their approach,	
	Network Standby Mode 1 (hrs/day)	15.28 hrs/d (HD) in 2013 decreasing to 14.4 hrs/d (HD) by 2020. Usage flat until 2025.	15.45 hrs/d in 2013 decreasing to 14.64 hrs/d by 2020. Usage flat until 2025.		These power modes are not considered.	The IA addresses these modes as industry has previously suggested that these modes may	

Network Standby Mode 2 (hrs/day)	1.70 hrs/d (HD) in 2013 decreasing to 1.60 hrs/d (HD) by 2020. Usage flat until 2025.	1.72 hrs/d in 2013 decreasing to 1.63 hrs/d by 2020. Usage flat until 2025.		exist in future game consoles.
Standby Mode (hrs/day)	4.20 hrs/d (HD) in 2013 decreasing to 4.00 hrs/d (HD) by 2020. Usage flat until 2025.	4.29 hrs/d in 2013 decreasing to 4.07 hrs/d by 2020. Usage flat until 2025.	Assumes usage of 21.80 hrs/d for all years in BAU scenario and 22.22 hrs/d in all other scenarios.	The IA model includes an expectation that time in standby/off mode will decrease in the future as game consoles spend more time in network standby mode.
Off Mode (hrs/day)	Assumes no time			

2.Power demand

The tables below illustrate the power demand levels used within the IA models. In addition a comparison between the power demand levels used in the IA models and within the industry proposal savings calculations is also presented.

		Existing Products					
		Business as Usual (BAU)	Industry-Proposal	Labelling Option	Policy-2-Higher-Ambition	Industry Model	Differences in Approach
General Description		Covers all current generation products including: Nintendo Wii, Sony PlayStation 2, Sony PlayStation 3 and Microsoft Xbox 360. Data secured from manufacturers during the ErP Preparatory Study and other external sources.			Only consider one model - PS3.		The IA model provide a greater level of detail to predict energy use and savings arising from game consoles and the different policy options.
Power Mode	Active Mode (W)	Based on industry supplied data and data from other sources. Does not vary within scenarios.			Considers the power demand of the PS3 only.		
	Game Play Idle (W)	Considered to be at the same power demand as Active mode unless industry supplied data indicated otherwise. Does not vary within scenarios.			n/a		
	Game Play Pause (W)	Considered to be at the same power demand as Game Play Idle/Inactive. Does not vary within scenarios.			n/a		
	Video Stream Play (W)	Based on industry supplied data and data from other sources. Does not vary within scenarios.			Considers the power demand of the PS3 only.		
	Video Stream Pause/Idle (W)	Considered to be at the same power demand as Video Stream Play unless industry supplied data indicated otherwise. Does not vary within scenarios.			n/a		
	Navigation Idle (W)	Based on industry supplied data and data from other sources. Does not vary within scenarios.			Industry only consider a single game console model in all analysis.		
	Network Standby Mode 1 (W)				The industry approach does not consider these power modes.		
Network Standby Mode 2 (W)							

	Standby Mode (W)		The industry model assumes a reduction in the power demand over time of a single mode called standby/off.	
	Off Mode (W)			

Future Products						
	Business as Usual (BAU)	Industry Proposal	Labelling Option	Ecodesign Requirements	Industry Model	Differences in Approach

General Description		Covers all next generation products including: Nintendo Wii U, and other future generations expected to be launched in 2014 and 2022. Given that no data is available for future generations of game console it was necessary to make assumptions on the power demands of future game consoles.					The IA model provides a greater level of detail to predict energy use and savings arising from game consoles and the different policy options.
Power Mode	Active Mode (W)	Based on estimated power demand of next generation of consoles. Assumed to start at 200W (for the 2014 and 2020 launches of consoles) and then reduce overtime at the same rate seen over the various iterations of current generation of consoles. These values do not vary within scenarios.					
	Game Play Idle (W)	Considered to be at the same power demand as Active mode minus a small percentage of power to account for CPU scaling. This reduction is based on what has been seen in current games consoles. These values do not vary within scenarios.					
	Game Play Pause (W)	Considered to be at the same power demand as Game Play Idle/Inactive. These values do not vary within scenarios.					
	Video Stream Play (W)	Based on assumption that all media playback will be offered at the same level as found in Active mode. This assumes that no CPU scaling is included in future product and so power demand in this mode will not be significantly reduced.	Based on estimated power demand starting at 90W (40W for Wii U at all times) which was included in the industry proposal. Reduces to 70W for up to 1080p playback by 2017. Also includes percentage of media playback for over 1080p. This higher definition playback is provided at the active mode power demand level. A weighting factor, based on estimated percentage of media play above 1080p, is used to derive a weighted average video stream/play power demand level.	For new products it is assumed that there is a gradual improvement in the energy class rating achieved as manufacturers strive to “move up” the energy classes. Assumes that new products launched in 2014 start at 90W (level G) and move to 55W (revised level E) by 2023. Assumes that new products launched in 2022 start at 63.3W (67% products at Tier II level F (60W) and 37% at Tier II level G (50W)) and move to 55W (Tier II level E) by 2025.	Based on assumption that all media playback will be offered at 70W until 2017 and then at 50W onwards. This matches the requirements set out under the mandatory measure policy option. The values in-between 2014 (launch) and 2017 are based on a straight line interpolation.		
	Video Stream Pause/Idle (W)	Assumes power demand slightly lower than for Video Stream/Play. Based on small reductions seen in current products.	Assumes power demand slightly lower than for Video Stream/Play. Based on small reductions seen in current products.		Considered to be at the same power demand as Video Stream Play. Based on the assumption that additional CPU scaling is not possible.		

Navigation Idle (W)	Based on assumption that all media playback will be offered at the same level as found in Game Play Idle/inactive. This assumes no CPU scaling is present meaning that power demand cannot be reduced in this mode to a large extent.	Based on assumption that navigation will be offered at 90W until 2017 and then at 70W onwards. The values in-between 2014 (launch) and 2017 are based on a straight line interpolation.	Based on assumption that navigation will be offered at 70W until 2017 and then at 50W onwards. The values in-between 2014 (launch) and 2017 are based on a straight line interpolation.
Network Standby Mode 1 (W)	Assumes network standby/sleep mode (wireless) power demand at 6W reducing to 3W by 2017. Values between 2014 and 2017 are based on straight interpolation.	Assumes network standby/sleep mode (wireless) power demand at 5W reducing to 3W by 2017. Values between 2014 and 2017 are based on straight interpolation.	
Network Standby Mode 2 (W)		Assumes network standby/sleep mode power demand at 3W (wired). Based on industry proposal during prep study.	
Standby Mode (W)	Assumes standby power demand of 1W		
Off Mode (W)	Assumes off mode power demand of 1W		

	BAU	Industry-Proposal	Labelling	Mandatory Measure	BAU	Industry-Proposal	Labelling	Mandatory Measure	BAU	Industry-Proposal	Labelling	Mandatory Measure	BAU	Industry-Proposal	Labelling	Mandatory Measure
	Active Mode (W)	Active Mode (W)	Active Mode (W)	Active Mode (W)	Game Play Idle (W)	Game Play Idle (W)	Game Play Idle (W)	Game Play Idle (W)	Game Play Pause (W)	Video Stream Play (W)						
Sony Playstation 2	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3
Sony Playstation 3 (2006 model)	191.7	191.7	191.7	191.7	174.3	174.3	174.3	174.3	174.3	174.3	174.3	174.3	176.8	176.8	176.8	176.8
Sony Playstation 3 (2007 model)	153.0	153.0	153.0	153.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	138.5	138.5	138.5	138.5
Sony Playstation 3 Slim (2010 model)	98.0	98.0	98.0	98.0	98.0	98.0	98.0	98.0	98.0	98.0	98.0	98.0	83.5	83.5	83.5	83.5
Sony Playstation 3 Slim (2010 model) - From 2014	98.0	98.0	98.0	98.0	98.0	98.0	98.0	98.0	98.0	98.0	98.0	98.0	83.5	83.5	83.5	70.0
Microsoft Xbox 360 (2005)	180.4	180.4	180.4	180.4	178.4	178.4	178.4	178.4	178.4	178.4	178.4	178.4	148.1	148.1	148.1	148.1

model)																	
Microsoft Xbox 360 (2007 model)	176.8	176.8	176.8	176.8	174.9	174.9	174.9	174.9	174.9	174.9	174.9	174.9	145.1	145.1	145.1	145.1	
Microsoft Xbox 360 (2008 model)	118.8	118.8	118.8	118.8	117.5	117.5	117.5	117.5	117.5	117.5	117.5	117.5	97.5	97.5	97.5	97.5	
Microsoft Xbox 360 S (2010 model)	85.7	85.7	85.7	85.7	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	61.2	61.2	61.2	61.2	
Microsoft Xbox 360 S (2010 model) - From 2014	85.7	85.7	85.7	85.7	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	61.2	61.2	61.2	61.2	
Nintendo Wii (2007)	16.4	16.4	16.4	16.4	10.5	10.5	10.5	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Nintendo Wii (2010)	14.0	14.0	14.0	14.0	12.0	12.0	12.0	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
New Product 2013 Launch	75.0	75.0	75.0	75.0	73.4	73.4	73.4	73.4	73.4	73.4	73.4	73.4	40.0	40.0	40.0	40.0	
New Product 2013 Launch (in 2014)	73.8	73.8	73.8	73.8	72.6	72.6	72.6	72.6	72.6	72.6	72.6	72.6	38.8	38.8	38.8	38.8	
New Product 2013 Launch (in 2015)	72.5	72.5	72.5	72.5	71.7	71.7	71.7	71.7	71.7	71.7	71.7	71.7	37.5	37.5	37.5	37.5	
New Product 2013 Launch (in 2016)	71.3	71.3	71.3	71.3	70.9	70.9	70.9	70.9	70.9	70.9	70.9	70.9	36.3	36.3	36.3	36.3	
New Product 2013 Launch - (in 2017 and beyond)	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	35.0	35.0	35.0	35.0	
New Product 2014 Launch	200.0	200.0	200.0	200.0	195.8	195.8	195.8	195.8	195.8	195.8	195.8	195.8	200.0	90.0	90.0	70.0	
New Product 2014 Launch (in 2015)	176.3	176.3	176.3	176.3	172.0	172.0	172.0	172.0	172.0	172.0	172.0	172.0	176.3	86.8	85.0	63.3	
New Product 2014 Launch (in 2016)	152.5	152.5	152.5	152.5	148.2	148.2	148.2	148.2	148.2	148.2	148.2	148.2	152.5	83.5	80.0	56.7	
New Product 2014 Launch (in 2017)	128.8	128.8	128.8	128.8	124.4	124.4	124.4	124.4	124.4	124.4	124.4	124.4	128.8	80.3	70.0	50.0	
New Product 2014 Launch (by 2018)	105.1	105.1	105.1	105.1	100.6	100.6	100.6	100.6	100.6	100.6	100.6	100.6	105.1	77.0	70.0	50.0	
New Product 2014 Launch (by 2019)	105.1	105.1	105.1	105.1	100.6	100.6	100.6	100.6	100.6	100.6	100.6	100.6	105.1	77.0	65.0	50.0	
New Product 2014 Launch (by 2020)	105.1	105.1	105.1	105.1	100.6	100.6	100.6	100.6	100.6	100.6	100.6	100.6	105.1	77.0	65.0	50.0	
New Product 2014 Launch (by 2021)	105.1	105.1	105.1	105.1	100.6	100.6	100.6	100.6	100.6	100.6	100.6	100.6	105.1	77.0	60.0	50.0	
New Product 2014 Launch (by 2022)	105.1	105.1	105.1	105.1	100.6	100.6	100.6	100.6	100.6	100.6	100.6	100.6	105.1	77.0	57.5	50.0	
New Product 2014 Launch (by 2023)	105.1	105.1	105.1	105.1	100.6	100.6	100.6	100.6	100.6	100.6	100.6	100.6	105.1	77.0	55.0	50.0	
New Product 2022 Launch	200.0	200.0	200.0	200.0	195.8	195.8	195.8	195.8	195.8	195.8	195.8	195.8	200.0	161.0	63.3	50.0	
New Product 2022 Launch (in 2023)	176.3	176.3	176.3	176.3	172.0	172.0	172.0	172.0	172.0	172.0	172.0	172.0	176.3	147.0	60.0	50.0	
New Product 2022 Launch (in 2024)	152.5	152.5	152.5	152.5	148.2	148.2	148.2	148.2	148.2	148.2	148.2	148.2	152.5	133.0	57.0	50.0	
New Product 2022 Launch (in 2025)	128.8	128.8	128.8	128.8	124.4	124.4	124.4	124.4	124.4	124.4	124.4	124.4	128.8	119.1	55.0	50.0	
New Product 2022 Launch (by 2026 and beyond)	105.1	105.1	105.1	105.1	100.6	100.6	100.6	100.6	100.6	100.6	100.6	100.6	105.1	105.1	55.0	50.0	

	BAU	Industry-Proposal	Labelling	Mandatory Measure	BAU	Industry-Proposal	Labelling	Mandatory Measure	BAU	Industry-Proposal	Labelling	Mandatory Measure	BAU	Industry-Proposal	Labelling	Mandatory Measure
	Video Stream Pause/Idle (W)	Navigation Idle (W)	Navigation Idle (W)	Navigation Idle (W)	Navigation Idle (W)	Network Standby Mode 1 (W)	Network Standby Mode 2 (W)									
Sony Playstation 2	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sony Playstation 3 (2006 model)	176.2	176.2	176.2	176.2	179.2	179.2	179.2	179.2	24.0	24.0	24.0	24.0	0.0	0.0	0.0	0.0
Sony Playstation 3 (2007 model)	138.0	138.0	138.0	138.0	120.0	120.0	120.0	120.0	24.0	24.0	24.0	24.0	0.0	0.0	0.0	0.0
Sony Playstation 3 Slim (2010 model)	82.0	82.0	82.0	82.0	82.0	82.0	82.0	82.0	9.0	9.0	9.0	9.0	0.0	0.0	0.0	0.0
Sony Playstation 3 Slim (2010 model) - From 2014	82.0	82.0	82.0	70.0	82.0	82.0	82.0	70.0	9.0	9.0	9.0	9.0	0.0	0.0	0.0	0.0
Microsoft Xbox 360 (2005 model)	146.5	146.5	146.5	146.5	144.4	144.4	144.4	144.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Microsoft Xbox 360 (2007 model)	143.6	143.6	143.6	143.6	147.2	147.2	147.2	147.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Microsoft Xbox 360 (2008 model)	96.5	96.5	96.5	96.5	97.5	97.5	97.5	97.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Microsoft Xbox 360 S (2010 model)	61.2	61.2	61.2	61.2	66.9	66.9	66.9	66.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Microsoft Xbox 360 S (2010 model) - From 2014	61.2	61.2	61.2	61.2	66.9	66.9	66.9	66.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nintendo Wii (2007)	0.0	0.0	0.0	0.0	10.5	10.5	10.5	10.5	9.0	9.0	9.0	9.0	0.0	0.0	0.0	0.0
Nintendo Wii (2010)	0.0	0.0	0.0	0.0	12.0	12.0	12.0	12.0	9.0	9.0	9.0	9.0	0.0	0.0	0.0	0.0
New Product 2013 Launch	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	6.0	5.0	5.0	5.0	6.0	3.0	3.0	3.0
New Product 2013 Launch (in 2014)	38.8	38.8	38.8	38.8	38.8	38.8	38.8	38.8	6.0	5.0	5.0	5.0	6.0	3.0	3.0	3.0
New Product 2013 Launch (in 2015)	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	5.0	4.3	4.3	4.3	5.0	3.0	3.0	3.0
New Product 2013 Launch (in 2016)	36.3	36.3	36.3	36.3	36.3	36.3	36.3	36.3	4.0	3.7	3.7	3.7	4.0	3.0	3.0	3.0
New Product 2013 Launch - (in 2017 and beyond)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
New Product 2014 Launch	195.8	90.0	90.0	70.0	195.8	90.0	90.0	70.0	6.0	5.0	5.0	5.0	6.0	3.0	3.0	3.0
New Product 2014 Launch (in 2015)	172.0	86.5	85.0	63.3	172.0	83.3	85.0	63.3	5.0	4.3	4.3	4.3	5.0	3.0	3.0	3.0
New Product 2014 Launch (in 2016)	148.2	83.1	80.0	56.7	148.2	76.7	80.0	56.7	4.0	3.7	3.7	3.7	4.0	3.0	3.0	3.0
New Product 2014 Launch (in 2017)	124.4	79.6	70.0	50.0	124.4	70.0	70.0	50.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

New Product 2014 Launch (by 2018)	100.6	76.1	70.0	50.0	100.6	70.0	70.0	50.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
New Product 2014 Launch (by 2019)	100.6	76.1	65.0	50.0	100.6	70.0	65.0	50.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
New Product 2014 Launch (by 2020)	100.6	76.1	65.0	50.0	100.6	70.0	65.0	50.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
New Product 2014 Launch (by 2021)	100.6	76.1	60.0	50.0	100.6	70.0	60.0	50.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
New Product 2014 Launch (by 2022)	100.6	76.1	57.5	50.0	100.6	70.0	57.5	50.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
New Product 2014 Launch (by 2023)	100.6	76.1	55.0	50.0	100.6	70.0	55.0	50.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
New Product 2022 Launch	195.8	158.0	63.3	50.0	195.8	70.0	63.3	50.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
New Product 2022 Launch (in 2023)	172.0	143.7	60.0	50.0	172.0	70.0	60.0	50.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
New Product 2022 Launch (in 2024)	148.2	129.3	57.0	50.0	148.2	70.0	57.0	50.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
New Product 2022 Launch (in 2025)	124.4	115.0	55.0	50.0	124.4	70.0	55.0	50.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
New Product 2022 Launch (by 2026 and beyond)	100.6	100.6	55.0	50.0	100.6	70.0	55.0	50.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

	BAU	Industry-Proposal	Labelling	Mandatory Measure	BAU	Industry-Proposal	Labelling	Mandatory Measure
	Standby Mode (W)	Standby Mode (W)	Standby Mode (W)	Standby Mode (W)	Off Mode (W)	Off Mode (W)	Off Mode (W)	Off Mode (W)
Sony Playstation 2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Sony Playstation 3 (2006 model)	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Sony Playstation 3 (2007 model)	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Sony Playstation 3 Slim (2010 model)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Sony Playstation 3 Slim (2010 model) - From 2014	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Microsoft Xbox 360 (2005 model)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Microsoft Xbox 360 (2007 model)	0.0	0.0	0.0	0.0	2.7	2.7	2.7	2.7
Microsoft Xbox 360 (2008 model)	0.0	0.0	0.0	0.0	3.1	3.1	3.1	3.1
Microsoft Xbox 360 S (2010 model)	0.0	0.0	0.0	0.0	0.7	0.7	0.7	0.7
Microsoft Xbox 360 S (2010 model) - From 2014	0.0	0.0	0.0	0.0	0.7	0.7	0.7	0.7
Nintendo Wii (2007)	0.0	0.0	0.0	0.0	1.9	1.9	1.9	1.9
Nintendo Wii (2010)	0.0	0.0	0.0	0.0	0.8	0.8	0.8	0.8
New Product 2013 Launch	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
New Product 2013 Launch (in 2014)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
New Product 2013 Launch (in 2015)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
New Product 2013 Launch (in 2016)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
New Product 2013 Launch - (in 2017 and beyond)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
New Product 2014 Launch	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
New Product 2014 Launch (in 2015)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
New Product 2014 Launch (in 2016)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
New Product 2014 Launch (in 2017)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
New Product 2014 Launch (by 2018)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
New Product 2014 Launch (by 2019)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
New Product 2014 Launch (by 2020)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
New Product 2014 Launch (by 2021)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
New Product 2014 Launch (by 2022)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
New Product 2014 Launch (by 2023)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
New Product 2022 Launch	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

New Product 2022 Launch (in 2023)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
New Product 2022 Launch (in 2024)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
New Product 2022 Launch (in 2025)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
New Product 2022 Launch (by 2026 and beyond)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

3. Sales and Stock

The tables below illustrate the sales and stock values used within the IA models. In addition a comparison between the sales and stock values used in the IA models and within the industry proposal savings calculations is also presented.

Existing Products						
	Business as Usual (BAU)	Industry Proposal	Labelling Option	Ecodesign Regulation	Industry Model	Differences in Approach
Sales	Based on world wide sales data published on manufacturers' websites. VG Chartz regional percentage data used to determine sales in the EU.				Industry assume a flat rate of sales from the years 2013 to 2020 only.	The IA model takes a more detailed approach to calculating sales for each game console model and each iteration of the models.
Stock	Stock in the IA models is calculated using the sales values derived above in a matrix which calculates how much each products sold in each year contributes to an overall summed stock level. Stock decline is based on products having a 6 year lifespan with a standard deviation of 2.				Stock in the industry approach is based on cumulative sales which decline rapidly using the average yearly sales volume as the decay factor.	The stock calculations in the IA model are derived differently to the calculations provided in the Industry approach.

Future Products						
	Business as Usual (BAU)	Industry Proposal	Labelling Option	Ecodesign Regulation	Industry Model	Differences in Approach
Sales	All future sales are based on similar sales patterns seen in previous and current game consoles. New generations of game console were expected to be launched to the market in 2013, 2014 and 2022. Sales of the new game console released to the market in 2013 were based on the average sales seen for the current high definition game consoles on the market. Sales on the products expected to launch in 2014 and 2022 were based on the sum of the sales seen for current generation HD game consoles.				Console sales have been calculated using sales of all consoles between January 2 nd 2005 and 1 st January 2011 (indicating a 6 year product lifetime). It is not clear where these values were sourced from.	The IA model takes a more detailed approach to calculating sales for each game console model and each iteration of the models.
Stock	Stock in the IA models is calculated using the sales values derived above in a matrix which calculates how much each products sold in each year contributes to an overall summed stock level. Stock decline is based on products having a 6 year lifespan with a standard deviation of 2.				Stock in the industry approach is based on cumulative sales which decline rapidly using the average yearly sales volume as the decay factor.	The stock calculations in the IA model are derived differently to the calculations provided in the Industry approach.

Sales (millions)															
Year	Sony Playstation 2	Sony Playstation 3 (2006 model)	Sony Playstation 3 (2007 model)	Sony Playstation 3 Slim (2010 model)	Sony Playstation 3 Slim (2010 model) – From 2014	Microsoft Xbox 360 (2005 model)	Microsoft Xbox 360 (2007 model)	Microsoft Xbox 360 (2008 model)	Microsoft Xbox 360 S (2010 model)	Microsoft Xbox 360 S (2010 model) – From 2014	Nintendo Wii (2007)	Nintendo Wii (2010)	New Product 2013 Launch	New Product 2014 Launch	New Product 2022 Launch
2005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	5.13	0.00	0.00	0.00	0.00	1.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2007	4.75	2.65	0.88	0.00	0.00	1.55	0.52	0.00	0.00	0.00	1.92	0.00	0.00	0.00	0.00
2008	2.74	0.00	3.92	0.00	0.00	0.00	1.82	0.91	0.00	0.00	6.12	0.00	0.00	0.00	0.00
2009	2.53	0.00	3.36	1.68	0.00	0.00	0.00	3.51	0.00	0.00	8.53	0.00	0.00	0.00	0.00
2010	2.22	0.00	0.00	5.55	0.00	0.00	0.00	1.62	1.62	0.00	0.00	6.75	0.00	0.00	0.00
2011	1.42	0.00	0.00	5.39	0.00	0.00	0.00	0.00	4.30	0.00	0.00	4.96	0.00	0.00	0.00
2012	0.50	0.00	0.00	4.31	0.00	0.00	0.00	0.00	4.01	0.00	0.00	3.23	0.00	0.00	0.00
2013	0.00	0.00	0.00	3.24	0.00	0.00	0.00	0.00	3.01	0.00	0.00	2.16	2.55	0.00	0.00
2014	0.00	0.00	0.00	0.00	2.16	0.00	0.00	0.00	0.00	2.01	0.00	1.08	2.99	5.10	0.00
2015	0.00	0.00	0.00	0.00	1.08	0.00	0.00	0.00	0.00	1.00	0.00	0.00	3.89	5.99	0.00
2016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.53	7.77	0.00
2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.31	9.06	0.00
2018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.31	8.63	0.00
2019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.62	8.61	0.00
2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.58	7.25	0.00
2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.54	5.17	0.00
2022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	3.08	7.65
2023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	8.98
2024	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.66
2025	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.59

Year	Stock (millions)														
	Sony Playstation 2	Sony Playstation 3 (2006 model)	Sony Playstation 3 (2007 model)	Sony Playstation 3 Slim (2010 model)	Sony Playstation 3 Slim (2010 model) – From 2014	Microsoft Xbox 360 (2005 model)	Microsoft Xbox 360 (2007 model)	Microsoft Xbox 360 (2008 model)	Microsoft Xbox 360 S (2010 model)	Microsoft Xbox 360 S (2010 model) – From 2014	Nintendo Wii (2007)	Nintendo Wii (2010)	New Product 2013 Launch	New Product 2014 Launch	New Product 2022 Launch
2005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	5.12	0.00	0.00	0.00	0.00	1.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2007	9.84	2.64	0.88	0.00	0.00	3.11	0.52	0.00	0.00	0.00	1.92	0.00	0.00	0.00	0.00
2008	12.47	2.63	4.79	0.00	0.00	3.08	2.33	0.91	0.00	0.00	8.02	0.00	0.00	0.00	0.00
2009	14.68	2.59	8.11	1.68	0.00	2.98	2.31	4.41	0.00	0.00	16.47	0.00	0.00	0.00	0.00
2010	16.16	2.47	7.99	7.21	0.00	2.77	2.26	6.00	1.61	0.00	16.25	6.74	0.00	0.00	0.00
2011	16.20	2.23	7.69	12.54	0.00	2.39	2.13	5.89	5.90	0.00	15.66	11.66	0.00	0.00	0.00
2012	14.59	1.83	7.05	16.66	0.00	1.86	1.89	5.63	9.86	0.00	14.43	14.75	0.00	0.00	0.00
2013	11.93	1.32	5.98	19.38	0.00	1.26	1.52	5.09	12.70	0.00	12.37	16.51	2.55	0.00	0.00
2014	9.08	0.82	4.56	18.29	2.15	0.73	1.07	4.25	12.28	2.00	9.55	16.68	5.52	5.09	0.00
2015	6.40	0.42	3.03	16.40	3.22	0.35	0.64	3.16	11.42	2.99	6.46	15.03	9.35	11.05	0.00
2016	4.16	0.18	1.72	13.67	3.18	0.14	0.32	2.04	9.96	2.96	3.73	12.59	13.69	18.70	0.00
2017	2.46	0.06	0.82	10.38	3.07	0.05	0.13	1.12	7.95	2.85	1.81	9.62	17.55	27.39	0.00
2018	1.31	0.02	0.32	7.05	2.82	0.01	0.04	0.51	5.67	2.62	0.72	6.62	20.93	35.10	0.00
2019	0.61	0.00	0.10	4.21	2.40	0.00	0.01	0.19	3.53	2.23	0.23	4.06	22.96	41.85	0.00
2020	0.24	0.00	0.03	2.18	1.82	0.00	0.00	0.06	1.89	1.70	0.06	2.20	23.20	45.92	0.00
2021	0.08	0.00	0.01	0.96	1.20	0.00	0.00	0.01	0.85	1.12	0.01	1.05	21.70	46.40	0.00
2022	0.02	0.00	0.00	0.36	0.68	0.00	0.00	0.00	0.32	0.63	0.00	0.43	18.65	43.40	7.64
2023	0.01	0.00	0.00	0.11	0.32	0.00	0.00	0.00	0.10	0.29	0.00	0.15	14.87	37.31	16.57
2024	0.00	0.00	0.00	0.03	0.12	0.00	0.00	0.00	0.03	0.11	0.00	0.04	11.15	29.74	28.05
2025	0.00	0.00	0.00	0.01	0.04	0.00	0.00	0.00	0.01	0.04	0.00	0.01	7.79	22.31	41.08

8.9 Annex 9

Summary of Public Consultation

A public Stakeholder Consultation exercise, inviting the views of stakeholders on the Sound and Imaging Equipment Impact Assessment went live on 5 October 2012 and lasted for four weeks. A Consultation Forum also took place at the European Commission on 9 November 2012.

For video recorders/players, approximately half of respondents were manufacturers of main market video recorders and players, and from other industry representatives. For projectors, approximately half of the respondents were projector manufacturers. For games consoles, over half the respondents were manufacturers and independent technical experts. Other respondents included environmental NGOs representing about 20% of responses.

Video recorders/players

The vast majority (over 75% of respondents) agreed with the policy options assessed, and agreed with those policy options that were discarded from further analysis. Just over half of respondents preferred the policy route of no action (but to re-evaluate the market in 3 to 4 years). Just under half the respondents preferred a regulatory route was pursued. The exemption for high-end products was supported by the majority. There was general agreement in the consultation of a downward trend in the video recorder/player market overall.

At the consultation forum, there was little discussion on video recorders/players. There was general agreement from video player/recorder manufacturers on the downward trend in sales of the products, and general agreement that regulation was unnecessary for this product group.

Projectors

Nearly all respondents agreed that the policies not developed further within the impact assessment were appropriate to dismiss. Overall, views on the need for policy action were mixed. The preferred policy route of respondents, by a slight margin, was mandatory Ecodesign requirements (regulation). The next preferred route was the no action option. Labelling was not deemed appropriate as a policy option. There was general agreement in a downward trend in the sales market for projectors.

At the consultation forum, there was mixed discussion on projectors with some attendees believing that a similar approach for video recorders/players was required, whilst some believing that regulation might be more appropriate.

Games consoles

The vast majority (over 75%) of respondents agreed that certain policy options could be dismissed. The need for policy action in Europe was questioned, with nearly 75% of respondents stating there was no need. The preferred policy options, supported by the consultation, were the industry proposal, the International Agreement and Mandatory Ecodesign Requirements (Regulation). Industry respondents were, naturally, supportive with the industry proposed approach and levels, whereas NGO respondents suggested that regulation would deliver results more quickly and cost effectively.

At the consultation forum, the majority of the discussion and views were concerned with games consoles. There was general agreement from Member States that the Industry Proposal was unambitious, and there was discussion around how compliant it is with Annex VII of the Ecodesign Directive.

Detailed documents on the consultation exercises, written and oral are available.

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