

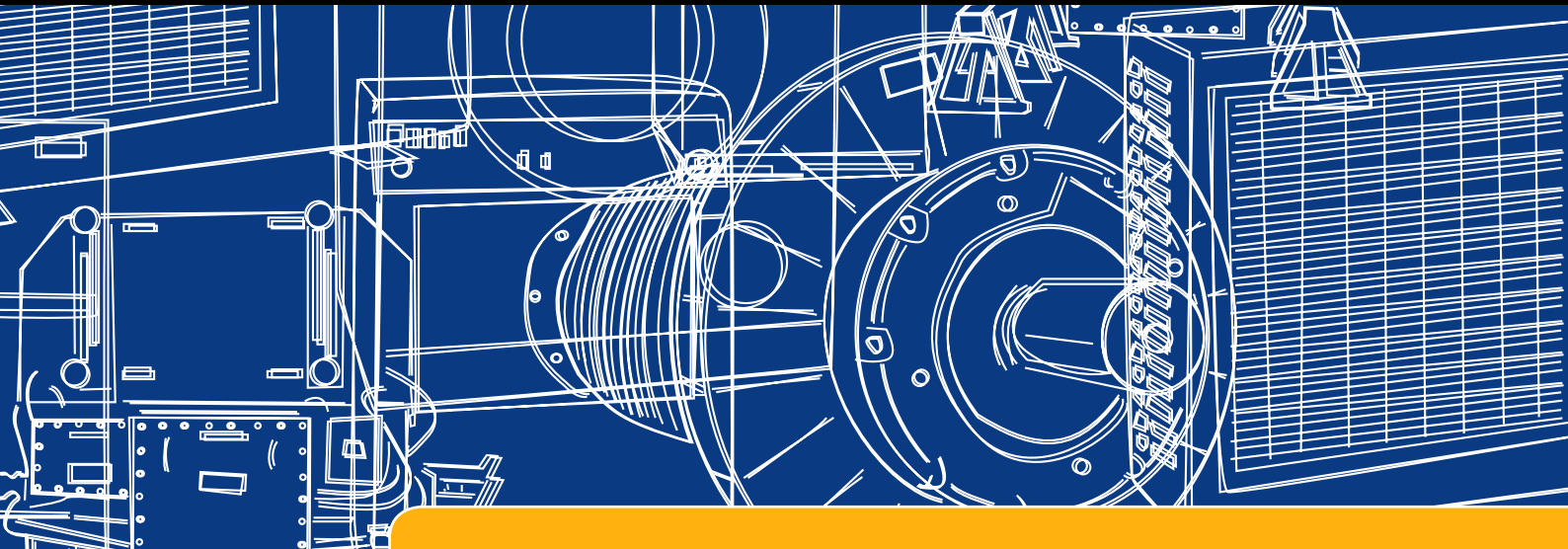


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EQUIPMENT ENERGY EFFICIENCY

Report No: 2006/13

EQUIPMENT ENERGY EFFICIENCY PROGRAMME (E3)

# A Draft Proposal for Minimum Energy Performance Standards



## *HOME ENTERTAINMENT EQUIPMENT*

**NOVEMBER 2006**

AN INITIATIVE OF THE MINISTERIAL COUNCIL ON ENERGY FORMING PART  
OF THE AUSTRALIAN NATIONAL FRAMEWORK FOR ENERGY EFFICIENCY AND  
NEW ZEALAND ENERGY EFFICIENCY AND CONSERVATION STRATEGY

PREPARED BY ENERGY CONSULT

*A draft proposal for:  
Minimum Energy  
Performance Standards  
for Home Entertainment  
Equipment*

*Prepared for*

*The Equipment Energy Efficiency Programme*

November 2006



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## Glossary

ABS	Australian Bureau of Statistics
Active Standby	Active standby mode occurs while the unit is activated and waiting to play. While in this mode, many units display a digital message reporting the status. This mode also applies to products that finish operation but have not been into passive or off mode by the consumer. e.g., when a CD finishes playing.
Comparative label	A type of product label that indicates not only that the product meets specific criteria (i.e. energy or environmental), but also allows comparison between products by providing some form of ranking.
DVD	Digital Versatile Disk
Endorsement label	A type of product label which indicates that the product meets specific criteria (i.e. energy or environmental). The label does not allow comparison between eligible products.
Off Mode	When a product or appliance is connected to a power source but does not produce any sound or picture, transmit or receive information or is waiting to be switched “on” by the consumer. If the product has a remote control, it cannot be woken by the remote control from off mode.
Ownership	The ratio of stock to the total number of households.
Passive Standby	Passive standby mode applies to products that have a remote control function that means the units can be put ‘to sleep’ rather than turned off. Many models also have a standby button on the unit and no longer have a ‘hard off’ switch at all
Penetration	The proportion of households in which a particular appliance type is present (irrespective of the number of units of that appliance in the household).
Saturation	The number of specified appliances per household for those households that have the appliance.



# Executive Summary

## Background

Over the past four years the Equipment Energy Efficiency<sup>1</sup> (E3) Committee has been tracking the energy usage, in particular standby power consumption of appliances offered for sale in retail outlets across Australia. Additionally E3 has commissioned two intrusive surveys of standby consumption in households (2001 & 2005) and a telephone survey of 800 households (2001) to determine appliance ownership and usage. This research has been the backbone of standby policy development in that finally Australian Governments has meaningful data on the extent of standby power consumption in Australian households.

Leading on from this earlier research, the Ministerial Council on Energy in 2002 released the policy document *Money Isn't all You're Saving* outlining Australia's Standby Power Strategy 2002 – 2012. The strategy outlined the products and appliances that require “immediate” or “subsequent” action in the standby power program. Initially stereo equipment was among a group of products identified for immediate action and with the rapid proliferation of DVD & home theatre products, these were added shortly after. Part of this action included the development of “product profiles” to “provide an overview of the product in terms of its standby characteristics, the purpose and functionality of their standby function, market status, ownership levels and trends in sales and product types.” (MCE 2002)

Product profiles for these appliance groups were released for comment during 2003 and 2004. Industry feedback indicated that the preferred approach for these products was regulatory action. As such this report was commissioned to consider a range of policy options including Minimum Energy Performance Standards (MEPS) to achieve that outcome.

## Product Coverage

Home entertainment equipment has become increasingly popular for the superior sound and associated picture quality, which allow the consumer to have a cinema like experience from home. The home entertainment area is constantly undergoing changes as the development and uptake of new technology proceeds at a rapid rate. While individual product categories have been detailed below, the home entertainment product category as it pertains to this report applies to any piece of equipment that produces records or assists in producing an audio or video signal/output. This includes multi-function devices such as DVD/VCR players. However it does not include devices that display video output such as monitors or televisions or any device that includes the function of a digital TV decoder/receiver (set top box). These products are currently under consideration for

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<sup>1</sup> Formerly known as the National Equipment and Energy Efficiency Committee (NAEEEC)

separate Minimum Energy Performance Standards. Currently the home entertainment product group can be divided into the 10 sub categories listed below:

- AV Receivers
- Home Theatre Systems
- Integrated Stereo
- Portable Stereo
- Audio Components
- Sub Woofers & Speakers
- DVD Players
- DVD Recorders
- Hard Disk Recorders
- VCR's

The overwhelming majority of home entertainment products are manufactured outside Australia. The market is dominated by companies based in Japan, Korea and China with the manufacture taking place in a diverse range of countries, mainly throughout Asia.

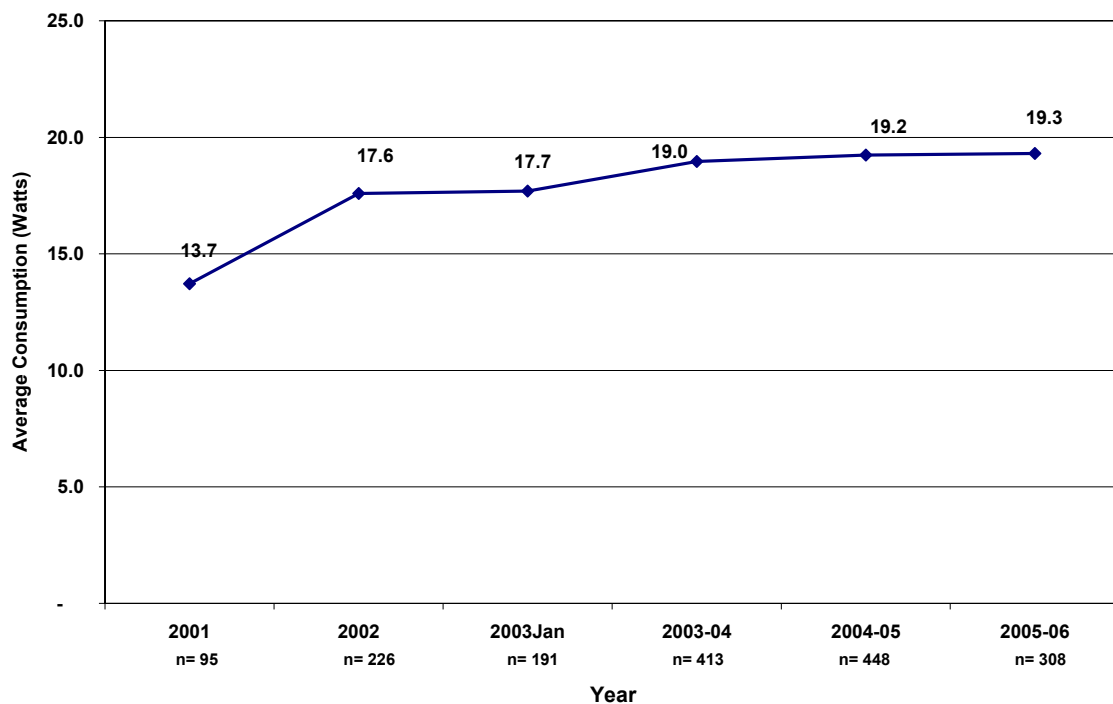
Ownership of home entertainment products is high. The take up of new products to the market is rapid and many technologies are present in multiple numbers. For example nearly 1/3 of homes have more than one VCR. It can be expected that in future as the ownership of new technologies such as DVD and Hard disk recorders increase the ownership of other home entertainment products such as VCRs will diminish.

### *Energy Consumption*

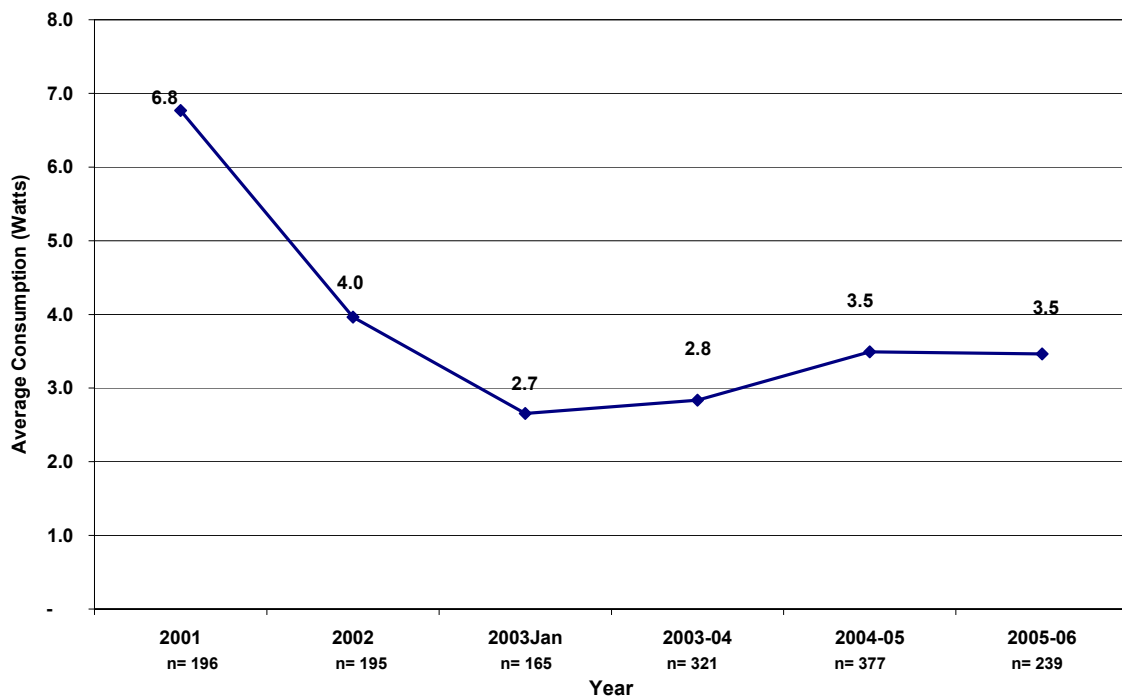
Energy usage for home entertainment equipment is estimated to be responsible for at least 3% of household energy usage, making it comparable with Clothes washers, dishwashers and dryers (Sustainable Solutions 2003). Home entertainment equipment has been measured in all six store surveys. While the types of products recorded has changed and grown over the years energy consumption has in general remained fairly constant. Over 1300 home entertainment products have been measured during this time, representing all of the nine categories listed in this report.

A recent intrusive survey of standby power in Australian households found from 7% to 56% of home entertainment devices were left in active standby mode (EES 2006). This usage characteristic, combined with the relatively high active standby power consumption, provides significant energy saving opportunities.

The power consumption of all home entertainment equipment in Australia in active standby in 2005/06 ranged from half a watt to 112.3 watts, with an average of 19.2 watts. active standby results are presented in Figure 1 and show an increasing trend, which is due the entry of new product types that have high active standby power consumption.

**Figure 1: Average Active Standby Consumption: Home Entertainment Products:**

Passive standby consumption for the home entertainment group of products ranges from zero to nearly 50 watts. The majority of appliances consume less than 2 watts in standby with nearly three quarters consuming less than 4 watts. Average passive standby decreased significantly from 2001 but has remained stable below 4 watts for the last few years. Figure 2 displays the passive standby results from 2001.

**Figure 2: Average Passive Standby Consumption: Home Entertainment Products:**

All available information indicates that the technology to improve energy efficiency of home entertainment equipment is available and currently being used in the market place. Table 1 demonstrates that for all home entertainment equipment tested in the 2005/06 store survey there is a large variation in active and passive standby consumption. The gap between the best and worst performing models was at its largest for AV Receivers at over 80 watts. Analysis has also showed that there was not relationship between price and energy consumption. Given this it could be assumed that the worst performing models could improve there standby consumption significantly.

**Table 1: Summary of Store Survey Measurement Ranges 2005/06**

Home Entertainment Product	Active Standby		Passive Standby		Off Mode	
	Max	Min	Max	Min	Max	Min
AV Receivers	87.4	14.2	11.7	0.1	1.8	0
Home Theatre Systems	51.0	6	17.4	0.2	0.0	0
Integrated Stereos	39.4	3.5	20.7	0.2	11.5	0
Portable Stereos	17.9	2.8	4.8	0.9	2.4	0
Audio Components	29.6	1.1	2.2	2.2	0.0	0
Sub Woofers & Speakers	24.7	2.1	10.9	2	13.4	0
DVD Players	19.2	3.8	9.1	0.1	0.9	0
DVD Recorders	33.9	13.5	23.9	1.2	NA	NA
Hard Disk Recorders	38.8	18.4	24.1	1.6	NA	NA
VCR's	8.5	5.5	3.0	2.1	NA	NA
<b>Total for all Home Entertainment Products</b>	<b>87.4</b>	<b>1.1</b>	<b>24.1</b>	<b>0.1</b>	<b>13.4</b>	<b>0.0</b>

There are several options for improving home entertainment equipment's efficiency. The difference in the best and worst consuming models already in the market are significant and indicate the technology exists to reduce energy usage in the poorest performers. Automatic power down systems could alleviate the high active standby consumption issues. However, it is up to the manufactures to determine the most cost effective and consumer appealing approach.

### *International Programs*

While there are several programs covering various combinations of Home entertainment products, the main focus of all of them is passive standby energy consumption. The majority programs are voluntary labelling schemes, which in general are aiming for appliances to consume no more than 1W. However, video recording products are generally allowed a higher target somewhere between 2 and 4 watts. Other requirements included in these programs, include automatic power down, visible off switch and on mode consumption limits. The mandatory programs are typically MEPS style programs and only target passive standby. The CEC program due to begin in 2006 requires products to consume less than 2 watts. The exception being those units with a clock display can consume up to 4 watts and Video recording products can consume up to 3 watts. Table 2 provides a summary of the international energy efficiency programs targeting Home entertainment equipment.

Table 2: Brief Overview of Energy Efficiency Programs

Program	Voluntary Programs							Mandatory Programs	
	Energy Star	GEEA	EICTA	HomeSpeed	Nordic Swan	Energy Boy	IEA 1W	CEC	Top Runner
Type	Label	Label	Agreement	Database	Label	Label	Target	MEPS	Target
AV Receivers	✓	✓	✓	✓		✓	✓		
Home Theatre Systems	✓					✓	✓		
Integrated Stereo	✓	✓	✓	✓	✓	✓	✓	✓	
Portable Stereo	✓	✓	✓	✓		✓	✓		
Stereo Components	✓	✓	✓	✓		✓	✓		
Sub Woofers	✓						✓		
Speakers	✓						✓		
DVD Players	✓	✓	✓	✓	✓	✓	✓	✓	
DVD Recorders	✓	✓	✓	✓	✓		✓	✓	
Hard Disk Recorders			✓				✓	✓	
VCRs	✓	✓	✓	✓	✓	✓	✓		✓

### Key Issues

With standby energy consumption of home entertainment products estimated to be at least 2,100 GWh pa by 2012, the case for addressing energy consumption from these products is strong. Key points considered in forming the recommended policy option include:

- The standby energy consumption of Home entertainment products estimated to be at least 2,100 GWh pa by 2012
- The vast majority of home entertainment products sold in Australia are imported and there is an extensive range of market players selling into Australia, reducing the likely effectiveness of any voluntary program. The extensive range of players selling into Australia though means that eliminating the poorer products via MEPS would not create a limited product offering for consumers.
- Energy consumption from Home entertainment products is estimated at around 3% of total household consumption. This level of consumption is comparable with that of clothes washers, clothes dryers and dishwashers. All of these household appliances carry an energy rating label indicating the significance of that level of consumption.
- Store surveys conducted between 2001 and 2006 have found that there is a considerable variation in the Active and Passive standby energy consumption of the

best and worst performing products on the market in each product group. This strongly suggests that there is scope for efficiency improvements using existing technologies.

- The only program that addresses energy consumption from home entertainment products in Australia is the ENERGY STAR program. This very important program has the opportunity to play a major role in promoting industry best practice and it is strategically significant in that it is an international program. Never-the-less, as an information program it will have limited impact on product take-up, it does not cover active or off mode energy consumption and will not rid the market of the worst performing models.
- Consumer decision-making criteria for home entertainment products do not take energy consumption into consideration. While information programs on energy consumption of home entertainment products would enhance consumer knowledge, they would not ensure that the consumer will purchase the most efficient model available, particularly when there are a myriad of other features to consider in the purchase decision. As such, to rely on information programs alone may be short sighted and not produce market transformation in the same way that a mandatory measure would.
- Industry groups have indicated that introducing MEPS is the preferred method for accelerating energy efficiency in home entertainment equipment.

MEPS are a government regulatory program stipulated in state and territory law that excludes, from the market, products that do not meet the minimum energy performance standards. A MEPS program could be developed which excluded the worst of the high energy consuming home entertainment products, which would lower the average consumption from the products sold. By progressively introducing lower MEPS requirements this would also encourage suppliers to improve their product's performance.

Sustainable Solutions (2003) suggests that MEPS for home entertainment products should incorporate (rather than try to replace) existing programs such as the IEA "One Watt" initiative and that action taken in Australia should not conflict with international developments and should use international test procedures. IEC 62087 test method already provides the standard test procedure.

### *Recommend Policy Option*

A MEPS scheme is the recommended course of action. A broad "horizontal" definition of products is proposed to be targeted by the MEPS and aim to simplify the issues associated with determining MEPS coverage. The definition proposed is as follows:

Commercially available consumer equipment that produces, records or assists in producing an audio or video signal/output.
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Products that are specifically covered by other MEPS requirements (such as TVs and set top boxes) would be excluded from this MEPS. A summary of the proposed maximum levels that would apply by mode and product type are shown in Table 3.

**Table 3: Proposed MEPS: Maximum Standby Power Levels**

Home Entertainment Product Type	Stage 1 MEPS		Stage 2 MEPS	
	Passive standby	Off	Passive standby	Off
Without video recording capabilities	4 watts	0.3 watts	1 watt*	0.3 watts
With video recording capabilities	6 watts	0.3 watts	1 watt*	0.3 watts

\* Auto power down to passive standby after 30 minutes of no AV input or inactivity is also required

As explained in the report, home entertainment products are only differentiated by their video recording capability.

### Stage 1 MEPS

The MEPS for implementation for Stage 1 is proposed at 4 watts for all home entertainment products without video recording capabilities and at 6 watts for those with video recording capabilities. Additionally all products with an off mode would be required to have consumption less than 0.3W. Products would be considered high efficiency models if they meet the criteria set out for Stage 2 MEPS. Approximately 23% of all models surveyed in 2006 would not meet Stage 1 MEPS level.

It is suggested that the MEPS Stage 1 is implemented as early as possible, but not before 2009, which provides 3 years to enable industry to comply with these levels. Compared to whitegoods, home entertainment equipment have shorter product development lifecycle which enables the MEPS levels to be taken into account without interruption to the normal model development cycle.

### Stage 2 MEPS

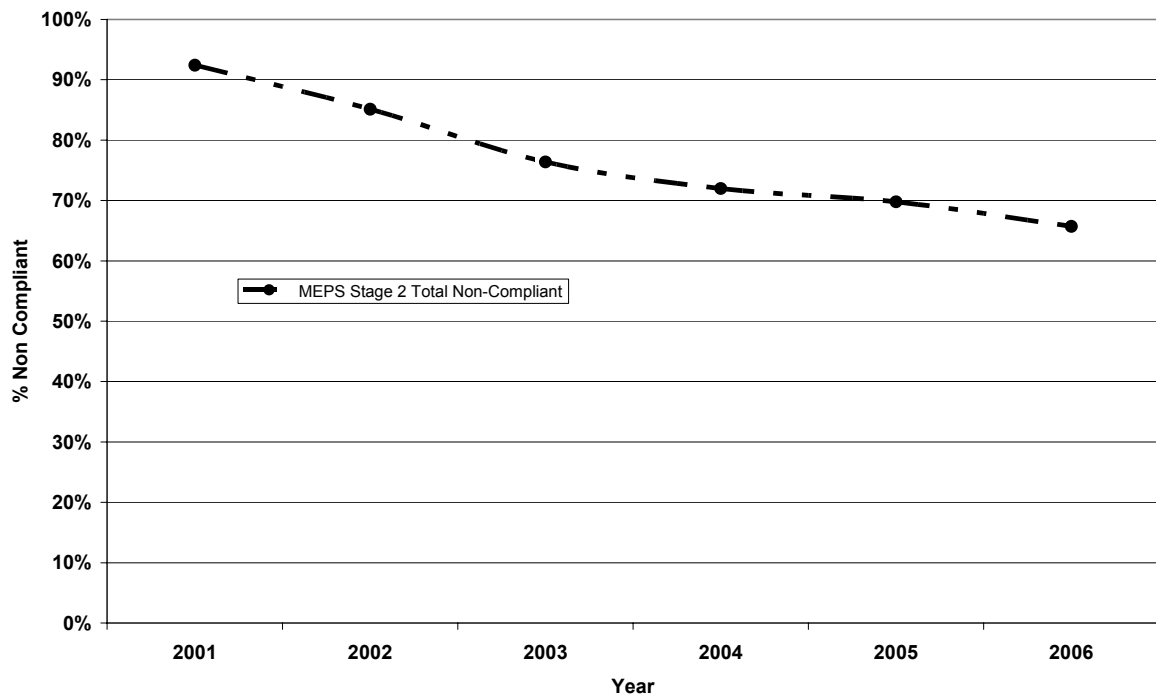
Stage 2 MEPS aims to meet the IEA target of less than 1 watt consumption in standby. The Australian Government has adopted this target for all appliances under its Standby Power Strategy (MCE 2002). The Strategy proposes that this level be achieved by 2012 and it is considered that by 2012 the market would be ready to achieve a MEPS level of 1 watt or less in passive standby for home entertainment equipment. Therefore it is proposed that Stage 2 MEPS be implemented on or after 2012. This would also be consistent with the levels expected by international programs. To reduce the impact of active standby all home entertainment products would be required to power down to passive standby within 30 minutes of inactivity. Assuming that the auto power down feature is implemented in all products, the proposed passive standby level of 1 Watt would currently exclude 66% of the market.

There is a downward trend in total percentage of products surveyed since 2001 that do not comply with the proposed MEPS Stage 2 as shown in Figure 3. If this trend



continues over the next 6 years, by 2012 approximately 30% of all products would not comply with the proposed MEPS Stage 2 levels.

**Figure 3: MEPS Stage 2 Percentage Excluded of all Product by Survey Year**

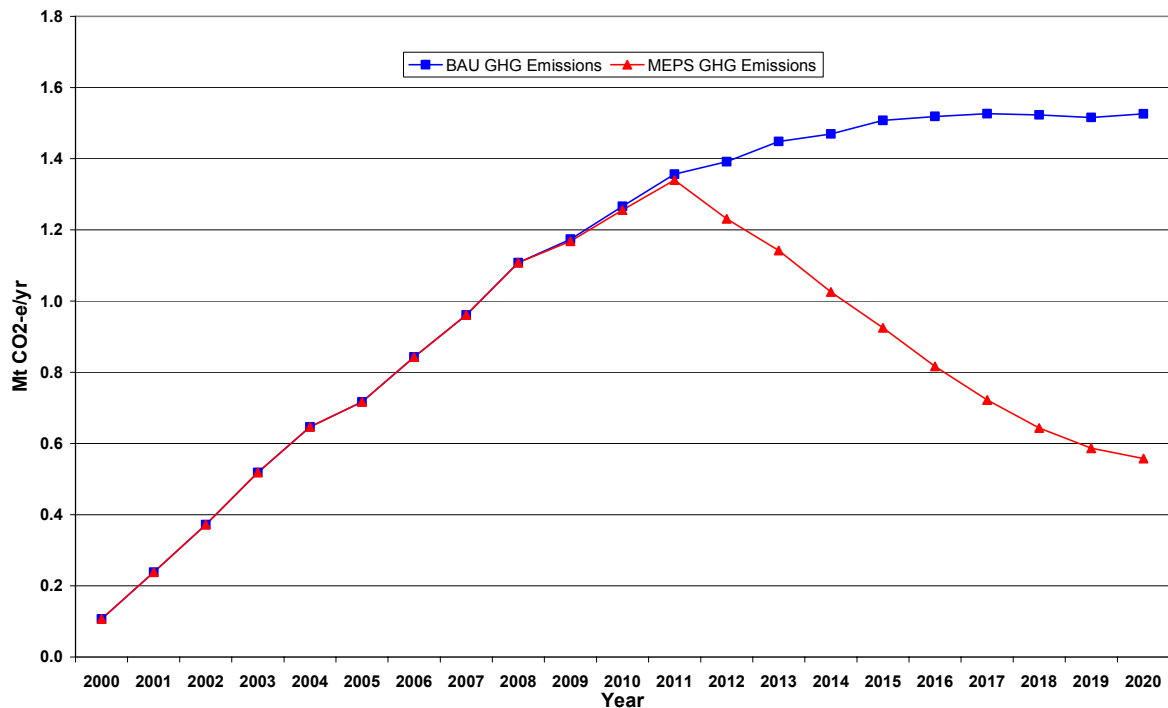


### *Estimated Impacts*

The MEPS targeting standby power for home entertainment equipment is estimated to reduce the GHG emissions 970 kt CO<sub>2</sub>-e pa and save over 1,200 GWh pa of electricity by 2020, as shown in Figure 4.

In summary the potential energy savings and GHG reductions are larger than the estimated impacts for other appliances that have in-use mode MEPS in place. For example, when MEPS was first proposed for air conditioners, the energy savings were estimated to be 450 GWh pa about 10 years after implementation.

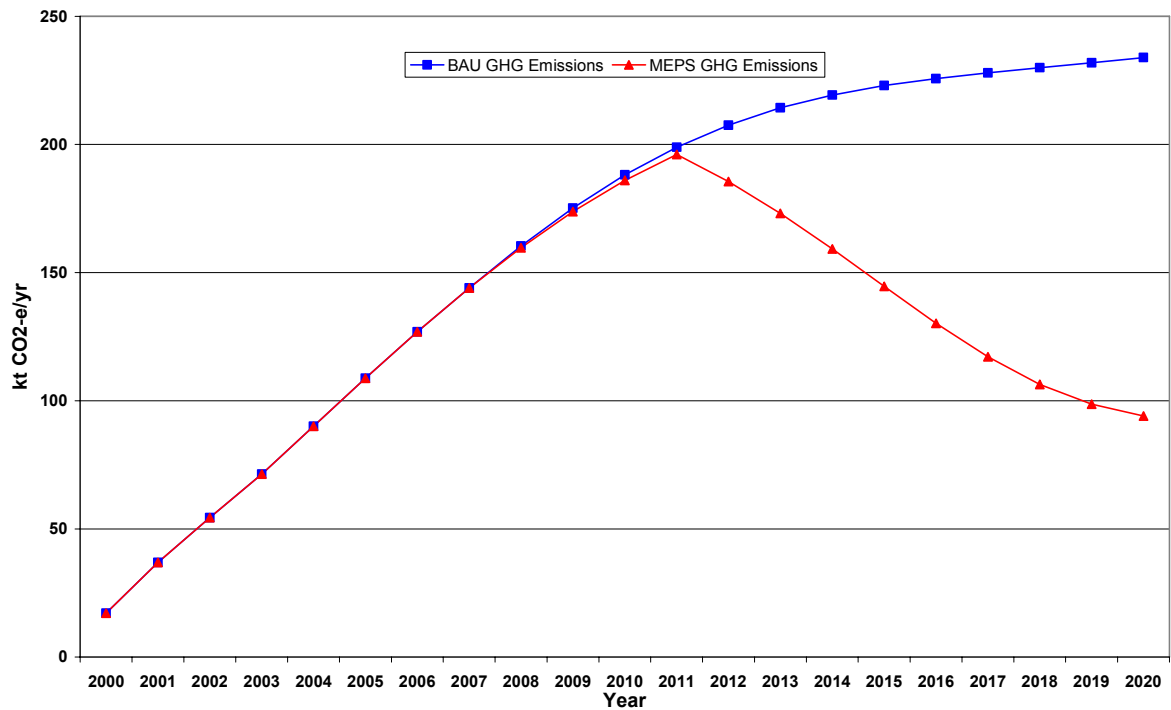
**Figure 4: BAU vs. MEPS Policy – GHG Emissions for Home Entertainment Equipment**



### *New Zealand Product Impacts*

The impact of the proposed MEPS in terms of percentage of product that is excluded in New Zealand is likely to be similar to Australia. The energy savings and GHG reduction potential of the proposed MEPS has been estimated using the same power and product usage characteristics for Australia, with the detailed sales forecasts developed from the GfK data. Figure 5 shows the BAU and MEPS policy scenario of GHG emissions for home entertainment equipment in New Zealand, with the majority of the emission reduction occurring after the Stage 2 MEPS is implemented in 2012. The potential GHG emission reduction in New Zealand is 22 kt CO<sub>2</sub>-e pa by 2012 and 140 kt CO<sub>2</sub>-e pa by 2020.

Figure 5: BAU vs. MEPS Policy – NZ GHG Emissions for Home Entertainment Equipment



The New Zealand Energy Efficiency and Conservation Authority (EECA) is considering the adoption of similar Standby Strategy to the strategy developed in Australia

# Introduction

## Background

Over the past four years the Equipment Energy Efficiency<sup>2</sup> (E3) Committee has been tracking the energy usage, in particular standby power consumption of appliances offered for sale in retail outlets across Australia. Additionally E3 has commissioned two intrusive surveys of standby consumption in households (2001 & 2005) and a telephone survey of 800 households (2001) to determine appliance ownership and usage. This research has been the backbone of standby policy development in that finally Australian Governments has meaningful data on the extent of standby power consumption in Australian households.

Leading on from this earlier research, the Ministerial Council on Energy in 2002 released the policy document *Money Isn't all You're Saving* outlining Australia's Standby Power Strategy 2002 – 2012. The strategy outlined the products and appliances that require “immediate” or “subsequent” action in the standby power program. Initially stereo equipment was among a group of products identified for immediate action and with the rapid proliferation of DVD & home theatre products, these were added shortly after. Part of this action included the development of “product profiles” to “provide an overview of the product in terms of its standby characteristics, the purpose and functionality of their standby function, market status, ownership levels and trends in sales and product types.” (MCE 2002)

Product profiles for these appliance groups were released for comment during 2003 and 2004. Industry feedback indicated that the preferred approach for these products was regulatory action. As such this report was commissioned to consider a range of policy options including Minimum Energy Performance Standards (MEPS) to achieve that outcome. Moreover, the potential for energy and greenhouse savings through the use of a combination of policy tools will also be investigated in this report.

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<sup>2</sup> Formerly known as the National Equipment and Energy Efficiency Committee (NAEEEC)

## *Product Description*

Home entertainment equipment has become increasingly popular for the superior sound and associated picture quality, which allow the consumer to have a cinema like experience from home. The home entertainment area is constantly undergoing changes as the development and uptake of new technology proceeds at a rapid rate. While individual product categories have been detailed below, the home entertainment product category as it pertains to this report applies to any piece of equipment that produces records or assists in producing an audio or video signal/output. This includes multi-function devices such as DVD/VCR players. However it does not include devices that display video output such as monitors or televisions or any device that includes the function of a digital TV decoder/receiver (set top box). These products are currently under consideration for separate Minimum Energy Performance Standards. Currently the home entertainment product group can be divided into the 10 sub categories listed below.

### *AV Receivers*

Audio/Visual (AV) receivers are essentially an amplifier with a built-in radio tuner that functions as a control centre for other components such as TV, DVD player, stereo etc. AV receivers are also available with built-in DVD players and/or digital signal decoder's i.e. built-in set top boxes. Those with built in digital TV receivers/decoders are not included in this report.

### *Home Theatre Systems*

Home theatre systems cover units that include an AV receiver and subwoofer speaker system all powered by the single AC lead. This category of product nearly always has a built-in DVD player and can include other components such as a digital signal decoders i.e. built in set top boxes. The key characteristic that defines a home theatre system is that all components are powered from the one source lead. For the purposes of this report, the home theatre systems category includes all variations except those with a built in set top box function.

It should be noted that manufacturers and retailers sometimes package individual components together, labelling them a "Home Theatre System". These would not fall into the home theatre system category as each product has its own individual AC power source. Hence, each component would be covered by its own category i.e. AV receiver, DVD player etc.

### *Integrated Stereo*

Integrated stereos are non-portable units that combine various audio components with an internal amplifier. The most common combination on the market at present usually includes compact disc, tape deck, amplifier and tuner. Older models used to have turntable components, while newer models may have a variety of options such as a multi

stack CD device, karaoke functions, even a DVD player. All the components in an integrated stereo system are powered by one lead. It should be noted that the definition of integrated stereos is somewhat confusing given the multitude of names for this type of home entertainment equipment, such as “hi-fi system”, “mini system”, “micro system”, etc.

## *Portable Stereo*

Portable stereo units combine various audio components with an internal amplifier and speaker system. They can be run using mains electricity or battery operated. The most common combination on the market at present usually includes compact disk player and tuner. Some models also include DVD players, tape decks and multi stack CD devices. The simplest definition of a portable stereo as distinct from other stereo equipment is that portable stereos are able to be run using battery power and will usually include a carry handle. This definition of portable stereos does not include devices such as walkmans, or portable disk players.

## *Audio Components*

With the proliferation of the new home theatre packages and the introduction of DVD technology there has been a decline in the market of previously common audio equipment. However products such as Amplifiers, CD Players, Tape Decks, Tuners, and Turntables are still available, especially at the high end of the market. These products will also be covered in this report, under the general category of Audio components.

## *Sub Woofers & Speakers*

Subwoofers are large speakers that amplify low-frequency (bass) sounds. There are two types of subwoofers: passive subwoofers rely entirely on the main amplifier for power while active subwoofers have their own AC source of power. It is the active types that are the focus of this report. A home theatre set up will generally have five speakers and a subwoofer, although not all packages necessarily include subwoofers.

Stereo Speakers have commonly been powered by the amplifier however there is an increasing number of speaker systems which are actively powered by an AC supply separate from the audio system. Additionally there are now cordless speaker systems on the market that have a central control box and audio terminals that direct sound to hard wired speakers both requiring direct connection to mains power. For the purposes of this report speakers have been categorised as any part of a speaker system that has its own lead requiring mains power to function, excluding sub woofers which are singled out as stated above.

## *DVD Players*

Digital Versatile Disc players, more commonly known as DVD (or Digital Video Disk) players, have become common place in the Australian market. DVD players deliver

superior sound and picture quality and compared to VCRs, offer much greater user convenience. DVD players are also able to play CDs and video games, and play home movies.

DVD players and DVDs themselves are subject to a regional zoning restriction that splits the world into a number of zones (Australia is zone 4). Discs are encoded with a region code and will only play on players with a matching region code (however some players are available that can read discs from all zones).

### *DVD Recorders*

DVD technology is expanding rapidly and has seen the DVD/VCR and DVD recorders become more widely available. The DVD recorder market is somewhat more complicated. When first introduced, DVD recorders could be used to record DVD images from video (such as home movies) or from a computer. However since 2001 DVD recorders can also record television images and hence function similarly to a VCR. This innovation is likely to see a rapid increase in ownership of the DVD recorder and eventual replacement of the standard VCR. The complication for the consumer is that there are five different format types (DVD-R, DVD+R, DVD-RAM, DVD-RW and DVD+RW) available for DVD and the format your appliance uses will determine what can be made and viewed. There are now some units available that are able to read/record more than one format type. DVD players/recorders that include a digital TV receiver/decoder, are subject to the MEPS proposals for Set Top Boxes.

### *Hard Disk Recorders*

Hard disk recorders (HDR) also known as Personal Video Recorders, Digital Video Recorders or DVD hard disk recorders are the latest development in the home entertainment product range. These units enable the user to record video images onto a hard disk from an external source such as a television, VCR or Video Camera. These units may include a DVD recorder/player and can incorporate a digital decoder (set top box function). Hard disk recorders that include a digital TV receiver/decoder, are subject to the MEPS proposals for Set Top Boxes.

### *VCR's*

VCRs are formally known as Video Cassette Recorders. In Australia, this means a conventional VHS video cassette recorder which uses the PAL broadcast system. Typically a VCR both converts a signal off a tape enabling a Television to transmit audiovisual images as well as recording Television transmissions for later playback. The advent of the VCR allowed viewers to have control of when and what they could watch on their TV's. VCRs are also sold as DVD/VCR combination units which allow the viewer to watch DVDs while using the VCR to record.

## *Sources of Product*

The overwhelming majority of home entertainment products are manufactured outside Australia. The market is dominated by companies based in Japan, Korea and China with the manufacture taking place in a diverse range of countries, mainly throughout Asia. However companies from Europe and the United States make up a significant share of the market especially at the high end. Australian companies manufacture a small number of products in the audio area.



## Market Profile

Some form of home entertainment equipment is present in almost every Australian home. Most homes will own multiple units including perhaps audio components, a portable stereo as well as DVD player or VCR. Technology in this area has changed rapidly in the last five years and the sales of new products have experienced rapid growth, expanding the ownership of this type of equipment.

### AV Receivers

There is very little information about the ownership of AV receivers in Australia. We do know that they were not found during the intrusive household survey conducted in 2000 and that they were only first picked up in the store survey in 2002. Store surveys have found that AV receivers can range in price from as little as \$200 to over \$3000. GFK has collected retail sales data from across Australia, with figures from 2000 to 2004 shown in Table 4. This demonstrates the demand for AV receivers more than doubled over the three year period with growth slowing in the last two years.

**Table 4: Total sales and Dollar Value for AV Receivers**

Year	No. Units Sold	Average Price	Total Sales (\$)
2000	46,154	\$860	\$39,697,274
2001	59,958	\$923	\$55,351,338
2002	107,027	\$899	\$96,189,903
2003	136,970	\$898	\$123,039,634
2004	109,329	\$778	\$85,034,908

Source: GfK Marketing

### Home Theatre Systems

The popularity of this relative newcomer to the home entertainment market is rapidly increasing especially as prices decrease. Since 2000 over 250,000 home theatre systems have been sold Australia wide (GfK 2005). Table 5 shows the sales of home theatre products increased nearly threefold in each year from 2000 to 2002 and have continued to have substantial growth since. While the average price of home theatre products was still over \$1,000 in 2002, it has been observed that most systems are now priced below \$1,000 with budget priced systems being sold for under \$200, making them increasingly competitive with integrated stereos. Home theatre systems were first picked up in store surveys in November 2003.

**Table 5: Total sales and average price of home theatre systems 2000-2002**

<b>Year</b>	<b>Total Sales</b>	<b>Average Price</b>	<b>Total Sales (\$)</b>
2000	7,232	\$1,427	\$10,319,494
2001	22,466	\$1,419	\$31,884,668
2002	61,258	\$1,169	\$71,630,361
2003	146,250	\$ 909	\$141,152,416
2004	190,726	\$ 778	\$112,804,432

Source: GfK Marketing

It is possible that these systems will eventually overtake integrated stereos as the major audio appliance in the home, in addition to their complimentary audio functions for video entertainment.

### *Integrated Stereos*

Integrated stereos first appeared in the 1950's and consisted of a tuner, amplifier and turntable. Over the decades various components have been added and/or excluded and units have shrunk from a large buffet cabinet style to a compact shelf unit. Very little data is available about integrated stereos, as most research tends to focus on the broad appliance group of audio equipment, neglecting to distinguish the various types of stereo products.

In 2001, E3 commissioned a household telephone survey based on a sample of 801 households. Participants were asked whether their stereo systems were integrated or made up of separate components. The results found that 48% of households have at least one integrated stereo and 11% of homes have two or more units. However, it is important to note that there were no questions in the study that asked respondents to distinguish specifically between integrated and portable stereo units. Therefore, some respondents may have been thinking about their portable stereos when answering questions about their integrated stereos. The penetration and ownership data presented below may consequently be overestimated. A summary of these survey results is shown in Table 6 and Table 7.

**Table 6: Penetration of integrated stereo ownership - Australia**

<b>Year</b>	<b>Penetration</b>	<b>Source</b>
2000	47.5%	E3

**Table 7: Ownership data for integrated stereos - Australia**

<b>No. of Integrated Stereos</b>	<b>2000 (E3) telephone survey</b>
None	52.4%
1	36.5%
2	8.2%
3	2%
4 or more	0.9%
Ownership	0.7603
Saturation	1.5984

The average age of integrated stereos in the stock was found to be 6 years in the 2000 telephone survey. This compares closely with an average age of 7 years in the intrusive survey of households conducted the same year.

The total sales value of integrated stereos in 2002 was more than \$207 million. Sales data indicates that sales of integrated stereos are decreasing, most probably due to the increasing home theatre system market. Table 8 illustrates the decreasing market.

**Table 8: Sales and market value of integrated stereos**

<b>Year</b>	<b>Total Sales</b>	<b>Average Price</b>	<b>Total Sales Value</b>
2000	485,398	\$529	\$ 256,905,334
2001	471,805	\$531	\$ 250,497,968
2002	433,380	\$479	\$ 207,441,008
2003	457,118	\$325	\$ 148,351,721
2004	435,935	\$250	\$ 108,814,579

Source: GfK Marketing

### *Portable Stereos*

Ownership and penetration data specifically for portable stereos is limited; however, a E3 commissioned study of standby power usage in Australian households in late 2000 found that penetration of portable stereos was 44%. This intrusive survey of 64 Australian households in Melbourne, Sydney and Brisbane found that 28% of households with a portable stereo had at least one, while 9% had two portable stereos. The survey also found that saturation of portable stereos was 1.54 per household. The results are presented in Table 9

**Table 9: Ownership data for Portable Stereos - Australia**

<b>Portable Stereos</b>	<b>Household conducted (n=64)</b>	<b>Dec 2000 survey</b>
1 Portable Stereo	28%	
2 Portable Stereos	9%	
3 Portable Stereos	5%	
4 Portable Stereos	2%	
Penetration	44%	
Saturation	1.54	
Ownership	0.67	

Source: EES &amp; EnergyConsult, 2001

The E3 commissioned survey of households found the average age of portable Stereos in stock was 11 years.

### *Audio Components*

In 2001, E3 commissioned a household telephone survey based on a sample of 801 households. Participants were asked whether their stereo systems were integrated or made up of separate components. The survey found that 47% of households have at least one stereo system made up of components and 6% of homes have two or more units. A summary of these survey results is shown in Table 6 and Table 7. However this data does not give us any indication as to how many components each home owned.

**Table 10: Penetration of component stereo system ownership - Australia**

<b>Year</b>	<b>Penetration</b>	<b>Source</b>
2000	47.3%	E3

**Table 11: Ownership data for component stereo system - Australia**

<b>No. of Component Systems</b>	<b>Stereos 2000 (E3) telephone survey</b>
None	52.7%
1	41.1%
2	5.5%
3	0.6%
4 or more	0.1%
Ownership	0.607
Saturation	1.152

The intrusive survey carried out in 2000 listed each individual component. This survey found 75% of homes had a components stereo system with most having between 3 and 5 components, with the average number of components per house being 3.8. The survey

found stereo components ranged in age from 0 to 34 years with the average being 12 years.

### *Sub Woofers & Speakers*

Traditionally most speaker systems in the residential market have been powered by amplifiers or receivers. However with more people including sub woofers in their home entertainment packages speakers are now powered via the sub woofer or have their own power source. Easdown (2004) reported that there has been “a fundamental shift” in speaker sales with one retailer reporting that 50% of purchases are now 5 speaker sets. Until recently the overwhelming majority of speakers were sold as pairs. A Melbourne retailer also suggested that it is now rare to sell an Audio visual system without a sub woofer being included in the purchase. While there is little data to back up this anecdotal evidence the intrusive data from the 2000 standby survey recorded 6 households as having either speakers or sub woofers with their own power source. The survey found the speakers were less than 3 years old except one unit which was 6 years old.

### *DVD Players*

DVD players became available in Australia from late 1997 with ‘early adopters’ and film enthusiasts initially dominating the market. However a rapid reduction in price, which has seen DVD players become competitive with VCRs, increased sales dramatically from 2000. GFK marketing Services has tracked sales of the product since its introduction, reporting 4,541 units were sold in the first year. It is estimated that by March 2001 there were 400,000 players in Australian homes (AFC 2002). In October 2002, an article in “The Age” newspaper reported that sales of DVD players were expected to reach 800,000 per annum in 2002 (Johnson 2002). The latest retail sales data suggests that sales in 2003 and 2004 were well over 1 million units. Retail sales data for DVD players in Australia is shown in Table 12.

**Table 12: Australian Retail sales of DVD players, 1998–2004**

<b>Year</b>	<b>Units Sold</b>	<b>Value (\$m)</b>	<b>Average Price (\$)</b>
1998	4,541	5.58	\$1,229
1999	44,919	45.13	\$1,005
2000	167,727	112.38	\$670
2001	451,486	212.17	\$469
2002	903,284	310.00	\$343
2003	1,690,968	360.30	\$212
2004	1,908,827	331.00	\$173

Source: 1998: GFK Marketing Services cited in AFC (2002).  
 1999 to 2002: GFK Marketing Services cited in AFC (2005)  
 2003 to 2004: GFK Marketing Services (2005)

In 2001, the penetration and ownership of DVD players was reported in a E3 commissioned study of standby power usage in Australian households (Harrington and Kleverlaan, 2001). Based on a telephone survey of 801 Australian households, penetration of DVD players was found to be at 8.2% in December 2000. An article printed in “The Age” newspaper in October 2002 estimated that penetration of DVD players in 2002 was about 25% (Johnson 2002) and OzTam data now recording it at more than 60%. Table 13 highlights ownership data from 2000 while Table 14 details penetration.

**Table 13: Ownership data for DVD Players – Australia**

<b>DVDs</b>	<b>Phone survey conducted Dec 2000</b>
Ownership	0.089
Saturation	1.0909

Source: Harrington and Kleverlaan, 2001

**Table 14: Penetration data for DVD Players – Australia**

<b>DVDs</b>	<b>Penetration</b>
2000	8.2%
2001	12%
2002	24%
2003	43%
2004	62%

Source: 2000: Harrington and Kleverlaan, 2001  
 2001-2003: OzTam Cited in AFC 2005

As a new product that has quickly gained acceptance in the Australian market place, penetration and ownership trends for DVD players are likely to continue to grow over the next few years.

## DVD and Hard Disk Recorders

DVD recorders and hard disk recorders are rapidly gaining a foothold in the Australian market place. In 2002 worldwide shipments of DVD recorders reached 1.5 million and are expected to be over 11 million units in 2005 (Shim 2003). It is estimated that at the beginning of 2002 approximately 15,000 DVD recorders were in Australian homes (Dasey 2002). The demand for recorders is expected to increase rapidly as the retail price decreases. For example Philips Australia cut the price of its DVD recorder by 36 percent in 2002 (Colley 2002) and with the average price dropping more than 60% by 2004 sales have skyrocketed. Table 3 below shows the sales figures of DVD recorders. The figures show how quickly the market has grown in a four year period.

**Table 15: Australian Retail sales of DVD recorders, 2001–2002**

Year	Units Sold	Value (\$)	Average Price (\$)
2001	87	\$302,110	\$3,473
2002	3,113	\$6,845,000	\$2,199
2003			
2004	77,199		\$829

Source: 2001-2002: GFK Marketing Services.  
2004: Lee 2005

Note: DVD recorders and Hard Disk Recorders are often categorised together and therefore these figures may include sales data for both products.

## VCR's

The VCR was introduced into Australia in 1976. Its initial price tag was in 1989/90 dollars was around \$4,500. By 1993 this had dramatically decreased to around \$440 (in 1989/90 dollars) making it much more affordable to the average household (ABS 2002). The Bureau of Transport and Communications Economics produced a, *Statistical Summary of the Communications, Entertainment and Information Industries* which reported penetration of VCRs in Australian Households at five-year intervals between 1976 and 1993. It found that VCR ownership increased from 3% of households in 1981 to 80% of households in 1993 (ABS 2002). Since 1984, the penetration of VCRs has also been tracked by Roy Morgan Research Centre (1984-1993) and AC Neilson TV Trends (1994 to 2001). In 2001, the penetration and ownership of VCRs was reported in a E3 commissioned study of standby power usage in Australian households<sup>3</sup>. This information on VCR ownership and penetration is presented in Table 16.

3 *Quantification Of Residential Standby Power Consumption In Australia: Results of recent survey work.* March 2001, Energy Efficient Strategies & EnergyConsult.

**Table 16: Ownership data for VCRs - Australia**

VCRs	2000 (E3)	2001 (AFC)	2002 (AFC)	2003 (AFC)	2004 (AFC)
None	11%	12%	11%	13%	14%
1 VCR	62.5%	64%	62%	59%	59%
2 VCRs	21.6%				
3 VCRs	4.6%	25%	27%	28%	27%
4 VCRs	0.3%				
Ownership	1.206				
Saturation	1.355				
Penetration	89%				

Source: 2000: Harrington and Kleverlaan, 2001  
2001-2003: OzTam Cited in AFC 2005

While current ownership of VCRs is high, the sales of VCRs are in rapid decline. It has been predicted that by 2007 the VCR market will be minimal (Johnson 2002). The value of VCR sales has more than halved since 2002 (Barker 2004). Sales data is presented in Table 17.

**Table 17: Sales data for VCRs - Australia**

Year	Estimated No. of VCRs Sold
2001	988,372
2002	850,000
2003	650,000
2004	300,000

Source: 2001-2002: Johnson 2002.  
2003-2004: Lowe 2004

## Summary

*Ownership of home entertainment products is high. The take up of new products to the market is rapid and many technologies are present in multiple numbers. For example nearly 1/3 of homes have more than one VCR. It can be expected that in future as the ownership of new technologies such as DVD and Hard disk recorders increase the ownership of other home entertainment products such as VCRs will diminish.*



## *Energy Consumption*

Energy usage for home entertainment equipment is estimated to be responsible for at least 3% of household energy usage, making it comparable with Clothes washers, dishwashers and dryers (Sustainable Solutions 2003). Home entertainment equipment has been measured in all six store surveys. While the types of products recorded has changed and grown over the years energy consumption has in general remained fairly constant. Over 1300 home entertainment products have been measured during this time, representing all of the nine categories listed in this report. Consumers buy home entertainment equipment for a variety of purposes be it attached to a television in a home theatre environment or in the back room for the kids. This means that the usage patterns of equipment can be quite varied from rarely used to being use for long periods throughout the day. (Sustainable Solutions 2003)

American studies suggest that Home entertainment equipment is left in active standby for around 13% to 19% of the time, however it is suggested that these are conservative figures and Sustainable Solutions asserts “our observations indicate that many Australian Stereo are left on active standby most of the time they are not playing...” (Sustainable Solutions 2003). A recent intrusive survey of standby power in Australian households found from 7% to 56% of home entertainment devices were left in active standby mode (EES 2006). This usage characteristic, combined with the relatively high active standby power consumption, provides significant energy saving opportunities.

The power consumption of all home entertainment equipment in active standby in 2005/06 ranged from half a watt to 112.3 watts, with an average of 19.2 watts. These figures are consistent with those recorded in the last five store surveys. Average active standby has increased slightly over the years; however there is no statistical significance in this growth and may be a result of increasing sample size. Active standby results are presented in Figure 6 and Figure 7 following. These figures show an increasing trend, which is due the entry of new product types that have high active standby power consumption.

Figure 6: Power measurements for Home Entertainment products: Active Standby

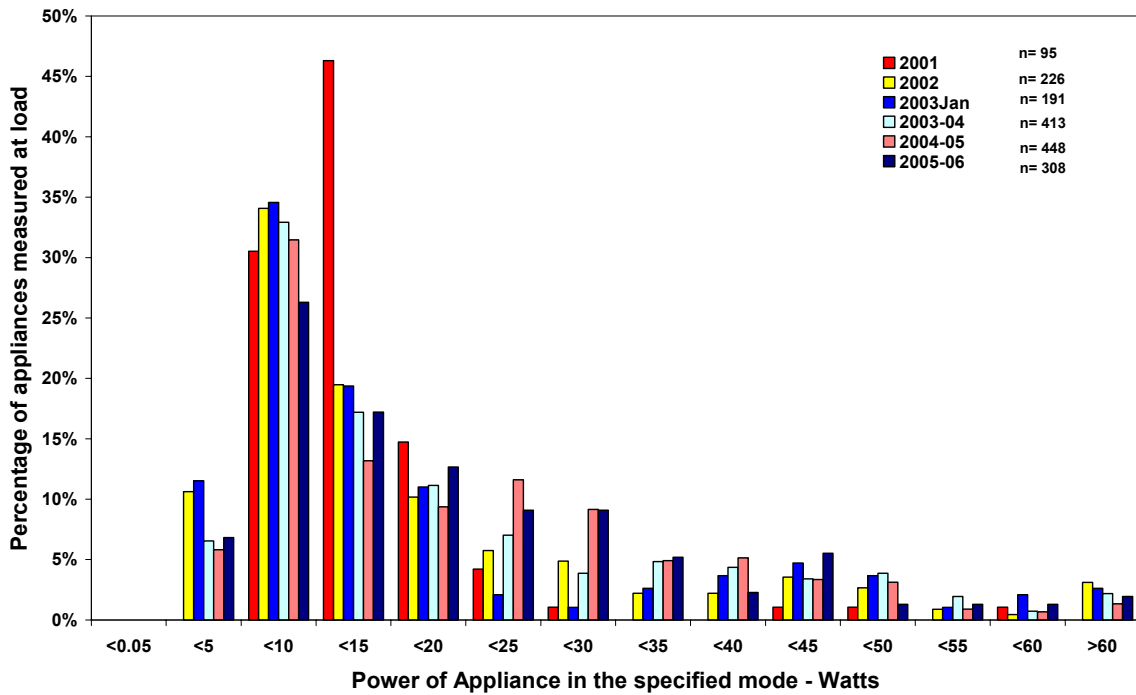
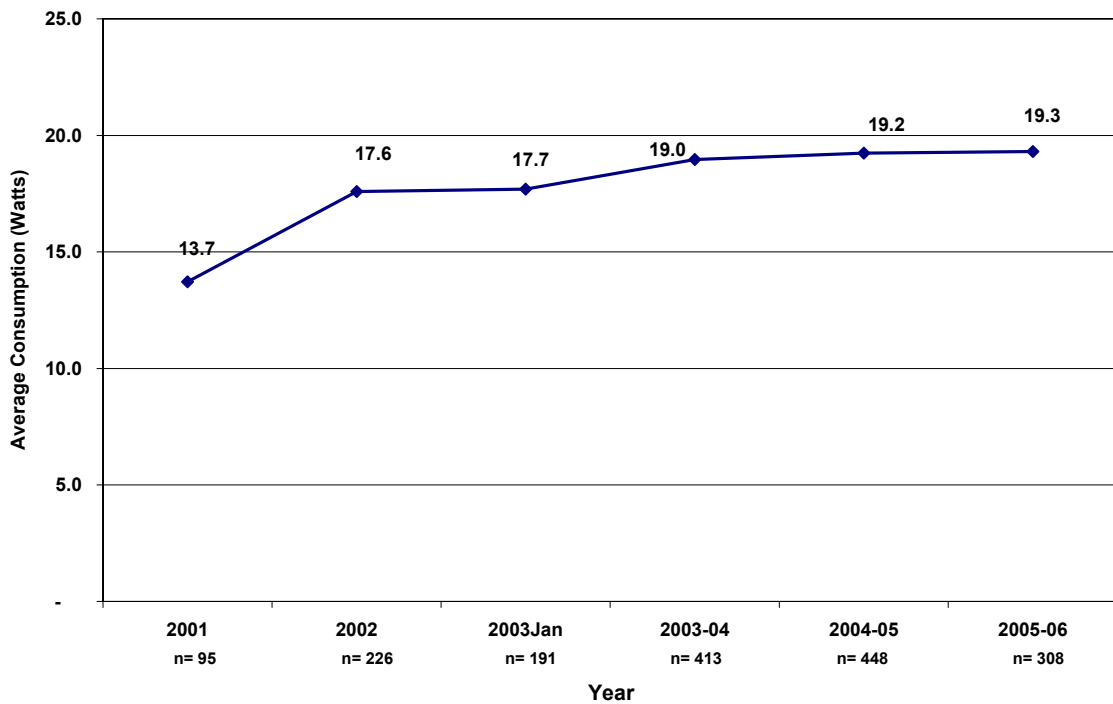
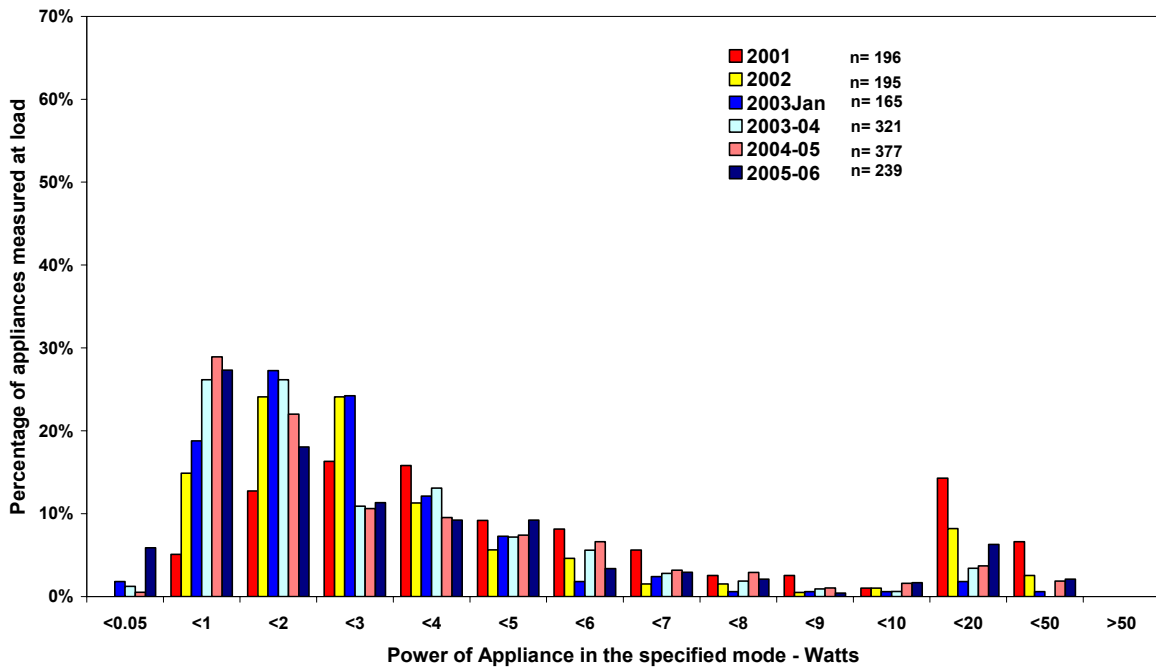


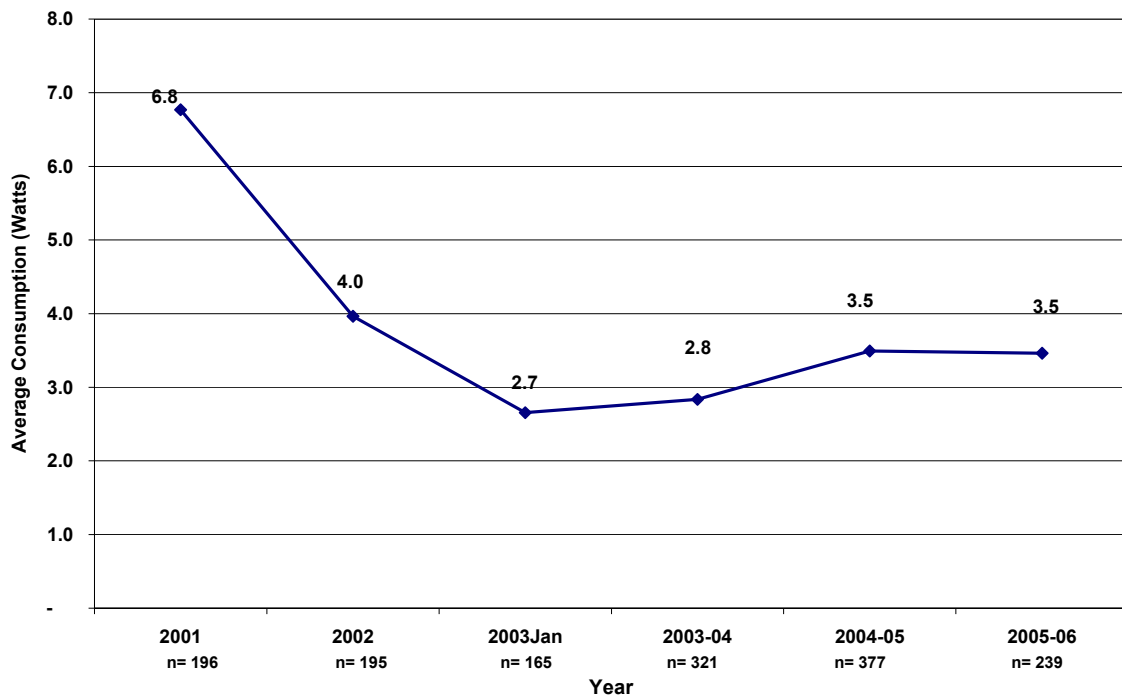
Figure 7: Average Active Standby Consumption: Home Entertainment Products:



Passive standby consumption for the home entertainment group of products ranges from zero to nearly 50 watts. The majority of appliances consume less than 2 watts in standby with nearly three quarters consuming less than 4 watts. Average passive standby decreased significantly from 2001 but has remained stable below 4 watts for the last few years. Rosen and Meier’s 1999 study of USA usage patterns estimated that home entertainment products were in passive standby for 50 to 75% of the time (Sustainable Solutions 2003). Figure 8 and Figure 9 display the passive standby results from 2001.

**Figure 8: Power measurements for Home Entertainment: Passive Standby**



**Figure 9: Average Passive Standby Consumption: Home Entertainment Products:**

Since 2001 only a quarter of appliances in the home entertainment product group have been found to have off mode. The overwhelming numbers of appliances have no consumption in this mode. The average consumption has been below 0.5 watts every year except 2001. These results are reflected in Figure 10 and Figure 11

Figure 10: Power measurements for Home Entertainment: Off Mode

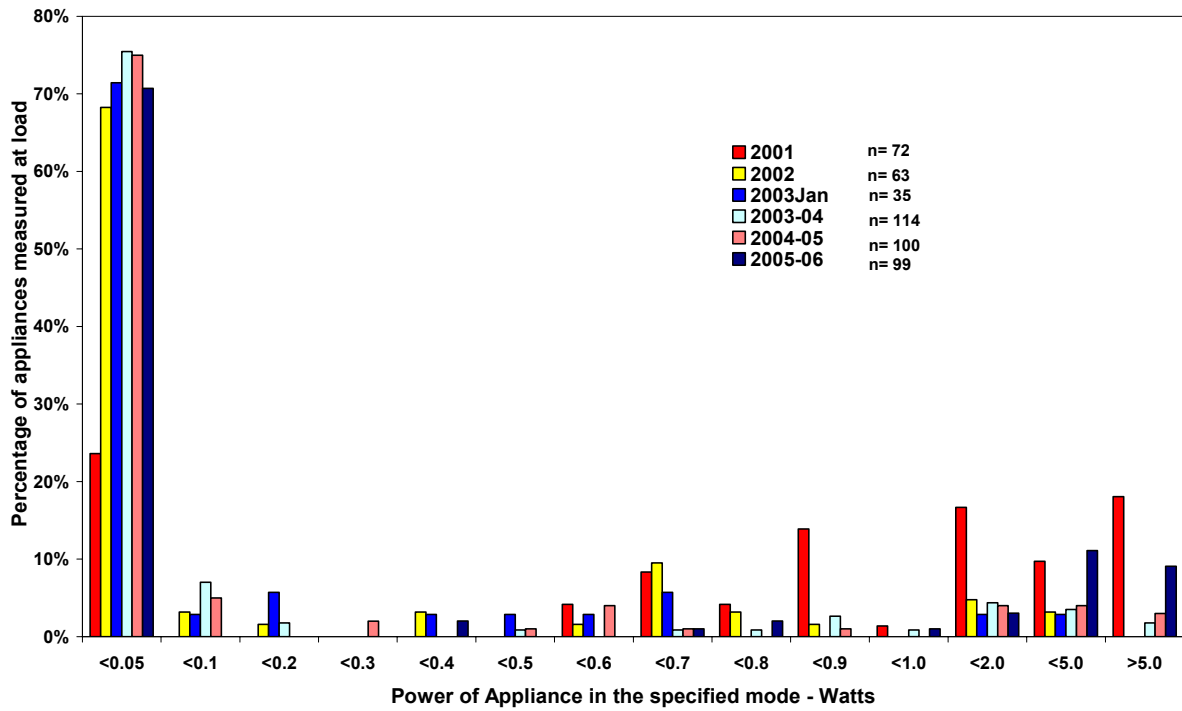
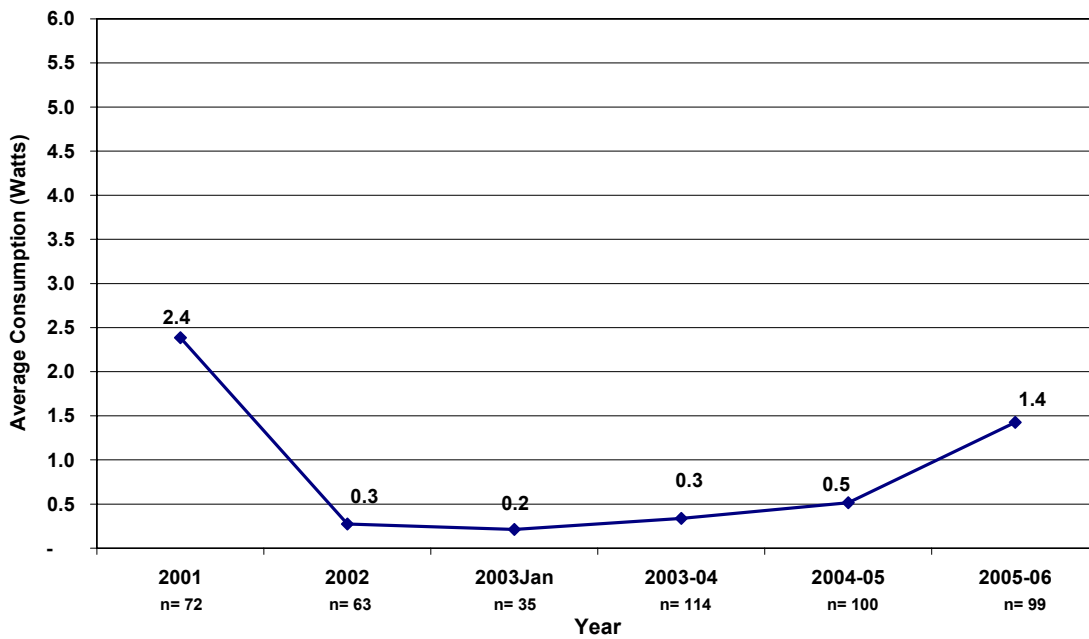


Figure 11: Average Off Mode Consumption: Home Entertainment Products:



## AV Receivers

The four in-store surveys conducted since 2002, demonstrate that the majority of AV receivers use between 40W and 50W in active standby. Figure 12 shows the distribution of power measurements for AV Receivers when in-active standby for these years. Figure 13 shows that the average active standby energy consumption for AV Receivers has been between 39W and 48W. Whilst there is almost a 10W difference between the highest and lowest averages there is no statistical significance in these numbers and active standby should be considered as stable.

The recent intrusive standby study conducted by EES (2005) showed that 13% of receivers were found to be left in active standby, indicating that these high levels of consumption are activated for lengthy periods of time.

**Figure 12: Power measurements for AV Receivers: Active Standby**

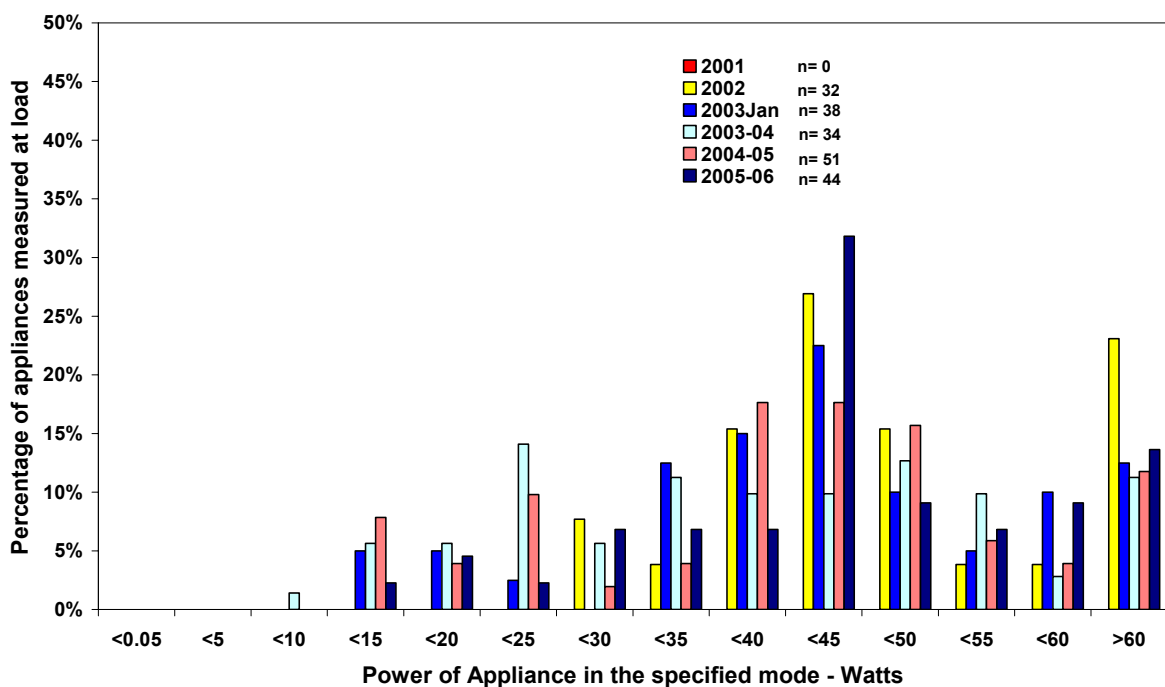
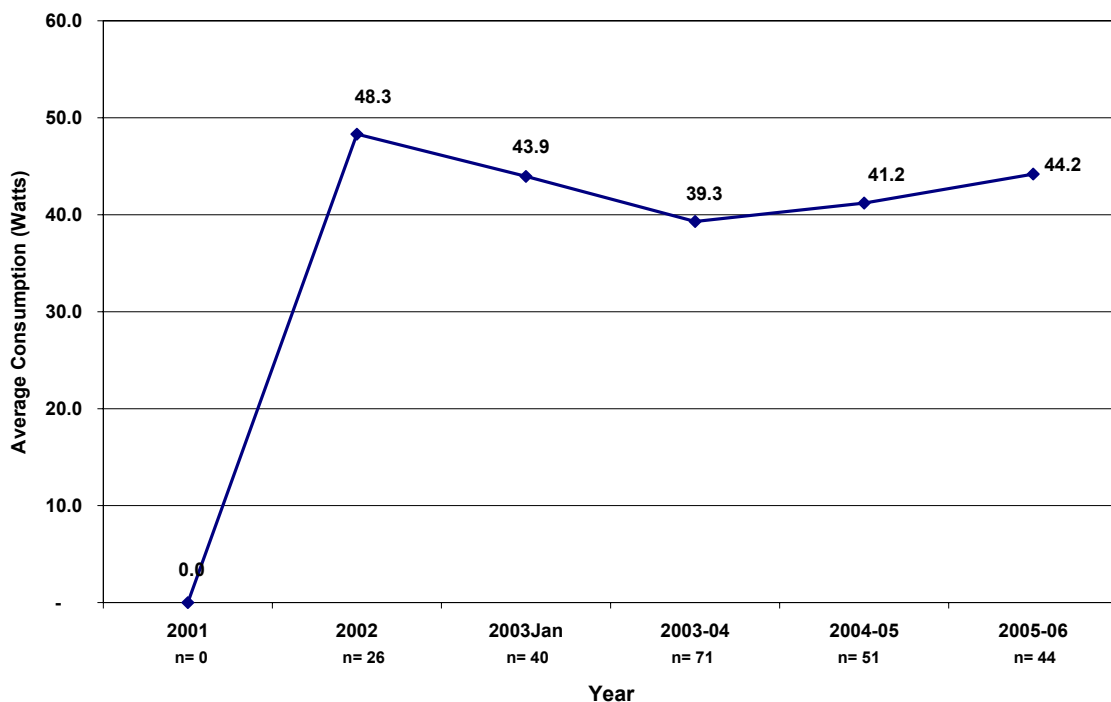


Figure 13: Average Active Standby Consumption: AV Receivers



During the period 2002 to 2004/5, the average passive standby for AV receivers has decreased from 2.1 in 2002 to 1.3 in 2004/05. However this decrease is not statistically significant and the majority of receivers still consume more than 1W in standby. Average passive standby measurements indicate that there has been no overall improvement standby consumption with the average rising for the first to 1.8W. The worst performing models consume more than 10W. These findings are presented in Figure 14 and Figure 15.

The proportion of receivers with off mode is in decline with only a quarter of the models in the 2004/05 survey having off mode. In off mode most receivers consume less than 1W. In 2005/06 all but one unit consumed less than 1W in this mode. Average off mode has remained constant at 0.2W for all 5 surveys.

Figure 14: Power measurements for AV Receivers: passive standby mode

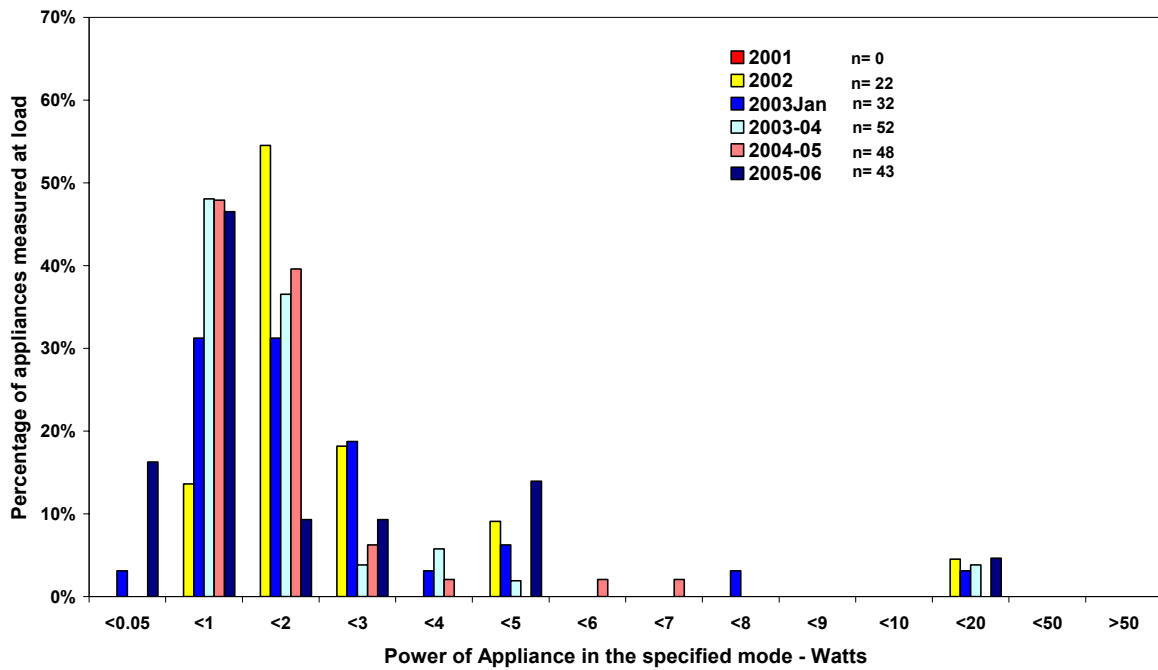
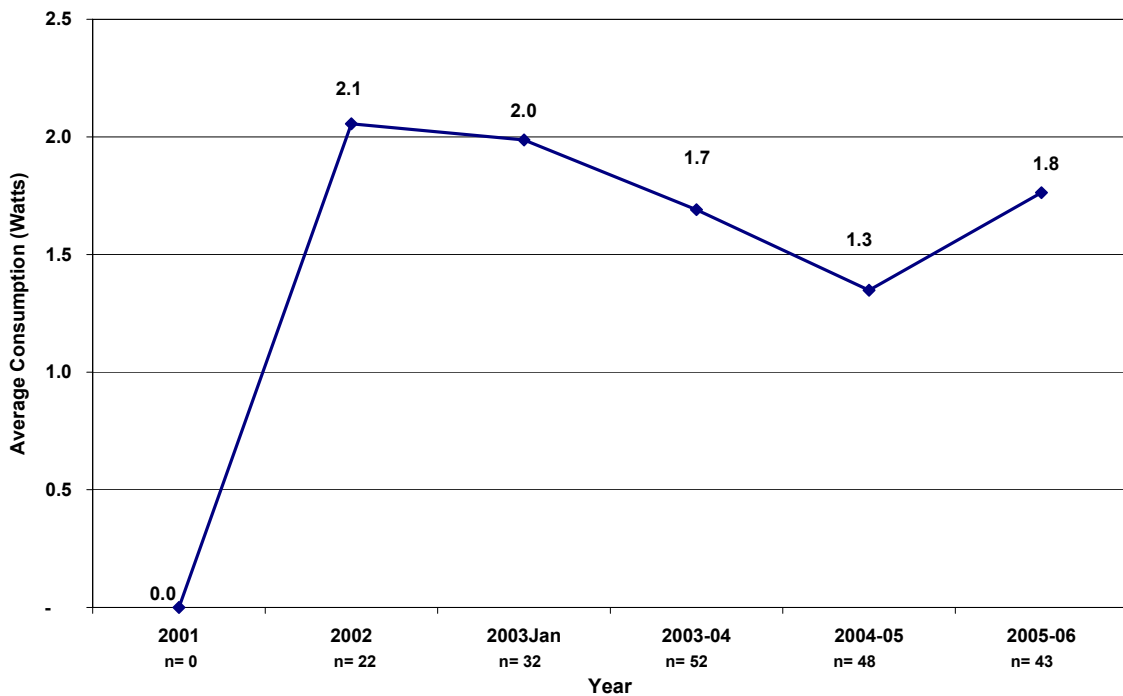


Figure 15: Average passive standby mode Consumption: AV Receivers





## *Home Theatre Systems*

Home theatre systems have been measured in the last two in-store surveys. The active standby of these appliances has ranged between 10 and 60 watts, with average consumption dropping from 31.5W to 24.1W. This decrease in consumption has statistical significance and as shown in Figure 17, continues a decline that has been occurring since home theatre systems were first measured. Figure 16 shows the distribution of active power consumption.

Passive standby results are presented in Figure 18. For passive standby, the majority of home theatre systems consumed less than 1 watt. However, nearly 10% of models consumed more than 8 watts in this mode. Average consumption in passive standby is stable with less than half a watt difference across the 3 surveys. This is demonstrated in Figure 19. Off mode was present in less than 20% of models and with the exception of one model there was no consumption in this mode.

Figure 16: Power measurements for Home Theatre Systems: Active Standby

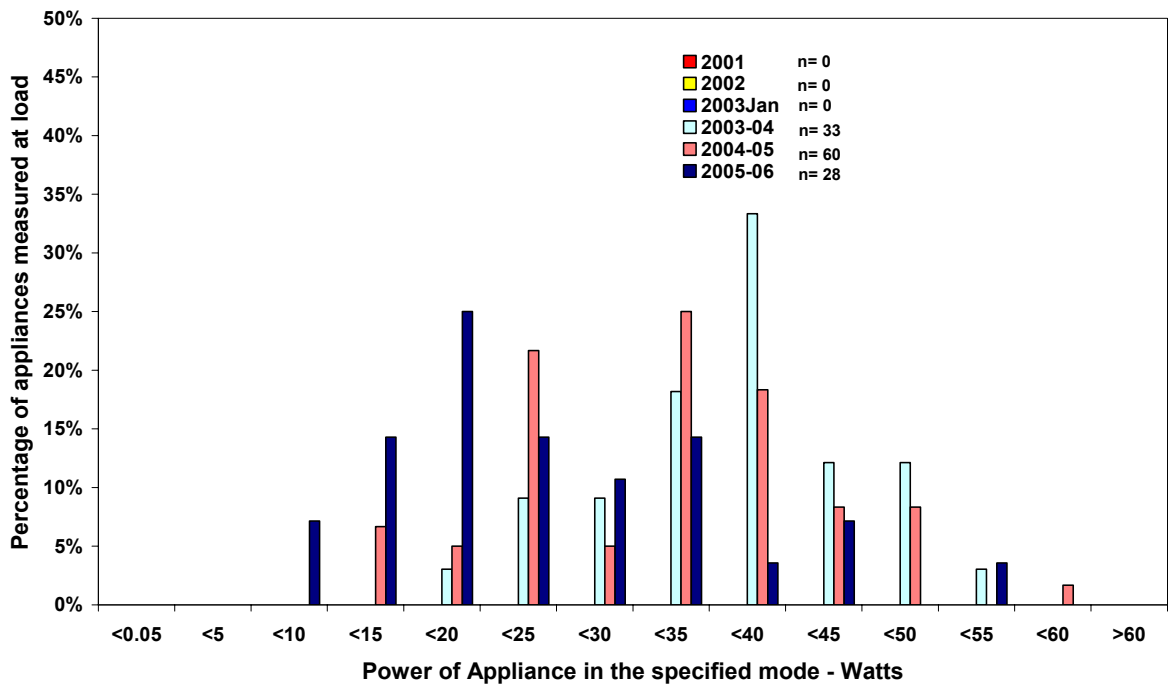


Figure 17: Average Power measurements for Home Theatre Systems: Active Standby

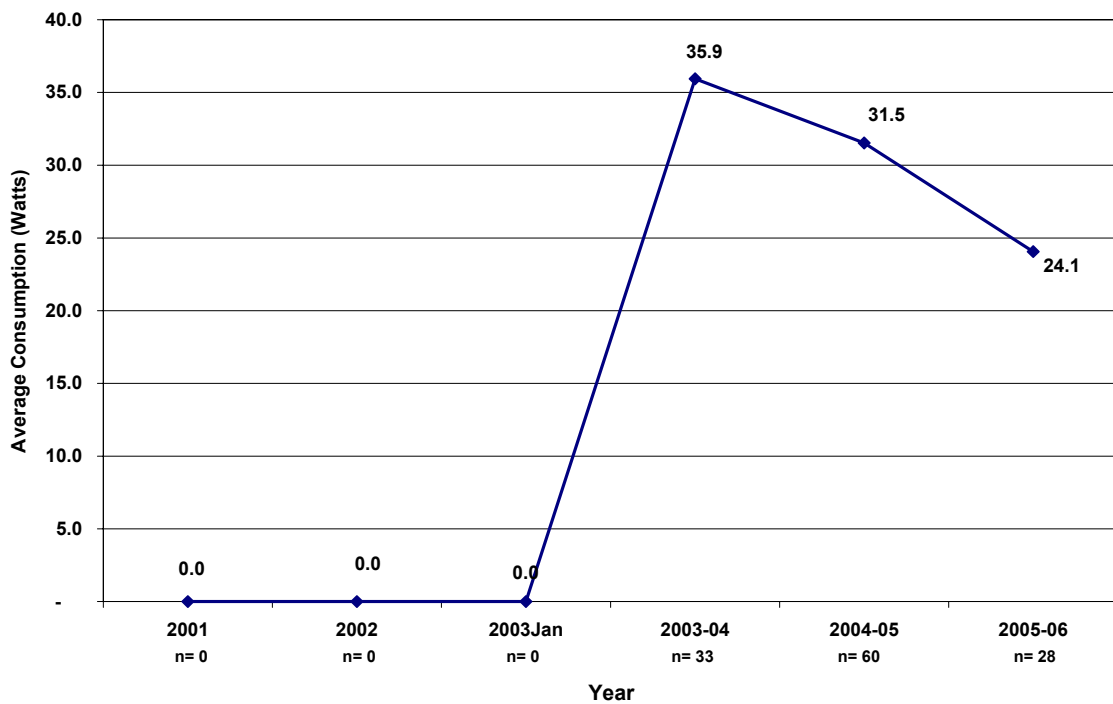


Figure 18: Power measurements for Home Theatre Systems: passive standby mode

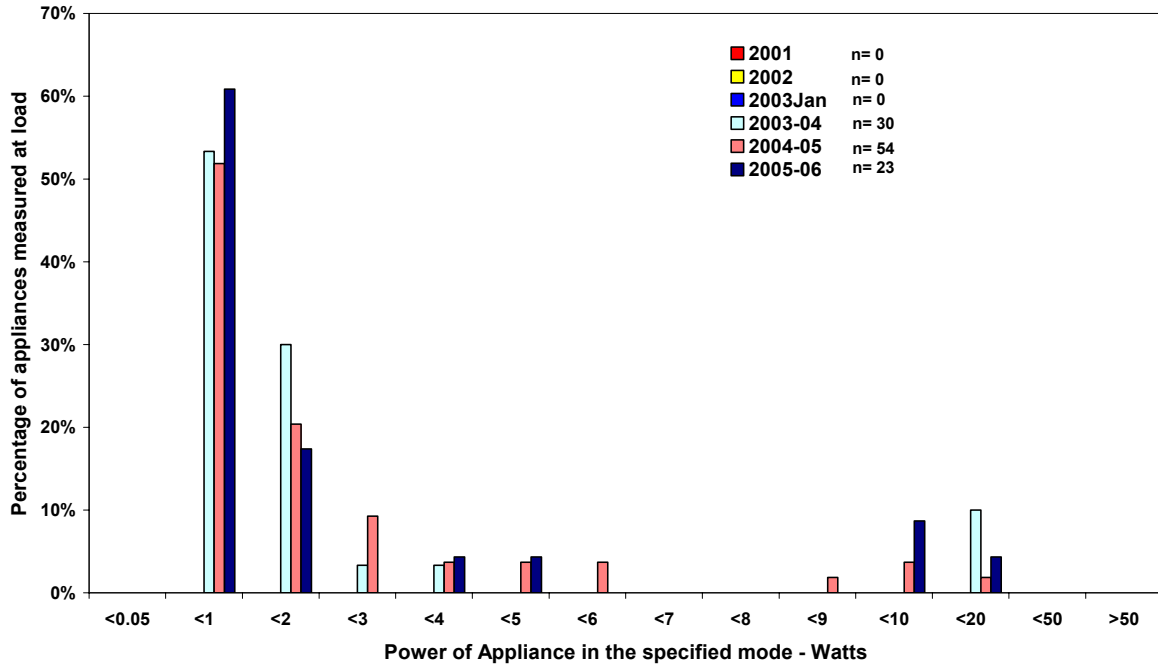
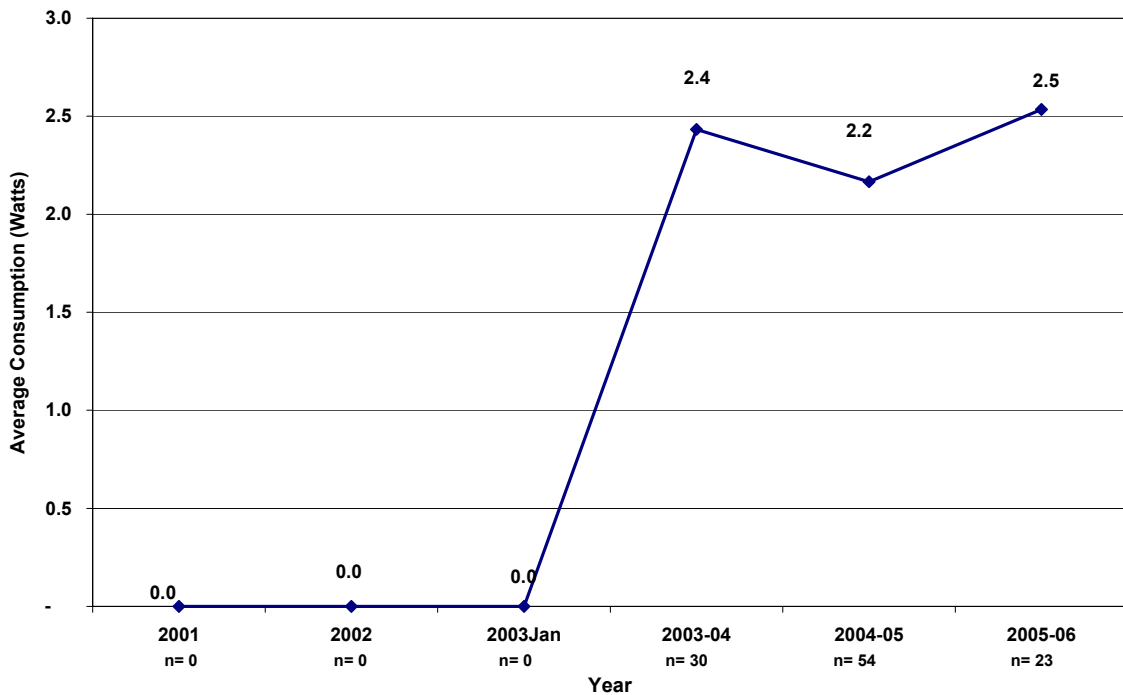


Figure 19: Average Power measurements for Home Theatre Systems: passive standby mode



## Integrated Stereos

Active standby in integrated stereos has a large distribution ranging from less than 2 watts to more than 50 watts. The average consumption in this mode is approximately 18 watts with no significant change in the last five years. Figure 20 and Figure 21 present these results.

Passive standby consumption of integrated stereos has decreased significantly since 2001, with the average dropping from 9.4 watts to just over 4.1 watts in 2003. It has remained stable at this level since, however the distribution range has never changed with the worst performers consuming close to 50 watts and the best performers using less than one watt. Less than 3% of integrated stereos have off mode with most less than 1W. Details of these results are presented in and Figure 22 and Figure 23.

**Figure 20: Power measurements for Integrated Stereos: Active Standby**

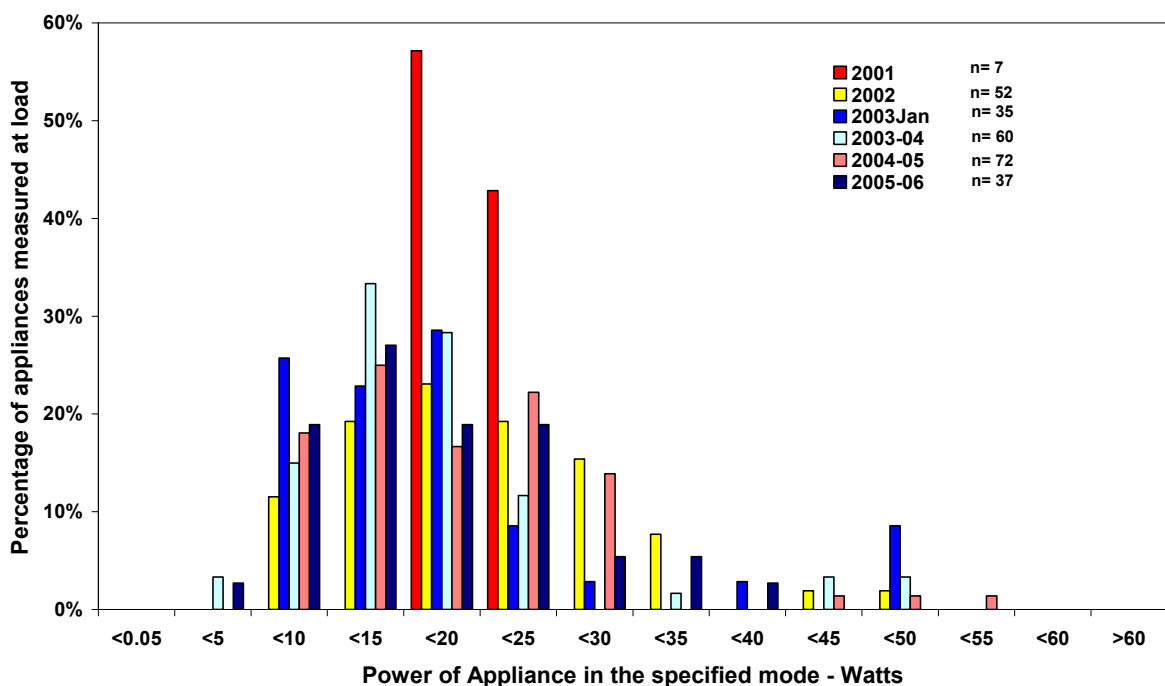


Figure 21: Average Active Standby Consumption: Integrated Stereos

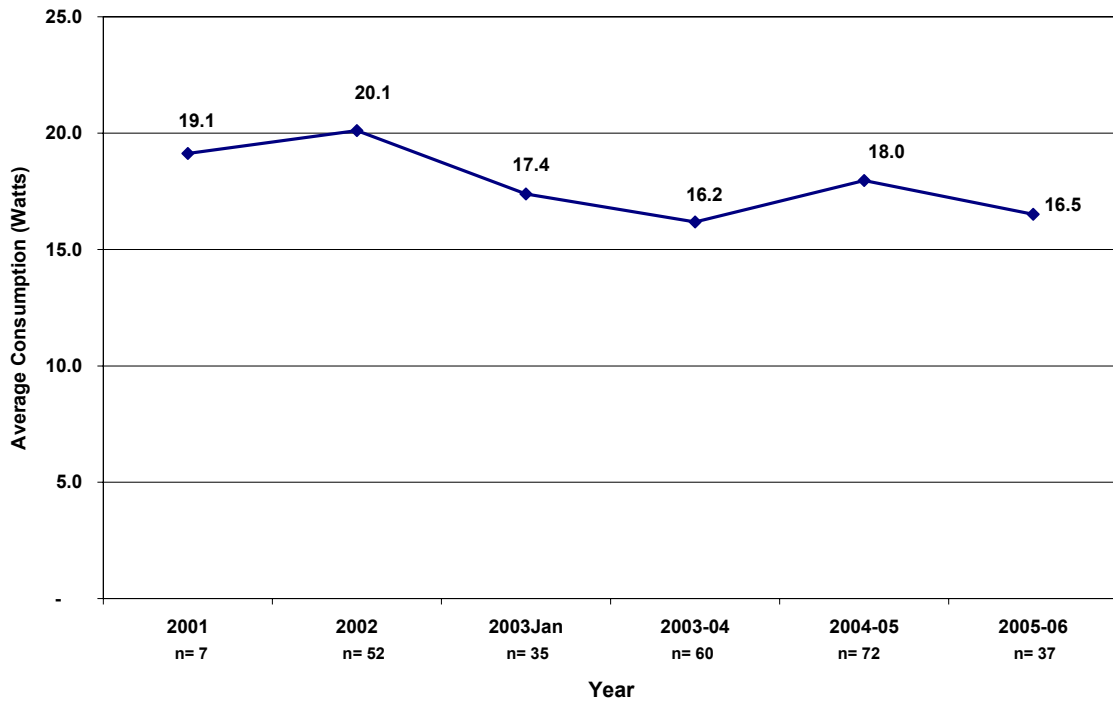


Figure 22: Power measurements for Integrated Stereo: passive standby mode

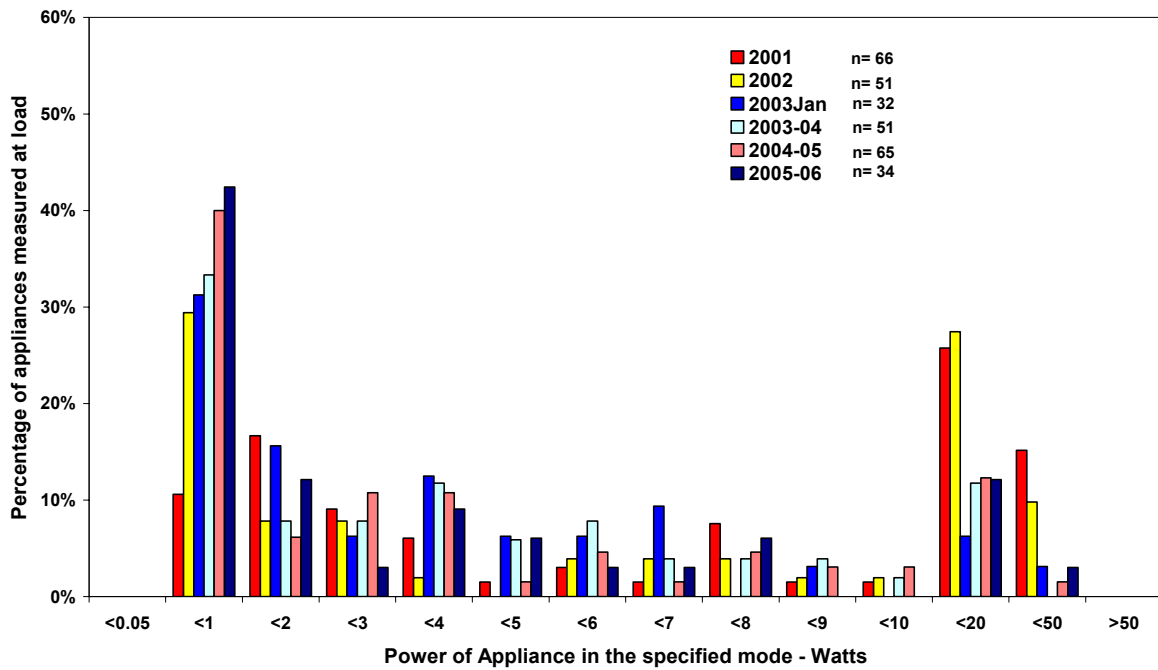
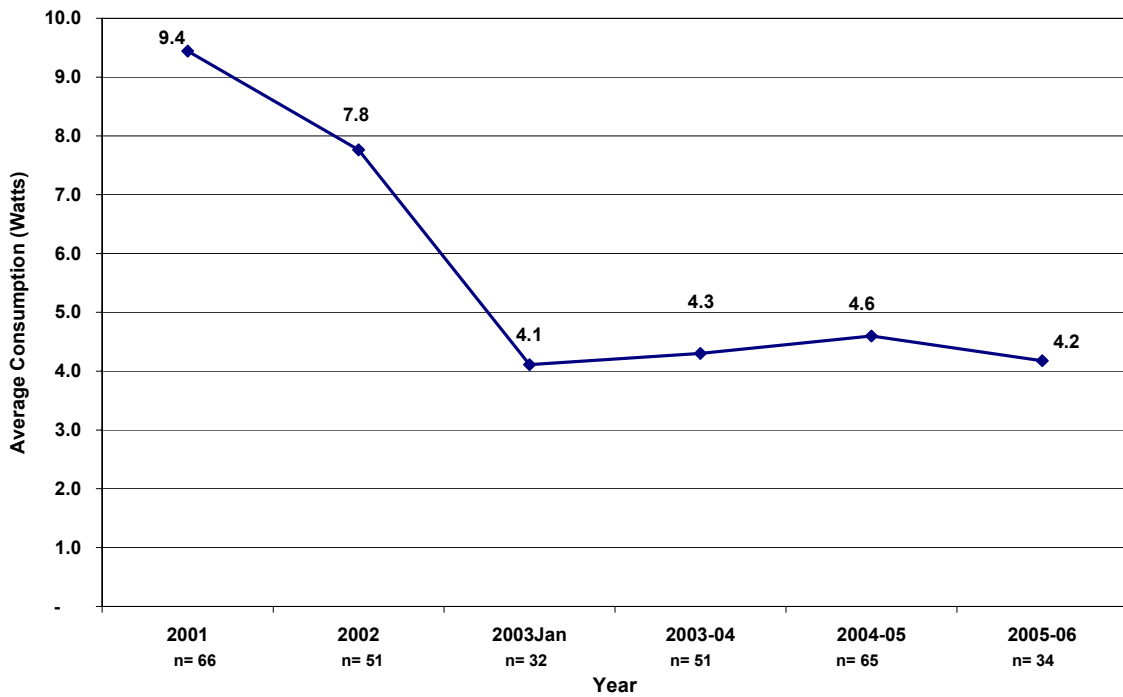


Figure 23: Average Passive Standby Consumption: Integrated Stereos



## Portable Stereo

Portable stereos consumption in active standby averaged 6.4 watts in the last in-store survey. The range of consumption is spread from 2 watts to 17 watts with the majority of models using less than 6 watts. Active standby results can be found in Figure 24 and Figure 25

In passive standby the overwhelming majority of portable stereos use less than 2 watts however the worst performing models are using around 6 watts. Over the last 4 years the survey results show that passive standby power consumption has ranged from 1.8W to the current 2.4W. Only 18% of models have an off function, with consumption ranging from zero to 3 watts. It should be noted that unlike other appliances this seems to be increasing. There were no models with an off mode found during the 2002 or 2003 store surveys. Active and passive standby results can be found in Figure 26 and Figure 27

**Figure 24: Power measurements for Portable Stereo: Active Standby Mode**

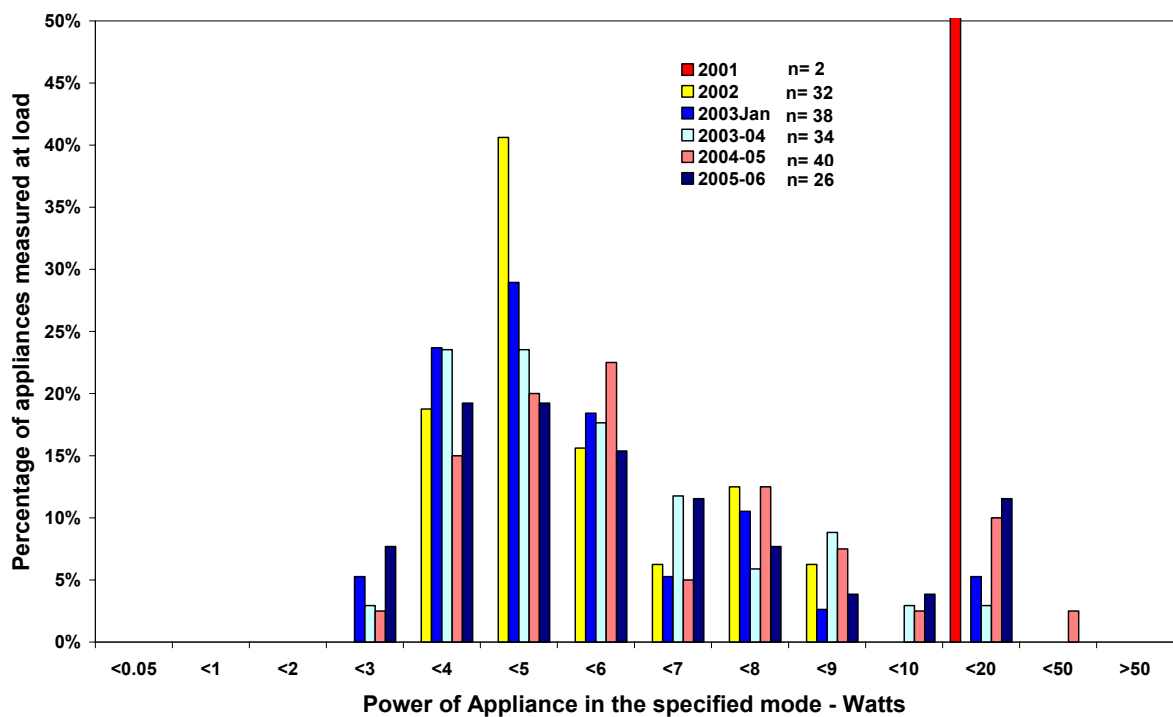


Figure 25: Average Active Standby Consumption: Portable Stereos

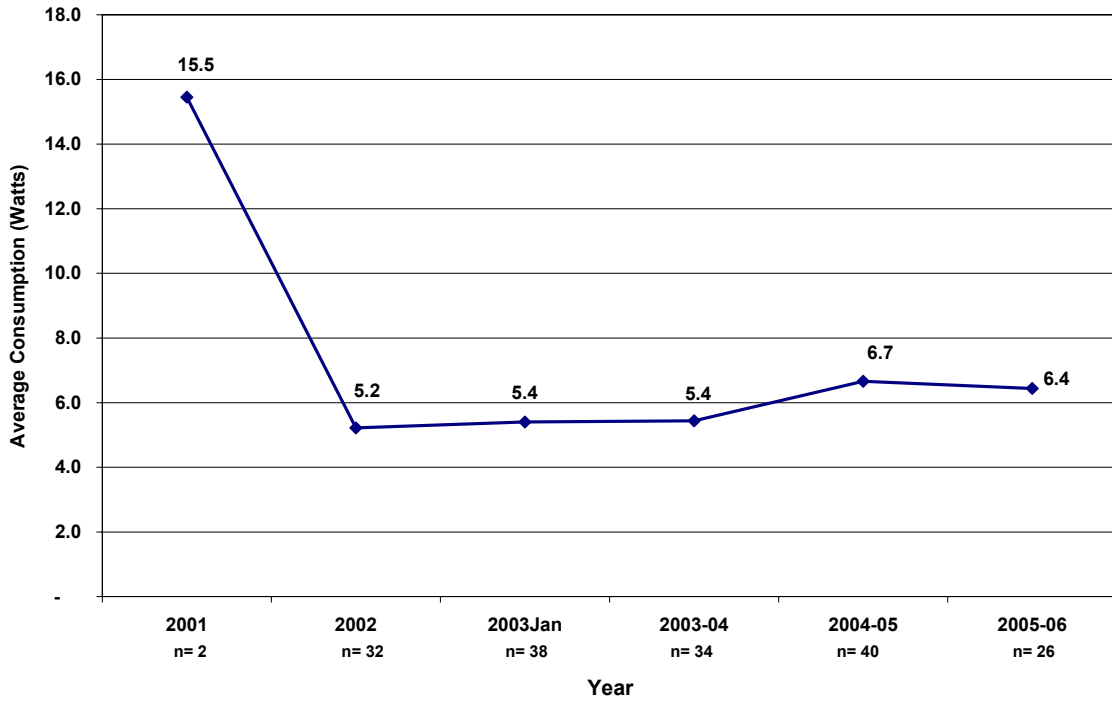


Figure 26: Power measurements for Portable Stereos: passive standby mode

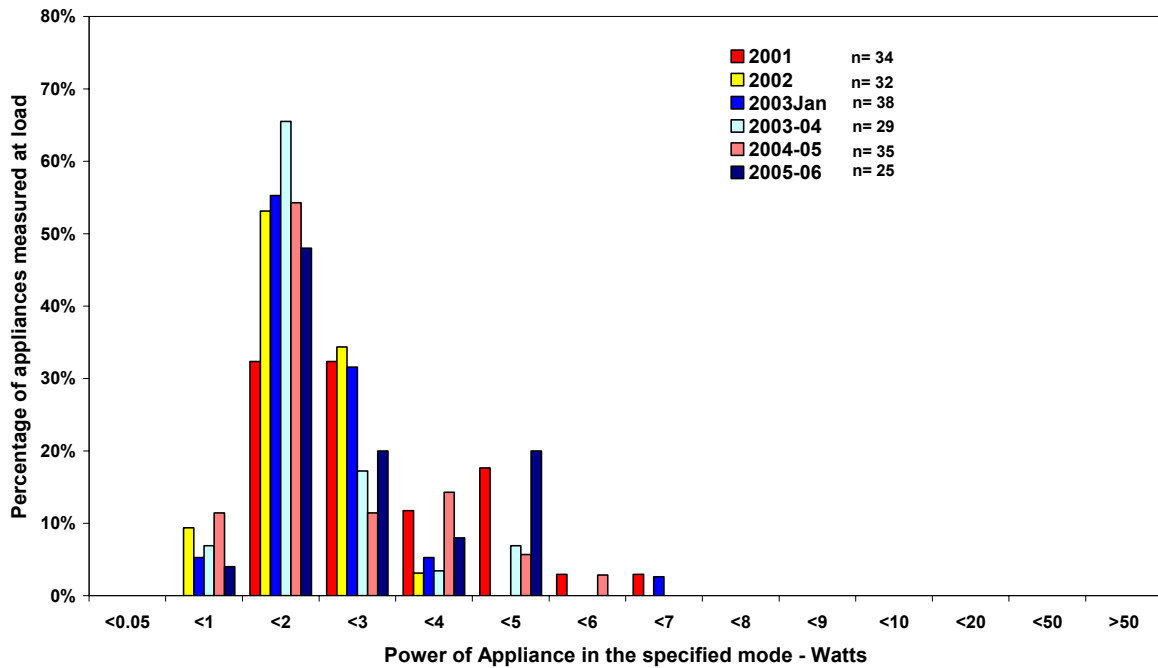
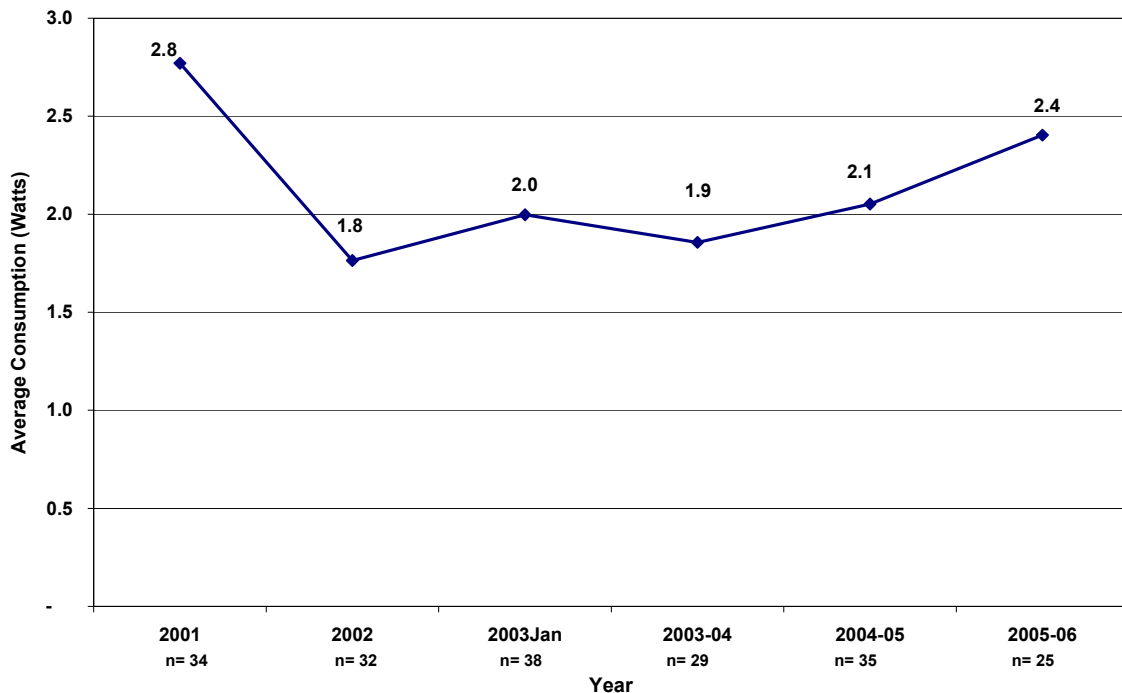




Figure 27: Average Passive Standby Consumption: Portable Stereos



### Audio Components

The number of components found in stores has been decreasing since the introduction of home theatre systems and DVD players. In the 2005/06 survey, very few were offered for sale and hence they were not reported upon. The latest data is from the 2004/05 survey. Audio components consume between 5 watts and 70 watts in active standby averaging at about 15 watts. Standby in 2004/05 decreased significantly however it should be noted that the mix of components was dominated by CD players which are among the lower consuming components. These results are displayed in Figure 28 and Figure 29.

Passive Standby has been stable since 2002 with average consumption of 2.5 watts. Consumption ranged from 0.5 watts to 6 watts with most appliances consuming less than 4 watts. Unlike other home entertainment products a higher proportion (65%) of components has off mode. The overwhelming majority consume no energy in off mode with average consumption over the last four years being 0.3 watts. Results for audio components active and passive standby are presented in Figure 30 and Figure 31.

Figure 28: Power measurements for Audio Components: Active standby mode

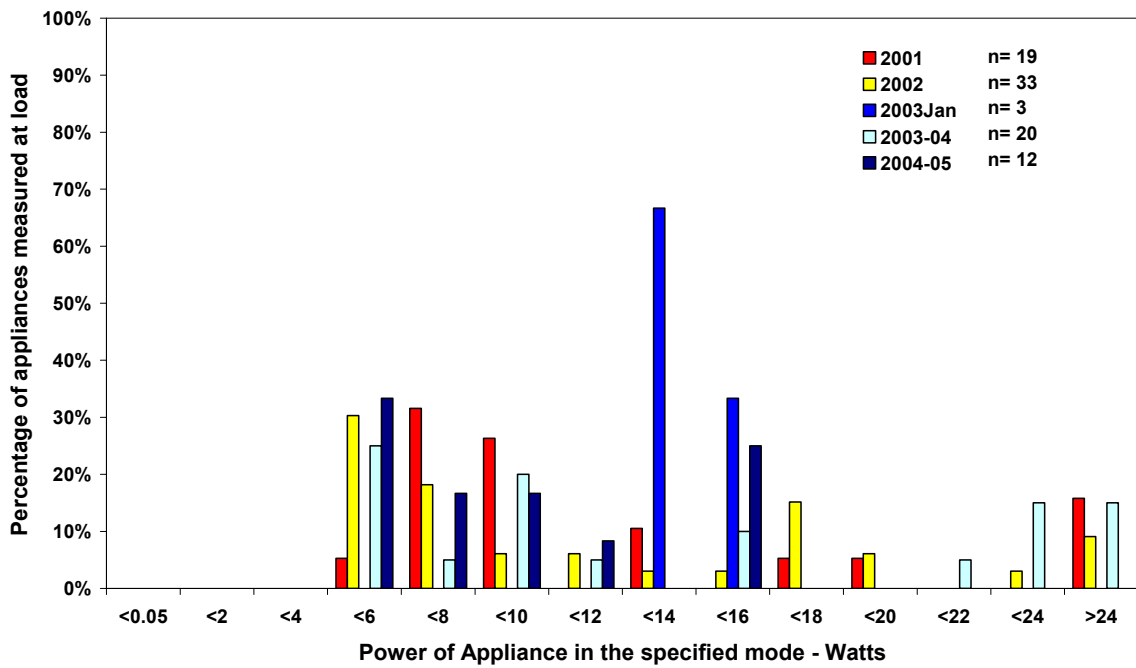


Figure 29: Average Active Standby Consumption: Audio Components

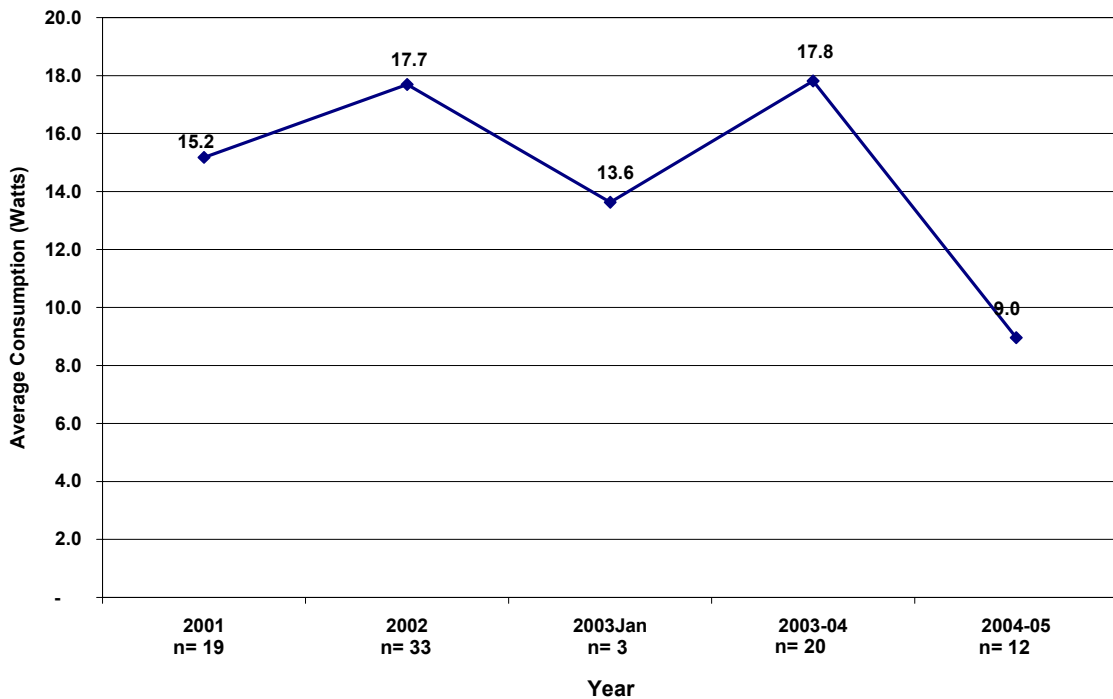


Figure 30: Power measurements for Audio Components: Passive standby mode

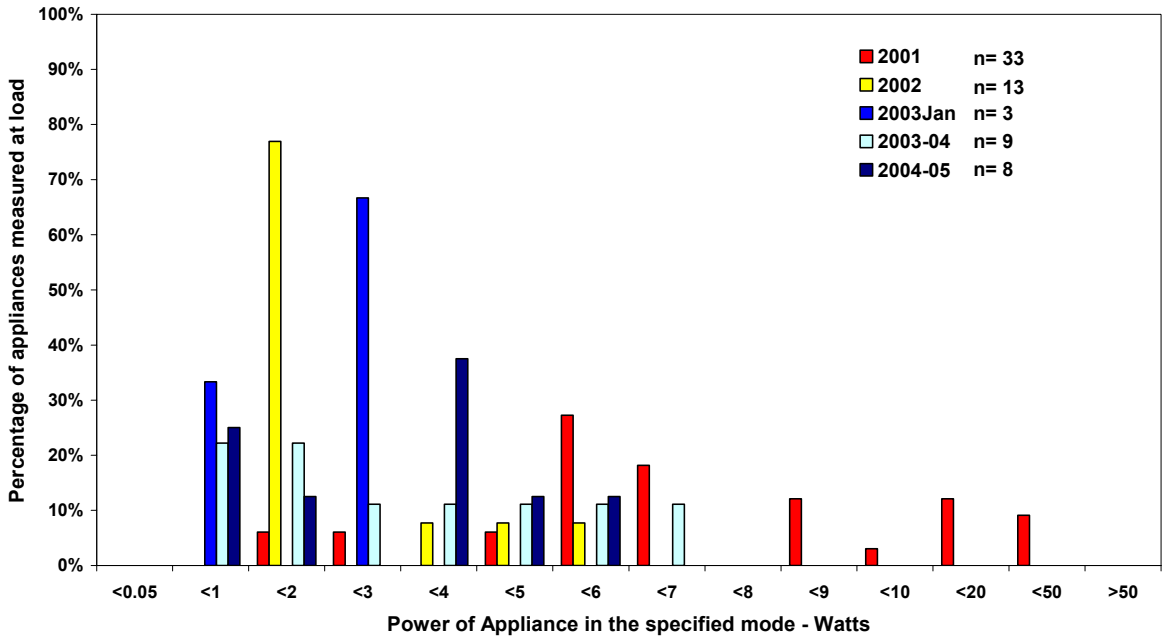
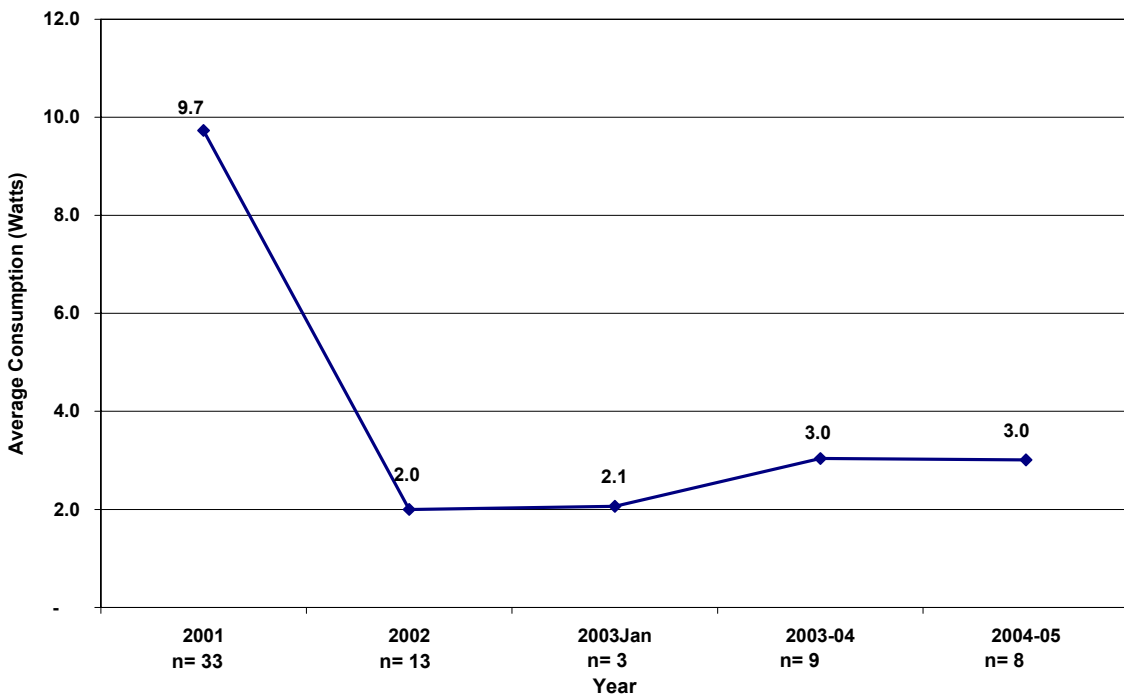


Figure 31: Average Passive Standby Consumption: Audio Components



## Sub Woofers & Speakers

Sub woofers and speakers for the most part only have active and off mode. Only 17% of units measured in the past 3 years have had a passive standby mode. In active standby, consumption ranges from 0.1 watt to 27 watts with the latest survey showing an average of 11 watts. Consumption in passive standby was spread from zero to over 17 watts. Half the units consumed less than 1 watt in passive standby. The overwhelming majority of sub woofers in all surveys have no consumption in off mode. However in 2005/06 there was an increase in the number of units consuming more than 8W in off. These high consuming units have brought the average up from less than 1.0W in previous years to 2.0W in 2005/06. Figure 32, Figure 33 and Figure 34 present the active and passive standby results. Figure 35 provides the distribution of power consumption in off mode.

It should be noted that the off switch for one third of sub woofers was at the rear of the appliance and difficult to access. This may reduce the likelihood of consumers using this mode. This is backed up by the recent intrusive survey conducted (EES 2006) where it found 56% of consumers left their sub woofer in active standby.

**Figure 32: Power measurements for Subwoofers & Speakers: Active standby mode**

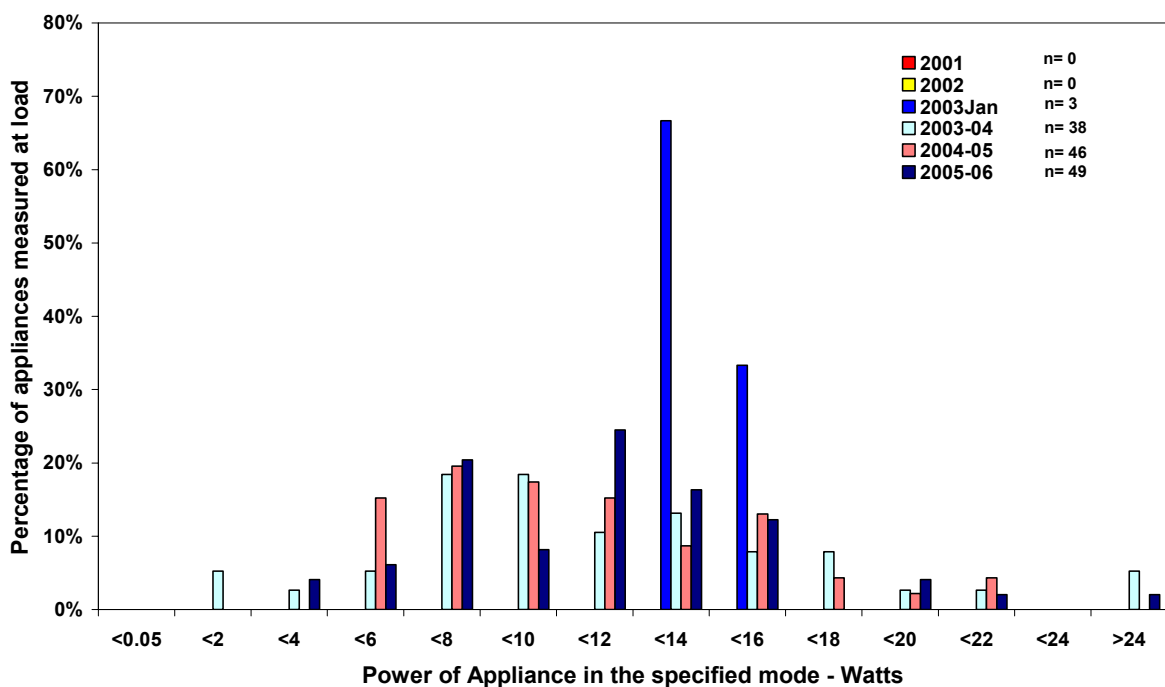


Figure 33: Average Active Standby Consumption: Sub Woofers and Speakers

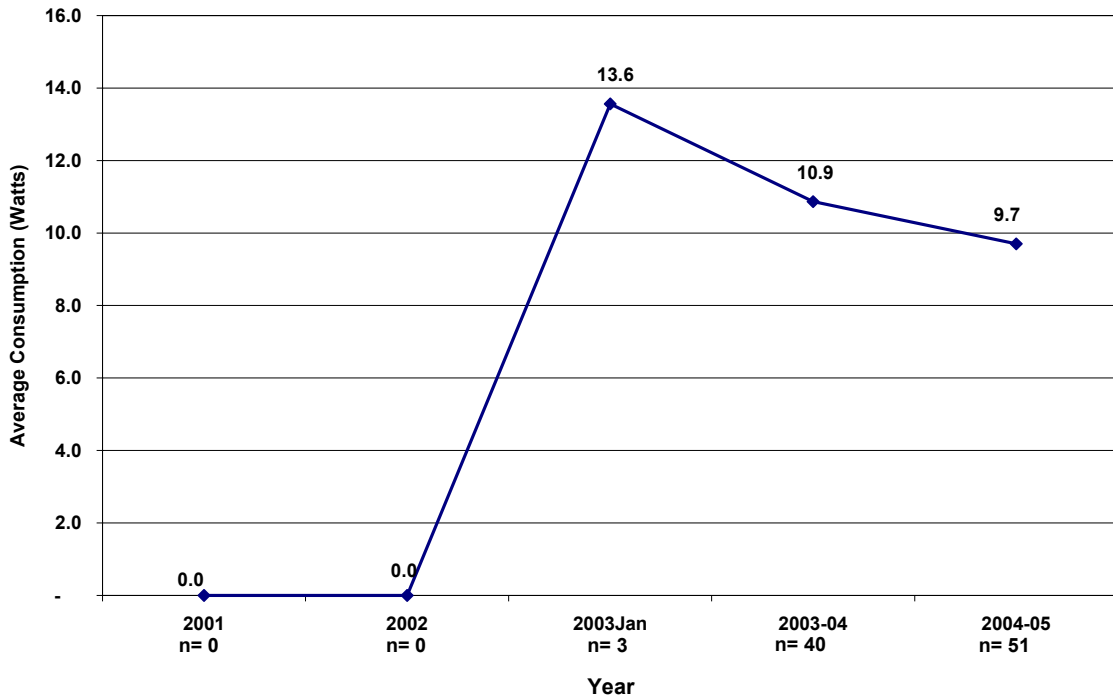


Figure 34: Power measurements for Subwoofers & Speakers: Passive standby mode

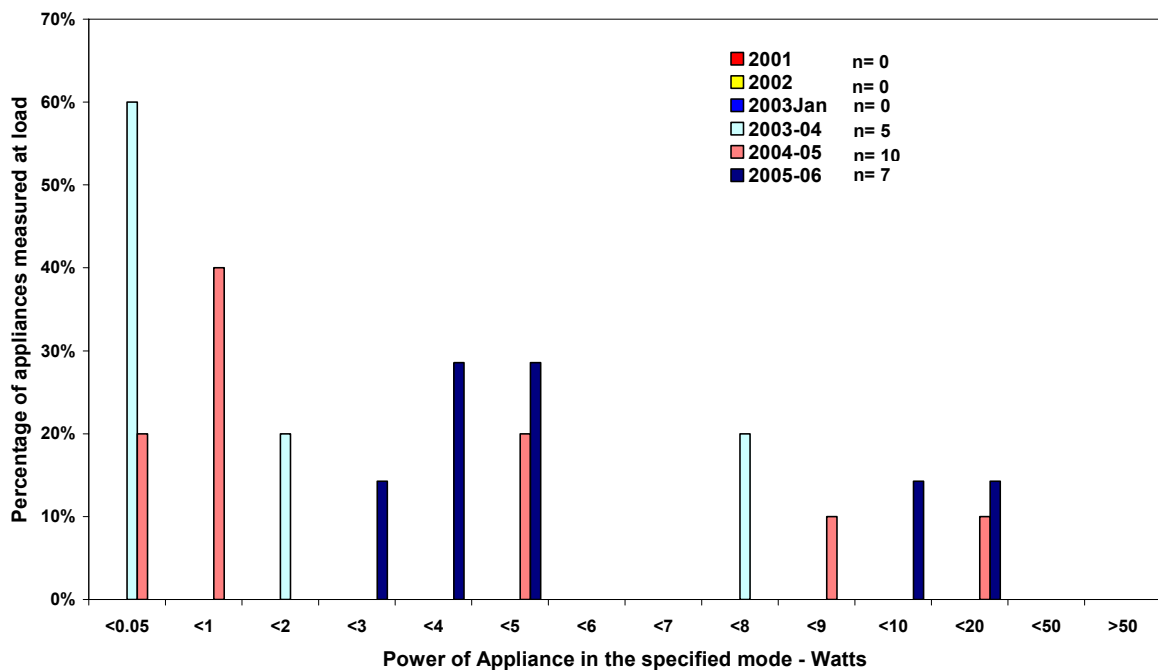
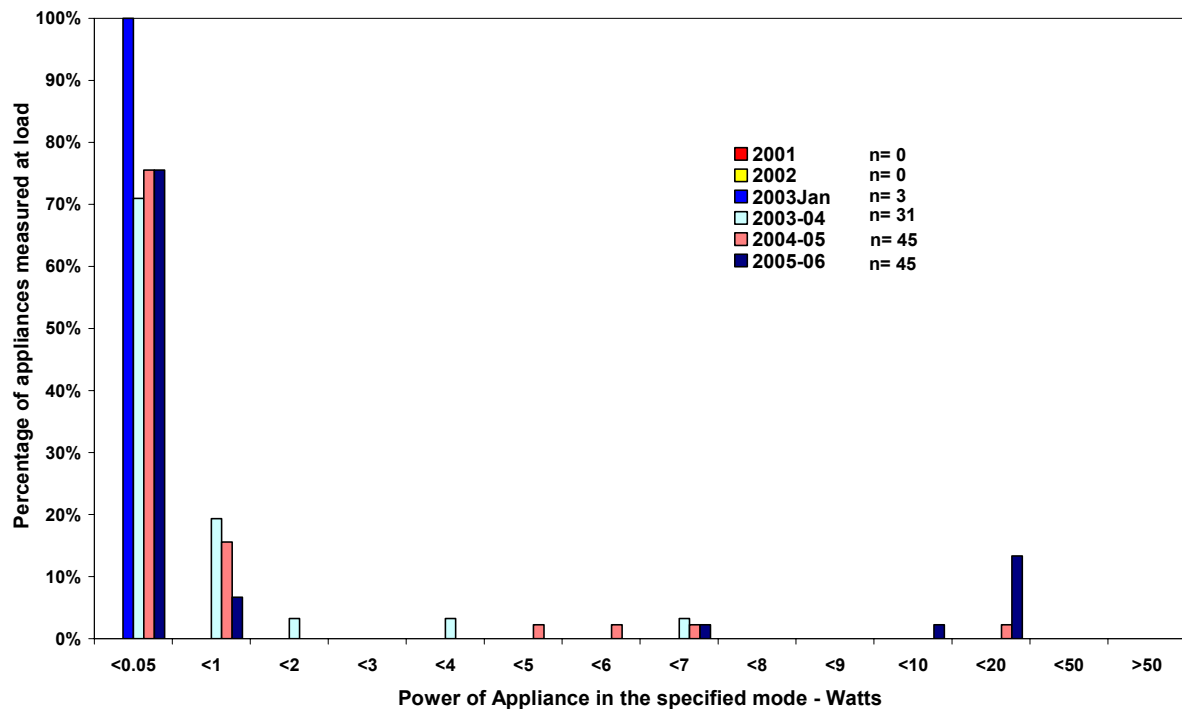


Figure 35: Power measurements for Subwoofers &amp; Speakers: Off mode



## DVD Players

DVD players most commonly have active and passive standby with no off mode. In 2004/05 less than 22% of models had off function. Active standby consumption ranges from less than 8 watts to 19 watts. In 2005/06 most players recorded active consumption between 6 and 10 watts. The average consumption in this mode has been reduced each survey with the decrease since 2001 being statistically significant. In 2001 the average consumption was 15.1 watts while in 2005/06 it was 8.8 watts. The distribution of active standby for DVD players is presented in Figure 36 while the average consumption can be found in Figure 37.

Figure 36: Power measurements for DVD Players: Active standby mode

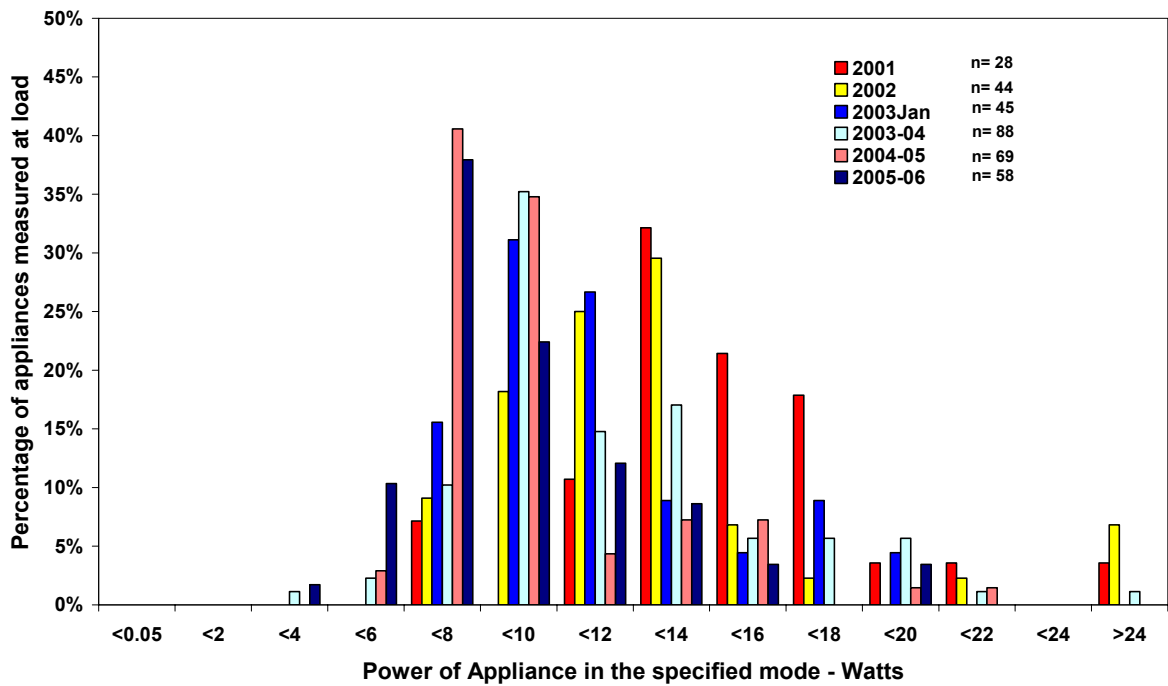
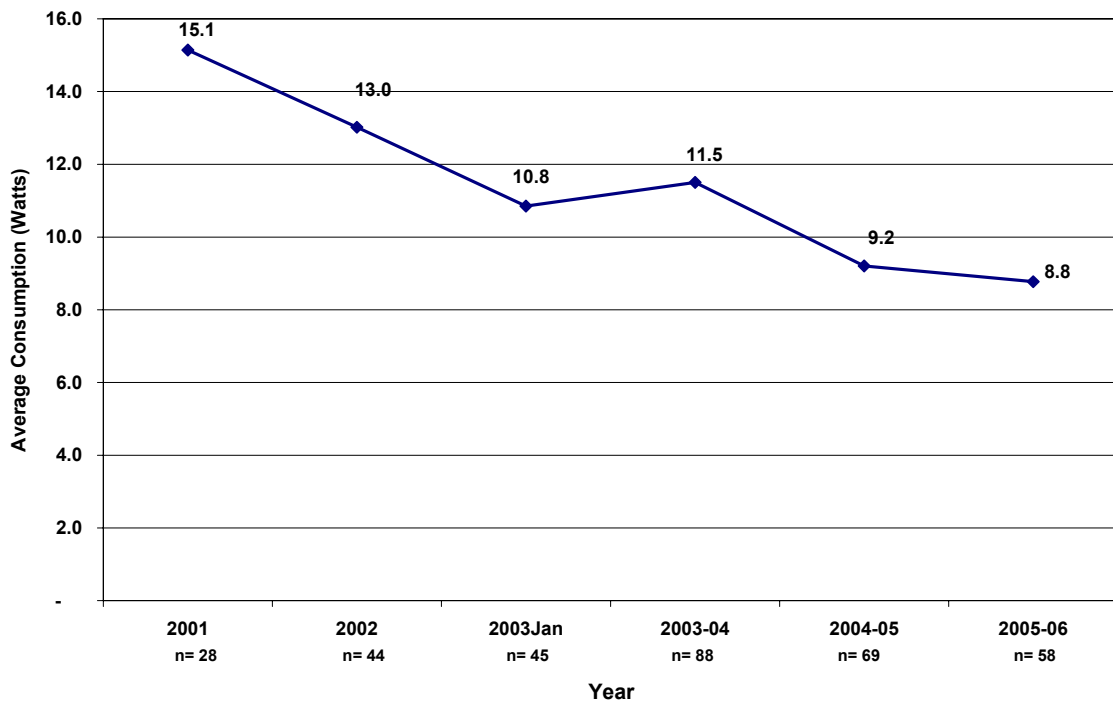


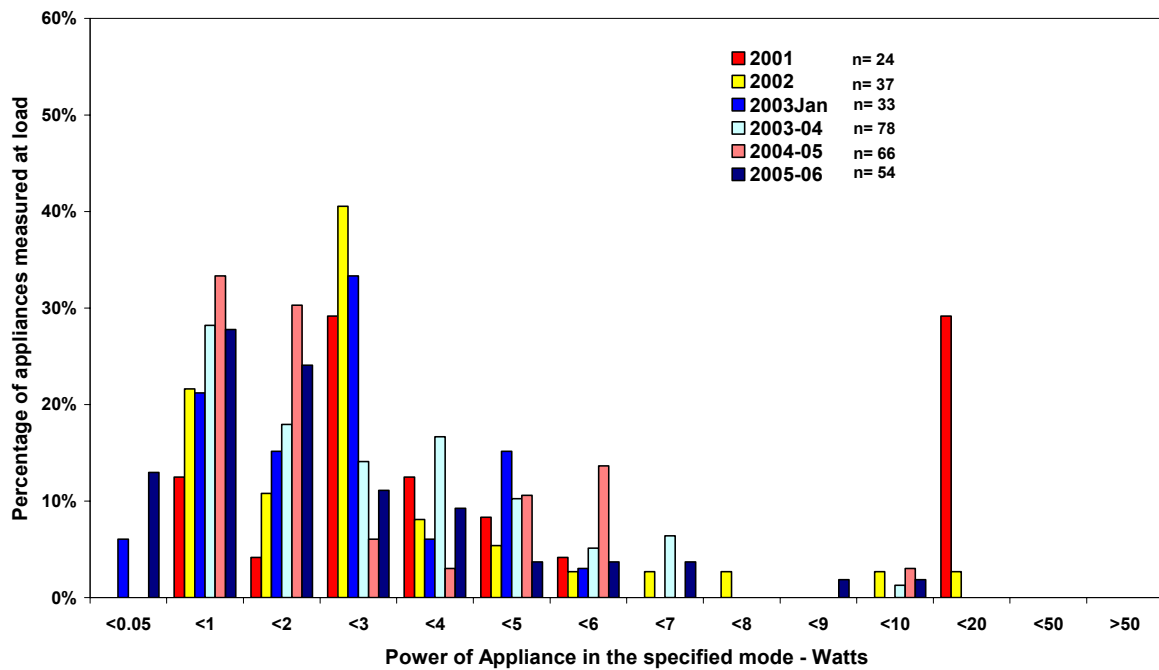
Figure 37: Average Active Standby Consumption: DVD Players



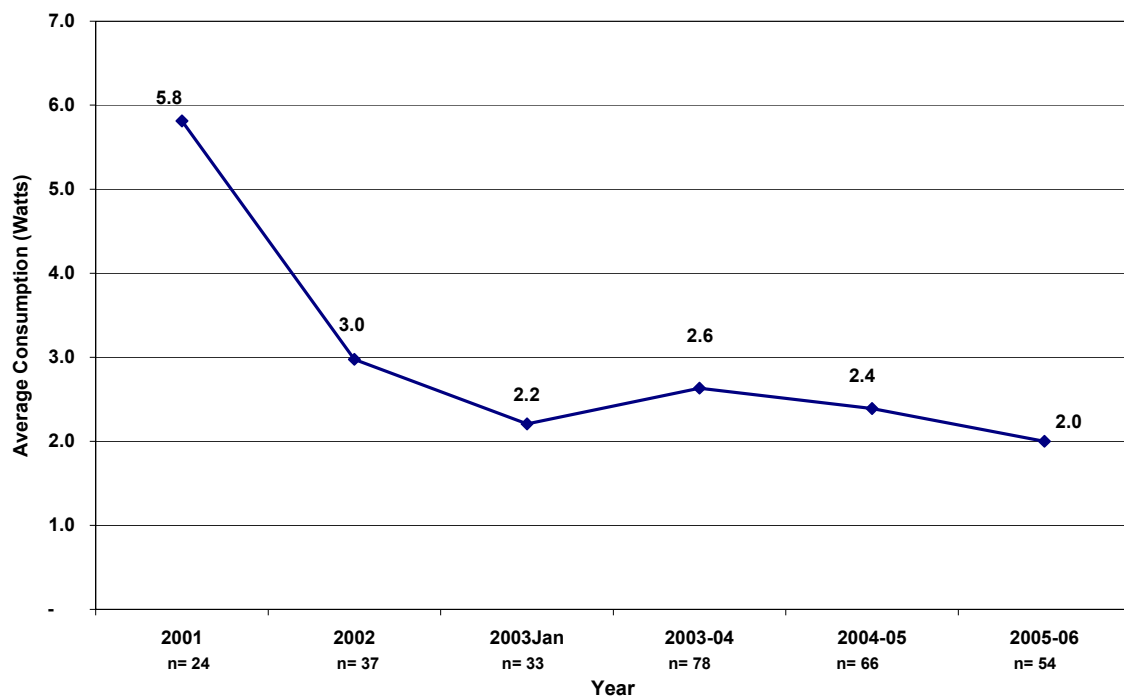
DVD players in passive standby consume between zero and 15 watts. The majority use less than 2 watts in passive standby with a significant proportion (41%) consuming less

than 1 watt. The average consumption for DVD players has been stable at around 2 watts for the last 4 years which is a statistically significant decrease from the 2001 results. All units measured in off mode in 2005/06 registered consumption less than 1W with the overwhelming majority having zero consumption. Figure 38 displays the spread of consumption for DVD players in passive standby with the decline in average consumption is shown in Figure 39

**Figure 38: Power measurements for DVD Players: Passive standby mode**





**Figure 39: Average Passive Standby Consumption: DVD Players:**

## *DVD Recorders*

DVD recorders have an active and passive standby mode. In the 4 years DVD recorders have been found in the store surveys only 1 has had an off mode and this unit consumed zero watts in this mode. Figure 40 shows the distribution of measurements in active standby mode, with the average power being 21.5W and a maximum of 33.9W and a minimum of 13.5W in 2005/06. Consumption in active mode has been stable over the three years, as shown in Figure 41.

Passive standby consumption is distributed over a large range, with average passive standby being 7.3W and ranging from 1.2W to 23.9W. In 2005/06 the distribution was largely the same as last year with consumption concentrated between 3W and 8W and 15% of models consuming more than 15W in passive, as shown in Figure 42. Figure 43 shows that average passive standby was relatively stable from 2004/05 to 2005/06. It should be noted that no statistical significance can be drawn from these figures.

Figure 40: Power measurements for DVD Recorders: Active standby mode

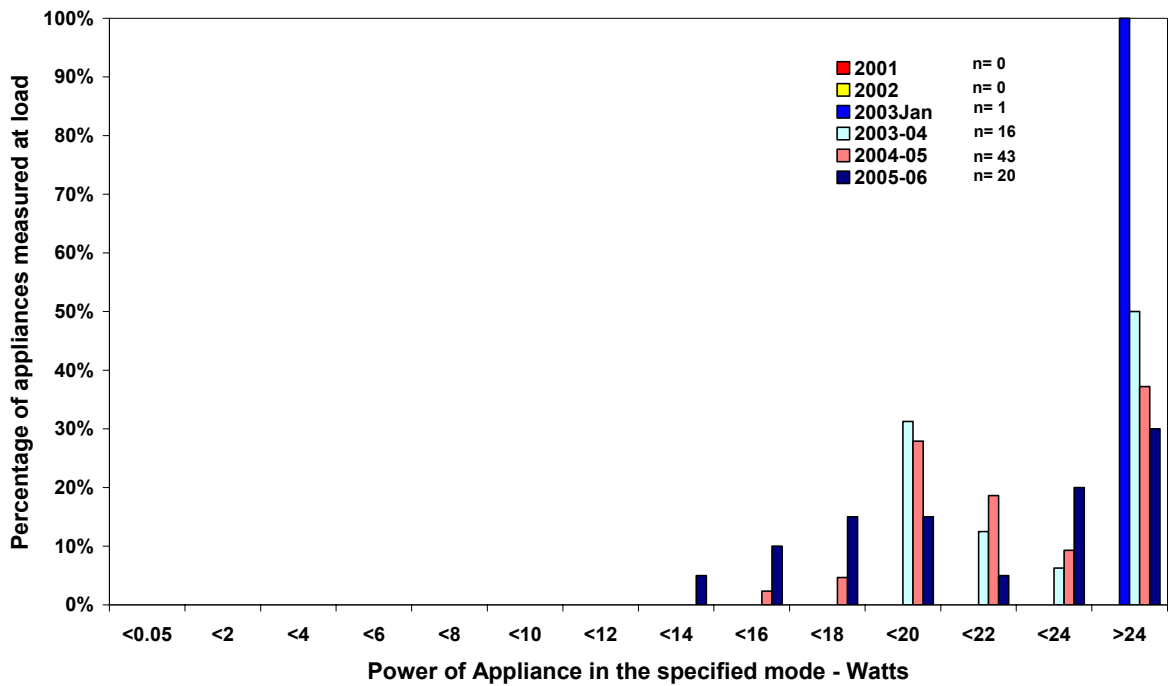


Figure 41: Average Active Standby Consumption: DVD Recorders

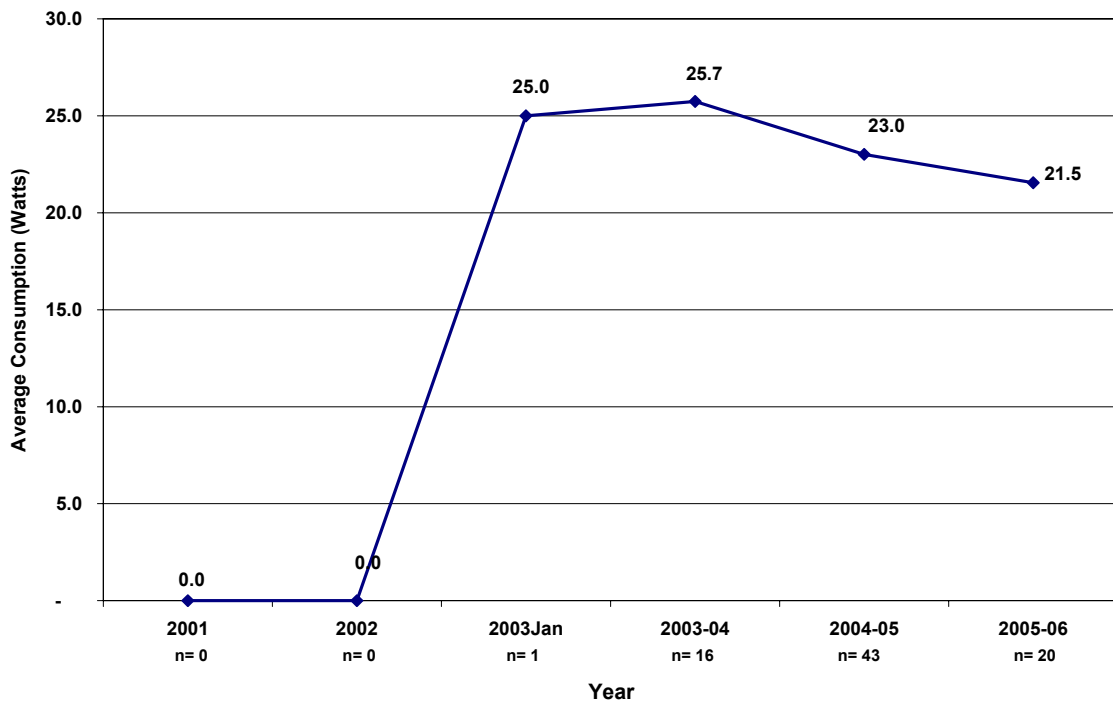


Figure 42: Power measurements for DVD Recorders: Passive standby

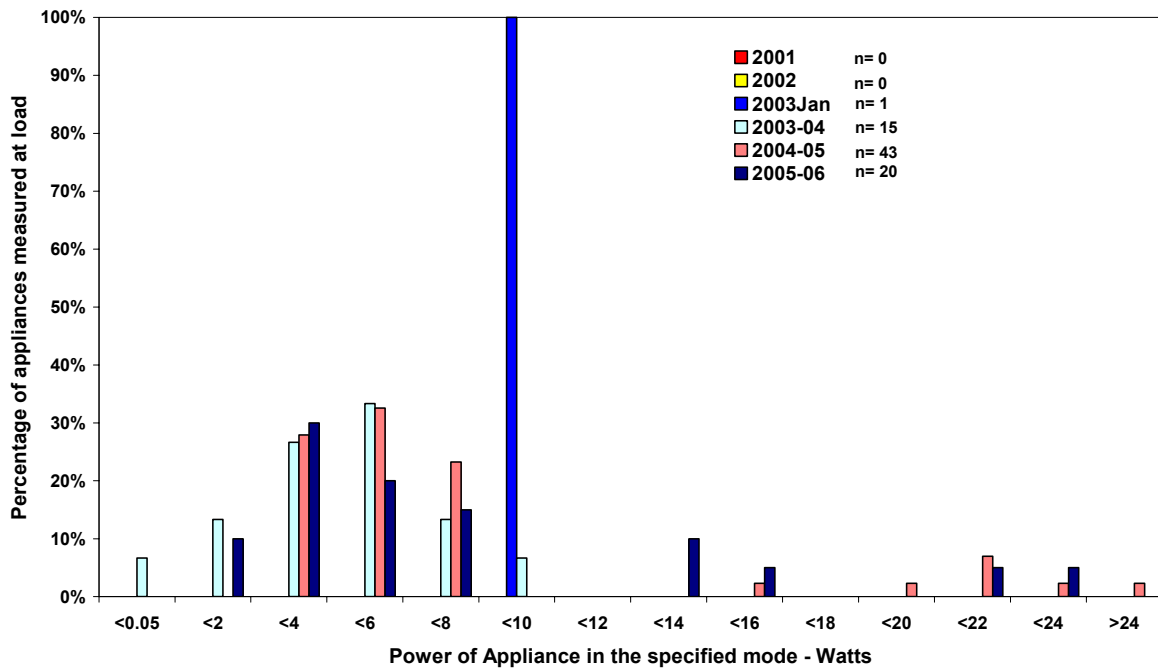
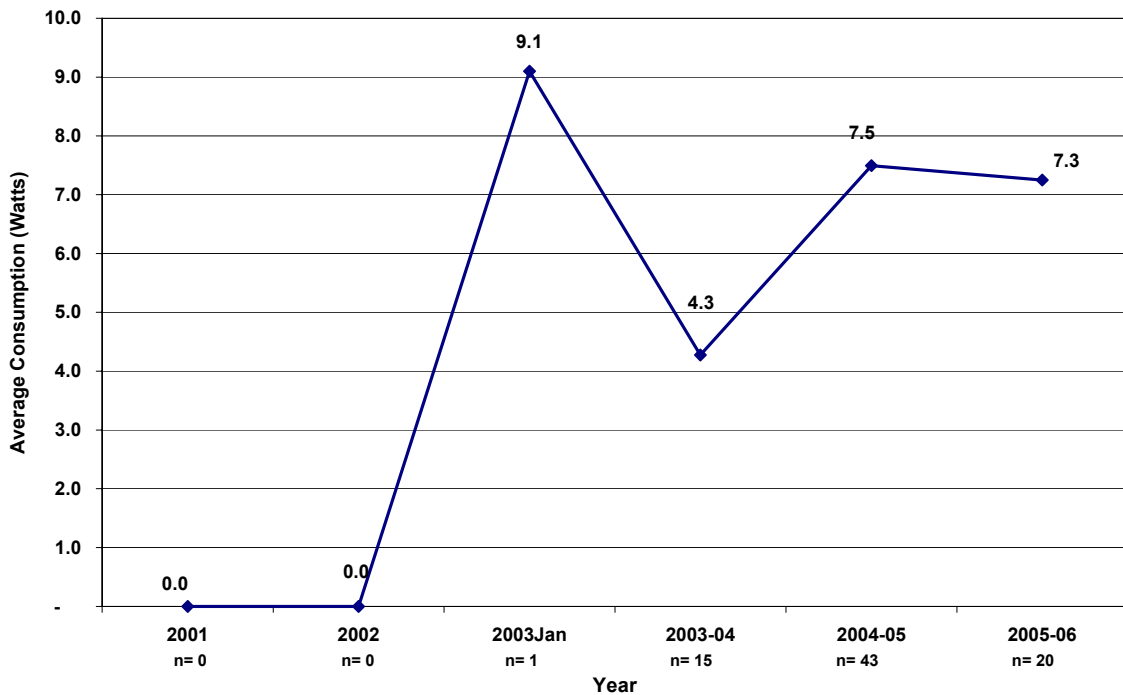


Figure 43: Average power measurements for DVD recorders: Passive standby



## *Hard Disk Recorders*

Hard disk recorders are new to the market and have only been measured in the last two store surveys. Twenty-Eight units were measured in the 2005/06 store survey recording an average active standby of 27.8 watts with consumption ranging from 18.4 watts to 38.8 watts. Passive standby consumption was spread from 1.6 watts to 24.1 watts, averaging 5.6 watts. No units had an off mode. The distributions and trends of power consumption in active and passive standby are presented in Figure 44 and Figure 45; and Figure 46 and Figure 47 respectively.

Figure 44: Power measurements for Hard Disk Recorders: Active standby mode

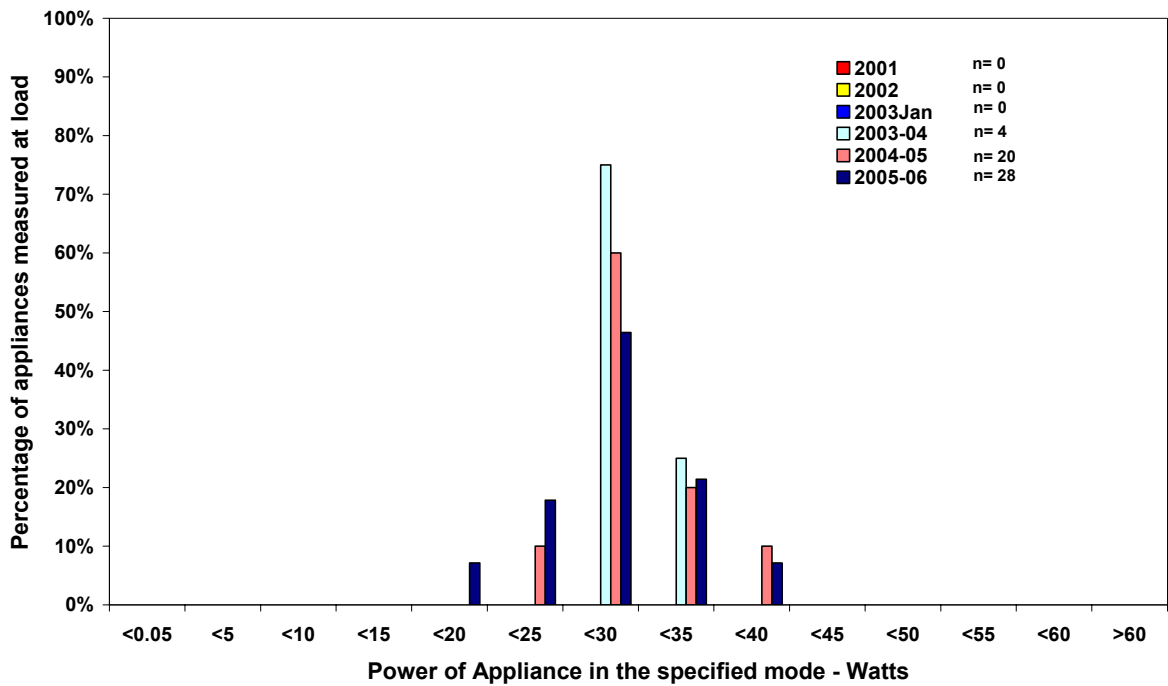


Figure 45: Average Active Standby Consumption: Hard Disk Recorders

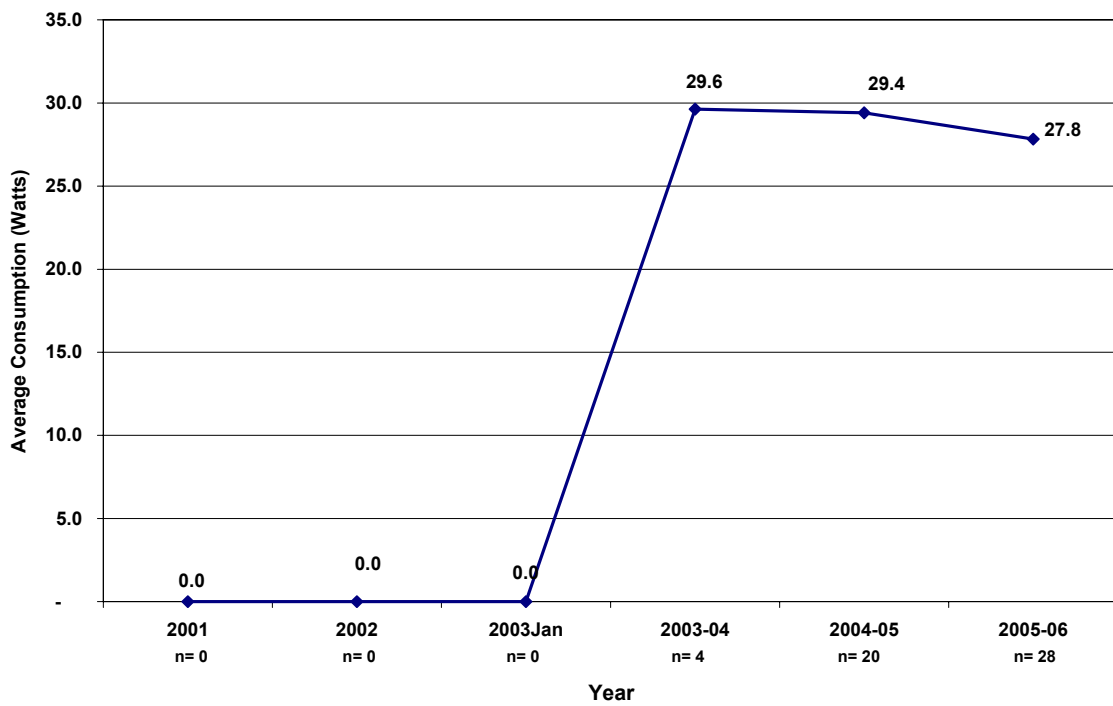


Figure 46: Power measurements for Hard Disk Recorders: Passive standby

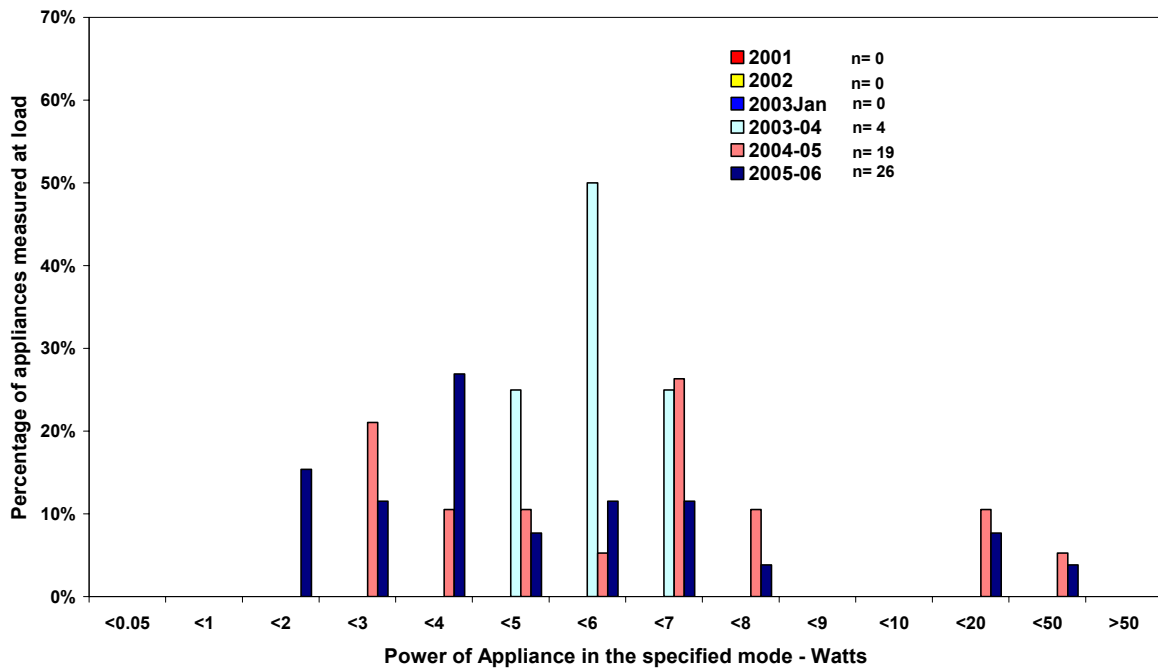
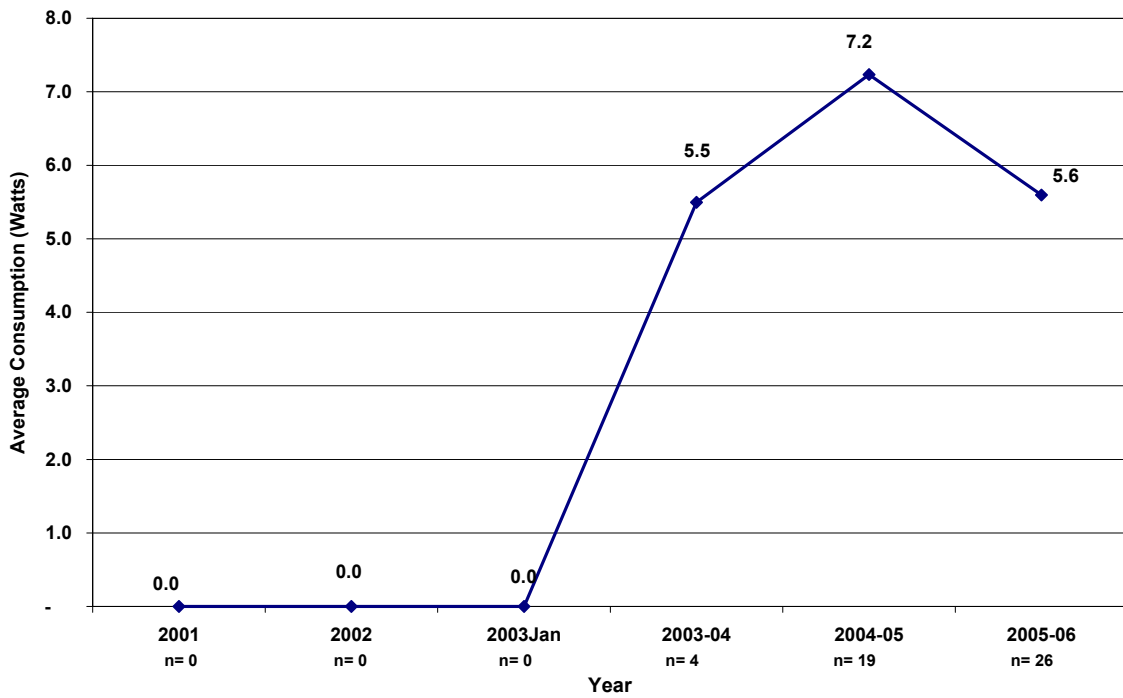


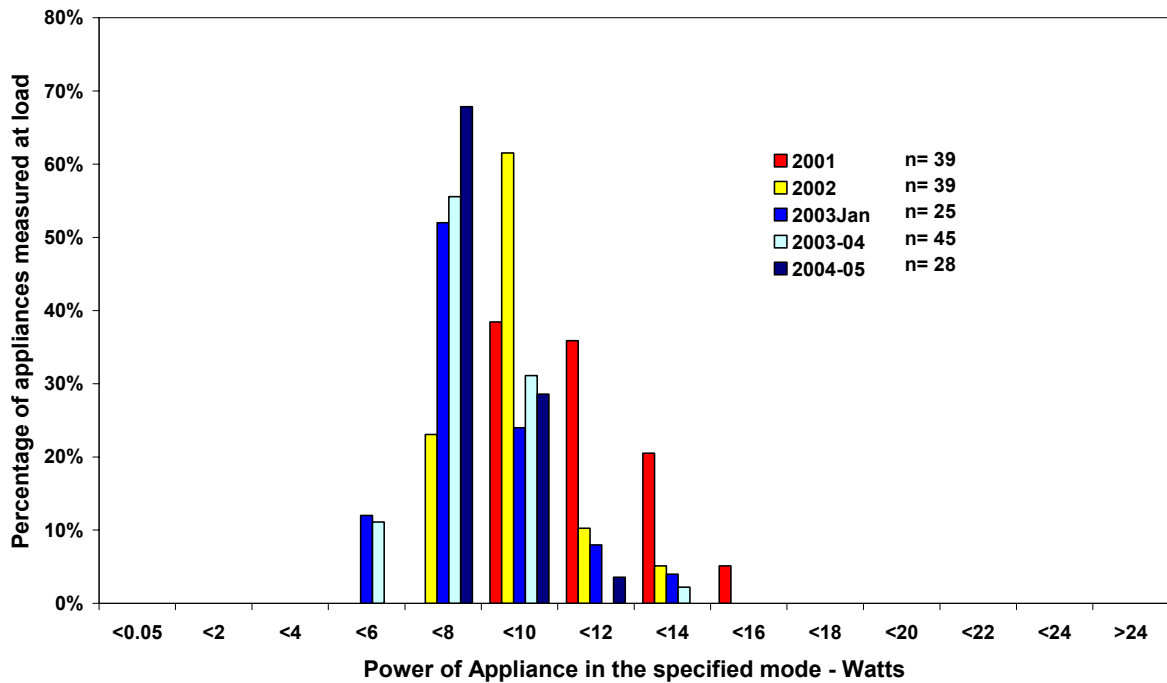
Figure 47: Average Passive Standby Consumption: Hard Disk Recorders

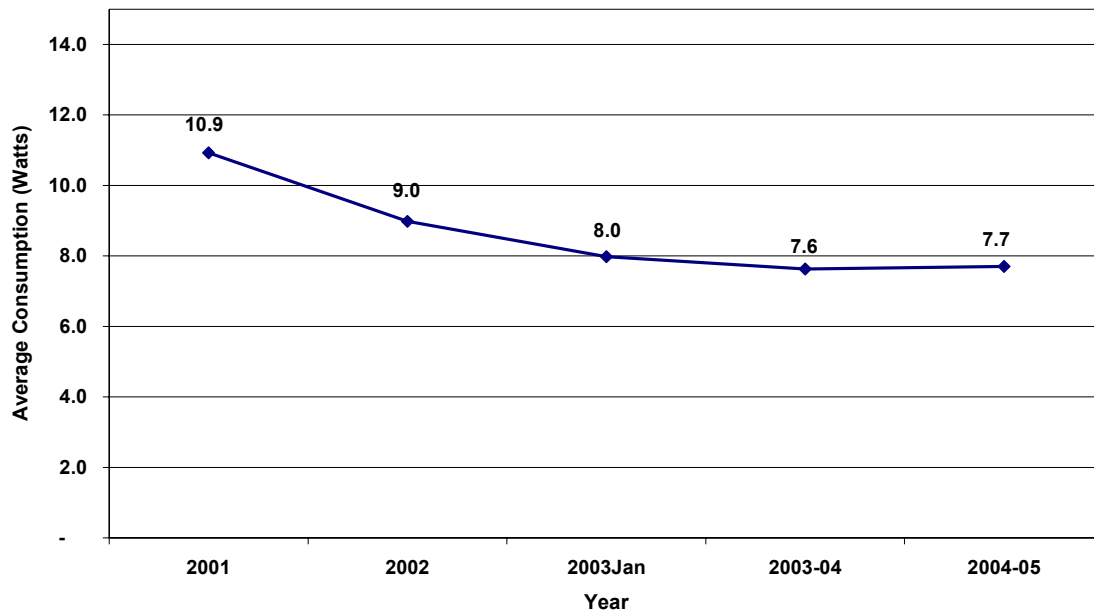


## VCR's

Active standby consumption for VCRs is distributed over a small 10 watt range with the best performers using less than 6 watts and the worst just over 14 watts. The majority of VCRs consume between 6 and 8 watts in active standby. Average active standby decreased significantly from 10.9 watts in 2001 to 8 watts in 2003. This level has been stable since with 2004/05 average active standby for VCRs being 7.7 watts. Figure 48 and Figure 49 present the last store survey (2004/05) to include active standby consumption data for VCRs. In 2005/06 only 3 VCRs were found in all the stores visited.

**Figure 48: Power measurements for VCR's: Active standby mode**



**Figure 49: Average Active Standby Consumption: VCRs**

Passive standby consumption for VCRs was distributed across a 5 watt range with the lowest usage recorded at just over 1 watt and the highest just over 6 watts. The vast majority of models consume less than 4 watts. There was a statistically significant decrease in average passive standby from 2001 (3.8W) to 2003 (3.1W). It has remained stable since with the 2004/05 average passive standby calculated at 2.9 watts. The store surveys have found no VCRs with an off mode since 2001. The passive standby results for VCRs are presented in Figure 50 and Figure 51.



Figure 50: Power measurements for VCR's: Passive standby

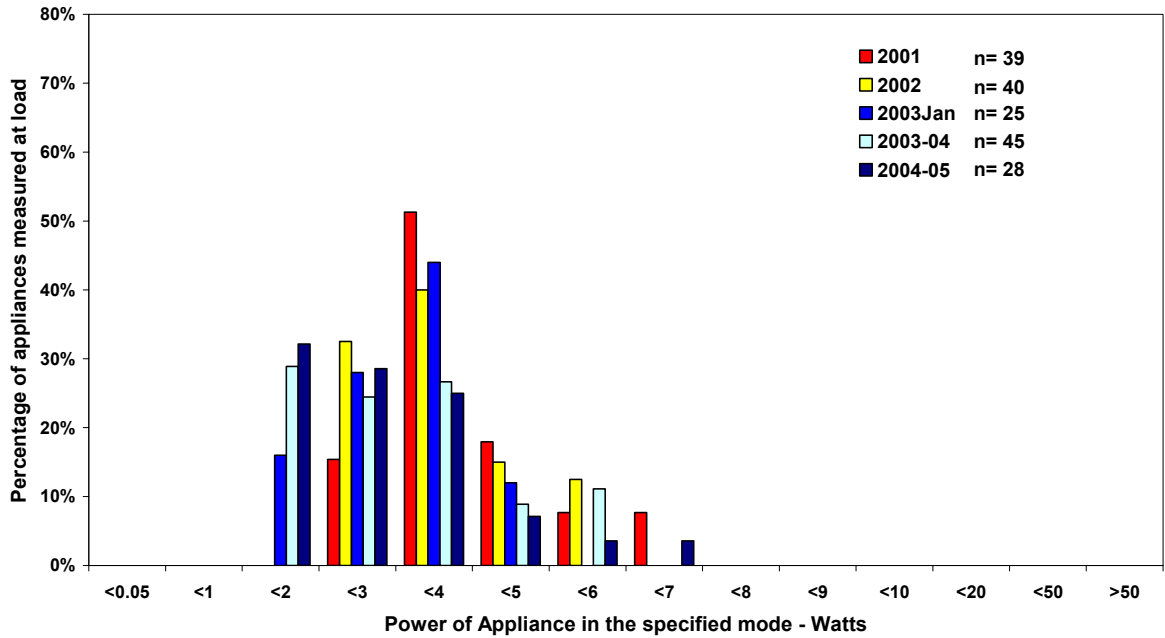
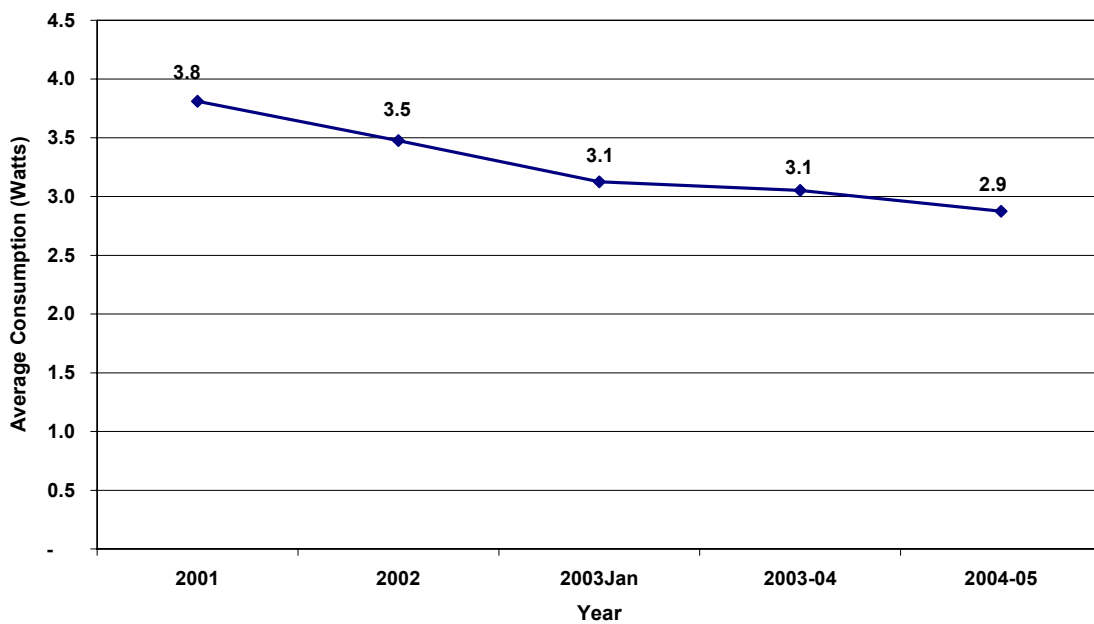


Figure 51: Average Passive Standby Consumption: VCRs



## Summary

Home entertainment equipment typically is in active or passive standby most of the time. Therefore these modes are most significant to the total amount of energy consumed by these types of products. Few products have off mode and those that do generally have no or low consumption in this mode. Home entertainment equipment uses much greater amounts of energy in active standby than in passive standby mode. The amount of energy used in active varies greatly by product however; over half the home entertainment equipment types use a significant amount of energy in this mode. Most home entertainment products use less than 4 watts in passive standby with the exception of new recording devices (DVD and Hard Disk Recorders). Table 18 summarises the average energy consumption results for all products from the 2005/06 store survey.

**Table 18: Summary of Store Survey Average Measurements 2005/06**

Home Entertainment Product	Mean Active Standby	Mean Passive Standby	Mean Off Mode
AV Receivers	44.2	1.8	0.2
Home Theatre Systems	24.1	2.5	0.0
Integrated Stereos	16.5	4.2	3.6
Portable Stereos	6.4	2.4	1.6
Audio Components	14.6	2.2	0.0
Sub Woofers & Speakers	11.0	5.5	2.0
DVD Players	8.8	2.0	0.1
DVD Recorders	21.5	7.3	NA
Hard Disk Recorders	27.8	5.6	NA
VCR's	7.3	2.6	NA
<b>Total for all Home Entertainment Products</b>	<b>19.3</b>	<b>3.3</b>	<b>1.4</b>

*Energy consumption from home entertainment equipment is estimated to constitute at least 3% of total household electricity use which is comparable with other household appliances such as clothes washers and dryers that already carry an energy rating label.*

*In-store surveys from 2001, 2002, 2003, 2003-04, 2004-05 and 2005-06 show a considerable range in both active and passive standby energy consumption indicating that there is technological scope for improvements to energy efficiency.*

*Passive standby in the new recording technologies is much higher than other products. Active Standby is significantly higher in about half the product groups.*

## Technology Scope for Energy Efficiency

All available information indicates that the technology to improve energy efficiency of home entertainment equipment is available and currently being used in the market place. Table 19 demonstrates that for all home entertainment equipment tested in the 2005/06 store survey there is a large variation in active and passive standby consumption. The gap between the best and worst performing models was at its largest for AV Receivers at over 80 watts. Analysis has also showed that there was not relationship between price and energy consumption. Given this it could be assumed that the worst performing models could improve there standby consumption significantly.

**Table 19: Summary of Store Survey Measurement Ranges 2005/06**

Home Entertainment Product	Active Standby		Passive Standby		Off Mode	
	Max	Min	Max	Min	Max	Min
AV Receivers	87.4	14.2	11.7	0.1	1.8	0
Home Theatre Systems	51.0	6	17.4	0.2	0.0	0
Integrated Stereos	39.4	3.5	20.7	0.2	11.5	0
Portable Stereos	17.9	2.8	4.8	0.9	2.4	0
Audio Components	29.6	1.1	2.2	2.2	0.0	0
Sub Woofers & Speakers	24.7	2.1	10.9	2	13.4	0
DVD Players	19.2	3.8	9.1	0.1	0.9	0
DVD Recorders	33.9	13.5	23.9	1.2	NA	NA
Hard Disk Recorders	38.8	18.4	24.1	1.6	NA	NA
VCR's	8.5	5.5	3.0	2.1	NA	NA
<b>Total for all Home Entertainment Products</b>	<b>87.4</b>	<b>1.1</b>	<b>24.1</b>	<b>0.1</b>	<b>13.4</b>	<b>0.0</b>

The store survey data is backed up by ENERGY STAR information that indicates that the best performing models in the USA market have very low passive standby. Again this suggests that the technology is available for high usage models to reduce consumption significantly.

**Table 20: ENERGY STAR Home Entertainment Equipment Best Performers**

<b>Home Entertainment Product</b>	<b>Best of Type Passive Standby (Watts)</b>
DVDs	0.28
Microsystems	0.90
Powered Speakers	0.80
Mini Midis	0.25
Mini Discs	1.40
Receivers	0.26
CDs	1.00
CD Record	2.00
Stereo Amplifiers	0.70

Source: Sustainable Solutions 2003

For most home entertainment appliances active standby is the default state when the equipment finishes operating. Hence much equipment spends a great deal of time in this state. Energy consumption in active mode for most products is quite high and requires consumer intervention to turn into passive standby or off. Sustainable Solutions (2003) suggests that along with energy efficient design the effects of active standby can be minimised by using a power down mechanism to automatically switch the appliance to its lowest power mode when not in use. This is a relatively simple addition that achieves energy reduction without relying upon the consumers' behaviour to be modified.

*There are several options for improving home entertainment equipment's efficiency. The difference in the best and worst consuming models already in the market are significant and indicate the technology exists to reduce energy usage in the poorest performers. Automatic power down systems could alleviate the high active standby consumption issues. However, it is up to the manufactures to determine the most cost effective and consumer appealing approach.*

## *Testing Standards Development*

### *Current Australian Standards*

Standards Australia International (SAI) advises that there are no standards applying to the energy consumption of home entertainment products. A new standard that defines the methods of measurement for the power consumption of audio, video and related equipment has been published as AS/NZS 62087:2004. This standard is almost a direct copy of the international standard IEC 62087 discussed below. The Australian government is also currently communicating with the relevant committees on developing a standard that includes voluntary efficiency performance requirements for standby energy consumption. These initial voluntary requirements would be published by SAI in a new part of the AS/NZS 62301.

AS/NZS 62301:2005: *Household electrical appliances - Measurement of standby power* was recently published to provide a test procedure to determine the power consumption of a range of appliances in standby mode. The appliances include mains powered electrical household appliances and to the mains powered parts of appliances that use other fuels such as gas or oil. The Standard defines standby mode as the lowest power consumption when connected to the mains, although product committees will be responsible for the definition of the relevant low power modes to which this test procedure is applied. The Standard is identical to the International Standard drafted by the IEC TC59 WG/9 (IEC 62301).

### *Test Laboratory Capability*

The ability of testing laboratories to perform the test in accordance with AS62087 is currently unknown, however the types of testing equipment and methodology is not very different to the standard type testing that is undertaken for various consumer/electronic equipment and hence Australian laboratory capability should not be an issue. However, after preliminary discussions with a major independent testing laboratory, they confirmed that they can test to the IEC standard. In addition, international suppliers have been testing to the IEC 62087 for a number of years and the acceptance of international testing laboratory test results would be probable.

### *International Standards*

The International Electrotechnical Commission (IEC) has released an international standard that defines the methods of measurement for the power consumption of audio, video and related equipment (IEC 62087). This international standard which covers televisions, VCRs, Set Top Boxes, audio equipment (separate stereo components) and multi-function equipment (such as integrated stereos) comprehensively defines all operating modes including:

- Disconnected

- Off
- Passive standby
- Active standby (low)
- Active standby (high)
- On (play)
- On (record)

## *International Energy Efficiency Programs*

### *Voluntary Programs*

Various voluntary programs that address standby and in-use power consumption exist internationally and these are summarised below. The international ENERGY STAR Program is the only voluntary program that operates in Australia and addresses standby power consumption.

#### *USA and International*

In the US, the ENERGY STAR Program run by the EPA aims to encourage industry best practice by forming partnerships with manufacturers and setting performance targets for appliances. The ENERGY STAR is a voluntary program and covers most home entertainment products. The *Consumer Audio and DVD products* category establishes criteria for AV Receivers, Home Theatre Systems, Stereo equipment, powered sub woofers and speakers, and DVD players/recorders. This has been implemented in two phases the first ending in 2002 and the second phase coming into effect on January 1, 2003. To qualify for an ENERGY STAR these products must consume 1 Watt or less in Standby mode. VCR's and VCR/DVD combination units are covered by the *TV's, VCR's and combination units* criteria. Phase I, which began in 2002 required both products to consume 4 watts or less In phase II, which began in July 2004, this level was lowered for VCRs to 1 Watt or less and in July 2005 phase 3 introduced the 1 watt or less criteria for VCR/DVD combination units. ENERGY STAR does not cover HDR's. These standards also apply to Canada, Australia and New Zealand and will shortly be introduced in Taiwan

#### *Europe*

In Europe, there are a number of initiatives that target power consumption in home entertainment products. The Group for Energy Efficient Appliances (GEEA), which is made up of representatives from European national energy agencies and government departments, encourages industry best practice through a voluntary energy labelling scheme. The GEEA label is available for VCR and DVD players and recorders. It also covers AV receivers, Integrated and Portable stereos and stereo components. The current criteria for these products, which are valid until 31 December 2006, are:

1. DVD players and all audio equipment must have a passive standby consumption less than 1W.
2. For the purpose of the GEEA label passive standby will be taken as the higher value when DVD players and audio components consumption values differ at the end of playing and when switched to standby.
3. Stereo Components and DVD players are required to power down to a lower consumption mode within 30 minutes after the end of playing

4. VCRs and DVD recorders must have a passive standby consumption less than 2.5W.
5. VCRs and DVD players must also meet on mode criteria with consumption limited to 15W for VCRs and 11W for DVD players.

In 1997, the European Association of Consumer Electronics Manufacturers (EACEM) established a voluntary agreement with the European Commission to reduce standby losses of VCRs. This agreement was updated in 2003 and EACEM has now merged its activities with the European Information & Communications Technology Industry Association and is now known as the European Information, Communications and Consumer Electronics Technology Industry Associations (EICTA). The updated agreement now also covers DVD players and a commitment was made to establish a code for 'Personal Video Recorder Equipment' which will cover DVDRs, VCRs and HDRs. Additionally in 1999 a voluntary agreement was made relating to audio equipment. This covers Av Receivers, integrated and portable stereos, and stereo components.

The 1997 agreement stated that from 2000 all VCRs would have a standby power consumption of 10 watts or less and that the average standby power consumption for all units sold by a single manufacturer would be 6 watts or less. The allowable average will be reduced to 3 watts by 2009 at which time a ban on all models consuming greater than 10w in standby will come into effect. The agreement made in 2003 stated that all DVD players when in passive standby should consume 1 watt or less by 2005. The audio agreement established 3 targets: By 2001 passive standby should be 5 watts or lower; by 2004 passive standby should be 3 watts or lower; by 2007 passive standby should be 1 watt or lower. As well as setting target values all three agreements stated that manufacturers needed to alert consumers to standby power consumption of products by for example printing information in operating instructions or product leaflets.

The European Commission also fund a pan European database of energy efficient appliances called HomeSpeed. The database includes white goods, consumer electronics and office equipment. It provides information about the brand name (manufacturer, model name), availability in several European countries and the latest energy related information. Specific information such as size, speed, add-ons or labelling systems (e.g. Energy Star or GEEA Label) is given, depending on the appliance type. The database currently covers 24 active appliance groups containing details of 11,874 appliances. Standby consumption is given for VCRs, DVDs, DVDRs and audio equipment. The database can be accessed by anyone, for more information see [www.homespeed.org](http://www.homespeed.org).

The Nordic Swan program is a voluntary eco label system used across five northern European countries. It launched eligibility criteria for integrated stereo systems, VCRs and DVD players and recorders in 2003. To be eligible integrated stereo requirements include a passive standby target of less than 1W and an on mode target of less than 40W. VCRs and DVD players and recorders need to have a passive standby consumption 2 watts or less and on mode consumption 15 watts or less. All equipment must have a clearly visible off switch and alert consumers that the unit can be turned off. The



program has earmarked auto power down as a feature they may require of products in the future. For more details see [www.svanen.nu](http://www.svanen.nu).

### ***Korea – Energy Boy***

The Energy-saving Office Equipment & Home Electronics Program has been implemented since April 1, 1999 to enhance the sales of the energy saving products that decrease electric energy consumption during standby. The agreement is based on the Article 13 of Rational Energy Utilization Act of Korea and Ministry of Commerce, Industry and Energy's Notification (Regulation on the Enhanced Spreading of the Energy-saving Office Equipments & Home Electronics). The purpose of the program is to save standby power consumption systematically by encouraging manufacturers to voluntarily produce and sell the energy saving products that meet the energy saving standard suggested by Ministry of Commerce, Industry and Energy (MOCIE) and Korea energy Management Corporation (KEMCO). The program is known locally as the "Energy Boy" and applies to energy-efficient products that meet the specifications. The label is available to VCRs, DVD players, home audio products, and home theatre system. The levels required to receive a label are:

1. VCRs must have a standby mode 4 watts or less
2. Audio products must have a standby mode 2 watts or less
3. Home theatre systems must have a standby mode 3 watts or less
4. DVD players must have a standby mode 3 watts or less

In addition, Korea has recently published their plan to implement the IEA standby power target of 1W – Korea Standby 2010. The strategy is based on three phases of action over the next 5 years, and includes voluntary targets, a transitional period and mandatory standards. The strategy clearly targets active standby power as a major issue to be addressed and home automation/entertainment equipment. More information on this program and the strategy can be found at [www.kemco.or.kr/](http://www.kemco.or.kr/).

### ***International Initiatives***

The International Energy Agency (IEA) has been promoting the "One Watt Initiative" energy saving program to cut world-wide electricity losses from appliances in stand-by. Launched in 1999, this campaign aims to guide government policy-makers and appliance manufacturers towards equipment that consumes no more than one watt when in standby mode. The Australian Government has endorsed the one watt standby target for appliances sold in Australia.

## Mandatory Programs

Two mandatory programs exist for home entertainment products. California has recently introduced mandatory MEPS covering DVD players and recorders, Hard disk recorders, Integrated Stereos and Stereo Components. Japan has mandatory targets for VCRs.

### USA

In addition to the ENERGY STAR program the California Energy Commission released mandatory regulations in April 2005. These regulations apply to products sold in California. The regulations deem that DVD players and Recorders including Hard Disk Recorders manufactured from 1 January 2006 must consume 3 Watts or less in passive standby mode. Additionally, the *Compact Audio Products* regulations require integrated stereo that are manufactured from 1 January 2007 to consume 2 watts or less in passive standby. If the product has a permanent illuminated clock displayed then this level is increased to 4 watts or less. These regulations do not cover AV receivers, Home Theatre Systems, Portable stereos; Stand alone subwoofers, stereo components or VCR's. See [www.energy.ca.gov/appliances/index.html](http://www.energy.ca.gov/appliances/index.html)

In addition, the Federal Energy Management Program (FEMP) requires all federal government agencies to purchase equipment with consumption at or below the recommended standby consumption. This applies to audio products, DVD players which are required to use no more than 1 watt and to VCRs which must have a consumption of 2 watts or less. Details of this program are available at [www.eere.energy.gov/femp/](http://www.eere.energy.gov/femp/).

### Japan – Top Runner

Japan's Top Runner program has criteria and energy efficiency standards for VCRs. Unlike the USA or Europe, the Japanese standards are mandatory. The standard is set as an energy consumption efficiency level calculated using the following formula:

Energy consumption efficiency = standby power consumption in which clock's display functions are displayed (w) - (0.2 x (standby energy consumption during a display state (w) - standby energy consumption during non-display state when not in display mode (w))).

The current target values are:

2.0W for VCRs with signal processing power for 400 lines of horizontal resolution and 1.7W for VCRs without signal processing power for 400 lines of horizontal resolution.

These standards are estimated to have achieved a 58.7% improvement in standby power between 1997 and 2003. More information can be found at [www.eccj.or.jp/top\\_runner/index.html](http://www.eccj.or.jp/top_runner/index.html).

## Summary of Testing Standards and Energy Efficiency Programs

While there are several programs covering various combinations of home entertainment products, the main focus of all of them is passive standby energy consumption. The majority programs are voluntary labelling schemes, which in general are aiming for appliances to consume no more than 1W. However, video recording products are generally allowed a higher target somewhere between 2 and 4 watts. Other requirements included in these programs, include automatic power down, visible off switch and on mode consumption limits. The mandatory programs are typically MEPS style programs and only target passive standby. The CEC program due to begin in 2006 requires products to consume less than 2 watts. The exception being those units with a clock display can consume up to 4 watts and Video recording products can consume up to 3 watts. Table 21, Table 22 and Table 23 summarise the coverage provided by international Standards and energy efficiency programs.

**Table 21: Summary of Testing Standards**

<b>Equipment Type</b>	<b>Region /Country</b>	<b>Program/ Standard Name</b>	<b>Modes</b>	<b>Target</b>
<b>Standards</b>				
All household mains powered appliances	Australia	AS/NZS 62301:2005	Standby	Standard defining methods of measurement
Audio, video and related equipment	Australia	AS 62087	All	Standard defining methods of measurement
Audio, video and related equipment	International	IEC 62087	All	Standard defining methods of measurement
All household mains powered appliances	International	IEC 62301	Standby	Standard defining methods of measurement

Table 22: Brief Overview of Energy Efficiency Programs

Program	Voluntary Programs							Mandatory Programs	
	Energy Star	GEEA	EICTA	HomeSpeed	Nordic Swan	Energy Boy	IEA 1W	CEC	Top Runner
Type	Label	Label	Agreement	Database	Label	Label	Target	MEPS	Target
AV Receivers	✓	✓	✓	✓		✓	✓		
Home Theatre Systems	✓					✓	✓		
Integrated Stereo	✓	✓	✓	✓	✓	✓	✓	✓	
Portable Stereo	✓	✓	✓	✓		✓	✓		
Stereo Components	✓	✓	✓	✓		✓	✓		
Sub Woofers	✓						✓		
Speakers	✓						✓		
DVD Players	✓	✓	✓	✓	✓	✓	✓	✓	
DVD Recorders	✓	✓	✓	✓	✓		✓	✓	
Hard Disk Recorders			✓				✓	✓	
VCRs	✓	✓	✓	✓	✓	✓	✓		✓

Table 23: Detailed Summary of Energy Efficiency Programs

Program/ Standard Name	Region /Country	Equipment Type	Modes	Target
<b>Voluntary Programs</b>				
ENERGY STAR	USA, Canada, Australia Coming soon to Taiwan.	AV Receivers Home Theatre Systems Integrated Stereos Portable Stereo Stereo Components Sub Woofers & Speakers DVD Players DVD Recorders VCRs VCR/DVD Combo	Standby only	Standby $\leq 1W$
GEEA Energy tick	Europe	AV Receivers Integrated Stereos Portable Stereo Stereo Components DVD Players DVD Recorders VCRs	Standby/On	Standby $\leq 1W$ (2.5W for VCRs or DVDRs) 30 min power down (Not VCRs or DVDRs) On mode $\leq 15W$ for VCRs $\leq 11W$ DVDPs
EICTA agreement	Europe	AV Receivers Integrated Stereos Portable Stereo Stereo Components DVD Players DVD Recorders Hard Disk Recorders VCRs	Standby only	Audio standby $\leq 3W$ ( $\leq 1W$ from 2007) DVDP standby $\leq 1W$ VCRs standby $\leq 10W$ plus achieve sales weighted average of 6W in passive standby. (Average reduced to 3W in 2009) Commitment to reduce consumption of video recording devices.
Nordic Swan	Scandinavia	Integrated Stereos DVD Players DVD Recorders VCRs	Standby/On	Audio standby $\leq 1W$ on mode $\leq 40W$ VCRs, DVDPs, & DVDRs $\leq 2W$ on mode $\leq 15W$ Visible Off Switch (Considering adding Auto power down)
Energy Boy , e-Standby	Korea	AV Receivers Integrated Stereos Portable Stereo Stereo Components Home Theatre Systems	Standby only	Audio standby $\leq 2W$ Home Theatre Systems standby $\leq 3W$ DVD players standby $\leq 3W$ VCRs players standby $\leq 4W$

<b>Program/ Standard Name</b>	<b>Region /Country</b>	<b>Equipment Type</b>	<b>Modes</b>	<b>Target</b>
		DVD Players VCRs		
IEA "One Watt Initiative"	International	All	Standby only	Standby $\leq 1W$
<b>Mandatory Programs</b>				
CEC	California	Integrated Stereos  DVD Players DVD Recorders Hard Disk Recorders	Standby only	From 2007 Audio Standby $\leq 2W$ ( $\leq 4W$ if has permanent clock display) From 2006 HDRs, DVDPs, & DVDRs $\leq 3W$
Top Runner	Japan	VCRs	Standby only	Sales weighted MEPS levels based on formula.
FEMP	USA Government Agencies	AV Receivers Integrated Stereos Portable Stereo Stereo Components DVD Players VCRs	Standby only	Must these purchase products with standby $\leq 1W$ and VCRs $\leq 1W$

## *Economic Implications*

A full economic study has not been conducted, as this usually is undertaken as part of the Regulatory Impact Statement (RIS) process when more information is available. However, it is worth noting that when mandatory programs are implemented through regulations, the requirements apply equally to manufacturers and importers. As a result, any additional costs of compliance are borne by all competitors. This situation is not always the case for voluntary programs, where companies who ‘do the right thing’ might be undercut by other company’s products which do not match their energy performance standards.

## *Policy and Program Approaches to Improve Energy Efficiency*

Aside from the ENERGY STAR program, there are no other programs in Australia that aim to improve the energy efficiency of home entertainment products. Additionally energy star does not currently cover the hard disk recorders nor sub woofers and speakers. As such, there is substantial scope for information programs to not only improve consumer awareness of product energy efficiency, but also drive manufacturers to achieve ‘best practice’.

This section aims to outline the variety of program approaches that could be used to improve the energy efficiency of televisions.

### *Information Programs*

Information programs are designed to inform the consumer in making a purchase decision. They may include:

- Brochures or other point of sale material
- Articles/advertisements in popular media
- Appliance labelling

This list is by no means exhaustive and each information program type has positive and negative attributes in terms of their success. Brochures and other point of sale material, while effective in that it prompts the consumer to think about the energy efficiency of the product at the time of purchase has a serious limitation in that it assumes that energy efficiency is an important factor in the decision making process. Research suggests that there are many other drivers before energy efficiency that consumers use to make a purchase decision, the most prominent being price<sup>4</sup>. This suggests simply providing information on product energy efficiency to consumers will not greatly affect their purchase decisions.

However other researchers argue that if products are fairly similar, except for their energy performance, consumers may use this factor as a key differentiator (Sustainable Solutions 2003) so it may affect a proportion of purchases. Sustainable Solutions also suggest that it is important that at least some information is made available to consumers on energy consumption of home entertainment equipment to demonstrate to manufacturers that governments are serious about encouraging improvement in energy performance.

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<sup>4</sup> Research by BIS Shrapnel found that in selecting a television, 43% of respondents nominated “competitive price” as the outstanding determinant of brand selection. Other factors included “more/better features” (18%), “aesthetics/design” (16%), “brand reputation” (13%) and “quality” (13%). BIS Shrapnel 1998 *The Household Appliances Market in Australia, 1998-2000* Vol 4: Home Entertainment.



## *Labelling Programs*

Labelling programs are a specific type of information program. Labelling programs can be either mandatory or voluntary or both and may include:

1. A voluntary energy endorsement label that endorses a product that achieves a specified target. This type of label merely informs the consumer that the product meets the required standard. The ENERGY STAR program is an example of this.
2. A voluntary energy endorsement label that endorses a product that achieves a specified target but also provides comparative information to the consumer (more like an energy rating label).
3. A mandatory energy label that provides comparative information on energy consumption to the consumer (such as the energy rating label for whitegoods).
4. A warning label that alerts consumers to information on the poor energy performance of a product.

Each of these options is discussed below.

### *Voluntary Energy Endorsement Label*

The ENERGY STAR label which is recognised internationally is also supported by the Australian Government. It covers all equipment types covered by this report and as such it would not be practical to introduce a new or similar scheme in Australia as there would be a risk of market confusion and overlap with existing ENERGY STAR coverage. The ENERGY STAR program covers standby energy consumption and (depending on the product) in-use energy consumption.

### *Voluntary Energy Endorsement Label with Comparative Information*

A variation of just an endorsement label (such as ENERGY STAR) is one that provides more information to the consumer to allow comparison of the energy efficiency of different products. The energy rating label on whitegoods allows consumers to do this however, the energy rating label is mandatory.

A similar approach might be to adopt an “award label” for those appliances that are the “best” in their class. The comparative information might include the energy consumption of the product compared to the “average” product in its class. Only those manufacturers who meet the target criteria would be “awarded” the label.

The concept of an “award label” while voluntary, encourages industry best practice with the prospect of increased sales of efficient products.

## *Mandatory Energy Label*

A mandatory energy label would essentially aim to achieve the same for home entertainment equipment as that for whitegoods. The energy rating label for whitegoods shows comparative energy consumption information and summarises the performance of the product with “stars” where the more stars indicate a more efficient product in that class.

An option with a mandatory energy label is to integrate it with MEPS. Those products that fail to meet a minimum standard (for example “1 star”) would be excluded from the market. Refrigerators, freezers and single-phase air conditioners are a few such products that are subject to a mandatory label and MEPS.

## *Warning Label*

The concept of a “warning label” to alert consumers to the poor energy performance a particular product offers is essentially the opposite to that of an endorsement label yet aims to achieve market transformation in the same way. Manufacturers aiming to avoid the bad publicity of such a label would hopefully improve the performance of their products so as to avoid the warning label. This concept has been raised before in Australia but as yet not applied to any products. As such the idea is not one that is tested or proven.

## *Summary Labelling Program Options*

Of the potential energy labelling programs, the ENERGY STAR voluntary program provides the most coverage for these types of products. The ENERGY STAR program is chiefly USA based and just over 12% of the products found in the Australian 2005/06 store survey carried an ENERGY STAR label. This lower coverage is primarily due to the voluntary nature of the program and hence only a small number of models met the requirements. In the USA, the federal government purchasing policy often reflects the ENERGY STAR requirements, and hence the ENERGY STAR program is not entirely voluntary in nature – to provide product to the USA government it must carry an ENERGY STAR label. So unless there is some form of “carrot” for the product suppliers, such as government purchasing requirements or significant government advertising, the ENERGY STAR labelling will most likely only influence a small percentage of home entertainment products.

In addition, the difficulty with a labelling program on its own for these products are that the standby energy running costs are typically small for individual products (however they represent over 10% of the average household energy use when aggregated) . Also, these running costs are often not included in the product decision criteria used by consumers (see earlier discussion on Information Programs). Therefore, labelling programs alone are unlikely to achieve lower standby power consumption.

## MEPS

MEPS are a government regulatory program stipulated in state and territory law that excludes, from the market, products that do not meet the minimum energy performance standards. A MEPS program could be developed which excluded the worst of the high energy consuming home entertainment products, which would lower the average consumption from the products sold. By progressively introducing lower MEPS requirements this would also encourage suppliers to improve their product's performance.

Sustainable Solutions (2003) suggests that MEPS for home entertainment products should incorporate (rather than try to replace) existing programs such as the IEA "One Watt" initiative and that action taken in Australia should not conflict with international developments and should use international test procedures. IEC 62087 already provides the standard test procedure.

With standby energy consumption of home entertainment products estimated to be at least 2,100 GWh pa by 2012, the case for addressing energy consumption from these products is strong. Key considerations in the argument for introducing MEPS include:

- The standby energy consumption of home entertainment products estimated to be at least 2,100 GWh pa by 2012
- The vast majority of home entertainment products sold in Australia are imported and there is an extensive range of market players selling into Australia, reducing the likely effectiveness of any voluntary program. The extensive range of players selling into Australia though means that eliminating the poorer products via MEPS would not create a limited product offering for consumers.
- Energy consumption from Home Entertainment products is estimated at around 3% of total household consumption. This level of consumption is comparable with that of clothes washers, clothes dryers and dishwashers. All of these household appliances carry an energy rating label indicating the significance of that level of consumption.
- store surveys conducted between 2001 and 2006 have found that there is a considerable variation in the Active and Passive standby energy consumption of the best and worst performing products on the market in each product group. This strongly suggests that there is scope for efficiency improvements using existing technologies.
- The only program that addresses energy consumption from home entertainment products in Australia is the ENERGY STAR program. This very important program has the opportunity to play a major role in promoting industry best practice and it is strategically significant in that it is an international program. Never-the-less, as an information program it will have limited impact on product

take-up, it does not cover active or off mode energy consumption and will not rid the market of the worst performing models.

- Consumer decision-making criteria for home entertainment products do not take energy consumption into consideration. While information programs on energy consumption of home entertainment products would enhance consumer knowledge, they would not ensure that the consumer will purchase the most efficient model available, particularly when there are a myriad of other features to consider in the purchase decision. As such, to rely on information programs alone may be short sighted and not produce market transformation in the same way that a mandatory measure would.
- Industry groups have indicated that introducing MEPS is the preferred method for accelerating energy efficiency in home entertainment equipment.

### *Summary*

Table 24 below summarises the positive and negative aspects of each of the policy tools discussed above. The table aims to highlight the strengths and weaknesses of each approach to enable a balanced evaluation to be made.

Table 24: Summary of program approaches/policy tools

Policy Tool	Positive elements	Negative elements
Information programs: Brochures & point of sale material	<ul style="list-style-type: none"> <li>Prompts the consumer at point of purchase</li> <li>Is easy to disseminate (such as through retail outlets)</li> </ul>	<ul style="list-style-type: none"> <li>Materials can become outdated</li> <li>Assumes energy efficiency is part of decision making process</li> </ul>
Information programs: Articles/ advertisements in popular media	<ul style="list-style-type: none"> <li>Receives wide-spread coverage</li> </ul>	<ul style="list-style-type: none"> <li>Expensive</li> <li>Requires continual repetition to maintain effectiveness</li> </ul>
Appliance Labelling: voluntary endorsement label	<ul style="list-style-type: none"> <li>ENERGY STAR is supported by Aust Govt and already covers equipment types identified in this report</li> <li>A positive marketing initiative for manufacturers producing energy efficient products</li> </ul>	<ul style="list-style-type: none"> <li>Wouldn't be practical to introduce similar endorsement label due to market place confusion</li> <li>ENERGY STAR does not currently cover in-use energy consumption</li> </ul>
Appliance Labelling: voluntary endorsement label with comparative information	<ul style="list-style-type: none"> <li>Provides more information to the consumer on the energy performance characteristics</li> <li>An award label that shows the best performing product compared to average is simple for consumers to interpret</li> <li>Encourages industry best practice</li> </ul>	<ul style="list-style-type: none"> <li>Effectiveness is diminished unless the label is mandatory as the consumer would need to compare the entire range of products</li> <li>Comparative labels can be confusing to consumers</li> <li>Information in the label not guaranteed to influence purchase decision</li> </ul>
Appliance Labelling: Mandatory Energy Label	<ul style="list-style-type: none"> <li>Encourages industry best practice</li> <li>Could be integrated with MEPS</li> </ul>	<ul style="list-style-type: none"> <li>Information in the label not guaranteed to influence purchase decision, especially if \$ savings are relatively small</li> </ul>
Appliance Labelling: Warning label	<ul style="list-style-type: none"> <li>Encourages industry best practice</li> <li>Potentially simple for the consumer to interpret</li> </ul>	<ul style="list-style-type: none"> <li>A new concept not yet tested in Australia or internationally</li> </ul>
MEPS	<ul style="list-style-type: none"> <li>Potential energy savings are significant</li> <li>Results in immediate removal of poor performing products from the market</li> <li>Encourages innovation in industry</li> <li>Does not rely on consumer decision making</li> <li>Supported by industry groups</li> </ul>	<ul style="list-style-type: none"> <li>Seen as being restrictive by some suppliers and adds additional testing burden and costs</li> </ul>

## *Recommended Policy Options*

Energy consumption associated with standby power in homes is estimated at 10% of electricity consumption, or 5,200 GWh in 2000 (NAEEEC 2001). A recent intrusive survey conducted under the E3 programme found that residential standby energy usage has increased by 3% per annum for the last five years and is now generating 6.2 million tonnes of carbon dioxide per annum (EES 2006). Home entertainment products contribute substantially to the overall standby power consumption in homes. These products are estimated to consume at least 2,100 GWh pa in standby power by 2012. Overall the standby power usage of home entertainment products is predicted to constitute over 4% of total household electricity use by 2012, which is approximately twice as much electricity consumed by the combined electricity use of clothes washers, clothes dryers and dishwashers. Our major trading partners and sources of home entertainment products recognise the importance of improving the energy efficiency of these products and are implementing policies that aim to improve the energy efficiency of these products.

These facts highlight the importance of introducing a program which will significantly contribute to lower the energy consumption of home entertainment products. A MEPS for home entertainment products will be the most effective policy option for improving the energy efficiency of these products. Information and labelling programs can have an important role in assisting in improving energy efficiency, but on their own will have a much smaller impact.

**This report recommends a MEPS for home entertainment products be implemented to ensure that the worst performing home entertainment units are removed from the Australian market.** The MEPS approach should address active and passive standby and off mode energy consumption. Furthermore a MEPS for home entertainment products should:

- Involve consultation with industry stakeholders, particularly major product suppliers on the MEPS levels
- Ensure that the Australian Standards Committee TE 1 could act as the vehicle to manage the transition to a regulatory scheme, subject to industry endorsement
- Remove approximately 30 % of the least efficient units from the market place
- Ensure any MEPS is consistent with international policy requirements as most of our product is imported.

The proposed approach incorporates both of the last two recommendations by firstly removing 30% of the least efficient products in Stage 1 MEPS, then moving towards the EU negotiated 2<sup>nd</sup> tier levels in Stage 2 MEPS. The EU levels are in line with Australian and the IEA's 1 watt policy and are transferable given that much of our product is primarily based on European product.

It is recognised that the EU have not implemented a MEPS, but a targeted reduction with voluntary agreements with major suppliers. However a voluntary agreement is unlikely to be suitable for Australia due to the large number of suppliers to Australia making a voluntary scheme much harder to implement and much less effective.



## Recommended MEPS Scheme

A MEPS scheme is the recommended course of action. The following section discusses the potential MEPS levels through a two stage approach.

A broad “horizontal” definition of products is proposed to be targeted by the MEPS and aim to simplify the issues associated with determining MEPS coverage. The definition proposed is based on the earlier definition, as follows:

Commercially available consumer equipment that produces, records or assists in producing an audio or video signal/output.

Products that are specifically covered by other MEPS requirements (such as TVs and set top boxes) would be excluded from this MEPS. A summary of the proposed maximum levels that would apply by mode and product type are shown in Table 25.

**Table 25: Proposed MEPS: Maximum Standby Power Levels**

Home Entertainment Product Type	Stage 1 MEPS		Stage 2 MEPS	
	Passive standby	Off	Passive standby	Off
Without video recording capabilities	4 watts	0.3 watts	1 watt*	0.3 watts
With video recording capabilities	6 watts	0.3 watts	1 watt*	0.3 watts

\* Auto power down to passive standby after 30 minutes of no AV input or inactivity is also required

As explained in the following sections, home entertainment products are only differentiated by their video recording capability.

### Stage 1 MEPS

The MEPS for implementation for Stage 1 is proposed at 4 watts for all home entertainment products without video recording capabilities and at 6 watts for those with video recording capabilities. Additionally all products with an off mode would be required to have consumption less than 0.3W. Products would be considered high efficiency models if they meet the criteria set out for Stage 2 MEPS (see page 72). Approximately 23% of all models surveyed in 2006 would not meet Stage 1 MEPS level as demonstrated in Table 26.

It is suggested that the MEPS Stage 1 is implemented as early as possible, but not before 2008, which provides 2 years to enable industry to comply with these levels. Government/industry consultation has suggested that a 4 year period is appropriate for MEPS notification, based on product development lifecycles (i.e., the time required to adjust product design to meet the new MEPS levels). However, the typical product lifecycle for home entertainment products is 18 months, due to the competitive nature of this market and the need to rapidly incorporate new technology and features. It has been reported by industry that a new model is typically released to the market every year for many of these equipment types. This shorter product development lifecycle enables the



MEPS levels to be taken into account without interruption to the normal model development cycle.

**Table 26: MEPS Stage 1: Home Entertainment Products excluded when applied to Store Survey Data from 2001 to 2006**

<b>Appliance</b>	<b>Year</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004<sup>1</sup></b>	<b>2005<sup>1</sup></b>	<b>2006<sup>1</sup></b>
AV Receiver	% of Models		30%	26%	12%	10%	14%
	No of Models		7	6	6	5	6
DVD Player	% of Models	42%	22%	18%	23%	27%	19%
	No of Models	10	8	6	18	18	10
Home Entertainment Other <sup>2</sup>	% of Models				33%	100%	75%
	No of Models				1	1	3
Home Theatre System	% of Models			22%	10%	15%	17%
	No of Models			2	3	8	4
Stereo Component	% of Models	88%	33%	20%	33%	25%	0%
	No of Models	29	4	1	3	2	0
Stereo - Integrated	% of Models	57%	53%	35%	39%	32%	32%
	No of Models	38	27	11	20	21	11
Stereo - Portable	% of Models	34%	0%	3%	7%	9%	24%
	No of Models	12	0	1	2	3	6
Subwoofer	% of Models				20%	40%	57%
	No of Models				1	4	4
DVD Recorder	% of Models			100%	20%	40%	40%
	No of Models			1	3	17	8
Hard Disk Recorder	% of Models				25%	53%	27%
	No of Models				1	10	7
VCR	% of Models	13%	0%	0%	0%	4%	0%
	No of Models	5	0	0	0	1	0
Total non-compliant	% of Models	47%	24%	17%	18%	24%	25%
	No of Models	94	46	28	58	90	59
Total All Home Entertainment	No of Models	198	195	165	321	377	239

Notes: (1) Data for 2004, 2005 and 2006 is from surveys undertaken in 2003/04, 2004/05 and 2005/06 respectively. (2) Home Entertainment Other is recent category and only includes very few products that can not be easily categorised (such as integrated stereos with a built in TV screen). Note that Blank cells indicate that no models were found with that mode for the year.

A MEPS level that removes the approximately 25% of the least efficient models surveyed is consistent with the method used to determine the MEPS levels for other products, such as three-phase air conditioners and motors, while still somewhat consistent a significant trading partners. The recommended levels are unique to Australia, as to directly mimic the only mandatory programs currently in existence would somewhat limit the Australian program and would not allow the flexibility for the constantly changing technologies. The CEC program only covers 4 product groups (DVD players DVD

Recorders, Hard Disk Recorders and Integrated stereos) whilst the Japanese top runner only looks at VCRs. The levels set by the CEC are somewhat lower than those set out in stage 1 MEPS which would result in over 40% of current products being removed from the Australian market. The MEPS levels nominated in stage one have been chosen to satisfy 3 criteria, removing approximately 30% of the least efficient models, keeping in-step with the international market especially Europe where product type is most similar, and a simple yet flexible system to cope with the constantly changing technological developments occurring in the home entertainment area.

Figure 52: MEPS Stage 1 Percentage Excluded by Product and Year

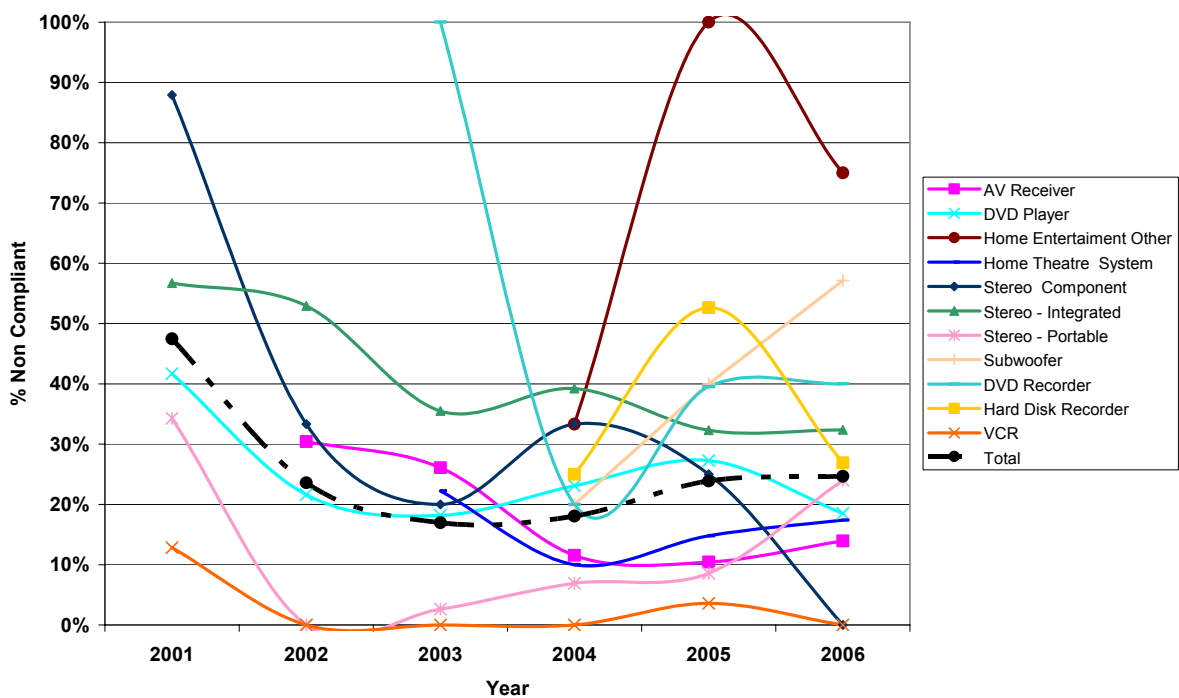


Figure 52 shows the trends in the percentage of products that would be non-compliant with the proposed MEPS Stage 1 levels when applied to the last 6 years of store surveys. Initially, the percentage of products excluded was relatively high; however over the last 5 years the trend has levelled off between 20 and 30%. It is apparent that the percentage non-compliant with the proposed MEPS Stage 1 levels is not decreasing over time – in fact there is a slight increase in the potential product that would not meet the proposed MEPS. This overall increase is probably due to the increase in number of models of DVD Recorders and Hard Drive Recorders and these products have greater percentages of non-compliance. If the overall trend is considered, than the number of non-compliant models would be expected to decrease between 2006 and the date of implementation of the proposed MEPS Stage 1.

## *Stage 2 MEPS*

Stage 2 MEPS aims to meet the IEA target of less than 1 watt consumption in standby. All Australian Governments have adopted this target for all appliances under its Standby Power Strategy (MCE 2002). The Strategy proposes that this level be achieved by 2012 and it is considered that by 2012 the market would be ready to achieve a MEPS level of 1 watt or less in passive standby for home entertainment equipment. Therefore it is proposed that Stage 2 MEPS be implemented on or after 2012. This would also be consistent with the levels expected by international programs. To reduce the impact of active standby all home entertainment products would be required to power down to passive standby within 30 minutes of inactivity. Assuming that the auto power down feature is implemented in all products, the proposed passive standby level of 1 Watt would currently exclude 66% of the market, as shown in Table 27. Some form of exemption process may be necessary where the product group or technology is not capable of meeting the Stage 2 levels, however this would need to be considered under an industry and government agreement. Discussion on such exemptions would require timelines for eventual compliance and applicable alternative levels. Specialist audio equipment (such as extremely high quality and low sales volume audio amplifiers) may be candidates for these exemptions.

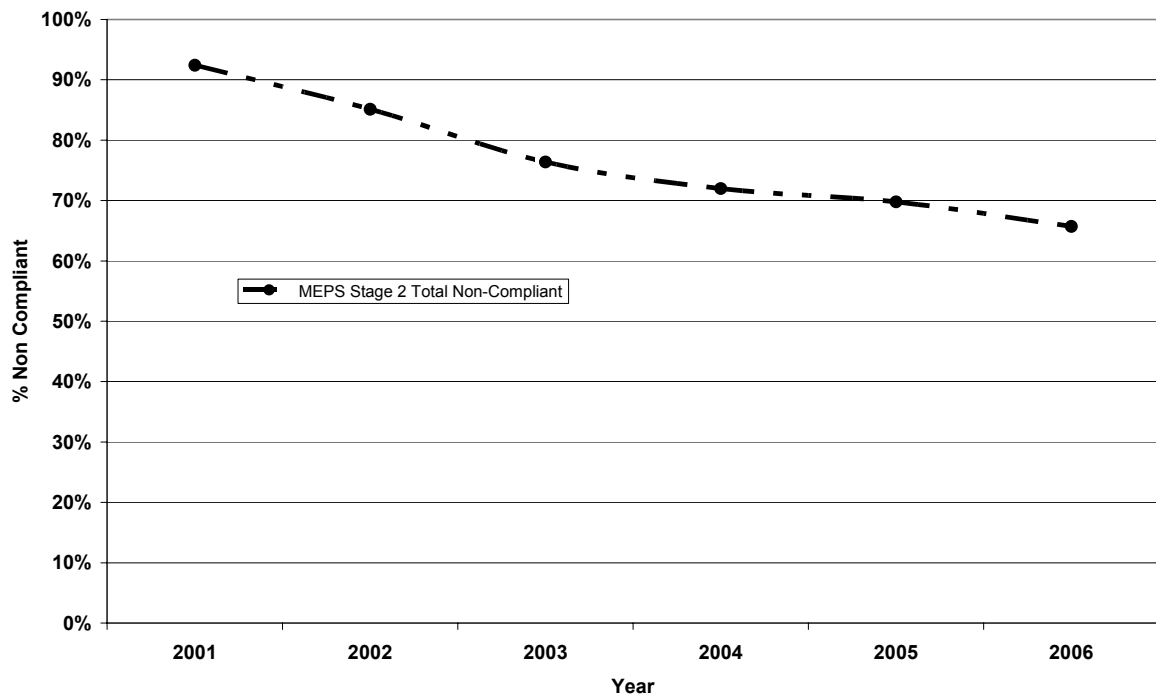
**Table 27: MEPS Stage 2: Home Entertainment Products excluded when applied to Store Survey Data from 2001 to 2006**

<b>Appliance</b>	<b>Year</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004<sup>1</sup></b>	<b>2005<sup>1</sup></b>	<b>2006<sup>1</sup></b>
AV Receiver	% of Models		87%	57%	52%	52%	37%
	No of Models		20	13	27	25	16
DVD Player	% of Models	88%	78%	70%	72%	67%	56%
	No of Models	21	29	23	56	44	30
Home Entertainment Other <sup>2</sup>	% of Models				100%	100%	75%
	No of Models				3	1	3
Home Theatre System	% of Models			56%	47%	46%	39%
	No of Models			5	14	25	9
Stereo Component	% of Models	100%	100%	60%	78%	75%	100%
	No of Models	33	12	3	7	6	1
Stereo - Integrated	% of Models	84%	71%	65%	67%	58%	56%
	No of Models	56	36	20	34	38	19
Stereo - Portable	% of Models	97%	91%	95%	90%	86%	96%
	No of Models	34	29	36	26	30	24
Subwoofer	% of Models				40%	40%	100%
	No of Models				2	4	7
DVD Recorder	% of Models			100%	87%	100%	100%
	No of Models			1	13	43	20
Hard Disk Recorder	% of Models				100%	100%	100%
	No of Models				4	19	26
VCR	% of Models	100%	100%	100%	100%	100%	100%
	No of Models	39	40	25	45	28	2
Total non-compliant	% of Models	92%	85%	76%	72%	70%	66%
	No of Models	183	166	126	231	263	157
Total All Home Entertainment	No of Models	198	195	165	321	377	239

Notes: (1) Data for 2004, 2005 and 2006 is from surveys undertaken in 2003/04, 2004/05 and 2005/06 respectively. (2) Home Entertainment Other is recent category and only includes very few products that can not be easily categorised (such as integrated stereos with a built in TV screen). Note that Blank cells indicate that no models were found with that mode for the year.

The trend in total percentage that does not comply with the proposed MEPS Stage 2 is downward, as shown in Figure 53. If this trend continues over the next 6 years, by 2012 approximately 30% of all products would not comply with the proposed MEPS Stage 2 levels. However, given that the EU agreement requires manufactures to meet the 1 Watt level by 2007, it is not unrealistic to assume the Australian market will be able to adjust by 2012.

Figure 53: MEPS Stage 2 Percentage Excluded of all Product by Survey Year



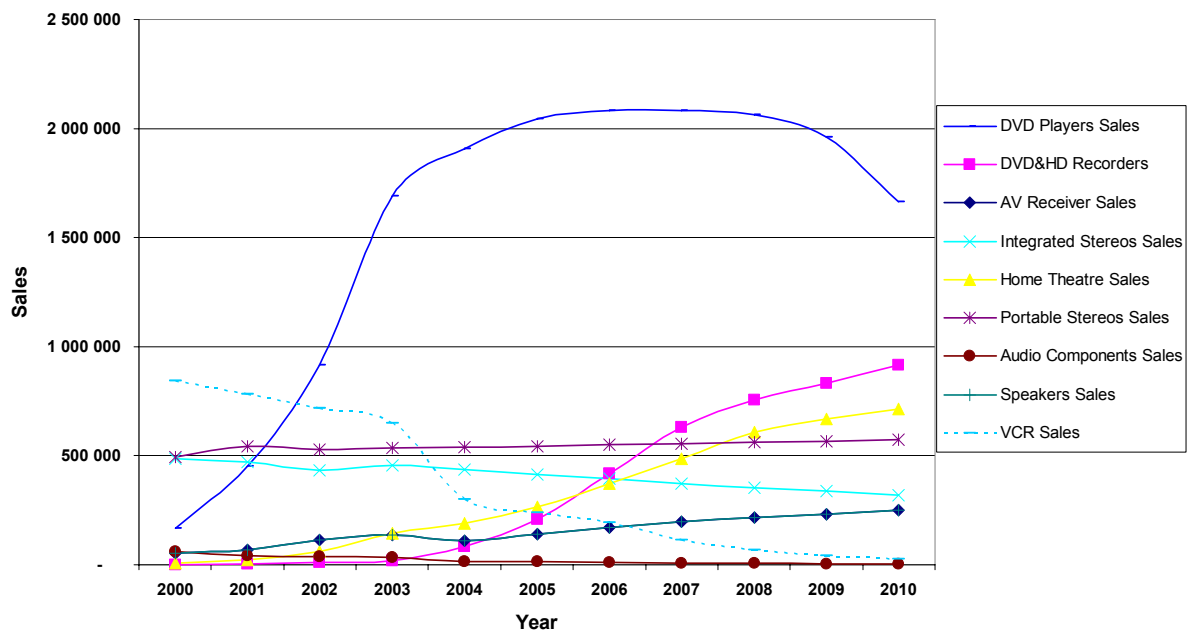
## *Greenhouse Reduction Potential*

The GHG emission of all home entertainment units is a product of the installed stock of the equipment, the unit electricity consumption and the GHG emission factor of electricity. Over time, the objective of the policy eventually chosen for implementation is to lower the standby energy consumption of equipment sold (both standby and off mode energy consumption). Hence the potential reduction of emissions and energy use will be directly related to the sales of new units and the effect of the policy on the energy consumption of these products. In assessing the GHG reduction potential, assumptions are required to be made about the effect of the policy option (i.e., voluntary action by suppliers, targets, MEPS, labelling) on product energy use and the sales of new product.

Modelling of business as usual (BAU) and policy GHG emissions has been conducted for these home entertainment products. The potential impact of mandatory MEPS on standby power usage is relatively large – saving over 1,000 GWh pa. The potential impact is estimated on the basis of the staged MEPS levels recommended and implemented as suggested. The following sections outline the results and key inputs of the modelling

### *Sales of New Product*

As the potential impact of a MEPS policy is highly dependent on the sales of the products, actual and forecast sales by product group were developed. Based on actual data from 2000 to 2004, projections were made for the various categories of equipment, as shown in Figure 54

**Figure 54: Annual Sales Forecast for Home Entertainment Equipment**

The sales of home entertainment equipment are related, as some products replace or substitute the functions of other products, such as the decrease in VCRs which are being replaced by DVD&HD Recorders. Also, it is likely that sales of DVD Players will be plateau and decrease as both Home Theatre Systems and DVD&HD Recorders increase. In 2005, it is estimated that approximately 4 million home entertainment products will be sold in Australia.

### *Key Data and Modelling Assumptions*

The emissions reduction potential was modelled on the basis of BAU and Policy (MEPS) scenarios. Key data used in the modelling were:

- Power consumption of the product by category in passive standby, active standby and off mode. This was based on the model weighted average from the store survey from 2000 to 2005
- Hours of use per product by category in passive standby, active standby and off and in-use mode. This was based on the surveys of households undertaken in 2001 and 2005 for E3.
- The auto-power down feature was estimated to reduce the time in active standby, dependant on the product category. For several product categories, it was estimated that an automatic power down (after 30 minutes) would reduce the average time in active standby by 2 hrs per day (under Stage 2 MEPS). This is a conservative

estimate of the potential for reduction as many products found in this mode in the latest intrusive standby power survey (EES 2006).

- The useful product lifetime was estimated for these home entertainment products using a logistic curve function, with 10 years useful life for most products categories.
- The year 2000 was used as the base year for modelling and analysis. All calculations show the energy consumption and GHG emissions of the equipment sold from the year 2000. Installed stock is not affected by the MEPS policy. The energy savings and GHG emissions reductions cumulate proportionally to the sales of equipment post the date of MEPS implementation.
- For modelling purposes, Stage 1 MEPS is implemented in 2008 and Stage 2 MEPS in 2012.

### *Modelling Results*

The MEPS targeting standby power for home entertainment equipment is estimated to reduce the GHG emissions 850 kt CO<sub>2</sub>-e pa and save over 1,000 GWh pa of electricity by 2020. The following figures are based on the assumptions and data described earlier. In summary the potential energy savings and GHG reductions are larger than the estimated impacts for other appliances that have in-use mode MEPS in place. For example, when MEPS was first proposed for air conditioners, the energy savings were estimated to be 450 GWh pa about 10 years after implementation.

Figure 55 shows the BAU and MEPS policy scenario of GHG emissions for home entertainment equipment, with the majority of the emission reduction occurring after the Stage 2 MEPS is implemented in 2012.



**Figure 55: BAU vs. MEPS Policy – GHG Emissions for Home Entertainment Equipment**

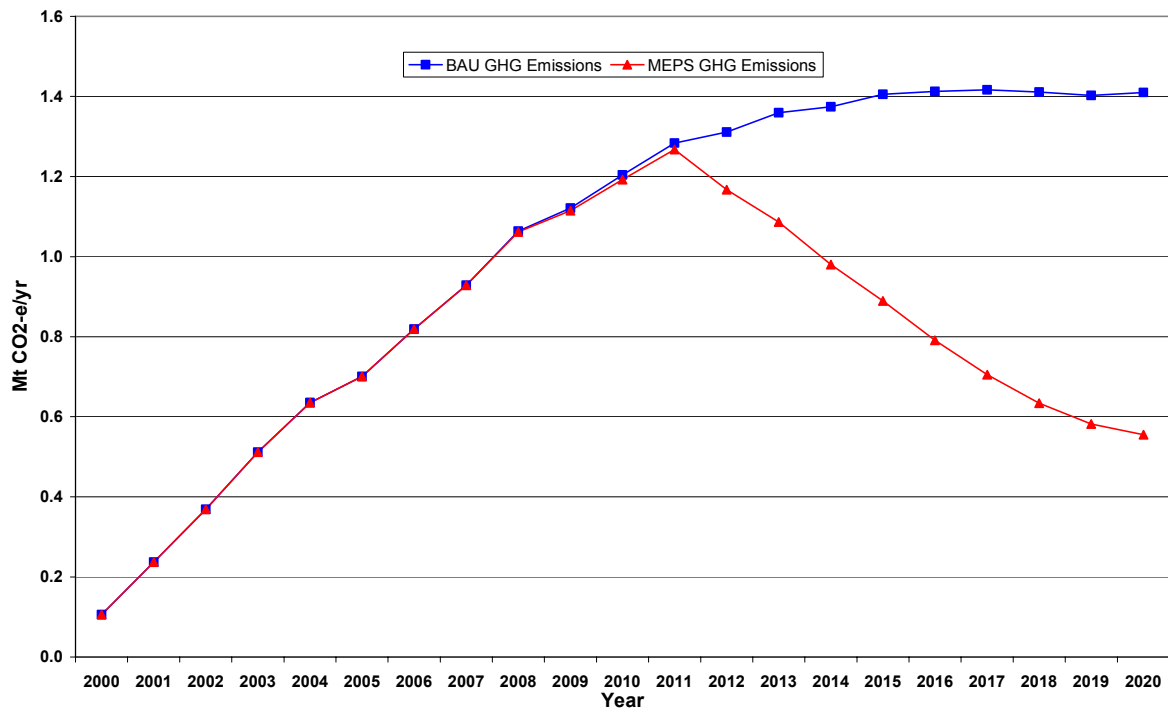
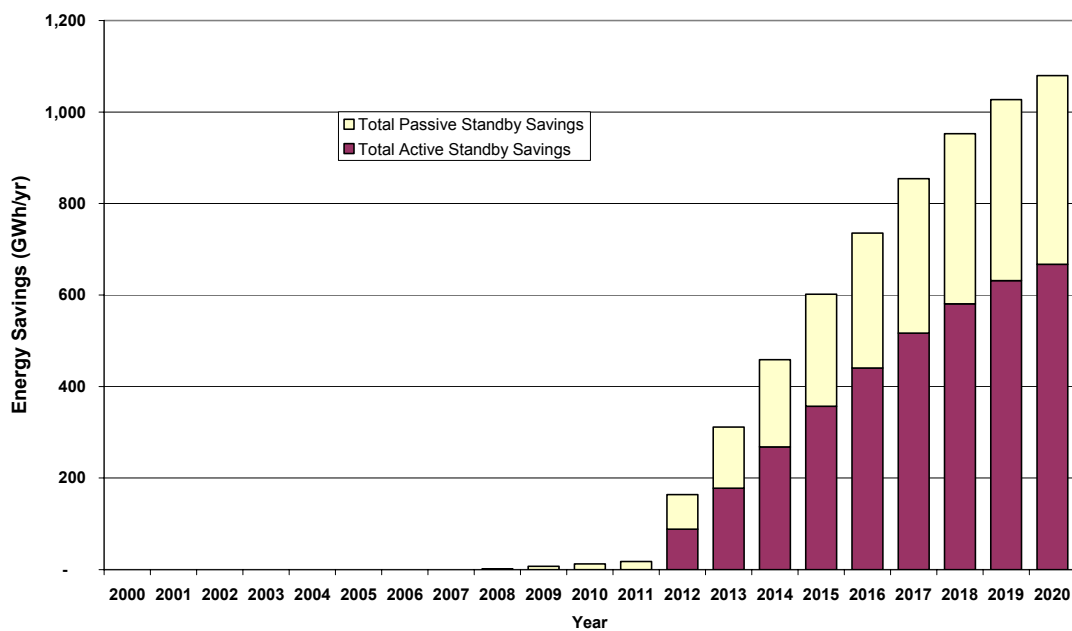


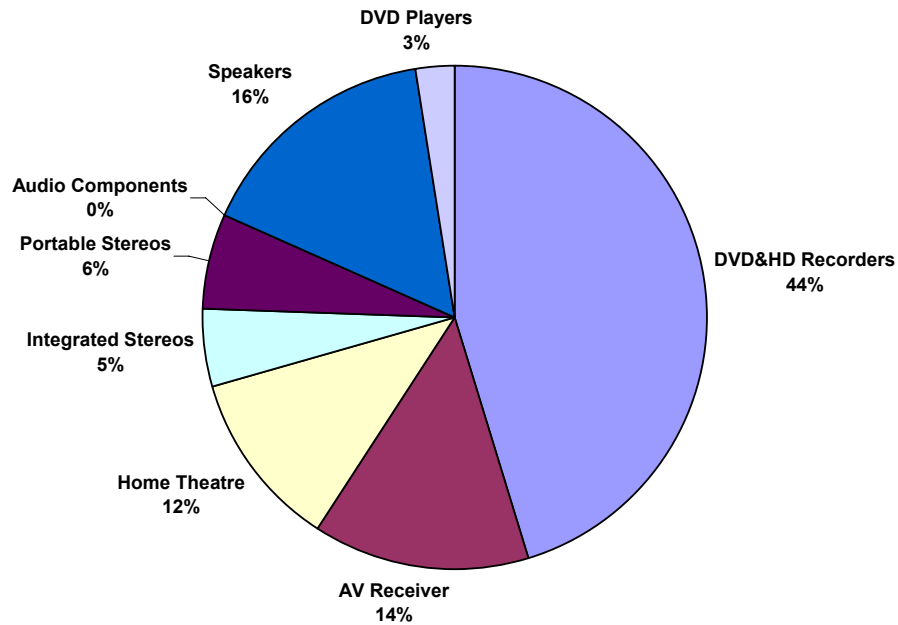
Figure 56 shows the energy saving potential of MEPS for home entertainment equipment attributed to passive and active standby mode. Stage 2 MEPS creates the greatest potential savings and the requirement for auto power down from active standby is expected to provide over 600 GWh pa of savings by 2020. The savings attributed to active standby represent over 60% of the total energy savings from MEPS, indicating the increasing importance of this mode of standby power consumption in these products.

Figure 56: MEPS Potential Energy Savings by Standby Mode



The contribution to the potential energy savings and GHG reductions by product category is shown in Figure 57. DVD and HD Recorders are estimated to provide over 40% of the potential savings, followed by AV Receivers, Speaker systems and Home Theatre systems. The large share of savings attributed to DVD&HD recorders is a function of their relatively high standby power use and increasing sales.

Figure 57: Share of Potential Energy Savings by Product Category



## Summary

*Internationally, standby power usage is being targeted for action. In the European Union, negotiated targets and voluntary labelling is aiming for passive standby power levels of 1W and auto power down features. In the USA, California has regulated standby power consumption for some audio products.*

*Analysis of Australian product standby power usage shows significant differences between models and hence great potential for reduction in unnecessary standby power consumption.*

*By modelling Australian units over time against the MEPS levels, savings of 850 kt CO<sub>2</sub>-e pa and 1,000 GWh pa of electricity are possible by 2020. The case for a MEPS set at the targets modelled in this exercise is therefore compelling. A MEPS implemented using the targets in this modelling approach would not be designed to meet the technical potential, but to ensure that the worst performing products are naturally replaced by products with an improved performance.*

## Implementation

A timetable for implementing the major elements of these recommendations is shown in Table 28, including the various stages of consultation with industry and other stakeholders.

**Table 28: Proposed Implementation Plan for Recommendations**

<b>Item</b>	<b>Date(s)</b>
1. Publication of draft Report	October 2006
2. Consultation with Industry and Government	2006
3. Finalisation of MEPS proposals and preparation of final Agreement	December 2006
4. Government Announcement of MEPS Proposals for Home Entertainment	January 2007
5. Regulatory Impact Statement Report development	January – March 2007
7. Publication of Draft Regulatory Impact Statement	April 2007
8. Prepare Draft Australia Standard Part 2 (MEPS requirements)	April - Jun 2007
9. Publish Draft Australia Standard Part 2 (MEPS requirements)	October 2007
10. Introduce MEPS	October 2008

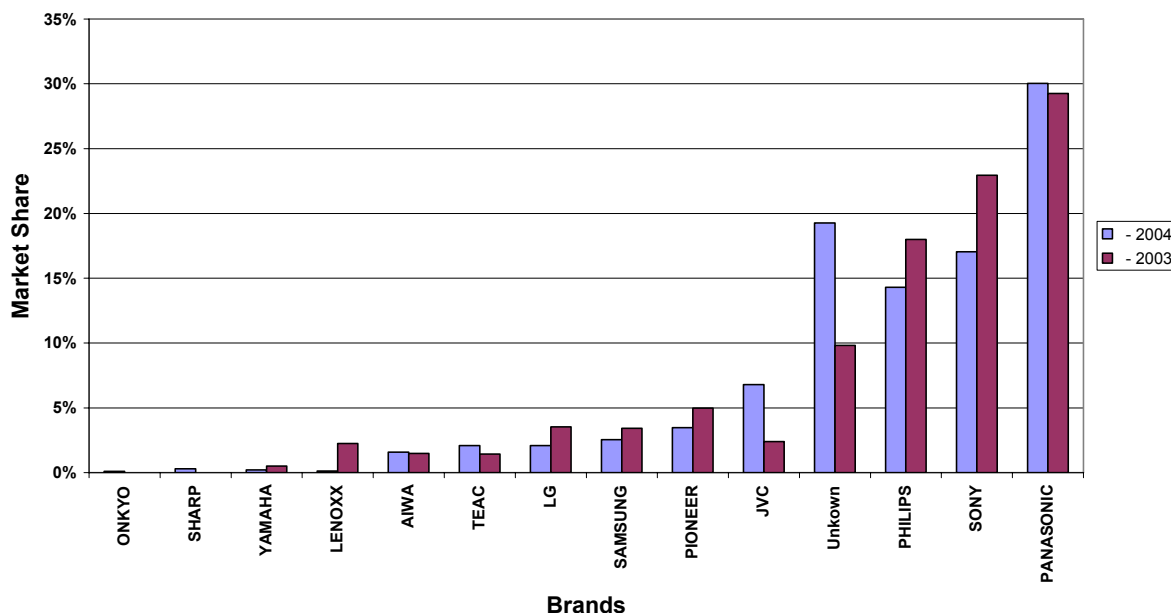
## New Zealand Home Entertainment Products and MEPS Impacts

This section outlines the certain product characteristics and the potential impacts of the proposed MEPS for standby power for home entertainment products if the policy was applied in NZ. The New Zealand Energy Efficiency and Conservation Authority (EECA) is considering the adoption of similar Standby Strategy<sup>5</sup> to the strategy developed in Australia (“*Money isn’t all you are saving, Australia’s Standby Power Strategy 2002-2012*”).

### Product Sales and Characteristics

An examination of the products sold in Australia confirms that similar products are supplied in NZ. Data from GfK was obtained that listed the NZ sales by brand and model for the period 2003 and 2004, for many of the home entertainment product types examined in this report (GfK 2006). An example of the sales market shares of suppliers of Home Theatre Systems in New Zealand are shown Figure 58

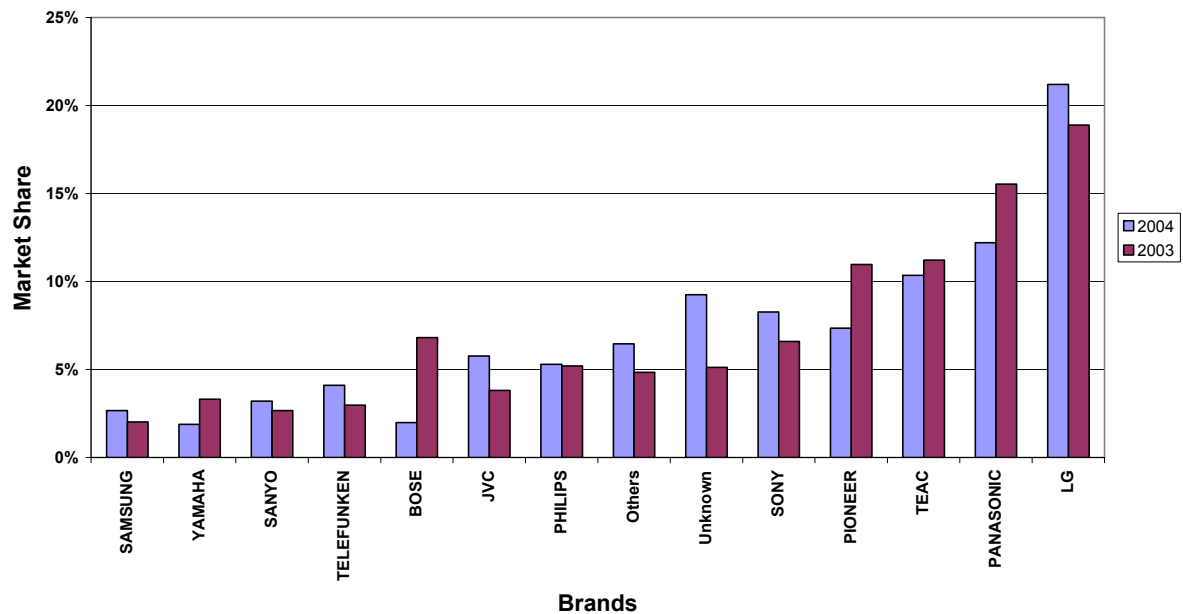
**Figure 58: NZ Supplier Market Share: Home Theatre Systems 2003 & 2004**



The Australian data for the same product category is shown in Figure 59.

<sup>5</sup> Appliance and Equipment Energy Efficiency Forward Programme 2004-05, EECA June 2004

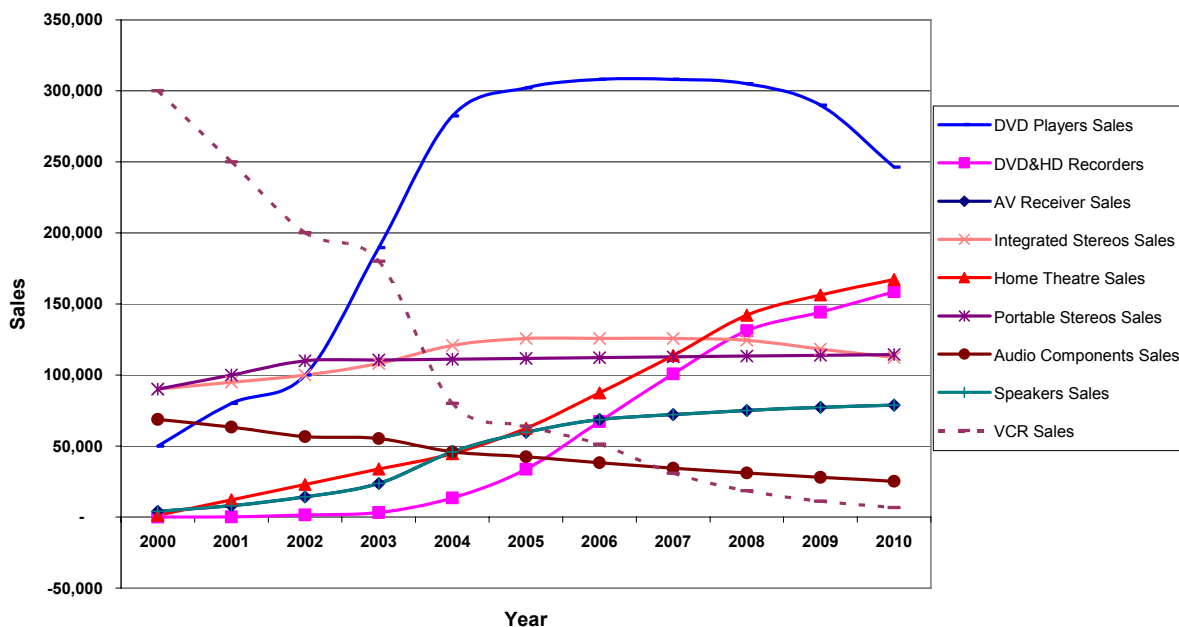
Figure 59: AUS Supplier Market Share: Home Theatre Systems 2003 &amp; 2004



The major suppliers present in Australia are also in New Zealand, with the exception of LG where they are the leading brand in Australia, but their share is under 5% in NZ. In general, the home entertainment product category features multinational brand names and products that are traded internationally.

The sales for home entertainment products were estimated from the GfK data (GfK 2006) and the NZ Standby Power Strategy Study (Dialogue 2005). These estimates are based in similar factors described in the earlier section Sales of New Product (page 75) and contain forecasts of the sales by product group. The NZ Sales are shown in Figure 60.

Figure 60: Annual NZ Sales Forecast for Home Entertainment Equipment



The energy consumption characteristics of the products sold in NZ is assumed to be similar to Australia. No measurements of the standby power of these products have been undertaken in NZ stores, as compared to Australia where the annual store surveys have provided time series data for the power use in various standby modes since 2001. However, measurements of the standby power of products have been undertaken in NZ homes during the BRANZ Household Energy End-use Project (HEEP). These measurements have been reported in a study (BRANZ 2004) supplied to EECA. They represent the power use of certain home entertainment products in the households being measured; hence they cover products that were purchased prior to 2004, and standby power consumption in various modes is combined (i.e., passive and active standby is not separated, however if the product is left in active standby mode, the power use is included in the overall standby power figure).

Table 29 lists the values of standby power from the Australian store surveys of new product and the values measured/estimated in NZ for current stock in houses. The BRANZ and Dialogue sourced data do not cover all the products separately, however they do provide an indication of the standby power that is present in New Zealand households for these home entertainment products. As the NZ data is sourced from older product, it is likely to be higher than those currently sold in NZ. Therefore these power levels show reasonable agreement with the Australian store survey data.

**Table 29: Comparison of Australian and NZ Standby Power Figures**

<b>Home Entertainment Product</b>	<b>Mean Active Standby</b>	<b>Mean Passive Standby</b>	<b>BRANZ/ Dialogue <sup>1</sup></b>
AV Receivers	44.2	1.8	NA
Home Theatre Systems	24.1	2.5	NA
Integrated Stereos	16.5	4.2	(B)6.5 / (D) 3.78
Portable Stereos	6.4	2.4	NA
Audio Components	14.6	2.2	(B) 4.2
Sub Woofers & Speakers	11.0	5.5	NA
DVD Players	8.8	2.0	(B) 3.1
DVD Recorders	21.5	7.3	
Hard Disk Recorders	27.8	5.6	(D) 4.73
VCR's	7.3	2.6	
<b>Total for all Home Entertainment Products</b>	<b>19.3</b>	<b>3.3</b>	<b>NA</b>

Note 1: Figures sourced are indicated by a prefix: B = BRANZ 2004, D = Dialogue 2005

Another comparison is possible between the recent Australian household intrusive standby power survey (EES 2006) and the average standby power for all home entertainment products measured in the NZ households. The BRANZ 2004 result is 29.2W per household, however it includes TV and set top boxes. If the power attributed to TVs and STBs (approximately 6.8W and 4.2W respectively) is removed, the average standby power for home entertainment products in NZ households would be 18.2W. This result is remarkable close to the findings of the Australian survey of 19.6W per household.

In summary, the various power and usage characteristics of these home entertainment products are the likely to be similar in New Zealand and Australia. Therefore the impact of the proposed MEPS is a function of the forecast sales of the NZ products.

### *Impact of Proposed MEPS in New Zealand*

The impact of the proposed MEPS in terms of percentage of product that is excluded in New Zealand is likely to be similar to Australia, as shown in the section *Recommended MEPS Scheme* on page 69.

The energy savings and GHG reduction potential of the proposed MEPS has been estimated using the same power and product usage characteristics for Australia, with the detailed sales forecasts developed from the GfK data. Figure 61 shows the BAU and MEPS policy scenario of GHG emissions for home entertainment equipment in New Zealand, with the majority of the emission reduction occurring after the Stage 2 MEPS is implemented in 2012. The potential GHG emission reduction in New Zealand is 22 kt CO<sub>2</sub>-e pa by 2012 and 140 kt CO<sub>2</sub>-e pa by 2020.



**Figure 61: BAU vs. MEPS Policy – NZ GHG Emissions for Home Entertainment Equipment**

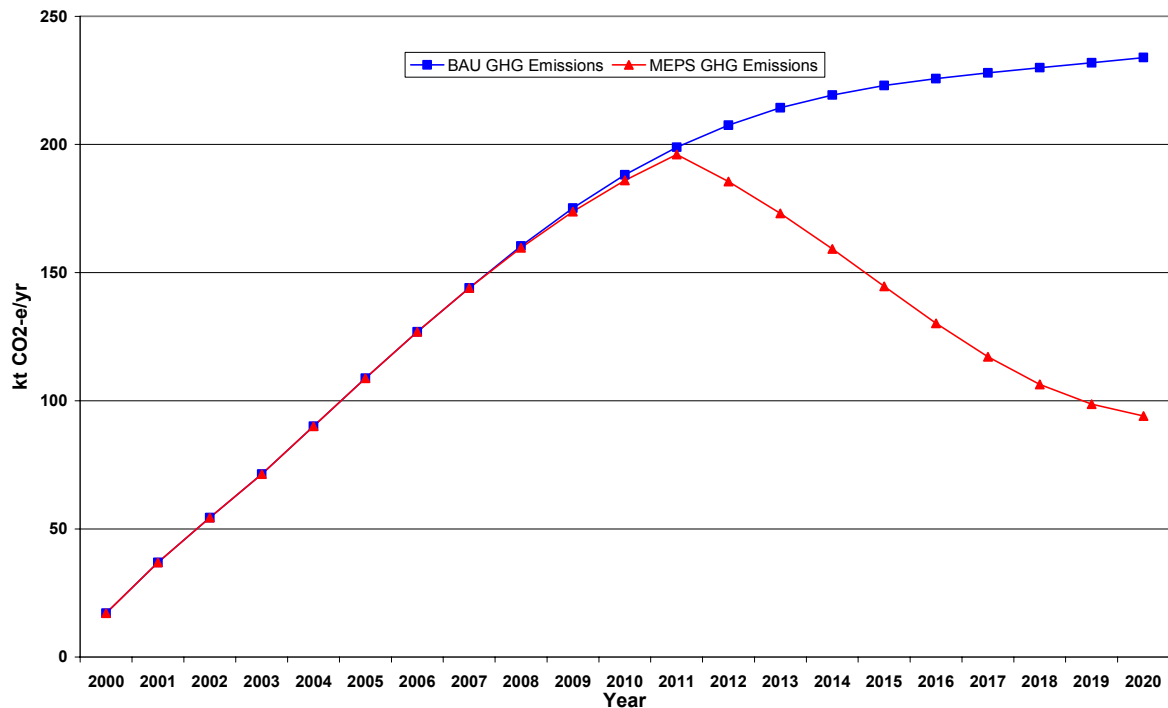
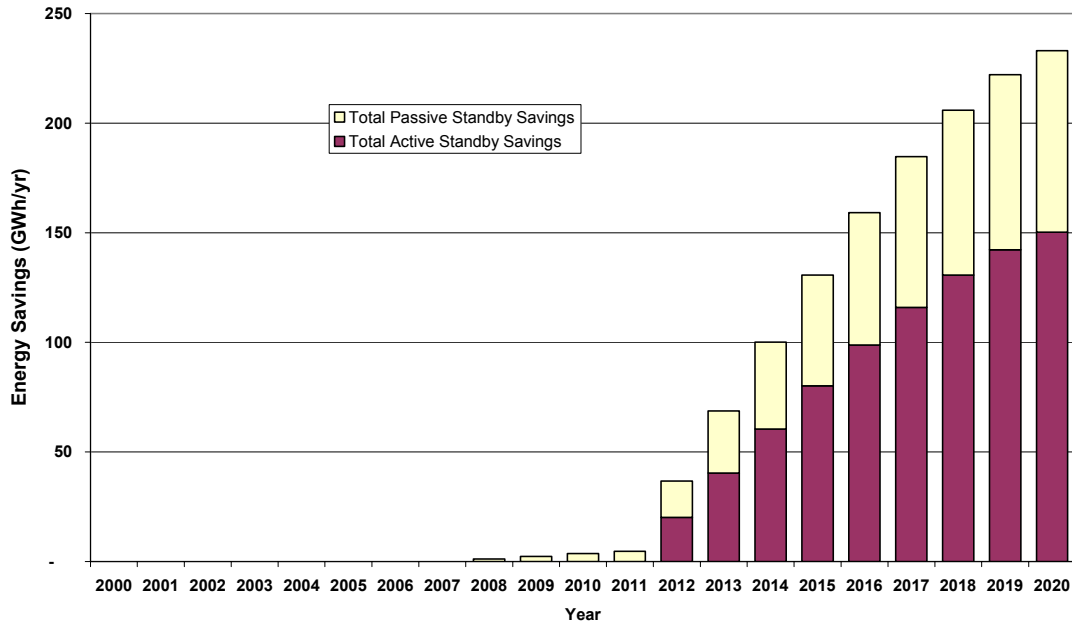


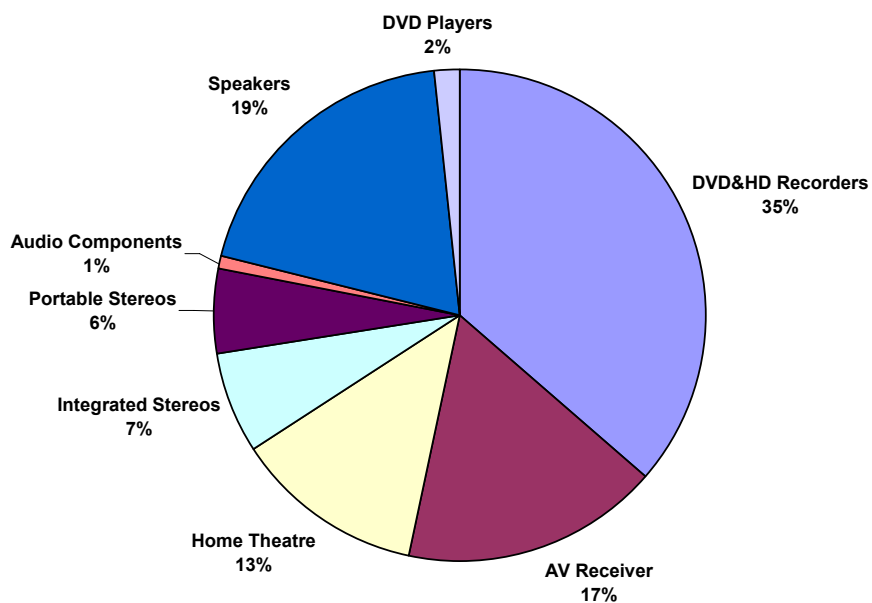
Figure 62 shows the energy saving potential of MEPS for home entertainment equipment in New Zealand attributed to passive and active standby mode. Stage 2 MEPS creates the greatest potential savings and the requirement for auto power down from active standby is expected to provide over 150 GWh pa of savings by 2020. The savings attributed to active standby represent over 65% of the total energy savings from MEPS, indicating the increasing importance of this mode of standby power consumption in these products.

Figure 62: NZ MEPS Potential Energy Savings by Standby Mode



The contribution to the potential energy savings and GHG reductions by product category is shown in Figure 63. DVD and HD Recorders are estimated to provide over 35% of the potential savings, followed by Speaker Systems, Home Theatre systems and AV Receivers. The large share of savings attributed to DVD&HD recorders is a function of their relatively high standby power use and increasing sales.

Figure 63: Share of Potential NZ Energy Savings by Product Category



## Summary

*New Zealand has similar products and usage characteristics to Australia for home entertainment products. If NZ is adopts a similar policy, the potential savings and benefits of a MEPS is significant.*

*By modelling New Zealand units over time against the MEPS levels, savings of 140 kt CO<sub>2</sub>-e pa and 230 GWh pa of electricity are possible by 2020. The case for a MEPS set at the targets modelled in this exercise is therefore compelling. A MEPS implemented using the targets in this modelling approach would not be designed to meet the technical potential, but to ensure that the worst performing products are naturally replaced by products with an improved performance.*

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