

PRODUCT PROFILE



FREE-TO-AIR DIGITAL
SET TOP BOXES (STBS)

AUSTRALIA'S STANDBY POWER STRATEGY 2002 - 2012

AN INITIATIVE OF THE MINISTERIAL
COUNCIL ON ENERGY FORMING
PART OF THE NATIONAL
GREENHOUSE STRATEGY

The National Appliance and Equipment Energy Efficiency Committee seeks comment on this proposal from any interested person or organisation.

Please email comments to:

energy.efficiency@greenhouse.gov.au

Alternatively, hard copy comments can be mailed to:

Free-to-Air Digital Set Top Boxes Product Profile
Equipment, Appliances & Transport Team
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Comments received by 30 June 2004 will assist in determining the final form of the policy proposals taken to government regarding free-to-air digital set top boxes.

An electronic version of this Standby Product Profile and other Profiles released for public discussion can be obtained from www.energyrating.gov.au under standby.

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PRODUCT DESCRIPTION

Digital STBs first became available in Australia in 2001 to coincide with the launch of digital television. A digital STB may also be referred to as a digital television adaptor, decoder or receiver. Essentially a digital set-top box is a device that acts as a decoder; it captures a digital signal and converts it into a signal compatible with the existing audiovisual display technology, including composite video, s-vhs or component video. Additionally, STBs can be distinguished by the way they capture signals i.e. via the television antenna (terrestrial), cable or satellite. STBs also are available as Standard Definition Digital Receivers (SD-DR) and High Definition Digital Receivers (HD-DR). The difference between these products is that an HD-DR connected to an HD display device will enable you to view High Definition and Standard Definition pictures. This profile only applies to

terrestrial STBs. Those STBs used for pay TV services are being considered separately, as the pay TV service provider specifies the units to be used.

STBs can have a range of options, from the basic box, which allows the user to watch digital TV channels, to those that include extra options such as interactive services like email and home shopping. These options are accessed through features such as multi-channelling, basic electronic program guides, closed captions, the ability to receive and Dolby Digital surround sound. An STB may also include a hard disk for recording and playing back programs.

It should be noted that this profile does not cover integrated digital televisions (IDTV) including those with an integrated receiver and decoder (IRD). These products will be addressed separately.

CURRENT OWNERSHIP AND TRENDS

The sales of STBs and IDTVs (the latter contributing less than 10%) are shown in Table 1 and seem to be increasing rapidly, with sales estimated at 200,000 in 2003, and predicted to grow to 350,000 by 2004.

TABLE 1: TOTAL SALES OF DIGITAL STBS & IDTV 2000-2003, ESTIMATED SALES TO 2004

Year	Total Sales
2000	0
2001	10,000
2002	40,000
2003	200,000
2004	300,000(e)

Source: *Digital Broadcasting Australia (DBA), Jan 2004 + Mar 2004 Newsletter*

Industry sources (*Counterpoint February 2004*) suggest that total penetration of digital STBs is now approaching 3% of households (approximately 300,000), which concurs with the estimated sales in Table 1. With analogue TV services expected to end in mainland cities by 2008 and a slow phase out expected in regional centres, STBs will certainly increase their market share. It is expected that millions of STBs will be required over the next decade with the majority sold in the next 5 years. Unless the consumer makes the decision to purchase a TV capable of receiving digital images, an STB will be the only option available for those who have an existing analogue TV after analogue services phase out.

RELEVANT MODES FOR THE 'ONE WATT' POWER PLAN

Digital STBs available in Australia generally have two operational modes: on and passive standby, although some STBs also have an off mode.

On mode is not generally relevant for the standby power plan, although the on mode power consumption and the hours of use are critical in determining total energy consumption of products. However, in the case of STBs, the way on mode functions means the in-use status has similar characteristics to the active standby measurements of other products. STBs can be left in this in-use mode for extended periods while producing no visible output. Therefore this mode has been included in this profile.

Passive standby mode is a standard feature of STBs and allows the unit to be put 'to sleep' either via a remote control or manual standby switch.

Off mode in theory disconnects the mains from most electrical circuits in an appliance ('hard off'). Normally the appliance cannot be activated with a remote control while switched "off". However, while some STBs have a hard off switch, not all have zero power consumption when in this mode.

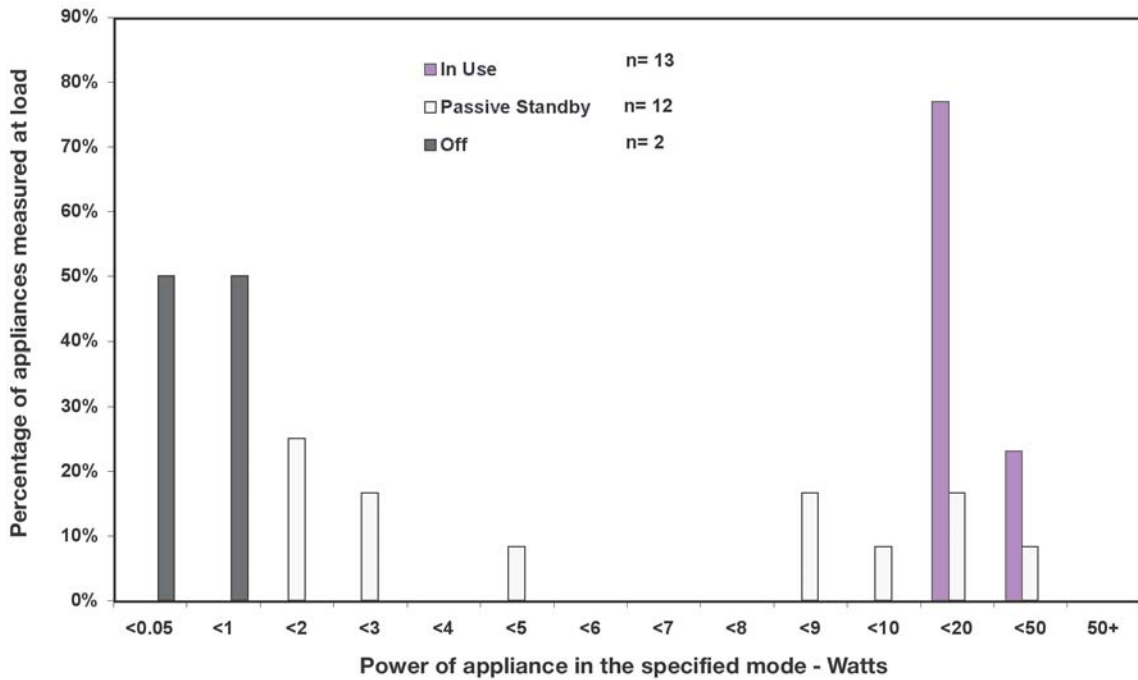
KNOWN STANDBY DATA FOR NEW PRODUCTS

For the past three years, NAEDEC has commissioned store surveys of products available for sale in major retail stores. The surveys collected the in-use, active standby, passive standby and off power measurements (where relevant) for a wide range of appliances for sale in retail outlets. However, due to digital STBs being new to the market, only eighteen have been measured; four in January 2003 and 14 in the November 2003 store survey.

In the January survey the passive standby for three units was less than 3W, while the other unit measured a very high 23.3W. In the November survey the results were spread across the range with an average of 7.5W, a high of 21.5W and a low of 1.9W. The in-use measurements for both surveys ranged from 10W to 35.3W, with the November average being 17.4W. Of all the STBs measured, only three had an on/off switch, with one of the units having no consumption in this mode. The results from the November survey are presented in Figure 1 below.

While there is little data on the passive standby consumption of digital STBs in Australia, results from the store survey suggest that there is potentially a wide variation in these consumption levels. Also, being a relatively new product in the marketplace and one which is likely to grow rapidly in the next five years, it is important to encourage industry best practice in the manufacture of digital STBs while the market is in its infancy.

FIGURE 1: POWER MEASUREMENTS FOR DIGITAL STBS NOVEMBER 2003



KNOWN STANDBY DATA FOR INSTALLED STOCK

As a relatively new product to the Australian market, installed stock data for STBs is limited. It can be assumed that the overwhelming majority of product would be less than four years old and consumption data would be consistent with the data for new stock.

GREENHOUSE EMISSIONS

For the purposes of estimating greenhouse emissions, it has been assumed that STBs are in-use for 1642 hours per year. 70% of the remaining time is spent in passive standby mode, 25% in active standby/on mode and 5% in off mode.

The greenhouse emissions reduction potential for the proposed passive standby target of 1W and active standby target of 6W by 2012 is shown in Figure 2. This indicates potential reductions of 250 kT CO₂-e pa by 2012 and building to over 600 kT CO₂-e pa by 2020. Note that Figure 2 shows the greenhouse emissions from digital STBs installed since 2000.

The projected effect on total annual energy consumption by STBs based on the implementation of these targets in Australia is shown in Figure 3.

FIGURE 2: BAU VS POLICY TARGET –GREENHOUSE EMISSIONS FROM DIGITAL STBS INSTALLED SINCE 2000

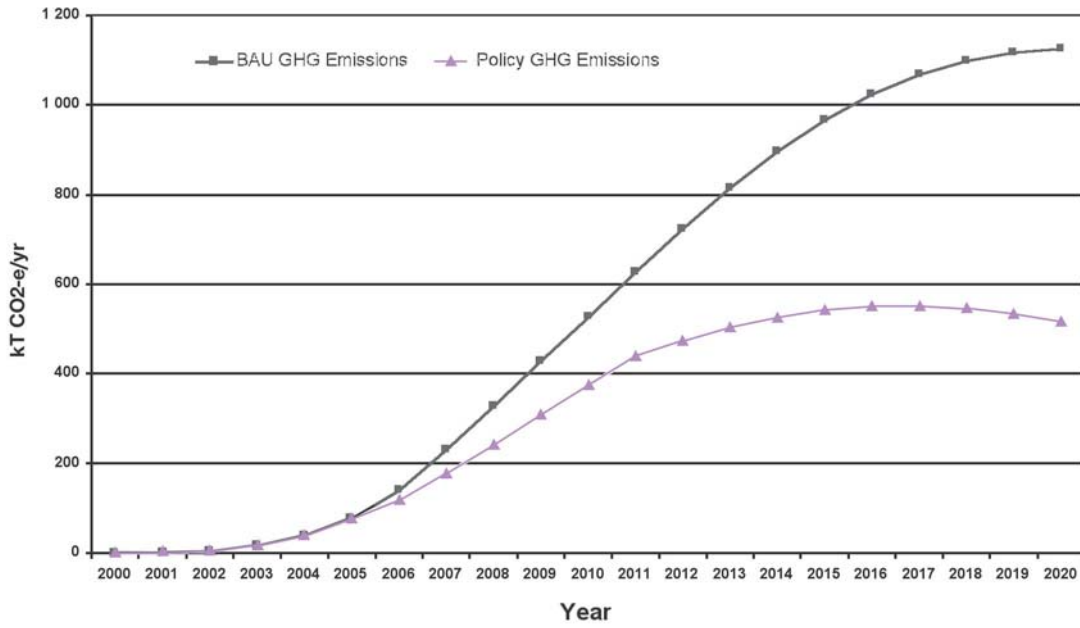
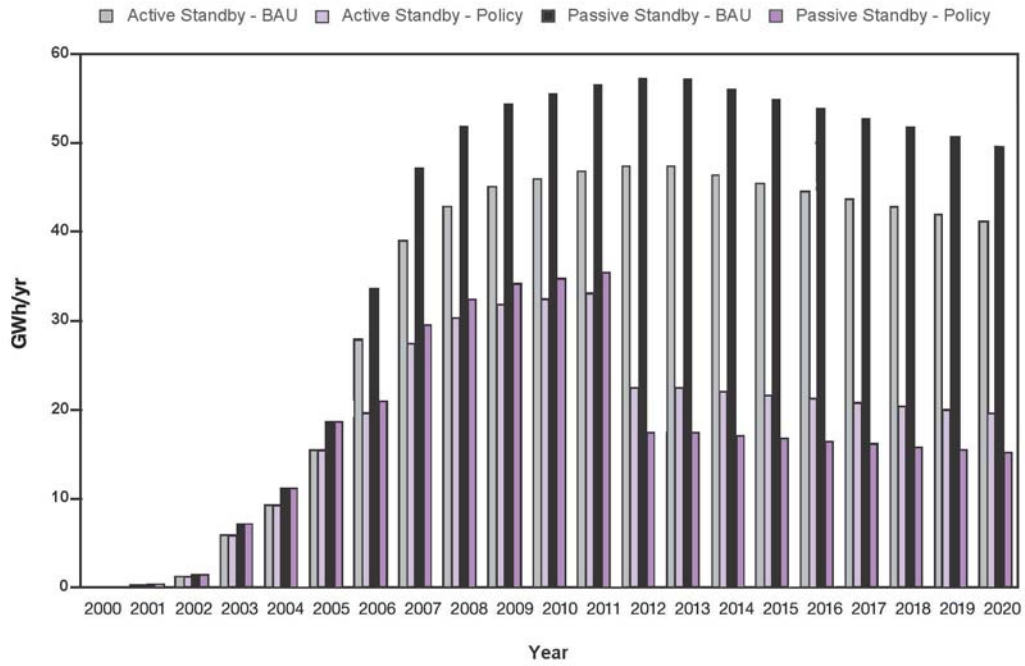


FIGURE 3: ANNUAL EFFECT ON ENERGY CONSUMPTION OF POLICY TARGETS VS. BAU FOR DIGITAL STBS



CURRENT OVERSEAS POLICIES AND TRENDS

USA AND INTERNATIONAL

In the United States and internationally, the ENERGY STAR Program run by the US Environmental Protection Agency (US EPA) aims to encourage industry best practice by forming partnerships with manufacturers and setting performance targets for appliances. The ENERGY STAR program is a voluntary program and is being implemented in two phases. Tier 1 concluded on 31 December 2003 while Tier 2 commenced on 1 January 2004. To qualify for an ENERGY STAR label in Tier 1, digital STBs were classified into 3 categories each with different requirements: digital TV converter boxes were required to consume less than or equal to 3W in standby mode; digital cable TV converter boxes were required to consume less than or equal to 15W in standby mode; and digital STBs with capabilities to perform additional functions such as internet access were required to consume less than or equal to 20W. In Tier 2 all STBs were required to meet the one specification being less than or equal to 7W. Specifications for Tier 2 apply to products that manufacturers began to ship after 31 December 2003. More details can be found on www.energystar.gov.

In addition to the ENERGY STAR label, several US states are considering introducing legislation making the Tier 1 levels mandatory within the State.

EUROPE

The European Commission has established a Code of Conduct for all digital TV service systems including, among other things, digital STBs. The Code of Conduct, which has several signatories including companies such as Philips, Sony, Pioneer, Nokia and Matsushita, aims to minimise the energy consumption of appliances listed in the code. The Code of Conduct is a voluntary agreement and signatories are obliged to provide, on a yearly basis, information concerning the power consumption of the equipment they produce. The maximum power consumption for STBs in passive standby mode is 6W while in active standby mode the maximum should not exceed 9W. The targets within the

Code of Conduct became effective on 1 January, 2003 and will remain in effect until 31 December, 2005. In November 2003, targets were set for the 2006 - 2007 period and included different levels for different types of STBs, including the creation of the "simple converter" category. This category covers units that only transfer free digital signals to analogue TVs and VCRs. All the target levels are summarised in Table 3: Summary of program requirements for STBs - Internationally

While the European targets are set as maximum levels there are exceptions set out in the Code. If the STB has additional components, an additional power allowance can be added to the maximum targets. The features and the allowable power consumption for each are listed in Table 2. However, the Code does stipulate that the total maximum power consumption targets in active standby mode should not exceed 15W.

TABLE 2: ADDITIONAL POWER CONSUMPTION ALLOWABLE FOR ADDITIONAL FEATURES

Feature	Additional power consumption
Internal hard disk drive	2.2W
IEEE1394 interface	0.8W
Ethernet interface 100 Mbit	0.4W
Wireless interface	0.7W
Serial USB interface	0.3W
Home automation interface	0.4W
ADSL modem	2.0W
Extra cable modem	0.7W
Additional LNB feed	1.3W
Additional tuner	2.0W
Powered remote IR receiver	0.25W

The Group for Energy Efficient Appliances (GEEA), which is made up of representatives from a number of European national energy agencies and government departments, encourages industry best practice through a voluntary energy labelling scheme which covers a wide range of home electronics and office equipment. The criteria for each product are generally reviewed (although not necessarily altered) on an annual basis. The criteria varies depending on the type of STB but essentially, until December 31 2003, the following were the requirements to be eligible to display the GEEA label:

- If the STB has an on/off switch, the power consumption in off mode must be 0.5W or less;
- In passive standby mode the power consumption must be 1W or less; and
- In active standby mode, the maximum consumption must be 9W or less for basic digital STBs, although for digital to analogue STBs the consumption must be 11W or less for terrestrial and cable types and 14W or less for satellite types.

Where STBs have additional features, such as hard disks, the criteria outlined in the Code of Conduct for Digital TV Service Systems (as summarised in Table 2) apply.

Since 31 December 2003, STBs have been categorised as IRD's (digital STB) and analogue converters with separate criteria as follows:

- If the STB has an on/off switch, the power consumption in off mode must be 0.5W or less (applies 2004 & 2005);
- In passive standby mode, (this mode is optional) the maximum consumption is 1W for digital STB, and 2W for a digital to analogue converter box (applies 2004 & 2005); and
- In active standby mode, digital STBs the 2004 limit is 9W, however, there are exceptions for additional features up to a maximum of 15W as outlined in Table 2. In 2006 these levels will change to 6W for terrestrial, 7W for cable and 8W for satellite. However the maximum allowed with add ons remains at 15W. For digital to analogue STBs the maximum limit will remain at 11W for cable and terrestrial and 14W for satellite units until the end of 2005.

The GEEA label criteria is summarised in Table 3. More details can be found on www.gealabel.org/home.htm.

KOREA

The Energy-Saving Office Equipment & Home Electronics Program (Energy Boy) is a voluntary labelling scheme that was implemented in April 1, 1999. The program is very similar to the USA's ENERGY STAR Program. A passive standby level for STBs was introduced in 2002 with consumption required to be less than or equal to 3W.

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 standby. Launched in 1999, this campaign aims to guide government policy-makers and appliance manufacturers towards equipment that consumes no more than 1W when in standby mode. The Australian Government has endorsed the 1W standby target for appliances sold in Australia. More details can be found in the Ministerial Council on Energy's standby strategy "Money isn't all you're saving" (MCE 2002).

In 2004, the International Energy Agency will be hosting an international workshop on saving energy in STBs. The objective of the workshop is to establish an informal agreement among the various players in the international STB "community" on procedures to greatly reduce the energy consumption of STBs (including all kinds of converter boxes). The community includes manufacturers of STBs, televisions and chips and service providers. Government regulators and staff from various voluntary energy efficiency programmes (such as Energy Star, GEEA, METI, European Commission, California Energy Commission, etc.) will also attend.

TABLE 3: SUMMARY OF PROGRAM REQUIREMENTS FOR STBS - INTERNATIONALLY

	Mode	Dates	Criteria
Energy Star	Passive standby Converter Cable Multi function	Tier 1: until 31/12/2003	A3W A15W A20W
	Passive standby	Tier 2: from 1/01/2004	A7W ¹
EC Code of Conduct	Passive standby	Until 31/12/2005	A6W
	Active standby	Until 31/12/2005	A9W ²
	Passive standby	From 1/1/2006	A3W
	Active standby Cable Terrestrial Satellite	From 1/1/2006	A7W ² A6W ² A8W ²
	Passive standby Simple converters	From 1/1/2005	A2W
	On mode Simple converters Cable & Terrestrial Satellite	From 1/1/2005	A11W A14W
GEEA, Europe	Off (must have off mode)	Until 31/12/2003 From 1/1/2004	A0.5W NA
	Passive standby Digital STB	Until 31/12/2005	A1W
	Active standby Digital STB Terrestrial Cable Satellite	Until 31/12/2004 From 1/1/2005	A9W A7W ² A6W ² A8W ²
	Passive standby Digital to analogue	Until 31/12/2005	A2W
	Active standby Digital to analogue Terrestrial & Cable Satellite	Until 31/12/2005	A11W ² A14W ²
Korea	Passive standby	From 1/1/2002	A3W

Note: GEEA criteria are reviewed annually.

1. Tier 2 criteria covers all STBs including analogue and cable/satellite STBs.
2. If the STB has additional components an additional power allowance is permitted although the total maximum consumption in active standby mode should not exceed 15W.

GOVERNMENT TARGET

In accordance with the National Standby Strategy, NAEEEC intends to recommend to the Ministerial Council on Energy an 'interim' target. The purpose of which is to provide governments with confidence that Australian products will meet the ultimate target of 1W in 2012. If the 'interim' target is not met in the specified year, government will commence dialogue with industry to explore other options, including the possibility of moving to Stage 2 mandatory measures. The interim target date is 2006 due to the rapid increase in sales before the change over to digital TV in 2008.

1. INTERIM TARGET - 2006

Product	Off mode power ¹	Passive standby mode power ²	On/Active mode ³
Set top box	Less than 1W	Less than 4W	Less than 11W

Notes:

1. *Lowest power when connected to the mains. Limit is applicable to models which have an off mode*
2. *When switched off using a remote control, where applicable*
3. *Depending on the functions of the unit this mode can be described as active or in use e.g. simple STBs that only decode may be considered in-use, which will be the same as active standby mode for an STB hard disc recorder which is not recording.*

This target applies to all digital STBs brought into Australia for sale in that year. NAEEEC proposes to monitor the sale of STBs in that year and to move toward regulation should that target not be met by a significant number of suppliers of products.

2. NATIONAL STANDBY STRATEGY TARGET – 2012

Product	Off mode power ¹	Passive standby mode power ²	On/Active mode ³
Set top box	Less than 0.3W	Less than 1W	Less than 6W

Notes:

1. *Lowest power when connected to the mains. Limit is applicable to models which have an off mode*
2. *When switched off using a remote control, where applicable*
3. *Depending on the functions of the unit this mode can be described as active or in use e.g. simple STBs that only decode may be considered in-use, which will be the same as active standby mode for an STB hard disc recorder which is not recording.*

The National Standby Strategy sets out the target of 1W, to be achieved by 2012. This is consistent with international activities, in particular, the IEA "One Watt Initiative" and the current Energy Star requirements. This target should apply to all STBs.

The above requirements will be inserted into the relevant Australian Standard.

GOVERNMENT PROPOSALS TO ACHIEVE THIS TARGET

Government agencies intend to take the following actions to assist industry meet the standby targets for STBs.

Voluntary tool available	Use for this product	Rationale/Action	Date
Energy Star	✓	<ul style="list-style-type: none"> This program will continue to be supported and communicated to stakeholders, particularly emphasising the value of investing in Energy Star compliant STBs 	Initiate 2004
		<ul style="list-style-type: none"> MCE are considering creating government policy of purchasing Energy Star STBs where available and fit for purpose 	2004
		<ul style="list-style-type: none"> NAEEEC will also consider highlighting manufacturers who are not Energy Star partners 	2005
Australian Standard	✓	<ul style="list-style-type: none"> To communicate government expectations - to be a part of AS/NZS 62301 	Initiated
Industry Code of Conduct	X	<ul style="list-style-type: none"> Not considered appropriate at this stage 	NA
Procurement database	✓	<ul style="list-style-type: none"> MCE are considering creating a high efficiency products database to assist consumers in their purchasing choice. Government agencies may purchase products from this database. 	2004
Annual in-store survey	✓	<ul style="list-style-type: none"> To collect data on all modes for new STBs and to analyse trends 	Ongoing, at least annually
Publish Statistics	✓	<ul style="list-style-type: none"> NAEEEC will highlight the range of performances of STBs in the marketplace through publishing data on a website or other means 	Ongoing, at least annually

Government will announce whether this product should be targeted for Stage Two intervention under the National Standby Power Strategy (involving possible regulatory intervention) or whether the abovementioned actions together with industry intervention have been successful in meeting the target at the NAEEEC Forum in the year:

2007

REFERENCES

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