FINAL REPORT

May 1998

SCOPING STUDY INTO STANDBY ENERGY USE BY DOMESTIC ELECTRONIC APPLIANCES

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1. Introduction

Standby electricity use is the energy consumed by appliances when they are switched 'off' and/or not performing their principal function but still drawing mains power. It is also known by the names 'leaking electricity' and 'phantom loads'. Standby power levels have become an issue of concern in a number of other countries in recent years as the increasing number of appliances which are consuming electricity in the standby mode, often associated with remote control operation, has essentially created a new category of energy end use.

It is estimated that the average household in the USA now constantly 'leaks' more than 50W. Rainer et al [1] found a selection of houses in the USA to be consuming between 53 and 115W with no appliances being used. Although this may sound like a small amount, when it is considered that most of these appliances are connected to the electricity supply continuously it amounts to an energy consumption level of about 450kWh per year.

If standby levels are similar in Australia, and there is little reason to think they are not given lifestyles and the international nature of the market for these products, this represents 5-10% of the average household's electricity consumption. A recent for Energy Efficiency Victoria estimated loads of between 400 and 1500kWh per year [2]. NSW households are currently spending about $40m annually to keep TVs and VCRs in the standby mode.

The majority of appliances with standby consumption at present fall into the categories of video, audio and communications equipment, such as TVs, VCRs, cable TV decoders, compact hi-fi systems and answer phones. Many of these appliances consume far more energy in standby than in actual use. For example, more than 80% of the energy consumption of a VCR is in standby and less than 20% when actually recording or playing back tapes [3].

However, more products in other appliance groups, such as white goods, are coming onto the market with standby. For example, some new refrigerators on the US market use 3-5W in standby mode for memory functions, which could represent over 5% of total consumption for an efficient model. Although this will be picked up by testing for the energy label, for products where the consumption is based on duty cycles, such as clothes and dish washers, it will not.

There is also a proliferation of 'plug pack' type power supplies for a range of appliances such as battery chargers, modems, 'dustbusters', desk lamps etc. which are often of inefficient design and can use several watts of power when the appliance they supply is turned off. One of the problems is that they are a mixed bunch of appliances spread across many groups and manufacturers. They do not come with a true 'off' switch which isolates them from the mains power completely and must be switched off or unplugged at the wall - this can often be inconvenient or difficult for users.

Given the diversity of appliances and uses, it will be necessary to develop a definition of different types of standby or 'leaking' electricity. Some of these categories are listed below:

- In some appliances, the standby mode is performing a useful function, such as a fax waiting for a communication signal, even if consuming more energy than is necessary due to poor design.
- In others it is performing a secondary non-essential function, such as the clock on a microwave oven.
- In others the power consumed is performing no useful function at all, such as plug packs which are powered when the device they supply is turned off.

- Others are using high power levels when they aren't doing anything functional, such as a CD player which has finished playing but left 'on' - in many cases this is the same as the on power level.

Standby is therefore a subset of the broader category of leaking electricity. It may therefore be necessary to eventually take a more generic and global approach to the problem of standby through power management techniques, such as powering down after a specified period of inoperation, rather than tackle it on a product by product basis.

Another issue to consider is that many of these appliances have very low power factors when in standby, often less than 0.6 and sometimes as low as 0.1 which may be of concern to the electricity suppliers [2].

2. Current policies on standby

2.1 The US Energy Star Program

The US Energy Star Program covering standby power levels in office equipment such as computers, photocopiers, faxes has been in operation for several years and is currently promoted by SEDA in NSW. The US program has recently been expanded to incorporate standby consumption of domestic TVs and VCRs. As of January 1998, appliances which comply with the following standby power levels are eligible for the award of an Energy Star label [4].

Table 1 US Energy Star compliance levels for TVs and VCRs

Appliance	Maximum standby power level
TV	3 W
VCR	4 W
Combination TV/VCR	6 W

There are now a considerable number of appliances on the market which are eligible for the Energy star award . It is anticipated that Energy Star will capture at least 50% of the market by the end of 1999. The Energy Star program has an unspecified Phase 2, which will probably set a target of 1W [5]. The following companies represented on the Australian market are participating in the US program:

Sharp
Matsushita (Panasonic, National, Technics)
Philips
Samsung
Sanyo
Sony
LG Electronics (Goldstar)
Thomson (GE)
Toshiba

For those appliances which consume most of their energy in the standby mode, such as VCRs, Energy Star is an appropriate policy option. However, for TVs where some people turn their sets off with the switch on the TV and not with the remote control, purchasing Energy Star may represent no saving at all. Research in Europe [8] found that about 40% of TVs are turned off at the set rather than with the remote control, but no similar usage survey has been conducted in Australia. In the USA, many sets do not have a true 'off. In addition with Tvs more energy is generally used in the on mode than standby, particularly if the set is a large user in the on mode). A consumer might purchase a set with higher on-mode power because

it has an Energy Star label even though they do not use the standby mode at all. Energy Star can, however, play an important role in consumer education, but a broader educational message than just to look for the Energy Star, such as turning off or unplugging the set, is therefore needed.

2.2 European policies

Switzerland

Concern about increasing standby consumption has also resulted in action to reduce it in Europe. In 1996 the Swiss Government introduced 'voluntary' standards, in the form of an agreement with manufacturers, which required maximum standby power levels as outlined below.

Table 2 The Swiss standby targets for TVs and VCRs

Appliance	January 1996	January 1997	January 1998	January 1999
TV	5W		3W	
VCR		7W		3W

Many appliances sold in Switzerland have complied and many are operating at levels of standby power well below the specified levels, some TVs as low as 0.1W and some VCRs less than 1W despite initial protestation from the industry that the targets could not be met without greatly increasing the cost of manufacture [6].

The Swiss intend to update the target values regularly, and it is supported by an award labelling scheme (E2000) for complying products [7].

The European Union

Following a major study into the standby consumption of TVs and VCRs by the European Union (EU) in 1995/96 [8], a voluntary agreement has been proposed by the European Association of Consumer Electronics Manufacturers (EACEM) to reduce standby power of TVs and VCRs to 6W by 2000 and then by a further 1W for each subsequent 3 years. The levels are a 'fleet' average of appliances on the market to allow for higher consumption of some individual appliances where this is considered necessary [9]. Measurements have shown that the industry is improving the efficiency of TVs and VCRs in the standby mode. This may be a continuation of past trends but is almost certainly due in part to the dialogue process between the manufacturers and the EU.

The EU and EACEM are negotiating the introduction of an E2000 type labelling scheme.

Current policies for other appliances

There are currently no policies for standby in place for appliances other than TVs and VCRs. It should not be difficult in principle to adapt the policies for TVs and VCRs to appliances with similar technologies such as audio equipment, microwave ovens and white goods as they are generally represented by manufacturers organisations. The US EPA is currently negotiating with manufacturers to expand the Energy Star program to audio equipment. They are also investigating set-top TV decoder boxes and telephony products [10].

Other products which 'leak' electricity, such as plug packs, answerphones, security systems, cable TV boxes, etc. tend to be part of a much more disaggregated market and not represented by manufacturers organisations.

The Lawrence Berkeley Laboratory in the US has proposed an international goal to reduce standby levels to less than 1W per appliance, with 50% of appliances manufactured to meet this target by 2005 through voluntary labelling, mandatory standards, procurement programs or international standards. There is general agreement that such a target is technically and economically feasible [5].

3. Levels of standby power and energy consumption

3.1TVs and VCRs

The table below shows typical standby power consumption measurements of TVs and VCRs from various data sources. Generally levels in the US were found to be slightly lower than in Europe and Australia. This may be due to the US data being more recent as changes are occurring quite rapidly due to the introduction of Energy Star, but also because to date there is no agreed international standard for a measurement procedure. The wide range of consumption amongst similarly priced units suggests that some basic design improvements could greatly reduce standby levels.

Table 3 Typical standby power levels for TVs and VCRs [11, 12, 13, 15]

Appliance	**Standby power (W)**				**Range (W)**	**Annual energy consumption (kWh)***
	USA	**Europe**	**Australia**	**Energy Star level**		
TV	4	7.5	9	3	0.1-25	66
VCR	6	9.5	11	4	2-15	96
TV/VCR combination	9			6		

* based on Australian data where available. Assumes appliances not turned off at mains.

None of the manufacturers represented in Australia were able to provide data on the standby power of their products on the Australian market. It is not listed in the technical specifications and would have to be obtained from their head offices, generally in Japan, where the appliances are designed. Some manufacturers have separate design teams for different regions eg. the US, Europe and Asia/Pacific, and sets designed for areas other than the US and Europe may not have been tested for standby power as it is not considered to be an issue elsewhere. Some manufacturers are trying to obtain the data but most say it may not be readily available. If SEDA decides to pursue the Energy Star option for TVs and VCRs it will need to arrange for this data to be collected.

Table 4 shows the ownership of TVs and VCRs in Australian households. These are very similar to data for Europe.

Table 4 Ownership of TVs and VCRs by Australian households [14]

Appliance	**% ownership**
TV	150*
VCR	90

* ie. 1.5 sets per household

The major domestic electronic appliances are manufactured for an international market so they can be sold anywhere in the world, and the market is dominated by a relatively small

number of large companies. It would therefore be reasonable to expect that standby power levels for the major appliances will not be substantially different from those which have been found overseas.

However, recent tests by the Australian Consumers Association (ACA) on ten 68cm TVs in January 1997 found an average of 9.8W, with a range of 3.2-23W, which is higher than values found in Europe and the US at the same time (see Table 3). A more recent test (not published to date) of seventeen 51cm sets found an average of 9W, with a range of 4.6-17W [15]. A recent test in the USA found a range of 1-12W [23]. It appears from this result that the rate of improvement found overseas in that time may not have been replicated on the Australian market, but these are very small market samples and there may be inconsistency between measuring techniques. However, it is worth noting that not one of the sets tested would comply with US Energy Star targets.

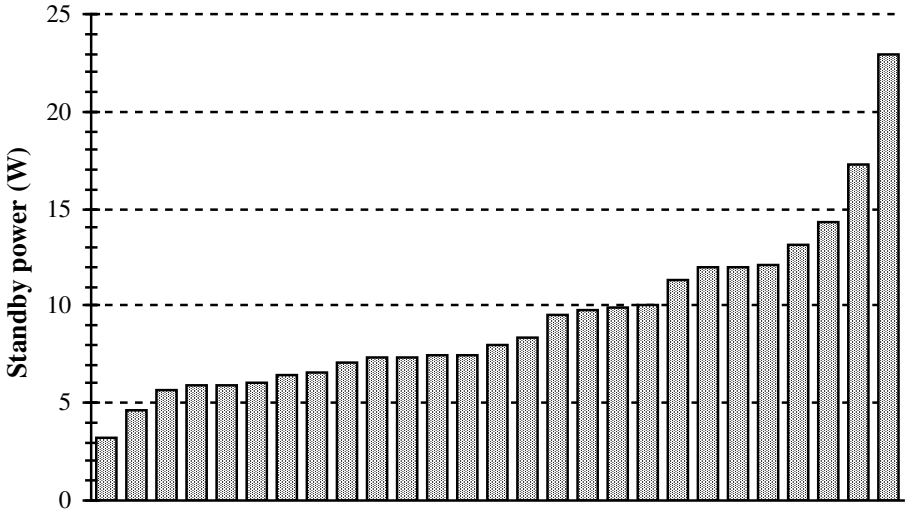

Figure 1 The spread of standby power consumption of TVs tested by ACA

It is likely that improvements in standby which are occurring due to policies in the USA and Europe will become evident in Australia with time. Most manufacturers revamp their production process for these appliances every few years, and it is extremely unlikely that they would produce a separate line of less efficient products for the Australian market in the longer term. Appliances 'made' in Australia use motherboards designed or manufactured overseas and intended for the international market [16].

However, although the Australian market is too small for a manufacturer locked out of a large market such as the US or Europe to get rid of all of their less efficient products, there is a risk that in the short term more efficient appliances will be designed for and sold on the US and European markets where policies are in place, and the same push to redesign for lower standby may not occur in Australia which is essentially part of the Asian market,. There is a precedent in Europe, where manufacturers supplied their more efficient products to Switzerland following the introduction of the Swiss standards, and the average standby power level on the Swiss market is now lower than the European average [11]. It would therefore be desirable to negotiate an agreement with manufacturers to guarantee that a certain percentage of appliances sold on the Australian market are Energy Star compliant, given that 50% of TVs and VCRs on the US market are expected to be by the end of 1999.

The international nature of the market and Australia's relatively small market share, make it more difficult for Australia to influence manufacturers, although as demonstrated by the Swiss program, it is not out of the question if the political backing is forthcoming. It is, however, preferable to use international platforms to implement changes where possible.

3.2Other appliances

The table below shows typical standby power and energy consumption for a range of other domestic appliances.

Table 5 Standby power consumption of a range of household appliances [10, 11, 17, 23]

Appliance	**Standby power (W)**			**Range (W)**	**Annual energy consumption per appliance (kWh)**
	USA	**Europe**	**Australia**		
Cable TV box	12				80
Set top digital box	15	20		5-25	145
CD player	12		10		80
Compact audio	11	15		2-28	125
Microwave oven	4	5			40
Oven			5		40
Clothes and dish washers			3		25
Answer phone	3.5				30
Cordless phone	3				20
Inkjet printer			12		100
Fax	15		20		170
Security systems	18	10	5		40
Light sensors			4		35
Garage doors	5		5		40
Battery chargers	2		5		40
DC plug packs		3.5	5		40
Other products for which no data are available:					
Air conditioners					
Gas heaters					
Low voltage lights					

Fisher and Paykel report that their all their clothes and dishwashers and about 40% of dryers do have standby power but none of them need to be left on for clocks and can be turned off at the mains without affecting their operation. Clothes washers originally had a standby consumption of about 5W. This is now about 2.5W and they are aiming to be at 1w by the end of the year (a clothes washer with standby of 2.5W could be using 30% of the total appliance energy consumption if the household washes with cold water). Some of their appliances do have higher standby levels. For example their new dishwasher uses 8W but this was just to get it onto the market and within a year that level will be greatly reduced [22].

One area of particular concern is set top decoder boxes for cable, satellite and terrestrial digital TV. These have been found to consume as much in standby as in the on mode in the USA and Europe. They are in nearly 45% of US households and a large marketing drive is

expected in Europe which will greatly increase ownership and is projected to become one of the largest categories of standby energy consumption [17]. SEDA should assess and monitor the situation in NSW.

Reliable ownership data for many of these miscellaneous appliances is difficult to obtain. The numbers of miscellaneous appliances which incorporate rechargeable batteries, such as mobile and cordless phones, appears to be increasing rapidly.

Table 6 Ownership of other appliances by Australian households [18, 19]

Appliance	**% ownership**
CD player*	50
Answer phone	25
Cordless phone	15
Mobile phone	25
Fax	8
TV decoder	5

A household owning the appliances in Table 6 in addition to a TV and VCR could be consuming in excess of 300kWh per year of standby energy.

4. The NSW market for TVs and VCRs

The vast majority of TVs and VCRs sold on the Australian market are fully imported, mostly from Asia, or assembled in Australia from largely imported components. Sharp and Panasonic have the only TV assembly plants operating in Australia, but these represent less than 20% of the domestic market, and tend to use the latest company designs and technology for components manufactured locally, such as some motherboards. Most products are designed in Japan but manufactured elsewhere in Asia [16].

Approximate annual sales of TVs and VCRs in NSW in 1997 were [14, 16]:

	Annual sales
TVs	260 000
VCRs	220 000

Based on national sales figures and modelling results

The market leaders are Panasonic with about 25-30% and Sharp with 20%. The remainder of sales are spread across a range of companies with generally 10% or less of the market. Two organisations represent the majority of manufacturers in Australia:

- the Consumer Electronics Suppliers Association (CESA) represents 11 importers of TVs and VCRs, including Sharp, who cover more than 50% of the market;
- the Australian Electrical Equipment Manufacturers Association (AEEMA) of which Panasonic is a member.

The affiliated members of these organisations supply approximately 90% of the market.

Four major retail chains have approximately 80 % of sales. They are Retravision, Betta, Harvey Norman and Chandlers [20]. Some retailers import TVs and VCRs direct from Asian manufacturers, predominantly from China, but this is considered to be less than 5% of the market [21]. It is worth noting that the TV in the ACA tests with the highest standby power of 23W was manufactured in China.

5 Potential energy and greenhouse savings in NSW

For the purpose of this report, the impact on energy consumption of various scenarios for the introduction of Energy Star for TVs and VCRs are considered. Ownership data for many of the miscellaneous appliances are difficult to obtain, and usage patterns are even more problematic eg. how many people turn off these appliances at the supply when they are not being used. The most reliable data will be for those appliances which are almost certainly going to be left turned on such as VCRs, cordless phones, answer phones. There is some data from other countries which indicates that currently about 60% of people use the remote to turn TVs off rather than the mains switch on the set. However this is likely to rise in the future as TVs take on more of a 'communications' role. This analysis will consider only TVs and VCRs for the purpose of assessing the impact of the current Energy Star labelling scheme.

The analysis is based on a stock model of appliances, and uses time series data on household numbers, appliance ownership and sales, usage patterns and technical trends to determine annual energy consumption and the potential savings from introducing a policy measure such as Energy Star. This methodology allows for changes in the stock parameters over time, such as standby power, to be considered in calculating energy savings. For example, the model estimates sales of TVs in 2000 to be approximately 280,000. If all these were Energy Star compliant the energy saving from Energy Star compared to the current average on the market could be calculated as:

= annual sales*standby power reduction 9W to 3W*hours standby per day*365 days
= 280,000*(9-3)*20*365
= 6.2Gwh

However, this is slightly lower than the model result of 7.8GWh as the model assumes that a large proportion of the new appliances will be replacing older units with higher than the current standby power. CO_2 savings are based on the approximate NSW average emissions of 0.91kg/kWh and cost savings on an electricity cost of 10c/kWh.

A reference case is established which assumes a gradual improvement in standby power levels of TVs and VCRs due to international developments without any intervention from SEDA. Ownership of TVs is projected to increase to 1.6 per household and VCRs to 1.1 per household by 2010 and it is assumed that there is no change in current usage patterns except that a higher percentage of households use the remote to turn off theor TVs over time. Standby power is projected to fall to 4W for TVs and 6W for VCRs by 2010 for the reference case, representing a lag of approximately 2-3 years on the EU targets. It assumed that Energy Star is implemented in 2000 and two scenarios are examined:

- 100% ES - all new sets sold in 2000 and after comply;
- 25% ES - 25% of all sets sold comply in 2000, 50% in 2001, 75% in 2002 and all in 2003.

The table below summarises the results of the modelling for cumulative energy, CO_2 and consumer electricity costs. Charts and more complete tables are contained in Appendix 1.

	Energy saving GWh		CO2 saving Tonnes		Cost saving $m	
	100% ES	25% ES	100% ES	25% ES	100% ES	25% ES
TVs						
2000	7.8	2.0	7,128	1,782	0.8	0.2
2001	23.5	7.8	21,344	7,067	2.3	0.8
2002	46.5	19.0	42,316	17,297	4.7	1.9
2003	76.5	36.9	69,590	33,613	7.6	3.7
VCRs						
2000	11.7	2.9	10,630	2,657	1.2	0.3
2001	35.2	11.8	32,035	10,735	3.5	1.2
2002	69.3	28.7	63,022	26,089	6.9	2.9
2003	112.9	55.3	102,701	50,359	11.3	5.5
TVs and VCRs combined						
2000	19.5	4.9	17,758	4,439	2.0	0.5
2001	58.7	19.6	53,379	17,802	5.9	2.0
2002	115.8	47.7	105,338	43,386	11.6	4.8
2003	189.3	92.3	172,291	83,972	18.9	9.2

5. Barriers to implementing an Energy Star program

5.1Consumer barriers:

There are a number of barriers which may prevent purchasers from taking due notice of standby energy consumption:

- the level of awareness of the issue amongst the public is very low. In recent tests on TVs and VCRs, Choice magazine has briefly mentioned standby, sometimes illustrating the cost of leaving a TV in standby mode and the environmental consequences, but it is a low priority factor and not taken into account in their rating of products.

- there is a lack of readily available information on standby power consumption of individual appliances

- the money saving on individual products through choosing one with low standby is minimal compared to household energy bills - 10W standby for a VCR is only about $8 per year.

- the power saving on individual appliances is often relatively small, which makes it sound like an insignificant amount.

- features other than energy consumption, such as picture and/or sound quality and appearance, are much more important to people when choosing electronic appliances.

There is however a great deal of public interest in the issue. When Energy Efficiency Victoria put out a media release on 'phantom' energy in 1997 it generated a large response, resulting in 20 national radio and two national TV interviews and an estimated $1m worth of media coverage. It was regarded as one of the three 'hottest' issues in terms of public response EEV

had covered in 10 years [13]. The standby issue was also given prominence in a recent article on energy in The Australian Magazine (April4-5 1998)

5.2Manufacturer barriers

A potential difficulty with introducing Energy Star in Australia is that there may be few sets currently made for the market which are able to comply. Sets are often designed specifically for the US market for NTSC and 115V operation, and cannot be imported. It may require time for suppliers to the Australian market to redesign power supplies. SEDA could profitably utilise a technical consultant to work through this process with manufacturers.

The US experience

In the US manufacturers were 'extremely cooperative' once shown the results of technical analysis demonstrating ways of complying. Nearly 100% of manufacturers have signed up, and three (Sony, Sharp and Panasonic) have upgraded their entire product line and indicated that they will label the actual product and not just the packaging. Some quotes from manufacturers are listed in Appendix 2 [10].

Australian importers and manufacturers

CESA has no objection to the introduction of a voluntary award label scheme such as Energy Star for standby consumption. One company which is a member of AEEMA, Panasonic, covers about half the remaining share [21]. They would strongly prefer to go with an already existing scheme such as Energy Star due to the international nature of their products.

CESA would be prepared in principle to act as a single negotiator on behalf of their members and would be prepared to consider the idea of signing up to an MOU, perhaps via a members' code of practice, although it is not something they have done before and would need to consult with members before a final decision. CESA can see no reason why setting a percentage quota of appliances which must comply with Energy Star would cause difficulties. Adequate consultation and time were considered to be the most important elements in reaching an agreed outcome, particularly to assess the technical aspects of the testing procedures specified in Energy Star, and to consider the problems posed by designs for different regions.

Although not openly welcoming another labelling scheme they are willing to go along with schemes such as Energy Star which are internationally recognised. They would, however, want to see substantial Government backing of consumer education for such a program if introduced.

AEEMA

AEEMA have an existing MOU with SEDA which covers areas such as consultation and discussion, and they would continue this role for Energy Star also. As an organisation they are not in favour of new labels because they see them as meaningless as they confer no marketing advantage and have no significance for consumers. However, as discussed elsewhere in this report, this would depend to a great extent on SEDA's promotion of the scheme. Following the publicity given to standby energy by Energy Efficiency Victoria mentioned above, they were approached by a number of manufacturers who were interested in ways of promoting their more efficient products [13].

Retailer barriers

Retail staff are often not very aware of energy issues. Awareness of energy for white goods has increased due to the introduction of energy labels but is generally not a consideration for other appliances. Two retail chains contacted did not see any problems for them with the introduction of Energy Star, but stressed the need for adequate information material at the

point of sale. Incorporation of Energy Star within the Energy Smart Retailers program rather than as an extra could simplify introduction.

As Energy Star for TVs and VCRs is designed into the product and does not need to be enabled as is usually the case for computers, there is not a need for such extensive training of retail staff.

6. SEDA's Goal

Standby power is becoming an increasing proportion of household electricity consumption. Many of the efficiency gains made through improved product operational design are being offset by a rising level of standby energy usage. Introducing Energy Star for TVs and VCRs is an important step in raising the profile of this issue for both the public and manufacturers, and can be seen as part of a more general program of promoting energy awareness.

Ultimately standby should be tackled on a more generic level rather than a product by product basis, as there are many common aspects of power management which could be applied to a large range of products, and the number of products with standby consumption is increasing. To this end, SEDA could contribute to international efforts to minimise standby power and will be in a better position to do so if it is implementing policies in this area.

7. Overcoming market barriers

As mentioned above, there has been a very positive response to previous publicity given to the issue of standby. Most people would be unaware of the total energy consumption in their household due to standby. Anecdotal evidence suggests that most are surprised to learn that up to 10% of their electricity bill is paying for this. It is vital to provide consumers with information such as Energy Star labelling if they are to make informed decisions. This would operate very easily alogside SEDA's Energy Smart Retailer program.

Two of the major retail chains are already participating in the Energy Smart Retailer program and it seems unlikely therefore that there would be any problem in gaining support for the Energy Star program if it could be incorporated into the Energy Smart scheme as another aspect of the package.

8. SEDA intervention

SEDA intervention should be to :

- initiate discussions with manufacturers to raise awareness of the Energy Star program for TVs and VCRs, to determine the technical factors in the timing of introducing the program in NSW, and demonstrate to manufacturers that the proposed levels are being achieved in other countries with relative ease and at little if any extra cost.

- negotiate an MOU with manufacturers (CESA and AEEMA) to have a minimum of 25% of products on the market which comply with Energy Star by January 2000 and a further 25% each year after that, or some other target as agreed.

- negotiate an MOU with large purchasers, eg. hotel chains, to include Energy Star compliance in their specifications.

- negotiate an MOU with large retailers to sell a minimum percentage of products which are Energy Star compliant and promote Energy Star products as part of the Energy Smart Retailers program.

- conduct a public information program on the issue of standby and Energy Star in particular, encouraging householders to turn appliances off at the mains switch if possible.

- negotiate with manufacturers to publish standby power in their product specifications

- contribute to international efforts at the IEA to reduce standby using a more generic approach to power management.

- have standby included in the energy label test procedure for white goods

- investigate ownership and standby power levels of other appliances, in particular TV decoders.

9. Key partners/Stakeholders

SEDA's key partners would be:

- CESA and AEEMA.

- The Australian Consumers Association could play a valuable role in raising awareness of Energy Star and standby in general. SEDA could negotiate with the ACA to include standby in their testing schedule, particularly of TVs and VCRs, and to ensure it is conducted to Energy Star specifications. The ACA have covered standby in the past for TVs and VCRs but it has not been given great prominence and is not considered in the overall rating of appliances - energy consumption of refrigerators receives a 25% weighting.

- Major retail outlet chains.

- Electricity utilities may have a role to play in funding and information dissemination

10. Program plan template and costs

This new Energy Star program for Tvs and VCRs could be run alongside the existing program for office equipment. If negotiations can be conducted with CESA and AEEMA it is envisaged that there may be no need for a managing agent as there would be no need to negotiate with the large number of individual companies involved in the market.

Some program costs could potentially be shared with the Energy Smart Retailers program.

	Year 1	**Year 2**	**Year 3**
SEDA staff time	25 000	25 000	10 000
Technical consultancy	25 000		
Advertising, training and promotion	50 000	250 000	50 000

I. SCOPING	Energy Star for TVs and VCRs		
Market Potential:	All sales of new TVs and VCRs		
Biggest Obstacles:	Technical issues Consumer awareness		
Completion Date:	January 2002		
II. PROGRAM DESIGN			
Key Players:	CESA, AEEMA, retailers,		
Key Delivery System:			
Market Transformation Elements:	Will transform entire market for TVs and VCRs		
Lifetime:			
Expected CO_2 Savings: (t/a)	End Year 1 0	End Year 2 4,439	End Year 3 17,802
Expected SEDA Investment	Year 1 $100 000	Year 2 $275 000	Year 3 $60 000
SEDA $ per tonne of CO_2 saved:	$25		
Lifetime CO_2 Savings:	750 000 tonnes to 2010		
Lifetime $ Program Savings:	$9m to 2003		
Lifetime Energy Savings:	822 GWh to 2010		
Other Relevant Metrics:			
Completion Date:			

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[13] Personal communication with Warren Edwards, Energy Efficiency Victoria. 29/4/98.

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[15] personal communication with Klaus Neuscheler, Australian Consumers Association.

[16] Personal communication with Robert Wooley, Sharp Australia.

[17] Molinder O. 1997. Study on miscellaneous standby power consumption of household equipment. Omvarden Konsult. Sweden.

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[19] Australian Bureau of Statistics. 1996. Household use of information technology 8146.0.

[20] Personal communication with Keith Penfold of Betta Stores

[21] Personal communication with Rod Price, Chief Executive, CESA.

[22] Personal communication with James Galloway, AEEMA.

[23] Consumer Reports (USA). March 1998.

Useful Web pages

http://www.epa.gov/appdstar/tv-vcr

http://eande.lbl.gov/EAP/BEA/RResearch/Leaking.html

http://eetd.lbl.gov/EAP/BEA/bea.html

http://eande.lbl.gov/eap/bea/Projects/Leaking/

http://eande.lbl.gov/BEA/People/MEIER/leaking.html

http://eande.lbl.gov/CBS/newsletter/nl17/leaking.html

http://eetd.lbl.gov/ea/buildings/project/leaking/results

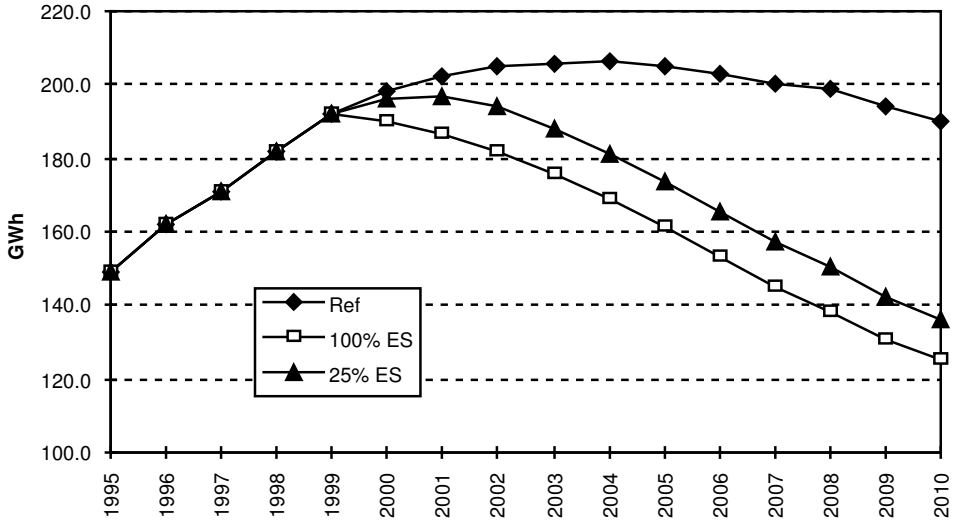
http://www.aceee.org/press/leakelec.htm

http://www.sciencenews.org/sn_arc97/10-25-97/bob1.htm

Appendix 1

Charts and Tables of results of modelling

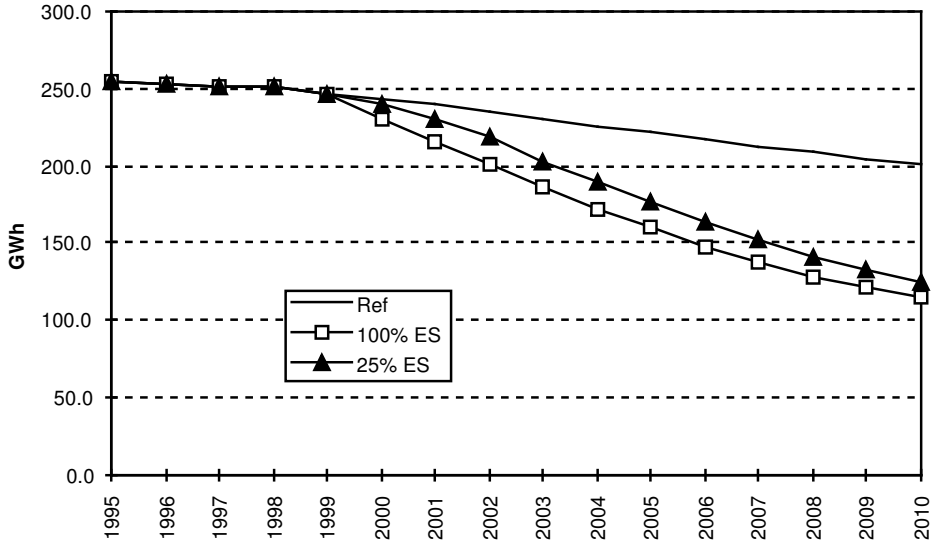
1. Energy saving for Energy Star TVs



2. Cumulative savings for TVs

Year	Energy saving GWh		CO_2 saving Tonnes		Cost saving $m	
	100% ES	25% ES	100% ES	25% ES	100% ES	25% ES
2000	7.2	3.6	6,560	3,280	0.7	0.4
2001	21.8	10.9	19,811	9,905	2.2	1.1
2002	43.5	21.8	39,623	19,811	4.4	2.2
2003	72.3	36.1	65,761	32,881	7.2	3.6
2004	108.7	54.3	98,888	49,444	10.9	5.4
2005	152.4	76.2	138,666	69,333	15.2	7.6
2006	203.2	101.6	184,939	92,470	20.3	10.2
2007	260.8	130.4	237,328	118,664	26.1	13.0
2008	325.4	162.7	296,076	148,038	32.5	16.3
2009	395.0	197.5	359,432	179,716	39.5	19.7
2010	469.3	234.7	427,079	213,539	46.9	23.5

3. Energy saving for Energy Star VCRs



4. Cumulative savings for VCRs

	Energy saving GWh		CO_2 saving Tonnes		Cost saving $m	
Year	100% ES	25% ES	100% ES	25% ES	100% ES	25% ES
2000	11.7	2.9	10,630	2,657	1.2	0.3
2001	35.2	11.8	32,035	10,735	3.5	1.2
2002	69.3	28.7	63,022	26,089	6.9	2.9
2003	112.9	55.3	102,701	50,359	11.3	5.5
2004	165.7	91.7	150,831	83,414	16.6	9.2
2005	227.7	137.6	207,170	125,176	22.8	13.8
2006	296.6	191.3	269,930	174,059	29.7	19.1
2007	371.6	252.0	338,149	229,328	37.2	25.2
2008	451.8	319.2	411,111	290,493	45.2	31.9
2009	535.4	391.3	487,169	356,108	53.5	39.1
2010	621.0	467.1	565,076	425,065	62.1	46.7

5. Cumulative savings for TVs and VCRs

Year	Energy saving GWh		CO_2 saving Tonnes		Cost saving $m	
	100% ES	25% ES	100% ES	25% ES	100% ES	25% ES
2000	18.9	4.7	17,190	4,297	1.9	0.5
2001	57.0	19.0	51,846	17,322	5.7	1.9
2002	112.8	46.6	102,645	42,432	11.3	4.7
2003	185.1	90.7	168,462	82,581	18.5	9.1
2004	274.4	152.0	249,719	138,338	27.4	15.2
2005	380.0	230.1	345,836	209,349	38.0	23.0
2006	499.9	323.0	454,869	293,964	50.0	32.3
2007	632.4	429.9	575,477	391,201	63.2	43.0
2008	777.1	550.5	707,186	500,973	77.7	55.1
2009	930.3	681.6	846,601	620,278	93.0	68.2
2010	1090.3	821.9	992,154	747,892	109.0	82.2

Appendix 2
Quotes from US manufacturers:

The 21st century will bring continued demand for environmentally friendly technologies and products. We at Sanyo Fisher Company are dedicated to provide quality products that offer more comfort and enjoyment in life, as well as cutting-edge products that aim to protect and preserve the environment. With this corporate commitment, we are proud to participate in the Energy Star TV/VCR Program.

Mr. Satoru Hotta
Senior Vice President
Sanyo Fisher Company

At Panasonic, we feel the Energy Star Program is a win-win situation for both consumers and manufacturers. Not only does it encourage companies like ours to provide consumers with quality energy-efficient products, but it is sure to encourage sales as well of televisions, VCRs and combination TV/VCR units.

Mr. Stan Hametz
Senior Vice President, Merchandising
Panasonic Consumer Electronics Company

Sony is proud to be a charter member of the Energy Star TV/VCR Program. Sony's 1998 big-screen TV and VCR line-up was designed to reach new levels of performance and energy efficiency. Sony is not only committed to being the best at bringing advanced technology together with the needs of the end-user, the company also is dedicated to protecting and improving the environment in all areas of its operations.

Mr. Mark Small
Director of Corporate Environmental Affairs
Sony Electronics

Samsung is very pleased to be part of the EPA Energy Star Program for our TVCR products. As a major electronics manufacturer, it is our responsibility to set a positive example when it comes to environmental issues.

Mr. Jim Sanduski
Senior National Marketing Manager, Video Products
Samsung Electronics America,