

STANDBY PRODUCT PROFILE 2004/8

NOVEMBER 2004

PRODUCT PROFILE



ESPRESSO COFFEE MACHINES

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.rating@deh.gov.au

Alternatively, hard copy comments can be mailed to:

Equipment & Appliances Team
Australian Greenhouse Office
Department of Environment and Heritage
GPO Box 787
CANBERRA ACT 2601

Comments received by 28 February 2005 will assist in determining the final form of the policy proposals taken to government.

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

CONTENTS

Product Description	1
Current Ownership and Trends	2
Relevant modes for the 1 Watt power plan	2
Known Standby Data for New Products	2
Known Standby Data for Installed Stock	3
Greenhouse Emissions	4
Current Overseas Policies and Trends	5
Government Target	5
Government Proposals to meet this Target	6
References	6

PRODUCT DESCRIPTION

Commercial espresso machines have been around for many years, however it was not until 1977 that the first machine designed for domestic use was released. During the 1990's there was a dramatic increase in the popularity of the espresso machine, with it now being one of the most purchased small appliances. Essentially an espresso machine operates by forcing hot water through tightly packed, ground coffee as well as producing steam for heating milk. The units need to heat the water to at least 88 degrees Celsius, provide pressure of around 15 bars and provide steam at a temperature of a round 65 to 70 degrees Celsius for heating milk. Beyond this, different units offer a variety of additional features such as cup warming, no of cups etc. This profile does not cover drip filter coffee machines except those where drip filter coffee and jug warming is an added feature of an espresso machine.

There are a number of characteristics that distinguish espresso machines. Firstly machines can be either pump or steam style. Pump-driven machines use a pump to force the water through the coffee and use a separate heating mechanism for creating steam for heating milk. Steam machines boil the water in a small chamber then use the steam created from this process to force the water into a pipe that flows through the coffee grounds. The same steam is also siphoned off to heat milk. Machines heat water using either a boiler or a thermo-block device. Boilers are slower to heat the water but are more common especially in commercial machines.

Espresso machines also come as manual, portioned or fully automatic. Manual machines regulate the water



temperature for brewing and steaming, however the user is required to measure the coffee and activate switches to perform the different functions including the amount of water. Portion units come with pre-packaged coffee and control the amount of water released per cup. This allows the user to simply add the coffee provided and push a button. This machine does not automatically heat milk etc. A fully automatic machine will provide the user with milk and coffee requirements at the push of a button included frothing milk. These units have an internal computer which automates the grinding and brewing system.

Finally, espresso machines come in bench top or installed models. Until recently all models designed for domestic use were the bench top style with installed units considered only as a commercial product. However, recently several manufacturers have released espresso machines for the domestic market that need to be hard plumbed and/or hard wired.

CURRENT OWNERSHIP AND TRENDS

According to the Sydney Morning Herald, in 2003 Australia's per capita ownership of espresso machines was second only to Italy (Taffel 2003). It is estimated that more than a million households in Australia own an espresso machine (BMW 2004) and that this figure is rising rapidly. A major department store claims that espresso machines are the biggest selling appliance and that customers are trading up to increasingly expensive models (Silkstone, 2004). The market is supplied by around 15 manufacturers producing approximately 70 different models, ranging in price from \$80 to more than \$3000 (Jacobs, 2003). It should also be noted that many small to medium business' use domestic espresso machines in the workplace.

GFK research indicates the sales of espresso machines has been steadily increasing over the past few years rising from just under 37, 000 units in 2000 to more than 137,000 units in 2002. This is almost a four fold increase. Table 1 presents the results.

TABLE 1: GFK SALES DATA FOR ESPRESSO MACHINES 2000 TO 2002 - AUSTRALIA

Type	2000	2001	2002
Pump Pressured Units	13 675	22 409	62 169
Steam Pressured Units	21 354	16 967	16 374
Unidentified Units	1 779	29 458	58 832
Total	36 808	68 834	137 375

RELEVANT MODES FOR THE 'ONE WATT' POWER PLAN

Espresso machines available in Australia usually have three operational modes: on mode, active standby and off mode. The 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 espresso machines.

Active standby mode applies to nearly all espresso machines. This mode occurs while the unit is plugged in and waiting for instruction. In this mode the machine will run a cyclic program providing energy to ensure that the heating unit remains at the temperature required for optimum performance. A small minority of espresso machines do not have active standby, performing a function once turned on.

Off Mode which is sometimes a 'hard' off, in theory disconnects the mains from most electrical circuits in an appliance. Most espresso machines have an off mode; however, not all have zero power consumption when in this mode.

While no Australian data exists on consumer behaviour toward espresso machines a Swiss survey found that 20% of households did not switch off their espresso machines during the day and in offices using domestic machines 47% were left on all day and an additional 29% were never switched off. If these behaviours are similar in Australia it would indicate that time spent in active standby is significant.

KNOWN STANDBY DATA FOR NEW PRODUCTS

The NAEDEC store surveys measured espresso machines for the first time in 2003. The machines were measured in active standby and off mode. However given the cyclic nature of active standby the measurements taken in this mode, this data can only be treated as qualitative rather than quantitative. In active standby, all machines consume a great deal of energy. Most machines use this mode to heat the machine to its optimum operating temperature and then perform a power on, power down cycle to maintain the temperature. As the length of the cycle varies for each machine, measuring this mode in stores only provides indicative results of the range of power consumption that occurs.

In order to gain accurate readings, active standby needs to be measured over a set period of time to account for all the highs and lows. The Australian and New Zealand interim standard recommends that appliances with cyclic loads be measured by averaging power or integrating energy over a period not less than 5 minutes. A Swiss study focussing on espresso machines suggests power needs to be averaged over 1 hour as a minimum and is proposing 3 hours or 20 cycles as the requirement when testing for regulatory purposes.

The 2003 survey only recorded the espresso machines' maximum consumption in active standby while the 2003/04 survey noted the maximum and minimum readings over a 2 minute period. In 2003 the results for active standby ranged from 818W to 1310W. In 2003/04 the maximum consumption measured in active standby mode was 1,631W while the minimum was 0.3W. These results indicate that active standby in espresso machines is likely to be significant.

Average consumption for espresso machines in off mode was 1.4W in 2003 and 0.4W in 2003/04. Table 2 opposite summarises the off mode results for the 2003 and 2003/04 NAEDEC store surveys.

TABLE 2: SUMMARY OF RESULTS FOR 2003 AND 2003/04 NAEDEC STORE SURVEYS

	2003 (n=12)	2003/04 (n=43)
Average Off Mode	1.8W	0.4
Minimum Off Mode	0.0W	0.0
Maximum Off Mode	12.3W	4.3

Note: n is total sample size in survey

Whilst most espresso machines have no consumption in off mode approximately 30% of 2003 units and 10% of 2003/04 units consumed more than 1 watt in this mode. Figure 1 indicates that many models should be able to decrease the off mode consumption.

KNOWN STANDBY DATA FOR INSTALLED STOCK

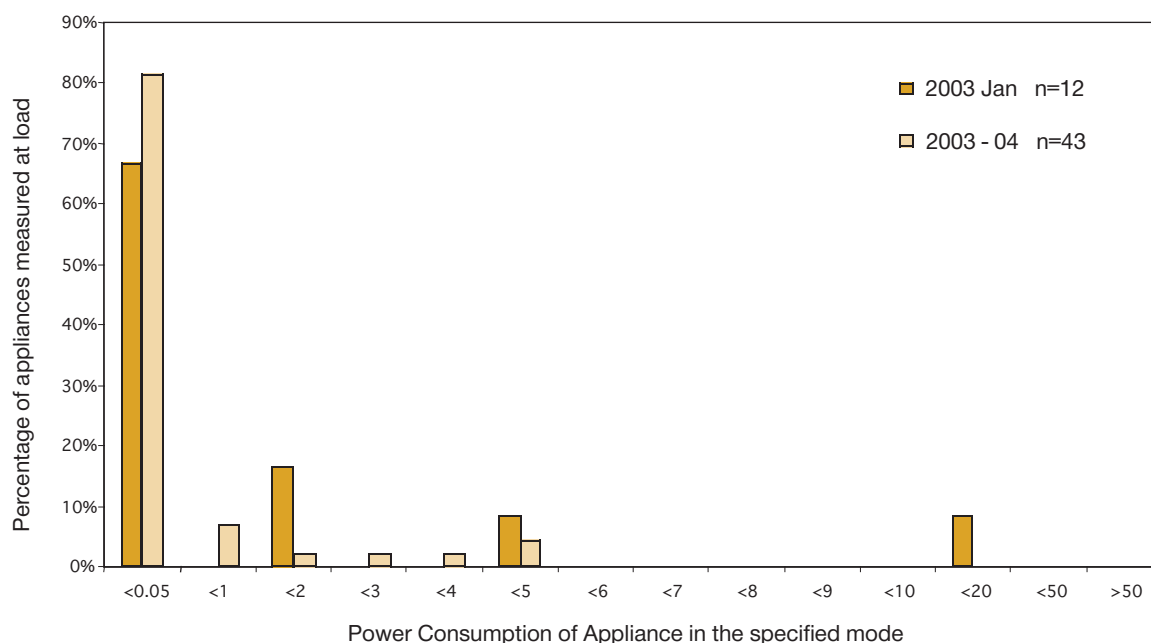
There is no Australian data available for existing espresso machines however a Swiss study did measure a small number of machines in households and calculated average standby. In 2003, SAFE (Swiss Agency for Energy Efficiency) undertook a study, 'Standby Consumption of Household Appliances', for the Swiss Federal Office of Energy (SAFE 2003). The study measured nine

different espresso machines all less than five years old. Measurements were taken by averaging power consumption in standby over a period greater than 1 hour. The espresso machines average consumption ranged from 18W to 57W. The study deduced the average active standby was 35W. It concluded that espresso machines consume the greatest amount of energy for heating purposes, that is when in active standby, rather than producing coffee. The Swiss study also estimated that there are approximately 2.3 million* domestic type espresso machines in use, consuming around 400GWh/a**. The findings attributed 6.4% of this consumption to the standby draw of electronic components and 65% to the heating function while in active standby mode. (SAFE 2003). The survey conducted for this study found that espresso machines were in active standby mode for approximately 19% of the time in the residential sector. These figures indicate that the energy consumption of espresso machines is greater than that of televisions in Switzerland. Evidence from limited testing over several hours of active mode of machines in Australia suggests that power use is similar to that found in Switzerland. In addition, most of the machines available in the Australian market are European brands.

* This includes espresso machines in households and domestic machines used at workplaces.

** This figure also includes nearly half a million drip filter coffee units.

FIGURE 1: POWER MEASUREMENTS FOR ESPRESSO MACHINES: OFF MODE



GREENHOUSE EMISSIONS

For the purposes of estimating greenhouse emissions, it has been assumed that espresso machines are in-use for approximately 10 mins/day, in active standby mode for approximately 5% of time and 95% of the remaining time is spent in off mode. This is relatively conservative compared to the findings of the Swiss study.

The greenhouse emissions reduction potential for the proposed off mode target of 1W by 2007 and 0.5W with

1 hour power down by 2012 is shown in Figure 2. This indicates potential reductions of 6.3 kt CO₂-e pa by 2012 and building to over 36 kt CO₂-e pa by 2020. Note that Figure 2 shows the cumulative effect of the savings over time.

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

FIGURE 2: BAU VS POLICY TARGET – CUMULATIVE ANNUAL GREENHOUSE EMISSIONS FOR ESPRESSO MACHINES

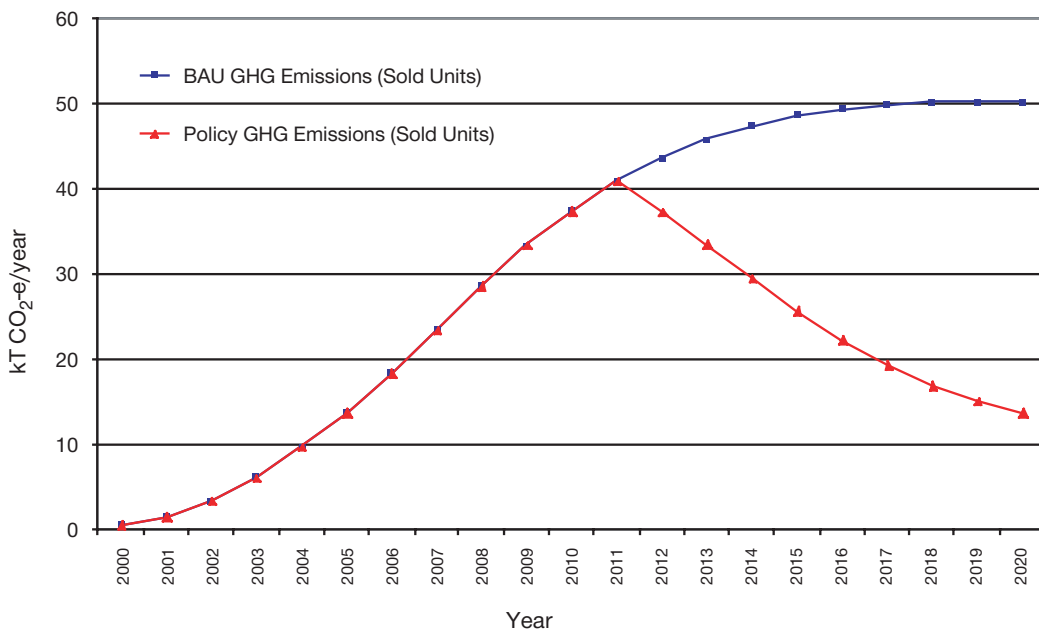
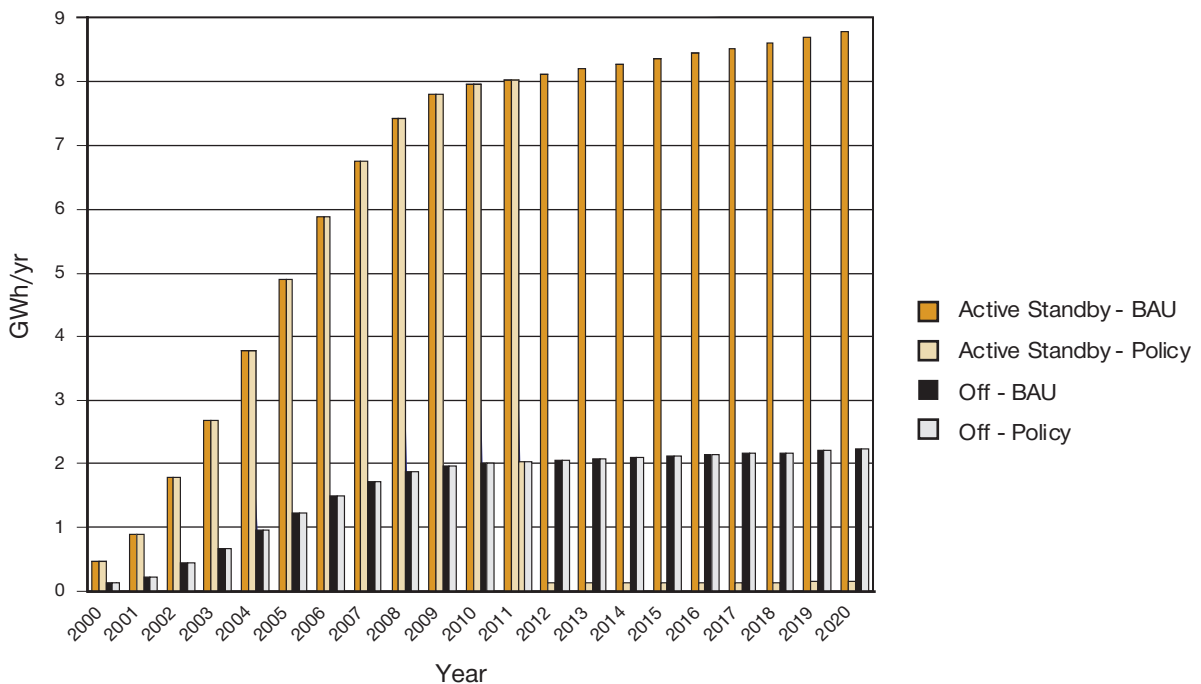


FIGURE 3: ANNUAL EFFECT ON ENERGY CONSUMPTION OF POLICY TARGETS VS. BAU FOR ESPRESSO MACHINES



CURRENT OVERSEAS POLICIES AND TRENDS

Currently there are no guidelines or regulations for espresso machines internationally. However the Swiss Federal Office of Energy is proposing that espresso machines should be subject to mandatory comparative energy labelling. The report declares that espresso machines consume a similar amount of energy to appliances already labelled, have great efficiency potential, measurement procedures are easily definable and most units are bought off the shop floor making labelling an effective strategy. The report also suggests requiring espresso machines to have an auto off function after an hour of inactivity as a significant amount of consumption is currently dependent on user behaviour (SAFE 2003).

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 this target 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, governments will commence dialogue with industry to explore other options, including the possibility of moving to Stage 2 mandatory measures.

Given the lack of data on the consumption of espresso machines in active standby mode it is not possible at this stage to determine a target level. However, targets have been set for off mode and the inclusion of a power down function.

1. INTERIM TARGET - 2008

Off mode ¹ (W)

Less than 1

Notes:

1. Lowest power when connected to the mains. Limit is applicable to models which have an off mode

This target applies to all espresso machines sold in Australia in that year. NAEEEC proposes to monitor the sale of these products in that year and to move toward regulation should that target not be met by a significant number of products.

2. NATIONAL STANDBY STRATEGY TARGET – 2012

Off mode 1 (W)

Power down time ²

Less than 0.5

1 Hour

Notes:

1. Lowest power when connected to the mains. Limit is applicable to models which have an off mode
2. Required to power down to passive standby after a nominated period of inactivity

This target should apply to all espresso machines. In addition, all espresso machines will be required to "power down" to off mode after a period of 1 hour inactivity.

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 integrated stereos:

Voluntary Tool Available	Action / Rationale	Date
Government procurement list	<ul style="list-style-type: none"> MCE are considering a policy of preferencing the purchase of low standby espresso machines where available and fit for purpose. Qualifying products to be included on the government Energy Allstars procurement database. 	2005/6
Australian Standard	<ul style="list-style-type: none"> To communicate government expectations in a new part of AS/NZS 62301. 	From 2005
Annual survey	<ul style="list-style-type: none"> To collect data on new espresso machines and analyse trends. This data will be published annually. 	ongoing

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:

2009

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