



PRODUCT PROFILE



MICROWAVE OVENS

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](mailto:energy.efficiency@greenhouse.gov.au)

**Alternatively, hard copy comments can be mailed to:**

Microwave Ovens Product Profile  
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Comments received by 30 December 2003 will assist in determining the final form of the policy proposals taken to government regarding microwave ovens.

An electronic version of this Standby Product Profile and other Profiles released for public discussion can be obtained from [www.energyrating.gov.au](http://www.energyrating.gov.au) under standby.

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### PRODUCT DESCRIPTION

A microwave oven uses microwaves (radio waves) to heat food. Most microwave ovens use a radio wave frequency of roughly 2,500 megahertz (2.5 gigahertz). Radio waves in this frequency range have an interesting property in that water, fats and sugars absorb them. This makes microwave ovens efficient in their use of electricity because a microwave oven heats only the food.

Since its introduction, the microwave has had several options and features added, such as the addition of convection heat, probe and sensor cooking, which enables the appliance to perform a wide variety of cooking functions. The development of the microwave oven has led to the appliance now being available in a wide range of styles, sizes, shapes, colours and prices. Microwave ovens can have electronic or mechanical controls.

## CURRENT OWNERSHIP AND TRENDS

Penetration of microwave ovens in Australian households has increased steadily since the early 1980's. In 2000, microwave oven penetration was found to be at 89% by studies conducted by NAEEEC<sup>1</sup> and by BIS Shrapnel<sup>2</sup>. The research by BIS Shrapnel suggests that the microwave oven market is fast approaching maturity. BIS Shrapnel research has shown that the volume of new demand fell from 92% in 1987 to 33% in 1999. A summary of microwave oven penetration, as reported in various surveys is shown in Table 1.

**TABLE 1: PENETRATION OF MICROWAVE OVEN OWNERSHIP - AUSTRALIA**

Year	Penetration	Source
1980	3.5%	ABS 8218.0
1983	10.0%	ABS 8218.0
1986	29.9%	ABS 8218.0
1997	78.9%	ABS 2002 <sup>3</sup>
1997/98	86%	BIS Shrapnel
1999	82.9	ABS 4602.0
1999/2000	89%	BIS Shrapnel
2000	89%	NAEEEC 2001
2001/2002	90%	BIS Shrapnel

**TABLE 2: OWNERSHIP DATA FOR MICROWAVE OVENS - AUSTRALIA**

Microwave Ovens	Ownership in 2000
None	11%
1	85.6%
2	3.2%
3	0.1%
Ownership	0.925
Saturation	1.039

Source: (NAEEEC 2001)

A graphical overview of microwave oven penetration trends is shown opposite.

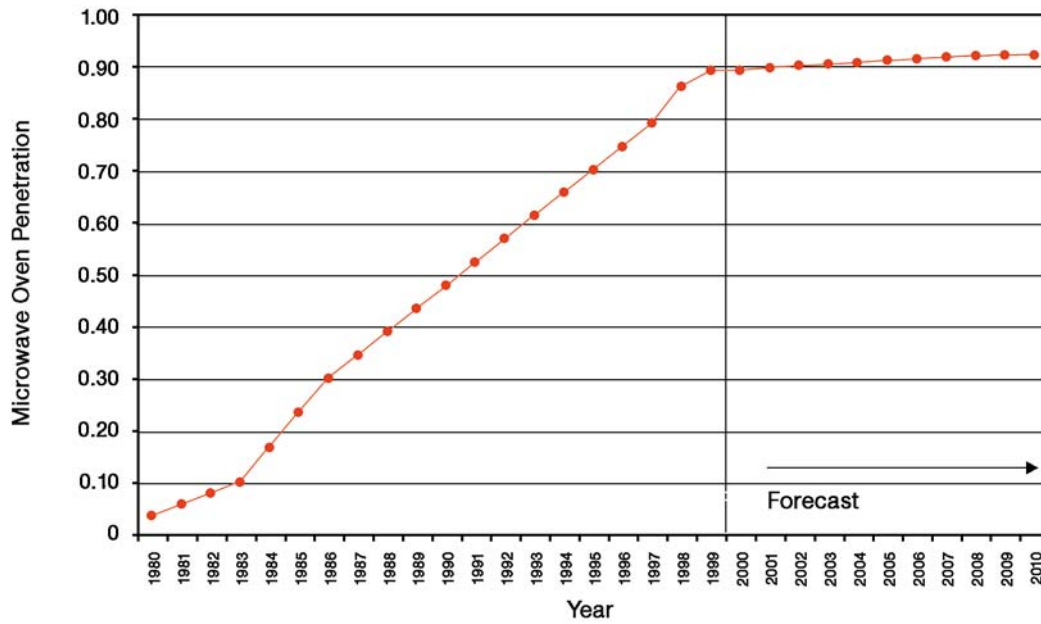
The 2001 NAECEC commissioned research using data from a telephone survey and an intrusive survey of households both found the average age of microwave ovens in stock to be 7 years.

<sup>1</sup> *Energy Efficient Strategies and EnergyConsult. 2001, Quantification Of Residential Standby Power Consumption In Australia: Results Of Recent Survey Work.*

<sup>2</sup> *BIS Shrapnel, 2002. The Household Appliances Market in Australia, 2000-2002, Vol1 (ii)*

<sup>3</sup> *Australian Social Trends 2001 Housing - Housing and Lifestyle: Household amenities. ABS 2002*

FIGURE 1: MICROWAVE PENETRATION IN AUSTRALIA



## RELEVANT MODES FOR THE 'ONE WATT' POWER PLAN

The majority of microwave ovens in stock do not have a "hard" off switch, hence only have two operational modes: **on mode**, and **passive standby mode**. This means that passive standby in most cases is the lowest possible power state and the only mode relevant to the One Watt power plan.

The 2001 telephone survey of appliance usage asked respondents to indicate the current status of their

microwave oven and the normal way that the unit was switched off when not in use. 81% of respondents left their microwave oven in standby with only 19% of respondents reporting that their microwave was switched off at the wall. The household survey also found that 20% were unplugged from the wall.

## KNOWN STANDBY DATA FOR NEW PRODUCTS

In 2001, 2002 and 2003, NAEEEC commissioned store surveys of new products for sale in major retail stores. Measurements were collected from 158 microwave ovens over the 3 years: 58 in 2001, 60 in 2002 and 40 microwaves in 2003. The new microwave ovens on display were measured in passive standby and where applicable, off modes.

The store surveys show that there has been little improvement in the average passive standby consumption of microwave ovens since 2001. In 2001 the average consumption was 3.5W while in 2003 the average was recorded at 3.0W. The maximum recorded measurement has declined since 2001, from 8.4W to 6.2W in 2003.

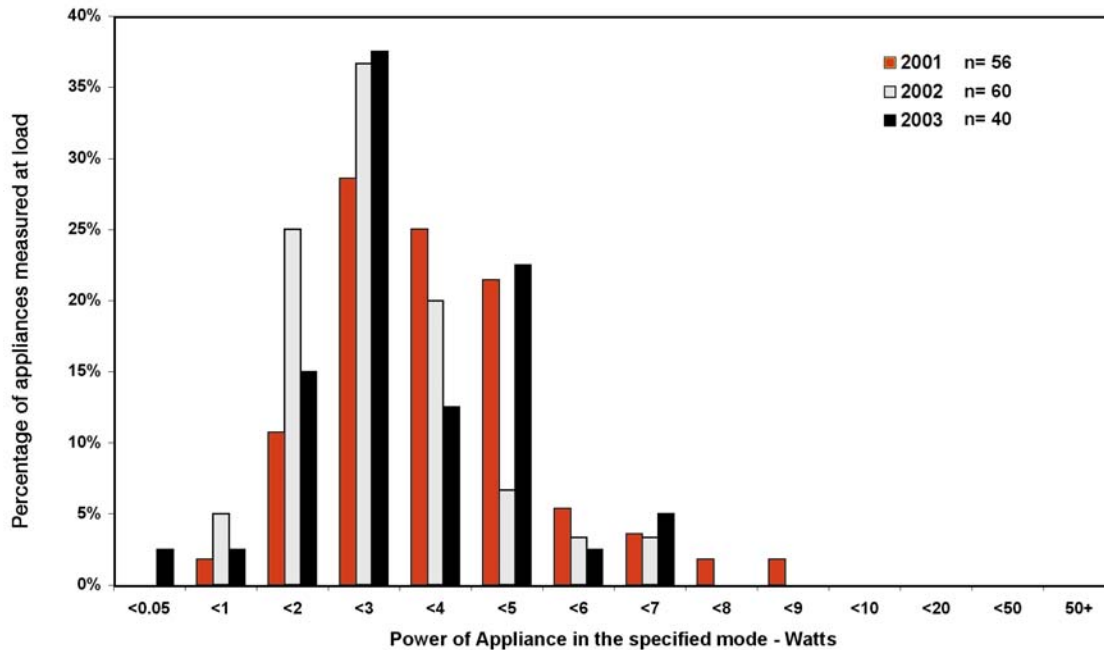
Figure 2 shows the distribution of passive standby consumption measurements collected from the

2001, 2002 and 2003 store surveys. The distribution shows that in 2002, standby consumption was trending downwards with a greater proportion of units consuming less than 3W compared to 2001 (67% in 2002 compared to 41% in 2001). However, this improvement was not sustained into 2003 with 58% of units consuming less than 3W and many falling into the <5W category.

Microwave ovens have a long way to go to achieve the requirements of the "One Watt" power plan with only a very small proportion of units measured (less than 5%) consuming less than 1W in passive standby.

Table 3 below summarises the results for the 2001, 2002 and 2003 NAEEEC store surveys.

**FIGURE 2: 2001, 2002 & 2003 STORE SURVEYS - DISTRIBUTION OF PASSIVE STANDBY POWER CONSUMPTION FOR MICROWAVE OVENS**



**TABLE 3: SUMMARY OF RESULTS FOR 2001, 2002 AND 2003 NAEEEC STORE SURVEYS**

	2001 (n=58)	2002 (n=60)	2003 (n=40)
Average Passive Standby	3.5W	2.7W	3.0W
Minimum Passive Standby	0.2W	0.1W	0.0W
Maximum Passive Standby	8.4W	6.5W	6.2W
Average Off	0.1W*	NA	NA

\* Only two microwaves measured had an off mode. No microwaves measured in the 2002 and 2003 store surveys were found to have an off mode.

## KNOWN STANDBY DATA FOR INSTALLED STOCK

The NAEEEEC commissioned household survey gained valid measurements for 55 microwave ovens installed in 64 households in Melbourne, Brisbane and Sydney. This survey allowed the standby mode power consumption to be measured as a function of the age of the microwave oven.

The lowest possible power state for most of the microwave ovens in the study was passive standby, however 10 units with mechanical timer mechanisms could be powered off. All except one of the units with an off mode consumed well below 1W when switched off, with the overwhelming majority (70%) recording zero consumption in this mode.

Passive standby readings were taken for 45 models with the average consumption being 3.9W. There appears to have been little change in the level of passive standby consumption from microwave ovens since the late 1980's. No models were found to have a standby consumption of less than 1W. In fact no

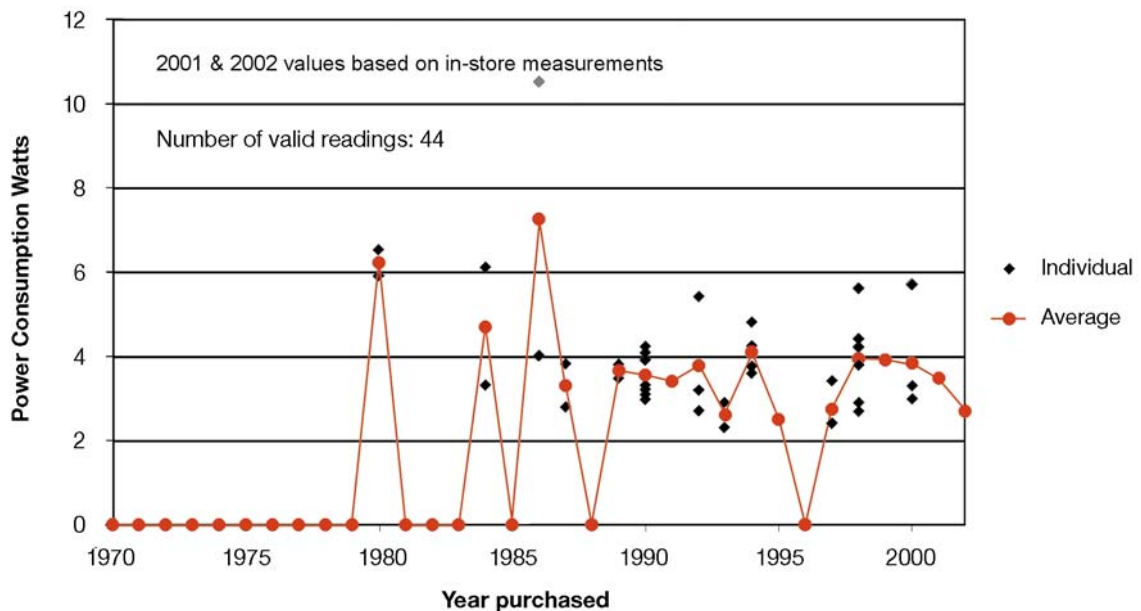
models recorded a passive standby measurement of less than 2W and only 22% of models consumed less than 3W in standby mode. Figure 3 shows a graphical representation of passive standby power measurements by age, as found in the household survey (2001).

Based on this survey, the amount of time a microwave oven is estimated to be left in the relevant mode is shown in Table 4.

**TABLE 4: ESTIMATED TIME IN MODE**

Mode	Time in Mode/day
In use	0.5 hr
Passive Standby	80% of remaining time
Off	20% of remaining time

**FIGURE 3: DISTRIBUTION OF MICROWAVE OVEN STANDBY POWER CONSUMPTION BY AGE**



## GREENHOUSE EMISSIONS

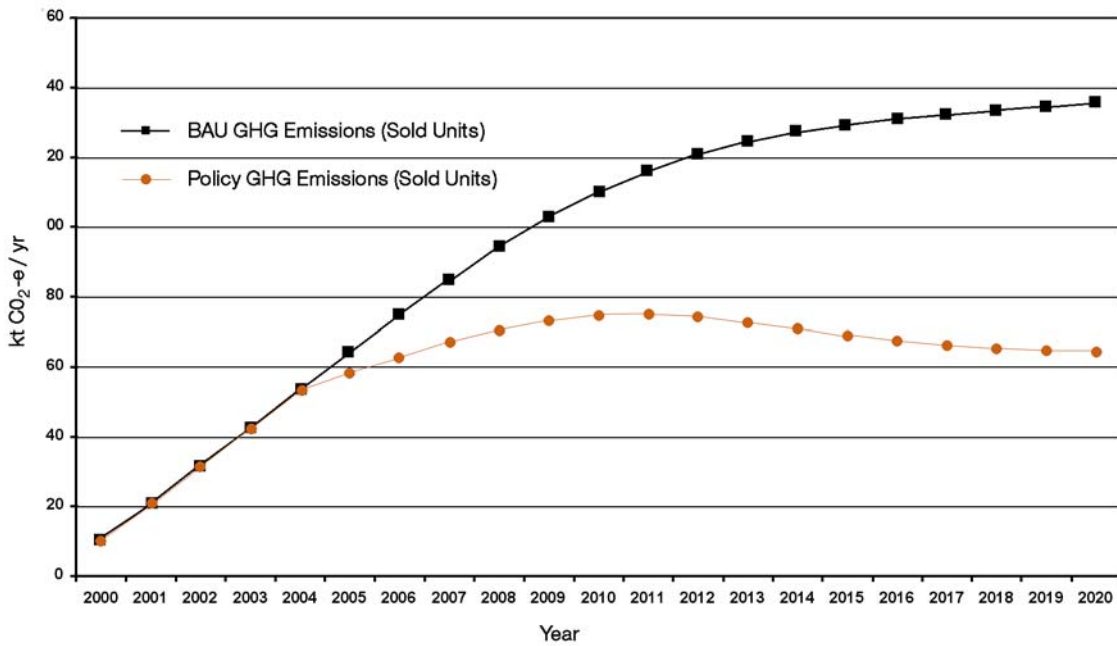
The GHG emissions reduction potential for the proposed standby target of 1W for passive standby is in the order of 46 kt CO<sub>2</sub>-e pa by 2012 and 71 kt CO<sub>2</sub>-e pa by 2020.

To examine the potential for greenhouse savings, one scenario was modelled based on a standby power target of 1W for passive standby applying to 80% of

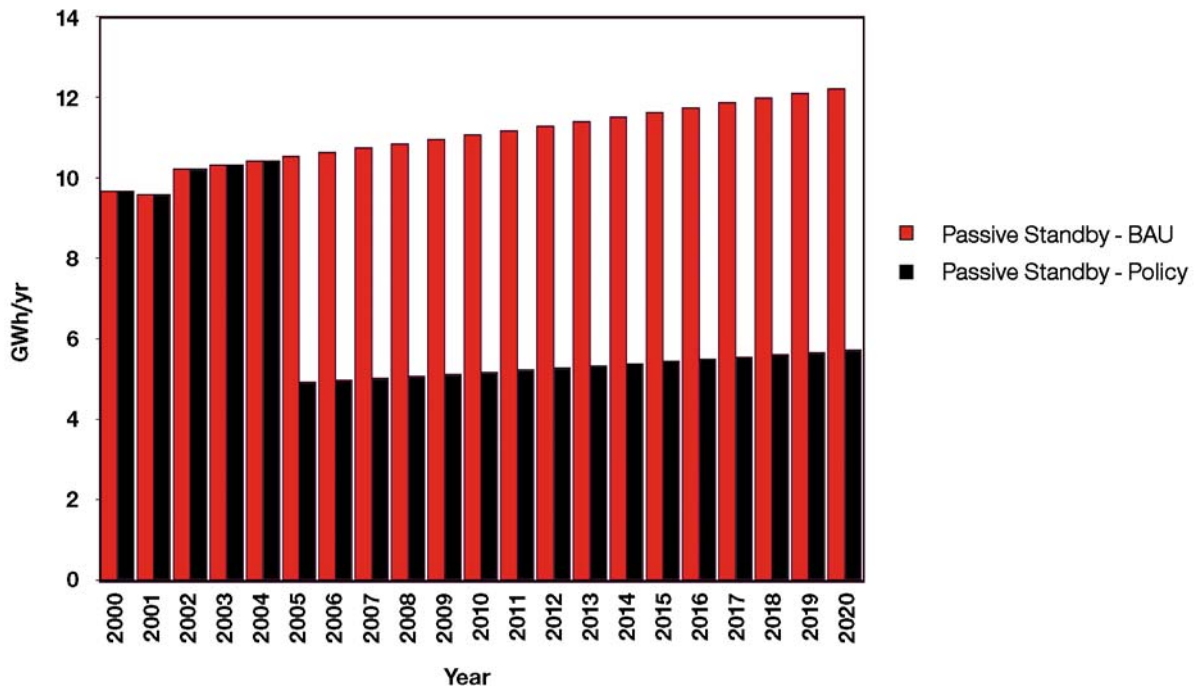
the market in 2005. Figure 4 shows the potential GHG emissions reduction.

The projected effect on total energy consumption used annually by these microwave ovens based on the implementation of these targets in Australia is shown in Figure 5.

**FIGURE 4: BAU VS POLICY TARGET GHG EMISSIONS FOR MICROWAVE OVENS**



**FIGURE 5: BAU VS POLICY TARGETS FOR ENERGY CONSUMPTION OF ALL MICROWAVE OVENS SOLD**



## CURRENT OVERSEAS POLICIES AND TRENDS

Currently, Korea is the only country which addresses standby power usage from microwave ovens. Chinese Taipei has a labelling program for microwave ovens, although this program does not consider standby power usage. The Korean program is described below.

### KOREA

Korea Energy Management Corporation (KEMCO) manages an energy labelling program called the "Energy Boy" label. KEMCO sets an efficiency

performance standard at the top end of the market and for microwaves, the maximum consumption in standby must not exceed 3W for the appliance to qualify for the label. The labelling scheme is voluntary and also includes a range of home entertainment and office equipment products. More information can be found at [http://www.kemco.or.kr/english\\_new/sub03\\_energyefficiency.asp](http://www.kemco.or.kr/english_new/sub03_energyefficiency.asp)

## 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 one watt 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.

### 1. INTERIM TARGET - 2007

Product	Passive standby mode power <sup>1)</sup>
Microwave ovens	Less than 4 Watts

Notes:

1. Lowest power when connected to the mains.

This target applies to all microwave ovens brought into Australia for sale in that year. NAEEEC proposes to monitor the sale of microwave ovens 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	Passive standby mode power <sup>1)</sup>
Microwave ovens	Less than 1.0 Watt

Notes:

1. Lowest power when connected to the mains.

The National Standby Strategy sets out the target of one watt, to be achieved by 2012. This is consistent with international activities, in particular, the IEA "One Watt Initiative". This target should apply to all microwave ovens.

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 microwave ovens:

Voluntary Tool Available	Use for this Product	Rationale	Date
Government procurement list	✓	<ul style="list-style-type: none"> <li>MCE will consider creating Government Policy of purchasing low standby microwave ovens where available and fit for purpose. This policy will encourage manufacturers to supply Government agencies with microwave ovens that are energy efficient.</li> </ul>	4th Q - 2003
Industry Code of Conduct	✗	<ul style="list-style-type: none"> <li>Not considered appropriate at this stage</li> </ul>	NA
Australian Standard	✓	<ul style="list-style-type: none"> <li>To communicate government expectations in a new Australian Standard, likely to be a part of AS/NZS 62301</li> </ul>	Initiate 3rd Q - 2003
Annual in-store survey	✓	<ul style="list-style-type: none"> <li>To collect data on all modes for new microwave ovens and to analyse trends</li> </ul>	ongoing
Publish Statistics	✓	<ul style="list-style-type: none"> <li>NAEEEC will highlight the range of performances of microwave ovens in the marketplace through publishing data on a website or other means.</li> </ul>	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:

## REFERENCES

- EES et al 2003, *Appliance Standby Energy Consumption: Store Report 2003*, report for the National Appliance and Equipment Energy Efficiency Committee prepared by Energy Efficient Strategies & EnergyConsult, March 2003, Canberra. NAEEEC Report 2003/04. [www.energyrating.gov.au](http://www.energyrating.gov.au)
- EES et al 2002, *Appliance Standby Energy Consumption: Store Report 2002*, report for the National Appliance and Equipment Energy Efficiency Committee prepared by Energy Efficient Strategies & EnergyConsult, June 2002, Canberra. NAEEEC Report 2002/08. [www.energyrating.gov.au](http://www.energyrating.gov.au)
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- MCE 2002, *Australia's Standby Power Strategy 2002-2012 - "Money Isn't All Your Saving"*. Final report of long-term strategy to achieve Australia's One-Watt Goal 2002 to 2012, Ministerial Council on Energy. NAEEEC Report 2002/12. [www.energyrating.gov.au](http://www.energyrating.gov.au)
- BIS Shrapnel 2002, *The Household Appliances Market in Australia, 2002-2004 Vol 1(i): Whitegoods - Consumer Survey*.

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