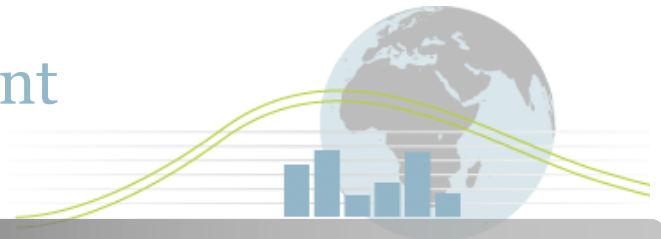


# 4<sup>E</sup>

## Mapping Document



Country:	Australia
Technology:	Notebook Computers
Sub Category:	ENERGY STAR category A, B and C

### Introduction

The first stage in the Mapping and Benchmarking process is the definition of the products, i.e. clearly setting the boundaries that define the products for use in data collection and analysis. Doing this ensures that comparison between the participating countries is done against a specific and consistent set of products.

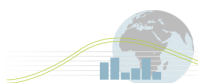
The summary definition for this product is:

Definition & scope	<p><b><i>'A portable computer that performs logical operations and processes data designed to be operated for extended periods of time without a direct connection to an ac power source (using an integrated battery) and typically designed to have similar functionality and software to that of desktop computers. Notebook computers are composed of, at a minimum: (1) a central processing unit (CPU) to perform operations; (2) user input devices such as a keyboard, mouse or digitizer; and (3) an integrated computer display screen to output information.'</i></b><sup>1</sup></p> <p>Limited to screen sizes of 7 inches and above.</p>		
ENERGY STAR category	ENERGY STAR V5 Category A	ENERGY STAR V5 Category B	ENERGY STAR V5 Category C
Other physical variables to be noted	<p>Size of screen Design input voltage for external power supply</p>		

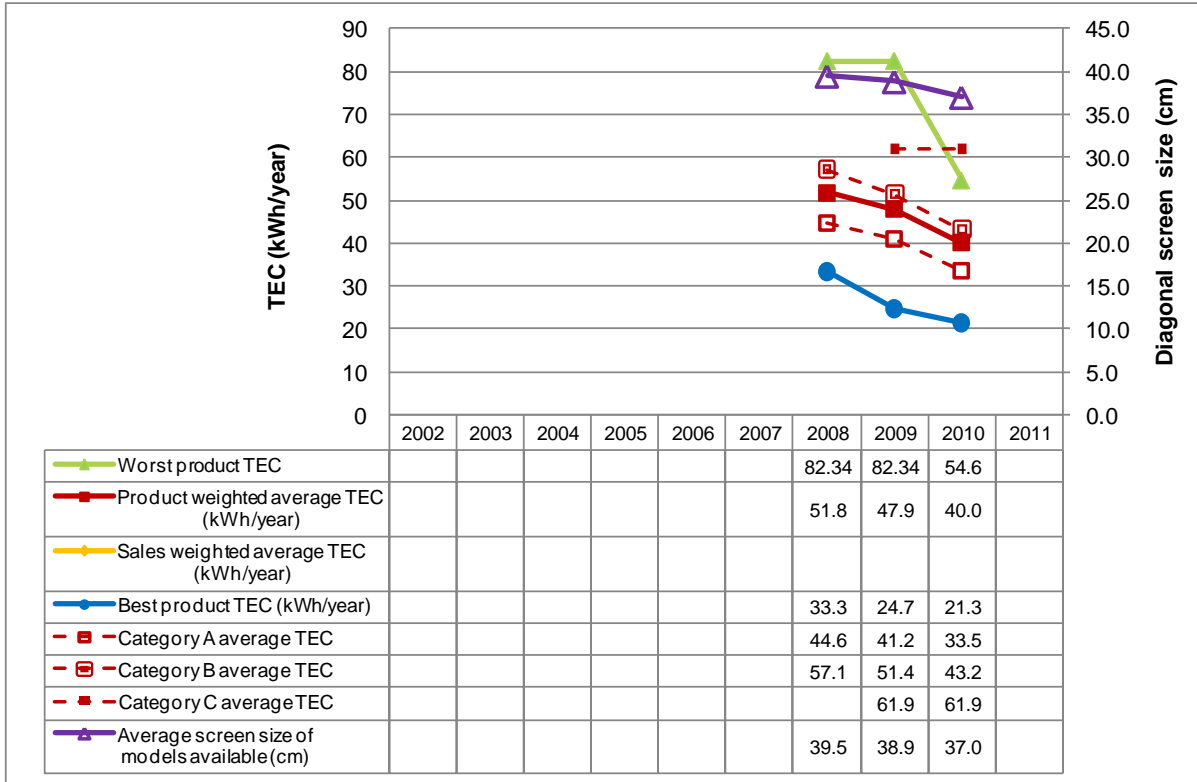
Note: Energy consumption requirements of the external power supply are included in energy consumption data.

- Docking stations are considered accessories and therefore energy consumption of these products is not within scope of this analysis.
- Tablet PCs which use touch sensitive screens along with or instead of other input devices are included in the scope.

<sup>1</sup> Adapted for this project purposes from ENERGY STAR® Program Requirements for Computers Eligibility Criteria (Version 5.0), US EPA.



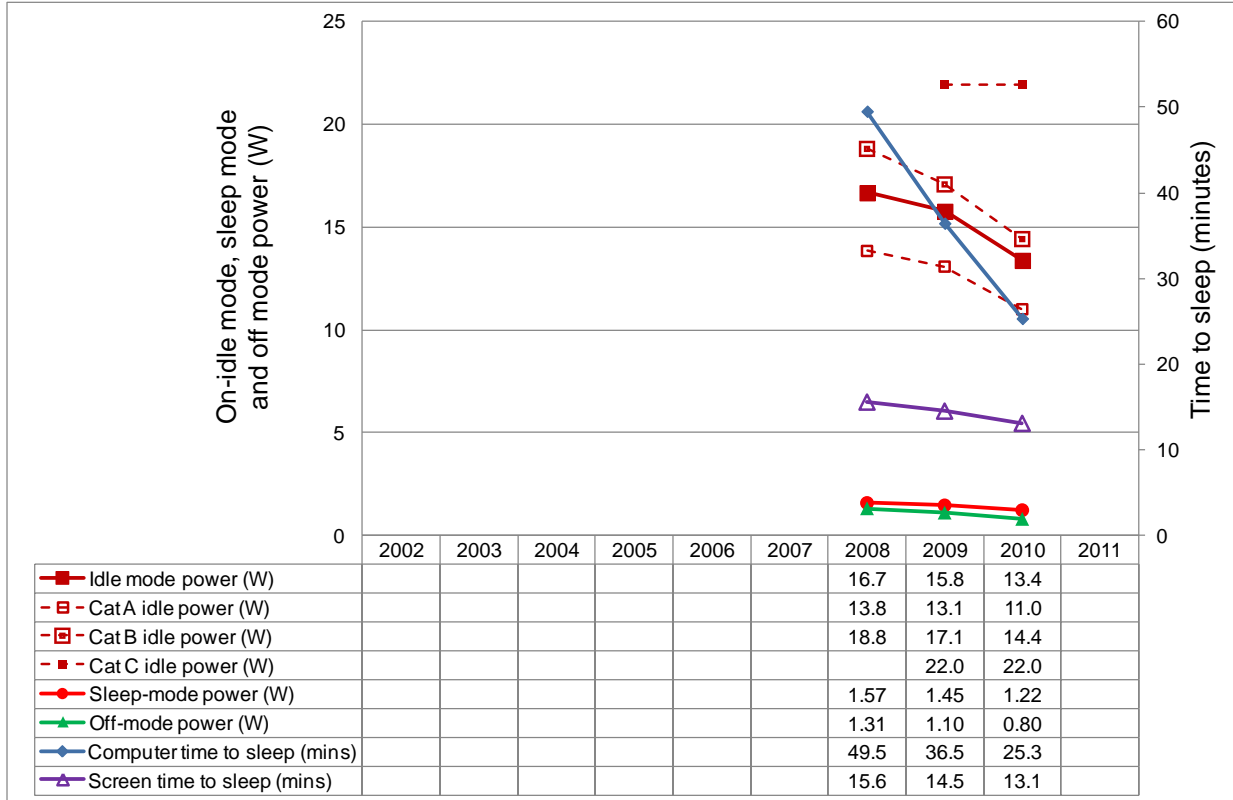
## Typical Energy Consumption (TEC) of New Notebook Computers - Australia



### Key notes on Graph (see notes section 1)

- The data presented arise from independent testing of around 111 notebook computers in 2008, 2009 and 2010 carried out for the Australian Government.
- The products were selected to be representative of base models from all major brands sold in Australia at that time.

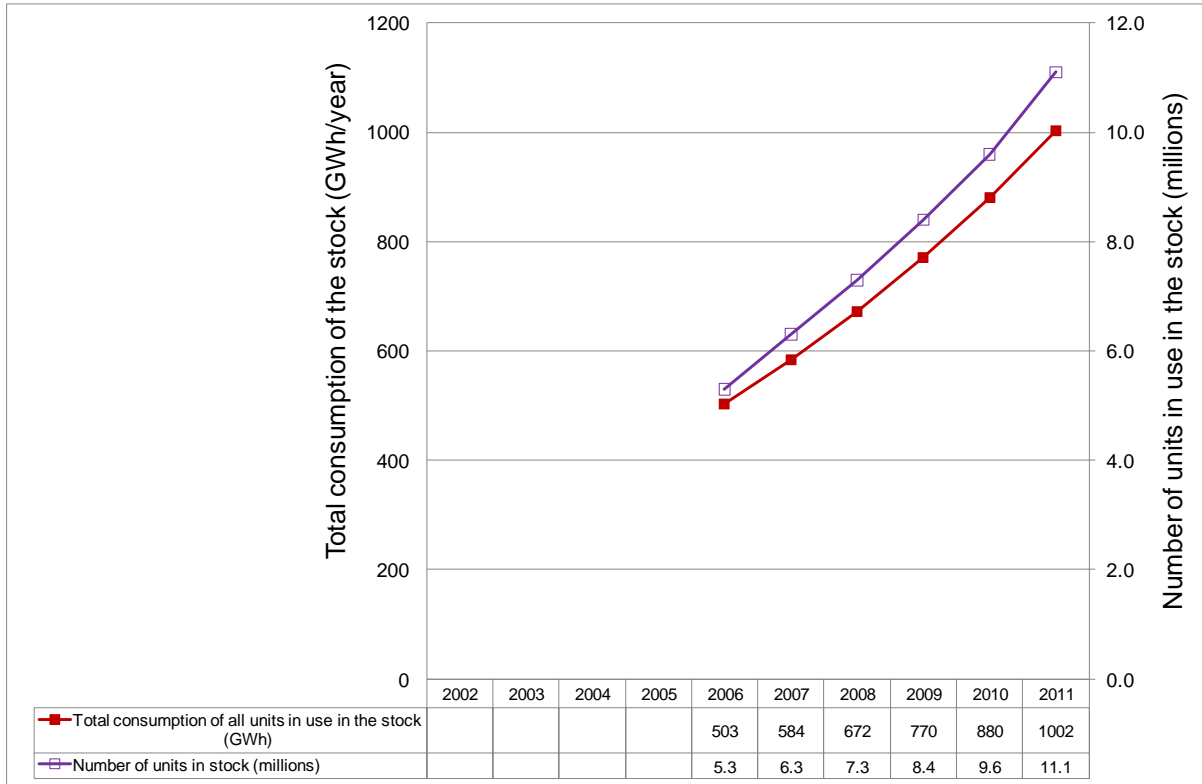
## Power by mode for New Notebook Computers - Australia



### Key notes on Graph (see notes section 2)

- The data presented arise from independent testing of around 111 notebook computers in 2008, 2009 and 2010 carried out for the Australian Government.
- The products were selected to be representative of base models from all major brands sold in Australia at that time.

## Total Energy Consumption in the existing Notebook Computers Stock - Australia



### Key notes on Graph (see notes section 3)

- The data are from Australian Government modelling carried out for the Consultation Regulatory Impact Statement on Proposed Minimum Energy Standards for Computers and Computer Monitors<sup>2</sup>.

<sup>2</sup> Published in October 2010, projected forward from the most recent stock estimates from 2007.

## Major Policy Interventions (See notes Section 4)

Australia has no regulatory MEPS yet in place but is consulting on possible future MEPS at the time of writing this report; Federal procurement policy requires a certain performance level for notebook computers (along with other ICT products) and the EENERGY STAR programme is applied in Australia. These policies are explained below.

### *Minimum energy performance standards (MEPS)*

No mandatory minimum standards are currently in force for notebooks in Australia. However, the Australian Government issued a consultation Regulatory Impact Statement on MEPS for computers in October 2010<sup>3</sup>. This proposed adopting ENERGY STAR Version 5.0 requirements as MEPS for all new computers sold in Australia from 30 June 2011. The current situation for this proposal after extensive industry engagement is as follows:

- Test method and performance requirements based on the ENERGY STAR computer specification 5.2 including thresholds based on Typical Energy Consumption (TEC, see Notes on Data section below).
- Requirements are set for each notebook category as per ENERGY STAR (A, B or C).
- Each category has a baseline component configuration for which there is a maximum TEC allowance (the MEPS). A computer which includes components different to the baseline configuration is eligible for additional allowances<sup>4</sup> to create a tailored TEC requirement.
- Power management shall be enabled within 30 minutes for a computer and within 15 minutes for the computer monitor/display.
- The regulation also specifies network and wake management requirements when in sleep or off modes, depending upon the market sector for which the computer is manufactured.

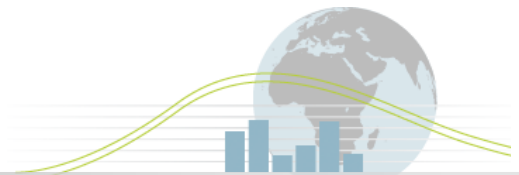
### *Federal Government procurement*

Australian Government agencies are required to adopt the following mandatory environmental standards in ICT procurement processes, as adopted in the Federal Government's ICT plan 2010 to 2015:

- compliance with ISO 14024 or ISO 14021 at the level of EPEAT Silver or equivalent as a minimum standard for relevant ICT equipment;
- compliance with the current ENERGY STAR version for relevant ICT equipment;

<sup>3</sup> Consultation Regulatory Impact Statement: Proposed Minimum Energy Performance Standards for Computers and Computer Monitors, Issued by the Equipment Energy Efficiency Committee under the auspices of the Ministerial Council on Energy, October 2010. Available from <http://www.energyrating.gov.au/library/details201011-consult-ris-computers.html> accessed 7 July 2011.

<sup>4</sup> The allowance definitions are taken from the European Commission's (EC) proposed Tier 1 levels in their Energy related Products (ErP) Lot 3 programme which builds upon ENERGY STAR Version 5.2. The allowances are those from the industry's submission to the EC.



### *ENERGY STAR in Australia*

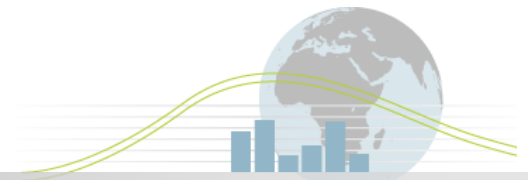
The Australian Government adopts the same criteria as the USA, but the Australian programme has a formal 12 month lag period behind those dates implemented in the US<sup>5</sup> and makes use of the USA EPA product database.

ENERGY STAR is an international standard for energy efficient electronic equipment including notebook computers. It was created by the US Environmental Protection Agency in 1992 and has now been adopted by several countries around the world, including Australia.

Note that the USA ENERGY STAR programme switched to mandatory third party certification of products in February 2011.

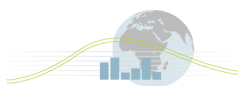
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<sup>5</sup> As noted at [www.energystar.gov.au/products/computers.html](http://www.energystar.gov.au/products/computers.html)



## Cultural Issues (See Notes Section 5)

No information available.



## Notes on data

### Section 1: Notes on Product Efficiency

#### 1.1 Test methodologies, Performance Standards and Labelling Requirements

**Typical Energy Consumption (TEC)** is adopted as the 'efficiency' metric for notebook computers. This requires power demand figures for idle, standby (sleep) and off modes to calculate the TEC as defined in the ENERGY STAR criteria version 5. This defines a typical annual usage profile<sup>6</sup>, the 'conventional duty cycle'<sup>7</sup>, which consists of 60% of the time in off mode, 10% in sleep mode and 30% in idle mode.

$$\text{TEC} = [(0.6 \times P_{\text{off}}) + (0.1 \times P_{\text{sleep}}) + (0.3 \times P_{\text{idle}})] \times 8,760$$

Where:

TEC = Typical Energy Consumption (annual) (kWh)

$P_{\text{off}}$  = Power in off mode (W). The Australian draft standard defines this as "correlates to ACPI system level G2/S5 state"

$P_{\text{sleep}}$  = Power in sleep mode (W) The Australian draft standard defines this as "correlates to ACPI system level G1/S3 (suspend to RAM) state"

$P_{\text{idle}}$  = Power in idle mode (W)

Power data was provided from testing programmes carried out on behalf of the Australian Government on models from 2008, 2009 and 2010 (see table below) that were claimed to qualify for ENERGY STAR version 3, 4 or 5. The third party testing used the appropriate ENERGY STAR test methodology, from which power demand measurements are assumed comparable to each other.

Data were provided for power demand in idle, sleep and off modes as well as a calculated figure for TEC. A wide range of additional data on the products was also included in the databases.

#### 1.2 Product Efficiency Graphic

The data for Australian products were derived from results of third party testing of samples of products in various batches during 2008, 2009 and 2010. (Some of these

<sup>6</sup> ENERGY STAR Version 5 criteria define two possible duty cycle patterns for notebooks in terms of their network connectivity: 'Conventional' and 'proxying'. For this analysis the conventional duty cycle was adopted.

<sup>7</sup> The TEC duty cycles are also dependant upon networking capabilities of the computer, and this analysis assumes 'conventional' networking set up, rather than the alternative 'proxying' type of computer.



data were published in two reports on computer testing in 2009<sup>8</sup>, and also used for evidence to support a regulatory impact statement for Australian MEPS in 2010).

Whilst the format of the reported data varied somewhat (three different labs and different analysts used), they were consolidated into a single database with an associated year of testing. Comprehensive supplementary data were available on the characteristics and specification of most of the products tested.

No sales data were available.

In considering how representative of the Australian market the data can be assumed to be: the products for test series 1 and 6 (see table below) were carefully selected by the test managers as representative of the base models of predominant products of their time on the Australian market<sup>9</sup> (based on separate analysis of sales data and press reviews). Series 2 to 5 involved targeting products that were compliant with the ENERGY STAR criteria of the time. The data can therefore be considered somewhat more representative of the Australian market than the number of products might imply (compared to the very large ENERGY STAR databases for example).

The input data is summarised in the table below, based upon the Australian terminology for the tests.

Due to the small data set, the products from the initial series were assumed relevant to 2008 and assumed still available in 2009. These were carried forward and added to 2009 products for analysis. Similarly, the data from series 1 to 6 were assumed relevant to the year of testing and included in totals for the subsequent year. No analysis was carried out for 2011 as no fresh data were available for that year.

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<sup>8</sup> 'ENERGY STAR® Computers in Australia Results of testing 22 Computers Marked with ENERGY STAR® V4.0 and V5.0', October 2009, DEWHA, Canberra. And 'Computers & Energy Efficiency in Australia: A report on testing of 56 randomly selected computers', June 2009, DEWHA, Canberra.

<sup>9</sup> Anecdotal evidence implies that the whole testing programme managed to test base models from the major brands that represented a large proportion of the Australian market. This was concluded since it became difficult to identify base models from mainstream brands that had not been tested.

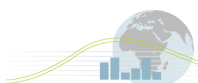
**Table explaining the series of tests from which the data used in this analysis were derived, as carried out for the Australian Government.**

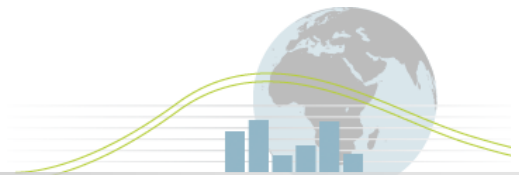
Testing Phase and Procurement Series	Product sample source	Market focus of sample (V=ENERGY STAR Version number)	Number of notebooks tested	When testing carried out
<b>(initial series)</b>	Retail market	V3.0 and V4.0	33	2008
<b>Phase One</b>				
<b>Series One</b>	Government and retail market	Government	11	Mar – Jun 2008
<b>Phase Two</b>				
<b>Series Two</b>	Retail Market	Broad sample	13	July 2008 – Mar 2009 (assumed relevant to 2008)
<b>Phase Three</b>				
<b>Series Three</b>	Retail Market, specifically targeting ENERGY STAR compliant products	V4.0 and V5.0	11	July 2009
<b>Phase Four</b>				
<b>Series Four</b>	Retail Market, specifically targeting ENERGY STAR compliant products	V5.0	18	Nov 2009
<b>Series Five</b>	Retail Market, specifically targeting ENERGY STAR compliant products	V5.0	15	Feb 2010
<b>Series Six</b>	Online Purchases, targeting most heavily advertised	V5.0 Market leaders	10	June 2010
<b>Total:</b>			<b>111</b>	

Some additional assumptions were necessary to facilitate analysis, these were:

- a. Where power was declared both with and without wake on LAN (WOL), the figure with WOL was adopted for analysis
- b. Products with a power value inserted as zero were rejected from the analysis (assumed incomplete data)

TEC could be calculated (i.e. adequate and robust data were provided) for over 85% of the models in the source database.





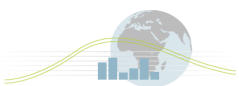
## Normalisation

The only normalisation carried out for notebooks is for voltage of the power supply. This is an adjustment of a few percent based upon analysis of products in the USA ENERGY STAR database that had performance declared for two voltage levels<sup>10</sup>. As all Australian data was based upon 230V input voltage, no normalisation was carried out on the data for mapping.

Note: A voltage of 115V was adopted as the basis of benchmarking and so Australian data was normalised from 230V to 115V for benchmarking (not shown in this mapping report).

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<sup>10</sup> The methodology used to derive these adjustments is explained in an Annex to the Notebooks Benchmarking report.



## **Section 2: Notes on product power demand**

### **2.1 Test methodologies, Performance Standards and Labelling Requirements**

The ENERGY STAR criteria have been recognised by the Australian Government as an appropriate international methodology to define power demand of computers. The data provided for this analysis was derived from testing to the ENERGY STAR methodology (Version 3, 4 or 5 as appropriate). No adjustment has been carried out on the power data as normalisation was not required, as noted above.

### **2.2 Product Power Demand Graphic**

No further information to add to that above.

## **Section 3: Notes on Consumption of Stock**

No further information available.

## **Section 4: Notes on Policy Interventions**

No further information available.

## **Section 5: Notes on Cultural Issues**

No further information available.