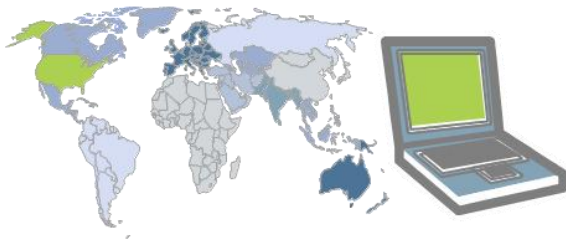
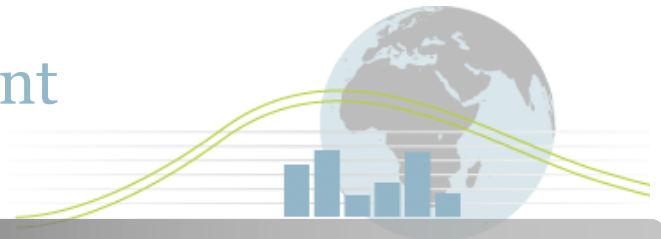


4E

Mapping Document



Country:	USA
Technology:	Notebook Computers
Sub Category:	Equivalent to 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.

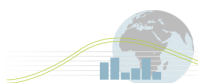
The summary definition for this product is:

Definition & scope	<p><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>¹</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>		

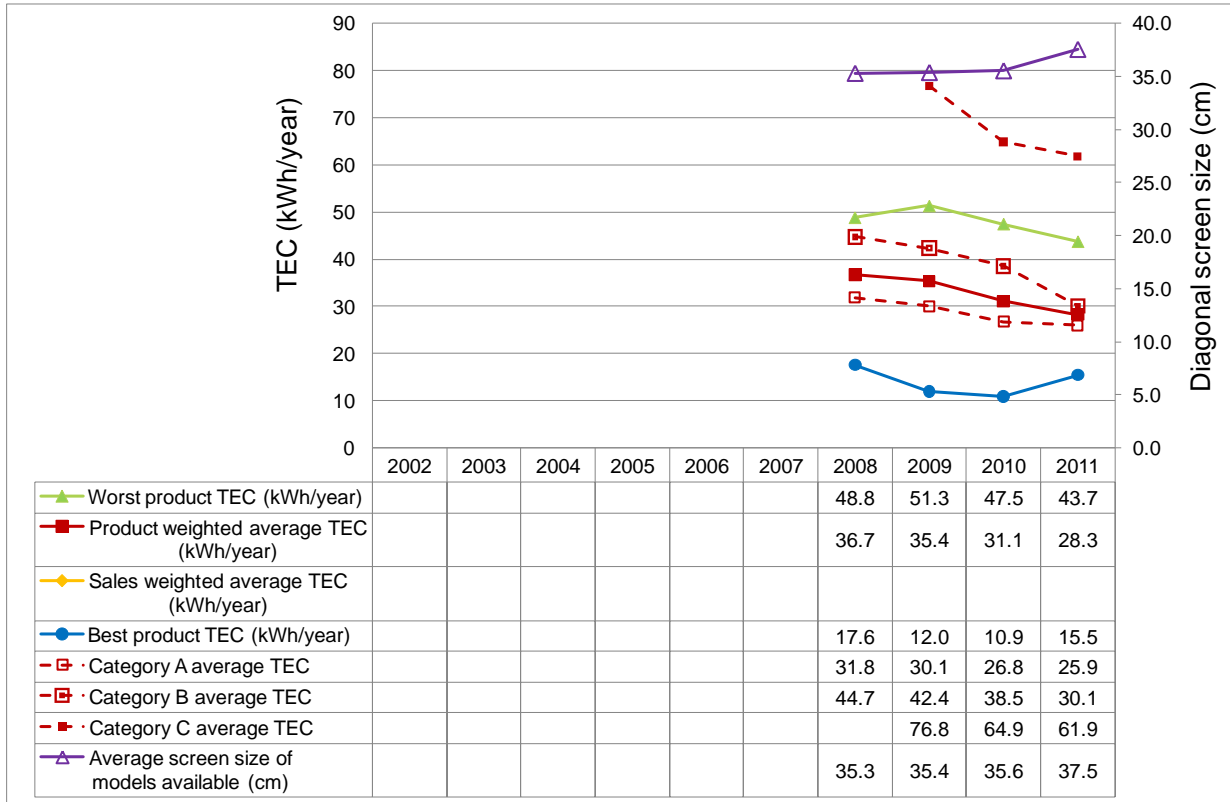
Note: Energy consumption requirements of the external power supply are included in energy consumption data.

- 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.

¹ 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 – USA ENERGY STAR data

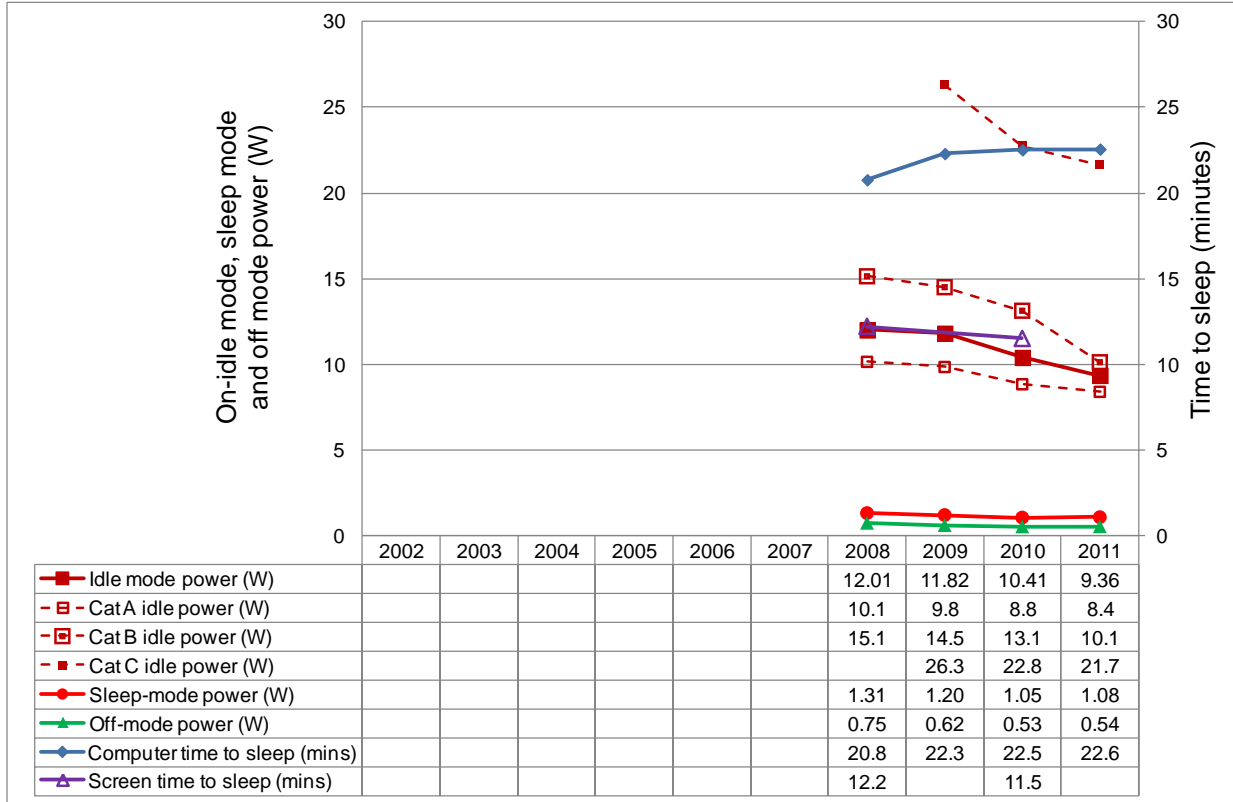


Key notes on Graph (see notes section 1)

- Graphic includes only ENERGY STAR registered (more energy efficient) notebook computers, which were estimated to account for 49% of all USA notebook sales in 2008 and 74% of all sales in 2009².
- TEC figures are as declared in the ENERGY STAR database for 115V power supply or where necessary normalised to be comparable with testing using a 115V power supply.
- Note that 2011 data is for a partial year (to June 2011).

² Quoted from ENERGY STAR® Unit Shipment and Market Penetration Report Calendar Year 2008 Summary and ENERGY STAR® Unit Shipment and Market Penetration Report Calendar Year 2009 Summary, available from www.energystar.gov/index.cfm?c=partners.unit_shipment_data

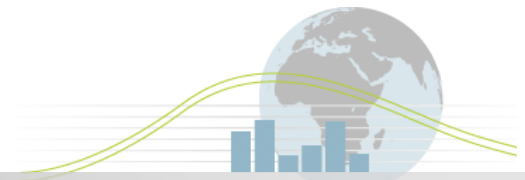
Power by mode for New Notebook Computers – USA ENERGY STAR data



Key notes on Graph (see notes section 2)

- Graphic includes only ENERGY STAR registered (more energy efficient) notebook computers, which were estimated to account for 49% of all USA notebook sales in 2008 and 74% of all sales in 2009³.
- TEC figures are as declared in the ENERGY STAR database for 115V power supply or where necessary normalised to be comparable with testing using a 115V power supply.
- Note that 2011 data is for a partial year (to June 2011).

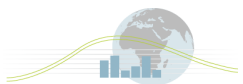
³ Quoted from ENERGY STAR® Unit Shipment and Market Penetration Report Calendar Year 2008 Summary and ENERGY STAR® Unit Shipment and Market Penetration Report Calendar Year 2009 Summary, available from www.energystar.gov/index.cfm?c=partners.unit_shipment_data



Total Energy Consumption in the existing Notebook Computers Stock - USA

Key notes on Graph (see notes section 3)

- No data available.



Major Policy Interventions (See notes Section 4)

The ENERGY STAR Programme⁴

The USA ENERGY STAR programme is a joint programme of the US Environmental Protection Agency (EPA) and the US Department of Energy. The programme endorses the more energy efficient products.



The ENERGY STAR label was established to:

- Reduce greenhouse gas emissions and other pollutants caused by the inefficient use of energy; and
- Make it easy for consumers to identify and purchase energy-efficient products that offer savings on energy bills without sacrificing performance, features, and comfort.

This voluntary program was designed to create self-sustaining markets for energy-efficient products and services via a common labeling strategy and awareness campaign and through strategic market interventions designed to overcome barriers identified for designated product markets.

ENERGY STAR was launched in 1992 with a label for computers and monitors and now extends to cover most major appliances, office equipment, lighting, home electronics, new and existing homes and commercial and industrial buildings.

An important motivator for suppliers to get products registered with ENERGY STAR is that federal agencies are required to purchase only energy efficient products⁵ – defined as being either ENERGY STAR qualified or designated energy efficient by the Federal Energy Management Programme (FEMP).

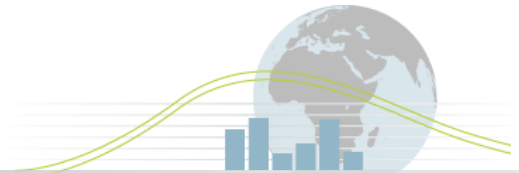
The US Government has an Agreement with the European Union on the co-ordination of voluntary energy labelling of office equipment. On the basis of the Agreement, the US EPA and the European Commission jointly manage the ENERGY STAR programme for office equipment. That includes cooperating on the development of product specifications with the same level of stringency in USA and EU. Under the current Agreement, product specifications aim to represent not more than 25 per cent of models for which data are available at the time the specifications are set.

The USA ENERGY STAR programme switched to mandatory third party certification of all products in January 2011. The USA EPA has already begun consultation on ENERGY STAR for Computers Version 6⁶.

⁴ This information is sourced from the document: COMMUNICATION FROM THE COMMISSION on the implementation of the ENERGY STAR programme in the European Union in the period 2006 – 2010, COM(2011) 337 final. Available from <http://www.eu-energystar.org/en/news.shtml>

⁵ The Energy Policy Act of 2005 requires federal agencies to buy either ENERGY STAR products or products designated as energy efficient by the Federal Energy Management Program (FEMP). These requirements are included in the Federal Acquisition Regulation (FAR) Subpart 23.203. See http://www.energystar.gov/index.cfm?c=fed_agencies.fed_ag_index

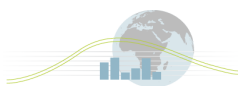
⁶ See http://www.energystar.gov/index.cfm?c=revisions.computer_spec



Cultural Issues (See Notes Section 5)

Some trends ENERGY STAR is seeing in the laptop market in the US include:

- Focus on portability - increased number and diversity of mobile devices (ie tablets)
- Faster data transmissions
- Emergence of hybrid hard drives (solid state and spinning disc)
- Increased display resolution.



Notes on data

Section 1: Notes on product power demand

2.1 Test methodologies, Performance Standards and Labelling Requirements

The power demand data in the ENERGY STAR database are all derived using the ENERGY STAR Version 5 criteria and so are assumed comparable.

2.2 Product Power Demand Graphic

This graph shows results from the USA ENERGY STAR database and so represents only the better products on the market. ENERGY STAR registered notebook computers were estimated to account for 49% of all USA notebook sales in 2008 and 74% of all sales in 2009⁷. Data were provided by the US Environmental Protection Agency.

Analysis was carried out on data provided by the EPA in July 2011 which contained the whole historical list of products endorsed at that date. The datasets supplied by EPA had already been filtered to contain only notebook products.

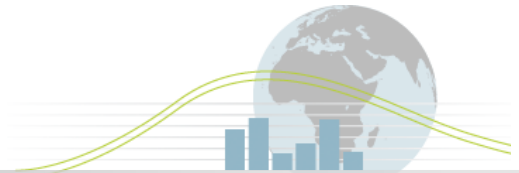
The year for which each product was analysed is derived from the date of test which was declared in the database. This was used in preference to the date of registration because the product list for EU ENERGY STAR did not include the actual date of registration. For consistency therefore all products were dated via their date of test. No products in the analysis were carried forward into subsequent years after their year of test⁸.

Some products have power and TEC data declared for more than one category (A, B, C) where one product represents a family of products. In these cases the product was duplicated into both/all three categories along with the appropriate configuration data provided in the database (RAM, number of cores etc).

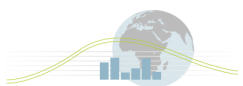
The ENERGY STAR database contained few data on screen size and so no filter could be applied to remove products with screen sizes of less than 7 inches (as per the product definition). The vast majority of notebook products are assumed to comply anyway, and so this is unlikely to significantly distort results.

⁷ Quoted from ENERGY STAR® Unit Shipment and Market Penetration Report Calendar Year 2008 Summary and ENERGY STAR® Unit Shipment and Market Penetration Report Calendar Year 2009 Summary, available from www.energystar.gov/index.cfm?c=partners.unit_shipment_data

⁸ As is done for some data sets to simulate continued availability on the market after initial registration.



The database provided contained fields that showed which regions of the world the product was available in. The products were filtered to include only those that listed USA in this field.



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 profile⁹, the 'conventional duty cycle', 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_{off} = Power in off mode (W)

P_{sleep} = Power in sleep mode (assumed equivalent to standby for the Swiss data) (W)

P_{idle} = Power in idle mode (W)

The ENERGY STAR voluntary endorsement label is described in the Major Policy Interventions section.

Normalisation for voltage

The only normalisation carried out for notebooks¹⁰ is for voltage of the power supply used during test. 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 levels¹¹. The product list indicates which voltage was used during the test, and adjustments were made accordingly. A voltage of 115V was adopted as the basis for mapping for the USA (and also for benchmarking all countries) and so 115V results were used in preference or, where necessary, TEC and power demand were normalised from 230V (or 100V) to 115V.

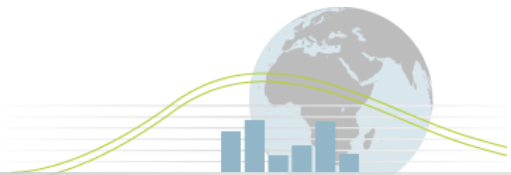
1.2 Product Efficiency Graphic

In most cases the TEC value quoted in the database was used. A data quality check as part of the analysis of the ENERGY STAR datasets was to compare the declared TEC with a TEC calculated from the separately declared power demands. If an error

⁹ 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.

¹⁰ This is only possible for data on individual products, not where market average data has to be used.

¹¹ The methodology used to derive these adjustments is explained in an Annex to the Notebooks Benchmarking report.



of more than 10% was found, the product was removed from the analysis. The declared TEC was used in preference, but if not provided then the declared mode powers (see above) were used to calculate TEC using the equation 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.

