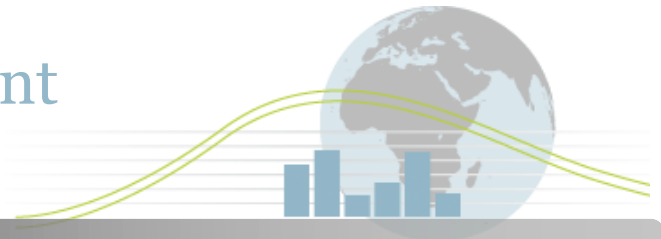


# 4<sup>E</sup>

## Mapping Document



Country:	European Union
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.

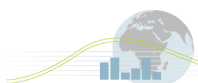
The summary definition for this product is:

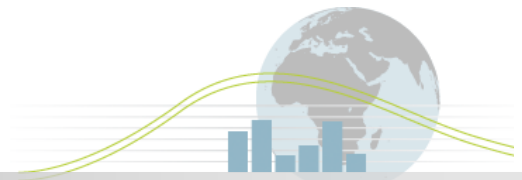
Definition & scope	<p><b><i>'A portable computer that performs logical operations and processes data designed to be operated for extended periods of time without a direct connection to an ac power source (using an integrated battery) and typically designed to have similar functionality and software to 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.

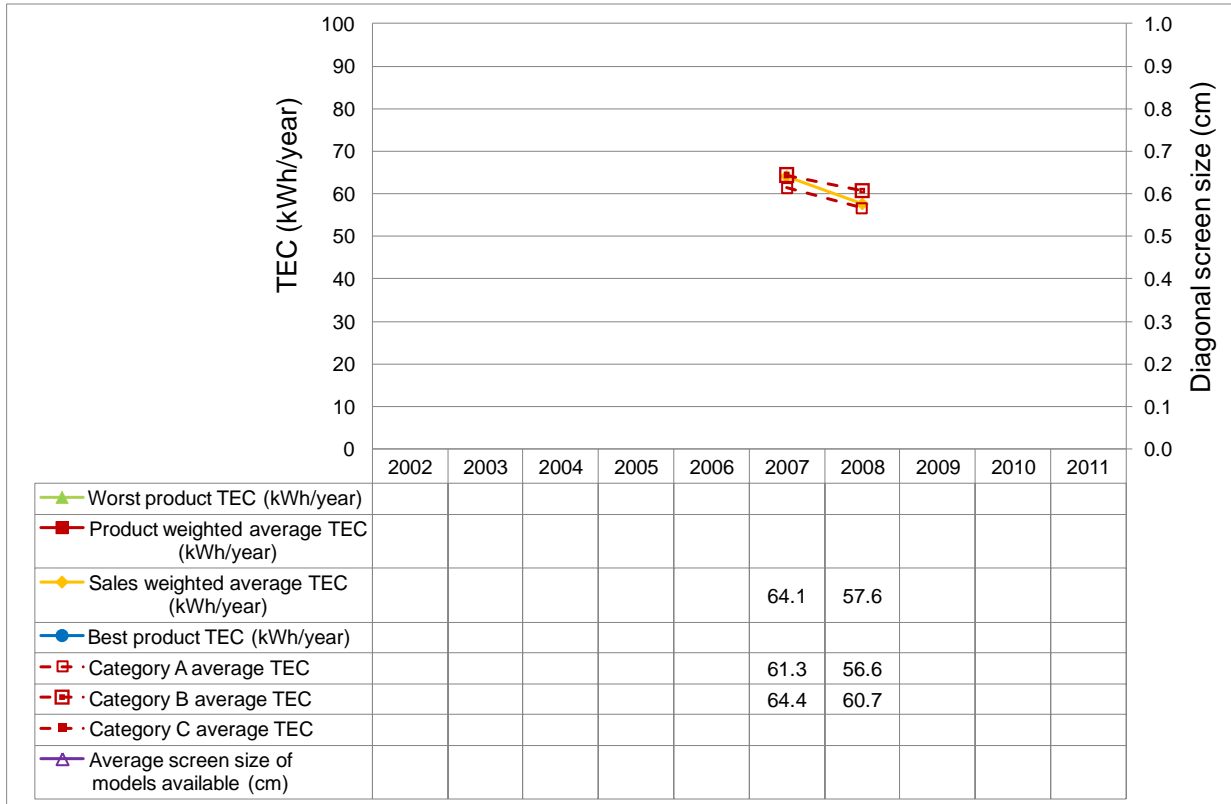
- Docking stations are considered accessories and therefore energy consumption of these products is not within scope of this analysis.
- Tablet PCs which use touch sensitive screens along with or instead of other input devices are included in the scope.

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





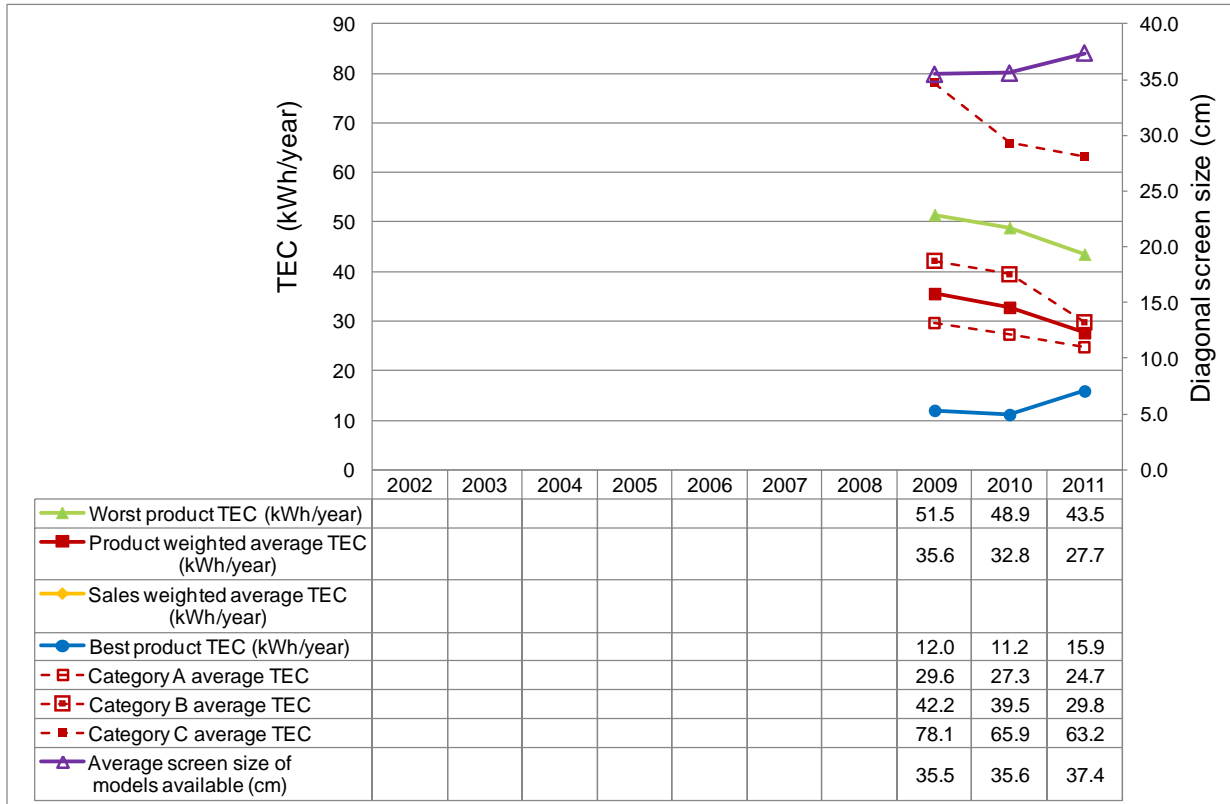
## Typical Energy Consumption (TEC) of new notebook computers - EU



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

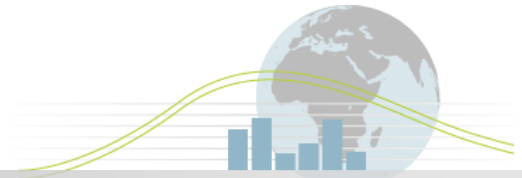
- The whole market data set for this analysis was provided by the European Commission from a consultancy report. The report used product and sales data for both ENERGY STAR registered and non ENERGY STAR products.

## Typical Energy Consumption (TEC) of new ENERGY STAR compliant notebook computers - EU

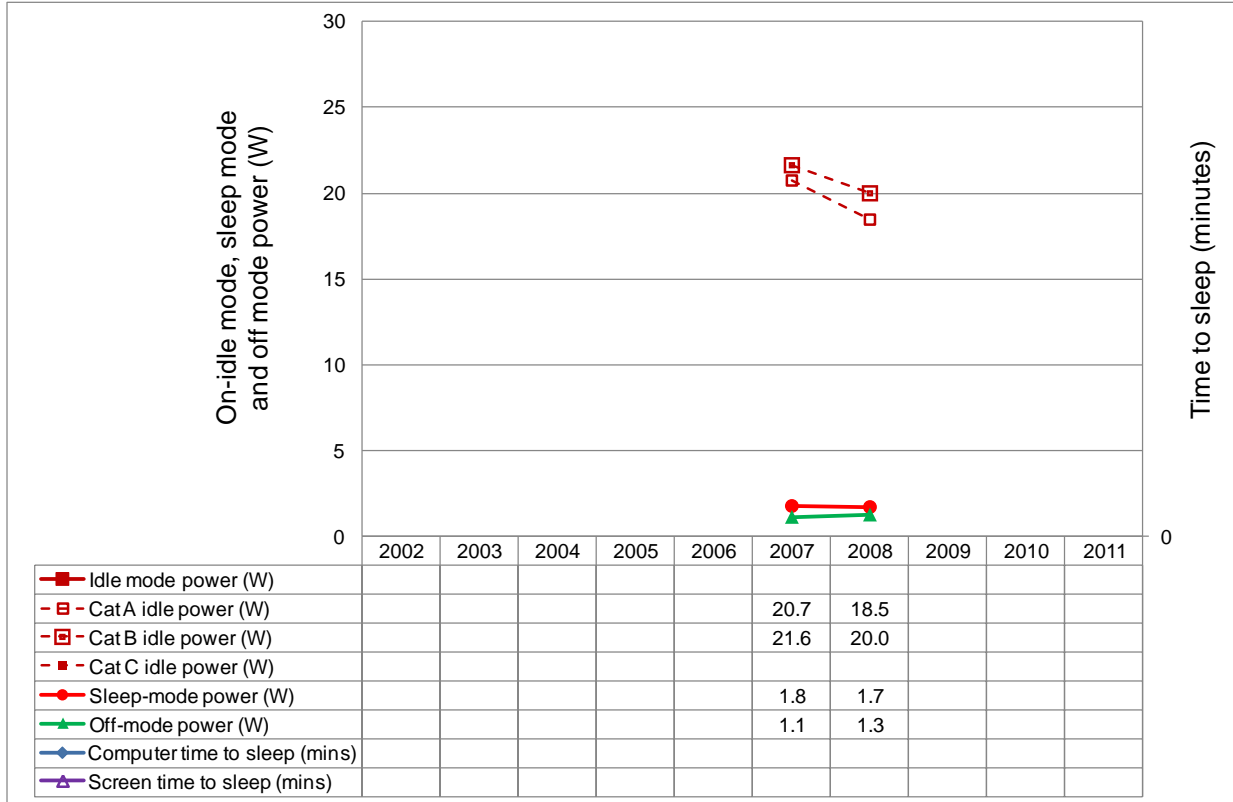


### Key notes on Graph (see notes section 1)

- The ENERGY STAR data set for this analysis was also provided by the European Commission and combines products solely registered for ENERGY STAR in the EU and products registered in the USA but declared as being sold in the EU. This data set was obtained in July 2011 and so the data for 2011 is only from a partial year.
- The ENERGY STAR programme endorses the more energy efficient products in the market. Details of the programme can be found in the policy interventions section below.
- No sales data was available to the annex at the time of publication and therefore calculation of sales weighted average (which more accurately reflects typical performance in the market) was not possible.
- Screen size was only available for a minority subset of the full dataset (varying between 10% in 2010 and 64% in 2011) so average screen size results should be viewed with caution.



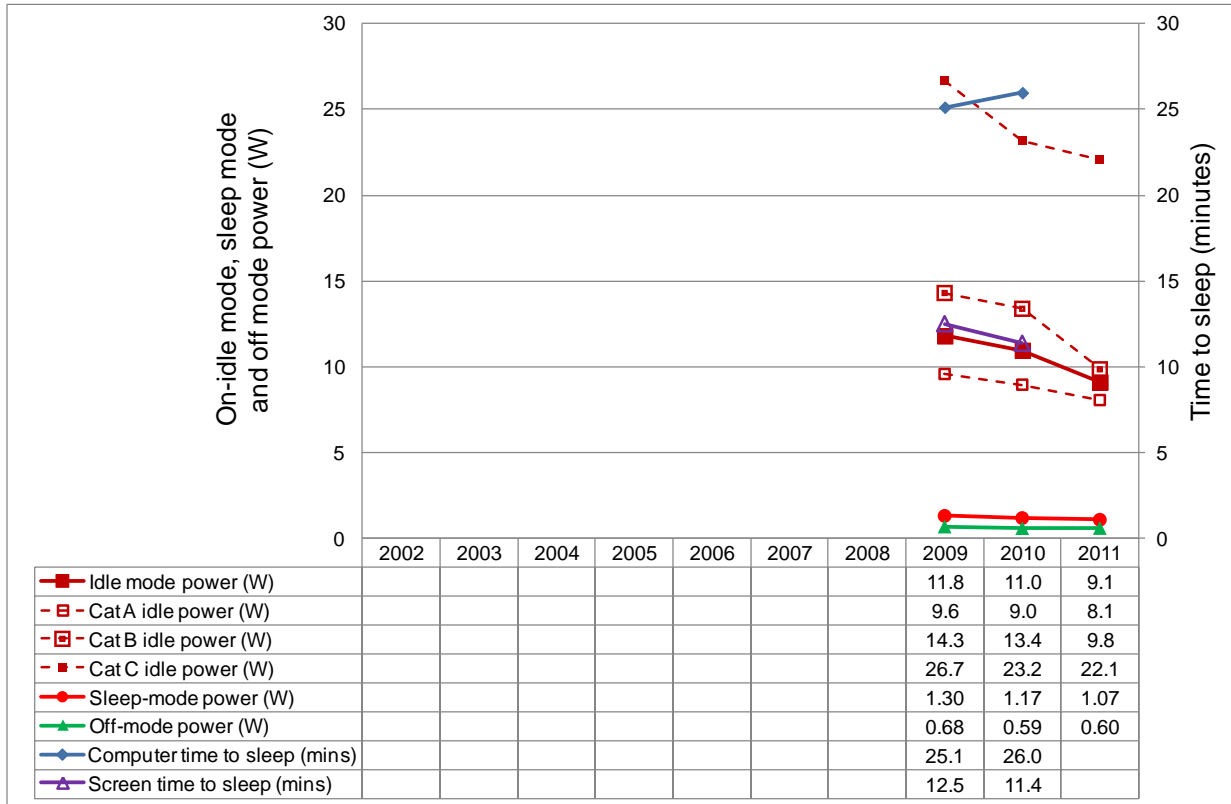
## Power by mode for new notebook computers - EU



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

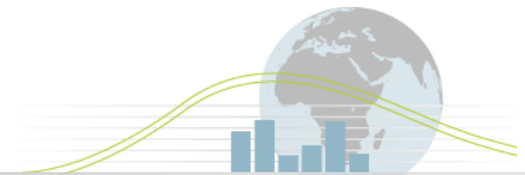
- The whole market data set for this analysis was provided by the European Commission from a consultancy report. The report used product and sales data for both ENERGY STAR registered and non ENERGY STAR products.

## Power by mode of new ENERGY STAR compliant notebook computers - EU



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

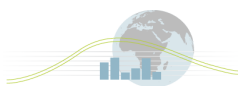
- The ENERGY STAR data set for this analysis was provided by the European Commission and combines products solely registered for ENERGY STAR in the EU and products registered in the USA but declared as being sold in the EU. This data set was obtained in July 2011 and so the data for 2011 is only from a partial year.
- The ENERGY STAR programme endorses the more energy efficient products in the market. Details of the programme can be found in the policy interventions section below.



## Total energy consumption in the existing notebook computers stock - EU

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

- No data on the total energy consumption of notebook computers in the existing stock were available to the Annex at the time of publication.



## Major policy interventions (See notes Section 4)

### The EU ENERGY STAR Programme<sup>2</sup>

EU ENERGY STAR endorses the more energy efficient products and so aims to 'pull' the office equipment market up towards greater efficiency and thus complements the EU Ecodesign Directive 2009/125/EC<sup>6</sup> which acts to 'push' the market through mandatory or voluntary minimum efficiency requirements.



The EU ENERGY STAR Programme follows an Agreement between the USA Government and the European Union on the co-ordination of voluntary energy labelling of office equipment, approved by the EU Council in April 2003. On the basis of the Agreement, the US Environmental Protection Agency 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 and, at least until December 2011 (see below), the mutual recognition of products registered in the EU and the US. 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.

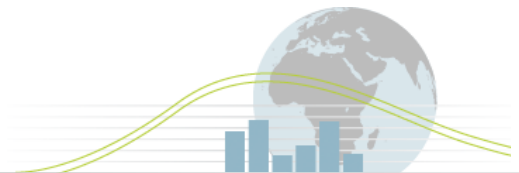
In 2008 the programme was significantly strengthened with the inclusion of an obligation for the central government authorities of Member States and the European institutions to specify, for public procurement, energy efficiency requirements 'not less demanding' than ENERGY STAR criteria. Public procurement is the primary driver for product registration in the EU.

The USA ENERGY STAR programme switched to mandatory third party certification of products from February 2011. The European Commission is proposing not to follow this step as explained in a June 2011 Communication<sup>3</sup>. Whilst the original agreement between US and EU governments on co-ordination regarding ENERGY STAR expired at the end of December 2011, an agreement was reached in November 2011 to extend the co-ordination for a further five years. The details of this will be finalised in early 2012.

The USA EPA has already begun consultation on ENERGY STAR for Computers Version 6<sup>3</sup>.

<sup>2</sup> 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>

<sup>3</sup> See [http://www.energystar.gov/index.cfm?c=revisions.computer\\_spec](http://www.energystar.gov/index.cfm?c=revisions.computer_spec)

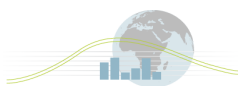


### Possible Ecodesign Regulations

The European Commission is likely to implement a measure under the Ecodesign Directive with requirements for notebook and desktop PCs. A separate but related measure covering computer displays is also likely. The European Commission released a draft Ecodesign measure for notebook and desktop PCs in October 2009 and the working document later proposed to adopt ENERGY STAR Version 5 requirements as mandatory 12 months from publication of the Regulation. The EU Regulatory Committee is expected to discuss these proposals in 2012.

### Cultural issues (See Notes Section 5)

No information on the cultural issues of notebook pc usage was available to the Annex at the time of publication.





## 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 EU ENERGY STAR database are all derived using the ENERGY STAR Version 5 criteria; power demand data from the other source (see below) are as declared by manufacturers, the vast majority of which have adopted the ENERGY STAR version 5 approach to performance measurement and so all of these values are assumed comparable.

#### *2.2 Product Power Demand Graphic*

This graph shows results from two distinct data sets provided by the European Commission:

- A. One data set for products registered with EU ENERGY STAR
- B. And a second whole market data set derived from a consultancy report based on product and sales data for both ENERGY STAR and non-ENERGY STAR products.

Each source and the steps taken with its data are described in more detail below.

#### *A. EU ENERGY STAR data*

The European Commission provided two separate spreadsheets of computer products: one sheet listed all computers<sup>4</sup> that are only registered in the EU for ENERGY STAR. The second sheet listed products registered in the USA but available in the EU (and other countries). A database of all products sold within the EU which are ENERGY STAR approved was produced by combining these two lists (only those products (also) available in the EU were analysed from the USA registered sheet).

Initial analysis during early 2011 was carried out on data provided by the European Commission in September 2010, but a fresh set of data was provided in July 2011 from which this analysis is derived. Both data sets contained the whole historical list of products endorsed at that date.

The first step was to filter out all products that were not notebooks (including removal of desktop computers, integrated desktops and thin clients).

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<sup>4</sup> The database included notebooks, desktops, integrated desktops and thin clients.

The year for which each product was analysed is derived from the date of test which was declared in the databases. This was used in preference to the date of registration because the USA registered product list did not include the actual date of registration (only the date on which the database was extracted) and so this was not possible. For consistency therefore all products were dated via their date of test. Using this method meant that the ENERGY STAR dataset for 2008 was too small to be considered representative of the market and this data was therefore removed from the analysis.

The ENERGY STAR database did not contain 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.

### *B. Whole market data*

The European Commission provide two consultancy reports in a series prepared by IDC and AEA Technology<sup>5</sup>. These reports cover sales weighted data for 2007 and 2008 for notebooks, desktops, workstations, monitors, MFDs and printers. In particular they examine the average performance data and whole market estimated sales figures.

The key data of interest to this work are quoted figures for average power demand in on/idle, sleep and off mode for notebooks, for both ENERGY STAR qualified products and non-ENERGY STAR products, also broken down into category A and category B products. This, combined with the relative sales proportions of these types of product enabled calculation of the idle/sleep/off powers for whole market categories A and B, and for the subsets of category A and category B.

## **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

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<sup>5</sup> SPECIAL STUDY Energy Modelling for EU Office Equipment, Section 2.1, IDC Analyst Team, second Energy Modelling report in a series of reports prepared by IDC and AEA for the EU under the contract TREN/D3/441-2006, first report dated November 2008 (2007 data), second report dated October 2009 (2008 data).

5. This defines a typical annual usage profile<sup>6</sup>, 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)

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

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

$P_{\text{idle}}$  = 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 notebooks<sup>7</sup> 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 levels<sup>8</sup>. The EU and EPA product lists provide indication of which voltage was used during the test, and adjustments were made accordingly. A voltage of 230V was adopted as the basis for mapping, so any TEC and power demand values declared at 115V (or 100V) were subject to adjustment. Benchmarking was based upon 115V tests and so TEC and power demand were normalised from 230V (or 100V) to 115V for benchmarking (not shown in this mapping report).

## 1.2 Product Efficiency Graphic

### A. EU ENERGY STAR data

Efficiency figures were derived from the data sets described in power demand section above.

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

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

<sup>8</sup> 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 below) were used to calculate TEC using the equation above.

### *B. Whole market data*

Further to the approach described above for calculation of power demands derived from the IDC/AEA reports, the quoted power demands combined with the relative sales proportions enabled calculation of the average TEC for whole market, all category A (combined with and without ENERGY STAR label) and all category B. And similarly to calculate overall TEC for ENERGY STAR; TEC for non-ENERGY STAR; TECs for ENERGY STAR categories A and B.

### **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.