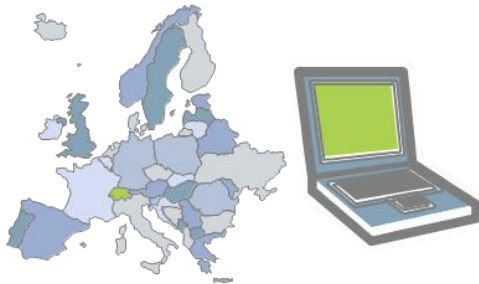
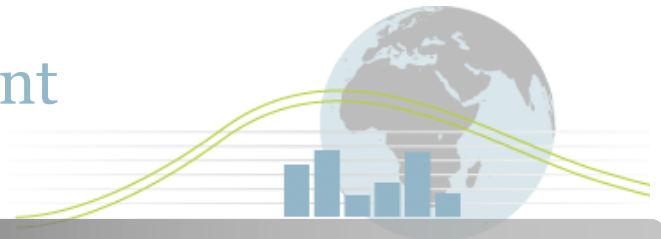


# 4<sup>E</sup>

## Mapping Document



Country:	Switzerland
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.

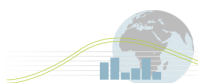
The summary definition for this product is:

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>		

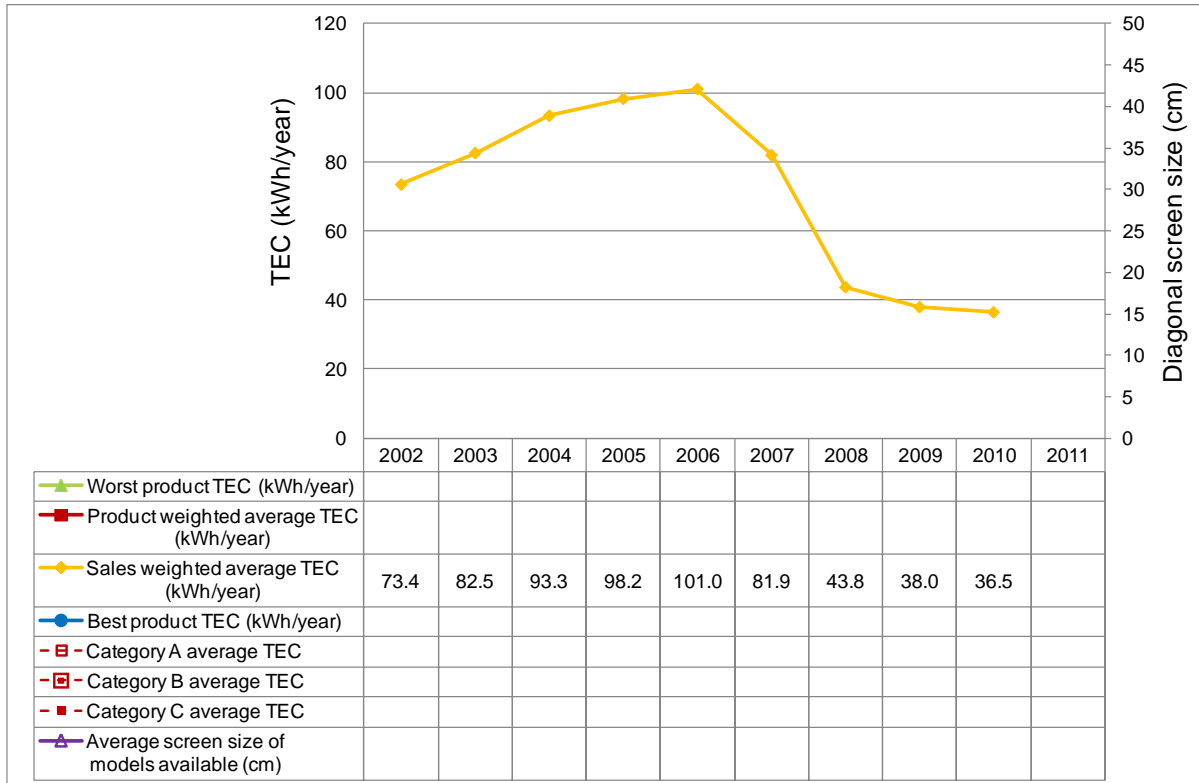
Note: Energy consumption requirements of the external power supply are included in energy consumption data.

- 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.



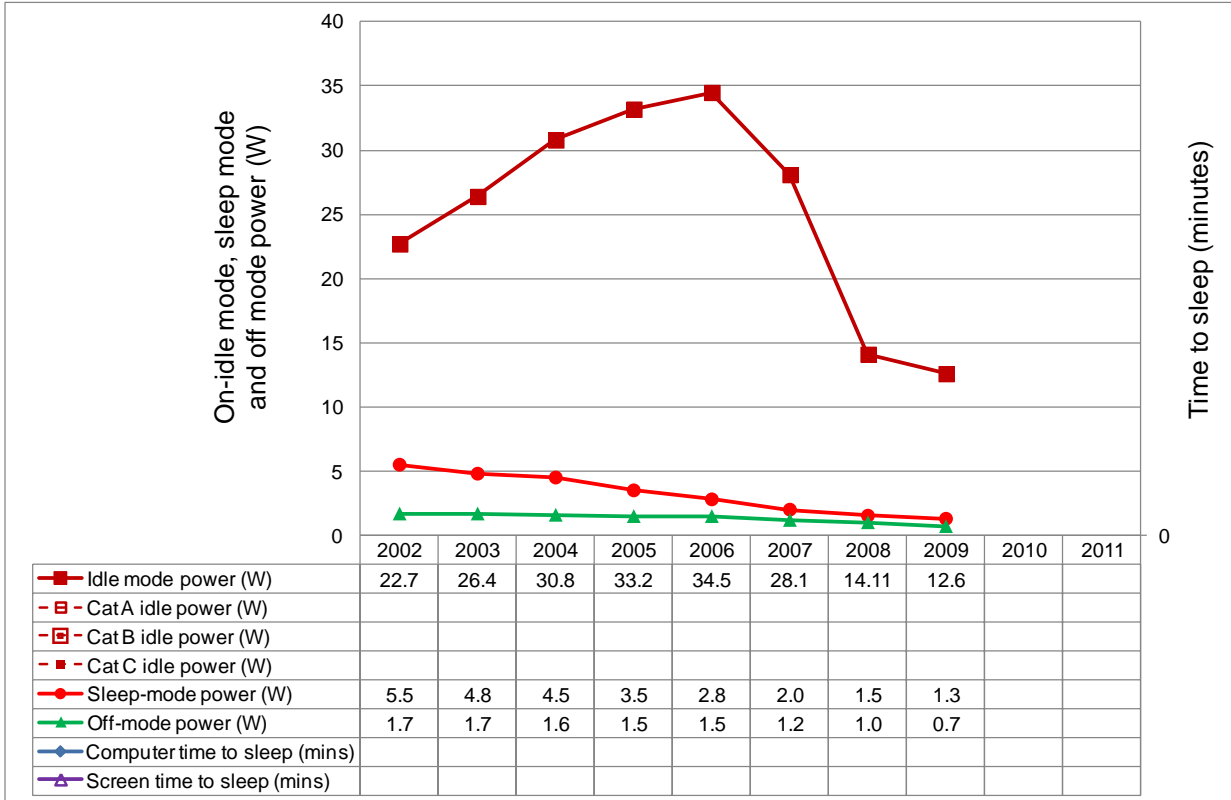
## Typical Energy Consumption (TEC) of New Notebook Computers - Switzerland



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

- The source data for power demand in each mode are from modelling work carried out by the Swiss Government and are based on sales weighted data.
- These data have been used to calculate typical energy consumption (TEC) according to the ENERGY STAR V5 methodology (rather than using the Swiss Government's own assumptions for annual usage profile which vary over time and depending on whether for home or office usage – see Notes on Data).

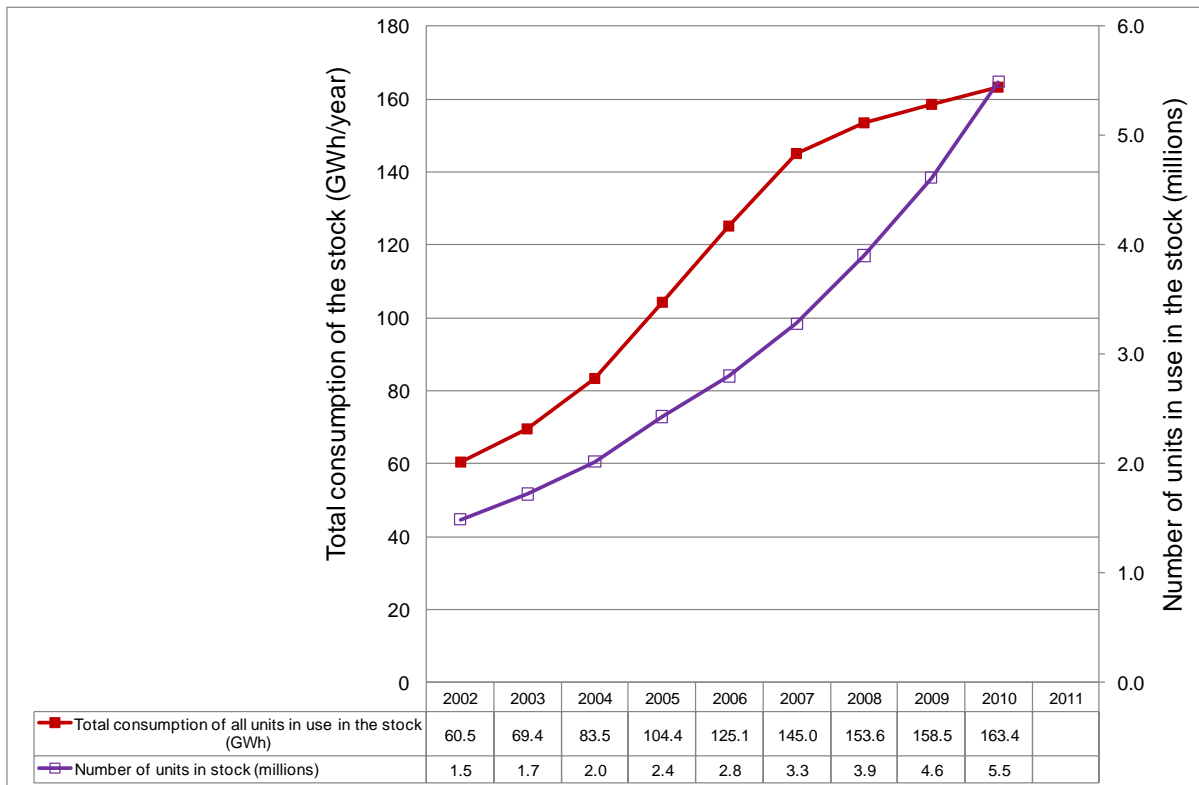
## Power by mode for New Notebook Computers - Switzerland



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

- These sales weighted data are directly from modelling work carried out by the Swiss Government. These data did not break the market down by ENERGY STAR categories (A, B, C).
- Swiss Government modelling assumes the same average power demand in each mode for both home and office notebooks.

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



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

- The consumption data include energy consumption of notebook computers used at home and those used at/in association with an office.
- These source data are from modelling work carried out by the Swiss Government and are based on sales weighted data. The total consumption is calculated from stock estimates for home and office notebooks using separate assumptions for usage profiles derived on behalf of the Swiss Government (these are different to the ENERGY STAR version 5 usage profile adopted for benchmarking analysis – see section 1 of Notes on Data).

## Major Policy Interventions (See notes Section 4)

The Swiss Government has had a bilateral agreement with the US Government since August 2008 to adopt the same criteria as are in effect for ENERGY STAR for computers in the USA.

### About the USA ENERGY STAR Programme<sup>2</sup>

The USA ENERGY STAR programme is a joint programme of the US Environmental Protection Agency 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.



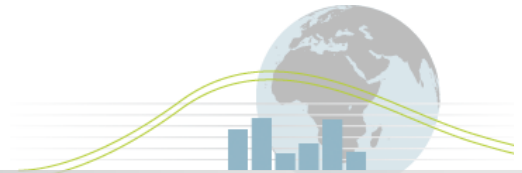
ENERGY STAR was launched in 1992 with a label for computers and monitors and now extends to cover most major appliances, office equipment, lighting, home electronics, new homes and commercial and industrial buildings. Product specifications aim to represent not more than 25 per cent of models for which data are available at the time the specifications are set.

The USA ENERGY STAR programme switched to mandatory third party certification of products from February 2011.

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

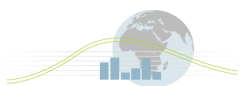
<sup>2</sup> This information is sourced from the document: COMMUNICATION FROM THE COMMISSION on the implementation of the ENERGY STAR programme in the European Union in the period 2006 – 2010, COM(2011) 337 final. Available from <http://www.eu-energystar.org/en/news.shtml>

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



## Cultural Issues (See Notes Section 5)

No specific information available.



## Notes on data

For further information about the background to metrics used, see also the product definition document.

### 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>4</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)

Power data was provided on the power demand in idle, stand-by (assumed equivalent to sleep) and off modes of new sales, assumed to be sales-weighted estimates.

No information was available on the sources for these product power data but they are derived from manufacturers' declared data and so assumed comparable with figures derived from the ENERGY STAR test methodology.

No normalisation or other adjustments have been carried out on the data for mapping or for benchmarking, other than using the mode power to calculate TEC (as below).

Note that for estimating its own national consumption for computers the Swiss Government has adopted a usage profile different to that used in ENERGY STAR. This profile is explained in the section on consumption of stock below.

<sup>4</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.

## 1.2 Product Efficiency Graphic

No further information to add to that above.

### Section 2: Notes on product power demand

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

The data provided by the Swiss Government on power demands in each mode have been presented without alteration by the Operating Agent, and includes notebooks for home and office use.

Swiss Government modelling assumes the same average power demand in each mode for both home and office notebooks. As noted above, no information was available on the sources for this data but it is derived from manufacturers' declared data and so assumed comparable with figures derived from the ENERGY STAR test methodology.

#### 2.2 Product Power Demand Graphic

No further information to add to that above.

### Section 3: Notes on Consumption of Stock

The data provided by the Swiss Government on consumption of stock has been presented without alteration by the Operating Agent, and includes notebooks for home and office use. Total consumption figures assume all notebooks are calculated according to the appropriate Swiss annual usage profile (**not** the ENERGY STAR usage profile which is used for TEC above) multiplied by the associated stock of home and office products.

There is one profile for home use and one for office use, as per the table below.

Hours per year (H)	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>Office, idle</b>	744	768	792	820	862	904	946	988	1030
<b>Office, standby</b>	960	960	960	966	972	978	984	990	996
<b>Office, off</b>	7056	7032	7008	6974	6926	6878	6830	6782	6734
<b>Home, idle</b>	1174	1169	1165	1160	1177	1193	1224	1255	1286
<b>Home, standby</b>	648	645	642	639	635	631	622	614	605
<b>Home, off</b>	6939	6946	6954	6961	6949	6936	6914	6892	6869



Swiss Government modelling assumes the same average power demand in each mode for both home and office notebooks.

For the Swiss data, to calculate annual usage for the purposes of calculating national consumption:

$$\text{TEC} = [(H_{\text{idle}} \times P_{\text{off}}) + (H_{\text{sleep}} \times P_{\text{sleep}}) + (H_{\text{off}} \times P_{\text{idle}})] / 1000$$

Where:

TEC = Typical Energy Consumption (annual, kWh)

$H_{\text{idle}}$  = Hours spent in idle mode per year (hours)

$H_{\text{sleep}}$  = Hours spent in sleep/standby mode per year (hours)

$H_{\text{off}}$  = Hours spent in off mode per year (hours)

$P_{\text{off}}$  = 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)

These TEC values are calculated separately for home and office notebooks, and multiplied by the appropriate stock figures.

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

No further information available.

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

No further information available.