Appliance Standby Power Consumption Store Survey 2008

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CENTER FOR CLIMATE CHANGE
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CENTRAL EUROPEAN UNIVERSITY

Executive Summary

The project "Appliance Standby Power Consumption – Store Survey in Central Eastern Europe" was initiated by Energy Efficient Strategies Pty Ltd (EES) (Warragul, Victoria, Australia) as part of the Asia Pacific Partnership on Clean Development and Climate Change (APP).

The purpose of the project was to measure and collect standby power data from a range of common household appliances on display in retail stores in two Central Eastern European countries – Hungary and the Czech Republic. The project was carried out to contribute to the pooling of standby data to assist in international comparisons and to track trends in standby power over time at the national level. In this report, the collected data are assessed, in order to indicate the characteristics of a cross-section of the current appliance market in the Czech Republic.

Appliances were analyzed as to the values metered in each relevant mode. In addition, specific characteristics (such as size, existence of different power switches, remote control, electronic display, the type of control and transformer (EPS), where relevant the type of subwoofer, screen resolution, number of tuners, and information on energy labels) were recorded, as to describe each product in more detail.

In the Czech survey, a total of 561 appliances have been measured, resulting in 1034 measurements being recorded for all the relevant modes during the survey. Out of the sample, 326 appliances were metered in their off mode. In most cases, the average off mode power level at the appliances types was less than 1W (18 out of 23 appliances types). In 292 cases, the passive standby mode was measured. The average power in this mode was 2.6W. In 28 cases the metered power in this mode was 0W or 0.1W. On the other hand, in 17 cases the appliances drew more than 10W. Active standby mode was metered for 289 appliances. The average power level of all the appliances in active standby mode was 6.9W. Only in six cases was the power level lower than 1W. In contrast, in more than 20% of the cases, the active standby mode power values reached more than 10W (and up to 30W).

An overview of the type of appliances measured, the number of units in each group with the relevant average powers for three major modes: active standby, passive standby and off is provided in Table 1 below.

Table 1 List of Appliance Types and Average Power in Three Modes in the Czech Standby Survey

Appliance	Number of metered appliances	Average of Power – Off (W)	Average of Power – Passive (W)	Average of Power – Active (W)
Computers - Laptop	25	1.2		
Computers - Monitor	26	0.6	0.7	
Computers - Speakers	17	2.7		4.8
Cordless Phone Base Station	12		1.5	2.3
Dishwasher	26	0		2.3
DVD Player	30	0	1	6.1
DVD Recorder	6	0	3	17
Espresso Machine	27	1.6		
Fan	11	0		
Hand Held Vacuum Cleaner	16		1	4
Hard Disk Recorder	17		5	22.7
Home Theatre System	17	0	0.8	18.3
Microwave	29	0	2	
Multi Function Device	20	1.7		5.5
Printer - Inkjet	14	0.7		2.7
Printer - Laser	5	0		9.7
Set Top Box	24	0	5.7	6.9
Stereo - Integrated	30	0	3	10.7
Stereo - Portable	32	1.1	1.4	4.4
Toaster	30	0.1		
TV - CRT	19	0	4.1	
TV - LCD	29	0.2	1	
TV - Plasma	9	0.5	0.7	
Washing Machine Front Loader	30	0.4		2.6
Washing Machine Top Loader	27	0.4		2.6
External Power Supplies	30		0.4	

Content

List of Tables

List of Figures

Introduction

The project "**Appliance Standby Power Consumption – Store Survey in Central Eastern Europe**" was initiated by Energy Efficient Strategies Pty Ltd (EES) (Warragul, Victoria, Australia) as part of the Asia Pacific Partnership on Clean Development and Climate (APP).

The purpose of this project was to measure and collect standby power data from a range of common household appliances found on display in retail stores in two Central Eastern European countries. Furthermore, the project aimed at briefly assessing the collected data, in order to indicate the characteristics of a cross-section of the current appliance market. The project was carried out to contribute to the pooling of standby data to assist in international comparisons and to track trends in standby power over time at the national level. The project covered retail outlets in Hungary and the Czech Republic.

The data collection and analysis was done by Center for Climate Change and Sustainable Energy Policy (3CSEP) of the Central European University (CEU) during April-July 2008.

Table 2 below shows the tasks performed as required by the contract:

Table 2: Contract Tasks and Schedule

Task	**Schedule**
Preparation – composing team, contacting shops, purchasing of equipment, practice	1st April to 3rd of May 2008
Field work	7th to 14th of May 2008
Data check, validation of data file	18th of May to 15th of June 2008
Methodology report	1st of May to 8th of July 2008
Report	15th of June to 8th September 2008

Project Background

Reducing standby power consumption, which is the power used by appliances when they are not performing their primary or main function, has been recognized as one of the most cost effective potential end-use energy efficiency measures. While the amount of standby power varies markedly between countries, the global energy consumption from standby has been estimated by the International Energy Agency (IEA) at between 200 TWh and 400 TWh per year.

A rough estimate for the situation in Czech households was made under the REMODECE project[1] carried out in 2006-2008. In the 115 households metered for a period of around 2 weeks under the project, the average standby power was found to be 40W to 50W. This project established the average standby power of the installed stock of appliances in selected homes.

In the 1990s, the IEA encouraged the development of a national 1 Watt standby consumption target culminating in a call to action in 2000[2]. Although the IEA has enabled and encouraged members to combat excessive standby consumption, there is no general global consensus on a uniform approach at this stage. At the International Standby Conference in Canberra, government, industry and efficiency advocates agreed that international cooperation, data sharing and early communication with stakeholders are essential to overcome excessive standby power.

Standby power is now used by a myriad of electronic products. Most people will be familiar with a television with a remote control. When the remote control is used to turn the television off, the television still uses some power to keep the remote control circuit active so that the remote control can be used to turn the TV on again. This is one form of standby power.

Some 20 years ago, almost no product used any power when not performing its main function. Now, "standby power" is present on a huge range of products and used to power a wide range of modes and functions (Figure 1). The many small lights emanating from appliances seen at night is a demonstration of the pervasiveness of standby power. Standby power can deliver a range of functions desired by the end-user (clocks, remote controls, communications, sensors, controllers) but it can also be due to poor design and through the use of inefficient components.

While global understanding of standby power is growing rapidly within governments and efficiency advocate circles, there is still little comparative data available which indicates the range of standby levels found in typical products and whether these power levels are improving or deteriorating over time. The level of information currently varies substantially by country, and no simple metric exists to compare data between even those countries that collect data. Moreover, the availability of data on standby consumption is especially scarce in the region of Central and Eastern Europe. The current project is the first one of this character and scope to be carried out in the Czech Republic.

There is growing international pressure from governments for manufacturers to reduce standby levels on new products so that they still deliver the same or improved functions, but use much lower levels of power than are delivered to the market today. Various studies have estimated that global standby power levels could be reduced to less than 30% of current levels using existing technology with little additional manufacturing cost. To facilitate this though, information is needed to track what is

[1] More information on the project for the Czech Republic can be found at http://www.svn.cz/remodece/.
[2] International Energy Agency (IEA). 2001. Things that go blip in the night: standby power and how to reduce it. Paris: IEA/OECD

happening in the global market, to help inform all market players and to track the effectiveness of standby reduction policies.

This study aims to provide a quantitative assessment of standby and off mode power levels for a selection of new products offered for sale in the Czech Republic in 2007/2008. This will provide an important benchmark against which to assess future trends in standby power in this country.

Definition of "standby" in this study

Appliances and equipment with a "standby mode" may include any household product that consumes power while not performing its primary function. "Standby" is better defined under various modes (Figure 1) and for the purpose of this research, standby modes were defined as set out below. These definitions and names below have been devised for the purpose of facilitating field data collections and are not intended to form an international mode naming system.

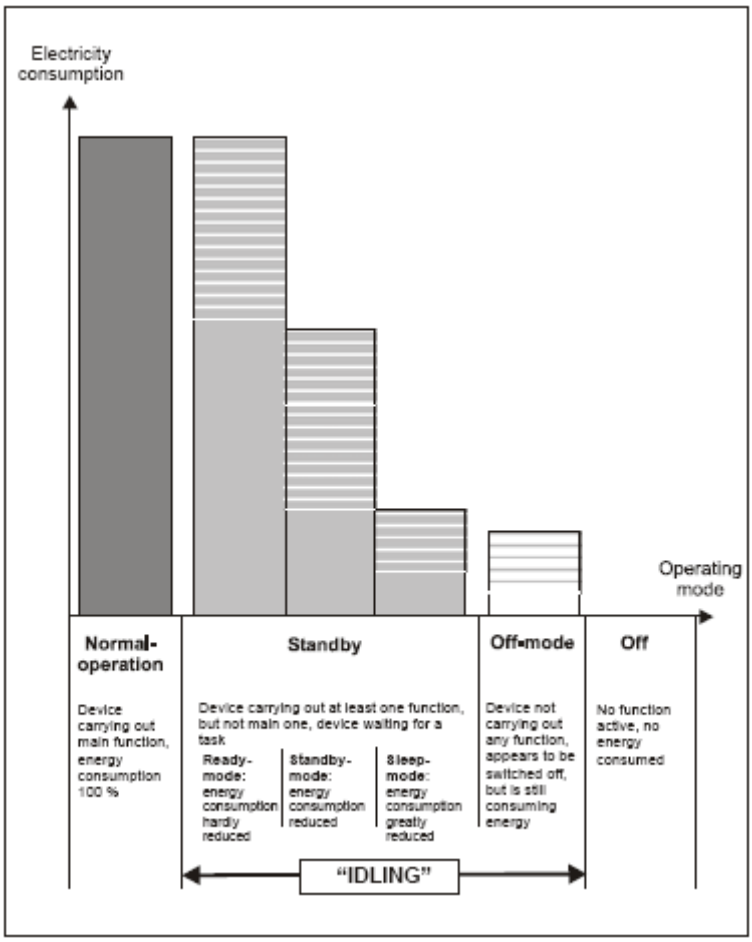
Off:
When a product or appliance is connected to a power source but does not produce any sound or picture, transmit or receive information or is waiting to be switched "on" by the consumer. If the product has a remote control, it cannot be activated by the remote control from off mode. While the product may be doing some internal functions in off mode (e.g. memory functions, EMC filters) these are not obvious to the user.

Passive Standby:
When a product or appliance is not performing its main function but it is ready to be switched on (reactivation function, in most cases with a remote control) or is performing some secondary function (e.g. has a display or clock, sensor etc.). This mode also applies to power supplies for battery operated equipment (portable appliances which are intended to be used when disconnected from the base station) when the appliance is not being charged.

Active Standby:
Active standby is mostly applicable to VCRs and some stereo equipment where operating involves some mechanical drive (including appliances like DVD and CD players). Active standby is when the appliance is on but not performing its main function. For example, a VCR may be on but not playing or recording. This mode also applies to power supplies for battery operated equipment (portable appliances) when the appliance is being charged (various sub-modes).

Delay Start:
Delay start mode is fast becoming common place in many major appliances. Essentially the appliance can be programmed to begin functioning at a later time, in some cases up to 24 hours later. Appliances left in this mode are in neither active nor passive standby and therefore it was decided to measure this mode as a separate category, even though this is a short duration mode. The frequency and duration of this mode and its effect on energy consumption will largely be determined by consumer behaviour.

Figure 1: Different Modes of Appliances[3]



Source: Schlomann *et al.* 2005.

[3] Source: Schlomann, B. Cremer, C., Friedewald, M., Georgieff, P., Gruber, E., Corradini, R., Kraus, D., Arndt, U., Mauch, W., Schaefer, H., Schulte, M. and Schröder, R. 2005. *Technical and legal application possibilities of the compulsory labelling of the standby consumption of electrical household and office appliances*. Summary of the final report for the Federal Ministry of Economics and Labour. Project no. 53/03. Karlsruhe: Fraunhofer-Institute for Systems and Innovation Research

Methodology

Data in this Report

Data in this report was collected in the Czech Republic during May 2008. Field data collection was undertaken on contract by Center for Climate Change and Sustainable Energy of the Central European University as part of the international "basket of products" standby project. The data collection was funded by Australian Government's Department of the Environment, Water, Heritage, and the Arts as part of the *Alignment of National Standby Power Approaches Project* under the *Asia Pacific Partnership on Clean Development and Climate*.

A standard "basket of products" is being measured in many countries in order to allow international comparison of standby power. The purpose of these standby measurements on a common set of products is to allow quantitative national and international comparison of like products across different countries and regions. Such measurement will heighten the awareness of stakeholders of the magnitude of standby power and will provide a focal point to highlight differences across regions. Such measurement will demonstrate the effectiveness of the policy mix used in individual countries and promote products that meet the standby power challenge. See Appendix A for more details.

Table 3 below shows the products that data was collected on as part of this project:

Table 3: Appliance Types and Numbers

Appliance	Number of Appliances
Computers – Laptop	*25*
Computers – Monitor	26
Computers – Speakers	*17*
Dishwasher	*26*
Stereo – Integrated	30
Stereo – Portable	32
DVD Player	30
DVD Recorder	*6*
Espresso Machine	*27*
Fan	*11*
Hard Disk Recorder	*18*
Home Theatre System	*17*
Microwave	29
Multi Function Device	20
Printer – Inkjet	14
Printer – Laser	5
Set Top Box	*24*
Toaster	*30*
TV – CRT	19
TV – LCD	31
TV – Plasma	9
Washing Machine Front Loader	30
Hand-Held Vacuum Cleaners	*16*
Cordless Phone Base Station	*12*
Washing Machine Top Loader	27
External Power Supplies	30
Total	**561**

Note: The number of products measured for this exercise is listed in the table. Appliances of the core basket are in normal font and italicized appliances belong to the secondary products.

Data was collected using a standard data collection instrument and the protocol provided by Australia. The expected modes are described above (Definition of "standby") and in the appendices.

Equipment and Preparation

The approach used for this study was to measure data on new appliances and equipment on display in retail outlets. Permission to undertake these measurements was obtained in advance from the store managers.

For each appliance, power consumption was measured while the appliance was in use, in standby (passive and/or active) and off, where applicable. Clearly for many appliances such as washing machines and dishwashers, it was impractical to measure the appliance in use. For most of these products there is a performance standard that adequately covers the 'in use' mode consumption. Information on the relevant modes is found in Appendix B. The data were collected using the metering equipment **Voltcraft Energy Logger 3500**. The logger has a resolution of 0.1W, and a precision of ±1% with 1 digital place.

In total, 561 products were measured, resulting in 1034 measurements being recorded for all the relevant modes during the survey. The metering was carried out in three shops: two of which specialized in electronics and household appliances; **Electroworld** and **Euronics**, and one

hypermarket; **Hypernova** (owned by AHOLD Czech Republic, a.s.). In the Czech Republic, it was particularly difficult to get the retailers to participate in the project. The retail stores were contacted via telephone, email, as well as personal visits, however, a large degree of skepticism and mistrust existed among both the retail and management staff towards the metering project. It is hoped that when future surveys are conducted, increased trust due to the present project will improve their cooperation.

Furthermore, one shop, which originally agreed to the metering, actually turned into an online shop during the time of conducting the contract (which also reflects the general trend in the home appliances and electronics market).

The incentive of offering to act as collaborators to the project, possibility to obtain the data and publishing their brand in the national report and on the website of the project, have proved to be very helpful incentives for the stores to participate.

Once participation was agreed, the store managers as well as the retail staff were very cooperative during the metering exercise, helping the Czech team significantly. In particular, the managers helped with organizing the metering in another branch shop to cover a larger number of appliances. Retail staff were also helpful when appliances (or parts, such as the power cord) needed to be unpacked or when preparing them to be metered (especially the case of batteries being put into laptop one day in advance, so that they were ready for the team to meter).

There were several problems occurring during the survey which made some appliances in the stores impossible the measure, despite the helpfulness of the personnel. Such difficulties include:

- appliances that were difficult to access without disturbing the store display (positioned too high or too close together – e.g. washing machines);
- shop fixture design did not allow access to power cords without removing shelving and panels;
- the model on display was not a working model;
- appliances locked in cabinets for security reasons;
- display appliances were hard wired or built in.

Limitations of the Data

The following limitations apply to data measured as a part of this survey:

- Simple meters have been used - while these usually have good accuracy, there may be some exceptions for products with highly distorted current waveforms.
- Regulation of voltage or test conditions is not possible during store measurements.
- Product stability cannot be guaranteed during field measurements.
- Products with short duration modes or with power management may give a false short term reading if this feature is not obvious during the measurement process.
- Sometimes remote controls were not available so some modes could not be activated for some products.
- Some products, such as batteries or remote controls remain in their packaging and cannot be opened for measurement in the retail shop.
- Some products, such as washing machines or dishwashers could not be set on active mode, as they immediately started washing. Similarly, some appliances could not be switched to delay start mode.
- The standard in use mode was not always possible to start due to screen settings for televisions and monitors, while the more accurate test in accordance with the IEC test method was not available for the current project.
- Several appliances, such as cordless phones or hand held vacuum cleaners, were not plugged in before metering; therefore were being charged when metered.

These limitations apply to data in this report.

Acknowledgements

The data in this report was collected under the Center for Climate Change and Sustainable Energy Policy of the Central European University and its staff. The researchers that carried out the data collection and the analysis in the Czech Republic were:

- Diana Ürge-Vorsatz (project leader)
- Michaela Valentová (coordination and data collection in CZ and contribution to project report)
- Alena Kováčová (data collection in CZ)
- Tibor Schwarz (data collection in CZ)
- Benigna Boza-Kiss (preparation of project, consultation, contribution to project report)

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Last, but not least, the Czech team would like to thank particularly the participation of the retail shops of Electroworld, Euronics and Hypernova, and will always be specially grateful for the helpfulness and cooperation of the management and staff.

Notwithstanding the many individuals and organisations that have assisted during this project, the content and form of this report, and all of the views, conclusions and recommendations expressed in it, are those of CEU.

While the authors have taken every care to accurately report and analyse the data, the authors are not responsible for any use or misuse of data or information provided in this report nor for any loss arising from the use of this data.

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The data were gathered with cooperation of the following companies:

Results

Overview

The following 26 appliance types were tested during the 2007/08 store survey in the Czech Republic:

- Computers - Laptop
- Computers - Monitor
- Computers - Speakers
- Cordless Phones – Base Station
- Dishwashers
- DVD Players
- DVD Recorders
- Espresso Machines
- External Power Supplies
- Fans
- Hard Disk Recorders
- Hand-held Vacuum Cleaners
- Home Theatre Systems
- Microwaves
- Multi Function Devices
- Printers – Inkjet
- Printers – Laser
- Set Top Boxes
- Stereos – Integrated
- Stereos – Portable
- Toasters
- Televisions – Plasma
- Televisions – LCD
- Televisions – CRT
- Washing Machines – Top Loader
- Washing Machines – Front Loader

The following section details the results by appliance type. The analysis is divided according to appliance category: major appliances, office equipment, home entertainment, small appliances and other.

The appliances were metered in their active standby, passive standby and off mode. In addition to this, basic characteristics, relevant to the respective appliance type, were collected. These included the brand, model and prize of the appliance, as well as particular features, such as presence of a remote control, size of the appliance (screen in the case of televisions, kilograms in the case of washing machines and other) or presence of an energy label.

Total of 561 appliances were metered in the 2007/2008 store survey in the Czech Republic. The average values of each appliance type in the respective modes (off, passive standby and active standby) are presented in Table 4.

Table 4 Average Power in Three Modes for All Appliance Types in the Czech Standby Survey

Appliance	Number of metered appliances	Average of Power – Off (W)	Average of Power – Passive (W)	Average of Power – Active (W)
Computers - Laptop	25	1.2		
Computers - Monitor	26	0.6	0.7	
Computers - Speakers	17	2.7		4.8
Cordless Phone Base Station	12		1.5	2.3
Dishwasher	26	0		2.3
DVD Player	30	0	1	6.1
DVD Recorder	6	0	3	17
Espresso Machine	27	1.6		
Fan	11	0		
Hand Held Vacuum Cleaner	16		1	4
Hard Disk Recorder	17		5	22.7
Home Theatre System	17	0	0.8	18.3
Microwave	29	0	2	
Multi Function Device	20	1.7		5.5
Printer - Inkjet	14	0.7		2.7
Printer - Laser	5	0		9.7
Set Top Box	24	0	5.7	6.9
Stereo - Integrated	30	0	3	10.7
Stereo - Portable	32	1.1	1.4	4.4
Toaster	30	0.1		
TV - CRT	19	0	4.1	
TV - LCD	29	0.2	1	
TV - Plasma	9	0.5	0.7	
Washing Machine Front Loader	30	0.4		2.6
Washing Machine Top Loader	27	0.4		2.6
External Power Supplies	30		0.4	

In most cases, the average off mode power level at the appliances types was less than 1W (18 out of 23 appliances types[4]). Out of the sample, 326 appliances were metered in their off mode. The highest off mode power from the entire sample was 9.2W, which was found at computer speakers. On the other hand, the average off mode power of multi functional devices was 1.7W and off mode of computer speakers was found to be as high as 2.7W.

In 292 cases, the passive standby mode was measured. The average power in this mode was 2.6W. In 28 cases the metered power in this mode was 0W or 0.1W. On the other hand, in 17 cases the appliances drew more than 10W. Among the appliance types, the highest average passive standby power was found for Hard Disk Recorders and Set Top Boxes (5 W and 5.7 W respectively). In 7 appliance types out of 15, for which the passive standby mode was metered, the average power level was 1 W or lower.

[4] At four appliance types the off mode was not metered; this was either by definition (hand held vacuum cleaners, cordless phones, external power supplies) or because the off switch was not present at all at the appliances in our sample (hard disk recorders).

Active standby mode was metered for 289 appliances. The average power level of all the appliances in active standby mode was 6.9W. Only in six cases was the power level lower than 1W. In contrast, in more than 20% of the cases, the active standby mode power values reached more than 10W (and up to 30W). This was mostly the case for Hard Disk Recorders, DVD recorders or Home Theatre Systems (22.7 W, 17 W and 18.3 W respectively). In general, no appliance type reached the power level in active standby mode lower than one 1 W on average. The lowest average active standby mode power was measured for washing machines (2.6 W), dishwashers (2.3 W), cordless phone base stations (2.3 W) and inkjet printers (2.7 W).
In the next section, the results are presented in more detail, separately for each metered appliance type.

Product Profiles

Major appliances

Dishwashers

There were 26 dishwashers metered in total in their active, off and delay start modes, where applicable. As shown in Figure 3, when switched off all the dishwashers drew 0W[5] (Figure 3). In active standby mode, when ready to start washing, the average power of the dishwashers was 2.3W (Table 5 and Table 52). There was one case in which the metered value in active mode was 17.6W. If this extreme value was removed, the average power in active mode would be 1.5W with minimum value of 0.6W. Interestingly, the dishwashers with an electronic display or a clock drew on average, less power in this mode than the ones without (averages of 1.2W to 1.7W, with and without a display, respectively). There were several dishwashers that were impossible to measure in this mode, as they would have started washing immediately. Among the fourteen dishwashers (54%) having the function of delay start, the average power in this mode was 2.2W (maximum 9.4W and minimum 0.8W). The dishwashers did not draw significantly more power when in delay start mode, compared to active standby.

Table 5: 2007/2008 Czech Republic Survey Dishwasher Results

Appliance	Dishwashers			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	13	2.2	9.4	1
Active	22	2.3	17.9	0.6
Passive	N/A	N/A	N/A	N/A
Off	26	0	0.2	0
Total number of units	26			

[5] One dishwasher drew 0.2W.

Figure 2: Czech Republic Survey 2007/2008 Dishwashers; Active Mode

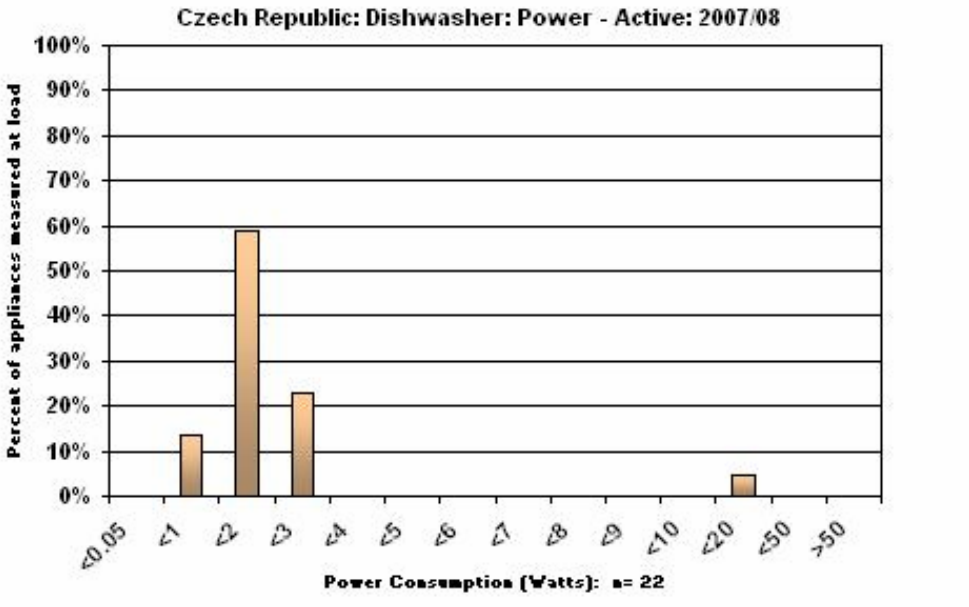
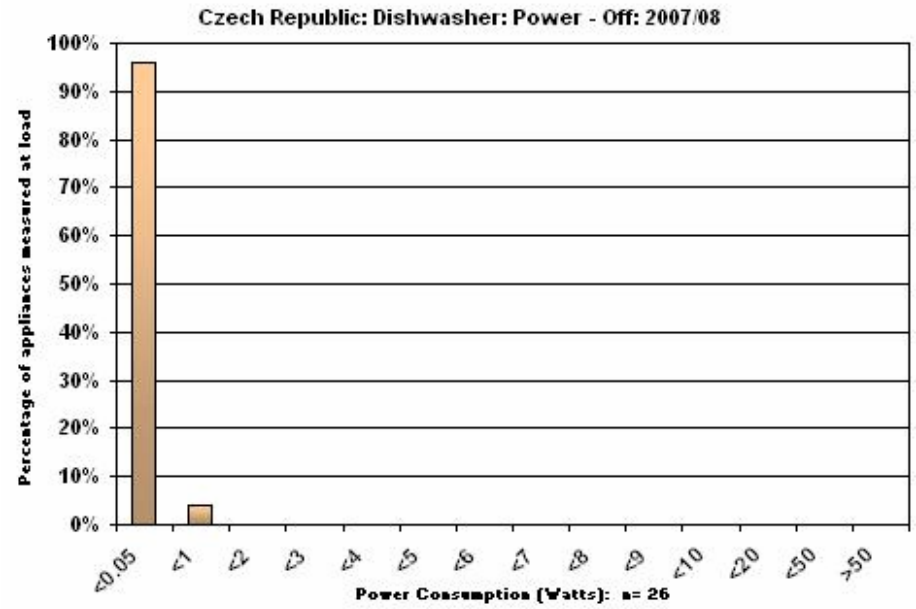


Figure 3: Czech Republic Survey 2007/2008 Dishwashers; Off Mode



More than half of the dishwashers (16 units) were designed for 12 sets of dishes; the rest can hold 4, 8 or 9 sets (1, 2 and 7 dishwashers respectively). All the dishwashers metered had a comparative energy label and all of them displayed the A class as defined by the EU directive (92/75/EEC). All the dishwashers except three had an "off" power switch and therefore could be switched off completely.

Washing machines

According to the project instructions, the washing machines were divided into two separate categories, depending on the way of loading them. In total, 57 washing machines were metered: 30 front loading and 27 top loading.

Front Loading Washing Machines

A total number of 30 front loading washing machines was included in this survey. Active standby, off mode and delay start, if applicable, were examined (Table 6). Average power in off mode was 0.4W, as some of the washing machines drew power even when switched off (average power of these units was 0.9W). This was mainly caused by presence of an electronic display, but one washing machine drew power in off mode even without a display or clock. Minimum value in off mode power was 0W and maximum 2.1W. When in active mode (ready to start washing), the front loading washing machines drew 2.6W on average (maximum 5.6W and minimum 0.6W). Active mode for washing machines with a display was 0.9W lower on average than units without a display (2.7W compared to 1.8W). Almost 75% of washing machines had a delay start function. When the delay start mode was set, the average power recorded was 3.3W (maximum 6.1W and minimum 0.7W). The counts for appliances in different power levels in active and off mode are shown in Figure 4 and Figure 5.

Table 6: 2007/2008 Czech Republic Survey Washing Machine – Front Loading Results

Appliance	Front Loading Washing Machine			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	19	3.3	6.1	0.7
Active	29	2.6	5.6	0.6
Passive	N/A	N/A	N/A	N/A
Off	30	0.4	2.1	0
Total number of units	30			

Figure 4: Czech Republic Survey 2007/2008 Washing Machine - Front Loading; Active Mode

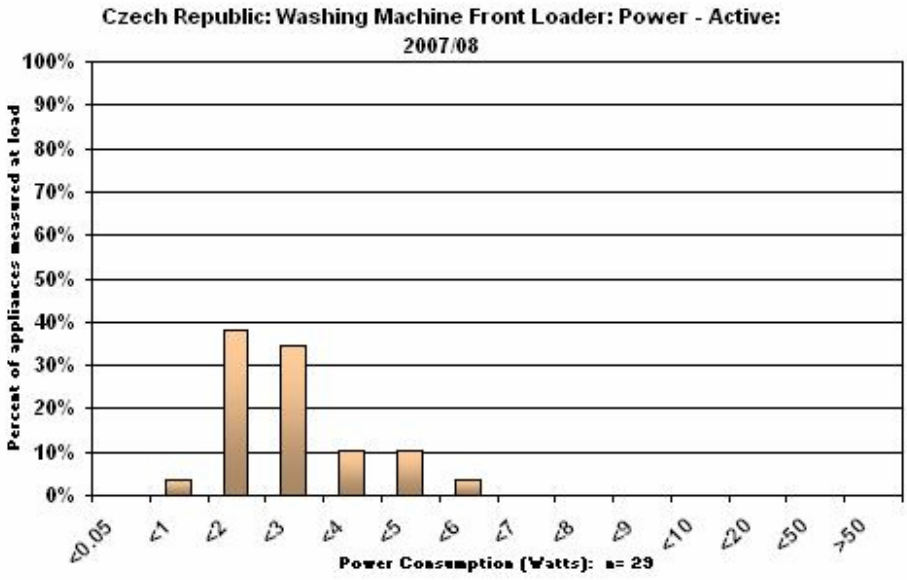
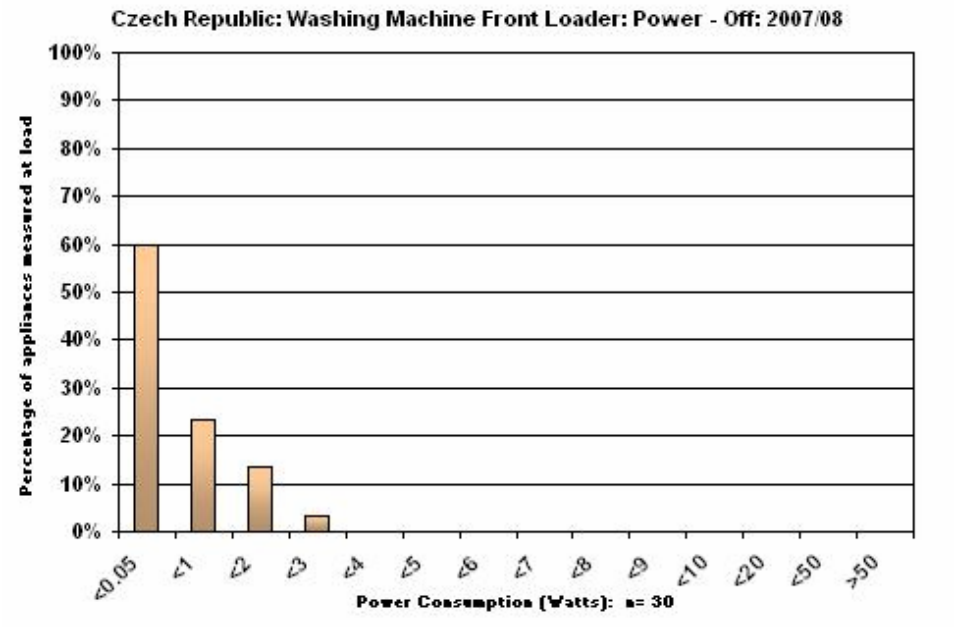


Figure 5: Czech Republic Survey 2007/2008 Washing Machine - Front Loading; Off Mode



Three quarters of the appliances (76%) were equipped with an electronic display. Similarly, 75% of the metered washing machines had a delay start function. All of the appliances had an off switch (often in form of a turning button for program start). All the washing machines except one, had the EU energy label displayed, with only A (17) and A+ (13) types being for sale. The loads of the washing machines varied from 3.5 to 8kg.

Top Loading Washing Machine

Twenty seven top loading washing machines were metered in the survey in active standby, off mode and delay start where applicable. The power levels are shown in Table 7. When switched off, the average measured power was 0.4W (maximum 1.4W, minimum 0W). As seen in Figure 7, most of the washing machines did not draw any power when switched off, but for 13 of them (48%), non-zero values have been recorded. Interestingly, most of these (54%) were appliances without an electronic display. The average power in active standby was 2.6W (maximum 5.2, minimum 1.1W). Figure 6 describes the distribution of different power levels. On average, the active standby power was 1.5W higher when an electronic display was present (an average power of 3.2W for those units that had a display compared to 1.7W in case of those without it). Delay start mode was found in 21 washing machines (77%). The average power in this mode was 3.8W (maximum 5.4W, minimum 1.5W).

Table 7: 2007/2008 Czech Republic Survey Washing Machine – Top Loading Results

Appliance	**Top Loading Washing Machine**			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	20	3.8	5.4	1.5
Active	27	2.6	5.2	1.1
Passive	N/A	N/A	N/A	N/A
Off	27	0.4	1.4	0
Total number of units	27			

Figure 6: Czech Republic Survey 2007/2008 Washing Machine - Top Loading; Active Mode

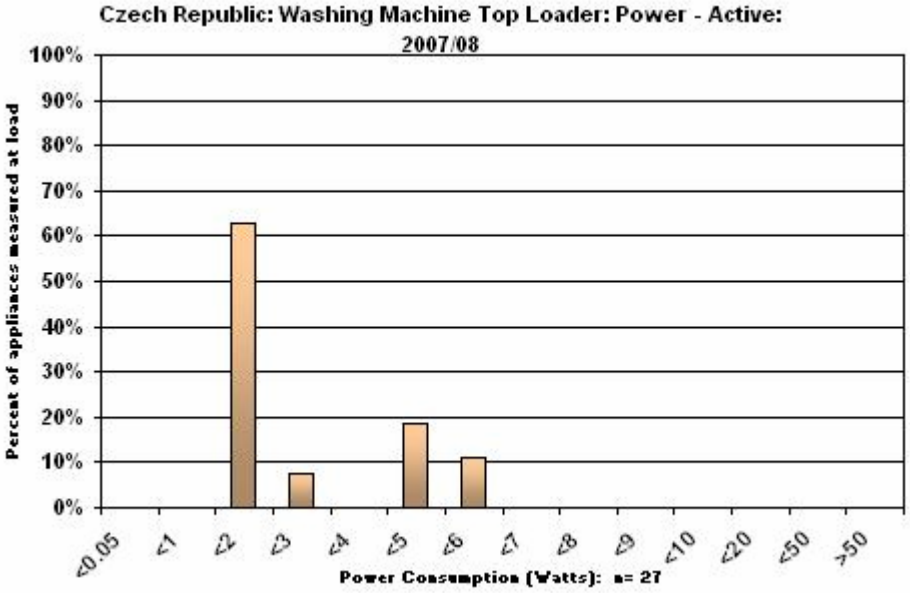
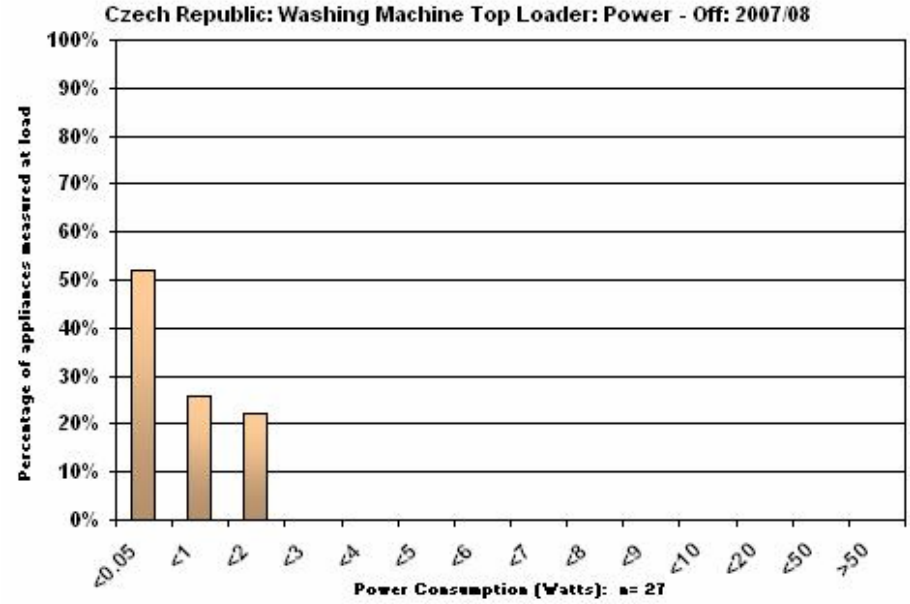


Figure 7: Czech Republic Survey 2007/2008 Washing Machine - Top Loading; Off Mode



One third of the washing machines had the A+ energy label, and two thirds were labeled as A. The values in all modes are very similar to the front loading washing machines, other characteristics show similar pattern, too. The main difference is in the available load; the top loading washing machines can only take from 5-6kg compared to 8kg and more in case of the front loaders.

Office equipment

Main appliances from the office equipment category were included in the survey. Namely, laptops, monitors, speakers, printers (laser and inkjet) and multifunctional devices (MFD) have been metered. Desktops were not included in the survey, because the number and variety sold in the stores was insufficient.

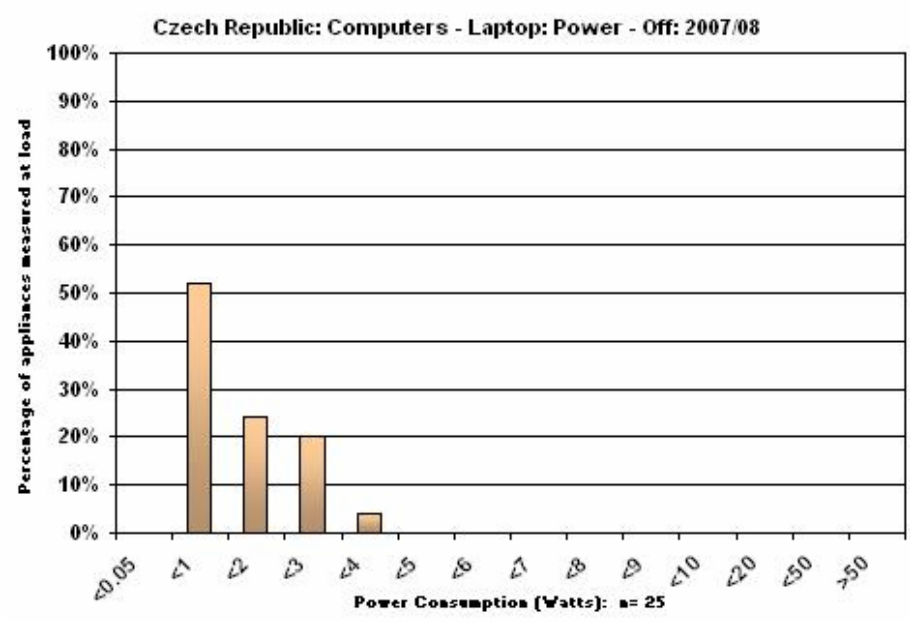
Laptops

Total of 25 laptops were metered during the 2007/2008 Czech store survey, all in the off mode (when switched off and battery charged). Table 8 shows that the average power in this mode was 1.2W with maximum of 3W and minimum 0.4W. In Figure 8, the distribution of the off mode measurements is illustrated.

Table 8: 2007/2008 Czech Republic Survey Laptop Results

Appliance	Laptop			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	N/A	N/A	N/A	N/A
Passive	N/A	N/A	N/A	N/A
Off	25	1.2	3	0.4
Total number of units	25			

Figure 8: Czech Republic Survey 2007/2008 Laptop; Off Mode



The average screen size was 15 inches (more than a half of the laptops with screen size 15.4”). All the laptops had an external power supply (discussed in a later section of this report). More than a third of the measured laptops (36%) displayed an Energy Star label. The average off mode power of these appliances was 0.93W. None of the laptops had an off switch and all but one, had a screen resolution of 1280x800 (considered a wide screen).

Computer Monitors

Of the 26 computer monitors measured during the survey, the off mode, passive standby and active standby, where possible, have been recorded (Table 9). When switched off, the monitors drew 0.58W on average (maximum 1.4W, minimum 0.3W). When in passive standby (monitor in "sleep mode"), the average power was 0.72W (maximum 1.5, minimum 0.4W). As seen from these values, there was only very small difference between the power levels in the two modes (less than 0.2W on average), and in 17 cases there was no difference at all. The metered values of passive and off mode are shown in Figure 9 and Figure 10.

Only for 4 cases was it possible to meter the "in use" mode of the monitors, none of the monitors was connected to the desktop and therefore most of them went into the sleep mode almost immediately after switching on. The average value of the in use power of the monitors was 30.1W (ranging from 25W to 34.2W), all the monitors were of the LCD type. CRT monitors are not sold in the participating stores anymore. Average size of the screen was 19.8", more than half of the monitors being of size 19". Only one monitor was equipped with an external power supply and more than 40% of the metered monitors displayed an Energy Star label. The passive standby and off mode powers of these appliances were slightly lower on average than the values of appliances without any energy label (0.68W and 0.62W respectively).

Table 9: 2007/2008 Czech Republic Survey Computer Monitor Results

Appliance	**Computer Monitor**			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	N/A	N/A	N/A	N/A
Passive	24	0.7	1.5	0.4
Off	23	0.6	3	0.4
Total number of units	26			

Figure 9: Czech Republic Survey 2007/2008 Computer Monitors; Passive Mode

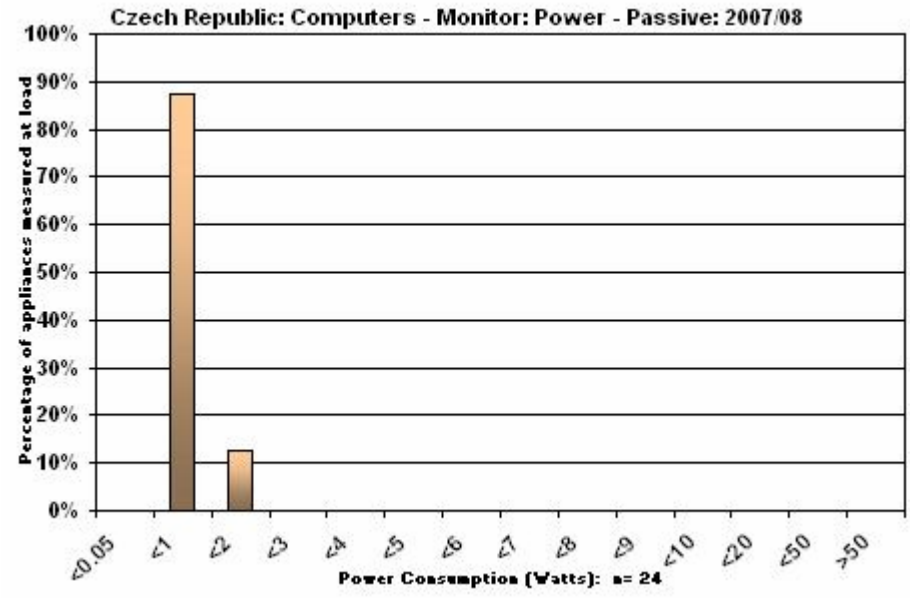
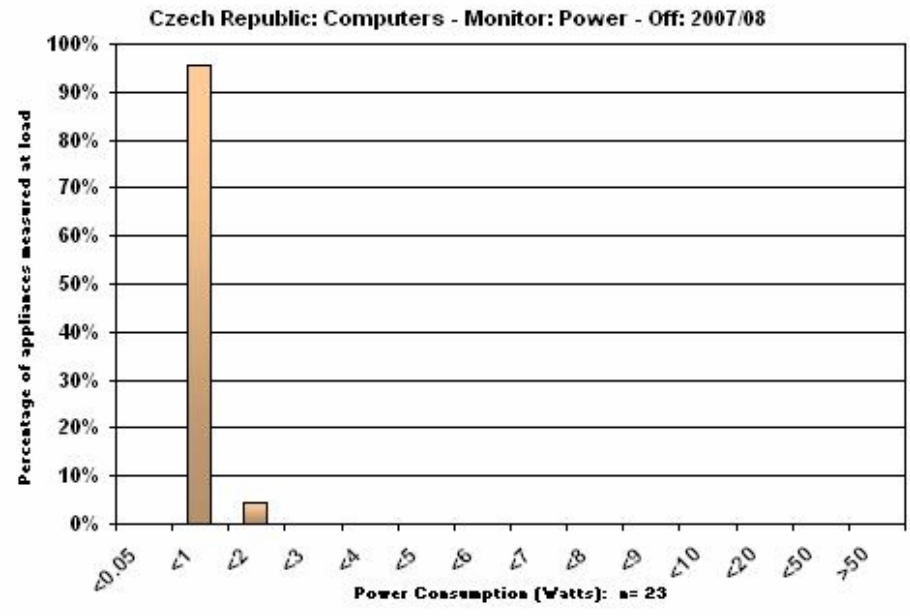


Figure 10: Czech Republic Survey 2007/2008 Computer Monitors; Off Mode



Computer Speakers

Computer speakers have been included into the survey as a rather common component of the household PC sets. A total of 17 speaker sets have been metered in active standby and off mode. Summary of the findings is shown in Table 10. In active standby mode (when switched on, but not producing any sound) the average power of the metered speakers was 4.8W (maximum 15.7, minimum 2.1W). When switched off, 70% of the speakers still drew some power – 2.7W on average when including the 0W values, 3.3W when excluding them (maximum 9.2W, minimum 0W). Figure 11 and Figure 12 demonstrate the distribution of the metered values. The number of speakers, including the subwoofers, was noted down for each appliance, speakers in a set varied from 2 to 6.

Table 10: 2007/2008 Czech Republic Survey Computer Speaker Results

Appliance	**Computer Speakers**			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	16	4.8	15.7	2.1
Passive	N/A	N/A	N/A	N/A
Off	17	2.7	9.2	0
Total number of units	17			

Figure 11: Czech Republic Survey 2007/2008 Computer Speakers; Active Mode

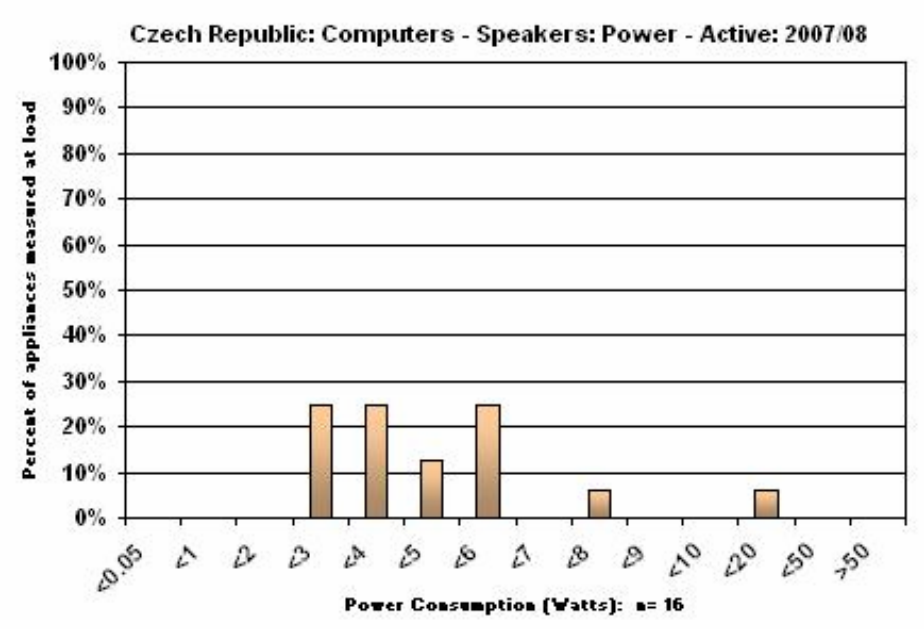
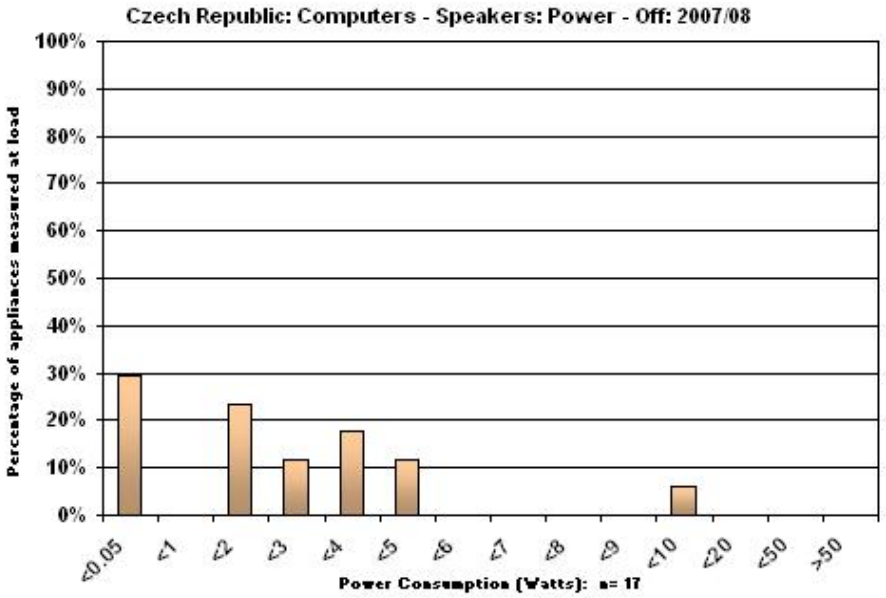


Figure 12: Czech Republic Survey 2007/2008 Computer Speakers; Off Mode



Multi Function Devices

A total of 20 multi function devices (MFDs) have been included in the Czech survey. Values in off mode, when the appliance is switched off, and active mode, when switched on but not performing any task, were metered and are summarized in Table 11. When switched off (all the appliances had an off switch), the average power drawn was 1.7W, the values ranged from 0W to as high as 6.3W. Average power in active standby mode was 5.4W with a range of almost 10W (from 2.8W to 12.7W). Three MFDs when switched on, showed an error, because of being switched on for the first time, which may have influenced the power level. In Figure 13 and Figure 14, distributions of active and off mode recordings are shown, respectively.

Table 11: 2007/2008 Czech Republic Survey Multi Function Device Results

Appliance	Multi Function Device			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	20	5.5	12.7	2.8
Passive	N/A	N/A	N/A	N/A
Off	20	1.7	6.3	0
Total number of units	20			

Figure 13: Czech Republic Survey 2007/2008 Multi Function Devices; Active Mode

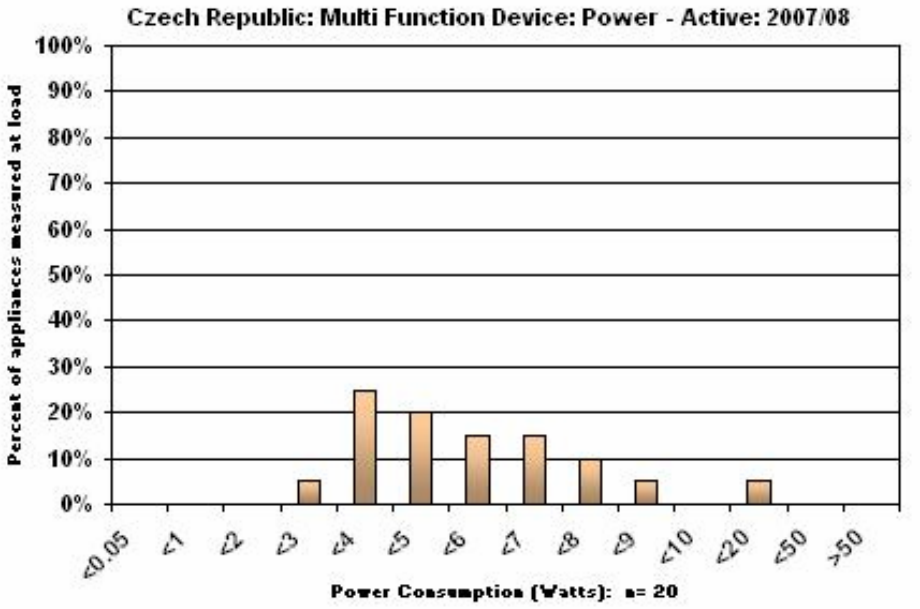
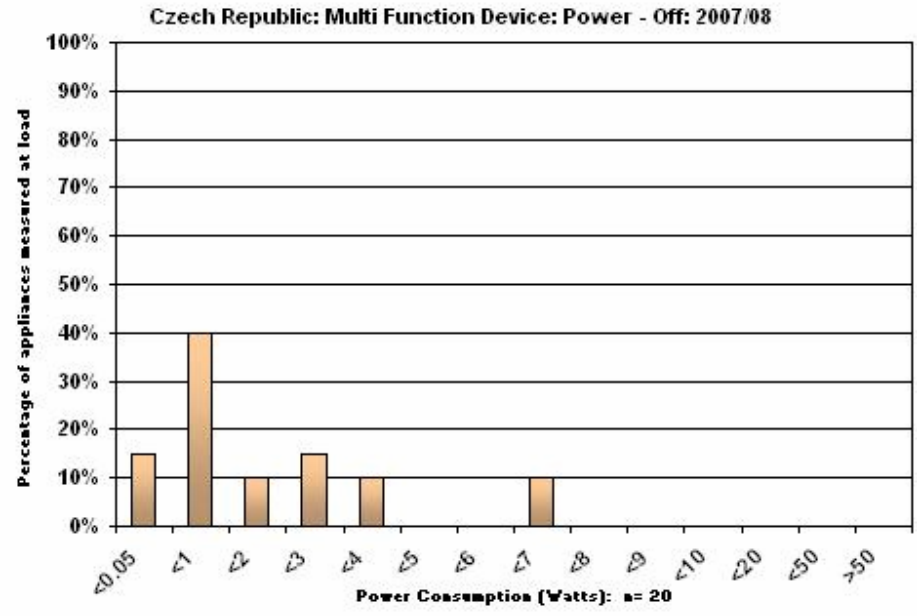


Figure 14: Czech Republic Survey 2007/2008 Multi Function Devices; Off Mode



More than 65% of the multi-functional devices displayed an Energy Star label. Passive standby of these appliances was less than half of the average, however active standby power was higher than the average active standby power of the total MFD sample (5.9W). There were three laser multifunctional devices and all of these (as opposed to the rest, which were inkjet MFDs) used 0W power when off.

Inkjet Printers

In the Czech survey, 14 inkjet printers have been metered. Off mode (when switched off) and active standby mode (when switched on but not performing any function) have been recorded. Average value of the off mode was 0.7W with the extreme values of 0W and 2.4W. In active standby, the appliances drew 2.7W on average, with maximum 7.8W and minimum 1.3W. The results are shown in Table 12, Figure 15 and Figure 16.

Table 12: 2007/2008 Czech Republic Survey Printer - Inkjet Results

Appliance	Printers - Inkjet			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	13	2.7	7.8	1.3
Passive	N/A	N/A	N/A	N/A
Off	14	0.7	2.4	0
Total number of units	14			

Figure 15: Czech Republic Survey 2007/2008 Printer – Inkjet; Active Mode

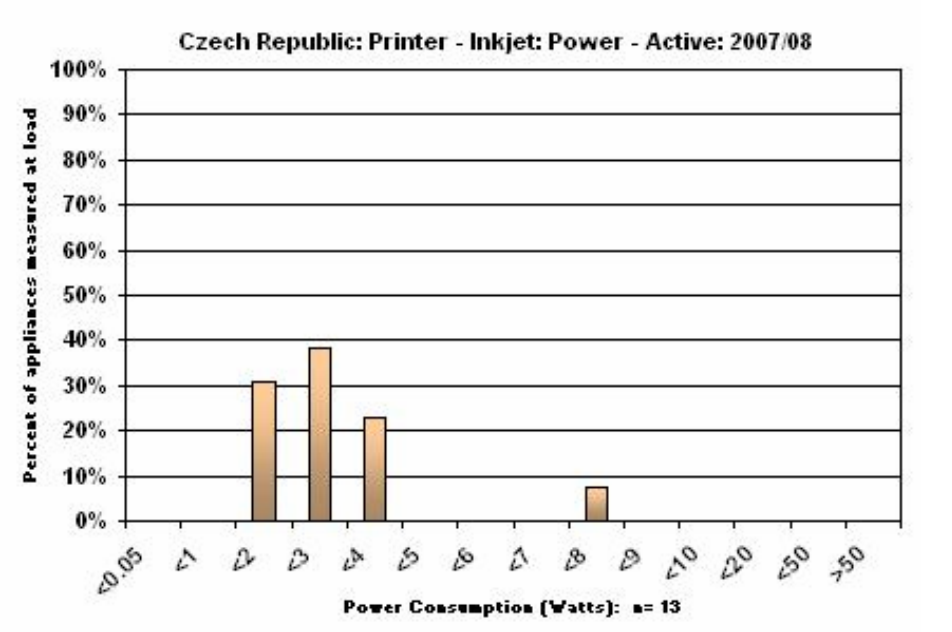
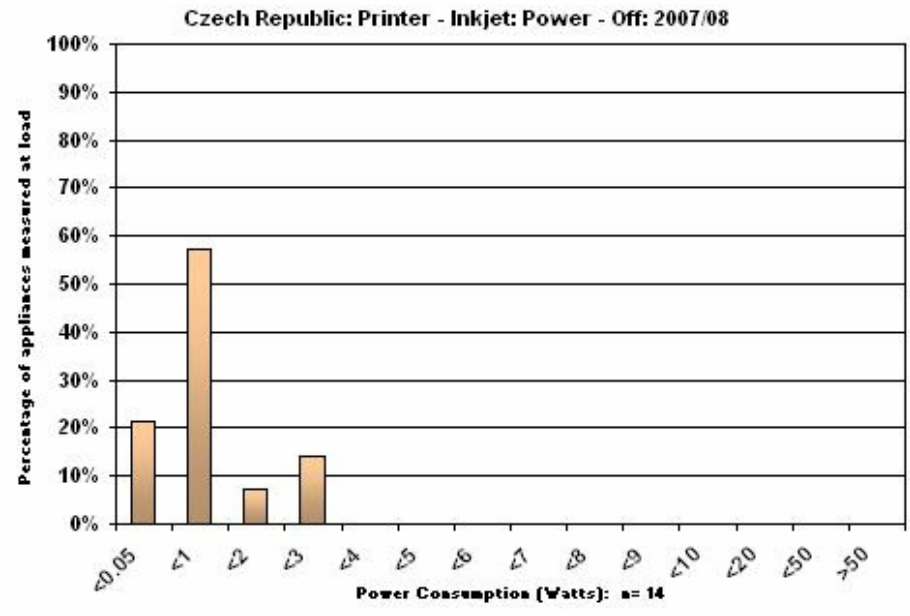


Figure 16: Czech Republic Survey 2007/2008 Printer – Inkjet; Off Mode



Half of the metered printers displayed an Energy Star label. The average off mode of these printers was 0.4W (almost half of the average of the total sample) and active standby power was 2W. One of the printers had a remote control and could only be switched to standby mode. One printer was the camera type[6] and one third of the printers had an electronic display. Both average off mode and active standby mode were higher in case of these appliances than the average (0.9W and 3.6W respectively).

Laser Printers

There were 5 laser printers included in the survey. Values in active standby and off mode have been recorded and are summarized in Table 13. In off mode, the power drawn by all of them was 0W. In active standby mode (when the printer is switched on, but not performing any task), the average power was 9.7W, with a minimum power of 5W. Maximum power in this mode was drawn by the only appliance with a display (19.2W). Distributions of both modes are illustrated in Figure 17 (Active standby mode) and 18 (Off mode). Three appliances displayed an Energy Star label.

Table 13: 2007/2008 Czech Republic Survey Printer - Laser Results

Appliance	**Printer - Laser**			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	5	9.7	19.2	5
Passive	N/A	N/A	N/A	N/A
Off	5	0	0	0
Total number of units	5			

[6] Printer adapted to print photographs.

Figure 17: Czech Republic Survey 2007/2008 Printers – Laser; Active Mode

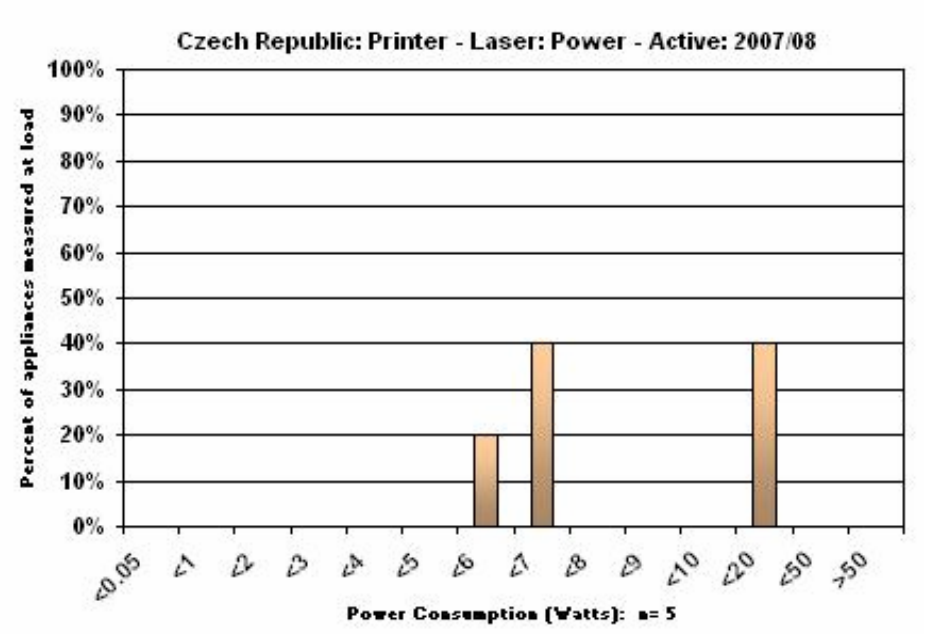
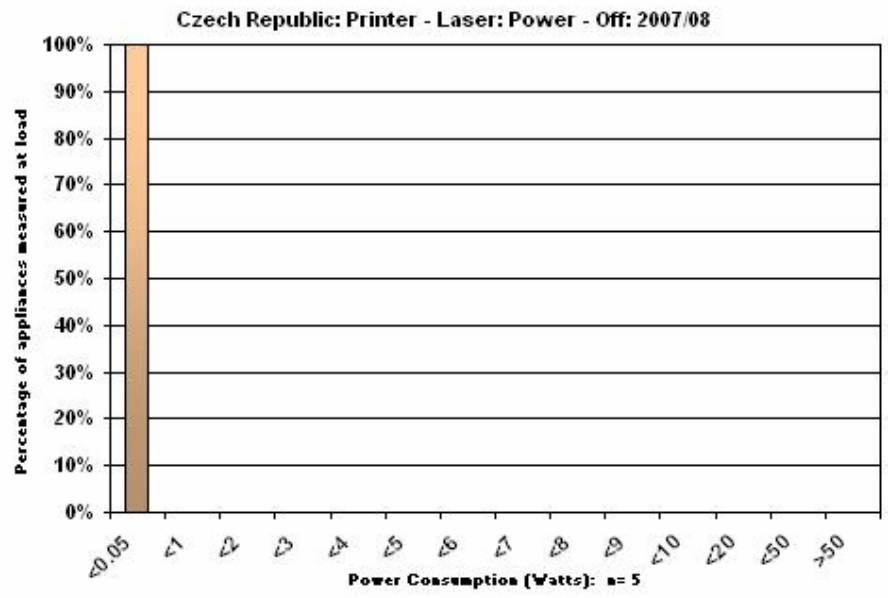


Figure 18: Czech Republic Survey 2007/2008 Printers – Laser; Off Mode



Home entertainment

Under the category of home entertainment appliances, the most common appliances, with high level of penetration in Czech households, were metered (such as televisions or stereos). In the meantime, new appliances, which are important from the point of their standby power and because their penetration is likely to increase in the near future, were also included (this is mainly the case of set top boxes, but also home theatre systems and hard disk recorders).

Integrated Stereos

There were 30 integrated stereos metered. Active and passive standby modes were noted down, and where relevant, also the off mode. The variance between the measured values was rather significant (Figure 19 and Figure 20). In passive standby mode, the average power metered was 3W, but the difference between maximum and minimum values was more than 13W (min 0W and max 13.7W). Even higher differences can be observed in active standby mode, where the average value was 10.7W, and maximum and minimum values 20.2W and 3W respectively (Figure 19 and Table 14). However, no major difference in the characteristics of the products, which would explain such a difference in values, was observed.

Table 14: 2007/2008 Czech Republic Survey Integrated Stereo - Results

Appliance	Integrated Stereo			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	29	10.7	20.2	3
Passive	29	3	13.7	0
Off	2	0	0	0
Total number of units	30			

Figure 19: Czech Republic Survey 2007/2008 Integrated Stereos; Active Mode

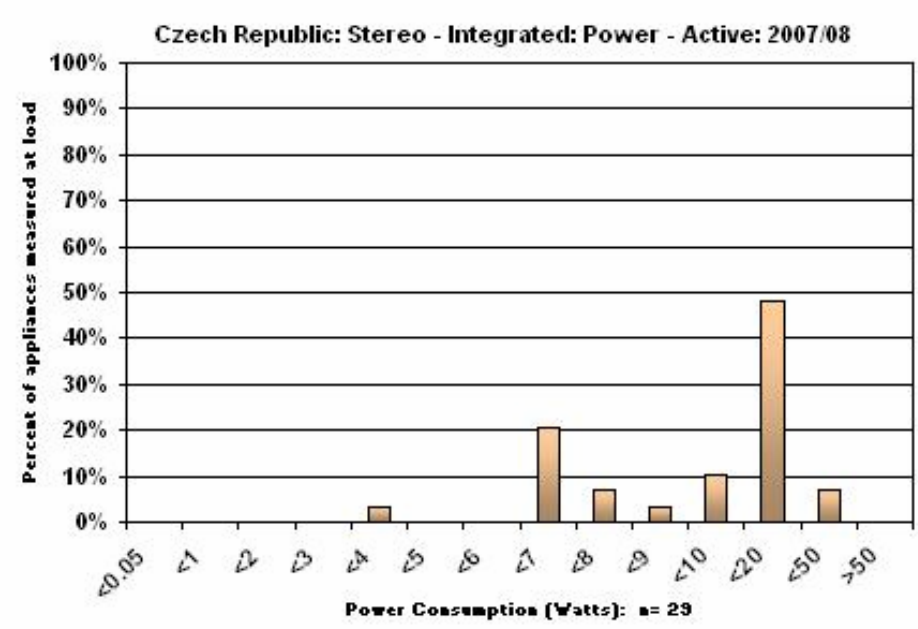
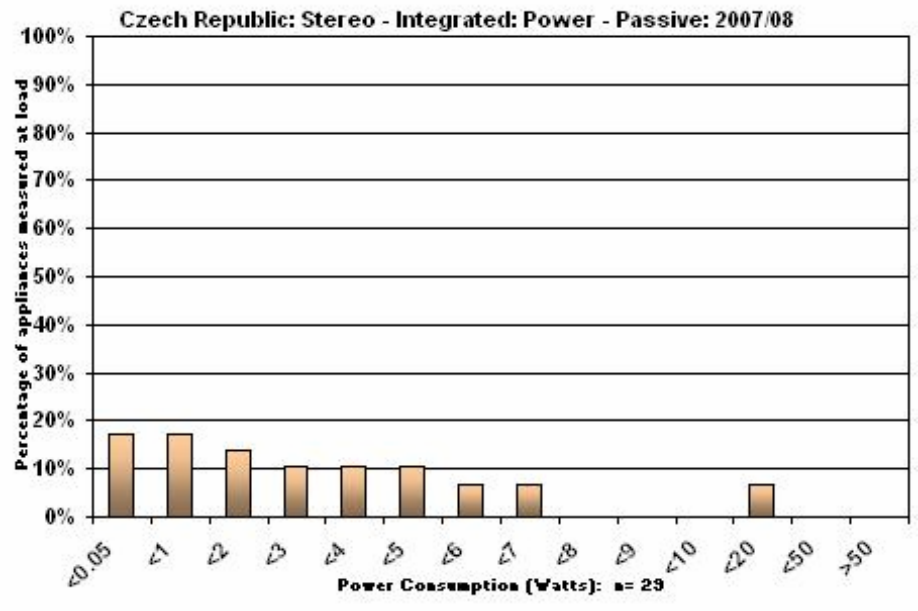


Figure 20: Czech Republic Survey 2007/2008 Integrated Stereos; Passive Mode



Two appliances had an off switch; the rest could only be switched to standby mode. Nevertheless, in 5 cases, even though in standby, the units drew 0W. All the appliances were equipped with a display. In our sample, only one appliance displayed an Energy Star label; however, neither the active standby, nor the passive mode were significantly lower than the rest of units (8.4W and 1W respectively).

Portable Stereos

During the survey in Czech stores, total of 32 portable stereos have been measured. More than a half of the portable stereos had a standby switch only, and so could not be switched off completely. Similarly, more than half of the stereos had a remote control. However, there was no correlation between these two characteristics – having only a standby switch does not mean automatically a remote and vice versa. Once the standby switch was present, the passive standby mode was measured; whereas in the presence of an off switch, only the off mode was measured. The average, maximum and minimum metered values in each mode are shown in Table 15.

Table 15: 2007/2008 Czech Republic Survey Portable Stereo - Results

Appliance	**Portable Stereo**			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	31	4.4	7.8	1.1
Passive	17	1.4	2.3.	0.7
Off	15	1.1	2.3	0.7
Total number of units	32			

Once the off switch was present in the appliance, the passive standby would have been relevant and metered only if the remote control was available at the same time. However, the remote controls could not be provided to the metering team and therefore the passive standby could not be measured in these cases. Average power of the units in off mode was 1.1W (with values ranging from 0.7W to 2.3W). For the appliances with standby switch, the average power in passive standby was 1.4W. The stereos

were also metered when in “aux input” or when “no disc” sign was on. The average power recorded in this mode (active standby) was 4.4W. The values varied significantly, from 7.8W to 1.1W. Distribution of values in each mode is shown in Figure 21, Figure 22 and Figure 23. None of the stereos were found to have any kind of energy or environmental label.

Figure 21: Czech Republic Survey 2007/2008 Stereos – Portable; Active Mode

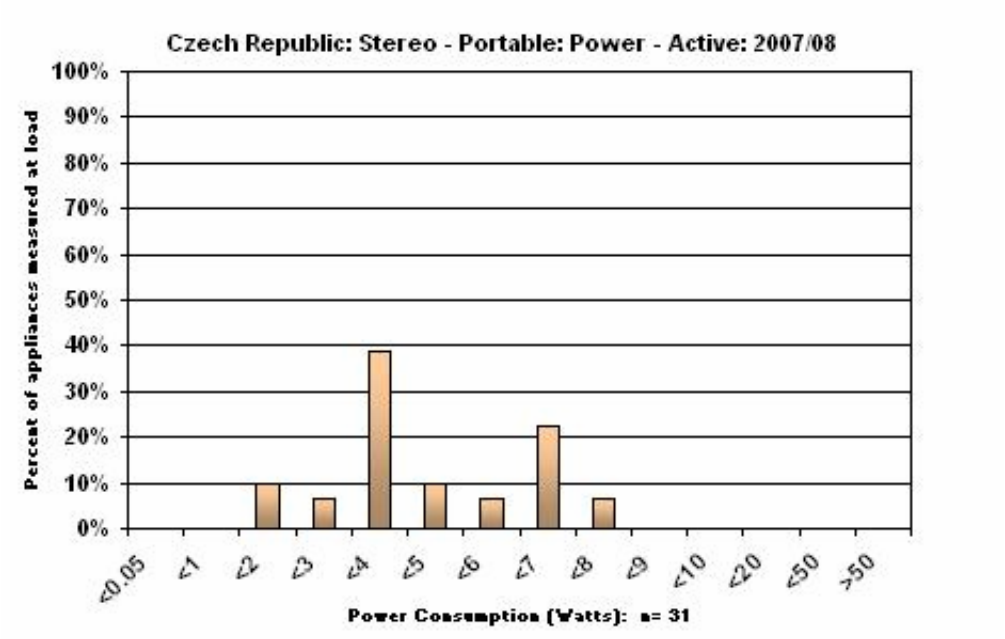


Figure 22: Czech Republic Survey 2007/2008 Stereos – Portable; Passive Mode

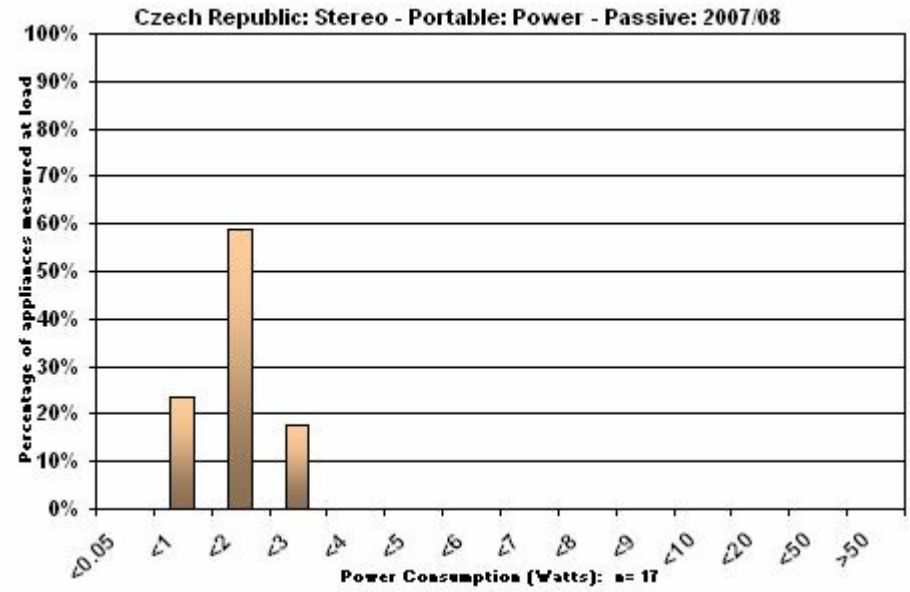
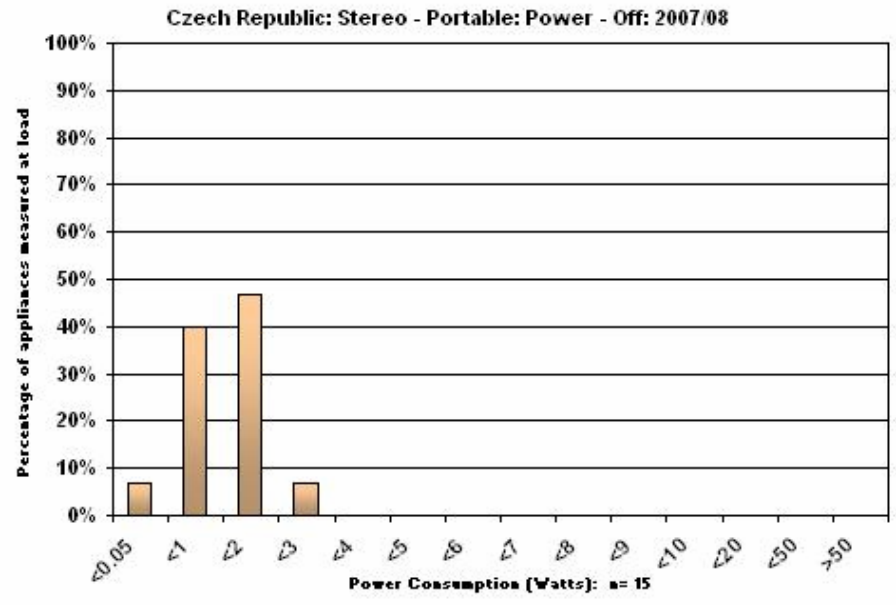


Figure 23: Czech Republic Survey 2007/2008 Stereos – Portable; Off Mode



DVD Players

In the survey, 30 DVD players were measured. These are different from the DVD or HD recorders in that they only play DVDs, but do not have any recording equipment. All the metered appliances had an electronic display and all were also equipped with a remote control. One fourth of the DVD players had a proper off switch (so they can be switched off completely), whereas the rest only had the standby button (which puts the appliance into passive standby, ready for remote control). In the presence of an off switch, power in off mode was metered. In each of the 8 cases, the off mode power was 0W (Figure 26). As the remote controls were not provided by the shop assistants, passive standby could not be measured for these 8 appliances (it was possible only in two cases). When only the standby switch button was present on the appliance, the power in passive standby was recorded. The average value was 1W, the highest value metered in this mode was 4.3W. Three of the appliances drew 0W even in passive standby. The distribution of values in passive standby mode is presented in Figure 25.

When put in active standby (with "no disc" sign on display), the average power drawn was 6.1W. The values varied from as high as 21W to only 3.2W (Figure 24). A summary of the findings is given in Table 16. There were three appliances displaying an Energy Star label. Their passive standby was lower than the average of all metered DVD players (0W in one case, 0.5W on average).

Table 16: 2007/2008 Czech Republic Survey DVD Player Results

Appliance	**DVD Player**			
Mode	**Number of measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	29	6.1	21	3.2
Passive	24	1	4.3	0
Off	8	0	0	0
Total number of units	30			

Figure 24: Czech Republic Survey 2007/2008 DVD Players; Active Mode

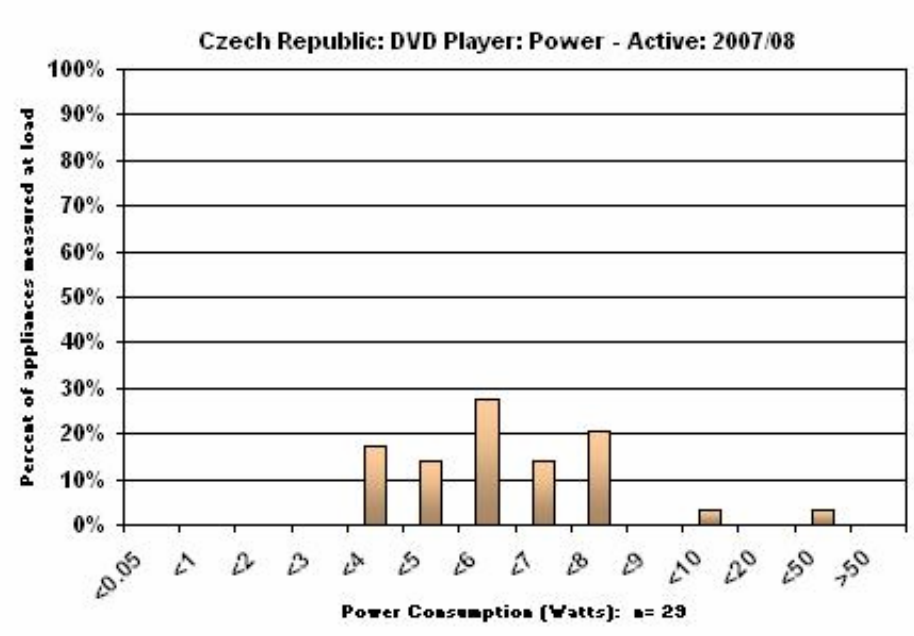


Figure 25: Czech Republic Survey 2007/2008 DVD Players; Passive Mode

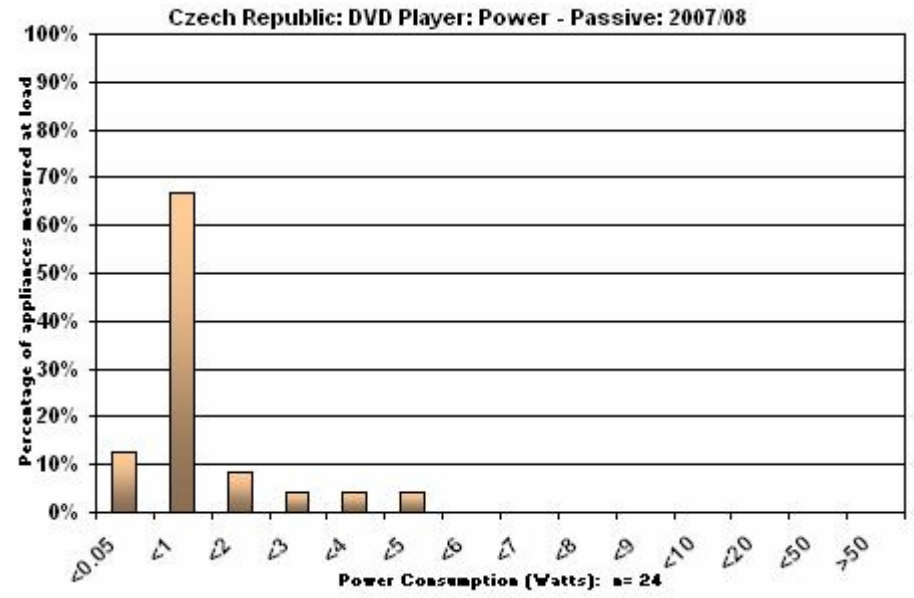
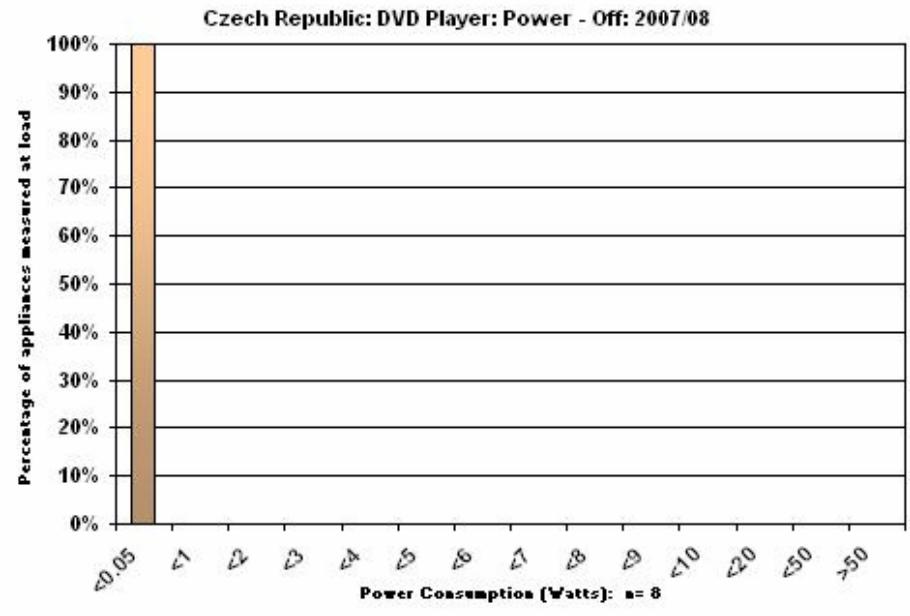


Figure 26: Czech Republic Survey 2007/2008 DVD Players; Off Mode



DVD Recorders

According to the project instructions a differentiation between DVD and Hard Disk Recorders has been made. Therefore, there were only 6 DVD recorders metered, as most of the recorders already include a hard disk and therefore fall in the other category.

The DVD recorders were metered in active standby (when switched on and displaying the "no disc" sign), in passive standby (when switched off, but ready to react to remote control) and in off mode where applicable. The metered values are summarized in Table 17.

The appliances averaged at 17W in active standby mode. The difference between maximum and minimum values was almost 20W (23.6W to 6.1W). Only one recorder had an off switch and the power in the off mode was 0W. Passive standby could not be metered in this mode, as remote control was not provided. Rest of the recorders only had a standby switch or no switch at all (in which case they can only be controlled by a remote). Average passive standby of these DVD recorders was 3W. There was no DVD recorder with any type of energy label.

Table 17: 2007/2008 Czech Republic Survey DVD Recorder Results

Appliance	**DVD Recorder**			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	6	17	23.8	6
Passive	5	3	5.2	1.1
Off	1	0	0	0
Total number of units	6			

Hard Disk Recorders

There were 17 hard disk recorders measured in the Czech survey. Passive and active standby modes have been recorded (in Table 18). Power in off mode was not relevant, as none of the appliances had an off switch.

Table 18: 2007/2008 Czech Republic Survey Hard Disk Recorder Results

Appliance	Hard Disk Recorder			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	17	22.7	29.3	6.1
Passive	17	5	13.8	1.9
Off	N/A	N/A	N/A	N/A
Total number of units	17			

Average power in passive standby (when appliance is switched off but ready to react to remote control) was 5W, 2W higher than at DVD recorders. The values ranged from 1.9W to 13.8W (Figure 28). In active standby (when the Hard Disk Recorder is turned on and "no disc" sign appears) the appliances averaged 22.7W with maximum 29.3W and minimum 6W (however, this was the only low reading, the rest of readings were above 19W). The range of values is shown in Figure 27.
The size of the hard disk was 160GB, 250GB and in one case 320GB. None of the metered Hard Disk Recorders had an energy label.

Figure 27: Czech Republic Survey 2007/2008 Hard Disk Recorders; Active Mode

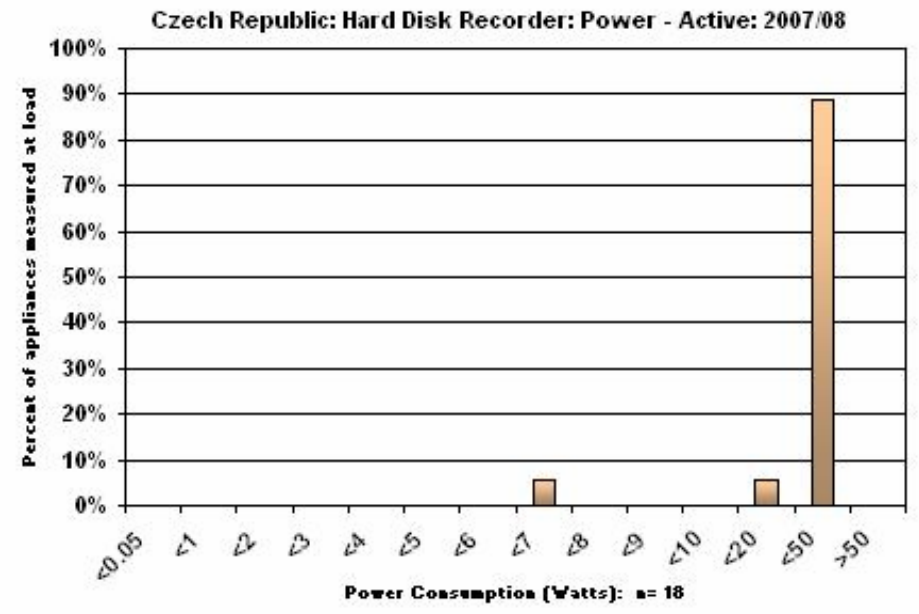
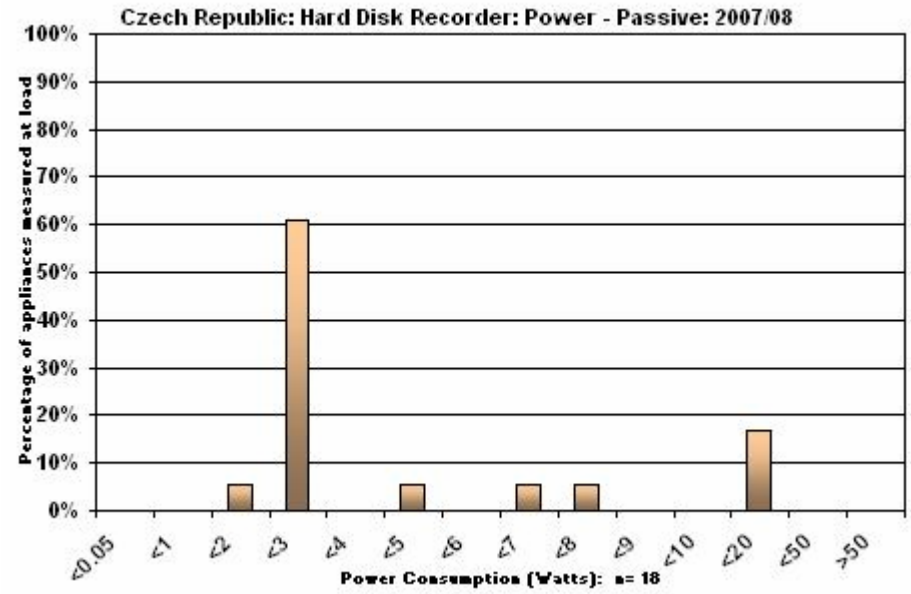


Figure 28: Czech Republic Survey 2007/2008 Hard Disk Recorders; Passive Mode



Home Theatre Systems

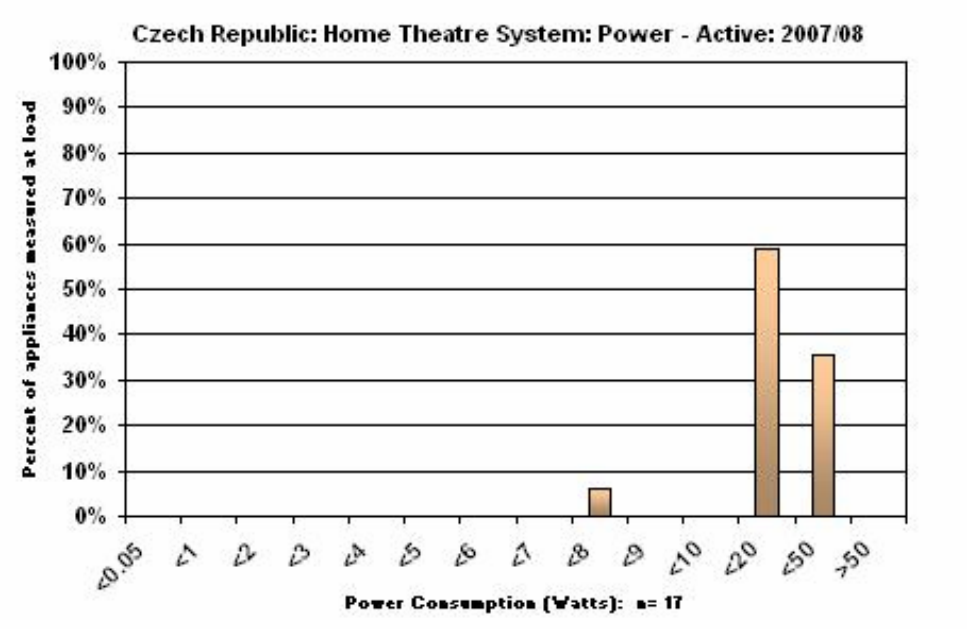
In the Czech survey, 17 home theatre systems were metered. As seen in Table 19, active and passive standby modes were recorded. Only one appliance had an off switch, in which case the off mode power was recorded, too.

Table 19: 2007/2008 Czech Republic Survey Home Theatre System Results

Appliance	**Home Theatre System**			
Mode	**Number of measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	17	18.3	31.6	7.3
Passive	16	0.8	1.8	0
Off	1	0	0	0
Total number of units	17			

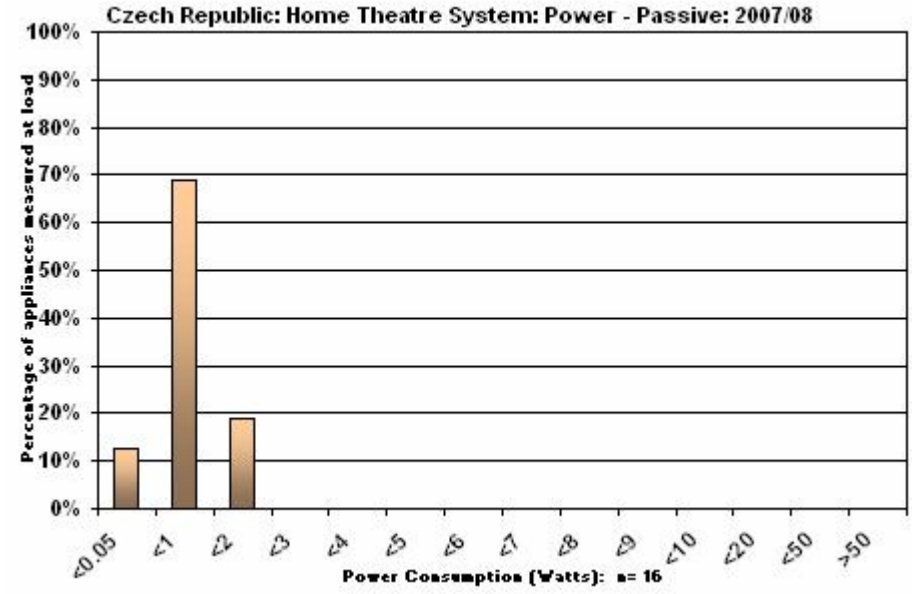
When turned on with “no disc” sign on display (active standby mode), Home Theatre Systems drew 18.3W on average. The values varied between 7.3W and 31.6W (distribution of the values is shown in Figure 29).

Figure 29: Czech Republic Survey 2007/2008 Home Theatre Systems; Active Mode



When switched to standby mode, the average power drawn was 0.8W with maximum at 1.8W and minimum 0W. Figure 30 shows the percentage shares at different passive standby power levels.

Figure 30: Czech Republic Survey 2007/2008 Home Theatre Systems; Passive Mode



There were two appliances with endorsement energy labels, one Energy Star and one Ecolabel (The Flower) – their passive standby was 0W and 0.6W respectively.

Set Top Boxes

In spite of not being in the basket of core products, set top boxes have been included in the survey, because with the expected upcoming transition to digital broadcasting, the currently already increasing trend is likely to continue and their penetration in Czech households is expected to grow significantly. There were 24 set top boxes metered during the survey. The appliances were metered in active and in passive standby modes. Off mode was measured only if an off switch was found on the appliance (in 9 cases of the sample). Table 20 shows the summary of metered values in the relevant modes.

Table 20: 2007/2008 Czech Republic Survey Set Top Box Results

Appliance	Set Top Box			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	23	6.9	11.5	3.4
Passive	21	5.7	11.5	2
Off	9	0	0	0
Total number of units	24			

Interestingly, the values in use and in passive standby mode did not vary significantly. When in passive standby, the average power of the set top boxes was 5.7W (maximum 11.5W and minimum 2W). In active mode (switched on, but not connected to television), the average power drawn was 6.9W with maximum power of 11.5W and minimum power 3.4W. When switched off, all the appliances drew 0W. Figure 31 and Figure 32 illustrate the distribution of values in passive and off mode respectively.

Figure 31: Czech Republic Survey 2007/2008 Set Top Box; Passive Mode

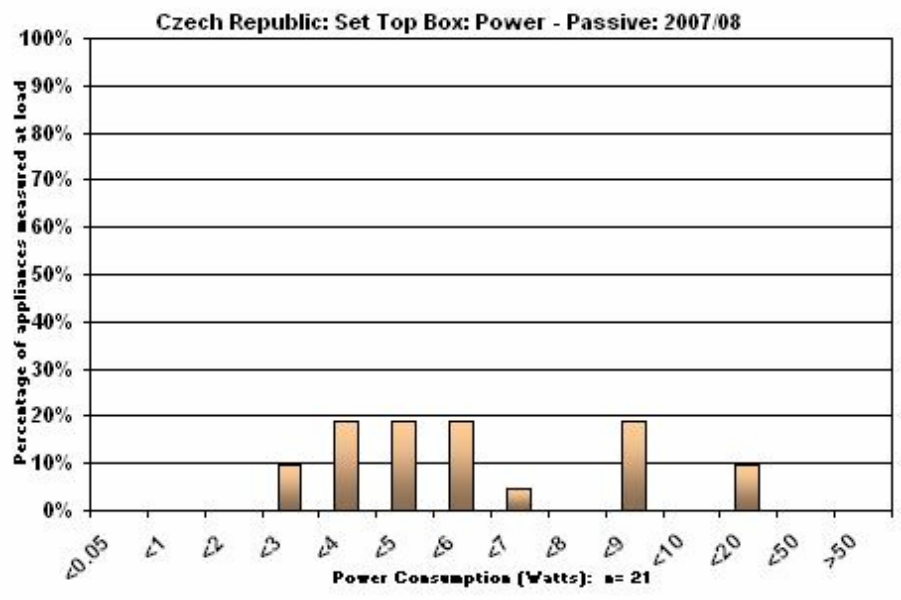
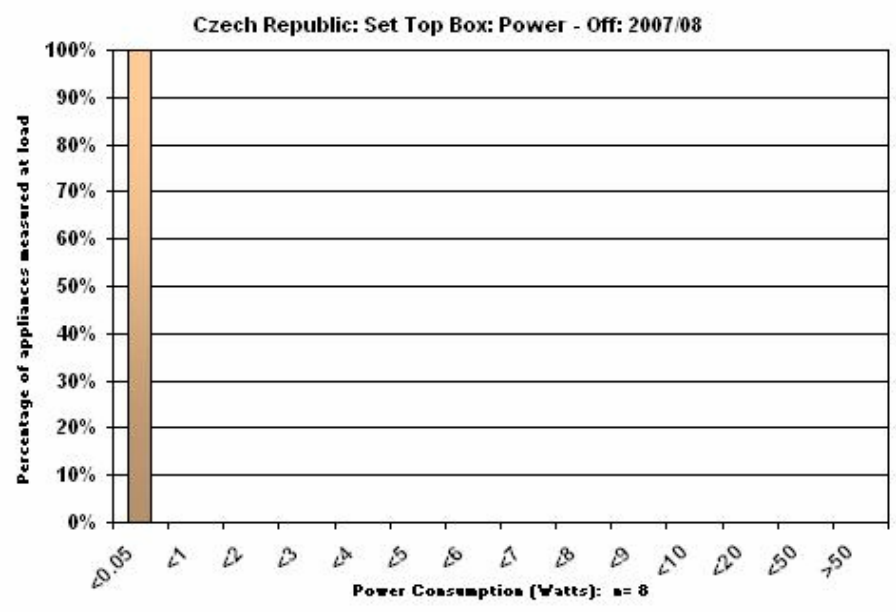


Figure 32: Czech Republic Survey 2007/2008 Set Top Box; Off Mode



Half of the set top boxes had an electronic display, which made noteworthy difference in the power levels; 3.1W in use and 3.2W in passive standby. Around 80% of the appliances had a remote control and in four cases this was the only option to actually manage the appliance as there was no other switch. None of the appliances were found to have any sort of energy label.

Televisions - CRT

The CRT televisions are being slowly phased out from the retail stores. They form a minority compared to LCD and Plasma televisions. In the Czech survey, 19 CRT televisions have been metered. The televisions were metered in passive standby mode, in off mode (if an off button found on the appliances) and in use. In Table 21, average, maximum and minimum values in relevant modes are shown.

Table 21: 2007/2008 Czech Republic Survey Television - CRT Results

Appliance	CRT Television			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	N/A	N/A	N/A	N/A
Passive	18	4.1	10.9	0.7
Off	17	0	0	0
Total number of units	19			

All the televisions with an off button, when switched off, did not draw any power (Figure 34). When switched off by the standby button or remote control, the average power drawn was 4.1W. Figure 33 demonstrates the distribution of values in this mode. The difference between minimum and maximum values was more than 10W (10.9W compared to 0.7W). When 15 televisions were metered when in use, the average power drawn in this mode was 62.3W.

Figure 33: Czech Republic Survey 2007/2008 Television – CRT; Passive Mode

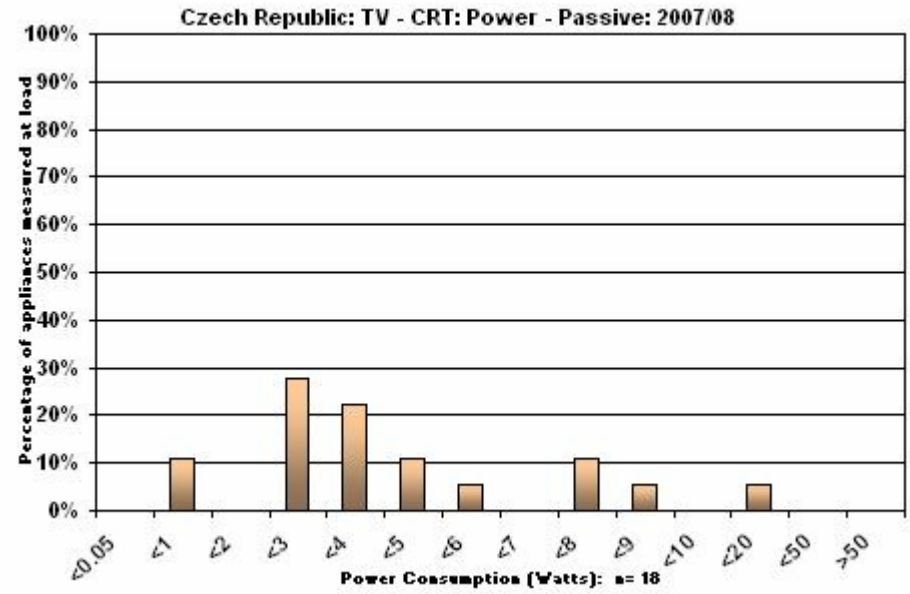
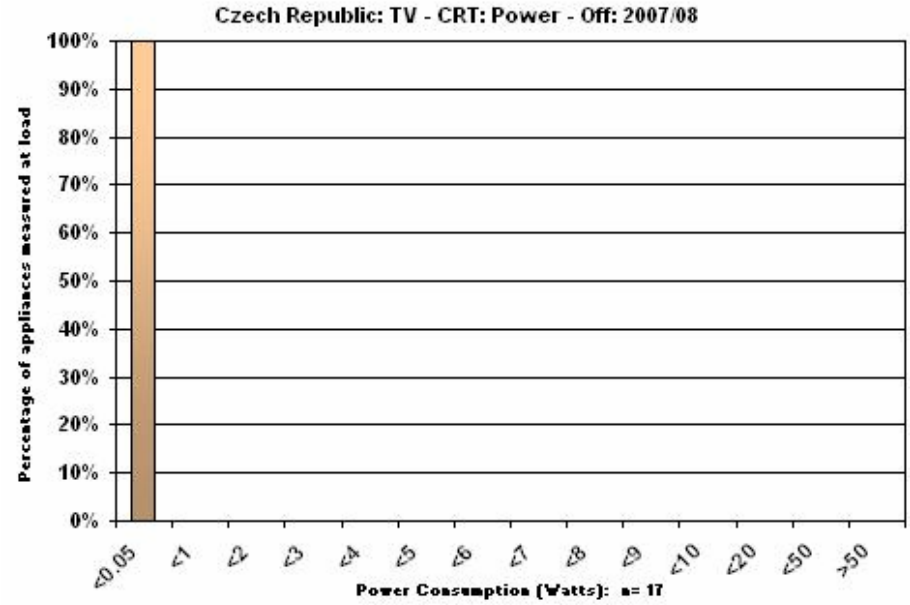


Figure 34: Czech Republic Survey 2007/2008 Television – CRT; Off Mode



The average size of the screens was 53 cm (diagonal). Less than one third of the TVs were ready to receive the wide screen format of 16:9 ratio and two TVs were equipped with a digital tuner. None of the CRT televisions had an energy label of any kind.

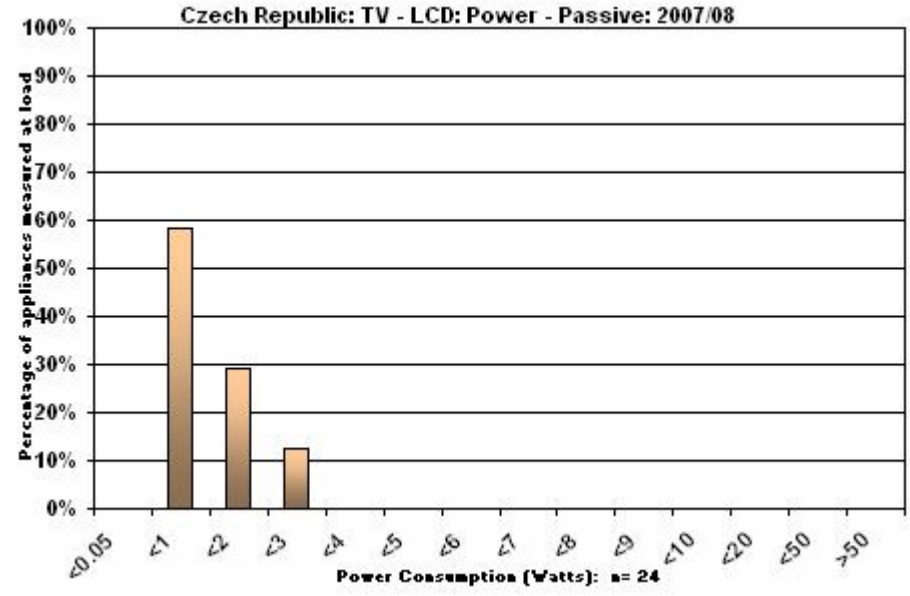
Televisions – LCD

LCD televisions are the most common type of television being sold in Czech retail stores. In the survey, 29 LCD televisions were been metered; however, only 25 were included in the analysis of passive standby, as 4 units have not been recorded properly in this mode[7].
An off switch was found only on 11 televisions; the rest can only be switched to standby mode. Of these 11 televisions, the average power in off mode was 0.1W, which included four televisions drawing power even when off (from 0.3W to 0.6W). In the passive standby mode, the televisions drew 1W on average. The values ranged from 2.7W to 0.1W (Table 22). Compared to the CRT televisions, the difference between extreme values is much lower. Distribution of the recordings in passive mode and off mode can be seen in Figure 35 and Figure 36.

Table 22: 2007/2008 Czech Republic Survey Television - LCD Results

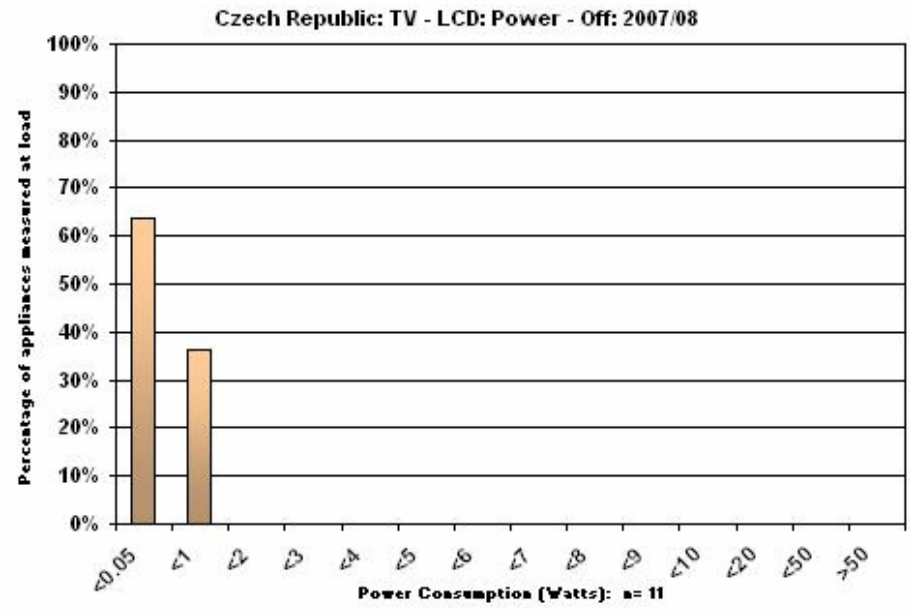
Appliance	TV - LCD			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	N/A	N/A	N/A	N/A
Passive	24	1	2.7	0.1
Off	11	0.2	0.6	0
Total number of units	29			

Figure 35: Czech Republic Survey 2007/2008 Television - LCD; Passive Mode



[7] This was due to existence of electronic programming in these TVs, which was probably still operating for a short period after the TV has been set into Passive standby. The readings in these cases were much higher than the average (30W compared to 1W), therefore they have been removed as not being the true passive standby mode.

Figure 36: Czech Republic Survey 2007/2008 Television – LCD; Off Mode



When in use, the average power metered was 128W. The average screen size was 78 cm (diagonal) and 90% of the televisions had a wide screen (ready to receive the 16:9 ratio pictures). Three quarters of the LCD televisions in the survey were equipped with a digital tuner, therefore ready to receive digital broadcasting. None of the televisions had an energy label.

Televisions – Plasma

There were 9 plasma televisions metered in the Czech in store survey. However, two off them had to be removed from the analysis of passive standby, as the readings were not properly done[8]. Most of the analyzed appliances only had a standby switch; only two of them had an off switch. All the appliances were metered in passive standby and two in off mode as well. A summary of the metered values in the relevant modes is shown in Table 23.

Table 23: 2007/2008 Czech Republic Survey Television - Plasma Results

Appliance	**Plasma** Television -			
Mode	**Number of measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	N/A	N/A	N/A	N/A
Passive	7	0.7	0.8	0.5
Off	2	0.5	0.8	0.1
Total number of units	9			

When switched off by the remote control or the standby button, the average power metered was 0.7W (maximum 0.8W and minimum 0.5W). The distribution is shown in Figure 37. Figure 38 shows the metered values in off mode.

[8] See note above.

Figure 37: Czech Republic Survey 2007/2008 Television – Plasma; Passive Mode

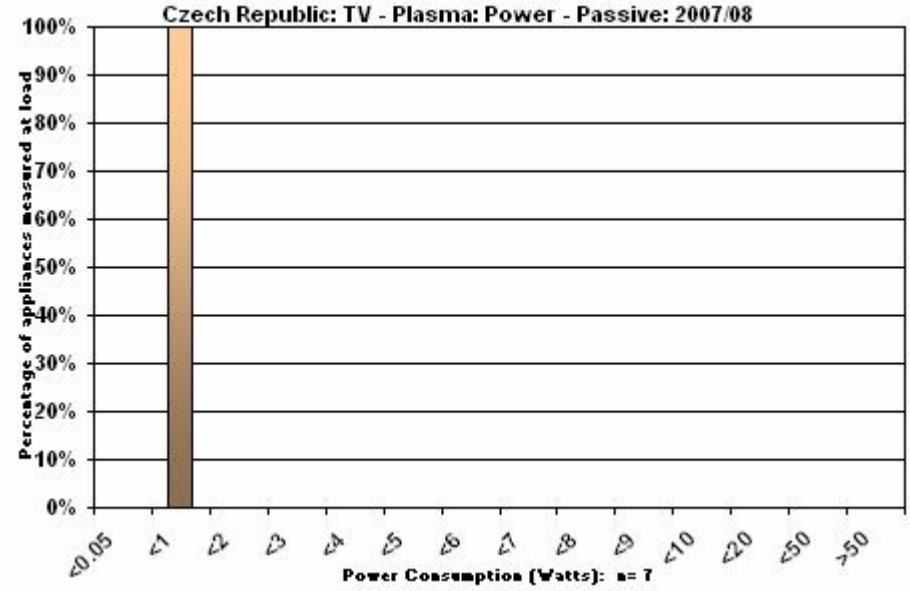
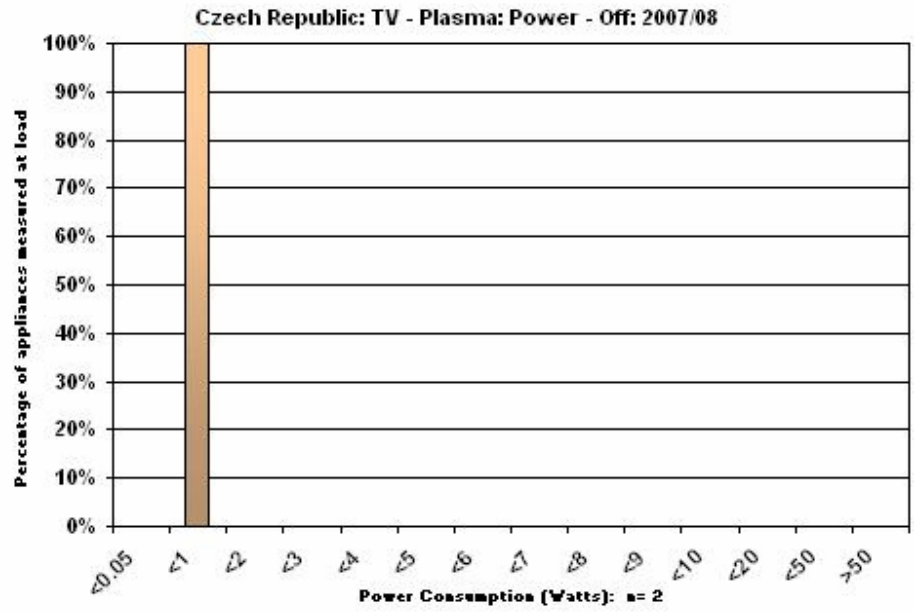


Figure 38: Czech Republic Survey 2007/2008 Television – Plasma; Off Mode



Three of the appliances were metered in use (it was not possible to switch the rest to a common screen). Among these, two appliances drew more than 300W when in use, whereas the other two drew less than 150W. The average diagonal size of the screen was 115 cm. All the metered plasma TVs, except one, had a digital tuner.

Small appliances

Espresso Machines

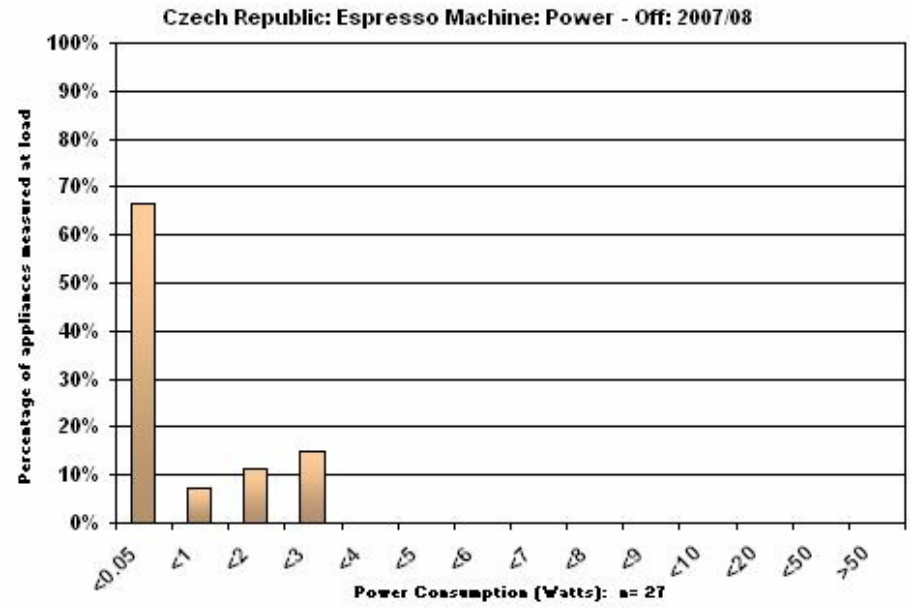
Espresso machines have been metered among the small appliances. There were a total of 27 units included in the Czech survey. The appliances were metered in an off mode. Once a second "hard off" switch was present at the rear (in 3 cases), the appliances were metered also with this "hard off" switch switched off (as "Other mode" in our analysis). Table 24 summarized the recordings.

Table 24: 2007/2008 Czech Republic Survey Espresso Machine Results

Appliance	Espresso Machine			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Other mode	3	0	0	0
Active	N/A	N/A	N/A	N/A
Passive	N/A	N/A	N/A	N/A
Off	27	1.6	2.5	0
Total number of units	27			

Of all the surveyed appliances, 9 drew power when switched off (including the 3 appliances with the hard switch in the back[9]). The average value metered was 1.6W and the distribution is shown in Figure 39.

Figure 39: Czech Republic Survey 2007/2008 Espresso Machine; Off Mode



[9] In these cases, the off mode power was recorded when the hard off switch in the back was on. Once it was off, the appliances did not draw any power.

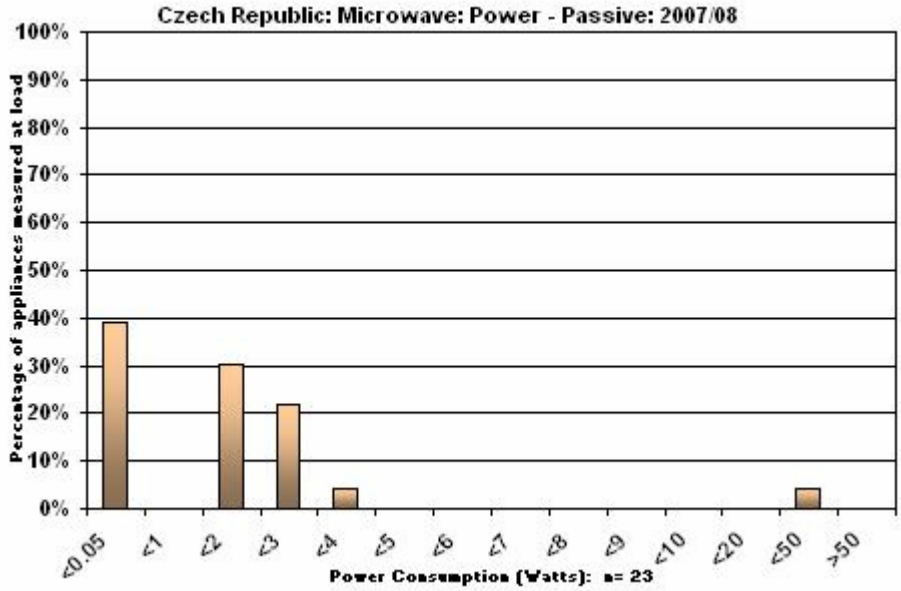
Microwaves

There were 29 microwaves metered in the Czech stores survey. The main differentiation was made according to existence or lack of display on the unit. There were 23 microwaves with a display (80%) and 6 without. If a display was present, the microwaves were recorded in a passive standby mode; if without a display, an off mode was metered (Table 25). In all cases when the microwave did not have a display, the off mode value was 0W. The average passive standby value of the microwaves with a display was 2W. There were 9 microwaves with a display, all of which drew 0W in the passive standby mode, although the clock/display was fully functioning (Figure 40).

Table 25: 2007/2008 Czech Republic Survey Microwave Results

Appliance	Microwave			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	N/A	N/A	N/A	N/A
Passive	23	2	20.5	0
Off	6	0	0	0
Total number of units	29			

Figure 40: Czech Republic Survey 2007/2008 Microwave; Passive Mode



The rated power of the microwaves varied from 700W to 1200W. None of the measured units were found to have any energy label. Three microwaves were managed by an electronic control, the rest 90% are controlled manually (very often by a turning button).

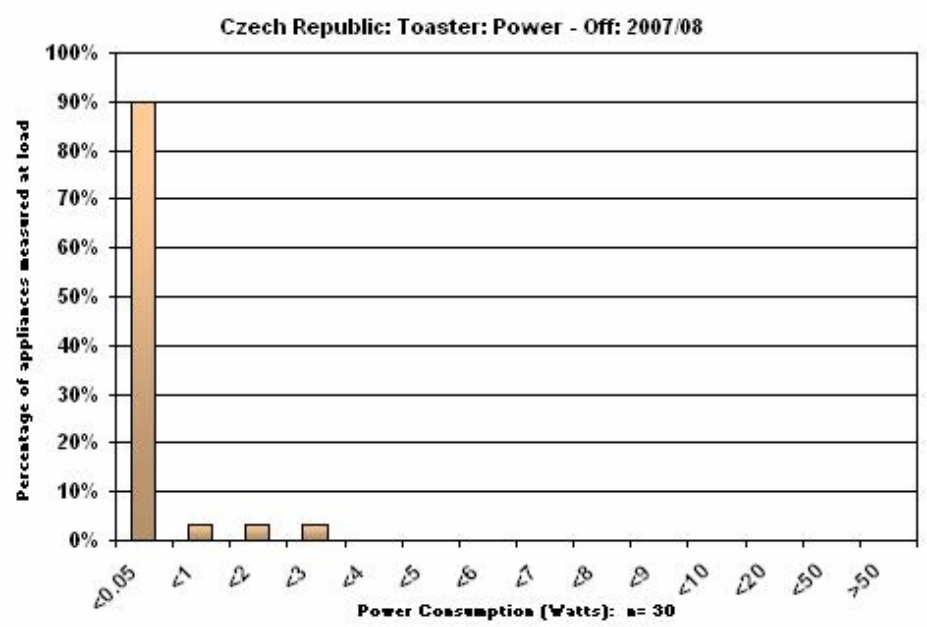
Toasters

Toasters, as a very common piece of equipment in Czech households, were included in the survey. A total of 30 toasters were metered in the off mode (Table 26). Only three appliances drew power in this mode – 2W, 1.2W and 0.6W (Figure 41). The highest value belongs to a toaster without an electronic display (the only one toaster with a display drew 1.2W in the off mode). None of the toasters had a power switch and none of them had any form of energy label.

Table 26: 2007/2008 Czech Republic Survey Toaster Results

Appliance	Toaster			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	N/A	N/A	N/A	N/A
Passive	N/A	N/A	N/A	N/A
Off	30	0.1	2	0
Total number of units	30			

Figure 41: Czech Republic Survey 2007/2008 Toaster; Off Mode



Hand-held Vacuum Cleaners

Hand-held vacuum cleaners were included among the optional surveyed appliances; 16 hand-held vacuum cleaners were metered. An EPS was present at 11 of the appliances. The hand-held vacuum cleaners were metered in two modes: in active standby referring to the vacuum cleaner being plugged into the charger and in passive standby, which refers to the power drawn by the charger itself. Table 27 sums up the main findings.

Table 27: 2007/2008 Czech Republic Survey Hand-Held Vacuum Cleaner Results

Appliance	Hand-Held Vacuum Cleaner			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	15	4	8.6	1.1
Passive	16	1	2.2	0
Off	N/A	N/A	N/A	N/A
Total number of units	16			

The average power of the charger is 1W, the values ranging from 0W to 2.2W. When the unit was in the charger, the average power drawn increased to 4W (with maximum 8.6W and minimum 1.1W). The results were probably influenced by the fact that 5 units were not fully charged during the metering.

Heating and Cooling

Fans

One electric heating appliance was included in the survey; 11 fans were recorded in the stores. The fans were metered when switched off and none of them were found to draw power in this mode (Table 28). The fans were all floor types. Only one fan had an electronic display, but still drew 0W in off mode.

Table 28: 2007/2008 Czech Republic Survey Fan Results

Appliance	Fan			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	N/A	N/A	N/A	N/A
Passive	N/A	N/A	N/A	N/A
Off	11	0	0	0
Total number of units	11			

Other

Cordless Phone Base Stations

There were 12 cordless phone base stations measured in the Czech survey. The appliances were metered in two modes: with the phone in the charger (active standby) and just the charger itself (passive standby). None of the phones were plugged in before metering; therefore they were all being charged when metered. As shown in Table 29, while in active standby the cordless phones drew 2.3W on average, with highest value of 4.1W and minimum power 1.3W. In passive standby (only the charger) the average power recorded was 1.5W. The values varied between 1.1W and 2.1W.

Table 29: 2007/2008 Czech Republic Survey Cordless Phone Base Station Results

Appliance	Cordless Phone Base Station			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	12	2.3	4.1	1.2
Passive	12	1.5	2.1	1.1
Off	N/A	N/A	N/A	N/A
Total number of units	12			

Distributions of metered values in active mode and in passive standby mode are illustrated in Figure 42 and Figure 43 respectively.

Figure 42: Czech Republic Survey 2007/2008 Cordless Phone Base Station; Active Mode

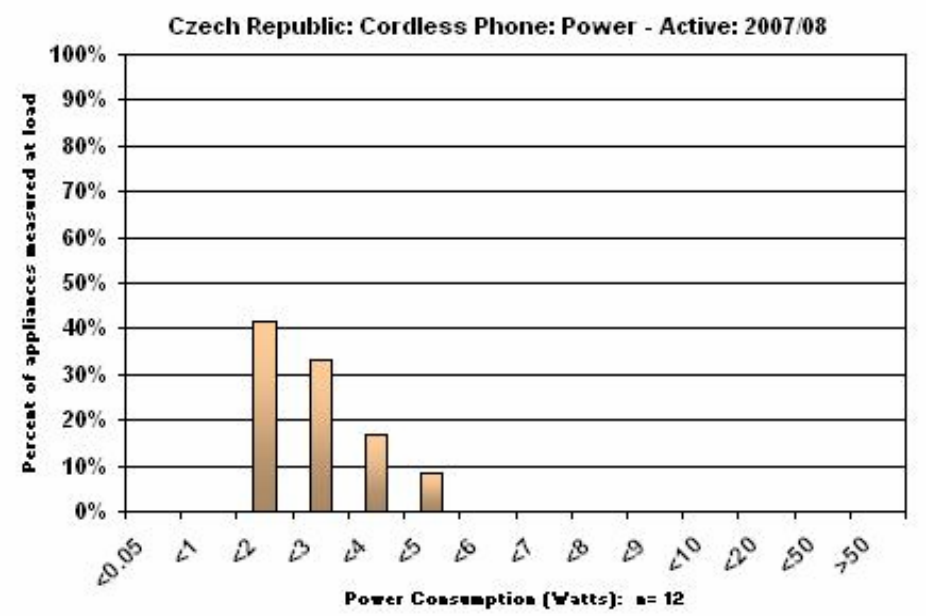
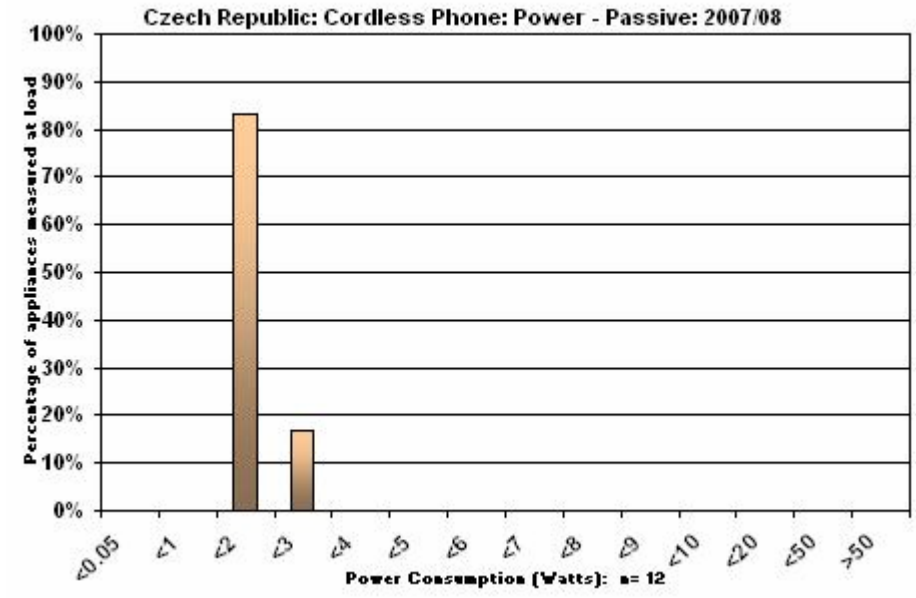


Figure 43: Czech Republic Survey 2007/2008 Cordless Phone Base Station; Passive Mode



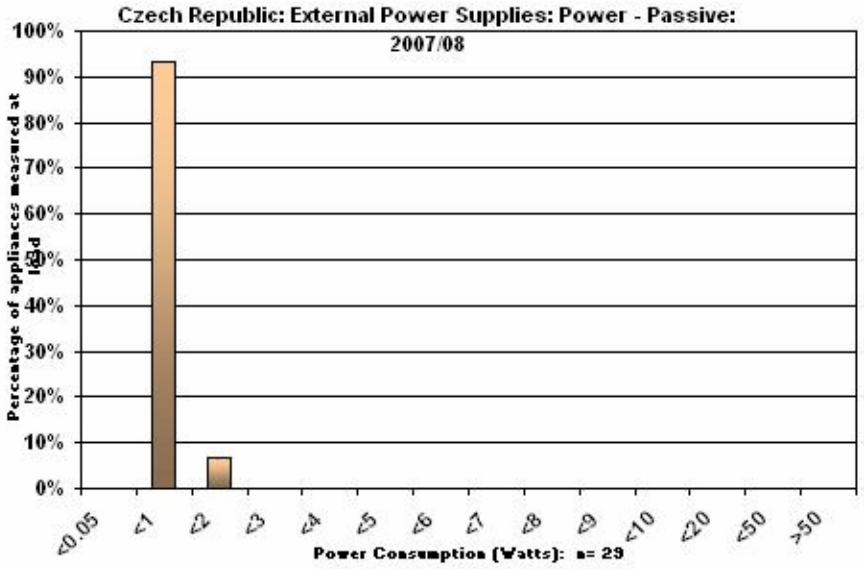
External Power Supplies

Total of 30 External Power Supplies (EPS) were metered in the survey. The EPS were measured only in passive standby mode, when only the EPS was plugged in and without any other appliances connected (Table 30). The average power in this mode was 0.37W ranging from 0.1W to 1.8W (EPS to a set top box) – as shown in Figure 44. Most of the EPS (60%) belonged to laptops, the rest of the EPS recorded belonged to set top boxes, cordless phones, two LCD televisions, computer monitors, computer printers and hand held vacuum cleaners.

Table 30: 2007/2008 Czech Republic Survey External Power Supply Results

Appliance	External Power Supplies			
Mode	**Number of Measurements**	**Average Power (W)**	**Power Max (W)**	**Power Min (W)**
Delay start	N/A	N/A	N/A	N/A
Active	N/A	N/A	N/A	N/A
Passive	30	0.4	1.8	0.1
Off	N/A	N/A	N/A	N/A
Total number of units	30			

Figure 44: Czech Republic Survey 2007/2008 External Power Supply; Passive Mode



Appendix A – Basket of Products Project

The list of appliances and equipment reproduced below are proposed for inclusion in an internationally coordinated "basket of products". The data collected will provide a central pool which can be used to track standby power trends over time for different product types in different regions around the world.

The basket of products is divided into two categories; the core 13 products for collection and a secondary grouping of another 29 products should stakeholders have the capacity to collect data on globally traded products.

The core products have been selected for the following reasons:
- they are relatively common in most markets
- they should be readily available in major retail outlets
- they have a high or increasing penetration within markets
- they have relatively simple modes which can be readily measured.

The secondary group presents some measurement challenges but the Australian experience will be shared in relation to measuring these appliances as well.

Basket of Core Products (14)

Major Appliances (2)
- clothes washers
- microwave ovens – electronic

Home Entertainment Products (6)
- televisions – CRT (conventional)
- televisions – LCD
- televisions – plasma
- portable stereos
- integrated stereos
- Digital Video Disc players (DVDs)

Office Equipment (5)
- computer monitors – CRT
- computer monitors – LCD
- computer printers – laser black and white
- computer printers – inkjet
- multi-function devices (MFDs – combination scanner, printer and fax)

Other Equipment (1)
- external power supplies (no load in addition to equipment powered)

Basket of Secondary Products (another 29)

Major Appliances (6)
- clothes dryers
- dishwashers
- clothes washer/dryer combination units
- air conditioners (any type with a single phase power plug – typically only window wall types)
- instantaneous (non storage) gas water heaters (with electronic ignition)
- microwave ovens – manual timer

Home Entertainment Products (8)
- televisions – rear projection
- set top boxes (including variations – digital/analogue tuners, hard drive)
- DVD recorders without hard drive (digital/analogue tuner)
- DVD recorders with hard drive (digital/analogue tuner)
- DVD/VCR combinations
- Video Cassette Recorders
- audio visual receivers (home theatre)
- subwoofers

Office Equipment (15)
- computers (off mode only)
- computer speakers
- computer printers – laser colour
- computer printers – inkjet
- network switches (including hubs)
- routers
- DSL or ADSL modems
- scanners
- facsimiles (fax machines)
- photocopiers – black and white (categorise by copy speed)
- photocopiers – colour (categorise by copy speed)
- telephone answering machines
- cordless phones – primary base station
- cordless phones – secondary base station
- cordless phones – with answering machine

Appendix B – Standard Products and Expected Modes

Appliance	Category	In-use	Active Standby	Passive Standby	Off	Delay Start or Other Mode
Air Conditioner	Heat-Cool			y	y	y
AV Receiver	Home Entertainment		y	y	y	
Breadmaker	Small Appliances			y		
Computers - Desktop	Computers			y	y	y
Computers - Home Theatre Box	Computers	y		y	y	y
Computers - Laptop	Computers				y	
Computers - Monitor	Computers	y		y	y	
Computers - Speakers	Computers		y	y	y	
Cordless Phone Base Station	Other		y	y		
Cordless Phone Outpost	Other		y	y		
Dishwasher	White Goods		y		y	y
Dryer	White Goods		y		y	y
DVD Player	Home Entertainment		y	y	y	
DVD Recorder	Home Entertainment		y	y	y	
Espresso Machine	Small Appliances				y	y
External Power Supplies	External Power Supplies			y		
Facsimile	Other			y		
Fan	Heat-Cool			y	y	y
Games Console	Other		y	y	y	
Gas Water Heaters	Heat-Cool			y		
Hand - held vac	Small Appliances		y	y		
Hard Disk Recorder	Home Entertainment		y	y	y	
Heater - Electric portable	Heat-Cool			y	y	y
Heater - Gas	Heat-Cool			y	y	y
Home Entertainment Other	Home Entertainment		y	y	y	
Home Theatre System	Home Entertainment		y	y	y	
Juicer	Small Appliances		y		y	
Microwave	Cooking			y	y	
Mobile Phone	Other		y	y		
MP3 Dock	Home Entertainment		y	y	y	
Multi Function Device	Computer Peripherals		y		y	
Printer - Inkjet	Computer Peripherals		y		y	
Printer - Laser	Computer Peripherals		y		y	
Set Top Box	Home Entertainment	y		y	y	
Stereo - Integrated	Home Entertainment		y	y	y	y
Stereo - Portable	Home Entertainment		y	y	y	y
Subwoofer	Home Entertainment		y	y	y	
Toaster	Small Appliances				y	
TV - CRT	Television	y		y	y	
TV - LCD	Television	y		y	y	
TV - Plasma	Television	y		y	y	
TV - Projection	Television	y		y	y	
TV/VCR/DVD	Television	y		y	y	
VCR	Home Entertainment		y	y	y	
Washing Machine Front Loader	White Goods		y		y	y
Washer/Dryer	White Goods		y		y	y
Washing Machine Top Loader	White Goods		y		y	y

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