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# Home Electronics Input Devices

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## VHK

Founded in 1984, VHK is a private engineering and consultancy company in the field of consumer durables and office equipment. Offices are in Delft (head-office) and Brussels (facility). Products developed by VHK include heating appliances, white-goods, electronic devices, lighting fixtures and products for airport terminal logistics.

Research activities of VHK are specialised in energy-efficiency and environmental issues of product design, as well as related energy policy instruments (labelling, standards, planning instruments, etc.). In this area VHK plays a leading role in the EU, working for energy agencies, national governments, European Commission, industry, utilities, NGO's.

## Research Services

Technical-economical analysis: Assessing energy saving design options, costs, investments, Life Cycle Costs)

Technical modelling, stock models, time series analysis, technology and energy forecasting

Life Cycle Analysis (cradle-to-grave ecological impact),  
Environmental impact

Energy policy support & consultancy

Results take the form of policy Reports, technical models, specific presentation software (e.g. 'Epolis' suite)

*Contribution to this site: Statistics aspect (all sections), Processing section.*

## Cordless PC input devices



In a recent test by c't magazine [2002, nr. 10] the average wireless ball mouse uses 24 mW (10 mA/2.4 V). Optical mouse may use up to 110 mW (40 mA/2.4). A wireless keyboard uses up to 17 mW (7.2 mAh). The receiver is plugged either into the PS2 or the USB port. With the former it uses typically 15 mW, with the latter 45 mW.

All in all, in the most efficient configuration the wireless input devices consume 56 mW. In the worst case, with an optical mouse and USB receiver, the energy use is 172 mW.

As they are no longer linked to the PC, these devices use batteries (2x AA for keyboard, 2 x AAA for ball-mouse, 2 xAA for optical mouse) which is an environmental concern that could be dealt with through using rechargeables. As far as energy is concerned: Apart from the very low consumption, they have a well developed power management that goes into standby either immediately (keyboard) or after 30 to 120 s (mouse).

Having said that, even at full load and 900 operating hours, the 172 mW-configuration would consume no more than 0.15 kWh/year.

*VHK.RK.2 May 2002*

## Webcam



Commercially available webcams in 2002 have an energy use between 50 and 400 mA at 1.2 or 2.4 V and in all cases can be attached to the USB port for their power supply (max. 2.5 W). Average power consumption will be around 0.7 W. To this the energy losses of the PC for supplying these 0.7 W have to be added (e.g. power supply efficiency of 65%), which will lead to say 1 W. For consumers using this type of camera as a gadget with their PC, operating hours will probably be low and energy consumption will not exceed a few kWh/year. On the other hand, if a webcam is used in a home security system (8760 operating hours/year), energy costs will be up to 100 kWh/yr (300 kWh/yr with an inefficient model) and energy becomes a real issue. There is no data available on the market penetration of webcam use for home security systems.

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## Digital camera



In 2002, energy use of digital camera's is between 40 and 60 Ws (1 Ws= 1/3600 Wh) per picture (one picture takes 3 to 4 seconds of operating time). In other words, at 400 pictures a year (400 x 50 Ws) energy use is around 55 Wh (0.055 kWh/year). Even assuming that a selection of those will be printed and use paper, printer energy, etc. , digital photography is not really something to worry about: not from the energy point of view and certainly not from the environmental point of view, where it is an excellent alternative to the conventional physical-chemical process.

*VHK.RK.2 May 2002*

## Mobile phone (incl. Infrastructure)



In a 2002 presentation of ongoing research for the German government, the Fraunhofer Institute and Swiss CEPE gave an overview of The Impact of Advanced Information and Communication Technologies on Energy Consumption in Germany until 2010. More specifically: The Case of Mobile Communication.

Their conclusions: Electricity consumption of mobile phones (0.1 TWh/yr) and chargers (ca. 0.4 TWh/yr) remains more or less stable throughout the 2002-2010 period, despite an increase in the number of subscribers (70 mio. in D 2010). Saving potential for chargers in 2010 was estimated to be 80(0.3 TWh/yr).

Nonetheless, the biggest increase in electricity consumption was envisaged outside the home's electricity bill. The energy costs of the infrastructure would rise from 1.4 TWh/yr. in 2002 to 4.4 TWh/yr. in 2010. Apart from the doubling of the number of subscribers, a major cause was the dual infrastructure for GSM and UMTS that will be in place by 2010. These energy costs statistically fall in the tertiary sector.

In total mobile communication thus would cause 4.9 TWh/yr. in Germany 2010.

[source: Clemens Cremer, Stefan Rieth-Hoerst, Fraunhofer, Paris IEA-Workshop 21-22 Feb. 2002]

Roughly multiplying by factor 4 to arrive at the EU situation, this would mean 20 TWh/yr. for the EU. This is the same consumption as the one that is foreseen for all EU washing machines in 2010 [source: CECED Report 2001]. The major difference to the consumer will be, that with the mobile phone only a small part (10 kWh/household/yr) will be visible on the energy bill and the rest (90 kWh/household/year) will be hidden in the phone bill.

At the same Paris workshop Fraunhofer data were confirmed by Dutch engineering company and contractor Tebodin, who is engaged in actual measurements of server parks and telecom switches for the obligatory environmental reporting.

Fraunhofer estimates the saving potential for the infrastructure at 21 in 2010. Tebodin and equipment industry sources are more optimistic.

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