

Checklist Electrical Generation of Heat or Cold

School:.....

Group (names of all pupils):.....

.....

.....

Taker of the minutes:

Tutor of the group (name, position):.....

Dialogue partner (name, position):

Date:



Find out where we use electric energy at our school to generate heat or cold! Examine the corresponding devices and estimate their electricity consumption.

Ask the caretaker or another suitable person to help you with answering the questions. You should solve the arithmetic problems yourselves.

Answer the questions in sequence! Be considerate when walking through the school! Enter the locations of the devices into the plan of the building. If possible take pictures that are in line with your topic!

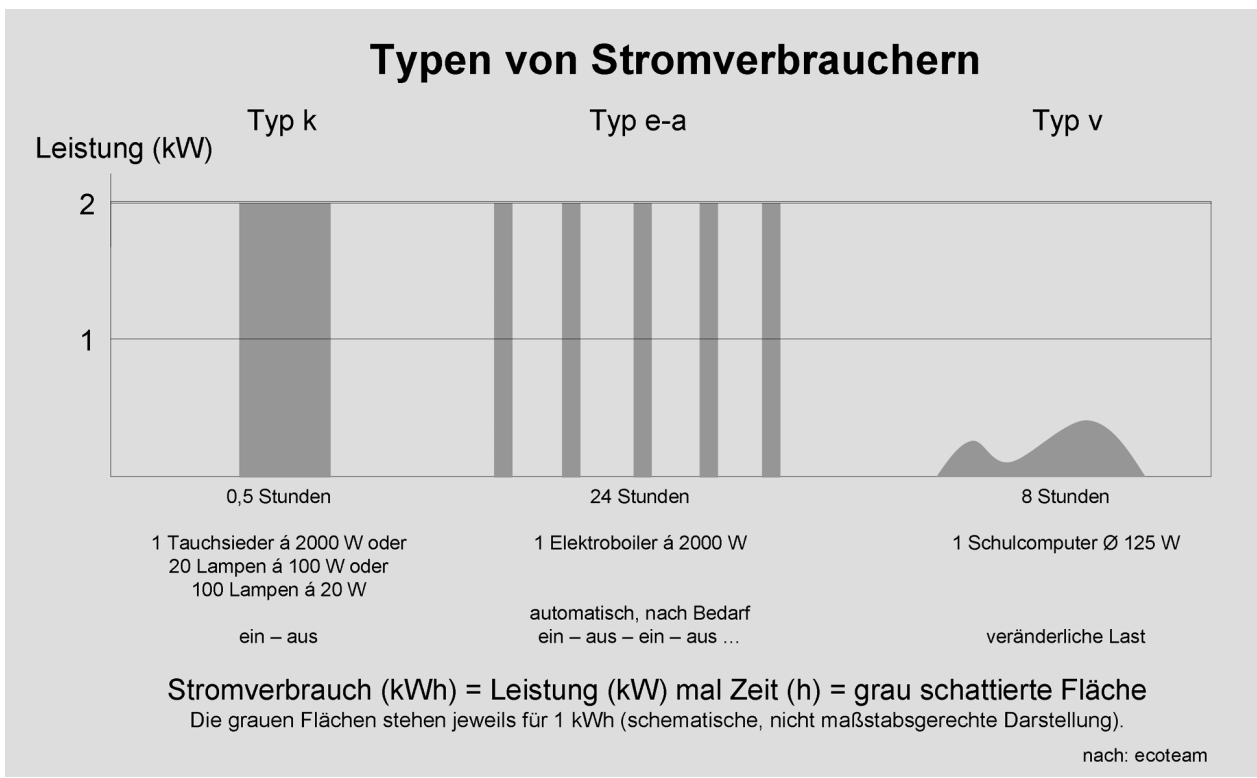
Question 1: Electric devices as electricity consumers

“Electricity consumption“ (electric work) often isn't easy to determine.

- a) With the help of the graph try to think about which difficulties might arise regarding the determination of electricity consumption.

.....

.....



- b) Later (question 2) you will determine the electric power of electrical devices and based on this you will estimate the power consumption. Why will there be no exact result for something like an electric boiler, a fridge or an electric cooker if you approach it this way?

.....
.....
.....

- d) How could you proceed if you wanted more exact results for the devices mentioned above?

.....
.....
.....

2 Examination of the devices

Find out where electrical energy is used to generate heat or cold and estimate the electricity consumption per year. Particularly pay attention to the heating of water in electric boilers or flow heaters, to the cooking and heating up of meals, dish washers and washing machines, electric heating, room cooling, fridges and freezers, electric kettles and coffee machines.

It is possible that such devices are used in different parts of the building at totally different times (like kitchen – canteen – gym). Do separate checklists for each and determine the electricity consumption in kWh per year separately.

Proceed as follows:

- a) Determine the **electric power** of each single device.

You might **find** this value **on the device itself** (for example on the label of an electric cooker).

If the device is connected via a socket, you can also measure the electric power with the measuring device for energy consumption.

- Have your teacher or tutor explain to you how this measuring device works. **Attention! Keep in mind that it can be extremely dangerous to touch the line current and work accordingly sensibly. If you detect any damaged cable, switches, plugs or sockets, never touch them but report them to your tutor.**
- First switch off the device that you want to examine if it has got a switch. Then pull the plug. Install the measuring device for energy consumption between the socket and the power plug of the device and switch it on again. Then read the value of the electric power on the measuring device (in W) and enter it into the checklist. After you switch of the device again, take out the measuring device and finally connect the plug to the socket again. **Attention: Proceed sensibly; for example you should fill water into the electric kettle before you switch it on.**

If both ways are not possible enter the device into the checklist all the same, but don't indicate the electric power.

- b) Calculate the **sum of the electric power** of the devices.
- c) Estimate the **running time** of the devices. First make a guess about the running time per day, then multiply this by the running days per year. For example: the electric cooker in the utility room is used for two hours a day – on 200 school days a year, this sums up to 400 running hours per year.
- d) Multiply the running time (hours per year) by the sum of the output (kW); thus you get the yearly electricity consumption for your devices (kWh per year).

4 Evaluation and presentation

As soon as you've arrived at this point, present your results to your teacher or tutor.

Now start with the evaluation:

- a) Ask the group that works on electricity consumption about the school's total electricity consumption per year. Then calculate the percentage of the generation of heat and cold (in %).

.....

- b) Then compare the situation at our school to the possibilities to an energy-saving generation of heat and cold that you researched.

.....

.....

.....

Now summarise your findings about electricity consumption when generating heat and cold at our school. Justify your assessment in such a way that teachers and pupils understand it!

It is good...

It is less good...

.....

.....

.....

.....

.....

.....

.....

.....

Discuss what we could do better!

.....

.....

.....

.....

.....

.....

.....

.....

Think about how you would like to present your results to other pupils and teachers!

Work out a placard for the staff room for example, in which you try to convince your teachers for an electricity-saving use of the coffee machine.

Write a wanted poster, in which you issue a search warrant the most important "electricity guzzlers" and in which you ask your classmates, teachers and parents to render them harmless.

Or write a letter to the headmaster, in which you name the problems that you discovered and in which you ask him as specifically as possible to support your suggestions for improvement. Pay attention to the fact that your suggestions are clear and well-founded and show their potential advantages!

Now get ready to present your results!

