Where does energy come from and where does it go?

At this station you can find out more about energy sources, energy demand, the different forms of energy and the conversion of one form of energy into another.

You "burn" energy if you are doing sports and you recharge your mobile phone with "new" energy if the accumulator is down. We usually think that after burning something, it doesn´t exist anymore or that the energy of a battery is gone after it has been used. This is wrong:

Energy cannot be destroyed or created, it can only be transferred and transformed from one form into another.

We know that energy exists in different forms, e.g. heat, electric energy, light or chemical energy and that in can be generated from different sources. There are different natural or **primary energy sources**. You can group them into **non-renewable energies** and **renewable energies** (see Fig.1). The oldest and greatest is solar energy. It will be available for the next billions of years. Fossil fuels like crude oil, coal or natural gas are finite, so we have to use them more intelligently and efficiently and not waste them. One big challenge for scientists is to increase energy efficiency in any field of our lives. An equally important goal is to develop alternatives to gasoline powered cars or to work on ways of using solar energy, either in photovoltaic cells or in solar thermal power plants that both deliver electricity.

Electricity is a **secondary energy source**. It can be transformed into any kind of useful energy. Therefore electrical energy is the most "noble" form of energy, whereas heat energy is considered minor.

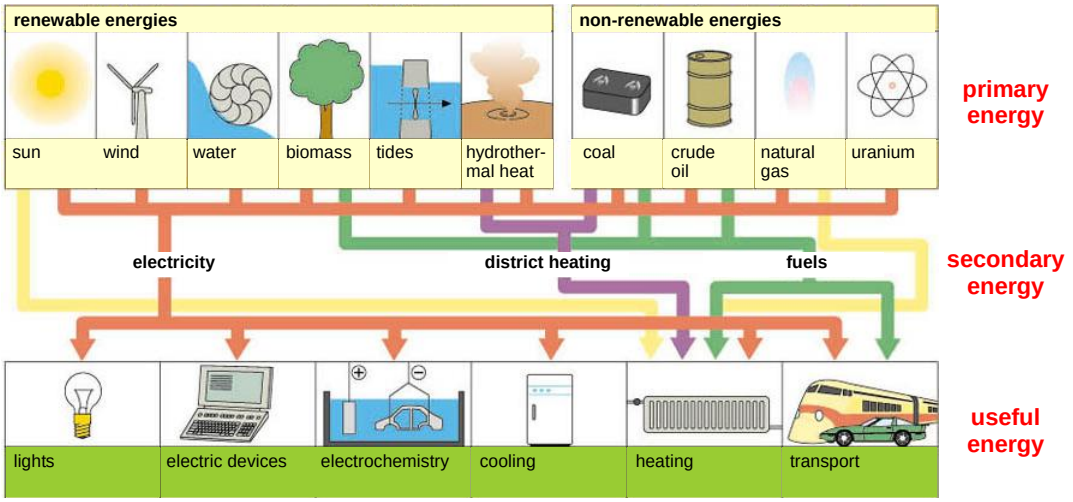

Fig. 1 Forms of energy and their transformation

☞ Questions

1) Referring to Fig.1, explain why electricity is considered a noble form of energy.

2) Look at Fig. 2 and estimate if we could cover our annual energy demand if we were able to convert 1 % of the solar energy reaching the earth per year into electricity.

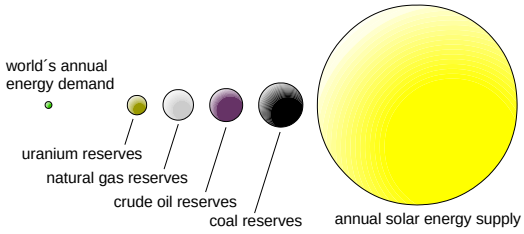

Fig. 2 Global energy demand and energy reserves

3) In Europe traditional light bulbs are banned step by step until the year 2015. From then on only more energy saving lamps will be produced. Read the following press info and explain it in more detail.

"…Though much cheaper to buy, incandescent bulbs are considered as wasteful because only 5 percent of the energy they consume goes to light production, with the rest just becoming heat…."

Words: *source*: Quelle; *demand*: Bedarf; *finite*: begrenzt; *challenge*: Herausforderung; *useful energy:* Nutzenergie; *tides:* Gezeiten.