Do we save by using energy-saving light bulbs?

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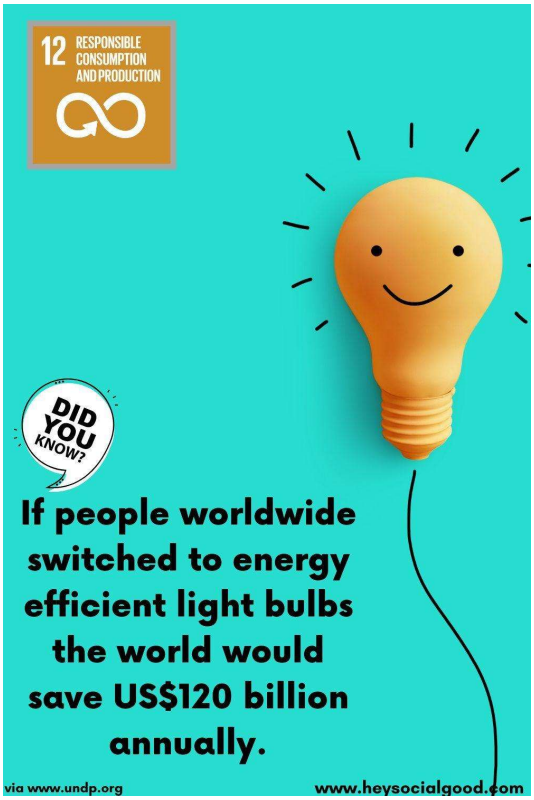
Type of activity

An exercise that can be posed in physics and chemistry classes, as well as in economics. It is related to SDG 12 "Ensure sustainable consumption and production patterns".

Target educational level

It can be addressed to the last courses of High School students and to any university student.



Source

https://www.fisicalab.com/ejercicio/765

Problem statement

An electricity company charges 0.08 euros per kWh.

a) How much will it charge for leaving the lamp in our room on for 12 hours, if it has 100 W of power?

b) By what percentage would we reduce our consumption with a 25 W energy-saving light bulb, equivalent to the previous one?

Solution

Cost of kWh: C=0.08 €/kWh

- Power of the normal bulb: P_n=100 W=0.100 kW

Cost of having this light bulb switched on for t=12 h

Cn=0.100W·12h·0.08 €/kWh=**0.096€**

- Power of the energy saving bulb: P_b=25 W=0.025 kW

What it means to have this bulb switched on for t=12 h

Cb=0.025W·12h·0.08 €/kWh**=0.024€**

- If we find the quotient between the consumption in both cases:

Cn/Cb=4 ® Cn =4 Cb

We can see that the normal bulb consumes 4 times more energy than the energy-saving bulb.

The savings can then be calculated:

$$(|Cn-Cb|/Cn)\cdot 100 = 75\%.$$

In other words, **the use of an energy-saving light bulb saves 75%.**