CREST

Community REtrofit through Sustainable Technology

CREST Project

Living lab experiment – What's a kWh?

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Content

Aim of the document

This document describes the activity that has been run in the living lab settled in Temple Sutton Primary School in Southend-on-Sea.

Audience: Living lab users. Pupils from the classrooms equipped with the living lab. People attending the CREST LESS CO2 Schools workshops.

1 Aim of the activity: explain what is a kWh

Goals:

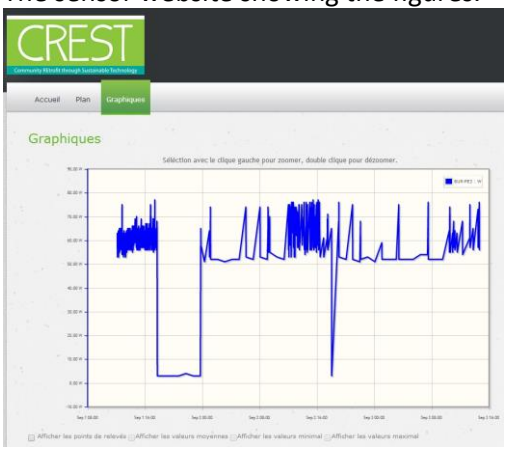
- Explain simply what a kWh is as it's not an intuitive unit and users usually don't understand it.
- Convert energy consumptions into money spent to make users realise what a kWh represents.
- (optional) Show the person associated with the experiment how to use the sensors in order to be able to be autonomous on other experiments.

2 Equipment required

To realise this experiment, the following material is needed:

- Energy bills of the building
- A ZPlug monitoring electric consumption of a device.

- The sensor website showing the figures.

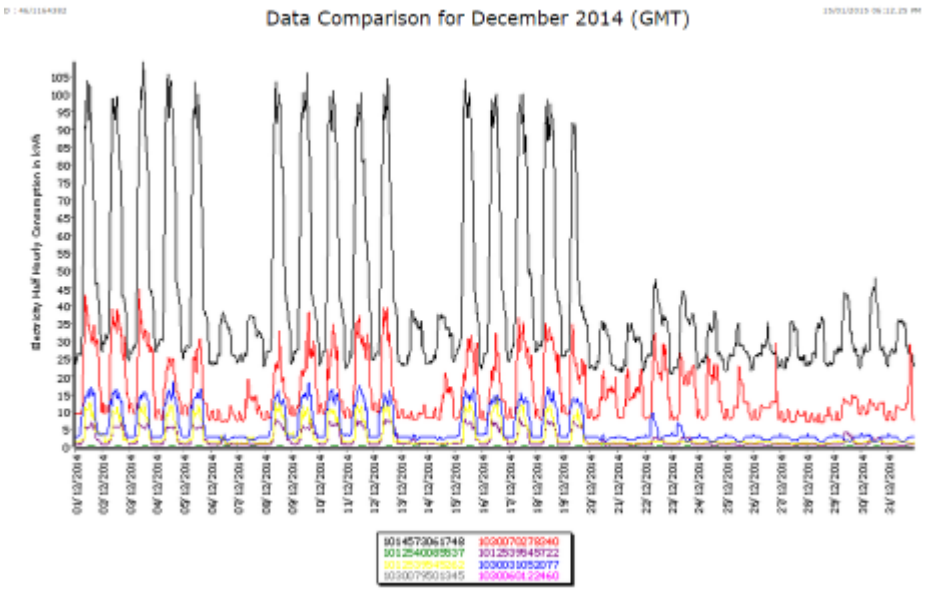


- A living lab user being able to follow the protocol.

3 How to run the activity

This experiment does not require a specific protocol as it has been designed to be an introduction to all the other activities that could be realised in the living lab.
It needs energy bills from a public building of approximately the same size than the one the activity is run in with the yearly electric consumption in kWh.
It is then possible to simply explain the definition of a kWh with a very simple light bulb that could be plug onto a Zplug.

4 Results



Here's the electric consumption of different buildings during December 2014. The unit is the kWh which does not make a lot of sense for most of the living lab users and the people that were involved in CREST activities on raising awareness on sustainability.
This figure shows the profile of consumption of a public building or a school running 5 days a week and unoccupied during weekends and term holidays:

- We can see the consumption oscillations between day and night and week and weekends and finally the last part of the curve shows the consumption during Christmas holidays where the building is almost not occupied but for rare activities.
- This shows that there's a basic consumption even when the building is empty.
- We can also notice that the consumption peaks each day are happening around midday.

Temple Sutton Primary School Energy usage in 2013

	Electricity	Natural Gas
Usage	219,432 kWh	1,179,389 kWh
Cost	£20,743	£35,790

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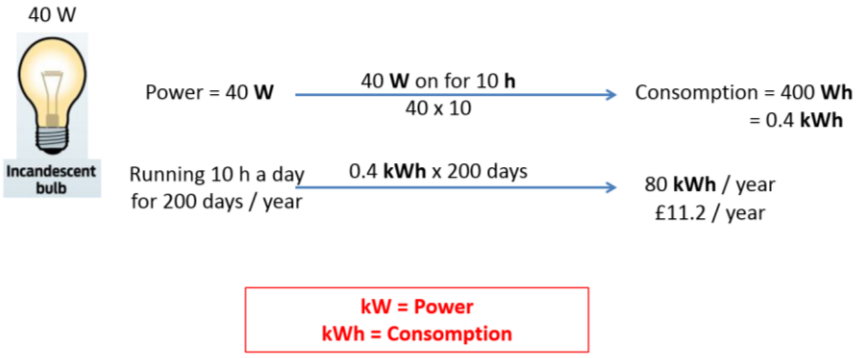
This table shows the correspondence between kWh and energy cost (this cost depends on the energy supplier of course).
The value in £ is easier to understand for the audience whereas the amount of kWh spent each year electricity does not represent a lot of things for them. This unit is indeed confusing even though it is used commonly in all the energy bills from the energy suppliers.



Finally, it is important to give a concrete example to explain what a kWh is in a very easy way to understand.
The example taken here is the consumption of a 40 W lightbulb.
If this lightbulb is on for 10 hours, it will consume 400 Wh which is equivalent to 0.4 kWh.
This very same lightbulb turned on for 10 hours per day 200 days per year will consume each year 80 kWh which Is equivalent in average to £11.2 (depending on the energy supplier).

5 Other experiment possible

Of course this introduction can be adapted to the place where it is held. It just needs its energy bills and plus the ZPlug onto another type of device.