One Planet Computing
Cash & Carbon

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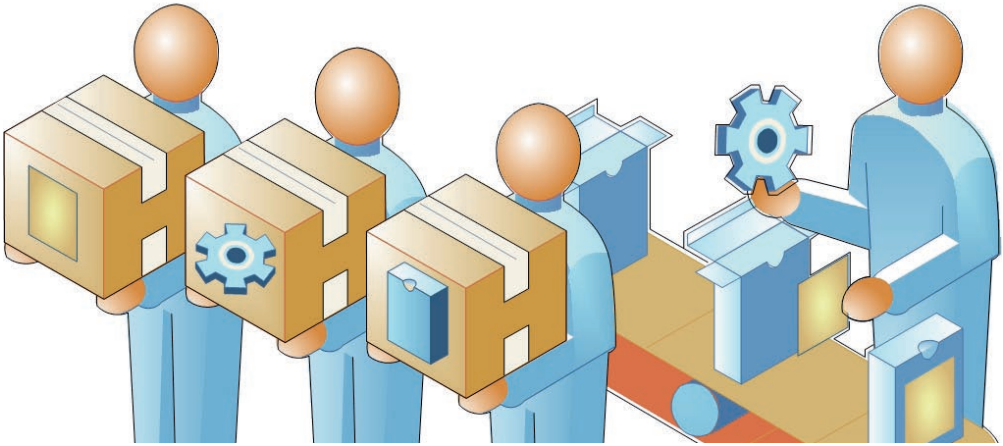
Energy Usage



In order to talk about energy usage we first need to understand some basic units:

Electricity

Electricity is measured in **watts (W)**
(After the scottish engineer James Watt 1736–1819)

1,000 Watts is equal to 1 **kilowatt (kW)**

If you draw 1 kw of electricity for an hour you have used a **kilowatt hour (kWh)**

CO_2

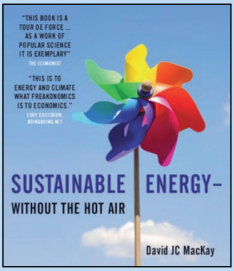
Carbon and CO_2 is measured in **grams (g)**

1,000 Grams in 1 **kilogram (kg)**

1,000 Kilograms is a metric **tonne (t)**

(An imperial ton only weighs 90% of a metric tonne)

For information about the commercial incentives for business executives on reducing your energy consumption and the associated costs in cash & carbon



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"At last a book that comprehensively reveals the true facts about sustainable energy in a form that is both highly readable and entertaining."
EDF Energy

Cash

Let's assume that you have a light bulb that is left switched on all day and it uses 1 kWh of electricity per day.

40 Watts x 24 hours = 960 Watt hour (or for easy reckoning 1 kWh)

(A 40 Watt bulb uses 960 Watts of electricity in 24 hours so that's probably close enough to use as a 1 kW example without having to create a special 41.6 Watt light bulb or a 25hour day.)

If your electricity company charge you 12p per kWh then leaving the light bulb in our example on for a whole year would cost you £ 43.80 per year.

1 kWh x 365 days x £ 0.12 per kWh = £ 43.80

If this were three 40 Watt light bulbs (120 Watts in total), or a 120 Watt computer the cost would be three times higher at approximately £ 131.40 per year.

Once you add a monitor, printer, storage devices and network equipment you could easily be consuming 200 Watts, or £219.00 per year.

The next time you see a desktop PC and monitor switched on but not in use, imagine it as wasting the equivalent of five 40 Watt light bulbs or over £200.00 per year.

Carbon

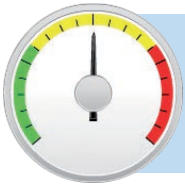
When most people think about carbon, or carbon dioxide (CO_2) they imagine big black puffs of smoke created from burning fossil fuels in traditional coal and gas power stations.

Whilst this is one of the major factors contributing to the amount of CO_2 in our atmosphere, it is not the only one that IT departments and responsible business owners need to consider.

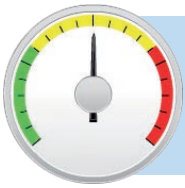
Embedded carbon is also another factor. Every year UK businesses spend millions of pounds replacing computers prematurely, creating more embedded carbon during the manufacturing process, thus effectively wasting all of the energy and raw material used during the manufacturing process.

On average manufacturing each of these new computers requires 1,500 litres of water, 240kg of fossil fuels and 22kg of other chemicals.

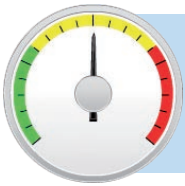
According to the Building Regulations 2006 part L2:



Every 1 kWh of electricity produced from renewable energy sources such as solar and wind saves 568 grams of CO_2 being released into the atmosphere.

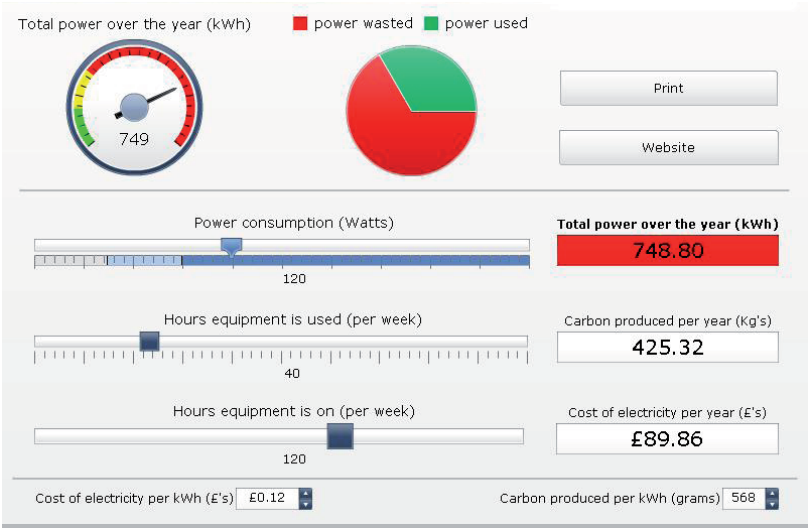


Every 1 kWh of electricity used from a traditional fossil-fuelled power station creates 422 grams of CO_2.



The differences between the 568 grams and 422 grams are caused by the transmission losses, getting the power from the power station to your power socket.

Worked Example 1



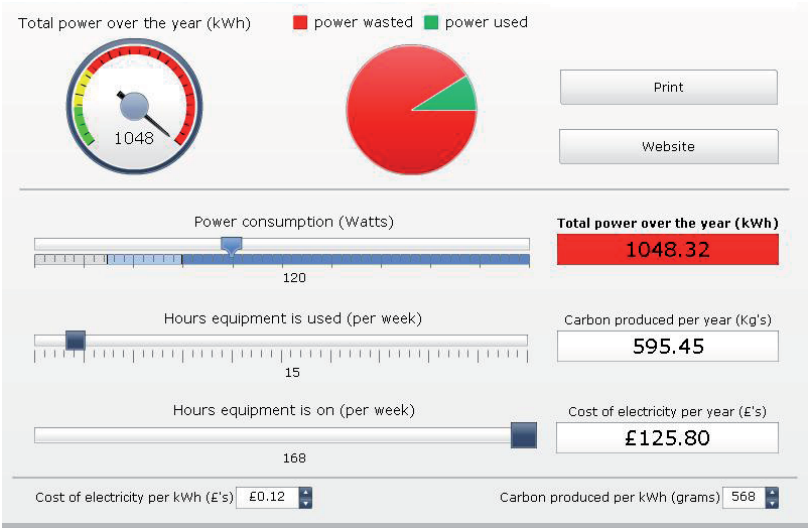
In this example we have an average desktop PC. The actual machine used was a Dell Optiplex with an Intel Pentium4 Processor.

According to the Dell website this PC has a power supply rated at a maximum of 300Watts. When tested with a power meter over a period of time, we found that the average power consumption for this PC was 120 Watts.

On the assumption that somebody is working on this machine for 40 hours per week, but the computer is powered on for five days, we would expect the following figures:

Total power over the year **748 kWh**	Energy used productively **33.3 %**
Carbon produced over the year **425 kg CO_2**	Energy wasted **66.6 %**
Cost of electricity per year **£ 89.86**	Wasted electricity per 1,000 PCs **£ 59,300 per year**

Worked Example 2

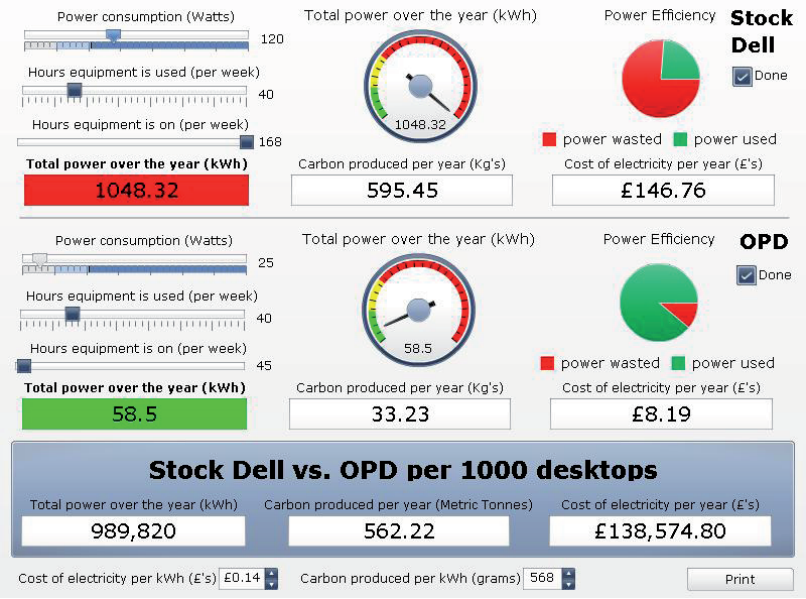


In this example we are still using the same computer as we did in the first example, but now assume that the PC is also left powered-on at weekends (possibly for software updates, patches or for scanning for viruses and spyware outside of normal working hours).

We also assume that although the person working at this machine works a 40 hour week they are allowed to take breaks or leave their desk for lunch, visiting clients or attending meetings. They might also spend a large amount of their time on the phone and cumulatively only spend 15 hours a week actually working directly on the computer

Total power over the year **1,048 kWh**	Energy used productively **9 %**
Carbon produced over the year **595 kg CO2**	Energy wasted **91 %**
Cost of electricity per year **£ 125.80**	Wasted electricity per 1,000 PCs **£ 114,470 per year**

Comparing Desktops



In this example we have taken the energy consumption figures for two PC devices, and the end users working habits from a public sector organisation and compared them directly on energy usage.

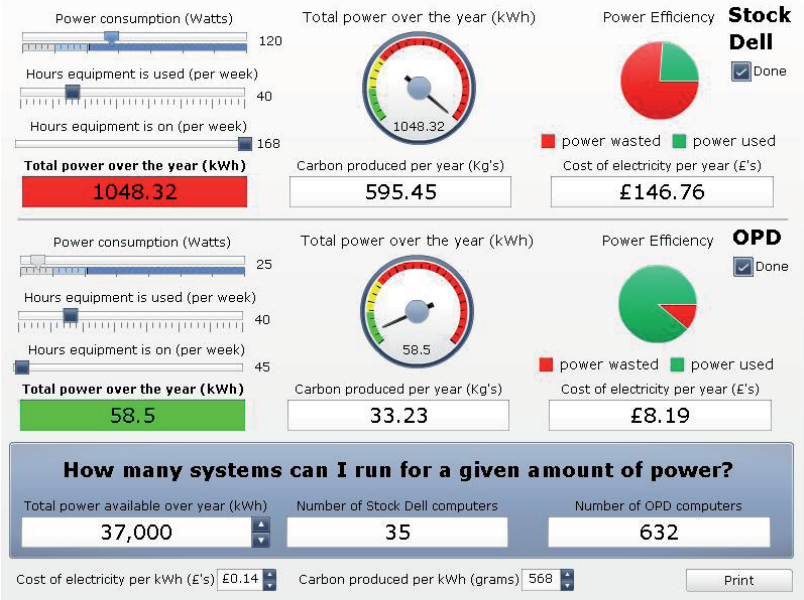
The "Stock Dell" PC was the most common model of device in the organisation, this consisted of a Pentium 4 machine running Windows XP.

The OPD device was the an older device which was about to be wiped of information and then sent to a disposal facility. This machine was a Pentium 3 running One Planet Desktop.

We then compared the energy usage and running costs over a year over each device based on a 40 hours a week usage pattern, then compared the results over 1,000 devices.

Over a thousand machines, OPD would save almost 1 million kWh's of electricity, 562 metric tonnes of carbon and £138,000 in running costs each year.

Renewable Energy



Using the same devices as in the previous example we then calculate how many devices we can power for a given amount of electricity.

The electricity could be derived from a traditional power station, in which case we would create the equivalent 422 grams of carbon for every kWh of electricity we use, or from a renewable energy source such as solar PV (PhotoVoltaic) which would save the equivalent of 568 grams of carbon for every kWh of electricity we use.

Knowing how many devices that you can power for a given amount of renewable energy is one of the calculations required for achieving zero-carbon computing.

In this example 37,000 kWh's of solar power would be able to power 35 of the stock Dell PCs for a year, or 632 of the One Planet Desktop Devices.

Reducing Your Carbon Footprint

+ opc = **Low Carbon Computing**

Low Carbon computing can be achieved by extending the life of your existing equipment and reducing the amount of electricity used from traditional fossil fuel power stations.

+ opc = **Zero Carbon Computing**

Zero carbon computing can be achieved by utilising electricity from an on-site renewable source such as solar or wind.*

** For more information about renewable energy and zero carbon computing please visit* **www.energiplc.com**

For more information or to arrange a demonstration please contact us at

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