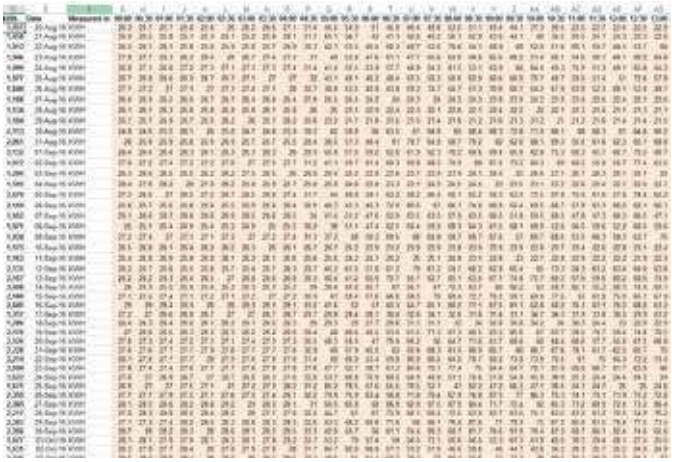
Energy Performance Indicators

Correctly interpreting the data when it comes to measuring energy performance indicators (KPIs) is perhaps one of the greatest challenges facing professionals in any sector of the economy.

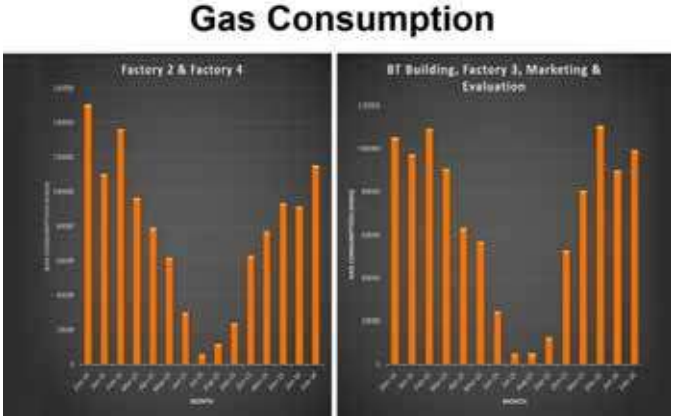
When information concerning energy performance, for example, is conveyed in the form of tables like in the example below, then peoples' eyes glaze over when presented with rows and columns of what appear to be meaningless numbers.



Finding the meaning behind the numbers is one of the greatest challenges when it comes to improving energy performance

However, when the information in the table is manipulated by application of analytical tools then the underlying message that the data contains becomes easier to comprehend and the scales can very quickly fall from the eyes.

Monthly consumption of natural gas, for example, may be displayed in the form of a histogram and if the energy is being used for providing space heating in a building then it is normal for a 'bathtub' curve to be presented, showing a greater consumption in the winter months steadily decreasing towards the warmer periods.



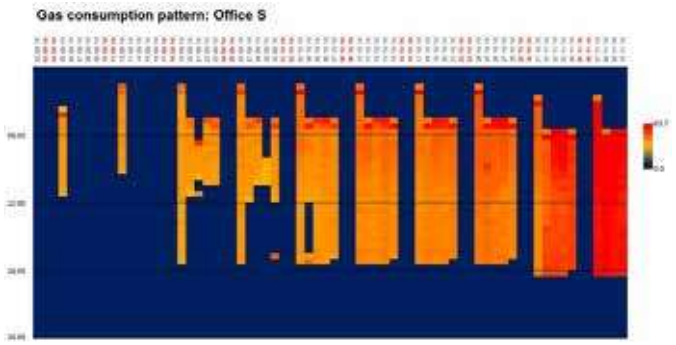
Typical "Bathtub" curve for gas heating showing progressively reduced consumption towards the warmer months

If the annual consumption graph is showing anything other than what might reasonably be expected, then it may be time to delve deeper and investigate the reasons why this is so.

Another useful diagnostic tool is to display energy consumption in the form of a heat-map, where each square is assigned a colour that corresponds to a certain kWh consumption value. The heat-map shown below illustrates the gas consumption pattern over a 24-hour cycle on the vertical axis and a time span of 70 days on the horizontal axis.

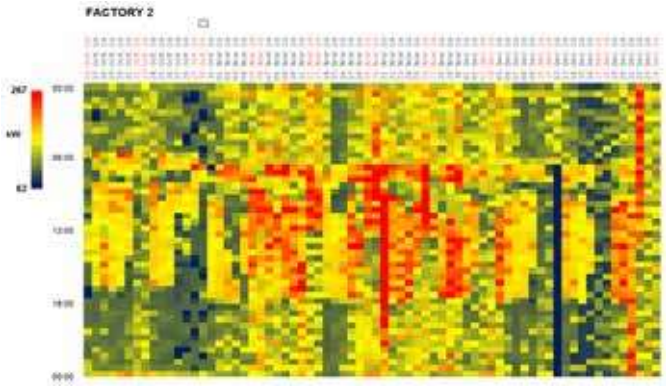
The results in this example show what might be expected in a controlled office environment where the heating comes on around 4:30am (according to outside and inside air temperatures) and then switches off at about 5:30pm with no consumption taking place over the weekends or other unoccupied periods.

The colours deepening as the seasons move towards autumn indicates that more gas is being consumed to maintain the required temperature in the offices. In other words, the chart displays a consumption pattern that one might expect for a heating system that is performing well.



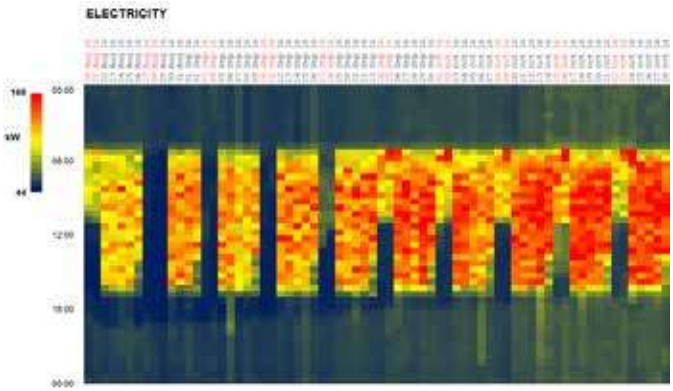
"Heat-Map" showing an optimal consumption pattern over the measurement period

Compare the above heat-map with the one shown below for a pharmaceuticals factory where high gas bills have led to an enquiry being instigated. Energy is being consumed almost randomly throughout the 24-hour cycle and over the unoccupied periods, indicating serious control issues requiring further investigation.



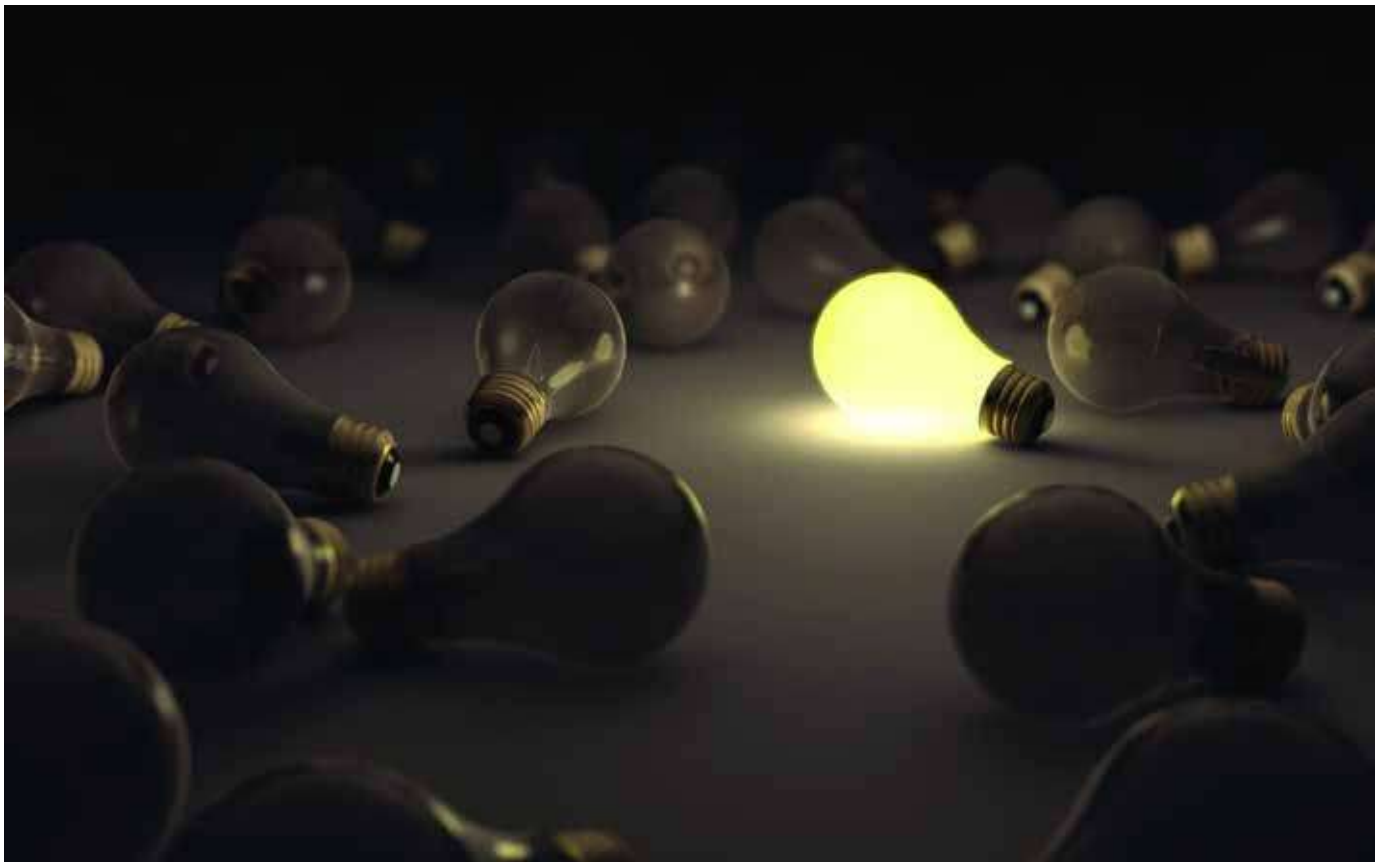
"Heat-Map" displaying "out-of-control" consumption pattern

A heat-map of the electricity consumption can also highlight irregularities such as in the example below, whereby increased electricity consumption as the season moves towards autumn is unexpected because a direct gas fired warm air system serves the heating demands of the factory.



"Heat-Maps" can also reveal underlying consumption problems with electricity demands

Analytical tools such as heat-maps and simple charting techniques offer an effective and powerful way of diagnosing problems and also communicating vital information to other actors in an organisation.



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