

Understanding a UK gas bill

The easiest way of monitoring your gas costs is to buy a Saveometer. This compact unique real time personal Smart Monitor is wireless, and displays the cost of gas and electricity you are using day by day in real time. By seeing what you are spending as it happens, the Saveometer will help you to make considerable savings on your energy costs. Gas and electricity meters are no longer spider ridden boxes gathering dust in dark places; their mystical and very expensive charging rates have been brought wirelessly into a very useful display that can be seen all the time, by all the family or employees, within the home or small business. The Saveometer - designed to save you money, reduce carbon foot print, and teach our children the true value of energy and how to stop wasting it.

But if you would like to know more about precisely how UK gas and electricity bills are calculated, please read on. Be warned – some of what you are about to cover could be rather heavy reading, unless you are fairly good at mathematics!

Very few people understand how their gas bill is calculated, and this is not surprising when considering the way in which it is worked out. To complicate matters more, many companies now supply both gas and electricity and use terms that are common to both gas and electricity tariffs, and yet these terms have totally different meanings when used for gas and electricity! This following explanations and examples explain how gas & electricity bills are calculated.

Electricity is simple. The meter shows how many kWh (“Kilowatt hours” or “Units”) have been used in any given period. One simply deducts a previous reading from the current reading to arrive at the “units” used in that period. Your bill shows the rate, or rates, charged for each unit or kWh used in a charging period & then adds any standing charges that apply, totals it all up and adds the appropriate VAT rate. All straightforward and relatively easy to understand and calculate. Gas is a different matter altogether!

A gas meter measures the volume of gas (usually in cubic feet and more recently in cubic meters) that have been used and, like electricity, the amount charged in any given period is the difference between the gas meter reading at the start of a period deducted from the gas meter reading at the end of the period. Gas meters express consumption using 4 or 5 or 6 (usually black) digits followed by 2 or 3 (usually red) numbers. The final 2 or 3 numbers in red (or surrounded by a red box) are decimal places of the volumes your meter is reading. So far so good. The volume of gas used is then converted to Kilowatt Hours (kWh).

Here starts the tricky bit. There is a rather complicated formula to arrive at what you actually pay, as follows:

$$\frac{(\text{Cu Mtrs Gas used}^1 \text{ OR } (\text{Cu.Feet used} \times .02832^2) \times \text{correction factor}^3 \times \text{Calorific value}^4)}{3.6^5} = \text{kWh}^6 \text{ (Kilowatt hours)}$$

The kWh are then charged at your supplier's particular tariff rate(s)⁷, plus any standing charges⁷, less any discounts plus the VAT rate⁷ applicable and this is what is billed.

¹ This is the difference between the current gas meter reading (or estimated reading) and the previous reading & is the cubic feet that have been used. Be careful - some literature expresses this reading as "units" – see ⁶ below. Also many gas meters read in cubic meters. When this is the case, omit this part of the calculation and use the cubic meter reading (gas used) in the above formula without multiplying by .02832

² The factor used to convert cubic feet to cubic meters .02832

³ This is a factor that depends on the meter you have fitted – a typical factor is 1.02264

⁴ Calorific value may vary slightly on each gas bill, and is stipulated by your supplier and monitored by Ofgem. It may vary due to the temperature, gas pressure and the quality of gas provided. It is known as the "Calorific value multiple". A typical value is between 38.9 & 40.10

⁵ This is normally a fixed number and it is known as the "Kilowatt Hour Conversion Factor"

⁶ Be careful – some supplier's literature expresses Kilowatt Hours as "Units" when used in a gas bill, while others refer to Cubic Meters, or 100 cubic feet as an Imperial Unit

⁷ Check your current bill to see the rates you are being charged – these are likely to vary quite often, usually to take account of fluctuating international gas prices

It may be useful to remember that 1 cubic meter = 35.3146667 cubic feet. Cubic feet multiplied by 3.17 = kWh approximately (this allows for most adjustments including the calorific value multiplier & other correction factors). Also 1 Cubic Meter of gas is approximately 11.2 kWh. Gas costs vary considerably across the UK but a rough average including VAT (January 2010) is around 40 pence per Cubic Meter or 3.6 - 4.2 pence per kWh.

As can now be clearly seen there are very many variables used in calculating a gas bill, and it can be quite a confusing undertaking. This is made even more difficult because the calorific value⁴ is not known until your bill actually arrives.

However, every gas bill must now show the kWh for which you are being charged, the relevant rate(s) that apply, and the total cost of the gas used, including VAT and all /any standing charges. To simplify keeping an eye on your gas costs we suggest that the easiest way is to take your last two or three gas bills and see how many kWh have been charged and divide this into the total costs that have been incurred. The number that you calculate is an accurate average of the cost per kWh you use, and this will generally be between around 4 pence depending on the amount used and your particular tariff.

In the future it is then a very simple matter of multiplying this value by the number of kWh used. In this way you can get a close indication of how much you are spending, without all the hassle of making complicated calculations.

Even though your gas meter records your gas consumption in cubic meters, (or hundreds of cubic feet on the older meters), your energy company is required to bill you in kilowatt hours (kWh). This seems to be an unnecessary complication, until you consider how you might compare your gas charges with your electricity charges (which have been billed in kWh for very many years). A Kilowatt-hour is an amount of energy equal to 1 kilowatt (1000 Watts) operating for 1 hour.

What is the calorific value of gas, where does that come into it, and why does it vary? The calorific value is a measure of the heat contained in the gas; it represents how quickly the gas can heat up water to a formula which is applied to the gas when it is tested periodically at various points throughout the national grid system. In simple terms gas delivered to homes near the point where it comes ashore contains a different level of moisture than the gas which is used say 50 or more miles from the shore. Moisture in the gas affects its performance and so the calorific value element should ensure that a hundred cubic feet of gas used inland, costs the same to the consumer as a hundred cubic feet of gas consumed on the coast - for doing the same amount of work.

So what happened to the Therm? The British thermal unit is still used in science, and industry but it is no longer relevant to domestic household bills in the UK.

So how do we convert hundreds of cubic feet of gas to kilowatt-hours? For this example take the current reading of your gas meter (which we have assumed expresses hundreds of cubic feet and not cubic meters) and deduct the previous meter reading from it. If your previous figure was an estimate this estimated reading may actually be higher, in which case deduct the previous reading from the current reading. This does not affect the arithmetic - it just means either you have more to pay, or your energy company owes you something back. Take this result and multiply it by 2.83 & this converts each 100 cubic feet of gas to 1 cubic meter. Multiply this result by a conversion factor of 1.022640 (may vary slightly between shippers) and then by the calorific value shown on your last gas bill. Finally divide the result by 3.6 to give kWh. As a very rough check a cubic meter of gas is about 11.2 kWh, & 100 Cu Ft is 31.5 kWh, depending upon the conversion factors which are used. Obviously the consumer has little option but to rely upon the accuracy of the suppliers declared calorific value and conversion factors, both of which are rigorously policed by Ofgem.

We hope that you found this useful. Here at Eco₁ we try hard to make things simple. But gas bills are certainly quite a challenge to explain succinctly in a few words! The simplest way to keep track of your gas costs is a Saveometer. The more aware you are of your costs the more you are likely to try and minimise waste and save money. Please remember that there are literally hundreds of different tariffs these days. As rates vary on the amount of kWh used per quarter there may be disparity between the display and the billed amount. However over 12 months the amounts will be approximately correct.