

Compare your Energy Prices

Easier said than done

Now that energy prices are varying as never before you know that you have to watch them before they empty your wallet. More than that, you need a handy way to compare different offers.

Whatever you are buying, your choice of **best buy** will often be thwarted. And why?

The **dollars per unit price** may not use the units appropriate to your purpose.

The **units may change** as you scan alternative offers.

The vendor may make the offer **too complicated** for ready comparison.

But with some products you find that your choice is easy.

Examples:

At the gas pump, easy. Just look at the posted price and compare as you drive by.

Common products like sugar, bottled water or salt the units are usually uniform and prices easy to compare - but packages can come in odd sizes and defeat your choice. Some retailers show a price per unit on the shelf label - in small print, naturally but you can still compare.

When a bunch of suppliers offers indistinguishable products we say that the products have become **commodities**; e.g. barrels of oil, cubic feet of gas, tons of copper. Here the best buy is easy to see because the price and product are expressed using agreed units.

So we all love **commoditized** products. That is, until we become suppliers. A supplier is uneasy being lined up with other competing suppliers of comparable products. So he will be delighted to find a way to make a sale without offering the lowest price. He can join a cartel or he can keep his prices in line with his competition.

How about mixing up the units? No effort. It's done already for him. The devilish Brits left behind a Trojan horse called the **Imperial System of Units**. Confusion wins.

While there are many other creative ways to confuse you, I will limit the task to putting **electrical energy, natural gas and heating oil** into comparable units at the user level. The price and units issue is far different as you move upstream towards the power station or wellhead.

Electrical energy. We'll use that handy sized unit, the Kwh (kilowatt-hour). If you've handled a 1kW hair dryer and a 100W light bulb you've got your mind round the kW (a metric unit and not exclusively an electrical unit). One kWh is just enough to boil 10.8 litres (2.85 US gallons) of water starting from room temperature.

How to confuse. My supplier advertises 3.1 cents/kWh. This irrelevant figure is hiding in small print on the bill. Seven other items on the bill, including delivery, raise the price to 7.7 cents/kWh. This **true rate**- the one to use - is not shown on the bill. You have to divide the bottom line dollars by the kWh consumption.

Imagine this treatment at the gas pump. You put your money down and hear " hey come back here! It's 2 ½ times the posted price, did nobody tell you?"

Natural gas. Not so easy. Your consumption could be shown in ft², M², btu (British thermal units), therms (=100 000btu) or gigajoules according to where you live in N America. ft² and M² are not even energy units so you need the energy per unit volume then the energy equivalent.

I have put the kWh equivalents in Table 1. For natural gas I have used a calorific value of 1030 btu/ft². My natural gas bill lists three other items after the gas price, bringing the final price to 2.35 times the posted (called the commodity) price of the gas. No price/unit of energy is shown for either the net or the gross price.

#2 Heating oil. Your bill will show US gallons (3.8litres) or litres in Canada. The price usually includes delivery so you need only add sales tax. The Kwh equivalents of the gallon and litre are in Table 1 where I have used a calorific value of 139000 btu/gallon.

To calculate and compare your energy costs. Find your metered unit from column1 and multiply your consumption by the figure in column 2. This gives your consumption in kWh. Divide the bottom line on the bill by the metered consumption expressed in kWh.

Natural Gas Unit	kWh Equivalent
Cubic ft	0.302
Cubic metre	10.66
Btu	29.3×10^{-5}
Therm	29.3
Megajoule	0.2778
Heating Oil Unit	
US Gallon	41
Litre	10.7

Table 1. Energy Unit Conversion

If you go for combustion heat because it looks cheaper than electric heat, bear in mind that your process may not be suitable for combustion heat.

And whatever the energy source, the **realisable heat** you can get into your product will be some percentage of the energy you bought.

This figure is hard to calculate. It depends on the process but you have to put it in your calculation.

This is where you call on experience and process records.

For example, the egg that you boil only takes in some 5% of the heat you have to buy.

My colleague Dick Bennet has recently written in process Heating Magazine about available and wasted heat in his Energy Notes column. See **“And Now, the Bad News”** archived on process-heating.com

The topic of realisable heat would take several columns and I would welcome readers’ contributions on the subject.