

INTRODUCTION

The terminology associated with energy is confusing. Different units are used for different fuels, and to highlight different characteristics of the same fuel. If you don't have a background in energy or physics, it can seem daunting trying to get to grips with terminology and converting from one unit of measure to another.

WHAT WATT

At a domestic level, people are used to thinking of their energy usage in relation to kilowatt hours (kWh - the unit of charge for electricity) or therms (the unit of charge for gas, although gas is often related to kWh on bills: one therm is equivalent to 29.31 kWh).

In industrial situations, mega-, giga-, tera- or even peta-watt hours are more commonly referred to than kilowatt hours: these are just prefixes, which indicate a large number of watts in multiples of 1,000.

Put simply, a kilowatt is 1,000 watts (from the Greek khilioi – thousand); a megawatt is 1,000 kilowatts (from the Greek megalos – large) a gigawatt is 1,000 megawatts (from the Greek gigas meaning giant); and a terawatt is 1,000 giga watts (from the greek word for monster).

Watt	1		10^0	One
Kilowatt	1,000		10^3	One thousand
Megawatt	1,000 x 1,000	1,000,000	10^6	One million
Gigawatt	1,000,000 x 1,000	1,000,000,000	10^9	One billion
Terawatt	1,000,000,000 x 1,000	1,000,000,000,000	10^{12}	One trillion
Petawatt	1,000,000,000,000 x 1,000	1,000,000,000,000,000	10^{15}	One quadrillion

JUST A JOULE

To confuse things further, a watt (named after James Watt) is actually a measure of the rate of use of energy: specifically a joule of energy per second. A joule (named after James Prescott Joule) is a very precisely defined unit: the energy exerted by one newton to move an object through a distance of one metre; or the work done to produce the power of one watt continuously for one second. (Just for completeness we should mention that the newton was named after Isaac Newton.) Therefore, a watt is also a joule per second per second (a confusing concept, but a useful point to remember).

IS IT ALL ABOUT OIL?

In this time of decreasing oil reserves, "oil equivalent" is another frequently heard term. This is usually expressed either as "barrel of oil equivalent" or "tonne of oil equivalent". In oil terms, a barrel is 42 US gallons. This is just under 35 Imperial gallons, or just under 159 litres.

Oil equivalent is an imprecise measure as different grades of oil have different energy values. It is assumed to be approximately 42GJ per tonne. GJ meaning giga-joule, or one billion joules.

FURTHER INFORMATION

Have a look at our factsheet "Biomass as Fuel" to see the relative energy contents of a variety of fuels. Our "Calculating woodland energy" factsheet explains how to estimate the potential energy in a woodland and relate it to kWhs.

