

## Calculating Your Energy Use and Cost

### Energy Bill Basics:

Your energy bills may sometimes seem confusing and have become something that gets paid and put away in a drawer for posterity or annual accounts. But...the energy bills for your community building are an excellent place to start to begin to analyse your specific needs for your renewable energy project.

Energy bills will give you the information to indicate how much energy your building requires and importantly what is the main energy requirement (i.e. heating or lighting). This is all very useful information to help you tailor your renewable energy project to meet the needs of your own particular situation. The information is also very valuable for funding applications for your projects.

Bills can also indicate: where you could save energy; if there are any problems with your system; tariff information; energy usage patterns throughout the year and even an estimation what you can expect to pay in annual running costs when comparing different fuels and heating systems.

### Things to Check

- Always make sure that you take time to submit **actual** meter readings: **estimates** make it difficult to accurately calculate your annual energy usage
- Check your **tariff**: Is your tariff the most suitable for your situation? Some organisations, such as local councils, offer discounted tariffs (from bulk buy agreements with power providers) which are available to community facilities and are often the most competitively priced option.
- Check your energy usage patterns: Do you have unexplained changes in energy use or costs? Energy profiles can help to **diagnose problems** (i.e. leaking oil tanks).
- Check your **VAT** rate. If you are a charity then you may be eligible for a reduced VAT rate on your fuel and exemption from the **Climate Change Levy (CCL)**. For more information see VAT notices: 701/19 Fuel and Power; 701/1 VAT and Charities.

### Using your bill information:

The table below shows a simplified *electricity* bill. Below this is a step by step guide to calculating three useful figures: total energy **cost**, total **energy usage** and total resulting **carbon emissions**

Time period	Previous Reading	Current Reading	Units Used/kWh	Tariff (£/unit)	Cost (£)
Quarter 1 <i>SPRING</i>	1000	8000E (estimate)	7000 (current – previous reading)	0.12	840 (0.12 X 7000)
Quarter 2 <i>SUMMER</i>	8000E (estimate)	12000	4000 (current – previous)	0.12	480 (0.12 X 7000)

Quarter 3 <i>AUTUMN</i>	12000	14000	2000 (current – previous reading)	0.12	240 (0.12 X 7000)
Quarter 4 <i>WINTER</i>	14000	21000	7000 (current – previous reading)	0.14	980 (0.14 X 7000)

## Annual Energy Costs

Total up the costs from each billing period of the year to give the annual financial expenditure for your buildings energy usage. In the bill above this is simply (Q1) £840 + (Q2) £480 + (Q3) £240 + (Q4) £980 = Total **£2540 per year**

*Tip: Keep an eye on your tariff costs (p/kWh or unit) for any changes and rises in energy costs*

## Annual Energy Usage

To work out how much energy is required to power your building for a year, look at the unit column of your bill. **Energy is measured in kWh (kilo watt hours)**. One unit of electricity is equal to 1kWh of energy. In the example above we add up the units used (Q1) 7000 + (Q2) 4000 + (Q3) 2000 + (Q4) 7000 = Total **20,000 kWh per year**.

*Tip: From year to year this value can vary with different weather and uses. For this reason comparing at least two or even three years worth of bills and taking an average will give you a more accurate result.*

Q Our building runs on oil, can I do the same thing. A. Yes, this same principle can be used for both oil and, LPG and natural gas bills. However you will have to use a conversion factor to determine how many kWh are contained in one unit of fuel. For example using the table below every litre of oil contains 10.3kWh. So if you use 6,000 litres of oil per year this is equal to 61,800 kWh of energy.

Calorific values	
Fuel type	kWh Per Quantity
Natural Gas	10.9/m <sup>3</sup>
LPG	7.1/litre
Kerosene	10.3/litre
Gas Oil	11.9/litre

## Annual CO<sub>2</sub> emissions

**CO<sub>2</sub> emissions are derived from the production or use of the type of fuel that is used to power your building.** Each fuel has a CO<sub>2</sub> conversion factor which enables you to convert your total yearly energy usage (kWh/year) to annual CO<sub>2</sub> emissions. For example using 1 kWh of electrical energy from the

national grid releases 0.43 Kg CO<sub>2</sub> into the atmosphere. The table below details the conversion factors for many different fuels.

So in our example above **20,000 kWh of electricity from the mainland national grid** will release: 20,000 X 0.43 = **8,600 Kg** or **8.6 tonnes CO<sub>2</sub>/year**

<i>Calculations of emissions from use of fuels</i>		
Fuel type	Unit	Kg CO <sub>2</sub> per unit
Natural gas	kWh	0.206
Kerosene	kWh	0.258
LPG	kWh	0.225
Gas Oil	kWh	0.265
<i>Calculations of emissions from use of electricity</i>		
Electricity (National Grid)	kWh	0.43
Electricity (Shetland Grid)	kWh	0.66
Electricity (From renewable source)	kWh	0

Data source from Carbon Trust? Daniel?

**Congratulations! This now allows you to complete the following information (which is very helpful for developing your CES grant aid application) these three simple figures will give you a good based line in how to develop your project.**

Annual energy cost (£)	Annual Average energy Consumption of building (kWh)	Annual CO <sub>2</sub> emissions (Kg CO <sub>2</sub> )
2540	20,000	8.6 tonnes

*TIP: Always remember to reference the source of information that you have used when calculating these figures.*

**\*\*\*It is important to remember that energy bills give an indication of your current situation and building fabric, usage will change if any upgrade is made to the fabric of the building such as the addition of insulation \*\***