

Bittern Countryside

Community Interest Company



Energy Fact Sheet 4.

“Avoiding waste”

Insulation and energy conservation

Update September 2012

Save energy, Save money
Save the environment!

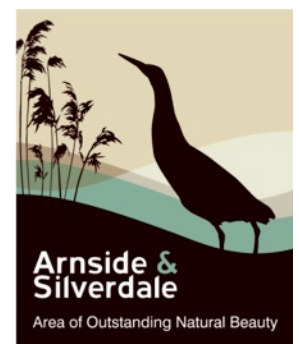


Supporting the

Arnside Silverdale AONB

Low Carbon Landscape Initiative

Bittern Countryside Community Interest Company
Registered Office: The Old Station Building, Arnside, LA5 0HG
Registered number 6363720



Website: <http://www.arnsidesilverdaleaonb.org.uk/AONB/Support/Bittern-Countryside-CIC.html>

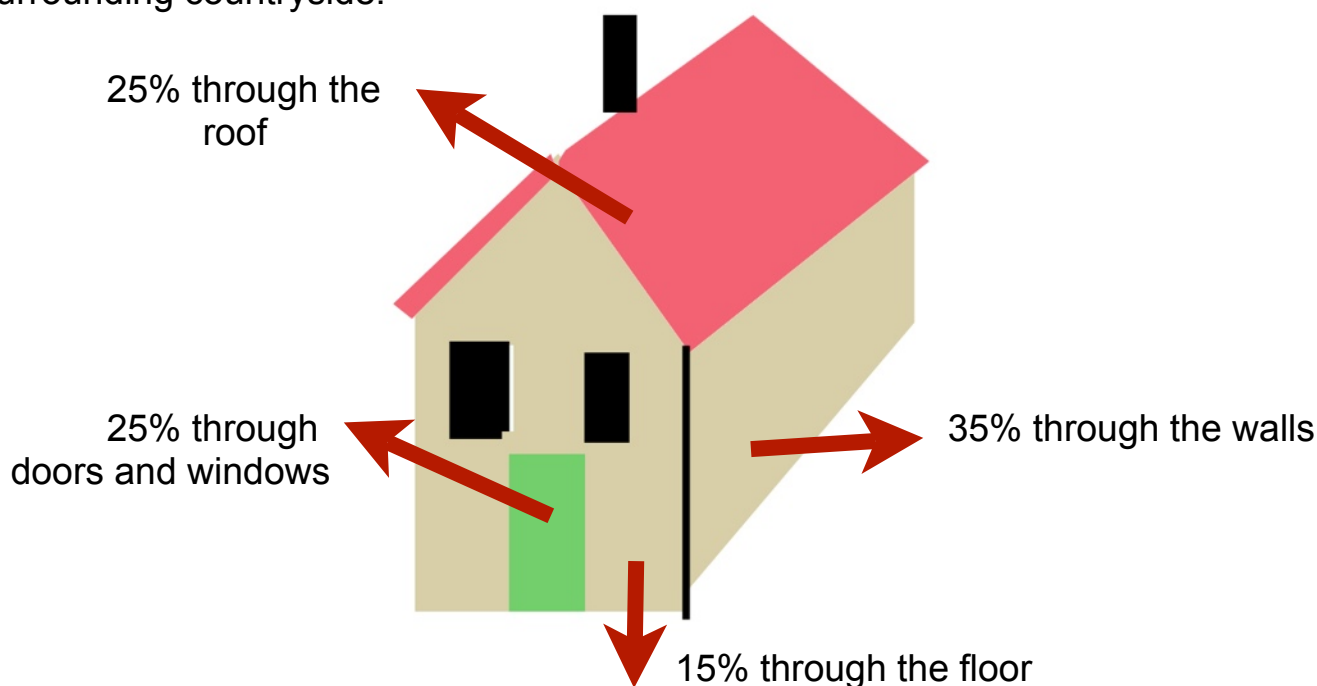
Introduction

This is the fourth in a series* of leaflets prepared by the Bittern Countryside CIC to help you understand renewable energy and see how it can save you money on your energy bills and reduce your carbon emissions too.

** Fact Sheet 1 "Electricity From Sunshine" deals with PhotoVoltaic panels. Fact Sheet 2 deals with woodburning and multifuel stoves. Fact Sheet 3 deals with buying, using and storing wood. Fact Sheet 5 looks at heat pumps. The series will eventually cover woodpellet and woodchip central heating boilers and solar hot water.*

Why insulate your house?

Heating is probably the biggest user of energy in your house over the year. It makes sense to try to keep most of that heat inside, where it is needed rather than heating up the surrounding countryside.



Heat loss from an uninsulated house

Saving money

Because there are still grants available for things like cavity wall and loft insulation, it makes sense to take advantage of them. Among other providers, the energy companies will arrange for cavity wall and/or roof insulation to be done, either free if you are over 70 years of age or receiving certain benefits, or at a very highly subsidised rate of around £200. You will then find your heating bills are greatly reduced. In addition you should find your house is more comfortable.

Providing local jobs

The use of wool for insulation of roof spaces and under floor areas means that a

resource that is often wasted can be used profitably. Local craftsmen can be used for big jobs like double glazing or cavity wall insulation as well as smaller ones such as the fitting of radiator shelves and making well lined curtains.

Recycling and avoiding waste

Materials that could otherwise end up as waste are often used to manufacture insulation materials.

Why should I insulate my roof?

A quarter of the heat lost from an uninsulated building is lost through the roof. Hot air rises in the house and this is quickly lost if your ceilings are uninsulated. It is very quick and easy to lay insulation between the joists of the attic of a house. You should however make sure that any electrical cabling is not buried in the insulation. Remember roof insulation should go over **not** under water tanks or pipes.

What materials can I use?

Sheep's wool insulation comes in panels, slabs or rolls that fit neatly between the joists. It is probably the best in terms of local sustainability in that you are using a local byproduct. It is also nice to handle and can be installed by the householder. It is not cheap however and you would have to pay for it yourself. Mineral fibre or fibreglass matting can be bought in rolls. This may be covered in a heat reflecting material to improve heat retention and make handling the material easier. Loose-fill loft insulation materials such as vermiculite, cellulose or mineral fibres can be poured between the joists. They are easier to use if the loft is obstructed or has awkward corners. Warmcel 100, a cellulose fibre insulation, is made from recycled newspapers and is fire retardant, non-irritant, non-toxic and safe to handle. For information about natural materials try www.naturalinsulations.co.uk

A good web site for general information is

http://www.diydata.com/projects/loft_insulation/loft_insulation.php

Are there any drawbacks to roof insulation?

If your joists are thin then you may not get a sufficient depth of insulation without allowing it to cover the joists. This would mean you could not see where they were and might go through the ceiling.

I use my roof space for storage. Can I insulate the rafters instead?

You can put rigid foam boards up under the tiles between the rafters. Make sure though that you leave a ventilation space between the roof felt/tiles and the insulation. Once again there is lots of information available on the web for DIYers.

Where can I get a grant?

The situation seems to change from week to week. The easiest place to get information is via the internet. You can always do this through the library. Your power company should also be able to give you information. You should certainly be able to get the work done at a subsidised price or in some cases free.

Why should I insulate my walls?

Heat will always flow from a warm area to a cold one. In winter, the colder it is outside, the faster heat from your home will escape into the surrounding air.

Wall insulation slows down the rate at which it escapes, keeping as much of it as possible inside your home for as long as possible. How? Insulation works by coating or filling walls with a layer of material that only allows heat to pass through it very slowly. This reduces what is known as the U value of the walls – the rate at which heat can flow through them. The lower the U value, the more slowly heat is lost – and the more money you will save on your fuel bill to keep your home warm.

Solid wall insulation also helps prevent “cold bridging”. Cold bridging occurs when a material that is a good conductor of heat makes a “bridge” between the warm interior and the cold exterior. This is a significant source of heat loss and can lead to condensation and mould forming in buildings. An example of a cold bridge would be the party wall separating two semi-detached homes and spanning the length of the building. Warmth from both homes is conducted along the length of this wall and escapes into the air.

You may on occasion also see references to the “thermal conductivity” or “lambda (λ) value” of the insulation material. This describes how easily heat passes through it. The best insulation materials have a low lambda value as a material with a low thermal conductivity will need a thinner layer than a material with a high thermal conductivity.

How can I check if I am losing a lot of heat?

One way to check how much heat you are losing is to buy or borrow an infra-red laser thermometer. They cost around £20. Choose a day when it is much colder outside than in. Find the internal and external air temperatures. Point the thermometer at the inside of an external wall and then at the outside of the same wall. Do the same for the windows and doors of your house. Make sure all the surfaces are out of direct sunlight. The bigger the difference between the inside ambient temperature and that of the inside surfaces or the outside ambient temperature and the outside surfaces, the more heat you are losing.

The following table shows the readings taken for a house in Arnside on a morning in February. The outside temperature was 3.5°C and the inside temperature was 19.5°C

Case Study	Inside: °C (difference)	Outside: °C (difference)	Heat Loss
Ambient temperature	19.5	3.5	
Cavity filled Wall	18.5 (-1)	4.5 (+1)	Low
Double glazed Window	17.5 (-2)	5 (+1.5)	Low
Wood external door	15 (-4.5)	7.5 (+4)	High

The wall is losing very little heat. The windows slightly more but the single skinned door is losing quite a lot.

What types of wall insulation are there?

First of all it depends on whether your house has cavity or solid walls. You can decide which yours is in several ways. Most houses built after 1920 have cavity walls. Those built after 1990 are likely to already have cavity wall insulation. You can measure the thickness of your walls. Those of around 260mm are likely to be cavity. Those that are much thinner or thicker are likely to be solid.

What types of cavity wall insulation are there?

There are several types of cavity wall insulation. The most common at the moment is rock or mineral wool. Expanded polystyrene beads were very popular but the binding agent used can deteriorate with age and lead to the beads pouring out if any building work is carried out on the walls. Urea Formaldehyde foam is also used. This sets immediately after it is injected by drying out through the outer wall. With all three it is important that they are used correctly.

Are there any drawbacks to cavity wall insulation?

If your outer walls are very damp either from faulty damp-proofing or from penetrating rain then the insulation itself can form a bridge between the outer and inner walls and cause problems with damp on the internal walls. A reputable installer will check for this before he begins but you might want to look at your walls after a period of heavy rain before you decide.

If your building is brick then once the holes drilled for injecting the insulation have been filled then they will probably not be noticeable. If your building is rendered then the filled holes will probably show. You might want to consider having the surface repainted afterwards.

We live in a semi and our neighbour doesn't want to have cavity wall insulation. Can we do our own house?

Yes. The installer will put a cavity barrier in place. This is usually a length of bristle brush which will prevent the insulation entering your neighbour's cavity.

What about solid wall insulation?

This is more expensive to do and can also be much more intrusive. However it can also provide much greater savings of energy. It is usually not a job for the amateur and it is beyond the scope of this booklet. However one of our members, Mike Smith, has had good results by lining his walls with Sempatap before papering them. A good first stop for more detailed advice would be the Energy Saving Trust website at <http://www.energysavingtrust.org.uk>.

How can I minimise heat loss through my windows?

Double glazing is very effective and triple glazing is even better. If you can't have double glazing, think of secondary double glazing or, if your walls are very thick, double glazed folding shutters that fold back in the window rebate when open in summer.

Why are most radiators sited in front of windows?

In single glazed houses, siting the radiator just below a window heats the very cold air descending from the internal face of the window and thus stops a layer of very cold air forming at floor level. In addition the area in front of a window is usually free from furniture so the heat from the radiator can circulate more easily. Now most houses have double, or even triple, glazing there is less heat loss from the window area and radiators are often placed against inside walls. However it is best not to have them on the wall opposite to the window as this can set up a current of air that can feel draughty.

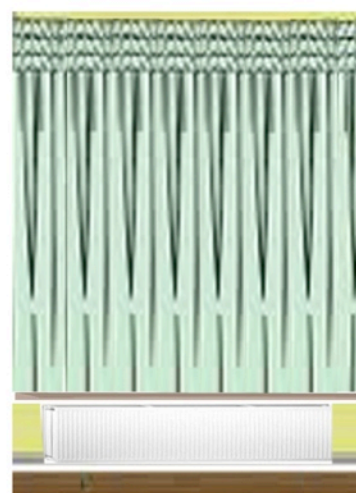
Should I pull my curtains at night?

Thick lined curtains can reduce heat loss from windows dramatically. However it is important that any radiators under the windows are not trapped behind the curtains.

Pull Those Curtains But:



Long curtains that hang in front of a radiator are a major cause of energy loss.



The curtains should not hide the radiator when drawn and there should be a shelf above the radiator to deflect heat back into the room.

Can I block the air vents under the floor to retain heat?

You should never block vents that provide air under the floor. There are 2 reasons for this. Firstly the air flow is necessary to stop the floor timbers rotting or becoming infested with woodworm. Secondly we live in a high risk Radon* area and good underfloor ventilation will stop the Radon gas seeping into your house.

How about the vents into the house?

If you have a woodburning stove or gas appliance you will need some form of ventilation. Do not block up any vents used for this purpose. Extractor fans and tumble driers should have flaps that only allow air to pass out and not in.

How can I stop draughts?

Double glazed windows should not allow draughts but ill-fitting doors often allow air to enter. There are lots of foam strips on the market that can be used to make the door airtight. Your letterbox is often a draught hotspot. Make sure you have a flap both inside and outside. A porch or lobby can also be a big help in keeping heat in the house, acting as a sort of airlock.

Why should I lag my hot water cylinder?

Even modern cylinders can benefit from an extra layer of insulation around them. You don't want the heat from the tank to escape into the air.

How else can I save energy?

Most ovens use around 1 kWh once they are up to heat. Why not invest in a slow cooker or a Remoska if you are often cooking for one or two people. A standard slow cooker will cook a stew for 4 people using under 0.7 kWh in total. This includes the energy to brown the ingredients first in a frying pan and then 5 hours in the slow cooker. This is much less than the total energy needed to cook the same dish in an oven. A Remoska can also be used to roast, grill and braise.

How can I measure the electricity I use?

You can buy a meter that straps to your mains power cable together with a remote display that shows how much power you are using at any one time. These cost around £35. A cheaper alternative is to buy a single meter that plugs into your socket and measure the power used by anything plugged into it. These cost around £15. They are both available from Amazon.

What about LED lights?

Low energy bulbs have been a sore point for some in the past. Cheap bulbs have given the rest a bad name. However things have moved on and LED replacements for halogen lights especially are well worth investing in. For a full discussion on their plusses and minuses go to <http://www.kulekat.com/>. However please note that if your halogen spots are 12V not direct mains you may need to replace the transformer as well as the bulbs.

Some kitchens have 8 or 10 spotlights each of 50W. This means a total outlay of between 400 and 500 watts each hour. Replacing these by LED lights would reduce this figure to around 40 watts per hour.

Does saving water also save energy and money?

Energy is used in providing and purifying the water we get from our taps. The more we can reduce our mains water consumption the better. Firstly think about water you use in the garden. A water butt linked to the downspout of your guttering will provide most of the water needed in a garden. If you have a large garden then several butts may be needed. These can be linked together so all the rain is collected. Outhouses and sheds can also be used as water collectors.

Have a shower rather than a bath and fit a water saver to the shower head. (This only works if you have a shower of less than 10 minutes. Those who sing the whole of the first act of 'Carmen' in the shower should stick to baths!!)

Consider having a water meter fitted. This way you only pay for what you use and can reap some of the benefits of saving water. If there are only two of you living in the house then you will almost certainly save money. You will also almost certainly save money if your house has a high rateable value. (This is not the same as the band of your council tax. It is what your house would have fetched as a monthly rent in 1973 or later if built after that date)

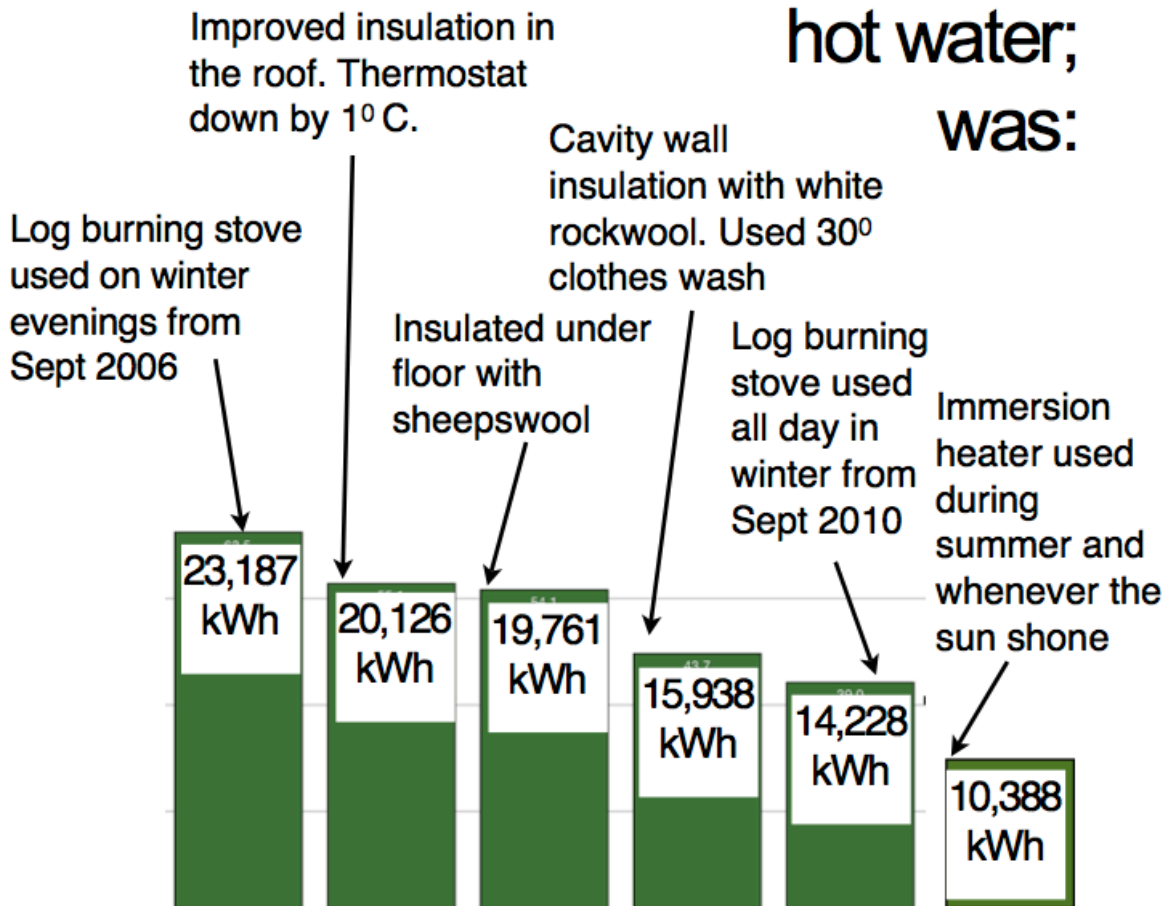
Can I really save money and resources?

In 2006 Ken and I decided to take this seriously and make real efforts to reduce our carbon footprint. In order to do this we started to monitor our expenditure. The following case study is what we did and how it affected our costs. It is difficult to pin down precise benefits as some winters are much colder than others. That being said, the last 2 winters have been the coldest.

We are still looking at ways of further reducing our bills. We do try to turn off lights when we leave rooms and keep our curtains pulled in the evening. We also have showers rather than baths and don't leave the taps running.

Are you paying too much?

The Kitchen's annual **gas** bill for
heat;
hot water;
was:

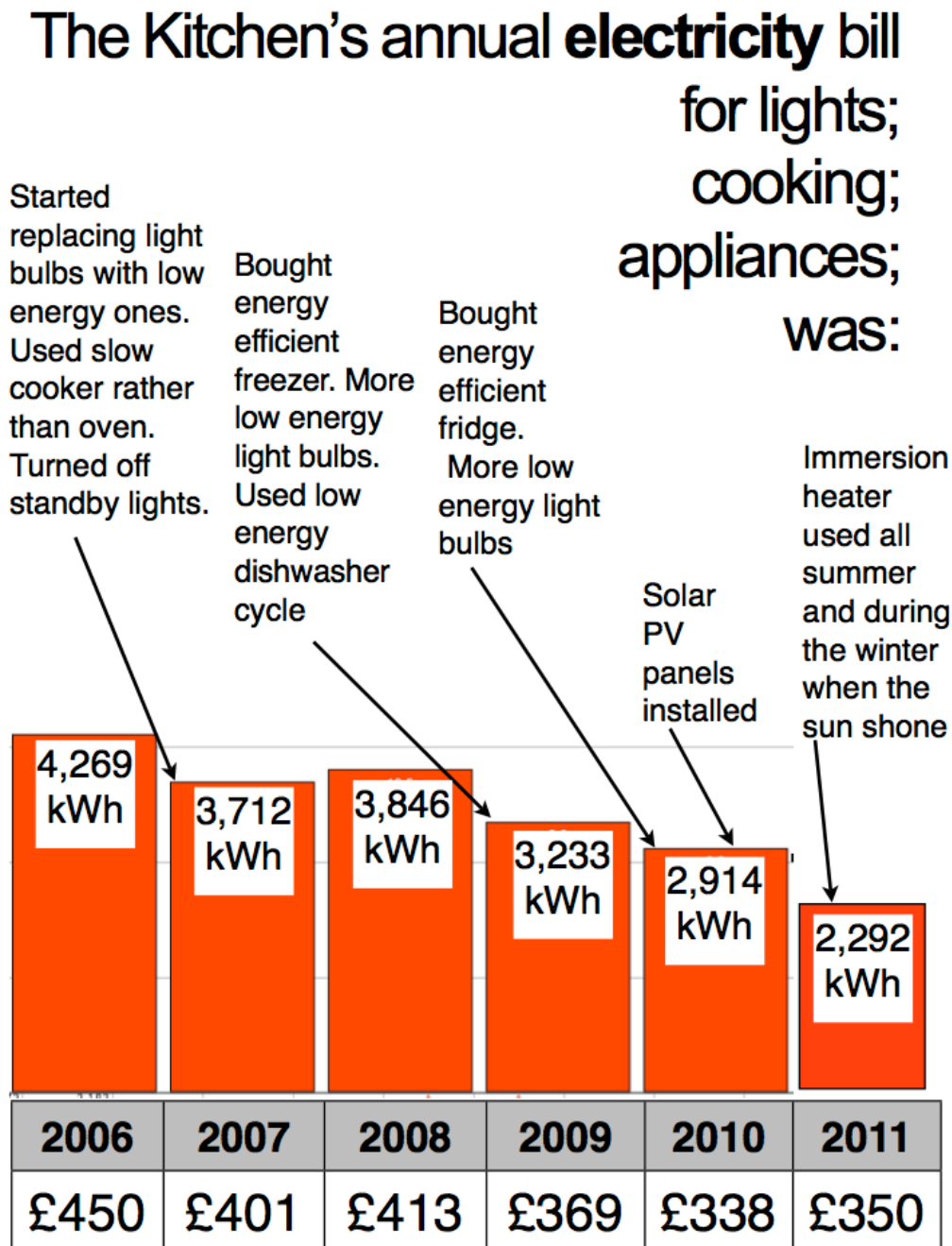


	2006	2007	2008	2009	2010	2011
Gas*	£675	£598	£589	£604	£551	£450
Wood	£50	£100	£100	£120	£150	£170
Total cost	£725	£698	£689	£724	£701	£620

* on fixed price contract for 2006, 2007 and 2008

The extra insulation in the roof cost about £100 and was well worth doing. We didn't notice the drop in temperature when we lowered the thermostat. The lambswool insulation was put between the joists under our floor. We have a 4 ft tall undercroft beneath the house and while we had to keep it very well aired to guard against radon, there were a lot of cold draughts coming up through the floorboards as well as the floor itself being cold in winter. It was not a cheap option, costing around £5 a m² and didn't

seem to reduce the fuel bills much but it certainly stopped the draughts and made the tiled floors seem warmer. The cavity wall insulation cost £199 and again made a big difference to our fuel bills. We bought a moisture meter in 2010 and ensured that all the wood was very dry before burning. That meant that although we had the fire on all day our wood bill only went up £30. We do use kindling from the garden as well as a small amount of our own wood and home-made newspaper briquettes. Using the free electricity from the solar panels all summer to heat the water meant that the boiler wasn't used from April to September.



None of the initial measures we took to reduce our electricity consumption cost a lot. We replaced the freezer after we rearranged the utility room and had to get an upright one rather than a large chest freezer. (We sold the chest freezer on ebay so it went to a good home). Our 17 year-old fridge was replaced when it broke down. Low energy light bulbs are more expensive but pay for themselves quite quickly. Given the rapid rise in fuel

prices over the 6 years we are quite pleased that our total energy bill has decreased from £1125 to £970 per annum.

We run the dishwasher and washing machine on a high heat cycle occasionally to make sure there isn't a build up of bacteria.

We had solar PV panels put on the roof in September 2010 and expect these to pay for themselves in around 10 years with the Feed-In Tariff. In addition, as we use any electricity we generate for free, we use our immersion heater in the summer when the sun is shining instead of using our gas boiler. When it didn't we used electricity from the grid. This reduces our gas consumption considerably with only a slight increase in our electricity bill. Also we use the dish washer and washing machine when the sun is shining.

We went on a water meter in 2005. Before that our bill for water and sewage but with a reduced sewerage charge (our surface water from the roof etc drains into soakaways not down the sewers) in 2004 was £320.

In 2010 with a water consumption of 75 m³ per annum our total bill was £239.

Given today's prices (2012) it would have been £280 with a meter and £526 unmetered.

How can I work out what I would save with a water meter?

For more more information you can have sums worked out on line. All you need to know is the amount you pay at the moment and your water usage habits. The online questionnaire will do all the sums for you.

Go to <http://www.unitedutilities.com/WaterMeterCalc.aspx>

How else can I save money?

Consider using ebay or local papers or newsagents to sell unwanted items. Used carefully this will enable things that would otherwise be destined for junk to find a new home. Make sure that you describe things properly and if possible add a photograph.

You might also consider using Freecycle. Donating items to charity shops may not save you money but will certainly help reduce our area's carbon footprint.

How about travel?

It goes without saying that if we can walk, or cycle, whenever possible we will be healthier as well as wealthier. Using public transport is also good where possible. However it is often not possible in a country area like ours to rely on buses and trains and we should also get into the habit of car sharing where possible.

Make sure your tyres are properly inflated. Underinflated tyres use more fuel. Drive gently and steadily. Avoid sudden braking and roaring away from traffic lights.

Where did the CIC get its information from?

All the information is drawn from recognised official websites, publications and from practical experience - contact us by email: bitternccic@arnsidesilverdaleaonb.org.uk or by telephone on 01524 761034 for more information.

Where can I find more information?**

The Energy Saving Trust on www.energysavingtrust.org.uk will give impartial advice on a whole range of measures to reduce your energy use.

Second Nature UK limited will give advice on wool insulation. They produce Thermafleece insulation and also EdenBloc³⁵ rigid insulation see www.Thermafleece.com or www.EdenBloc.co.uk

Alian Energy Solutions supply LED lighting, Thermafleece and Solar and Wind Power among other things. www.alianenergy.co.uk

Details on Sempatap can be found at www.mgcltd.co.uk/Products/Thermal_and_Acoustic_Insulation/SEMPATAP_THERMAL/

To check whether a water meter is for you go to www.unitedutilities.com/WaterMeterCalc.aspx

You can find out about Slow Cookers and the Remoska at Lakeland Ltd. www.lakeland.co.uk

You can buy replacement LED bulbs, electricity monitors etc on Amazon. www.amazon.co.uk

For information on lighting go to <http://www.kulekat.com/>

† What is Radon and how can I find out more about it?

Radon is a colourless and odourless gas that comes up from the bedrock in our area. It tends to be channelled through cracks in the limestone so one house may have a high radon reading and its neighbour a very low reading. High levels of radon are thought to cause lung cancer so it is wise to keep the reading as low as possible in your house. More details can be found on <http://ukradon.org> run by the Health Protection Agency, a government sponsored body.

There are various things that you can do to lower your radon reading if your house is above the recommended limit.

*** Neither the AONB nor the Bittern Countryside CIC are endorsing any of these particularly*