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Customer Name: Example 1

Date of Survey: 25/12/2016



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About TheGreenAge

TheGreenAge have been providing impartial energy advice for the last 5 years, helping households and businesses lower energy bills, improve thermal comfort and move towards a more sustainable future.

We know there are plenty of energy assessors out there are all qualified to carry out Government energy assessments, however we feel that they are too general to provide any real insight. Our GreenAge Plus survey was conceived on the idea of producing a tailored report specific to the household or business - thereby offering really valuable insight on the elements to target to help increase energy efficiency. The UK building stock is some of the most diverse in the world, so recognising what to target first is often half the battle!

We hope you find our GreenAge Plus survey and this accompanying report a useful starting point to help improve your property.

James & Nick (Founders of TheGreenAge)



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Getting Started

When viewing your home in terms of efficiency, we can broadly divide it into 3 areas:

- 1. The envelope of the home, which refers to the external heat loss surfaces. This includes things like the walls, roof and floor as well as windows and doors and even chimneys.
- 2. The heating system of the home including controls and the mechanism for distributing the heat around the house.
- 3. Other electricity / gas usage e.g. lighting, cooking facilities and any unusual appliances.



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Meeting current building regulations

A new build property built today will have vastly improved thermal efficiency, compared to an older property. One of the major reasons for this is that a new build needs to adhere to building regulations and more specifically part L – Conservation of fuel and power.

This document makes it a legal requirement for new buildings to be built to certain efficiency standards.

Obviously if you exceed the standards set out in building regulations your home will lose less heat and therefore be even more efficient. However the key is getting the balance right between the cost of getting the extra insulation installed (labour and materials) with the returns – the reason for this is related to the law of diminishing returns.



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Law of Diminishing Returns



More insulation is better – less heat loss. It makes sense!

However, when considering the thermal envelope of the property you need to consider the law of diminishing returns. Put simply, it reaches a point where it is simply not worth adding any more insulation.

The extra insulation would of course increase slow the rate of heat loss even further but the cost of doing it would not make sense because the material and labour costs would far outweigh the energy savings.

In our experience, building regulations have pretty much hit this sweet spot, so this seems a fairly sensible starting place for us (and your home) to achieve. However, there are a few areas of the thermal envelope where we would go that little bit further!





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U-Value – How we measure heat loss

What are U-values?

- U-values illustrate the heat loss of insulating materials for any given thickness;
- The U-values are measures in watts per metre squared kelvin (W/m2K);
- It is widely referenced in building regulations as the insulation standards for applications such as walls, roof, floors, windows, etc – applicable to new buildings and retrofit projects;
- The key thing to remember is that a low U-value is better as it signifies a well insulated element. A high U-value (e.g. an uninsulated wall) signifies an area of high heat loss and is something that should be targeted.



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Heat Loss from the thermal envelope





- 25% of heat loss occurs through the roof of your home
- 35% of heat loss occurs through the walls of your home
- 10% of heat loss occurs through the doors and windows of your home



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Your Home - the external walls (approximately 30% heat loss)



- This property was built around 1930 from solid brick construction. It is a 2 story property and is detached.
 - CURRENT This puts the heat loss at approximately 2.70w/m²k (this is known as the U-value)
- TARGET Current building regulations stipulate new homes are built to a u-value of 0.30w/m²k.



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- On the back and side of the property there is a single story extension.
- This is estimated to be built in the last 20 years and will therefore should have a better U-value. Unfortunately many extensions are not built to the building regulations and therefore the insulation could be lacking.
- In total there is 38.6m of heat loss wall on the first floor and 45.6m of heat loss wall on the ground floor.





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Improve the thermal efficiency of the walls

- In theory the easiest and most effective solution to improve the thermal efficiency of your home is to add external wall insulation. You can find out much more about EWI via our partner site at <u>www.beconstructiveltd.co.uk</u>, which installs the EWI system.
- External wall insulation (EWI) would be preferable because you can maximise efficiency without losing any internal space, however EWI normally changes the look of the property because it is finished with a render and can bury period features which are difficult to emulate.
- If you were to go down the external wall insulation route, you could easily meet current building regulations this would involve adding 100mm of EPS board or 120mm of Rockwool. The average cost for a detached house like this is £15,000. Our EPC and energy bill analysis suggests a saving of £380 a year, but you will also get significant benefits in terms of comfort and improve the finish externally.



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Improve the thermal efficiency of the walls

- Internal solid wall insulation is another possibility again it would be relatively easy to do but you would lose space as the insulation board is attached to the inside walls. This is the major downside of this type of insulation.
- Remember you are only insulating walls that are exposed to the air so in your case, this is most of the property. Internally you can also use PIR board, like Celotex or Kingspan, and since these have higher efficiencies than EPS board you could meet current building regulations with just a 70mm internal layer of insulation.
- Internal wall insulation, like external wall insulation, is a fantastic way of improving the efficiency of your home, however it does tend to cause lots of upheaval. Radiators on the external walls would have to be moved off the wall to allow insulation to be added behind. For many people internal wall insulation is done at the same time as decorating rooms to minimise the upheaval.
- Internal wall insulation in your home would cost approximately £15,000 + VAT.



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The expected energy savings

- In your house, external / internal wall insulation are the two solutions that would make the biggest difference in terms of increased energy efficiency.
- Based on our calculations (and your gas bill), if you were to go with either of these solutions you would save approximately £32 per month (£380 per year) on your heating.
- These energy saving calculations do not take into account the rising price of energy. Even though the price of oil has fallen sharply over the last 12 months, the price we pay utility companies, for gas and electricity, is at a record high.
- In 2005 the average energy bill was £580 last year the average bill was £1,240. Therefore you could confidently predict that your annual energy savings would increase as time goes on.



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Other potential solutions to improve the efficiency of your walls

- Internal & external wall insulation are both solutions that need to be carried out by professional installers.
- There is one DIY solution that you might want to consider, although this would not give you anywhere near the energy savings discussed previously. This solution is a type of insulated wallpaper, known as Wallrock KV600. At 4mm thick it takes up virtually no noticeable space in the home and will certainly help improve warm up times in your rooms.
- The KV600 is made up of wood fibres and is applied to the walls much like wallpaper (albeit a far thicker version!). The cost of this is approximately £100 for a 15m² roll so it is considerably cheaper than external / internal wall insulation.
- Obviously at 4mm thick, compared to the 100mm thick external or 70mm internal wall insulation, the energy savings are not going to be vast but it may help improve comfort to a certain extent. The u value will be improved by about 0.4 (i.e from 2.7 to 2.3).



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Windows



- Your property has double glazed 20 year old units.
- Unfortunately windows are notoriously bad in terms of energy efficiency in fact out of all of the different building elements, windows are the worst performers. The U-value of your existing windows is about 3.5w/m²k – but even the best triple glazed windows can only achieve a U-value of 0.8w/m²k (remember walls nowadays are built to 0.3w/m²k) so we would always recommend targeting other improvements before looking at the windows.
- The savings to be made by installing modern double glazing are around £70 per year. This is very low compared to the installation cost, which is going to be £10-20,000.
- I recommend hanging on to your current glazing as long as possible, and try to minimise the condensation on the windows by providing adequate ventilation. You can look at getting the windows resealed, although this tends to give mixed results, and the payback on this in terms of savings is poor, although it may help with the condensation.





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Loft Insulation – Main house



- Your property currently has 300mm of mineral wool insulation in the loft at joist level, which gives a U-value of 0.14w/m²k. This is excellent and better than modern building regs.
- Current building regulations stipulate that a U-value of 0.16w/m²k should be achieved.





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Loft Insulation – Main house

- As alluded to earlier, this is very much a case of diminishing returns and as such I would say this level of insulation in the loft space is more than adequate to minimise heat loss.
- The boarded area does not meet building regs and I would recommend using joist extensions or loft lifters to add insulation and retain the storage space. <u>http://www.theecostore.co.uk/eco-store/loft-lifters/</u>
- The extensions will be more difficult to insulate, and you will probably have to take the ceiling down to insulate properly. The returns on this won't be great as the areas involved are small.



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The Heating System

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- Your current Vaillant boiler has a seasonal efficiency of around 88%. Put simply, this means that for every unit of gas burnt, you get 0.88 units of useful heat.
- Although there are some more efficient boilers (up to 90%), since the savings are relatively small I wouldn't look to replace it at this time.



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The Heating System – heating controls





Your cylinder is well insulated and has a cylinder thermostat. You could add another jacket which will see savings of around £20 a year.

Much like your boiler, your heating controls are adequate and will give you the required control over your heating (you have a thermostat, programmer and TRVs on the radiator). Any new model would just be a bit shinier rather than operate in a different way.





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Lighting – the move to LED bulbs



- The lights in your home were a mixture of Halogen spotlights and LED.
- The halogen and incandescent bulbs produce light by getting hot the filaments get extremely warm as electricity flows through them this causes them to glow and produce light. For each unit of electricity running through one of these types of bulb, 90% is converted into heat, while just 10% actually produces light.
- New LED bulbs turn this on its head 90% of the electricity going through an LED bulb will produce light, with just 10% wasted as heat – so replacing your existing bulbs with LED bulbs will see a decent saving.
- LED bulbs also have two other advantages aside from the energy savings. Firstly, they last up to 20 times longer than conventional incandescent or halogen spotlights and secondly, they light up instantly unlike the older CFL energy saving bulbs.



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Lighting – the move to LED bulbs



- The energy savings LED versus halogen bulbs
- Comparing a 50w halogen with a 5w LED on for 4 hours per day. Taking the price of electricity as 12.5p/kWh
- A 50w halogen will use 50w per hour (0.05kWh) so would use 0.2kWh per day at a cost of 2.5 pence. This would cost £9.13 per year to run.
- An equivalent 5w LED will use 0.02kWh per day at a cost of 0.25 pence per day over 4 hours. This would cost £0.91 pence per year to run.
- If you multiplied the savings over all the Halogen spotlights you have in your home, you would be looking at a cumulative energy saving of £100 per year and you wouldn't need to replace them for 10 years plus! The savings would be more if you hadn't changed quite a few already.



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Renewable Options



- As discussed on the day, although there are a raft of different renewables these days, your best option is to look at the two solar possibilities.
- Solar Thermal heats the hot water directly from the sun and a typical system has an area of only 3-6m2, so could fit on your roof easily.
- The cost of Solar Thermal is around £2,500-4,000 depending on the size of the system. You would need to replace your current hot water cylinder for a dual coil one.
- You would receive Renewable Heat Incentive payments of around £1,500 or so over 7 years, as well as an annual saving of around £100 on your water heating bill. If it is hooked up to your swimming pool as well, you could see even bigger savings.



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Renewable Options



- Solar PV is the other solar option. These are the most common in the UK and create electricity from the sunlight to help power your home.
- Typical system size is larger and you will need 15-20 square meters of space on your roof that is south facing for these to be a good option. Your roof has a decent south facing roof which could accommodate a system, but you will need a solar installer to do a desktop survey for you – we can arrange this free of charge if you are interested.
- Cost of the system will be £5-7K and you will see savings of around £450-550 on your electricity. This may be even higher given the price you pay for daytime peak electricity.
- You will also get a feed in tariff payment of around £100 a year (much reduced since the government cut the tariff massively in January 2016).
- You can find lots more about solar on our website here: <u>http://www.thegreenage.co.uk/tech/types-of-solar-panel/</u>



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Other Improvements



- Your radiator cabinets block heat from getting out into the room, and have been shown to reduce the heat distribution in a room by up to 50%
- All radiators are equally efficient, it is only the speed at which the room heats up that you can effect by replacing them.





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GreenAge Plus Top Five Recommendations



- 1. Insulate the rest of your loft up to 300mm.
- 2. Insulate externally or internally with EWI or IWI. Use thermal liner if the cost is prohibitive.
- 3. Move to LED lighting on all fittings
- 4. At solar thermal as an option to help heat your pool and your hot water.
- 5. Remove radiator cabinets which block heat from getting into the room.



