Making ColGlen Warmer

This case study is one of a series produced by Warmer ColGlen to show how Colintraive and Glendaruel residents can make their homes more energy efficient - giving them a warmer home, saving them money on their energy bills and reducing their carbon footprint. We hope the case studies will demonstrate what is possible and encourage others to take action too. You can find out how to save energy in your home further on in the leaflet.

Case Study 4. Modern timber frame house

Craigliath, Glendaruel

£334 in savings and £400 income per year

"This is the warmest house we have ever lived in but we still found room for improvement. Thank you."

Increasing energy efficiency

Built in 2007, this timber frame house was constructed to a high standard. It has at least 300mm wall insulation and 270mm in the loft, meeting current building regulations. It is still possible to achieve increased energy efficiency using a combination of low cost measures, behaviour change and renewable technologies.

Improvements

DIY improvements

Insulation:

Thermal imaging showed the following:

- 2 un-insulated loft hatches
- 1 open chimney can have temporary insulation material or chimney balloon fitted whilst not in use
- 3 un-insulated dormers
- Draughty doors

Lighting

- Out of 40 fixed light fittings, only 2 had low energy bulbs

Potential further improvements

Heating

- Replace current boiler (85% efficient) with more efficient condensing boiler (93% efficient) for heating and hot water.

  or

- Convert to biomass with a log boiler and save money and carbon, whilst generating income.

Solar PV

- Installation of 3kW system would save over 1tonne of CO_2 a year.

Getting the work done

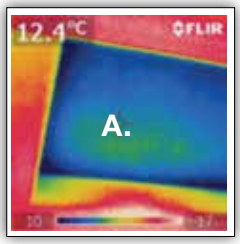
- Loft insulation top-up, draught-proofing, chimney balloon and replacement low energy light bulbs were cheap and easy to install DIY measures with no disruption
- Replacing the oil-fired non-condensing boiler with a new oil-fired boiler would be a medium cost, simple process eligible for partial finance through the **Green Deal**. Installation would be quick and easy, replacing like for like.
- Biomass boiler installation is high cost, but would attract - *£2000 available for installation costs from **Renewable Heat Premium Payment**, OR an interest free loan of up to £10,000 from the **Home Energy Scotland Renewables Loan Scheme**. Planning permission may be required. Otherwise straightforward installation. Heat and hot water demand for the property is 28,000kWh/yr, and **Renewable Heat Incentive** currently proposed is 12.2p /kWh. *NB. in 2014 all biomass fuels will need to be accredited to be eligible for RHI.*
- High capital cost for Solar PV that can be financed partly through the Green Deal. *Interest free loan of £2500 available for installation from **Home Energy Scotland Renewables Loan Scheme**. But immediate savings and income with very little disruption - quick and easy contractor installation

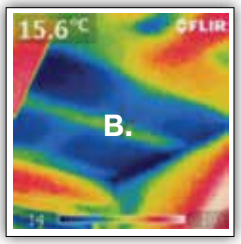
** Grants, tarriffs and loans currently available in Scotland August 2013.*

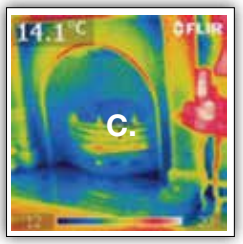
A. Uninsulated loft hatch

B. Uninsulated dormer

C. Open chimney losing heat







Costs

Measure	Approx. Cost DIY	Approx. Cost Professional	Notes
Loft insulation top-up	£100	(£300)	Pays for itself within 5 years if DIY
Draughtproofing and chimney balloon	£120	(£240)	Saving £55 per year* *
38 Low energy light-bulbs	£114	-	Saving £69 per year* *
TOTAL COST	**£ 334**		**DIY total cost is equal to the saving in the first year. So *Payback in 1 year.**
OR			
Replacement biomass (wood log) boiler		£11,000 and up for a manual – feed log boiler	Income - from **Renewable Heat Incentive** at the proposed *12.2p / kWh - could be around £3000 / year. Replacing 3000 oil with 9 tonnes of logs could also save £1000 on fuel bills / year). **Payback in > 3 years without loan.**
ALSO			
Install 3kW solar PV - Energy Saving Trust solar calculator figures	-	£6430	Total income over 25 years £9,704. **Payback over 13 years without loan.**


Filling roof insulation gaps


Example of indoor manual feed log boiler


Daylight saving eco light-bulbs

* *The Domestic Renewable Heat Incentive is awaiting parliamentary approval, so may change, and will be implemented in 2014*

* * *Energy Saving Trust estimate*

Save Energy in Your Home

This section provides information on how you can save energy in your own home – making your home warmer, saving you money and reducing your carbon footprint.

1. No Cost Energy Saving Actions

Start off saving energy with a few changes that are free and straightforward. Some of these actions will save you up to **£60** and **100kg/CO_2** per year.

Lights and appliances:

- Switch off lights when you are not using them
- Don't leave electrical appliances (such as the TV) on standby – always switch them off at the plug
- Unplug chargers when not in use (such as phone chargers) as they still draw electricity.

Heating:

- Your room thermostat should be set to 18–21°C (or lower if you are comfortable) – turning the room thermostat down by 1 degree could save you money
- Draw your curtains at nightfall.

Washing:

- Make sure you have full loads before using the washing machine or dishwasher – half loads are not efficient
- Wash clothes at 30°C or 40°C
- Dry your clothes outside or on a clothes horse instead of using a tumble drier.

Food and cooking:

- Only fill the kettle with as much water as you need
- Use lids on saucepans
- Let warm foods cool before putting them in the fridge
- Switch the oven off a few minutes before the food is cooked – the oven will stay warm for a while.

2. Energy Saving Improvements

This section outlines a range of improvements you can make in your home to reduce your energy bills. These are split by cost: low (under £100), medium (up to £500) and high (over £500). Unless otherwise stated, all savings and costs are from Energy Saving Trust[1].

Low cost improvements: under £100

Lighting: to reduce energy use, replace 'normal' (incandescent) bulbs with low energy bulbs (CFLs), and halogen spotlights with LEDs. These last a lot longer (up to 50 times as long) and are available in a variety of shapes and sizes, and as dimmable bulbs.

Energy monitors: these tell you how much energy you are using in your home – helping you to see what might use a lot of electricity. Monitors typically cost around £30-£40, but phone your energy supplier to see if they can provide one for free.

Hot water: reduce heat loss from your hot water system by fitting insulation around pipes (lagging), fitting a hot water tank jacket and a hot water tank thermostat (which should be set to 60°C).

Radiator panels: reflective radiator panels can be fitted behind radiators to keep heat in the room. They are most effective behind radiators on external walls and cost about £30 for a pack.

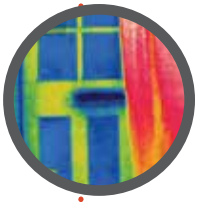
[1] *www.energysavingtrust.org.uk/scotland*

Measure	Cost	Energy bill savings per year	CO_2 savings per year
Replace 1 bulb with CFL bulb	£2 – 10*	£3 (£55 over the lifetime of the bulb)	12kg
Replace 1 halogen light with a LED	£8 – 30*	£4 (£70 over the lifetime of the bulb)	16kg
Hot water tank jacket	£15 (DIY)	£40	170kg
Primary pipe insulation	£10 (DIY)	£15	60kg
Room thermostat	£120**	£70	280kg
Hot water tank thermostat	£80**	£30	130kg

* Approximate cost from http://www.thelightbulbshop.co.uk ** Changeworks cost

Medium cost improvements: £100 - £500

Energy efficient appliances: choose the most efficient appliances (such as fridges, washing machines and TVs) when replacing them. 'A+++' is the most efficient rating (and 'G' is the least efficient). An efficient fridge freezer will use £86 less in electricity bills over its lifetime compared to an average model.



Reducing draughts: minimising cold draughts in your home can make it feel warmer and save you money. Draught-proofing doors, windows, letter boxes, loft hatches. In addition, gaps in floor boards can be sealed and draughts in chimneys can be blocked with a chimney balloon. There are many different ways of draught-proofing windows: more information on these can be found in the 'Further Information' section at the end of this document.

Cavity wall insulation can be fitted if the property has cavity walls, by injecting insulation into the cavity.

Loft insulation is cheap and easy to install – it should be 270mm (10 inches) deep, so 'topping up' existing loft insulation is also worth doing. Pitched roofs without a loft room in roof can be insulated (with rigid insulation boards attached between the roof rafters), and flat roofs can be insulated from above: these measures will cost more than standard loft insulation.

Heating controls – a central heating system should have a full set of heating controls including a room thermostat and thermostatic radiator valves (TRVs).

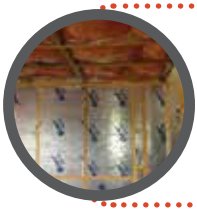
Floor insulation – can be fitted underneath the floorboards either DIY or professionally. Fitting from below is the cheapest and simplest option. Solid floors can be insulated from above and can require more work.

Measure	Cost	Energy bill savings per year	CO_2 savings per year
Draught-proofing (all windows and doors) - DIY	£120	£55	220kg*
Draught-proofing (all windows and doors) - professional	£240	£55	220kg*
Filling gaps between floor and skirting board	£20	£25	100kg
Insulating timber floor - DIY	£100 (DIY)	£60	240kg
Insulating timber floor - professional	£770	£60	240kg
Loft insulation (if none)	£100 - £350	£175	720kg
Loft insulation (from 50mm)	£100 - £350	£25	110kg
New fridge freezer	£200 - £600	Up to £40	135kg

*Changeworks estimate

High cost improvements: over £500

Windows: upgrading single glazed windows to double glazed will make your home feel warmer and reduce energy use. If double glazing is not appropriate, secondary glazing (an additional sheet of glazing fitted to the inside of the window) may be fitted. Again, there are many different options and more details can be found in the 'Further Information' section at the end of this document.



Solid wall insulation: this can either be external wall insulation (insulation attached to the exterior of the house and covered in render or cladding) or internal (a variety of techniques are used to attach insulation to the inside of the wall).

Fit an 'A' rated boiler: old boilers can be inefficient, so installing a new efficient boiler will save energy.

Measure	Cost	Energy bill savings per year	CO_2 savings per year
New boiler (replacing previous G rated boiler)	£2300	£300	1,220kg
New boiler (replacing previous E rated boiler)	£2300	£200	810kg
Internal wall insulation	£5,500 – £8,500	£445	1.8 tonnes
External wall insulation	£9,400 to £13,000	475	1.9 tonnes
Installing double glazing (where single before)	£400 – 800 per window*	£165	680kg

*Changeworks estimate

3. Renewable Energy Systems

There are a variety of technologies you can install into your home to generate renewable energy. These reduce your carbon footprint and your energy bills. In addition, most technologies are available to receive Government subsidy as long as you use accredited installers and products. This includes:

- **Feed-in Tariff (FITs):** a payment for every unit of electricity generated (includes PV and wind turbines)
- **Renewable Heat Incentive (RHI):** a payment for every unit of heat generated (includes solar hot water, air source heat pumps, ground source heat pumps and biomass boilers). This is due to start in summer 2013.

Some technologies will require planning permission, depending on the circumstances.

Photovoltaic (PV) panels generate electricity for your home. Roofs facing south are ideal, but east or west facing roofs will work.

Solar hot water/solar thermal produce hot water for your home. They are best suited to homes with a lot of hot water demand (e.g. families), but do not tend to work if the boiler is a combi boiler (as there is no hot water tank). Most hot water is provided in the summer months.

Air source heat pumps (ASHPs) absorb heat from the outside air to heat a house or provide hot water. The technology is similar to a fridge, but it works the opposite way around (fridges extract heat from its inside), so they even work at low temperatures. They work best with large radiators or under-floor heating, or can be used with 'warm air vents'. They still require electricity to work, but should save carbon and money in off-gas properties (i.e. those heated by oil, solid fuel or electric). Homes need to be well-insulated to work well with ASHPs.

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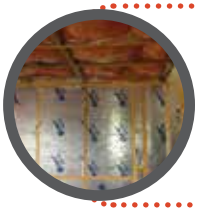

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*Changeworks estimate

4. Further Information

The following references provide further information on making your home more energy efficient:

Big Green Tarbert/ARC Architects published guides for five typical house types found on the West coast of Scotland (2011): visit greentarbert.wordpress.com and search for **Household Energy Efficiency Manual**

Changeworks (2009) Renewable Heritage: A guide to microgeneration in traditional and historic homes: visit Changeworks.org.uk/publications

Changeworks (2008) Energy Heritage: A guide to improving energy efficiency in traditional and historic homes: changeworks.org.uk/publications

Energy Saving Trust Scotland, general information on saving energy: energysavingtrust.org.uk/scotland

Energy Saving Trust Scotland, information on home renewables: energysavingtrust.org.uk/scotland/Generating-energy

Historic Scotland Inform: Improving Energy Efficiency in Traditional Buildings: conservation.historic-scotland.gov.uk/publication-detail.htm?pubid=6947

Historic Scotland, Short Guide – Fabric Improvements for Energy Efficiency in Traditional Buildings, visit: conservation.historic-scotland.gov.uk/publication-detail.htm?pubid=9550

Historic Scotland, Technical Papers (including research on double glazing and case studies), visit: historic-scotland.gov.uk/technicalpapers

North Howe Transition Toun, Energy toolkit: Our top 40 energy saving ideas for your home, visit: nhtt.org.uk/wp-content/uploads/2010/03/TOOLKIT-SMALL2.pdf

Sustainable Uist (2010-2) Research on Hard to Treat Houses: visit: sustainableuist.org/hard-to-treat-houses/

Cutting costs...

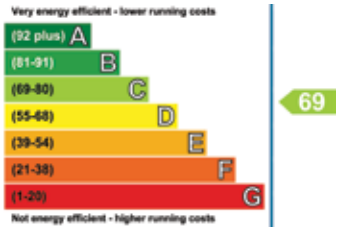
The householders have made savings and could also save more and generate income as a result of further improvements to their house:

- **Currently saving £334 per year** - reducing their annual heat and electricity bills from £2552 to £2218 with DIY measures and changing behaviour to use less electricity
- **Potential income of of £3000 a year, also saving of £1000 on fuel per year converting to biomass**
- **Potential saving of £89 per year** from the electricity bill with Solar PV, including **£346 income** from generation and **£54 income** from export tariff. ** *Energy Saving Trust figures.*

...and Carbon

- DIY measures saved 1.6 tonnes CO_2e per year
- Replacement oil-fired boiler could save 0.43 tonnes CO_2e /yr
- Log boiler – converting from oil could save over 8 tonnes CO_2e /yr
- Solar PV could save 0.9 tonnes of CO_2 per year

Before



After DIY measures

They have also improved the energy efficiency rating of their home as shown above in the Energy Performance Certificates (EPCs), but could further increase the rating from a 'C' to a 'B' rating, if installing renewables measures such as the biomass boiler or solar PV.

Warmer ColGlen is a Colintraive and Glendaruel Development Trust project, funded by the Scottish Government's Climate Challenge Fund. It helps householders to reduce their home energy use - saving them money and also reducing their carbon footprints.

Find out more

For more information about the project go to:
www.warmercolglen.cgdt.org
or contact Sara on sara@cgdt.org or 01700 841298/358
Registered office: The Village Hall, Colintraive, Argyll, PA22 3AS

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For more information about saving energy in your home, go to:
www.energysavingtrust.org.uk/scotland

This leaflet was created with support from environmental charity Changeworks ~ Inspiring change for people and the environment. www.changeworks.org.uk

CHANGEWORKS

Find a Woodsure accredited biomass supplier www.woodsure.co.uk/suppliers.htm

For up to date information on all grants and offers call Home Energy Scotland on 0808 808 2282