

# Making ColGlen Warmer

This case study is one of a series produced by **Warmer ColGlen** to show how Colintrave 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 2. "Non-Traditional" Swedish timber house



Duiletter, Glendaruel

**£422  
saved  
per year**

*"This project has really made us think about the ways we heat our house, the improvements we can make and the environment. We will certainly be making changes."*

# Increasing energy efficiency

Built in 1949. As a result of the Post-war Burt Commission study into housing stock, to house forestry and farm workers and their families, these “Weir Houses” were imported from Scandinavia, pre-fabricated and clad with cedar. Although wood is a good insulator, building standards have considerably improved and nowadays

we would expect to see 300+mm or equivalent wall insulation. Historically, these hard to treat houses have simply been ‘over-heated’ to keep them cosy. Retro-fitting external wall insulation is expensive and tricky due to the structural nature of the cladding and the risk of trapping moisture in the timber.

## Improvements

### Insulation

- Top-up loft insulation to 300mm or more
- Draught excluding around doors

### Heating and Hot Water:

- Adding an extra 80mm jacket to the foam covered hot water cylinder reduces heat loss
- Making more efficient use of woodfuel over oil saved money and CO<sub>2</sub>e

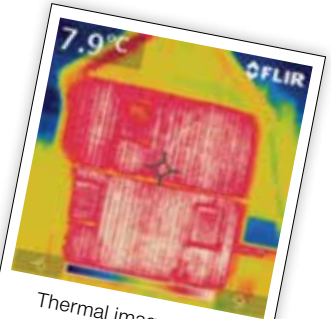
### Energy Efficiency:

- Fitting low energy bulbs in all outlets

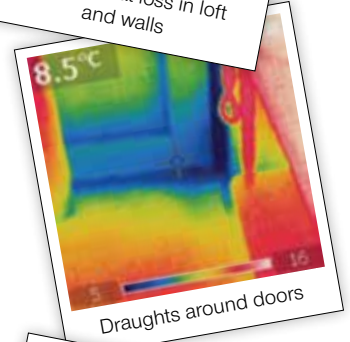
### Further measures possible:

- Suspended timber floors can be insulated from below, using netting to keep 150mm of rockwool in place.
- Internal wall insulation
- Replacing the current \*84.2% efficient oil boiler with a more efficient condensing boiler
- Installing a woodburning stove – 80% efficient in place of the open fire – 15-20% efficient - significantly reducing heat loss through the open chimney

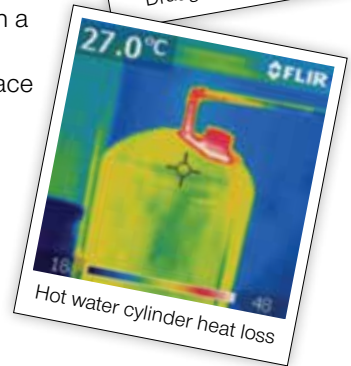
\* SAP 2009



Thermal image shows varying heat-loss in loft and walls



Draughts around doors



Hot water cylinder heat loss

# Getting the work done



Possible Internal wall insulation solution



- **DIY measures** – top-up loft insulation, replace bulbs, fit extra jacket on hot water cylinder, draught exclude around doors and windows. Consider DIY floor insulation
- **Professional measures** – boiler replacement, installation of stove, and internal wall insulation

## Advantages

- **DIY measures:**- Low cost, quick and easy. Floor insulation may be more tricky but cheaper if DIY.
- **Professional measures:**- Qualify for Green Deal part financing, quick installation with guarantees, servicing and back-up

## Disadvantages

- **DIY measures** need level of fitness / ability, especially for under floor and loft insulation
- **Professional measures:**- High costs; important to get good advice on the right solution for internal wall insulation which is also very disruptive

## Costs

Measure	Approx. Cost DIY	Approx. Cost Professional	Notes
Loft insulation top-up	£80	£250	Pays for itself within 5 years if DIY
Hot water cylinder jacket	£15	-	Pays for itself in less than 6 months
Draughtproofing	£120	£240	Saving £55 per year
Low energy light-bulbs	£40	-	Saving £3 per year per bulb
<b>Total Cost of DIY measures</b>	<b>£ 255</b>	<b>Payback* &lt; 1year</b>	

### Further measures available that would be eligible for funding through current schemes, grants and loans

Under floor insulation	£500	£1,000	** Saving around £60 a year
Boiler replacement	-	£2,200 - £3,000	** Saving £76 a year
Wood-burning stove and chimney flue	-	£2,000 - £3,000	Uses 80% less fuel than open fire
Internal wall insulation	-	£3,000 - £7,000	*** Saving up to £460 a year

\* Number of years to 'pay back' the DIY installation costs through annual energy savings. Based on annual savings of £422 (see overleaf).

\*\*\* Recommendations from Energy Performance Certificate Report

\*\* Energy Saving Trust estimates

# 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<sub>2</sub>** per year.



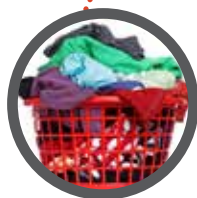
### Lights and appliances:

- 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<sup>1</sup>.

### 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.

<sup>1</sup> [www.energysavingtrust.org.uk/scotland](http://www.energysavingtrust.org.uk/scotland)

Measure	Cost	Energy bill savings per year	CO <sub>2</sub> 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

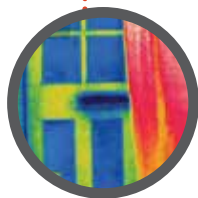
\* Approximate cost from <http://www.thelightbulbshop.co.uk>

\*\* 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 <sub>2</sub> 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 <sub>2</sub> 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.



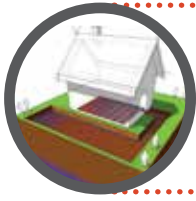
**Photovoltaic (PV) panels** generate electricity for your home. Roofs facing south are ideal, but east or west facing roofs will work.



**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.



**Ground source heat pumps (GSHPs)** work in a similar way to ASHPs but they absorb heat from the ground via pipes inserted into the garden (either vertically or horizontally). They are more expensive to install than ASHPs but can be more efficient.



**Biomass (wood)** – can be used either in a room stove or in a boiler for the whole central heating system. Back-boilers can also be added to stoves to heat some hot water. Both systems can use logs or wood pellets. If wood is sourced sustainably (this means that felled trees are replaced with new ones, and from a local source), wood is a low carbon fuel.



**Wind turbines** generate electricity. Free-standing turbines (the bigger the better) are the best approach, especially in rural areas with high wind speeds. Roof mounted turbines are available but these tend to be ineffective.

Technology	Installation cost	Previous heating fuel	Fuel bill savings per year	CO <sub>2</sub> savings per year (tonnes)
Solar PV	£7600	n/a	£98*	1.4
Solar hot water	£4800	Electricity	£80	0.5
ASHP	£6,000 - £10,000	Oil Electricity	£80 - 310 £380 - 610	0.8 – 1.6 4.4 – 5.3
GSHP	£9,000 - £17,000	Oil Electricity	£180 - 310 £480 - 610	1.2 – 1.6 4.8 – 5.3
Biomass stove	Pellet - £4,300 Logs - £2,150	n/a	n/a	n/a
Biomass boiler	£11500	Oil Electricity	£280	4.0
Wind turbine	£22500	n/a	£580	7.5

\* Based on using 25% of electricity generated from 3.5kWp system

\*\*\* For a 6kW system. A 2.5kW system would cost about £15,000

## 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 [greentarbort.wordpress.com](http://greentarbort.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](http://changeworks.org.uk/publications)

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

**Energy Saving Trust Scotland**, general information on saving energy: [energysavingtrust.org.uk/scotland](http://energysavingtrust.org.uk/scotland)

**Energy Saving Trust Scotland**, information on home renewables: [energysavingtrust.org.uk/scotland/Generating-energy](http://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](http://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](http://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](http://historic-scotland.gov.uk/technicalpapers)

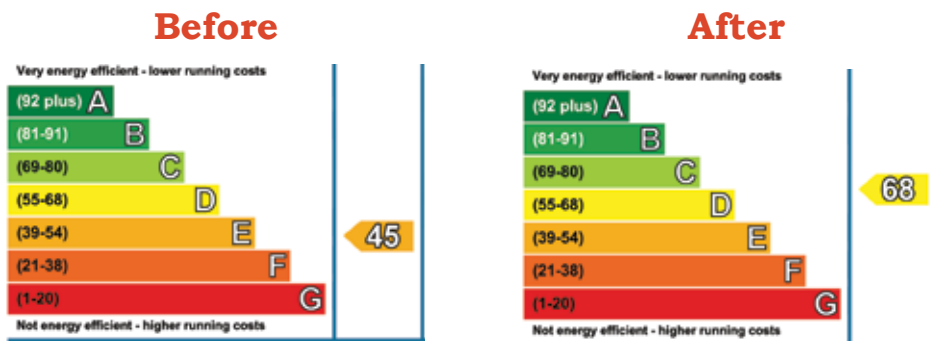
**North Howe Transition Toun**, Energy toolkit: Our top 40 energy saving ideas for your home, visit: [nhtt.org.uk/wp-content/uploads/2010/03/TOOLKIT-SMALL2.pdf](http://nhtt.org.uk/wp-content/uploads/2010/03/TOOLKIT-SMALL2.pdf)

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

# Cutting costs and carbon

The householders have made savings as a result of the improvements made to their house:

- ✓ **£422 per year** - energy bills reduced from £1,926 to £1,504 (including heating fuels and electricity).
- ✓ **2.1 tonnes of CO<sub>2</sub> per year** – reducing their CO<sub>2</sub> footprint from 9 to 6.9 tonnes of CO<sub>2</sub>
- ✓ They have also improved the energy efficiency rating of their home from an **'E' to a 'D' rating**, as shown below in the Energy Performance Certificates (EPCs).



Warmer ColGlen is a Colintrave 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](http://www.warmercolglen.cgdt.org)

or contact Sara on [sara@cgdt.org](mailto:sara@cgdt.org) or 01700 841298/358

Registered office: The Village Hall, Colintrave, Argyll, PA22 3AS



For more information about saving energy in your home, go to:

[www.energysavingtrust.org.uk/scotland](http://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](http://www.changeworks.org.uk)



Find a Woodsure accredited biomass supplier [www.woodsurre.co.uk/suppliers.htm](http://www.woodsurre.co.uk/suppliers.htm)

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