FINTRY DEVELOPMENT TRUST

Fintry Community Energy Project

Contents

Acknowledgements

Thanks to the following who have helped make this project a success.

The Directors of Fintry Development Trust (FDT) who had the vision of a sustainable community and commissioned this project.

Natural Scotland for the Climate Challenge Fund. (CCF)

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Stirling Council for assistance with analysis and insulation of council properties.

The surveyor, Joe McAleer of Clyde Insulation, who was professional and polite at all times.

Clyde Insulation who installed all the insulation measures in private households.

IRT Surveys who successfully located 98% of properties and took thermal images.

Geoff Davison of ConceptInformatics for timely IT support.

And finally, last but not least, every householder in the community who enthusiastically embraced the project, provided the surveyor with all the relevant details and now have lower fuel bills and a more sustainable lifestyle as a result.

Michael Carr
Project Manager
Energy Agency
Donald Hendrie Building
Auchincruive
Ayr
KA6 5HW

Direct Dial 01292 525507
michaelcarr@energyagency.org.uk
www.energyagency.org.uk

Executive Summary

The community of Fintry in Stirlingshire has benefited from a Climate Challenge Fund created by the Scottish Government and a Carbon Emission Reduction Target Fund from Scottish Hydro Electric.

This was the first stage in a long term strategy developed by the Fintry Development Trust, established in 2007.

The delivery of this first project to survey and insulate properties was led by the Energy Agency.

333 rural properties within the Fintry Community Council area were targeted. The target properties included private, rented and council housing in addition to a number of community buildings.

Doorstep surveys were conducted between August and December 2008 to establish the energy efficiency of households and determine whether each household was suitable for cavity wall insulation or loft insulation. Appropriate information was also collected to enable an ecological / carbon footprint analysis of each household.

78% of households actively took part in the project, providing energy efficiency and carbon footprint information. Between September 2008 and January 2009, 58% of surveyed households benefited from the free insulation measures on offer. Those receiving cavity wall and/or loft insulation will save, on average, £600 on their annual fuel bill. This represents a total increase in annual disposable income for the community of £91,352. If energy savings from behavioural changes are included, the increase in annual disposable income for the community is £180,000.

Carbon Dioxide Emissions will reduce by 464 tons each year as a result of the insulation measures and the community will use 1.5GWh less energy from insulation measures and 1.3GWh from behavioural changes.

Gemma McDade's winning poster

Fintry Development Trust

Fintry Development Trust is based in the village of Fintry, Stirlingshire. It broadly has the aim of reducing energy use in the village. It has over 150 members (out of an adult population of approximately 500) and an elected board of seven directors. It is constituted as a company limited by guarantee, membership and the area of benefit are limited to the Fintry Community Council boundary and it has charitable status.

The development trust has a trading subsidiary, Fintry Renewable Energy Enterprise which secured ownership of a wind turbine on the nearby Earlsburn Wind Farm.

Energy Agency

The Energy Agency is a charitable organisation providing free, impartial, expert advice on energy efficiency, renewable energy and sustainable issues.

The Agency was registered under the Companies Act 1985 on 18th November 1998. The company was set up to reduce carbon dioxide emissions with funding from South Ayrshire Council and the European Commission. Part of the original remit was to help develop energy efficiency and renewable systems in private properties. Since 2000 all types of property ownership (including the private rented sector) is covered by the activities of the Energy Agency across the 4 Councils of South Ayrshire, East Ayrshire, North Ayrshire and Dumfries and Galloway (i.e. South West Scotland).

In April 2000 the Energy Agency bid successfully for a contract to be part of the network of 52 Energy Efficiency Advice Centres in the UK. Since then the Energy Agency have been part-funded by the Energy Saving Trust (EST). Other main sources of funding are Carbon Emission Reduction Target (CERT) contributions from utility companies, grants and awards for specific energy efficiency projects.

Project Manager, Michael Carr, pictured below, joined the Energy Agency in December 2006.

Image courtesy of Ashden Awards – Andrew Aitchison

The Community

Fintry Community Council area represents 333 properties and, by extrapolating the survey data, a population of around 800.

The community around Fintry is not on the mains gas supply, many properties are on high ground and exposed, with the result of higher than average fuel bills. Before the project started, insulation was generally poor in the majority of households. Due to recent significant rises in fuel costs, fuel poverty is high in the area.

Using a combination of Stirling Council data, address lists provided by Anne Winther of the University of Stirling and Scottish Assessors council tax information, a database of addresses was established for the project.

The directors of the Fintry Development Trust oversaw the project with monthly review meetings and directed the Energy Agency accordingly.

Project Objectives

The main objective of the first project was to reduce energy demand and decrease fuel poverty.

The most significant aspect of the project was for the provision of free insulation for all suitable households in the community. Doorstep surveys were carried out to gather data about the properties and energy use in the village. As well as being of immediate use for this project the surveys will provide valuable data that will inform and guide decisions taken by the trust regarding future energy saving measures.

Thermal images were to be taken of all households to highlight where heat was being lost, doorstep surveys were to be carried out to calculate the energy efficiency of properties and householders were to be issued with a report indicating their energy consumption and emissions before and after the installation of the free insulation measures.

To promote energy efficiency with the young people in the community, the Energy Agency provided a lesson on energy for the primary 7 pupils of Fintry Primary School. A poster competition produced a logo designed by Gemma McDade, who received a prize of a wind up radio.

Publicity

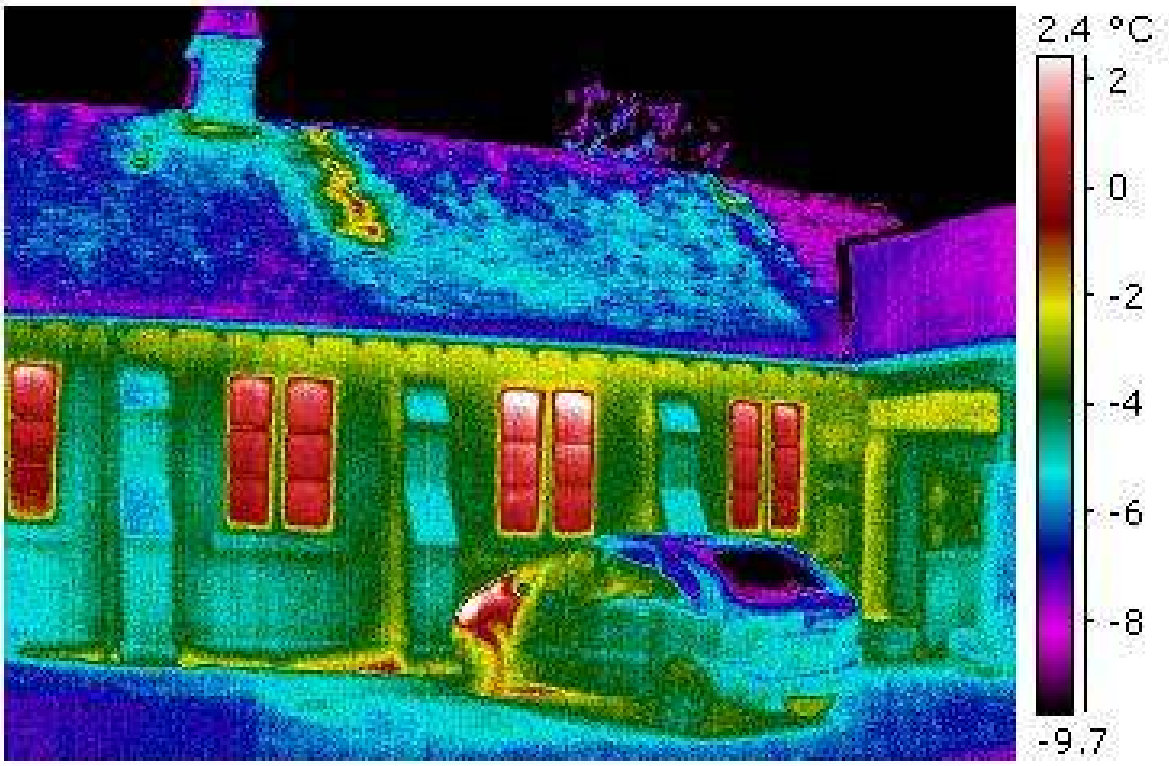
To raise awareness of the project, there were posters on community noticeboards, meetings with the Fintry Development Trust, a launch event in the Menzies Community Hall and letters were sent to all the properties involved.

There was an article in the Stirling Observer and regular updates appeared in the local paper, the Fintry Focus.

Thermal Images

Once surveys were under way and evenings became cooler, thermal images were taken of properties in the area.

The objective was for these images to be shown to householders to highlight where they were losing heat from their property and help identify the best measures for improving energy efficiency.



Menzies Community Hall

Doorstep Surveys

Using a trained surveyor, doorstep surveys were conducted to gather data relating to build and structure of the property, heating fuel and systems. The data gathered was National Homes Energy Rating (NHER) level zero, with a few extra questions and this enabled an energy efficiency rating to be calculated.

Householders were given two free low energy light bulbs to help them start making immediate savings on their fuel bills. The survey showed that more than a quarter of households had no low energy lighting.

Questions were asked in relation to flying, driving and income in order to calculate the ecological footprint of the household.

The surveyor entered the answers to all questions into hand held computers and was able to periodically download results to a secure web based server. He could also upload the next batch of addresses to be surveyed.

During the doorstep survey, the surveyor also established whether cavity wall insulation and loft insulation measures were suitable and could be offered free to the household.

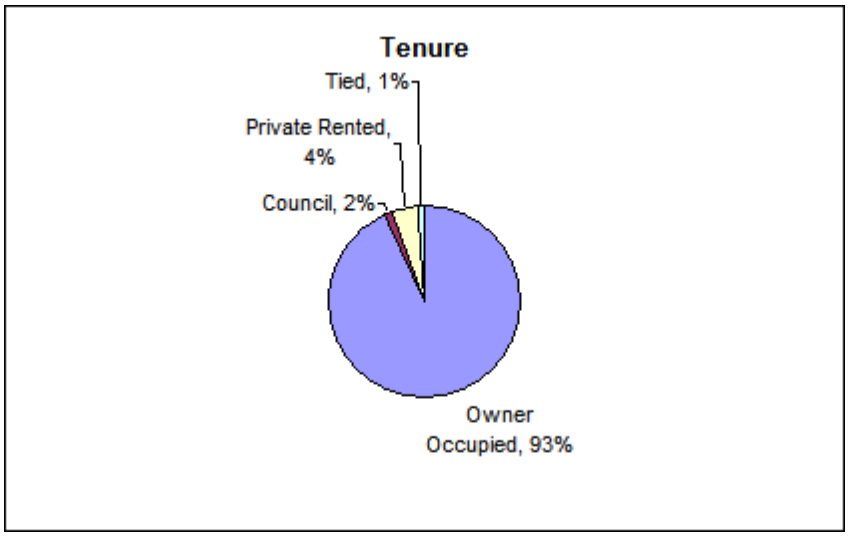
Households not suitable for loft or cavity wall insulation received a free energy meter which monitors how much energy and money is being used and helps change behaviour.

Clyde Insulation surveyor, Joe McAleer

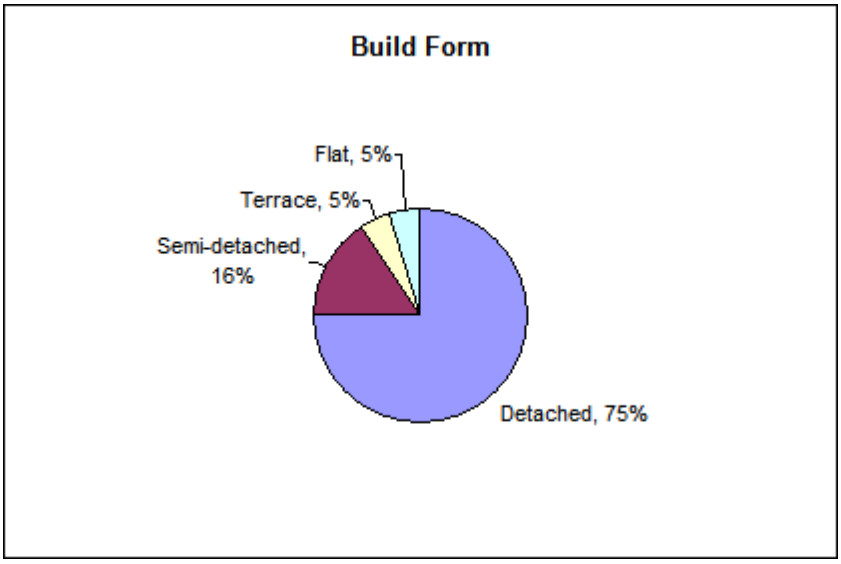
Data Analysis

The data gathered by the surveyor has provided a comprehensive overview of the whole community. The key data is shown below:

Tenure		Total
Owner Occupied	93%	241
Council	2%	4
Private Rented	4%	11
Tied	1%	3
Grand Total		259

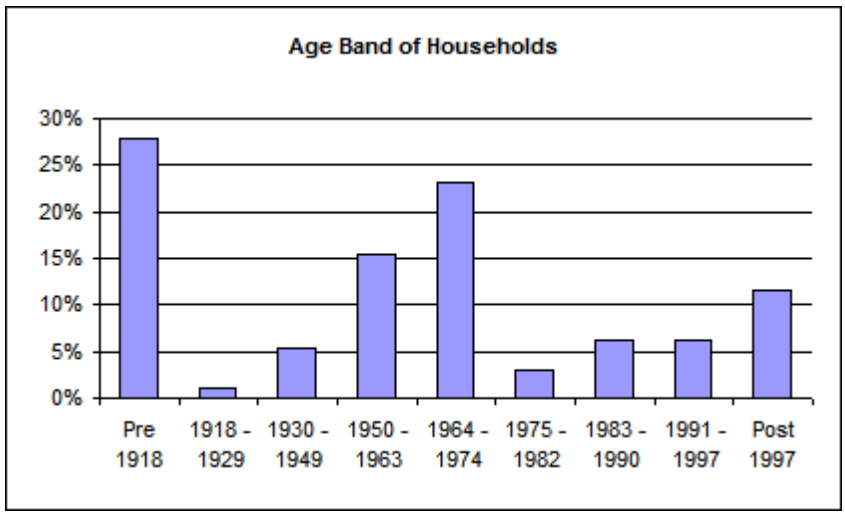


Built Form		Total
Detached	75%	194
Semi-detached	16%	41
Terrace	5%	12
Flat	5%	12
Grand Total		259

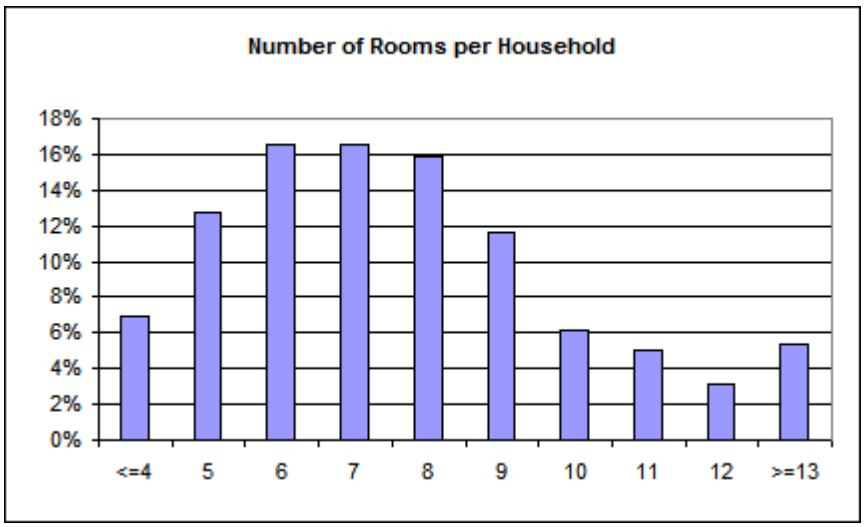


13% of properties are single glazed.

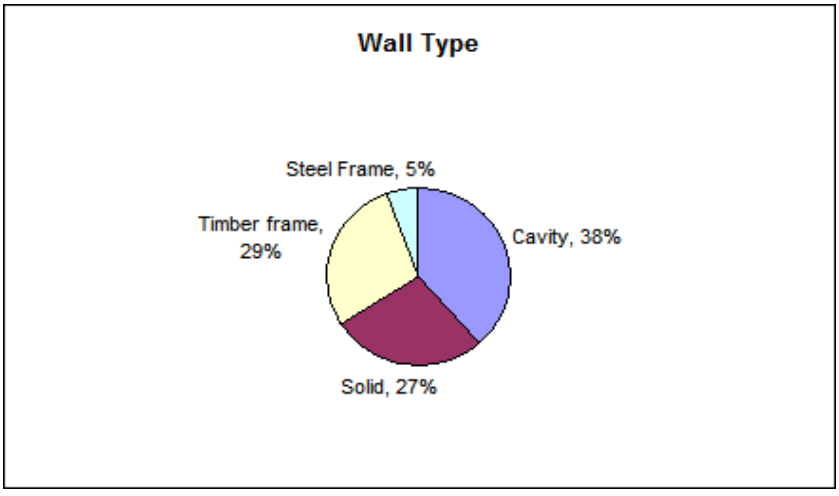
Age Band		Total
Pre 1918	28%	72
1918 - 1929	1%	3
1930 - 1949	5%	14
1950 - 1963	15%	40
1964 - 1974	23%	60
1975 - 1982	3%	8
1983 - 1990	6%	16
1991 -1997	6%	16
Post 1997	12%	30
Grand Total		259



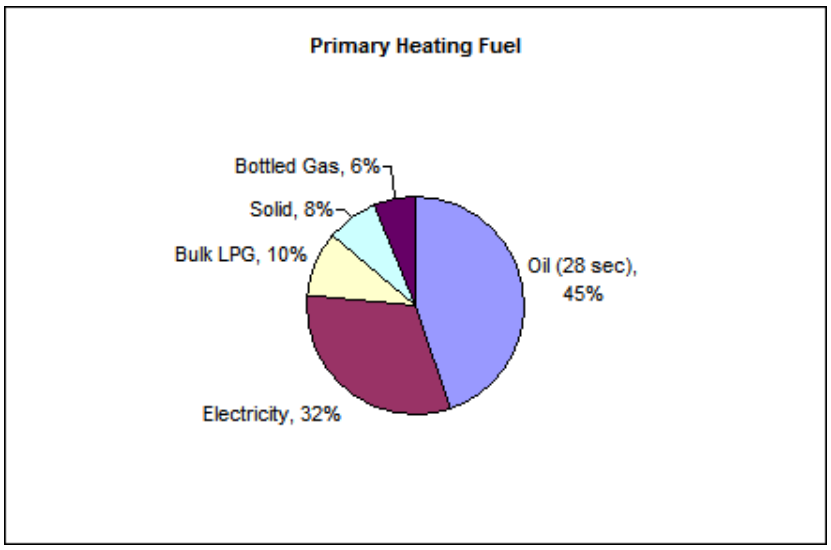
No of Rooms		Total
<=4	7%	18
5	13%	33
6	17%	43
7	17%	43
8	16%	41
9	12%	30
10	6%	16
11	5%	13
12	3%	8
>=13	5%	14
Grand Total		259



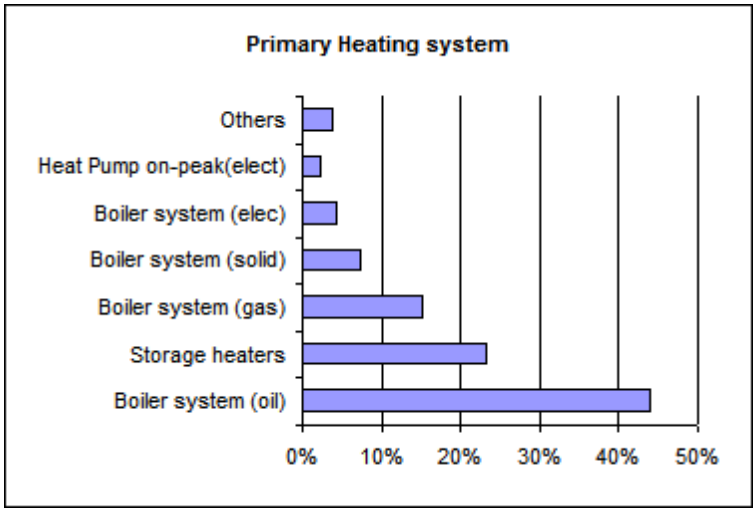
Wall Type		Total
Cavity	38%	99
Solid	27%	71
Timber frame	29%	75
Steel Frame	5%	14
Grand Total		259



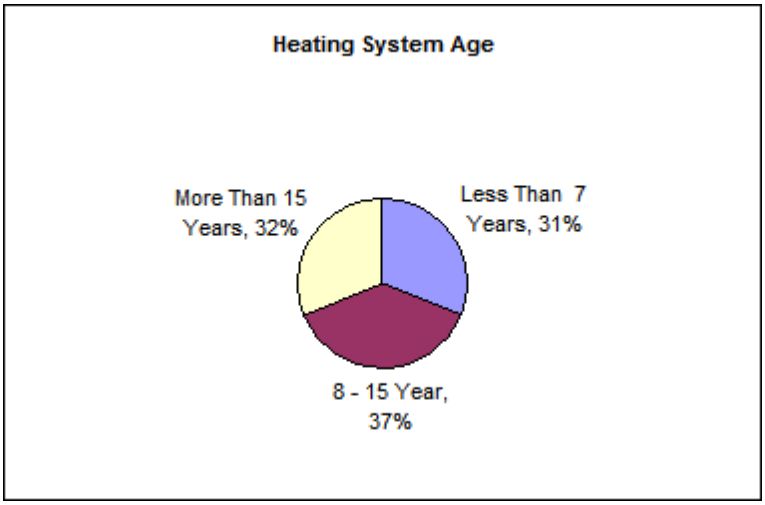
Primary Heating Fuel		Total
Oil (28 sec)	45%	116
Electricity	32%	82
Bulk LPG	10%	25
Solid	8%	20
Bottled Gas	6%	16
Grand Total		259



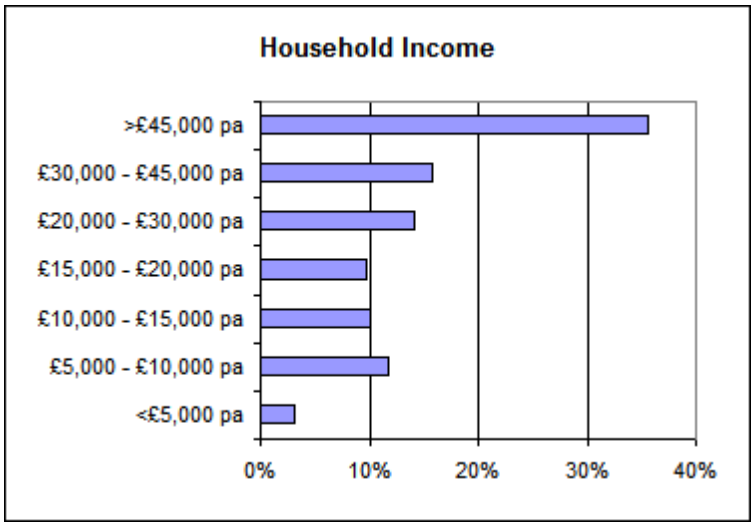
Primary Heating System		Total
Boiler system (oil)	44%	114
Storage heaters	23%	60
Boiler system (gas)	15%	39
Boiler system (solid)	7%	19
Boiler system (elec)	4%	11
Heat Pump on-peak(elect)	2%	6
Others	4%	10
Grand Total		259



Heating System Age		Total
Less Than 7 Years	31%	81
8 - 15 Year	37%	96
More Than 15 Years	32%	82
Grand Total		259



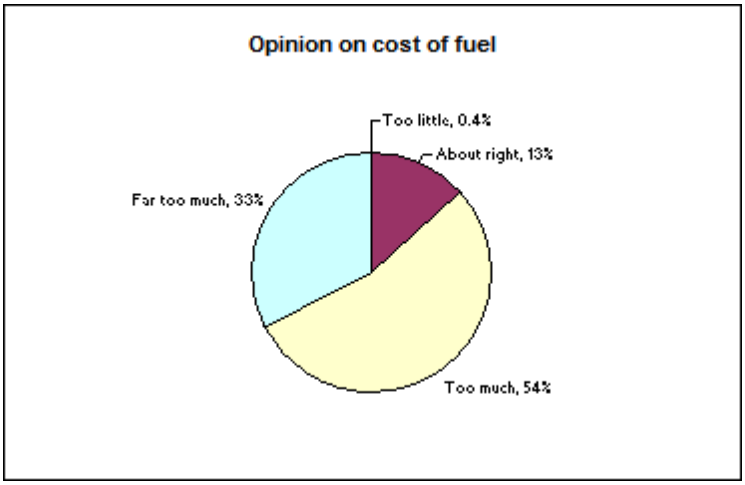
Income Band		Total
<£5,000 pa	3%	6
£5,000 - £10,000 pa	12%	23
£10,000 - £15,000 pa	10%	20
£15,000 - £20,000 pa	10%	19
£20,000 - £30,000 pa	14%	28
£30,000 - £45,000 pa	16%	31
>£45,000 pa	36%	70
Grand Total		197



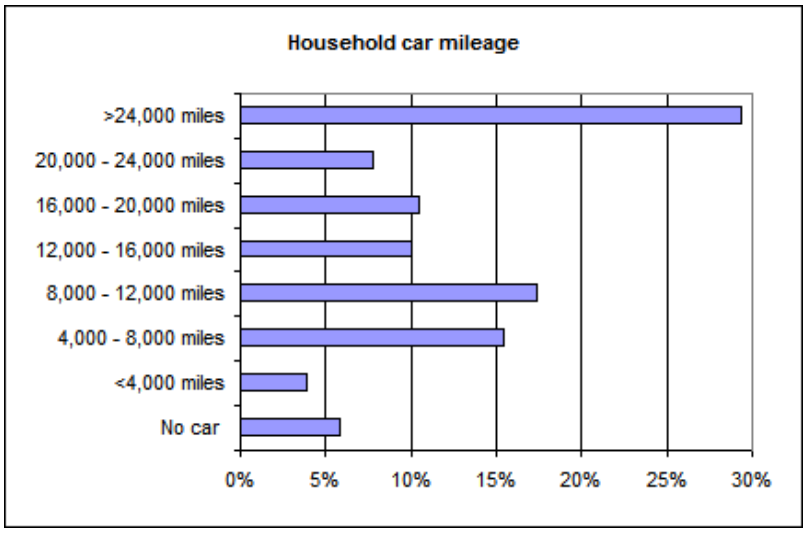
43% of households have at least one occupant over 60 years old.

9% of households contain at least one occupant claiming government benefit, with a further 11% over 70.

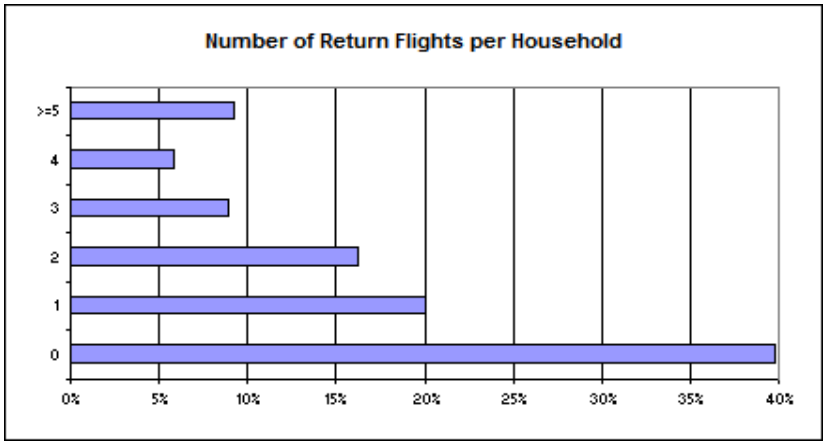
Opinion on cost of Fuel		Total
Too little	0.4%	1
About right	13%	33
Too much	54%	139
Far too much	33%	84
Grand Total		257



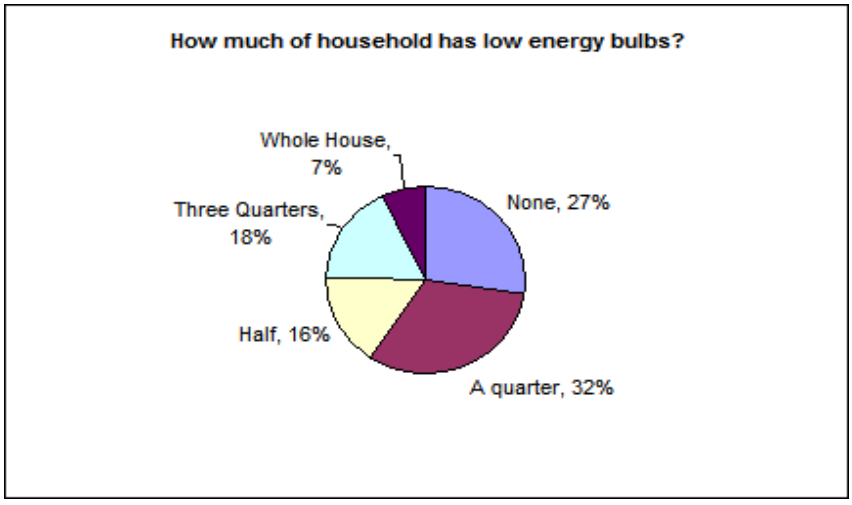
Mileage Band		Total
No car	6%	15
<4,000 miles	4%	10
4,000 - 8,000 miles	15%	40
8,000 - 12,000 miles	17%	45
12,000 - 16,000 miles	10%	26
16,000 - 20,000 miles	10%	27
20,000 - 24,000 miles	8%	20
>24,000 miles	29%	76
Grand Total		259



No of Return Flights		Total
0	40%	103
1	20%	52
2	16%	42
3	9%	23
4	6%	15
>=5	9%	24
Grand Total		259



Low Energy Bulbs		Total
None	27%	71
A quarter	32%	82
Half	16%	42
Three Quarters	18%	46
Whole House	7%	18
Grand Total		259



Outcome

The doorstep surveys achieved a 78% uptake with 260 of the 333 properties surveyed. The initial CCF target was to survey 300 properties.

Insulation measures were installed between September 2008 and January 2009 with 58% of surveyed households benefiting from free loft and / or cavity wall insulation. The 152 properties insulated compares with the CCF target of 170.

Each household received a report based on the information they provided during the survey, showing their individual ecological footprint, an energy efficiency rating for their property and useful tips on further measures to save energy and money. The project has provided an almost complete picture of the energy demands for the whole community. This data can be used to establish and monitor a future sustainable energy strategy.

Number of households receiving measures.

Energy Efficiency Advice = 333 = 100% of original target area
Survey and Energy Report = 260 = 75% of 333 targeted
Insulation measures = 152 = 46% of 333 targeted
Of which
Loft Insulation = 137 = 41% of 333 targeted
Cavity Wall Insulation = 37 = 11% of 333 targeted

The survey found that for households receiving insulation, the average fuel bill in 2007 was £2,194. Using October 2008 fuel prices, the survey data and NHER Autoevaluator, the average theoretical fuel bill was £2878 before insulation and £2,277 after insulation. The average annual fuel saving for each household who received an insulation measure is therefore in the region of £601.

The total energy consumption of 152 properties receiving either loft and/or cavity wall insulation is estimated at 6,365MWh per annum.
After installation of loft and cavity wall insulation, the estimated total annual energy consumption is 4,818MWh which equates to a reduction in energy consumption of 1,546MWh for the 152 households giving an average reduction of 10.2MWh per household.

The average energy efficiency of households has increased by a third as a result of the insulation measures. (From 3.5 to 4.7)

The community is producing 464 tonnes less CO_2 each year as a direct result of the insulation. This compares with a CCF target of 272 tonnes.

Fuel Poverty

A household is said to be in fuel poverty if it needs to spend more than 10% of its income on fuel to maintain a satisfactory heating regime (usually 21 degrees for the main living area, and 18 degrees for other occupied rooms). Fuel poverty is caused by the interaction of a number of factors, but three specifically stand out. These are:

- The energy efficiency status of the property
- The cost of energy
- Household income

Although this project was unable to influence the cost of energy, the improvement in energy efficiency of households reduced the number of households in fuel poverty in the Fintry area

Based on 109 households who received insulation and provided sufficient data, 51, 47% spend more than 10% of income on fuel. After insulation measures, 38 households, 35% are estimated to still be in fuel poverty. This is a reduction of 25%.

69% of those in fuel poverty indicated that they were not claiming benefit and were not over 70. They would not have been supported by a typical insulation scheme which provides free insulation to those on benefit.

This highlights the significant advantage of this approach in supporting households who are in fuel poverty but not on benefit. A quarter of the households receiving insulation have been lifted out of fuel poverty. Had this project only supported priority households, more than two in every three households in fuel poverty would have had no help.

Ecological Footprint

Ecological footprint (*EF*) analysis measures human demand on nature. It compares human consumption of natural resources with planet Earth's ecological capacity to regenerate them. It is an estimate of the amount of biologically productive land and sea area needed to regenerate (if possible) the resources a human population consumes and to absorb and render harmless the corresponding waste, given prevailing technology and current understanding. Using this assessment, it is possible to estimate how many planet Earths it would take to support humanity if everybody lived a given lifestyle.

The average biologically productive area per person worldwide is approximately 1.8 global hectares (gha) per capita. The UK's average ecological footprint is 5.45 gha per capita.

To calculate the ecological footprint of households and individuals in Fintry, the surveyor asked questions in relation to income, number of private miles driven and return flights. Type and size of house, energy consumption and the number of occupants were also taken into account to calculate the average ecological footprint of each householder.

191 of the surveyed households provided sufficient data to calculate an ecological footprint. The average across the whole community before any insulation measures were installed was 6.2gha per capita. This indicates that three and a half planets would be required if the world population had the same ecological footprint as the community of Fintry.

Further Energy Efficiency Measures

Most effective in reducing energy consumption is the adoption of simple tips which will make households more energy efficient at no extra cost. See appendix.

The Energy Saving Trust calculates that the average household can reduce their fuel bills and emissions by 20% by following a number of simple tips that were passed on to householders in Fintry.

Many households in Fintry are already taking action to minimise energy consumption, so if we calculated that the average householder saves a further 10% from their fuel bill by following the simple tips provided, this represents a reduction in the average fuel bill of £268. (Note: the average fuel cost for the whole community was £2681) This equates to an increase in disposable income for the whole community of £89,244. (£268 x 333 households.)

This brings the total increase in disposable income for the community to over £180,000 a year from both insulation savings and behavioural changes.

Village Energy Consumption

From the data gathered, the total household energy consumption for the whole of Fintry has been estimated at 13.0GWh per annum before the insulation project. Once the project is complete, the energy consumption will be an estimated 10.2GWh per annum.

The combination of energy saved from insulation, 1.5 GWh and behavioural changes, 1.3 GWh will save the community an estimated 2.8GWh per annum.

The Fintry wind turbine generates approximately 7.5GWh per annum, so the community is well on its way to being Carbon Neutral.

The Future

The doorstep surveys, energy efficiency advice, loft and cavity wall insulation were the first stage of a long term strategy to make Fintry Carbon Neutral.

The surveys included questions in relation to draughtproofings, coomb ceiling and solid wall insulation as well as measuring the interest in micro-renewables.

107 households, of which 30 are single glazed, would like draughtproofing.

52 households are interested in a quote for coomb ceiling insulation.

13 households are interested in solid wall insulation, although there are 82 solid wall or steel frame homes that would benefit from such a measure.

95% of those surveyed would like micro-renewable systems in future

There is already work underway looking at how to insulate the park homes at Balgair Castle Caravans and there is talk about external insulation for the steel frame houses.

This project has launched the community of Fintry down the path to a warmer, more fuel efficient and sustainable future.

Appendix - **Simple Tips on Saving Energy**

Heating System

- Turning your room thermostat down by 1ºC could cut your heating bills by up to 10 per cent and save you around £30 per year.
- Is your water too hot? Your cylinder thermostat shouldn't need to be set higher than 60ºC/140ºF.
- Install thermostatic radiator valves to cut heating bills by as much as 17%.
- **Electric Storage Heaters** - use with off peak electricity rate.
  Input control – only set to maximum during coldest weather, reduce in milder weather. The higher the setting the warmer your heater will get and the more energy will be consumed.
  Boost Control – normally leave boost setting at minimum. Turn up if more heat is required later in the day. Leaving the control on a higher setting will provide an automatic boost each day.

Lighting

- Fit low energy lightbulbs in lights or lamps that are used most frequently.
- Switch off lights when you leave a room.
- Adjust your curtains or blinds to let in as much daylight as possible.

Kitchen

- If you're not filling up the washing machine, tumble dryer or dishwasher, use the half-load or economy programme.
- Washing clothes at 30^0C or 40^0C rather than 60^0C uses 1/3 less electricity.
- Only boil as much water as you need (but remember to cover the elements if you're using an electric kettle).
- Purchase "A-rated" domestic appliances when replacements are needed.
- Choose the right size of pan for the food you are cooking and use the lid.
- Open the fridge or freezer door for as short a time as possible.
- Defrost your fridge regularly to keep it running efficiently.
- Try to avoid placing your fridge beside the cooker or boiler.

Water

- In just one day, a dripping hot water tap can waste enough water to fill a bath. Make sure they're turned off.
- Only heat the water when needed – it is NOT cheaper to leave on all the time.
- Put a plug in a basin or sink. Leaving hot water taps running without the plug is both wasteful and expensive.
- Having a shower uses around 75% less hot water than a bath.

General Tips

- Don't leave appliances on standby and remember not to leave appliances on charge unnecessarily.
- Close your curtains at dusk to stop heat escaping through the windows.
- Draught proof doors and windows to stop cold air getting in.