



Ecological Footprint of the Findhorn Foundation and Community

Report produced August 2006 by:

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Contents

List Of Tables.....	2
List Of Figures.....	Error! Bookmark not defined.
Executive Summary.....	3
1.0 Introduction.....	5
1.1 Scope Of Study.....	5
1.2. Findhorn Foundation And Community.....	5
1.3 Ecological Footprinting.....	6
1.4 Stockholm Environment Institute.....	6
1.5 Boundary Of Study.....	6
2.0 Research Methodology.....	7
2.1 Data Collection.....	8
2.1.1 Resident Questionnaires.....	8
2.1.2 Food Data.....	8
2.1.3 Waste.....	8
2.1.4 Energy.....	9
2.1.5 Water.....	9
2.1.6 Travel.....	9
2.1.7 Non-Food Items.....	9
2.1.8 Guest Questionnaires.....	9
3.0 Ecological Footprint Results For Findhorn Foundation And Community.....	10
3.1. Residents.....	10
3.1.1 Food.....	13
3.1.2 Home And Energy.....	13
3.1.3 Travel.....	15
3.1.4 Consumables.....	18
3.1.5 Services.....	19
3.1.6 Government And Other.....	20
3.1.7 Capital Investment.....	21
3.2 Guests.....	21
3.2.1 Travel.....	22
3.2.2 Government And Capital Investment.....	26
3.3 Waste.....	26
3.4 Overall Footprint For Findhorn Foundation And Community.....	29
4.0 Comparisons.....	30
4.1 Resident Ecological Footprint.....	30
4.2 Total Ecological Footprint.....	32
5.0 Limitations.....	33
5.1 Criticism Of The Ecological Footprint Model.....	33
5.2 Limitations To Findhorn Foundation Data.....	33
6.0 Conclusions.....	34
7.0 Appendix.....	35
7.1 Questionnaires.....	35
7.1.1 Guest Questionnaire Issued.....	35
7.1.2 Resident Questionnaire Issued.....	41
7.2 Data.....	52
8.0 References.....	57

LIST OF TABLES

Table 1. Resident questionnaires..... 10

Table 2. Breakdown of the Findhorn Foundation and Community resident ecological footprint per person..... 11

Table 3. Main food types contributing to the resident food footprint per person. 13

Table 4. Ecological footprint per person of energy types used by the Findhorn Foundation and Community residents. 14

Table 5. Breakdown of the Findhorn Foundation and Community resident travel ecological footprint per person..... 15

Table 6. Breakdown of kilometres per passenger contributing to the resident travel ecological footprint..... 16

Table 7. Comparison between Findhorn and Scotland per capita..... 18

Table 8. Consumables contributing to the Findhorn Foundation and Community resident ecological footprint per person. 18

Table 9. Footprint of services contributing to the resident Findhorn Foundation and Community ecological footprint per person. 19

Table 10. Breakdown of Governmental services contributing to the resident Findhorn Foundation and Community ecological footprint per person. 20

Table 11. Guest questionnaires. 21

Table 12. Breakdown of the Findhorn Foundation and Community guest ecological footprint per person..... 22

Table 13. Breakdown of the Findhorn Foundation and Community guests travel ecological footprint..... 23

Table 14. Breakdown of kilometres per passenger contributing to the guest travel ecological footprint. 24

Table 15. Tonnage of waste discarded by Findhorn Foundation and Community residents. 27

Table 16. Waste footprint for Findhorn Foundation and Community resident households. 27

Table 17. Tonnes of waste discarded by Cluny Hill College and Findhorn Foundation Community Centre. 28

Table 18. Waste Footprint for Cluny Hill College and Findhorn Foundation Community Centre. 28

Table 19. Overall ecological footprint of Findhorn Foundation and Community..... 29

Table 20. Comparisons of Findhorn Foundation and Community resident ecological footprint and other ecological footprints. ... 30

Table 21. Inverness ecological footprint. 31

Table 22. Comparisons of total Findhorn Foundation and Community ecological footprint and other ecological footprints. 32

Table 23. Food categories in ecological footprint of Findhorn Foundation and Community..... 52

Table 24. Capital investment contribution to resident footprint. 55

Table 25. Breakdown of food types in guest footprint. 56

LIST OF FIGURES

Figure 1. Breakdown of the ecological footprint per person for Findhorn Foundation and Community. 11

Figure 2. Percentage of ecological footprint contributed by each category. 12

Figure 3. Ecological footprint per person used by Findhorn Foundation and Community residents. 14

Figure 4. Breakdown of travel ecological footprint per person for Findhorn Foundation and Community residents. 15

Figure 5. Kilometres per passenger contributing to the resident travel ecological footprint. 16

Figure 6. Percentage of mileage undertaken by each mode of transport. 17

Figure 7. Breakdown of consumables contributing to the Findhorn Foundation and Community resident ecological footprint
per person. 19

Figure 8. Breakdown of ecological footprint per person for Findhorn Foundation and Community guests. 22

Figure 9. Breakdown of travel ecological footprint for Findhorn Foundation and Community guests. 23

Figure 10. Kilometres per passenger contributing to the guest travel ecological footprint. 24

Figure 11. Percentage contribution of each mode of transport to total kilometres travelled. 25

Figure 12. Comparison of Ecological Footprints for UK, Scotland, Findhorn Foundation and Community and Bed Zed. 30

Figure 13. Comparison of ecological footprints for UK, Scotland, total Findhorn Foundation and Community and Bed Zed. 32

EXECUTIVE SUMMARY

The study was commissioned by HIE Moray, a Highlands and Islands Local Enterprise Company, to measure the Ecological Footprint of the Findhorn Foundation and Community. The ecological footprint method has been used to determine the extent to which the Findhorn Foundation's sustainable practices are reducing the Community's environmental impact.

Ecological footprinting was devised by Professor William Rees and Dr. Mathis Wackernagel in the early 1990s and has become used all over the world to assess sustainability. The tool quantifies how much energy and raw materials are used, and how much solid, liquid and gaseous waste is generated. Ecological footprinting then converts this into a measure of land area, gha (global hectares), required to produce all the resources used and absorb all the waste that is produced.

The Findhorn Foundation and Community is the operational base of an internationally spread community. The Park consists of eco-houses, four wind turbines and a biological sewage treatment plant called 'The Living Machine'. The Findhorn Foundation holds various educational programmes, at both the Park and at Cluny Hill College in Forres, also owned by the Findhorn Foundation, which attract both national and international guests. The site at Findhorn also contains private houses and independent businesses but these have not been included in the footprint.

The study has focused on the Findhorn Foundation residents and guests at both the Park and Cluny Hill College, and the day to day running of the Community. Questionnaires were used to obtain data from residents and guests on food, transport, consumables and services. Additional data was collected at the sites on energy, food, transport and consumables.

The ecological footprint for residents at the Findhorn Foundation and Community was 2.71 gha per person. This consisted of the categories: food, home and energy, travel, consumables, services, Government and other and capital investment. The ecological footprint for guests to the Findhorn Foundation was 2.10 gha per person and consisted of food, home and energy, travel, consumables and services. Combining the two ecological footprint results as a weighted average gives an overall ecological footprint for the Findhorn Foundation and Community of 2.56 gha per person.

For contextual purposes, the study compares the Findhorn Foundation and Community's footprint per person to the ecological footprint per person of the United Kingdom (5.4 gha), Scotland (5.37gha) and the Beddington Zero Energy Development (Bed Zed), a sustainable community development of 3.2 gha. The resident ecological footprint for the Findhorn Foundation and Community is lower than the Bed Zed ecological footprint, and the weighted average results in an even lower ecological footprint. This suggests that the Findhorn Foundation and Community's practices have less impact upon the environment.

1.0 INTRODUCTION

1.1 Scope of Study

The study was commissioned by HIE Moray, a Highlands and Islands Local Enterprise Company, to measure the Ecological Footprint of the Findhorn Foundation and Community. The ecological footprint will determine to what extent the Findhorn Foundation's sustainable practices are reducing the Community's impact upon the environment.

This study will ascertain if the eco-houses, wind turbines and biological sewage treatment plant contribute to making the Findhorn Foundation and Community sustainable and whether it is more sustainable than other communities. The footprint will also examine the impact that travel undertaken by the residents, and guests, of Findhorn Foundation has on the environment.

1.2. Findhorn Foundation and Community

The Findhorn Foundation Community was formed in 1962. In 1972 the Community became registered as a Scottish Charity under the name 'The Findhorn Foundation'. Through the 1980's more people became attracted to the area, wanting to join in Community life but not to work for the Foundation, and this led to the creation of a wider Community. Throughout the 1990's the community continued to grow and the site is now the operational base of a worldwide community. The Park itself has evolved and is now a mixture of Community and private housing, educational facilities and independent businesses.

The Findhorn Foundation also own Cluny Hill College in Forres, formerly the Cluny Hill Hotel. This is a large Victorian building that hosts a number of the Findhorn Foundation's educational programmes and provides accommodation to guests and residents.

The Findhorn Foundation erected a wind generator at The Park at the end of the 1980's and began to build eco-friendly community buildings. There are now around forty ecological buildings on the site and at the beginning of 2006 a further three wind turbines were erected. The Community Centre at the Park provides food for residents, guests and visitors and the dining room in Cluny Hill College caters for guests and residents. The Findhorn Foundation operates its own biological sewage treatment plant, 'The Living Machine'. The Findhorn Foundation and community is part of the Global Ecovillage Network (GEN) that links ecovillage projects worldwide. They have a United Nations (UN)-HABITAT Best Practice Award and are an NGO with consultative status at the UN.

1.3 Ecological Footprinting

Ecological Footprinting (EF) is a means of measuring environmental impact. The results determine the amount of land that the population requires to provide their resources and absorb their wastes within the context of the Earth's biological capability to regenerate them. The footprint deals only with demands placed on the environment; it does not attempt to include the social or economic dimensions of sustainability.

The modelling was co-originated in the early 1990's by Professor William Rees and Dr. Mathis Wackernagel. It is now being used in many countries at national and local levels. Its application includes analysis of policy, benchmarking performance, education, and awareness raising and scenario development.

EF essentially accounts for the use of the planet's renewable resources. Non-renewable resources are accounted for only by their impact on, or use of, renewable, bioproductive capacity. EF quantifies how much energy and raw materials are used, and how much solid, liquid and gaseous waste is generated, and then converts this into a measure of land area, gha (global hectares), required to produce all those resources and absorb all the waste that is produced. To make the land measurement easier to visualize; 1 hectare is equivalent to 2.5 acres and 1 acre is the size of a football pitch. It has been calculated that a sustainable area of land for each person to exist on is around 1.8 global hectares (gha) (Loh *et al* 2004). Current research figures however indicate that each person in the UK uses 5.4 gha (WWF 2006), which would require an additional 2 planets to sustain the current world population. This suggests that humanity is using more natural resources than can be sustained in the long term.

Once an EF has been determined it is then possible to compare this to other EFs, whether they are for regions, towns or events. Many organisations and individuals all over the world have employed the methodology to assess how far they are living within the carrying capacity of our planet. In Section 4.0 the Findhorn Foundation and Community results will be compared to national, regional and local EF figures.

1.4 Stockholm Environment Institute

The modelling of the Ecological Footprint data was carried out by the Stockholm Environment Institute (SEI), which is located within the University of York. SEI is an independent, international research organisation that has become established as an expert on the subject of Sustainable Consumption within Europe and especially the UK. SEI is experienced in assessment methodologies such as Material Flow Analysis (MFA) and Ecological Footprint analysis (EF). In the past SEI have undertaken MFA and EF studies for Wales, the South East and the North West region, a number of towns and local authorities in the UK as well as specific studies on sustainable homes, local transport, the NHS and cotton and hemp.

1.5 Boundary of Study

The Findhorn Foundation consists of people who work within the Park and some private residents who have built their homes on the site. The Findhorn Foundation currently runs almost 200 week-long courses every year, as well as conferences and training. These attract people from all over the world who stay for various periods of time from days to months. The Park also has a caravan park owned by the business

arm of the Findhorn Foundation. There are other businesses that are on the site and these include publishers, a café, printers, charities and arts and crafts. The Community at The Park consists of around 300 people, 200 of which are staff.

The businesses, including the caravan park, have not been included in the ecological footprint data, as they are not strictly part of the 'Community'. The Findhorn Foundation also own a house in the village of Findhorn called Station House. A number of staff live-in here, but this has not been included in the ecological footprint. The parts of The Park that have been included in the study are:

- 27 bungalows
- 51 caravans
- 58 houses on private land called 'Field of Dreams' which consists of Eco-houses and Barrel Eco-houses
- Community Centre Kitchen
- Cluny Hill College

Cluny Hill College has also been included in the ecological footprint, although it is not on the Findhorn site but is situated in Forres, 9.2 kilometres from the Findhorn Park site. This can house up to 145 people, 45 of which are long-term residents. Many of the courses are held at Cluny Hill College and many of the students stay there.

The Findhorn Foundation installed their own 75 kW wind turbine at the Park at the end of the 1980's and in March 2006 commissioned a further three wind turbines, which now supply all of the Park's electricity. The Findhorn Foundation also has its own sewage works on the Park site, called 'The Living Machine', which is based on anaerobic digestion. 'The Living Machine' itself has not been included in the footprint but its electricity use has been.

2.0 RESEARCH METHODOLOGY

Meetings were held with representatives of Findhorn Foundation to discuss the type of data that would need to be collected, and the best methods to achieve this. It was decided to design three questionnaires to collect data on: Residents, guests staying less than two months and guests staying longer than two months. SDRC produced draft questionnaires for each of these and sent them to SEI staff to suggest alterations. Alterations were made and the questionnaires were shown to the representatives at Findhorn Foundation. The decision was then made to have only two questionnaires, one for residents and one for guests staying three months or less. The final questionnaires are shown in Appendix 7.1. Residents were encouraged to participate in the survey by the project leader at the Findhorn Foundation. The course leaders at both sites promoted the questionnaires to the guests. For two programmes, Walk Your Talk and GEN+10, the questionnaires were put on a desk outside the rooms and guests were asked to complete them before leaving.

The data collectors at each site were asked to provide data on the day-to-day running of the Findhorn Foundation and Cluny Hill College. This involved data on food purchasing for the Community Centre and Cluny Hill dining room, energy and water data from both sites and mileage from the Findhorn Foundation buses.

2.1 DATA COLLECTION

2.1.1 Resident Questionnaires

A questionnaire (Appendix 7.1) was given to residents in the bungalows, caravans, eco-houses and barrel eco-houses situated in The Park and residents at Cluny Hill College who were willing to participate in the survey. The resident questionnaires were completed during August and September 2005. The resident questionnaires consisted of questions on travel made during a typical week through personal, commuting and business travel. It also asked for non-typical travel made in the last two months and international travel made in the last year. The food data was collected in a table, listing food types, in which the data could be entered in either monetary value or weight. Also asked for was the percentage of the food that was organic, home grown, locally grown, UK grown and imported. The data could cover a day, week or month. Residents were asked to quantify their types of waste in either black bags or supermarket bags and either over a day, week or a month, and state if it was recycled. This was separated into packaging and non-packaging waste. The last section asked for goods and services purchased over one month.

2.1.2 Food data

Cluny Hill College dining room and the Park Community Centre provide two meals a day for residents and guests. This enabled food data to be collected through the kitchens. The Park Community Centre and Cluny Hill College provide only vegetarian food, with the exception of providing meat at Christmas. Additional snacks and extra foodstuffs were collected through the resident and guest questionnaires. This did not include food that was eaten in restaurants off site.

Park kitchen food data was sourced from 2004 records. The data was supplied by the park food buyer and includes all food bought by the Findhorn Park kitchen for that year. The Community Centre caters for residents, guests, and wider community members, some of which may not be members of the Findhorn Community and may distort the figures slightly. The Cluny Hill College kitchen food data is from the year 2005 and was supplied by the Cluny Hill College food buyer. The food details were not on computer, as they had been at the Park, but receipts had been kept. In order to determine food purchased, the data were taken from 10 weeks in 2005 (1 week from each month from February to November). The week chosen for each month was selected randomly, although Cluny Hill College holds conferences during the year and attention was paid not to include these weeks. The data for conference weeks were collected separately. The weeks collected were then multiplied up for the whole year. This means that the data is not entirely accurate, but will still be a good indication of food consumption.

2.1.3 Waste

Waste volumes were monitored from the Community Centre kitchen, the residents at the Park and the general waste discarded by Cluny Hill College. Guests were not asked for waste data as this could have resulted in double counting.

2.1.4 Energy

The Park energy was collected through electricity meters from the Park, as well as deliveries of fuel and tonnages of wood fuel. The whole Park energy was calculated and the businesses and commercial caravan park were then subtracted from it. The timeframe for this data is between February 2004 and January 2005. The energy collection for Cluny Hill College was derived from electricity meters and natural gas deliveries.

2.1.5 Water

Water, as with the energy, was metered in the Park and at Cluny Hill College. Businesses were subtracted from the overall Park data.

2.1.6 Travel

Findhorn Foundation runs three buses for residents and guests travelling between the Findhorn Park site and Forres. Mileage covered by the buses was obtained for the year 2004. Travel was also determined through the resident and guest questionnaires.

2.1.7 Non-Food Items.

The Park kitchen non-food items were determined for 2004. Cluny homeware products, which include detergents, soap, towels, bin liners and vacuum cleaner bags were determined for 2005. Findhorn Park homeware products were difficult to collect for and therefore were estimated at twice that of Cluny Hill College.

Building materials were not included in the ecological footprint although data on maintenance of buildings were provided.

2.1.8 Guest Questionnaires

The guests were asked to complete a questionnaire at the end of their visit. This was given to guests who stayed for 3 months or less at Findhorn Park or Cluny Hill College. They were asked to detail their journey to the Findhorn Foundation and whether the return journey would change. They were also asked for daily travel and non-typical travel during their stay. Guests are provided with meals at either the Cluny Hill College dining room or the Park's Community Centre and, as these data were collected separately, the questionnaires asked only for additional food consumed e.g. snacks. They were also asked for the goods and services purchased during their stay. Two programmes – Walk Your Talk and GEN+10 - had separate questionnaires. These asked for only their travel details so that a separate ecological footprint for the travel aspect of the programmes could be calculated.

3.0 ECOLOGICAL FOOTPRINT RESULTS FOR FINDHORN FOUNDATION AND COMMUNITY

3.1. RESIDENTS

To obtain a good representation of the residents, the aim was for at least 20% of households of each accommodation type to complete the questionnaires. The return of questionnaires for the eco-houses and barrel-houses were 17 questionnaires, which is 29% of the households. Seven of the caravan residents returned questionnaires, which was lower than desired at only 14% of the residents. The bungalow residents returned 15 questionnaires, which was 56% of the households. The residents at Cluny Hill College returned 9 questionnaires, which is 20% of the residents there. A total of 63 questionnaires were issued, 48 of which were returned and provided data on 58 residents. Two questionnaires returned were only partly completed: One questionnaire from an eco-house contained no waste data and one questionnaire from a caravan did not contain food data. These questionnaires were still included in the project as the other sections were completed fully.

Table 1. Resident questionnaires.

Housing Type	Number Of Households In Findhorn Foundation	Number Of Households Participating In Survey	Percentage Of Households Returned Questionnaires
Barrel/Eco-houses	58	17	29%
Bungalows	27	15	56%
Caravans	51	7	14%
Cluny Hill College	45	9	20%
Total	181	48	27%

The data gathered from Cluny Hill College and the Findhorn Foundation Park site have been adjusted by SEI for food and energy to encapsulate the resource use of all the residents at the Park and Cluny Hill College. The travel, consumables and services figures are based on the 58 residents who returned questionnaires, but assuming each resident not involved in the survey has a similar lifestyle, the footprint per person will be the same for all residents.

The results for the ecological footprint have been calculated in global hectares (gha) per person. The total footprint per person for residents at the Findhorn Foundation and Community is 2.71 gha. The categories that contribute to the ecological footprint are shown in Table 2 and Figures 1 and 2.

Table 2. Breakdown of the Findhorn Foundation and Community resident ecological footprint per person.

Category	Ecological Footprint Per Person (gha)
Food	0.42
Home and Energy	0.29
Travel	0.37
Consumables	0.30
Services	0.35
Government and Other	0.47
Capital Investment	0.51
Total	2.71

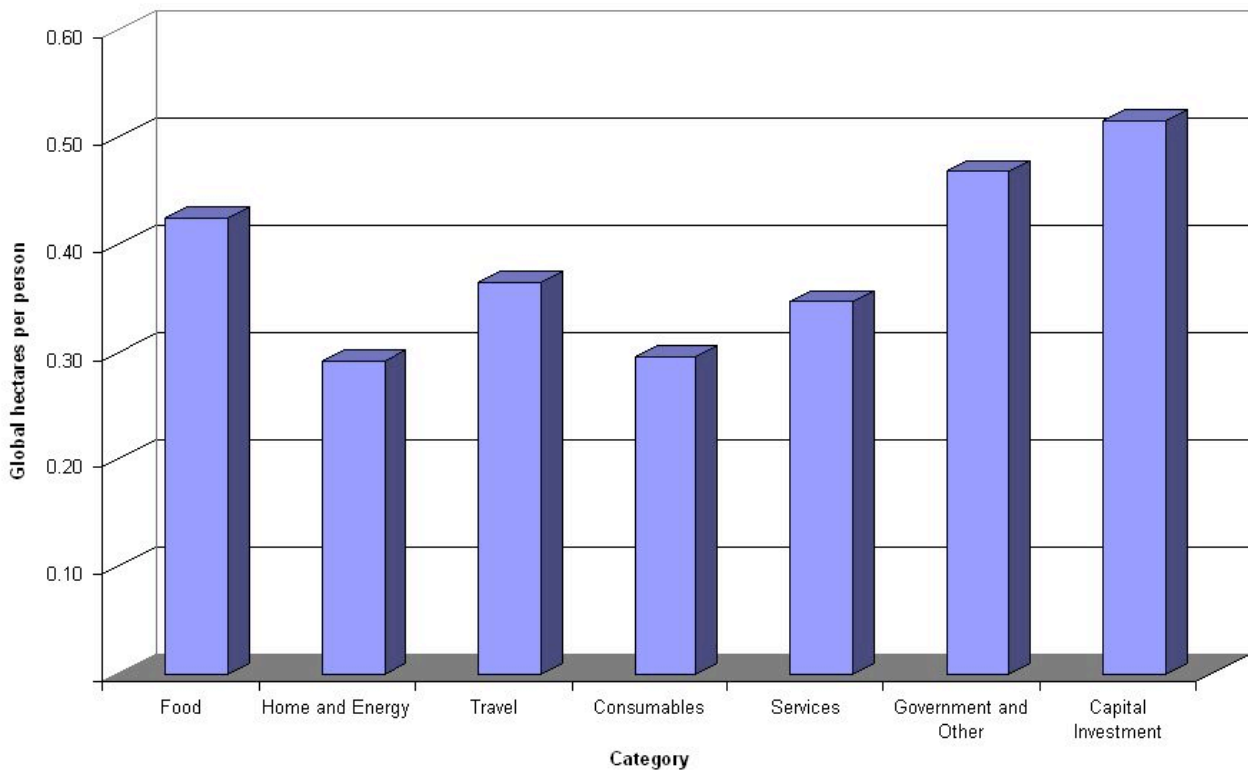


Figure 1. Breakdown of the ecological footprint per person for Findhorn Foundation and Community.

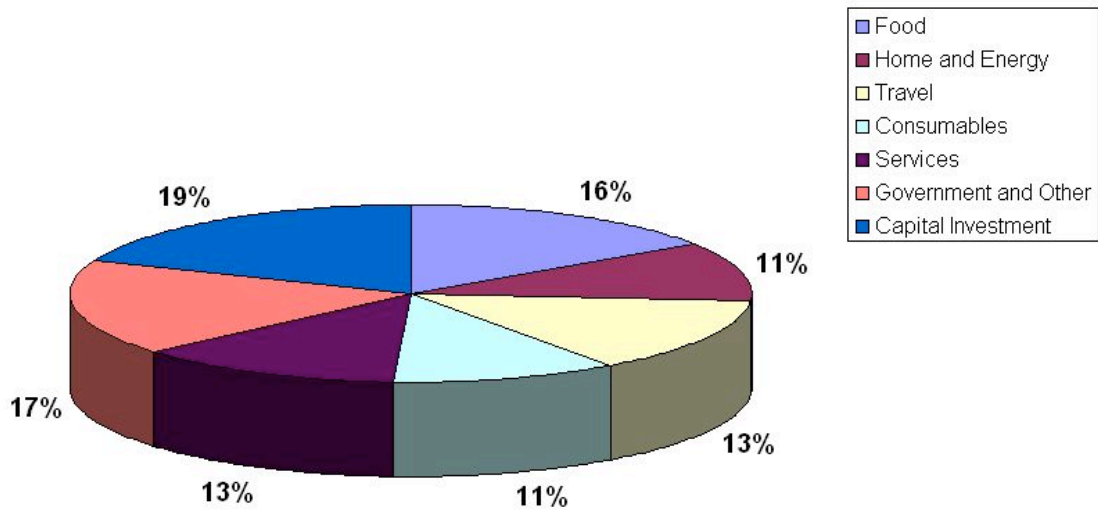


Figure 2. Percentage of ecological footprint contributed by each category.

The waste data collected has not been included in the ecological footprint. This would have resulted in double counting as some of the food and consumables purchased are likely to be part of the waste. A separate footprint has been calculated for the waste for comparative purposes only, and can be found at Section 3.3.

The following sections discuss the categories contributing to the resident ecological footprint in more detail.

3.1.1 Food

The food footprint is 0.42 gha per person. This is from data provided by the Findhorn Foundation Community Centre, Cluny Hill dining room and resident questionnaires. The Findhorn Foundation Community Centre and Cluny Hill dining room cater for guests as well as residents and so during the modelling SEI apportioned a percentage of the food consumed to residents and a proportion to guests in order to give an indication of the amount consumed by each. Table 3 shows the main categories that contribute to the resident's food footprint.

Table 3. Main food types contributing to the resident food footprint per person.

Food Type	Ecological Footprint Per Person (gha)
Butter	0.03
Cheese	0.05
Cream	0.01
Fresh Fruit	0.01
Fresh Green Vegetables	0.01
Milk	0.20
Other Fresh Vegetables	0.02
Processed Vegetables	0.01
Soya Milk	0.01
Vegetable Oil	0.01

Cluny Hill College and the Findhorn Park Community Centre provide only vegetarian meals with the exception at Christmas when meat is provided. This special diet has resulted in a very small food footprint. Dairy products (butter, cheese, milk), Soya milk and fruit and vegetables are the greatest contributors to the residents' food footprint. Data from resident's homes indicated that they eat meat, but not in significant enough amounts to affect the footprint. For the complete list of food types consumed, and their associated footprint, see the Appendix 7.2.

3.1.2 Home and Energy

The total Findhorn Foundation and Community energy footprint is 0.29 gha per person. Table 4 and Figure 3 show the energy types that are used at the Findhorn Park and Cluny Hill College. As with the food footprint, the data has been adjusted to demonstrate only what the residents are likely to use.

Table 4. Ecological footprint per person of energy types used by the Findhorn Foundation and Community residents.

Energy Type	Footprint Per Person (gha)
Findhorn Park:	
LPG	0.03
Kerosene	0.01
Fuel Wood	0.00
Electricity (wind)	0.00
Cluny Hill College:	
Natural Gas	0.09
Fuel Wood	0.00
Electricity (hydro)	0.01
Additional:	
Capital Investment Proportion	0.02
Maintenance and Repair	0.00
New Dwelling	0.13
Total:	0.29

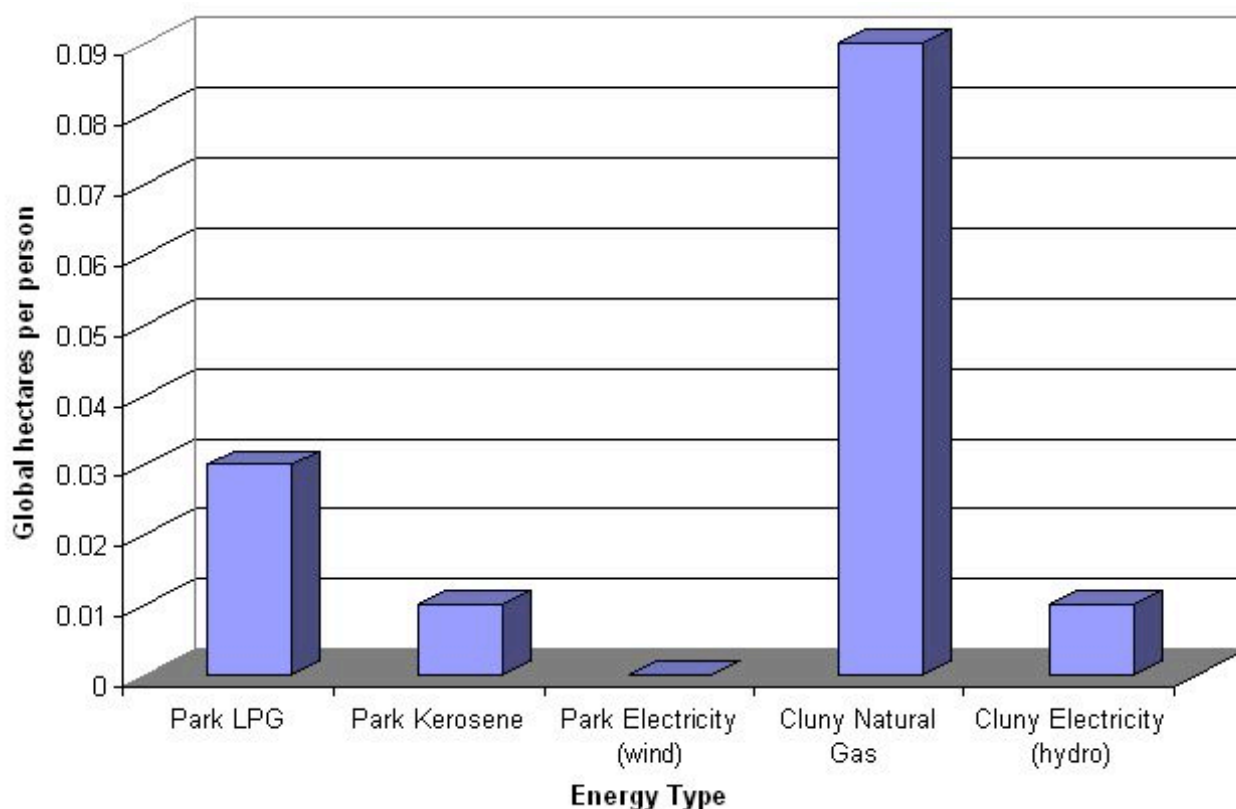


Figure 3. Ecological footprint per person used by Findhorn Foundation and Community residents.

Table 4 shows that natural gas use at Cluny Hill College is the greatest contributor to the footprint at 0.09 gha, which is 31%. The energy footprint before the installation of the additional wind turbines was 0.36 gha per person. Prior to March 2006, hydro electricity contributed 92.4% of the electricity used, with 7.6% being renewable wind energy. The three new wind turbines now supply all of the Park's electricity and it is estimated that 23% of total production can be exported to the national grid. By

replacing the hydro electricity with wind electricity, the energy footprint has been reduced to 0.29 gha per person. This is a reduction of 19%. Cluny Hill College still uses hydro electricity and this is 3% of the footprint. The fuel wood amounts are too small to make an impact on the footprint, as these are only 57 tonnes a year in total. Fuel wood is used for heating residents' accommodation and the 'hot tub'. Findhorn Foundation provided maintenance and building materials data but these are not significant enough to contribute to the footprint. Capital investment proxy data has been supplied by SEI and used here. Capital investment is explained in Section 3.1.7.

3.1.3 Travel

The travel ecological footprint for the residents is 0.37 gha per person. Table 5 and Figure 4 show the modes of transport that contributed to the footprint.

Table 5. Breakdown of the Findhorn Foundation and Community resident travel ecological footprint per person.

Mode Of Travel	Footprint Per Person (gha)
Car travel	0.025
Train	0.053
Local bus	0.004
Motorcycle	0.001
Air travel	0.247
Capital Investment	0.035
Total	0.365

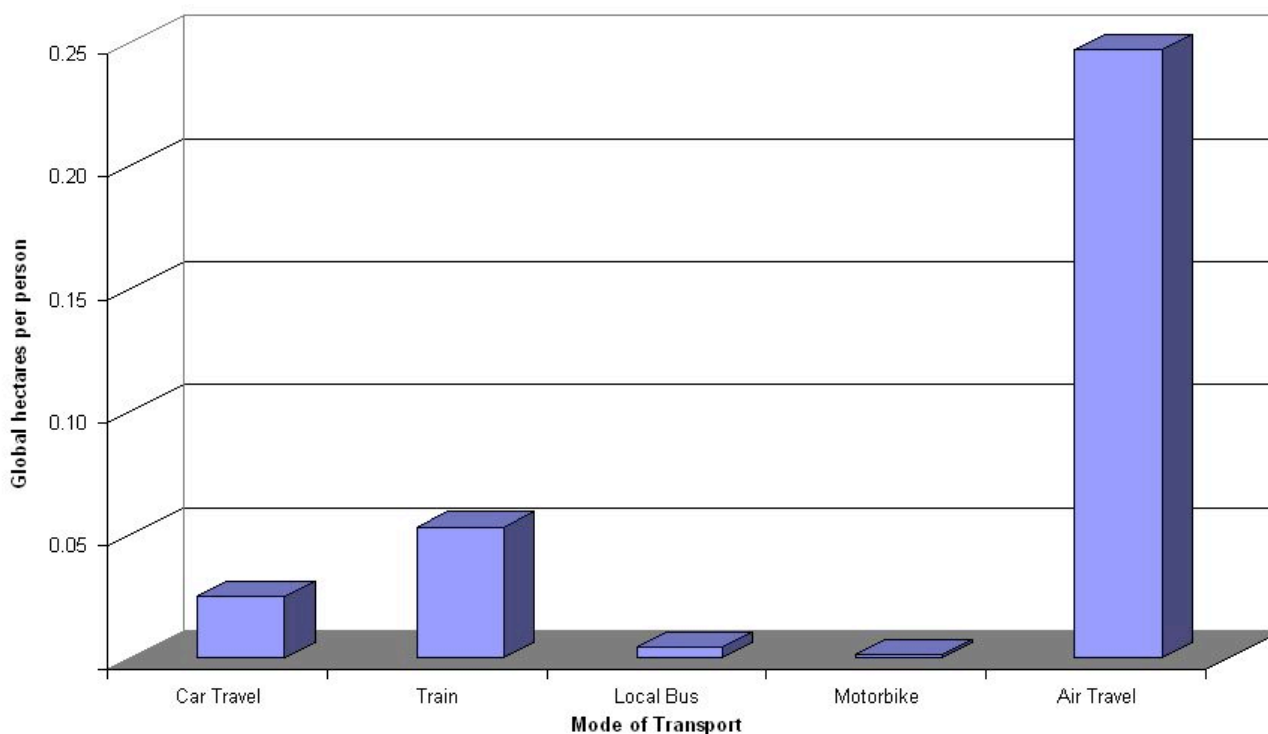


Figure 4. Breakdown of travel ecological footprint per person for Findhorn Foundation and Community residents.

The kilometres that contributed to the ecological footprint through each mode of transport are shown in Table 6 and Figure 5 below. This shows the travel undertaken by the 58 residents in the survey.

Table 6. Breakdown of kilometres per passenger contributing to the resident travel ecological footprint.

Mode Of Travel	Kilometres Per Passenger
Car Travel	539
Train	3055
Local Bus	127
Motorcycle	26
Air Travel	8438
Walking/Bicycle	20

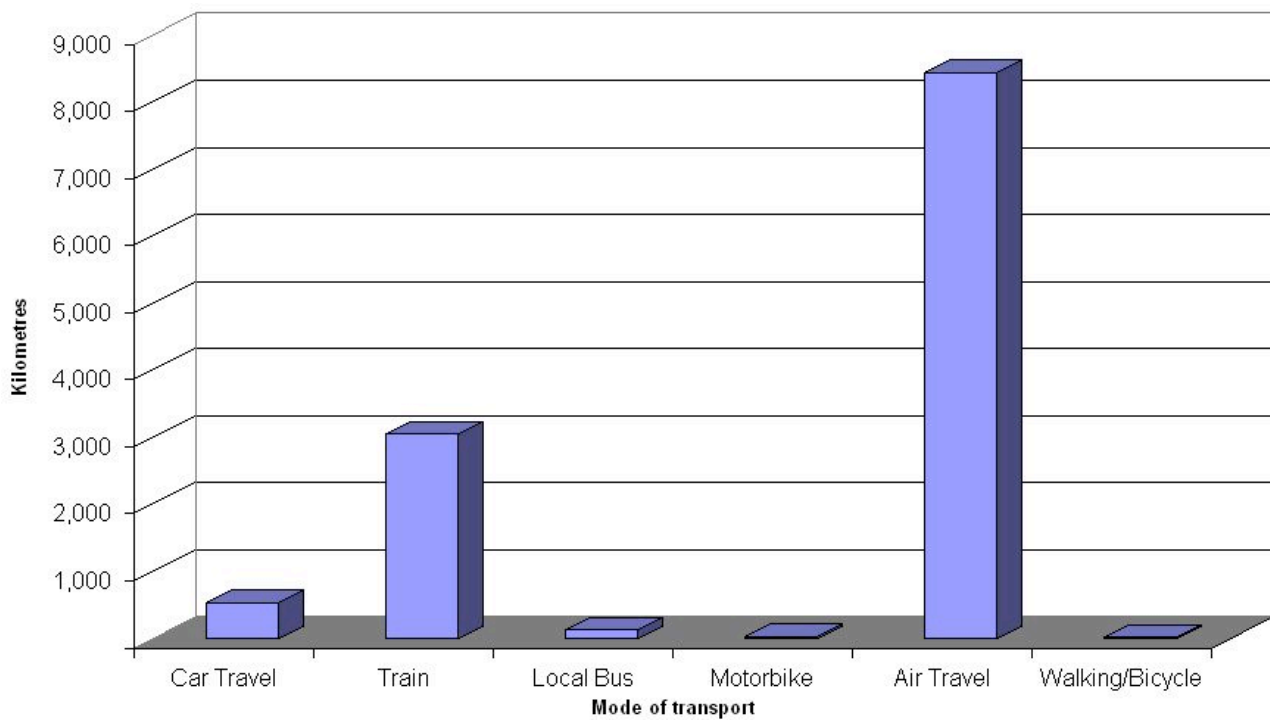


Figure 5. Kilometres per passenger contributing to the resident travel ecological footprint.

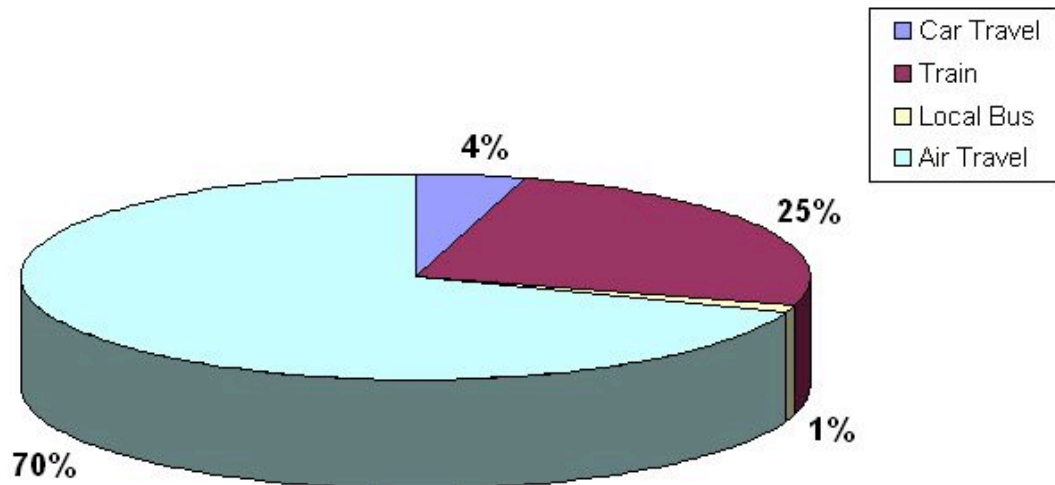


Figure 6. Percentage of mileage undertaken by each mode of transport.

Figure 6 shows the percentage of mileage undertaken by each mode of transport. Motorcycle and walking/bicycle were used, but each come to less than 1%.

Air travel is the greatest contributor to the ecological footprint with kilometres per passenger at over 8000 per year. Just over 10% of the international travel was undertaken for Findhorn Foundation business purposes, with the rest of the journeys being for leisure purposes. The local bus and motorcycle travel contribute only a small amount to the footprint, as the mileage per person carried out was not significant. Walking and cycling are not included in the footprint as they do not use significant resources and therefore do not contribute to the ecological footprint. Capital investment is explained in section 3.1.7.

Table 7 shows a comparison between the travel undertaken by Findhorn Community residents and travel undertaken per capita in Scotland. It can be seen that car travel is far lower for the Findhorn Community – it is only 6% of the average car travel per person in Scotland. Train travel is seven times higher for Findhorn residents than the Scottish average. The air travel undertaken by Findhorn residents, however is more than twice that of the Scottish average.

Table 7. Comparison between Findhorn and Scotland per capita

Transport	Findhorn		Scotland Average	
	Distance Travelled	Footprint per Capita	Distance Travelled	Footprint per Capita
Car Travel	539	0.02	8,619	0.39
Train	3,055	0.05	459	0.02
Local Bus	127	0.00	623	0.02
Motorbike	26	0.00	64	0.00
Air Travel	8,438	0.25	3,613	0.99

3.1.4 Consumables

Consumable purchases were ascertained through resident questionnaires and purchases by Findhorn Park and Cluny Hill College. The ecological footprint for consumables for the Findhorn Foundation Community is 0.3 gha per person. Table 8 and Figure 7 show the major contributors to the consumables ecological footprint.

Table 8. Consumables contributing to the Findhorn Foundation and Community resident ecological footprint per person.

Consumable	Footprint Per Person (gha)
Tobacco	0.006
Clothing and Footwear	0.008
Household Equipment: furniture, carpets, appliances, tableware, tools	0.052
Medical Products	0.020
Audio-visual, photo and infra-red processing equipment	0.063
Recreational items and equipment*	0.116
Newspapers, book and stationery	0.025
Total	0.300

* Hobbies, sport equipment, camping equipment, swimming pools and fitness centres, amusement parks

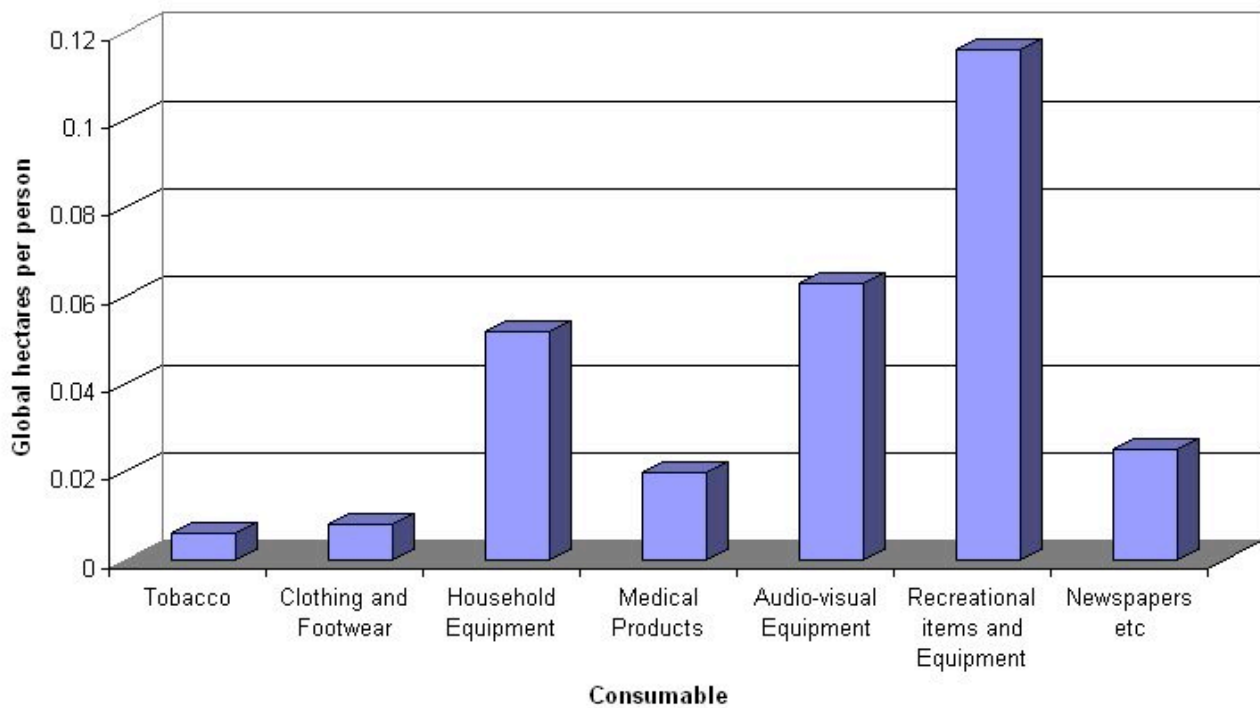


Figure 7. Breakdown of consumables contributing to the Findhorn Foundation and Community resident ecological footprint per person.

The category of recreational items and equipment is the greatest contributor to the consumable ecological footprint at 0.12 gha per person. This is followed by audio-visual equipment and household appliances at 0.06 and 0.05 gha per person respectively.

3.1.5 Services

Services used were obtained through the resident questionnaires. The footprint for services is 0.35 gha and Table 9 lists the services and their contribution to the footprint.

Table 9. Footprint of services contributing to the resident Findhorn Foundation and Community ecological footprint per person.

Service	Footprint Per Person (gha)
Postal services	0.00
Telephone and telefax services	0.02
Recreational and cultural services	0.01
Education	0.02
Accommodation Services	0.17
Social Protection	0.04
Insurance	0.02
Financial Services	0.07
Total	0.35

The greatest contributor to the services footprint is accommodation services at 0.17 gha per person. The next largest contributor is financial services at 0.07 gha per

person. Postal services are shown as 0 gha as the value is too small to be displayed with the significant figures used.

3.1.6 Government and Other

The Government contribution to the ecological footprint is 0.47 gha per person and is shown in Table 10. These data were not gathered by the survey at Findhorn Foundation and Community, but provided as proxy data. The proxy data have been included as part of the ecological footprint as it is difficult to allocate the impact of Government and so this has been equally distributed between the residents.

Table 10. Breakdown of Governmental services contributing to the resident Findhorn Foundation and Community ecological footprint per person.

Government	Service	Footprint Per Person (gha)
Central government	Public administration	0.245
Local government	Public administration	0.173
Capital Investment		
	Public administration	0.021
	Education	0.014
	Health and social work	0.015
Total		0.468

3.1.7 Capital Investment

Capital investment has been included and has a footprint of 0.51 gha per person. The details of this are shown in the Appendix 7.2. Capital Investment has been included in the ecological footprint as this refers to the consumption of fixed capital. This covers both tangible and intangible fixed assets. Consumption of fixed assets is measured using the average set of prices of the period. The value of the fixed assets will decline due to physical deterioration and accidental damage through the course of its use. The value of the fixed asset will depend on the benefits that can be gained from the remainder of its service life. As a result, consumption of fixed capital is measured by the proportionate decline in this value between the beginning and end of a particular accounting period.

3.2 GUESTS

All guests were informed about the questionnaires, and the purpose of them, but not all guests completed them. The data were collected between August and December 2005. This resulted in a return of 282 guest questionnaires. There are actually in the region of 3000 guests visiting the Findhorn Foundation and Cluny Hill College in a year. Table 11 shows the number of questionnaires returned and the number of useable questionnaires.

Table 11. Guest questionnaires.

Questionnaires Returned	Questionnaires Used
282	276

Six of the guest questionnaires received were completed by people who had stayed longer than 3 months. These were not included in the data.

The guests attending Walk Your Talk and GEN+10 programmes were asked to provide only travel data. Of the two hundred and seventy six questionnaires returned, Walk Your Talk and GEN+10 guests completed one hundred and twenty of them. Guests attending other programmes and courses were asked to supply data on their travel, food and goods and services. One hundred and fifty six of these were returned. The ecological footprint has been calculated with the data supplied by the questionnaires, and whilst some tables refer only to that data, the ecological footprint per person will be relevant for every guest staying at the Findhorn Foundation.

The total guest ecological footprint is 2.10 gha per person. The breakdown of this can be seen in Table 12 and Figure 8.

Table 12. Breakdown of the Findhorn Foundation and Community guest ecological footprint per person.

Category	Footprint Per Person (gha)
Food	0.24
Home and Energy	0.32
Travel	0.95
Consumables	0.47
Services	0.12
Total	2.10

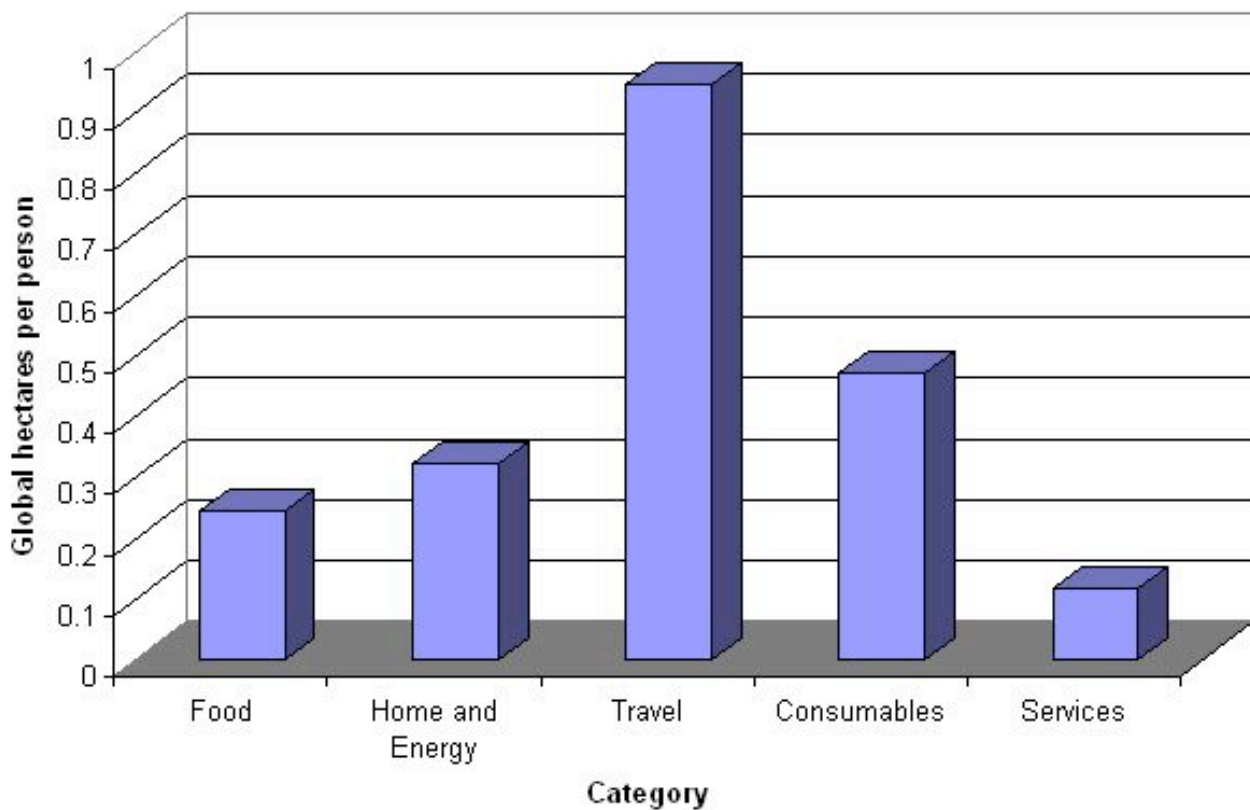


Figure 8. Breakdown of ecological footprint per person for Findhorn Foundation and Community guests.

The guest data showed similar levels of consumption to the residents and therefore it was considered unnecessary to show the breakdown of data. The only notable exception was guest travel. This is discussed in the following section.

3.2.1 Travel

The guests travel footprint is 0.95 gha per person. Table 13 and Figure 9 show the modes of transport that contributed to the footprint.

Table 13. Breakdown of the Findhorn Foundation and Community guests travel ecological footprint per person.

Mode Of Travel	Footprint Per Person (gha)
Car and Taxi	0.05
Train	0.02
Bus and Coach	0.04
Air Travel	0.73
Capital Investment	0.11
Total	0.95

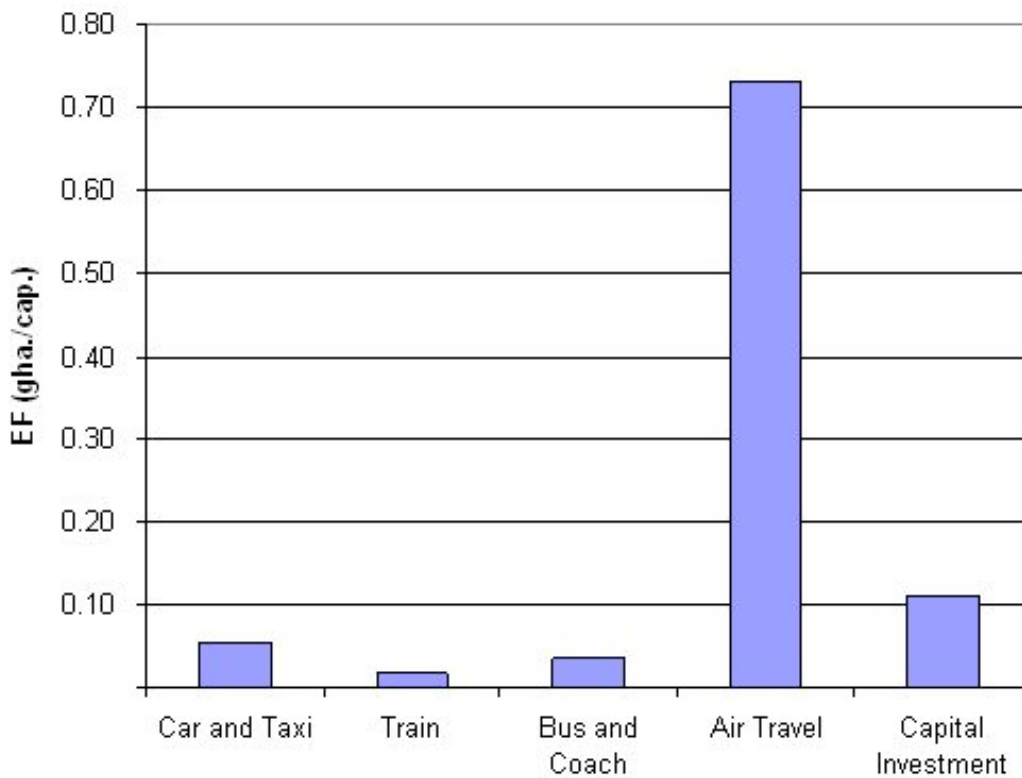


Figure 9. Breakdown of travel ecological footprint for Findhorn Foundation and Community guests.

Table 14 and Figure 10 show the kilometres travelled by the guests and the modes of transport used.

Table 14. Breakdown of kilometres per passenger contributing to the guest travel ecological footprint.

Mode Of Travel	Kilometres Per Passenger
Car and Taxi	1,293
Train	1,325
Bus and Coach	1,018
Air Travel	24,788
Walking and Bicycle	11

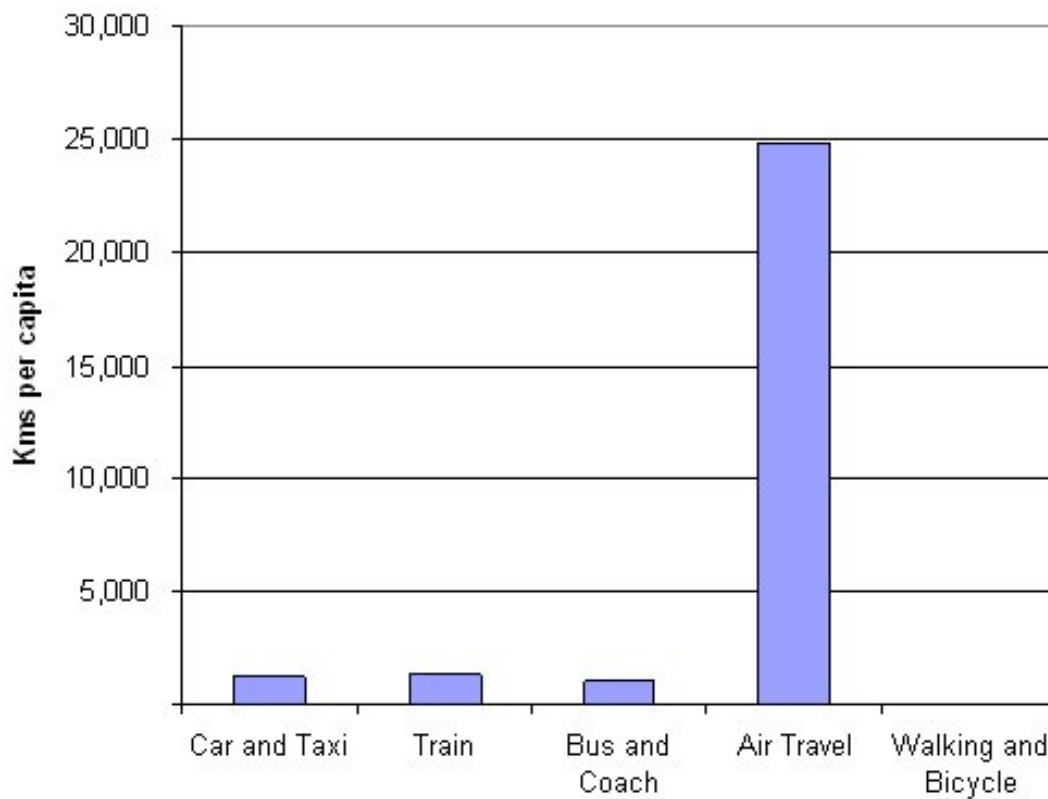


Figure 10. Kilometres per passenger contributing to the guest travel ecological footprint.

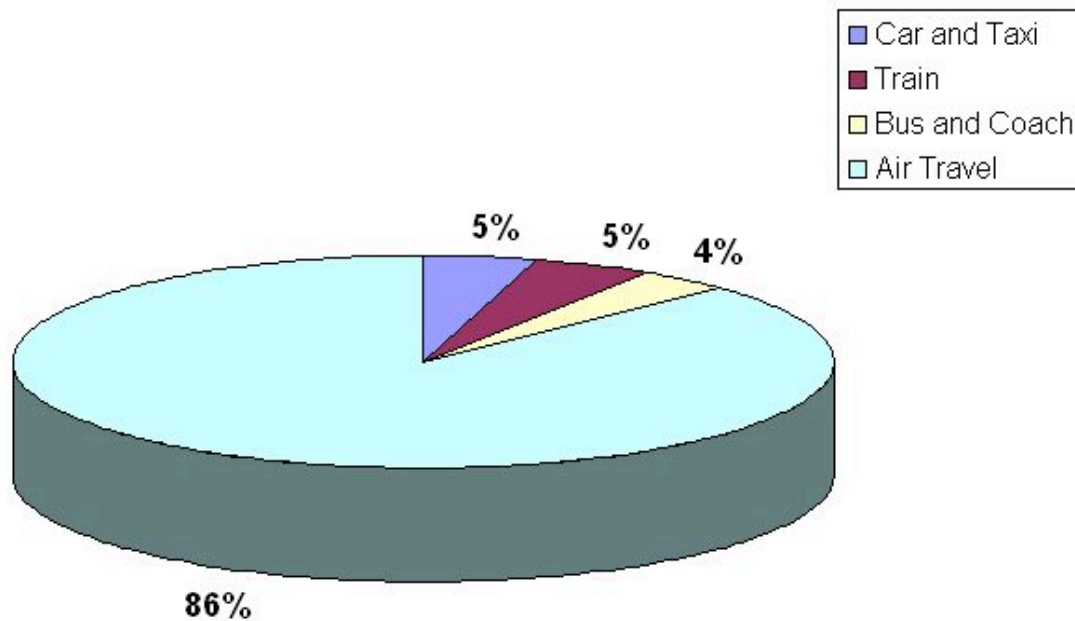


Figure 11. Percentage contribution of each mode of transport to total kilometres travelled.

The guest travel footprint is dominated by air travel, which is 0.73 gha per person, and as Figure 11 shows, 86% of the kilometres travelled. Sixty three percent of the journeys undertaken consisted of either an international flight or a domestic flight. This has resulted in a total of 24,788 km per passenger for air travel. Train travel was used to travel nearly the same number of kilometres as car and taxi travel, but as can be seen by the footprint, train travel has less of an impact on the environment. Walking and cycling have not been included in the footprint, as they do not use a significant amount of resources. Capital investment is explained in section 3.1.7.

3.2.2 Government and Capital Investment

Government and Capital Investment have not been included in the guest ecological footprint. These were not included, as the guests in the survey did not stay long enough at the Findhorn Foundation to contribute greatly to either of these areas.

3.3 WASTE

Waste has not been included in the footprint for the Findhorn Foundation and Community as it would lead to double counting and hence a greater overall footprint. This section has been included in the report to give an indication of the waste discarded by the Community and its impact on the environment. Waste data were collected through the resident questionnaires, Cluny Hill College staff and Findhorn Foundation Community Kitchen. Guest waste has not been quantified for those staying at the Findhorn Foundation Park site as it may have lead to double counting.

Table 15 shows the tonnages of waste discarded over a year by the 58 residents who completed questionnaires.

Table 15. Tonnage of waste discarded by Findhorn Foundation and Community residents.

Waste Stream	Tonnes To Landfill	Tonnes Recycled
Paper and card	0.008	0.147
Glass	0.023	0.420
Non-ferrous metal (cans)	0.001	0.034
Plastic	0.049	0.001
Textiles	0.001	0.003
Putrescible (food)	0.002	0.151
Total	0.084	0.756

Table 16 shows the footprint associated with the waste discarded by the 58 residents. Assuming that the waste discarded by the residents is the same for all residents at the Findhorn Foundation, the waste footprint per person in Table 19 is likely to be applicable to each resident in the Community.

Table 16. Waste footprint for Findhorn Foundation and Community resident households.

Waste Stream	Footprint for Landfill Waste per Person (gha)	Footprint for Recycled Waste per Person (gha)	Total Footprint of Waste per Person (gha)
Paper and card	0.020	0.071	0.091
Glass	0.004	0.017	0.022
Non-ferrous metal (cans)	0.005	0.010	0.015
Plastic	0.057	0.001	0.057
Textiles	0.008	0.004	0.012
Putrescible (food)	0.004	0.000	0.004
Total	0.098	0.103	0.201

The tonnage of waste for Cluny Hill College and Findhorn Foundation Community Centre is shown in Table 17

Table 17. Tonnes of waste discarded by Cluny Hill College and Findhorn Foundation Community Centre.

Waste Stream	Tonnes To Landfill Per Year	Tonnes Recycled Per Year	Total Tonnes Discarded
Paper and card	4.16	0.05	4.21
Plastic film	3.67		3.67
Dense plastic	2.13		2.13
Wood	0.52	0.11	0.63
Textile	0.21	0.12	0.33
Glass	0.10	0.53	0.63
Food	12.48	60.76	73.24
WEEE	0.05	1.00	1.05
Ferrous metal (cans)		0.55	0.55
Non-ferrous metal (cans)		0.03	0.03
Total	23.32	63.15	86.47

It has been difficult to quantify the number of people that the waste from the Community Centre is likely to encapsulate, as many residents, guests and people from out with the community dine there. As a result, Table 18 shows the total footprint of the waste discarded, not global hectares per person.

Table 18. Waste Footprint for Cluny Hill College and Findhorn Foundation Community Centre.

Waste Stream	Ecological Footprint Of Landfill Waste (gha)	Ecological Footprint Of Recycled Waste (gha)	Total Waste Ecological Footprint (gha)
Paper and card	10.34	0.02	10.36
Glass	0.02	0.02	0.04
Ferrous metal (cans)		0.22	0.22
Non-ferrous metal (cans)		0.01	0.01
Dense plastic	2.46		2.46
Plastic film	5.11		5.11
Textiles	1.68	0.18	1.86
Wood	2.06	0.03	2.09
Putrescibles (food)	22.22		22.22
Total	43.89	0.48	44.37

An example of how the waste footprint might look per person would depend on the number of people involved over a year. Cluny Hill College can accommodate 145 people and, assuming that the Community Centre caters for 100 people, the 245 people would result in a footprint per person of 0.2 gha. There are likely to be more people

catered for at the Community Centre than 100 and therefore the footprint per person in reality will be smaller.

3.4 OVERALL FOOTPRINT FOR FINDHORN FOUNDATION AND COMMUNITY

A weighted average has been calculated to encapsulate the overall impact the guests and residents have together. In order to do this the guests have been converted to the equivalent of residents. For example, if there were 1000 guests each staying only one day, dividing by 365 days would result in each guest's impact over a year. The figures for the Findhorn guests have been converted in this way so that the weighted average of the guests and residents could be calculated. The overall footprint is 2.56 gha per person and this can be seen in Table 19.

Table 19. Overall ecological footprint of Findhorn Foundation and Community.

Category	Resident Ecological Footprint Per Person (gha)	Guest Ecological Footprint Per Person (gha)	Weighted Average Ecological Footprint
Food	0.42	0.24	0.38
Home and Energy	0.29	0.32	0.30
Travel	0.37	0.95	0.51
Consumables	0.30	0.47	0.34
Services	0.35	0.12	0.29
Government	0.47	-	0.35
Capital Investment	0.51	-	0.38
Total	2.71	2.10	2.56

The greatest overall contributor to the footprint is travel at 0.51 gha per person. This is due to the large number of international flights that are undertaken by both residents and guests.

4.0 COMPARISONS

4.1 Resident Ecological Footprint

Table 20 and Figure 12 show the ecological footprint of the Findhorn Foundation and Community residents compared to the Beddington Zero Energy Development (Bed Zed), Scotland and United Kingdom ecological footprints.

Table 20. Comparisons of Findhorn Foundation and Community resident ecological footprint and other ecological footprints.

Category	UK	Scotland	Findhorn Residents	Bed Zed
Food	1.14	1.06	0.42	0.99
Home and Energy	1.35	1.33	0.29	0.36
Travel	0.85	0.99	0.37	0.26
Consumables	0.65	0.67	0.30	0.37
Services	0.41	0.33	0.35	0.24
Government and Other	0.47	0.47	0.47	0.47
Capital Investment	0.51	0.51	0.51	0.51
Total	5.40	5.37	2.71	3.20

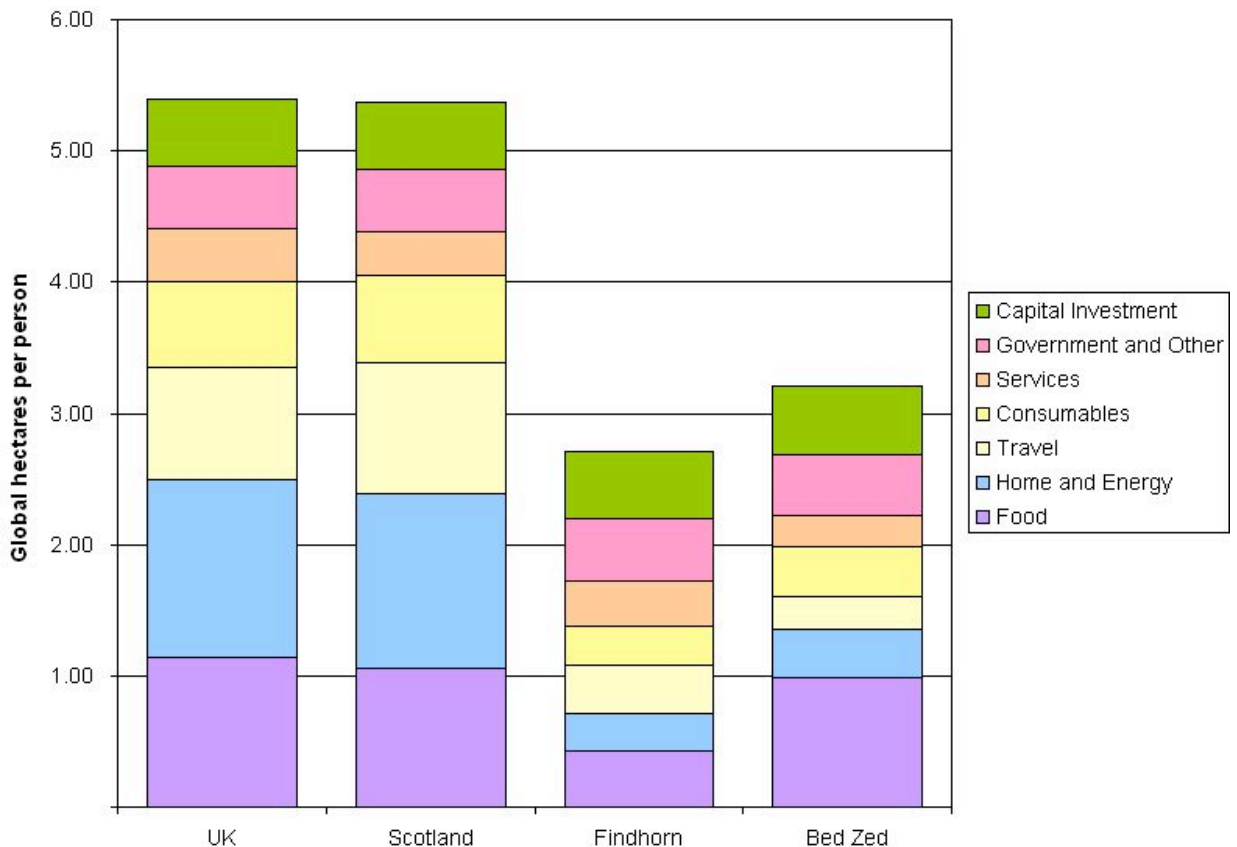


Figure 12. Comparison of Ecological Footprints for UK, Scotland, Findhorn Foundation and Community and Bed Zed.

The Bed Zed is the largest eco-community in the UK. This was a former sewage works that has been turned into a community of 100 properties for sale and rent to

residents and businesses. It is estimated there are 200 people on the development. The developers have brought together ideas, tried out elsewhere on a small scale, to create an environmentally-friendly, energy-efficient development of housing and work-space in Beddington, Sutton, Surrey. Residents have been living at Bed Zed since March 2002. The building materials were, where possible sourced from local (within 35km of site), natural, renewable or recycled sources. The development was designed to derive its heat and electricity from a combined heat and power (CHP) unit fuelled by tree waste diverted from landfill. Due to technological difficulties, this has not been achieved, and the development is currently using gas fired heating. The footprint, however, has been calculated based on the CHP being in use. Gas use will be low due to good insulation and low energy demand appliances and lighting in the development and so the actual footprint is unlikely to be much larger than that calculated. It has been used here for comparative purposes, as it is currently perceived as the best example of sustainable living. The Findhorn Foundation and Community have a lower footprint than this.

The Scotland and UK ecological footprints are very similar in size, which is almost double the Findhorn Foundation's ecological footprint. The Scotland and UK footprints are likely to be less accurate than more local, smaller sized projects due to the extent of proxy data used in the model. Community level projects have a higher accuracy, as it is possible to assess actual household data whereas on larger scale projects, it is often necessary to use proxy data, which in most cases is only available at the national level.

A footprint on the city of Inverness was carried out by SDRC in collaboration with SEI in 2004. The footprint consisted of data on nourishment, housing, energy consumption, transport, waste, goods and services and built land. All data were to be collected locally but where this was not possible national proxy data were used. The overall footprint of Inverness was 6.30 gha and detailed in Table 21.

Table 21. Inverness ecological footprint.

Ecological Footprint	Ecological Footprint Per Person (gha)
Energy- Domestic	1.27
Energy- Commercial	0.30
Transport	0.70
Infrastructure (Housing)	0.12
Infrastructure (Rest)	0.92
Waste - Municipal	0.97
Waste - Service	0.34
Water	0.01
Land Use	0.04
Food	1.63
Total Footprint	6.30

The Findhorn Foundation and Community resident ecological footprint is lower than the UK, Scotland, Inverness and Bed Zed ecological footprints. The Bed Zed development is a good example of sustainable living, and as the Findhorn Foundation and Community have a lower footprint, it suggests that the Findhorn Foundation and Community's sustainable practices have a reduced impact upon the environment.

4.2 Total Ecological Footprint

The total Findhorn Foundation and Community ecological footprint, which includes the resident's and the guest's footprints as a weighted average is shown in Table 22 and Figure 13.

Table 22. Comparisons of the total Findhorn Foundation and Community ecological footprint and other ecological footprints.

Category	UK	Scotland	Findhorn	Bed Zed
Food	1.14	1.06	0.38	0.99
Home and Energy	1.35	1.33	0.30	0.36
Travel	0.85	0.99	0.51	0.26
Consumables	0.65	0.67	0.34	0.37
Services	0.41	0.33	0.29	0.24
Government and Other	0.47	0.47	0.35	0.47
Capital Investment	0.51	0.51	0.38	0.51
Total	5.40	5.37	2.56	3.20

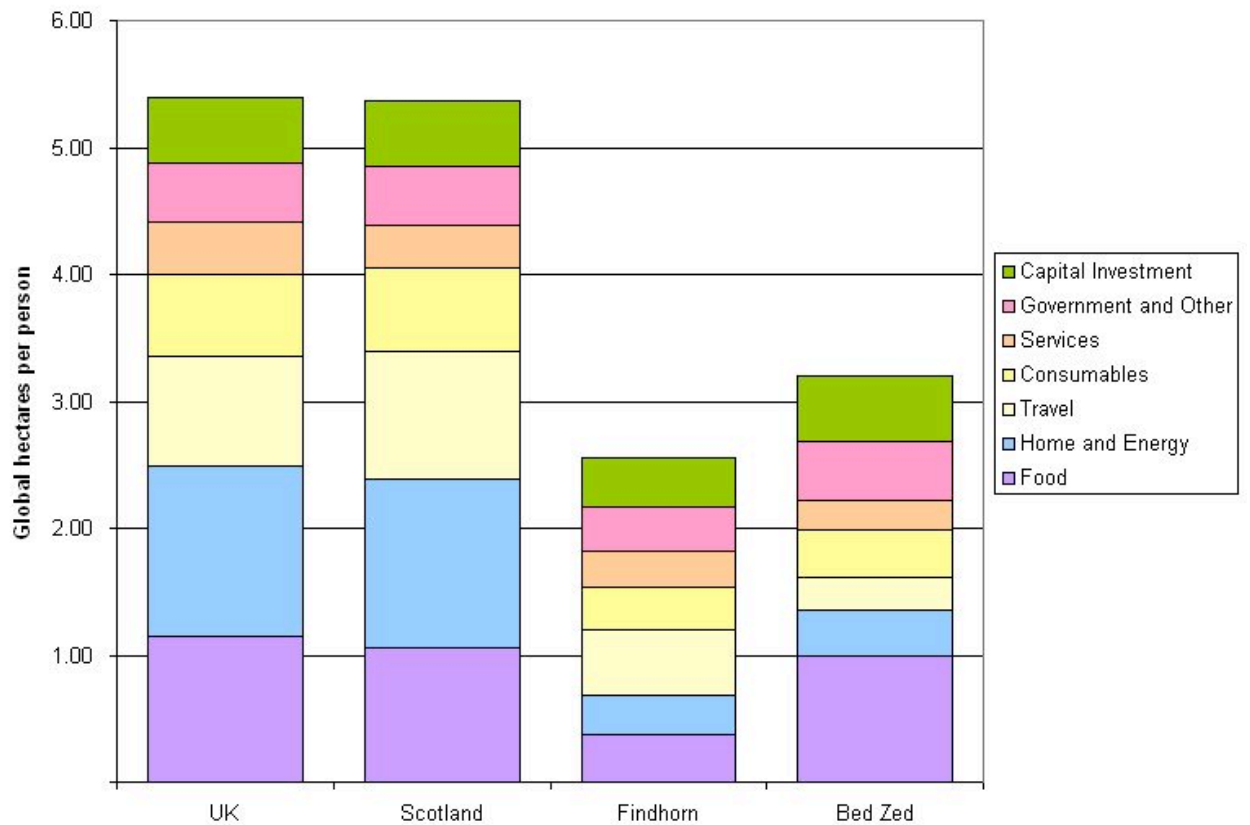


Figure 13. Comparison of ecological footprints for UK, Scotland, total Findhorn Foundation and Community and Bed Zed.

5.0 LIMITATIONS

5.1 Criticism of the Ecological Footprint Model

The ecological footprint is not an exact science and for the purposes of modelling, certain assumptions and proxy data need to be used for certain areas. There have been a number of criticisms of the Ecological Footprinting method which include van den Bergh & Verbruggen, (1999), Ayres, (2000) and Van Kooten & Bulte, (2000). Some of the criticisms are discussed briefly below.

Chambers *et al* (2000) in ‘Sharing Natures Interest’ discussed the point of why the ecological footprint method focuses only on renewable resources, when they are already perceived as sustainable. They went on to explain that renewable resources can be depleted if they are overused or misused and the ecological footprint highlights how much these are being diminished by current practices.

Vuuren & Smeets, (1999) have argued that ecological footprinting is limited as an indicator of sustainability and cannot be a true indicator of sustainability until it includes economic and social indicators. The method, however, is not to show sustainability, but the impact of the activities that have been undertaken at a given point in time. It does not take into account the quality of people’s lives.

Chambers *et al* 2002, discussed the fact that the model could be thought of as too simple to represent the complex relationships between systems. They explain, however, that it is only designed to be an indicator, which should be used in conjunction with other indicators related to the particular issue being investigated. It is also often better to use simple models, as complex models can result in being too complicated for the purpose.

Moffat, (2000) and Kooten & Bulte (2000) have argued that the method has no predictive value and is therefore of little value to policy makers. The ecological footprinting method, however, was not designed for prediction. EF is used to provide a ‘snapshot’ in time of the current resource use. Several of these snapshots can be used to determine trends. Using this method also enables the consideration of alternative scenarios to create more sustainable communities.

5.2 Limitations to Findhorn Foundation Data

The Findhorn data collected through the residents would have been more comprehensive if it had been possible to get more of the residents involved. The aim had been to have at least 20% of each type of dwelling represented. This was achieved for the eco-houses, barrel-houses returned 29% and the bungalows 56%. The caravan residents’ return was only 14%, which was less than anticipated. A better understanding of the residents resource use may have been achieved through a second period of data collection.

The Park Community Centre provides meals to non-community members as well as residents and guests. These data were taken from food purchased by the kitchen, and as they provide food to those out with the community, the food footprint may be higher than it actually is for just the Findhorn Foundation Community.

Guests staying longer than 3 months have not been accounted for. The ecological footprint has only included guests staying at the Findhorn Foundation for up to three months and long-term residents. It is not known how many people stay longer than three months.

6.0 CONCLUSIONS

The ecological footprint for residents at the Findhorn Foundation and Community was 2.71 gha per person. This consisted of the categories: food, home and energy, travel, consumables, services, Government and other and capital investment. The ecological footprint for guests to the Findhorn Foundation was 2.10 gha per person and consisted of food, home and energy, travel, consumables and services. Combining the two ecological footprint results as a weighted average gives an overall ecological footprint for the Findhorn Foundation and Community of 2.56 gha per person. This is a very low footprint compared to the national figures. There is one area however, where the Findhorn Foundation Community impact is higher than national figures, and this is air travel which is discussed below. There are also some suggestions for data collection for further studies undertaken in the future.

The resident's air travel is high at over 8000 km per person resulting in a footprint per person of 0.25 gha. Residents could be encouraged to use more sustainable modes of transport for their journeys such as travelling by train or other types of public transport. The guests have a greater air travel footprint at 0.95 gha per person, which is 24,788 km per person. This would be difficult to reduce for international guests, but for national guests it may be possible to use the train or coaches instead of domestic flights.

The food footprint is low for residents of the Findhorn Foundation and Community due to the special diet that does not include meat, except at Christmas. It may also be low as the Community Centre and Cluny Dining room cater for most of the Community and so the guests and residents are not purchasing and discarding food separately.

For future data collection with the Findhorn Foundation, it would be beneficial to perform a second period of data collection. This would most likely provide a fuller data set and may include seasonal variations that were missed in this survey.

It may also be beneficial to include a questionnaire for guests that are staying at the Findhorn Foundation for a longer period than three months, but are not permanent residents there. This, at the moment, is an unknown number and could be a significant factor in a future ecological footprint.

A comparison of the Findhorn Foundation and Community resident ecological footprint with other ecological footprints suggests that the Findhorn Foundation and Community footprint is lower than other ecological footprints in the UK. In particular, comparison with the Bed Zed development shows that they have a smaller resident footprint at 2.71 gha per person than a development that has been designed in a sustainable way (3.2 gha per person). Calculating the weighted average for the guests and residents of the Findhorn Foundation and Community results in an even lower footprint of 2.56 gha per capita. This suggests that the Findhorn Foundation and Community sustainable practices have a reduced impact upon the environment.

7.0 APPENDIX

7.1 Questionnaires

7.1.1 Guest Questionnaire Issued



Ecological Footprint of Findhorn Foundation and Community- QUESTIONNAIRE FOR GUESTS (Staying 3 Months or less)

The Ecological Footprint Analysis of The Findhorn Foundation & Community is a project in partnership with The Findhorn Foundation, Global Ecovillage Network-Europe, Sustainable Development Research Centre and the Stockholm Environment Institute.

The project aims to undertake an ecological footprint study of the Findhorn Foundation and community. Ecological footprint analysis requires the calculation of the current levels of consumption of the local population. We hope this study will help the FF and community to reduce its environmental impact. This questionnaire is prepared as a part of this study, please fill in the following questionnaire and help us reduce our environmental impact. Thank you! The questionnaire should take 15 minutes to complete.

PART 1- General Information

Name:

Date of arrival:

Date of departure: _____

Length of stay: _____ **Day(s)** _____ **Month(s)**

1. Where are you living during your stay at Findhorn? Caravan Eco-house Bungalow Cluny Hill

2. Which **country** have you travelled from?

3. Which **city/town** have you travelled from?

4. What is the name of the Programme you are attending?

PART 2- Travel Footprint

A. Flights and Travel from your Permanent Place of Residence

We would like to get a better understanding of the journey you have taken to get to the Findhorn Community **from your country of residence**. Journeys can sometimes be made up of many modes of transport i.e. taxi to the airport, followed by a flight, then a train to the final destination.

1. Please fill in the table for each mode of transport you used during your journey from your place of permanent residence to the Findhorn Foundation.

If you used one mode of transport more than once in your journey, (e.g. you took a taxi before and then after a flight), please use the space on the next page to give details of the additional journey. Alternatively, if you know the distance travelled by each mode of transport, just fill in the last column with the **TOTAL** distance.

If you are unsure, please just give an estimation.

I would like to give distances in (please tick one): Kilometres [] or Miles []			
Mode of Transport	At what location (town/city/country) did this part of the journey start?	At what location (town/city/country) did this part of the journey end?	If possible, please estimate how far you travelled to get to your destination by this mode of transport?
Car (as the driver)			
Car (as a passenger)			
Air Travel (Domestic Flight)			
Air Travel (International Flight)			
Train			
Local Bus			
Coach			
Bicycle			
Walking			
Taxi			
Motorcycle			

Additional Information

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2. Do you expect your departure journey to differ from your arrival journey? If so, please give brief details of the changes below:

--

B. Daily travel during your stay at Findhorn

3. Please list the average day-to-day mileage you have done **during your stay at Findhorn**, in the following table. **Please do NOT include any travel done on the Findhorn Foundation bus, as this will be collected separately.** If you are unsure, please just give an estimation.

I would like to give distances in (please tick one): Kilometres [] or Miles []	
Mode of Transport	Distance travelled using this mode of transport during your stay at Findhorn
Car (as the driver)	
Car (as a passenger)	
Air Travel (Domestic Flight)*	
Air Travel (International Flight)*	
Train	
Local Bus (excluding Foundation bus)	
Coach	
Bicycle	
Walking	
Taxi	
Motorcycle	

*See over page

***Please Note: If you do not know your mileage for flights, write below the Airport from which you are flying and your destination:**

4. If you have a car what is the model?

C – Non typical travel made during your stay at Findhorn

5. In this section please identify NON-typical trips that you are making during your stay at Findhorn and fill in the table below.

This includes travel that is **NOT part of your typical daily travel habits or your programme**. For example, holidays or weekend breaks to see friends and family. If you are unsure, please just give an estimation.

I would like to give distances in (please tick one): Kilometres [] or Miles []

		Personal Travel Total Distance travelled
Mode of Transport	Number of people in car	
Car (as the driver)		
Car (as a passenger)		
Airplane (Domestic Flight) [§]		
Airplane (International Flight) [§]		
Train		
Local Bus (excluding Foundation bus)		
Coach		
Bicycle		
Walking		
Taxi		
Motorcycle		

§Please Note: If you do not know your mileage for flights, write below the Airport from which you are flying and your destination: