Findhorn Ecovillage
Carbon Assessment 2015

Photo from Sarek National Park, Lapland Sweden

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ecometrica

Background

The carbon footprint assessment of Findhorn Ecovillage's[1] carbon emissions from 2015 is an initiative undertaken by Roger Doudna after his participation in COP 21 in Paris December 2015. The question that needed to be answered was how Findhorn is doing in this respect? Has it high or low carbon emissions, and is there place for improvement?

Göran Wiklund, a consultant specialised in sustainability and especially carbon strategies, offered to carry out an assessment.

The assessment has been done using the web-based calculation tool *Our Impacts*, the use of which has kindly been sponsored by Ecometrica, an Edinburgh based soft-ware company.

A study has earlier been done (2006) of the ecological footprint at the Findhorn community. It was 2.71 gha/person. The ecological footprint for guests was 2.10 gha/person. Combining the two resulted in weighted ecological footprint of 2.56 gha/person.

Definitions

Ecological footprint: A measure of how much area of biologically productive land and water an individual, population or activity requires to produce all the resources it consumes and to absorb the waste it generates, using prevailing technology and resource management practices. The Ecological Footprint is usually measured in global hectares (gha). Because trade is global, an individual or country's Footprint includes land or sea from all over the world. Without further specification, Ecological Footprint generally refers to the Ecological Footprint of consumption.

Carbon footprint: A measure of how much CO2 emissions are associated with fossil energy use. When studying ecological footprints the carbon footprint is added because it is a competing use of bio-productive space, since increasing CO2 concentration in the atmosphere is considered to represent a build-up of ecological debt, and is believed by the scientific community to be a primary driver of global warming.

[1] 'Ecovillage' is defined as all activities in The Park and at Cluny and based on the concept of Findhorn being an intentional ecovillage.

Summary

The assessment is divided into four reporting units:

- **The Park**
- **Cluny**
- **NFD**
- **THA**

Total emissions are 4,067 tCO2e (tonnes CO2e, please see page 4 for explanation).
Scope 1 direct emissions (burning of fossil fuels and use of electricity produced by FWP) are 908 tCO2e.
Scope 2 indirect emissions (purchased electricity) amount to 48 tCO2e.
Scope 3 indirect emissions (indirect emissions other than purchased electricity) are 3,111 tCO2e.

When all three scopes are related to individuals (the number of staff, business employees and individuals living/working at the Park and Cluny) the average carbon footprint is 9.5 tCO2e/person. For the guests the emissions are 1.2 tCO2e/person.

In order to balance the emissions an attempt has been made to measure the 'carbon negative' effect of certain activities (i.e. those that reduce emissions). Trees for Life's activities result in sequestration of CO2. The effect of using renewable electricity from Findhorn Wind Farm (FWP) rather than grid electricity results in avoided emissions.

Avoided/sequestrated emissions:

- **Trees for Life 2,133 tCO2e**
- **Use of wind energy 446 tCO2e**

If avoided/sequestrated emissions are subtracted from the carbon footprints of individuals we get 3.4 tCO2e/person compared to 9.5, and for guests 0.4 tCO2e/person compared to 1.2.

It is important to emphasise that the carbon assessment shows a high degree of uncertainty and should basically be seen as an approximation that in fact it can be higher or lower. We recommend it be regarded as such and that steps be taken to improve data collection for a 2017 assessment.

Some comparative data to bear in mind

- ***In order to halt global temperature increase each individual has a carbon budget of about 2.0 tCO2e***
- ***The average UK emissions are 9.8 tCO2e/person, or 13.4 tCO2e/person (incl. all greenhouse gases)***
- ***A return air trip economy class New York-Inverness emits 2.4 tCO2e.***
- ***Emissions/person of CO2e using various transport means:***
  Inverness-London return:
  Bus 63 kg

Train 107 kg
Air 376 kg
Car 413 kg

Reporting standard - Greenhouse Gas Protocol

This assessment follows the international standard Greenhouse Gas (GHG) Protocol. The Protocol requires that seven potent greenhouse gases be measured. As the gases have different GWP (global warming potential), (methane for instance has 25 times higher GWP than CO2) the seven gases are converted to carbon dioxide equivalents: CO2e.

The GHG Protocol differentiates between three 'Scopes':

- **Scope 1: direct emissions from burning fossil fuel (petrol, gas etc.)**
- **Scope 2: indirect energy (purchased grid electricity)**
- **Scope 3: other indirect emissions (travel, food, commuting, paper consumption etc.)**

Air travel has been calculated using RFI factor 2.0 (Radiative Forcing Index). RFI factor means that air travel at high altitude causes greater emissions due to the effect of the vapour trails than the fossil content of the fuel. RFI factor 2.0 means the content of emissions in fuel is doubled. For Scope 1 fossil fuels' upstream emissions have been added. This means emissions from the manufacture of petrol, gas or pellets. For windpower and purchased grid electricity both upstream emissions and T&D losses (Transmission and Distribution) are included.

Results

The focus has been on calculating the greatest emissions.
Newbold, Cullerne, Iona and Erraid are not included, nor are NFA members living outside The Park and Cluny.

The ambition has been to include businesses that are part of or associated with NFD. This can be done for Scope 1 and 2, but not yet for all Scope 3 emissions. Assumptions have been made when data was not available. Assumption models have been used for guest travel, volunteer travel for Trees for Life, Caravan Park guest travel, THA travel and Guest meals.

Due to the fact that there is a high degree of uncertainty, the result must be seen as an approximation. The actual emissions can therefore be higher or lower.

Several people have assisted in the data collection. Thanks are due to Roger Doudna, Jürgen Muthmann, Paul Randell, Sverre Koxvold, Duncan Easter, Mari Hollander and Paddy Atkinson amongst others.

Total emissions

The measured emissions are 4,067 tCO2e.

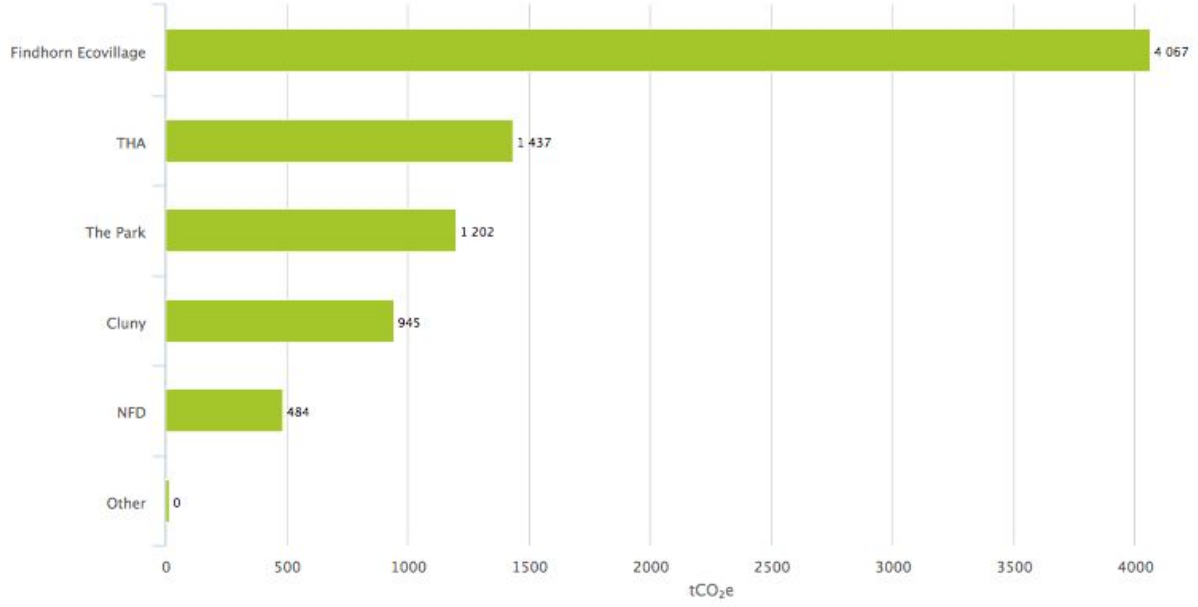


Table 1. Total emissions divided by organisation unit.

THA has the highest emissions at 1,457 tCO2e. As will be seen further on, a major cause of emissions for all units is travel. Emissions from the different units will be commented on later in this document.

Emissions by Scope

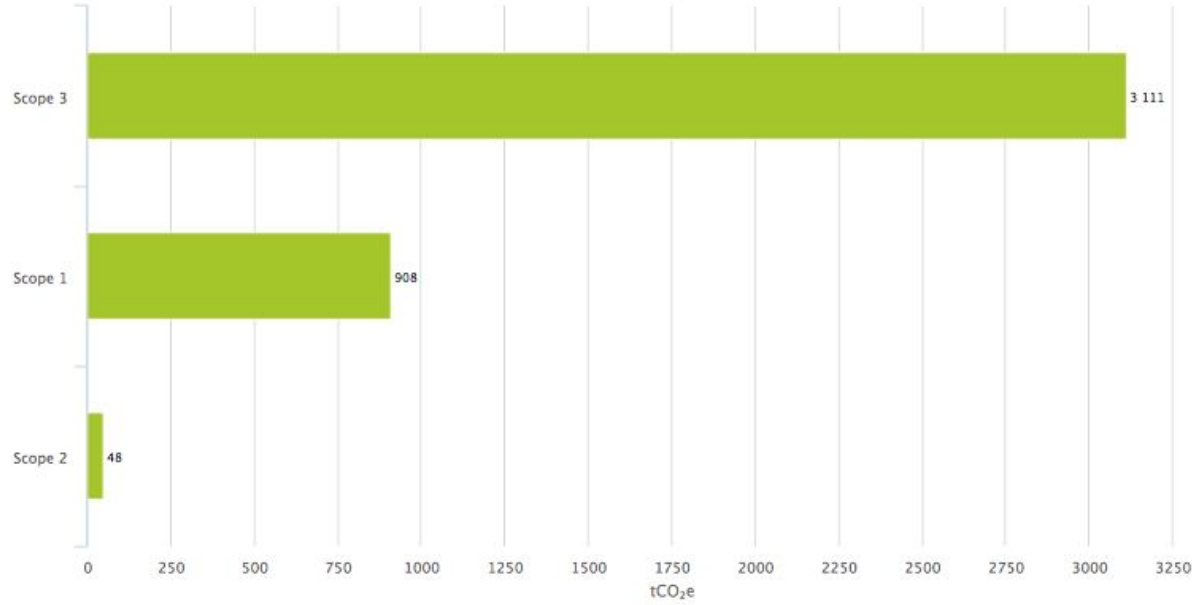


Table 2. Emissions divided by Scope.

Scope 1 emissions (emissions direct from burning fossil fuel and generation of wind energy) are 908 tCO2e. Scope 2 (indirect emissions from purchased electricity) is 48 tCO2e. The reason for the low Scope 2 emissions is that only a fraction of the energy comes from the grid since FWP, with very low emissions, provides the bulk. Scope 3 (other indirect emissions) amounts to 3,111 tCO2e. The largest part of Scope 3 is caused by travel and in particular air travel as will be seen in the next table.

Emissions allocated by Emission source and Organisation unit

Emissions source	Park	Cluny	THA[2]	NFD	Total tCO2e
Air travel	979	718	883	164	2 744
Natural gas	87	183	358	18	645
Cars	21	-	180	154	355
Food for guests	40	24	-	-	64
Rail travel	9	7	-	44	59
Electricity	3	6	4	25	38
Fuel oil	-	-	-	34	34
Wood, pellets burning	27	-	5	-	31
Staff owned cars/ vans	-	1	-	24	25
Buses	23	-	-	-	23
Wind power	4	-	7	8	19

[2] THA includes title holders and households that rent houses/caravans.

Taxi	7	6	-	-	15
Fertiliser	-	-	-	9	9
Bus travel	3	2	-	-	5
Office paper	0	0	-	-	0
	1 202	946	1 437	484	4 067

Table 3. Emissions divided by source and unit. Zero in a box represents a very small number. A dash means that the there are no emissions or that data has not been available. Blue colour means reliable quality data.

Air travel is the dominant cause of emissions. The second is natural gas and the third is car/bus usage. These three emissions amount to 88% of the total. Air travel represents 64% of all emissions.

Emissions divided into their sources

Travel

Data on means of travel is to a larges extent missing so assumptions have been made regarding the use of airplanes, cars, trains and buses.

The largest emission is air travel at 2,744 tCO2e. To get an idea of what the air travel emissions represent they are the same as the emissions from putting 1,200 new cars onto the streets. Or the same as travelling to New York from Inverness return trip more than 1,150 times.

The Park and Cluny are responsible for flights that brought guests participating in the various programmes. In 2015 the Park had 2,000 and Cluny 1,100 guests. The flight emissions are based on statistics covering most of the countries the guests are travelling from.

Air travel was used by some of the 900 guests to the Findhorn Caravan Park (NFD), the THA members, and the 300 volunteers helping Trees for Life with tree planting, and. The assumption is that air travel is used by the volunteers for long distance trips while mostly rail and bus within the UK.

All flights are assumed to be taken in economy class seats.

Commutes between the Park and Cluny are covered via fuel consumption for the buses.

Travel in connection with work is included for Cluny, but not for the staff at the Park as no data is available, but there should be some local and longer trips using cars or other means of travel.

For THA travel is a large source of emissions. In order to calculate air travel, which emits 883 tCO2e, a model has been used for the 276 individuals from 187 households. They represent a wide range where some do not travel at all and some travel extensively. There are major uncertainties regarding the results as in the first place

the number of trips is based on approximations, and secondly the destinations and the means of travel are based on guesses.

Car use is another major source of emissions for THA. It is estimated to be 180 tCO2e. The assumption is that 50% of households have a car (some have more than one) and that the car is used approximately 10,000 km per year (approximate UK average) for trips and shopping. It includes private car sharing.

The Caravan Park has some statistics on the places people travel from, and the assumption is that most come by car which results in 154 tCO2e.

To a large extent rail and bus travel emissions are due to guests and the Trees for Life volunteers. The emissions are relatively low, all in all 64 tCO2e, as rail and bus are carbon efficient means of transport.

There are data gaps in journeys made by NFD-owned or associated businesses other than Trees for Life. That means actual emissions exceed what has been calculated.

Energy

Propane gas is commonly used for heating and cooking and the total emissions are 645 tCO2e, a figure that is based on actual measurements and probably covers all use of gas. THA is using most of the gas and emits 358 tCO2e (56%). Of all Scope 1, emissions from gas represent 71%.

Thanks to a government grant financing a feasibility study for energy use at the Park, gas consumption data for THA has been reliably gathered.

Emissions from use of electricity come from FWP and the grid. An emission factor from one of the major wind energy producers has been used to calculate the wind energy emissions. The windpark itself does not cause any emissions, but there are transmission and distribution losses (T&D) and upstream emissions (emissions having to do with use of fossil fuel for the maintenance of the windpark, and for building and erecting the generators).
Emissions also come from electricity distributed through the grid, but only to a small extent as only a small net amount was purchased. The Park and NFD both "imports" and "exports" grid electricity, but for this purpose only the net import has been calculated.
Electricity from FWP generated 19 tCO2e emissions and the grid 38 tCO2e.

Cluny is not served by wind power hence it only uses electricity from the grid. In addition, Trees for Life consumes electricity at other locations than the Park.

Other energy emissions result from burning fossil fuel oil, 34 tCO2e, and burning wood and pellets, 31 tCO2e, at the Park and at Soillse combined. Only the amount of wood/pellets that is bought to be used in boilers have been measured. There is no data for private use of wood for stoves. As with wind power, burning of wood and pellets does not result in direct emissions, but upstream there is production and transportation that create emissions.

Food

Food consumed by guests at the Park and Cluny has been calculated based on the annual number of guests and assuming three vegetarian meals per day. That gives a slight under-estimation because some fish dishes are also served. The estimated emissions are 64 tCO2e. Were a comparison made where meat is frequently served the emissions would have been doubled.

Food for staff and volunteers has not been included in the calculations but should be in future carbon assessments.

Vehicles: cars/vans/buses and cars owned by staff

The buses that run between the Park and Cluny emit 23 tCO2e, while the private cars/vans that are used to go Trees for Life planting areas emit 25 tCO2e.

Scope 1 and 2 are all that have been measured for NFD. Calculations of electricity and gas consumed by all NFD businesses including HoCo and the Universal Hall are included. We don't yet have data from other emissions sources such as business travel, private/leased cars, paper consumption, etc. except for Trees of Life.

Other emissions

Paper is not a big source of emissions, however it is important to measure as it uses ecosystem resources. The office paper consumption (which is recycled), is 54 kg for Cluny and emits less than 1 tCO2e. There is no data available for the Park and NFD but it is assumed that it is on the same consumption level.
There is no data available for printed material, like books, brochures and leaflets.

Emissions from fertiliser, 9 tCO2e, refers to the use of phosphates in connection with Trees for Life's tree planting activities.

Data quality

The blue coloured boxes represent high quality data, because the data was sourced from meters or bills. They represent only 18% of all emissions. All other data are estimated or built on assumptions. For the future a target would be to increase the data quality.

Emissions divided by greenhouse gas

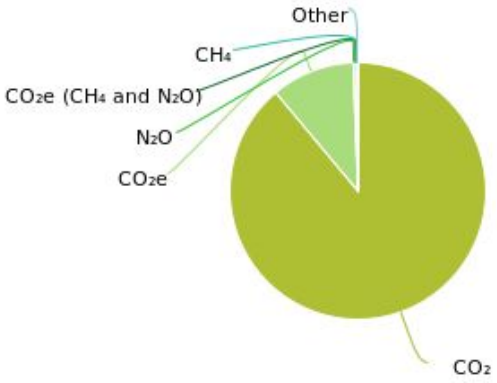


Table 4. Emissions per greenhouse gas

Different greenhouse gases have different Global Warming Potential (GWP).
In the case of Findhorn Ecovillage CO2 and CO2e are the dominant emissions. Methane, CH4, has 25 times more potency than CO2 while Nitrous oxide, N2O, is 298 times more potent, but since the quantities are small they do not have much effect on the total.
We have also had Biogenic CO2 (burning of wood and pellets), but as the GWP is 0 there are no emissions (CO2 from burning of wood will be sequestrated in living biomass).

Key Performance Indicators (KPIs)

There are two ways of measuring carbon emissions: Absolute and intensity emissions. Absolute emissions give the total CO2e emissions. Intensity emissions give emissions in relation to some relevant Key Performance Indicator (KPI).

Intensity measures are helpful to describe the emission context when an organisation grows or reduces its activities and when emissions over the years are compared. Absolute emissions might increase over the years but the intensity measure might stay the same or go down because of an underlying factor, for instance number of staff has not increased to the same extent.

Two KPIs have been used for measuring carbon intensity: emissions/staff and THA individual in the ecovillage, and emissions/guest. It is assumed that individuals in the ecovillage to a large extent are responsible for the emissions that occur, and as the number of individuals increase or decrease this will affect the total emissions. In the same way, the number of guests each year will to a large extent explain the total emissions.

The number of individuals is 427, and emissions average out at 9.5 tCO2e/person. The number of guests was 3,500 and their average was 1.2 tCO2e/person.

If we take away the emissions generated by education/college guests and holiday park guests' travels and look only at our own organisation the emissions are 2,058 tCO2e and the average per person is 5 tCO2e. Out of that THA travel is the largest emission with 883 tCO2e.

Avoided emissions and sequestrated carbon

The total avoided and sequestrated CO2e was 2,509 tonne. For FWP the avoided emissions represent the avoided purchase of grid electricity, which gives more emissions due to the energy mix contains coal.
For Trees of Life, carbon is sequestrated in the growing biomass. A growth model has been used to arrive at the annual amount of sequestrated CO2e.

Avoided emissions 2015	tCO2e
Findhorn Wind Park	446
Trees for Life	2 133
Total	2 509

Table 5. Avoided or sequestrated emissions

When avoided emissions are deducted from total emissions the net emissions are 1,558 tCO2e.

Net emissions	tCO2e
Gross emissions	4 067
Avoided emissions	2 509
Net emissions	1 558

Table 6. Avoided emissions deducted from gross emissions

The use of solar collectors replaces grid electricity and gas and also gives avoided emissions. Unfortunately, we don't have measurements of how many have been installed, so they are an unknown quantity. If the number of m^2 installed solar panels were known, we could make an approximate calculation of avoided emissions.

Moray Car Share (MCS) avoids emitting CO2e through car sharing compared to a base line scenario. Statistics show that car club vehicles are more fuel-efficient than the UK average and on average there are more people in each club car. The difference between the UK average emissions and the emissions from MCS is the avoided emission. Since there is no data on MCS's own emissions we have excluded the avoided emissions, but these should be included next year.

AES sells solar collectors. By comparing solar collectors with alternative ways of generating electricity or heating water such as fossil fuel or electricity we can calculate avoided emissions for the lifetime of the solar collectors. Although AES is a company that started as a Findhorn business, it does not have its premises at Findhorn Ecovillage, and therefore the avoided emissions have not been included.

It is important to emphasise that the calculation of net emissions includes a number of assumptions and uncertainties, and it should not be taken as a fact but rather as an indication or possibility.

Continuous reporting

2015 has been a pilot reporting year. I suggest that carbon reporting becomes institutionalised in the same way as economic reporting, and in the same way that progressive businesses are doing. In the EU and the UK there is now a law stipulating that companies of a certain size must produce an annual sustainability report, which always includes a carbon assessment.

There have been difficulties collecting data for the carbon report since that kind of data collection is not systemised to give a basis for emission calculations. Data from some emissions sources has not been available and in many cases estimations have been done as have been shown, which means the results show a high degree of uncertainty. That is normal for an organisation that starts to measure its emissions, and it usually takes 2-3 years until the data is of good quality.

When doing the *ecological footprint* study certain data are the same as for the carbon assessment. There should be an integration of reporting to avoid duplicate work.

In the future more emissions sources should be included based on:

- **Materiality (the largest emissions)**
- **Availability**
- **Can be reduced**

I suggest that representatives from relevant data sources come together to decide how data systems can be streamlined for a carbon footprint study of 2017. Different data sources should from the beginning of the year be adjusted to be available for carbon calculations. In the interests of the whole, data should be made more easily available and without charge.

Data improvement

The Scope 1 and Scope 2 emissions, i.e. direct and indirect use of fossil energy are well documented and accurate, as data is based on readings and bills. There might be some missing data for NFD owned/associated businesses that buy gas directly and not through NFD.

Regarding Scope 3 there is room for improvements since there are data gaps, and in many cases only estimates have been used. All that creates uncertainty as to the final result.

Examples of possible additional emissions, which the GHG Protocol recommends be measured:

- **Purchase of capital goods, cars, computers, printers and other investments**
- **Building activities and building maintenance**
- **Electricity from distant servers**
- **Waste; recycling, waste for incineration, waste that goes to landfill**

Examples of missing data:

- **Staff travel in connection with work. Data from the Park is missing**

- **Staff use of private cars for commuting, shopping and other reasons**
- **Scope 3 emissions for all Findhorn businesses are missing, except for Trees for Life.**
- **Other Scope 3 emissions missing are staff food, printed material and office paper for the Park.**
- **Emissions from purchased products that are sold through Phoenix shop, Phoenix café, the Bakehouse and la Boheme**

Examples of estimations:

- **THA travel has only been estimated, thus a survey needs to be carried out to get reliable data in order to reduce uncertainty**
- **Travel for guests attending various programmes has been estimated based on rudimentary statistics over country of departure, covering about 60% of guests and based on figures from 2014. Since travel is a major source of emissions, it would be good if a record were kept of where guests come from, as well as their means of travel**
- **Regarding volunteers working for Trees of Life we know where they come from but it would be more accurate if we also knew how they travel here**
- **Car use for titleholders, and households that rent a house/caravan: An assumption is made that 50% of the households have one car and drive 10,000 km annually. In order to have more precise data a survey should be made.**
- **For the Caravan Park an attempt has been made to estimate guest travel and assumptions have been made regarding means of travel and country/city of origin. If possible, they should be asked these details at registration.**
- **Calculating avoided emissions (uptake of carbon in the biomass) for the tree planting is clouded by uncertainty. A lot of assumptions have been made regarding soil quality, annual growth, mix of trees planted, planting distance etc. In order to refine the assumptions more research needs to be done.**

Vision, emission targets and carbon strategies

In Paris, the participating countries agreed to reduce their emissions, so that the global temperature increase would not exceed 2°C above preindustrial level.

Forward looking corporations are now formulating what is called Science Based Targets, which means aligning their own emission reductions goals with the climate models of the 2°C pathway.

Is Findhorn Ecovillage willing to formulate a vision that goes hand in hand with the Paris decarbonisation agreement?

If so, a process needs to be started and discussions opened to involve, encourage and inspire all stakeholders.

Reduction targets and actions
In order to make reduction targets meaningful on an individual and organisational level there must be awareness and knowledge of the carbon effects of different actions, plus a willingness to reduce emissions.

Having an annual carbon emission measuring system provides feedback and is a necessity for knowing if targets are met.

Each organisational unit should set reduction targets, and all individuals should be inspired to keep track of their footprints and to reduce them.

A Carbon Reduction Plan from 2008 listing resources and projects is attached (Appendix 1). I suggest a similar, updated plan be developed and that potential carbon reductions are included. Such a plan should be focused on the largest emissions and emissions that can be reduced without investments (so-called low hanging fruit). When it comes to carbon reducing investments, such as replacing buildings, investing in insulation and heating systems etc. the plan should include financing and a carbon reduction time line.

Communication and awareness-raising
If Findhorn Ecovillage wants to set a vision for its future footprints and direct efforts and resources in order to meet the targets, communication and awareness-raising are needed. It applies both internally, to our own members, and externally, to the guests coming to Findhorn for courses or as tourists.
I suggest a task force be set up that suggests how to achieve this.

Footprint calculator
For individuals and households it is not so easy to see the carbon effect of one's lifestyle and different actions. A way of keeping track and learning more is to use a carbon calculator. A recommended calculator is developed by myclimate, a Swiss charity that also does carbon offsetting. There is a calculation tool on the website for flying, driving and household emissions.

With the calculator is also possible to calculate the carbon footprints of events, like Experience weeks, workshops and conferences. Doing this will increase our understanding of the carbon consequences of Findhorn's activities.

The footprint calculator also gives an opportunity to offset emissions.

Integration
The vision and carbon targets should be integrated into everyday actions and in decision-making both for Findhorn's organisation units and individuals. This includes food purchasing, household items, cars, electronic equipment etc. It includes recycling, repairing and repurposing. One area where integration is vital is building projects, as buildings will have a long life. Carbon inefficient buildings will continue to emit unnecessary carbon for many years.

Regarding the guests one goal could be that, as a result of their Findhorn experience, they change their lifestyle in a way that reduces their carbon emissions more than the trip to Findhorn caused. One way would be to include the issue of global temperature increase and individual climate responsibility in each curriculum to increase environmental consciousness.

Whether we can do likewise with Caravan Park guests is questionable, but this should be explored.

Leadership
One requisite for successful carbon reduction is leadership. Leaders are the guardians of the vision and their role is to hold the system together and balance the different aspects. Leadership will ensure that the different aspects of Findhorn Ecovillage support the vision and do not oppose it. Leadership should hold back or remove what might stop the transition to a zero carbon village.

Reduction potential

For Findhorn Ecovillage as a whole the following steps should be prioritised based on the carbon footprint analysis:

1. **Gas used for heating and cooking is a major carbon emitter, 645 tCO2e. It represents 15 % of all emissions. Replacing gas for renewable energy should reduce emissions considerably. It is therefore very timely to have a project in the Park that aims at introducing pellet boilers and/or heat pumps. Heat pump suppliers claim electricity for heating goes down by 1/3. This also means lower running costs. Using wind power is always better than fossil fuels.**

2. **Installation of solar collectors, both thermal and photovoltaic, also reduces emissions and energy costs.**

3. **Travelling by air and car should be reduced. Of the total emissions 3,099 tCO2 is significantly related to guests. Of this amount 883 tCO2e is due to THA's travels. In order to reduce the THA travel emissions a change of behaviour is required, and that is something to look into. At the moment the emissions figures are uncertain and, as has been stated earlier, a survey of travel patterns needs to be done to increase the data quality.**
   In the same way, guest travel requires behavioural change. Long distance air travel can hardly be reduced, but journeys within the UK could reduce their carbon impact by using buses and trains instead of air and car transport.
   Within the community, buying electric or hybrid cars would reduce emissions compared to petrol or diesel cars, as would less driving. Participating in the car share pool is better than owning an older car since the pool cars are new and have low fuel consumption.

Findhorns' reputation

The "ecological footprint" assessment in 2006 demonstrated that Findhorn Ecovillage had a low ecological footprint in terms of global hectares, lower than any other village/town in the UK.
However, as can be seen from this analysis, which is focussing on carbon emissions, the result is less encouraging.
When we balance the total emissions with avoided/sequestrated emissions we get a very low net emission. However, from a reputational point of view, it is important

that Findhorn Ecovillage engages in a series of attempts to reduce its fossil dependence in order to maintain the profile of "ecovillage". The risk otherwise is that the Findhorn image is seen as "green wash", that the attraction becomes tarnished and interest to come here diminishes as the world around us catches up (which is, of course, itself a great thing!)

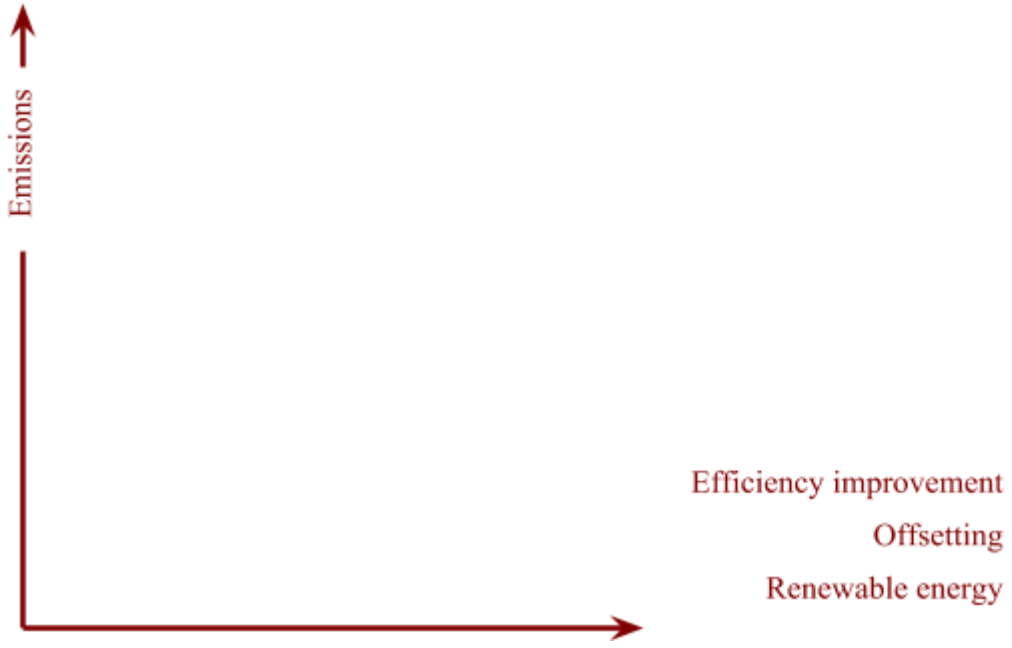
Today, for instance, green or eco housing standards have become the building norm and therefore it is important that new houses at Findhorn fulfil far-reaching ecological standards in order for the community to stay ahead and continue to be an inspiring centre of demonstration.

Carbon offsetting

For most organisations it is impossible to reduce their carbon use to zero. There will always be some emissions left that can't be mitigated or eliminated, and in some cases one has to wait for innovations and technological development of carbon free alternatives. This has been acknowledged in the Paris Agreement and carbon offsetting will be allowed on a national level.

Today, companies are using carbon offsetting as a way of profiling their sustainability work and as an internal cost or carbon tax. The cost of offsetting is allocated to the various parts of a company that cause the emissions. The effect of this is that creativity gets released to avoid costs, and this speeds up the move towards decarbonisation. In addition, CDP has observed that carbon-offsetting companies have lower emissions than the average for their sector, and that they are more profitable than their competitors who don't do carbon offsetting.
A way of looking at carbon offsetting is presented below:

A dynamic carbon strategy



A carbon strategy starts with calculating the carbon emissions. All the emissions are then offset. The work then starts to 1) improve energy efficiency/save energy and 2) move to renewable energy. Over time (x-axis) less and less carbon offsetting is necessary as the carbon reduction activities come into effect. The experience of this strategy is that the offsetting costs result in creative efforts to limit them.

This approach is different to the one that argues that offsetting is a way of avoiding other necessary steps and that, before offsetting, every other step should be taken first. Unfortunately, taking all other steps first will take some time and therefore taking full responsibility for the emissions gets delayed.

Introducing an offset programme

I suggest a carbon-offsetting programme be introduced at Findhorn. It can be carried out in two ways: either the Findhorn Ecovillage takes responsibility for all emissions created, which would cost approx. £ 85 000, or a scheme is set up whereby those who travel or in other ways causing emissions offset the emissions.

The latter would be a voluntary proposal and it would not offset all emissions, but if promoted and presented in a clear and simple way it could take care of a certain amount of emissions. For guests, the best would be if the offsetting could be done at the time of registration and booking, but it should also be possible to buy it during or after their visit.
To make offsetting an individual responsibility seems from a pedagogical point of view to be the most relevant concept: the carbon emission cost of travelling, using a car etc. becomes visible, and how it adds to each individual's annual carbon footprint is understood.

Suppose 25 % of all air travels were offset, then the emissions would go down by 686 tCO2e and the emission/person go down to 8,5 tCO2e.

The most obvious proposal is to make Trees for Life's tree-planting an offsetting project. Before this can be done Trees for Life must decide to become an offset provider, which is a business in itself, and the offset potential of the tree planting must be researched and certified by a verifying organisation. If such a project seems viable and covers its costs the offsetting should be available via the web, and include an internet payment system in order to make offsetting easy to choose.

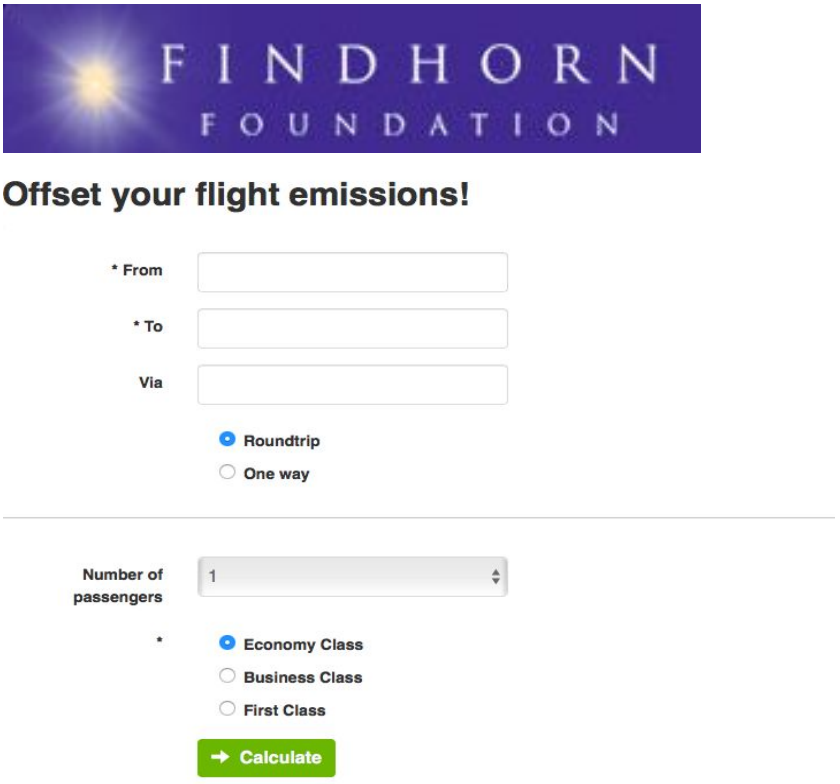
The experience is that ease of availability to offset is vital. Many airlines offer offsetting but on the booking website one has to scroll down several levels to find the service. The result is that few travellers use this option.

Another alternative is to cooperate with an organisation that already has an offsetting service and a portfolio including tree planting and protection of forests in developing countries. An advantage with such offsetting projects is that they also give important co-benefits such as supporting ecosystem services and improving the economic standard of poor communities. Offsetting and payment can be made with cards through an internet payment system. Myclimate would be one such offset

provider. On their website different offsetting projects can be chosen, for instance reforestation in Nicaragua.

The offsetting should to be done in a way that makes it possible to add up. With myclimate it would be possible to set up a system whereby all "Findhorn offsetting" are reported back. This way, we can add up all offsetting and see how much Findhorn's total emissions are reduced. Using other offsetting programmes, like the ones airlines provide, would not give this service.

It would be possible to have a tailor-made offset scheme for Findhorn. Below is an example what it could look like for offsetting air travel. There could also be offsetting for cars, households and events.



GEN, Global Ecovillage Network

Findhorn is a member of GEN that has members in many countries. GEN is interested in assessing the carbon footprints of its ecovillage network, with the hope that they will show lower emissions than other villages and communities, which don't have the same values and intentions.

A possibility that could be explored is to use the same calculation software Our Impacts that Findhorn is using on a larger scale, in order to apply scientific and equal measuring methods. One idea is to apply for grants to set up a "GEN Carbon Assessment System" in order to introduce the calculation tool and measuring methods oriented towards these kind of organisations.

Appendix 1

A carbon action plan was presented several years ago. Several proposed actions have been taken. It is attached as an example of what should be done again.

FC = Findhorn Community, FF = Findhorn Foundation, HD = Hard Disk				
Resources	Type	Author	Date	Locate
FC Renewable Energy Strategy and Action Plan	Report	Galen	2008	File, HD
FC Renewable Energy Strategy	Powerpoint	Galen	2008	HD
Toward a NZ or CN settlement	Report	Galen	2008	File
Assessment of Initial Energy Savings Opportunities for FF	Report	Stewart King	2004	File
FF Wood-Powered Boiler Project Feasibility Study	Report	Barney, Peter, Michael	2007	File
Wood Boiler Project	Update	Galen	2008	File, HD
FF Fuel consumption table	Analysis	Jurgen	2008	File
Bungalow loft insulation at the Park	Survey	Terry	2006	File
Community-Ecovillage Structure	Chart	Galen	2008	File
Checklist - Toward zero Carbon	Checklist	Ken Levenson	2008	HD
Code for Sustainable Homes	Code	Dept for Communities and Local Govt, Lond.	2008	HD
Energy Costs in the Park	Excel	Galen	2006	HD
Cluny Infrared Survey	Proposal	Patrick	2007	File
Island Carbon Strategy	Powerpoint	Galen	2007	HD
Island Number Tables	Excel ssheet	Galen	2008	HD
Ecological Footprint of the FF and FC	Report	SDRC, Forres	2007	HD
Ecological Footprint of the FF and FC	Press Release	Jonathon Dawson	2007	HD
Conversions Table	Excel	Galen	2008	File, HD
International Carbon Emmissions	Report	Int'nal Energy Agency	2007	HD
FF Water Boreholes: Technical Report	Report	Barney, Michael	2007	HD
Embodied Energy in Construction	Table		2007	File, HD
Climate Change and Energy Awareness	Powerpoint	Jonathon Dover	2005	HD
HWE Pellet Stove Range and Price List	Brochure	Highland Wood Energy	2008	File, HD
Getting to Zero	Report	Forum for the Future	2008	HD
Greenflame leaflet	Brochure	Greenflame	2008	HD
Projects	Cost estimate	Timeframe	Priority	
Yurt Insulation	£ 1 000	now	1	
YP Bldg Boiler Replacement	£ 1 000	now	1	

Hall/Park Bldg Biomass Boiler	£ 80 000	asap	1	
Park Solar Panels Refurbishment	£ 2 000	asap	2	
Cluny Loft insulation	£ 5 000	late 2008	2	
CC Loft insulation	£ 2 000	late 2008	2	
Muriels retrofit pilot	£ 5 000	late 2008	2	
Caravan replacements (mobiles)	£ 30.000 ea	2009	2	
Hall HVAC investigation	£ 15 000	2009	2	
Cluny windows	£ 25 000	2009	3	
Cluny Infrared Imaging	£ 1 500	2009	3	
Separate meters for Park Bldgs without	£ 3 000	2009	3	
Hexiad Cluster Biomass Boiler	£ 6 000	2009	3	
Hall HVAC refurbishment	£ 80 000	2010	3	
Total cost	£ 256 500			