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Carbon Audit & Management Report
Blue Ventures UK & Madagascar
2008

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1. Introduction and General Overview:

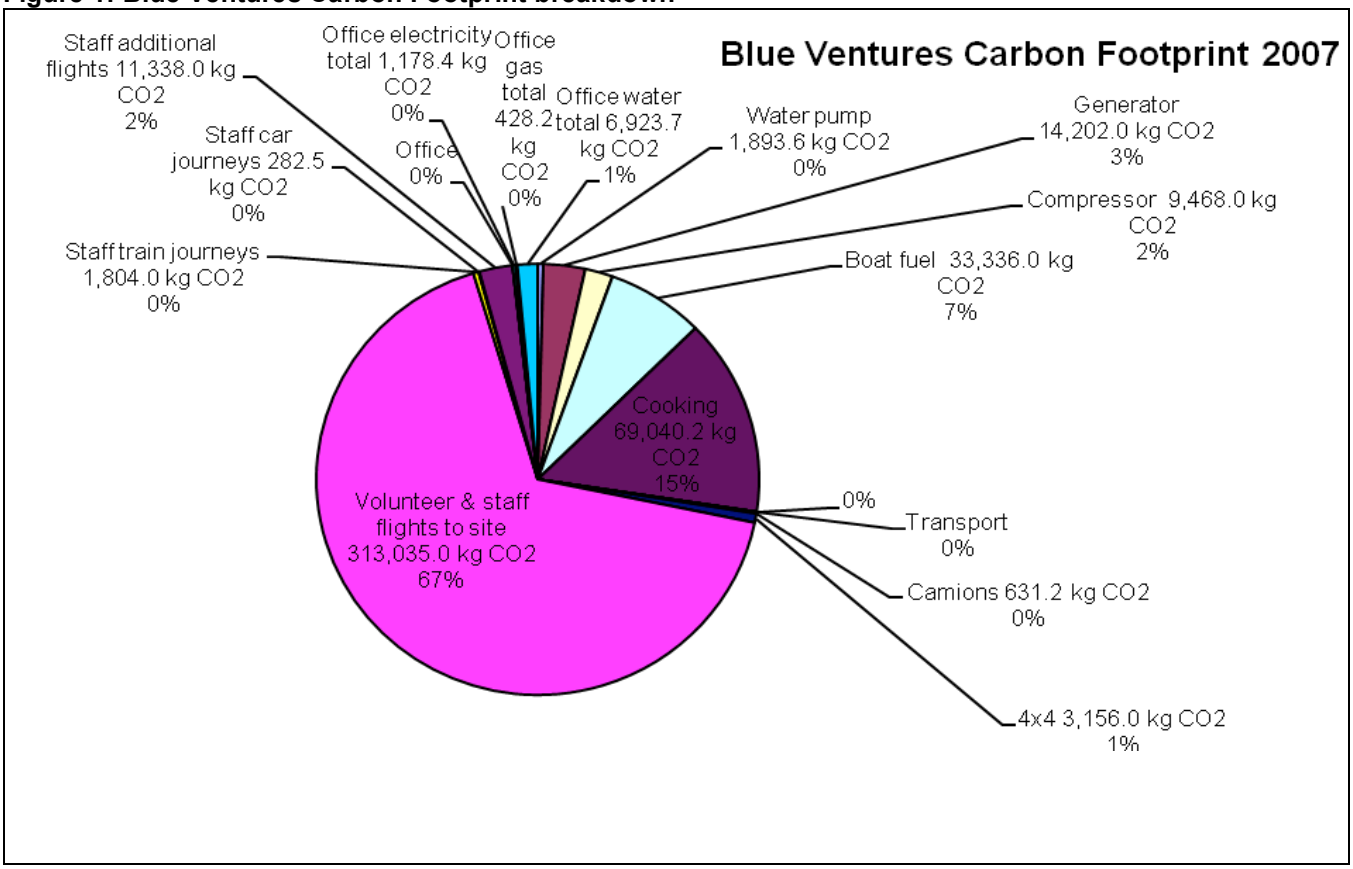
This report summarises an assessment of Blue Ventures' carbon footprint during the period January 2007 – January 2008. The review was conducted in February 2008 to calculate the amount of carbon dioxide emissions produced by Blue Ventures' activities in the UK and Madagascar, and makes suggestions and recommendations to reduce that amount by at least 20%.

Blue Ventures' carbon footprint was estimated to be 467 tonnes of carbon dioxide over the 12-month period concerned. This equates to approximately 47 times the UK national household average.

Table 1: Overview of Blue Ventures' carbon footprint for the period January 2007 – January 2008

Site Operations	2007	Unit	%
Water pump	1,893.6	kg CO2	0.41
Generator	14,202.0	kg CO2	3.04
Compressor	9,468.0	kg CO2	2.03
Boat fuel	33,336.0	kg CO2	7.14
Cooking	69,040.2	kg CO2	14.79
Transport			
Camions	631.2	kg CO2	0.14
4x4	3,156.0	kg CO2	0.68
Volunteer & staff flights to site	313,035.0	kg CO2	67.07
Staff train journeys	1,804.0	kg CO2	0.39
Staff car journeys	282.5	kg CO2	0.06
Staff additional flights	11,338.0	kg CO2	2.43
Office			
Office electricity total	1,178.4	kg CO2	0.25
Office gas total	428.2	kg CO2	0.09
Office water total	6,923.7	kg CO2	1.48
Total	**466,716.6**	**kg CO2**	100.00

Figure 1: Blue Ventures Carbon Footprint breakdown



Carbon Footprint breakdown

In this analysis Blue Ventures' carbon dioxide emissions have been split between those made on site in Andavadoaka, Madagascar, those made by the London office and those made as a result of transport between site and other locations.

The two primary sources of carbon dioxide emmisions make up 82% of Blue Ventures' total carbon footprint (approximately 67% and 15% respectively). The largest component of the carbon footprint is from volunteer and staff flights to Madagascar; making up 313 tonnes of the carbon footprint. The second largest contribution to the overall carbon footprint was from cooking activities for staff, volunteers and other personnel on site in Madagascar, which produced an estimated 69 tonnes of carbon dioxide in 2007. Cooking on site is carried out by kitchen staff, using approximately 3000kg of wood, 225kg of charcoal, and 63 litres of LPG per month (

Table 1).

During 2007, 100 volunteers and 23 staff and independent researchers travelled to Madagascar to participate in Blue Ventures' research and conservation efforts based in the village of Andavadoaka. Although predominantly from the UK, visitors travelled from a range of global destinations, including mainland Europe, Asia, USA, Canada and Australia. The total carbon dioxide emissions that resulted from these flights are estimated to have been 313 approximately tonnes. This value is adjusted to include the effect of radiative forcing (the enhanced global warming potential of carbon dioxide released in the upper atmosphere).

The top ten emitting activities are summarised as follows:

1. Volunteer & staff flights to site: 67.07%
2. Cooking: 14.79%
3. Boat Fuel: 7.14%
4. Generator: 3.04%
5. Staff additional flights: 2.43%
6. Compressor: 2.03%
7. Office water total: 1.48
8. 4 x4: 0.68%
9. Water Pump: 0.41%
10. Staff train journeys: 0.39%

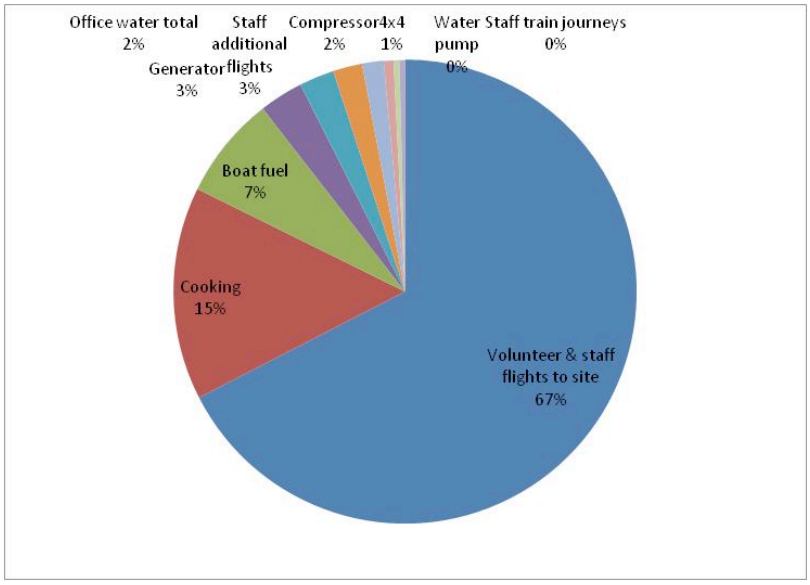


Table 2. Breakdown of the Carbon Footprint:

Site Operations	Unit	2007
Water pump diesel amount per month	litres	60
Generator fuel type	n/a	Diesel
Generator fuel amount per month	litres	450
Compressor fuel	n/a	Petrol
Compressor fuel amount per expedition	litres	300
Boat fuel type	n/a	Petrol
Boat fuel amount per expedition	litres	1200
Wood per month	bundles	300
Wood per month	kg	3000
Charcoal per month	sacks	15
Charcoal per month	kg	225
LPG per month	bottles	3
LPG per month	litres	63
Number of volunteers per expedition	number	15
Fuel used to cook meals	text	Gas, charcoal & wood

Table 3: Breakdown of the transport component of Blue Ventures' carbon footprint

Transport		
Numbers of camions hired	number	16
Numbers of 4x4s hired	number	12
Litres used per journey by 4x4	Number	100
Number of Staff flights to Madagascar including London Staff	number	123
Train journey distance travelled on BV's behalf	km	2250
Car journey distance travelled on BV's behalf	km	2008
Train journey distance travelled on BV's behalf - interns	km	14150
Car journey distance travelled on BV's behalf - interns	km	560
Other flights made by BV Staff:		
UK - South Africa - Joburg	$kgCO_2$	2540
South Africa - Joburg - Durban	$kgCO_2$	2648
2 x Madagascar - Mauritius	$kgCO_2$	239
2 x Mauritius - London	$kgCO_2$	2545
2 x London - Berlin	$kgCO_2$	210
2 x Berlin - Paris	$kgCO_2$	188
2 x Paris - Madagascar	$kgCO_2$	2448
Madagascar - Durban	$kgCO_2$	520

Table 4: Breakdown of Blue Ventures' London office carbon footprint

Office		
Electricity		
Wattage of desktop computer 1	W	170
Length of time left on per month	hrs	194.85
Wattage of desktop computer 2	W	170
Length of time left on per month	hrs	151.55
Wattage of desktop computer 3	W	100
Length of time left on per month	hrs	151.55
Wattage of Laptop 1	W	75
Length of time left on per month	hrs	194.85
Wattage of Laptop 2	W	75
Length of time left on per month	hrs	194.85
Wattage of Laptop 3	W	75
Length of time left on per month	hrs	129.9
Wattage of fax machine	W	70
Length of time left on per month	hrs	720
Wattage of printer	W	750
Length of time left on per month	hrs	86.6
Gas		
Radiator size	kW	2
Length of time left on per month	hrs	86.6
Number of meals cooked a week	number	5
Water use		
Average number of toilet visits per month	number	324.75
Flush size	litres	4
Litres drunk per month	litres	108.25

2. Actions currently being taken to reduce Carbon Dioxide emissions

Blue Ventures is currently growing rapidly, developing new partnerships and projects for marine and coastal research and conservation within Madagascar. This growth has resulted in a steady increase in the number of personnel working on projects, and a concomitant increase in the number of flights, local journeys, meals and other sources of carbon dioxide emissions over the past four years. However, against this background of organisational growth, Blue Ventures has taken a number of steps to minimise avoidable emissions, and to adapt operating procedures to take account of carbon dioxide emissions wherever possible.

Staff and volunteer flights

Blue Ventures has been concerned about volunteer and staff carbon dioxide emissions for a number of years. This has lead to the creation of the Blue Ventures Carbon Offset (BVCO) programme, to provide Blue Ventures with a means of offsetting carbon dioxide emissions in a number of energy efficient and renewable energy programmes in Madagascar. It is now compulsory for all Blue Ventures volunteers and staff to offset with the BVCO scheme, and the revenue raised is currently directed to support specific projects in the Andavadoaka region. This direct local investment provides gives volunteers and staff an opportunity to see exactly where their offset contribution has gone. In doing so project personnel are able to observe the impact that the BVCO programme is having on the community within which personnel are based whilst working with Blue Ventures.

Cooking

The current carbon offset programme being developed by BVCO works to promote and distribute fuel-efficient stoves and solar stoves. The programme is currently based in the village of Andavadoaka itself, however the project is now working to distribute stoves further a field within additional communities in the Velondriake area.

Fuel use- boat, generator and water

Fuel use on site is closely monitored by Blue Ventures staff due to the considerable financial burden that fuel-use currently places on Blue Ventures' operating budgets; this monitoring and rationing helps to increase the efficiency of its use.

Increased site-based project management

Blue Ventures has employed a site-based project manager (in 2007) to supervise research and conservation efforts within Andavadoaka and surrounding villages has reduced the traveling need for UK research staff to share this role, and reduced the amount of travel required by UK-based research staff. In 2008 Blue Ventures plans to start an office based in Madagascar where a Director will be based, again, reducing external flights.

3. Specific recommendations

a. **Cooking –** 15% of the footprint

Action to take	Reason	Cost
Trial and run solar stoves and fuel efficient stove	Solar stoves can reduce fuel use by 50% Fuel-efficient stoves can reduce fuel use by 60 – 70%	BVCO funded
Promote the use of renewable wood above LPG and charcoal,	Sustainable wood use has a zero carbon footprint compared to 0.1590 $kgCO_2$/ kWh for non-renewable wood, 0.225$kgCO_2$/ kWh for LPG and 0.395 $kgCO_2$/ kWh for charcoal	None
Promote the use of wood above charcoal	As above	None

b. **Volunteer & staff flights** – 67% of the footprint

Action to take	Reason	Cost
Continue the BVCO offset funding	The BVCO project can help to compensate the carbon footprint of these travels, in addition to providing tangible economic, environmental and health benefits to partner communities	None
Move Blue Ventures headquarters closer to Madagascar	Shorter distances to travel to project sites by UK staff will result in a smaller overall carbon footprint	Consider-able

c. **Boat fuel –** 7% of the footprint

Action to take	Reason	Cost
Regularly service of boat engines	An un-serviced outboard engine may be running inefficiently for long periods of time resulting in fuel wastage. As much as 20% of fuel use can be wasted in this way	Moderate
Promote efficient driving with all boat drivers	Inefficient boat driving will result in avoidable fuel wastage. This includes practices such as revving engines and leaving engines running when not in use	none
Plan all boat journeys	Travelling to uncertain destinations will result in avoidable wastage of fuel. All journeys should aim to have a fixed GPS destination to head to.	none
Monitor and analyse boat fuel use, driver and boat	Collecting accurate fuel-use records enables comparison of boat driver's efficiencies.	none

d. **Generator** – 3% of the footprint

Action to take	Reason	Cost
Use of alternative renewable energy systems	Making use of the readily available solar and wind energy on site could help to reduce generator use. Solar and wind energy can both be used to charge batteries that can be used to run lights, computers etc.	High
Increase battery use - integrated with renewable energy systems	See above	Moderate
Monitor generator use	Keeping accurate records of generator and fuel use and fuel can indicate when problems are present and identify times for servicing.	Free

e. **Staff additional flights** – 3% of the footprint

Action to take	Reason	Cost
	Flights produce approximately 5 times more carbon dioxide than travelling by train over the same distance.	Varies
	Identifying whether the need for the journey is essential. Can a conference call / teleconference achieve the goal of the journey?	Varies

f. **Compressor** – 2% of the footprint

Action to take	Reason	Cost
Monitor compressor use	Keeping records of compressor use and fuel used can indicate when engine problems may be reducing compressor efficiency, and identify times for servicing	Free

g. **UK office water** – 2% of the footprint

Action to take	Reason	Cost
Use a SMART water meter	Detecting leakages and need for repair work	£50
Use water hippos to save 3 litres of water at every flush	Saves 3 litres per flush of the water requirement	£6.99 for three

h. **Andavadoaka water pump** – 0.4% of the footprint

Action to take	Reason	Cost
Use alternative renewable energy systems	Making use of the readily available solar and wind energy on site could help to reduce generator use for pumping water	High
Use of hand / foot pumps	Hand and foot pumps can be used to pump water to distances of up to 20m in height	Moderate

i. **UK office electricity** – 0.25% of the footprint

Action to take	Reason	Cost
Switching to a green energy supplier	Energy will be supplied mostly from renewable sources	Free
Turn off lights in areas where natural light is adequate	Avoiding unnecessary use of energy	Free
Replacing traditional bulbs with energy-efficient fittings and bulbs.	70-80 % improvement in energy efficiency compared to halogen lamps	Small
Replacement of all office electrical equipment with energy-efficient models	Copiers and fax machines consume considerable amounts of energy as they are commonly left on for long periods of time. Replacement may lead to an improvement in energy efficiency as much as 25%	Moderate
Separate the heating systems for the office	If there are rooms that need more heating than others, separation of the heating system can save energy.	High
Installation of *Smartmeters*	Usage of *Smartmeters* will inform the consumer of unnecessary use of electricity as well as promoting better monitoring and awareness which would encourage energy efficiency. These can even be	£50

	applied to a single room.	
Avoiding leaving equipment on stand-by	Leaving equipment on stand-by uses up to 95% of the energy that it would use if it was turned on.	Free
Switch appliances with power packs or adapters off at the plug	Switching off at the plug avoids energy wastage through adapters and power packs	Free
Renew & replace thermostats if needed	Efficient thermostats avoid unwanted accidental heating of space	Moderate
Ensure all windows have draft proof seals	Heat loss through windows can be prevented by removing gaps	Moderate
Use in the office	Curtains can reduce heat loss through the windows by considerably	Moderate
Replace windows with double-glazed ones	15% of heat loss through the windows can be prevented by adding a second layer of glazing to the windows	High
Install radiator insulators	These are cheap to install and can reduce 10-15% of space heating bills	Slight
Fix draft excluders on doors and ensure that doors are shut after use	Gaps under doors allow drafts to run through the house	£20

j. **Staff train journeys –** 0.39% of the footprint

Action to take	Reason	Cost
Ensure flights are essential – travel by train if possible	Flights produce approximately 5 times more carbon dioxide than travelling by train over the same distance	Varies
If the above is not appropriate look for alternative ways of achieving the same goal	Identifying whether the need for the journey is essential. Can a conference call / teleconference achieve the goal of the journey?	