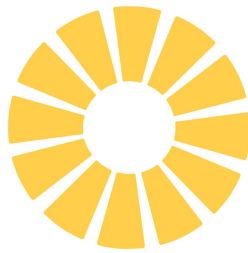


Centre for
Alternative
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Environmental Statement 2008

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1.Introduction

The Centre for Alternative Technology (CAT) is a research, education and demonstration centre aiming to inspire, inform and enable. It aims to provide the knowledge and skills required to minimise our impact on the environment and to live and work sustainably.

The Centre offers education ranging from school groups to day or week-long courses, plus Masters & PHd level education. The site also has self- contained 'eco-cabins' where groups can stay and experience living with a small renewably powered electricity system supplied by hydro, wind and PV systems.

The centre is open to visitors where there is a range of displays as well as organic gardens, vegetarian restaurant and children's play area.

CAT is currently developing the Wales Institute for Sustainable Education (WISE) centre, which will provide comprehensive study and conference facilities for a wide range of audiences. The centre has been constructed from wherever possible 'environmental' materials. The project is being extensively monitored and ongoing research into building materials such as hemp and lime is being undertaken.

2.Environmental policy

2.1 Environmental Aims:

To reduce our environmental impact and greenhouse gas emissions year on year by monitoring, reducing, optimising and ensuring efficiency of all of our activities and specifically:

- Monitor and reduce consumption of energy (heating, electricity), water and other natural and raw materials, ensuring that all uses are as efficient as possible
- To generate electricity from renewable sources where possible, and

optimise their usage

- To monitor and reduce the amount of fossil fuels consumed including fossil fuels for transportation
- To reduce the impacts of our purchasing through the adoption of a sustainable procurement policy
- To reduce the impacts of food, both from the sourcing of food, from the food we buy and sell, to the energy used from preparing our food
- To maintain and increase biodiversity by surveying & appropriately managing our land. To garden organically. To manage our land simultaneously both for biodiversity and also for the development of the human community (e.g woodland products, food production, aesthetics, water management). To protect and enhance ecosystems that enables the capture and storage of atmospheric carbon dioxide.
- Waste: To reduce waste, repair, re-use and recycle waste generated with a firm commitment to the prevention of pollution.

3. Staff & volunteers

Total employed staff hours	154,016
Long term volunteer hours	8,216
Short term volunteer hours	720
TOTAL hours	162,952

4. Energy and Carbon Dioxide equivalent (CO₂e) emissions

Emissions are reported as Scope 1 Direct, Scope 2 indirect and Scope 3 Other Indirect as per Defra's guidance document¹

Scope 1 (Direct emissions) – Activities owned or controlled by the organisation that release emissions straight into the atmosphere. These include road diesel (truck), direct fuel emissions (generators, LPG, mains Gas)

Scope 2 (Energy Indirect emissions) include Grid electricity imports,

Scope 3 (Other indirect emissions) include business travel, staff travel to work

Biomass – All wood fuels, pellets, woodchips, logs

CAT sources its grid electricity from a green tariff provider who keeps Levy Exemption Certificates (LECs) in respect of it (2). CAT claims a 50% reduction in CO₂e emissions as outlined in Defra's Draft guidance Document 2009³

The Defra long-term grid average emissions factor is used to calculate grid electricity emissions.

CAT recognizes that aviation potentially has greenhouse gas effects beyond the directly measured CO₂ emissions. CAT applies a multiplier to make allowance for this radiative forcing, and since the science is not clear, Defra's suggested figure of 1.9 is applied.

It is acknowledged that there are potentially other sources of CO₂e emissions on site and aims to improve and increase the reporting of these year on year.

4.1 Summary by category - all sites

Includes Main site, Quarry Shop, Cabins, Quarry Café, WISE

Site	Energy use (MWh)	CO ₂ e emissions (tonnes)
Scope 1 – Direct emissions		94.92
Scope 2 – Indirect emissions		81.40
Scope 3 – Other Indirect		75.3
Biomass		14.86
Gross Emissions		266.62
Total green tariff electricity import	143.58	39.07
Net Emissions		227.55

4.2 Totals summaries – all sites

Includes Main site, Quarry Shop, Cabins, Quarry Café, WISE

Overall Summary of Emissions

Type	Energy use (MWh)	CO ₂ e emissions (tonnes)
Main site	820.12	91.93
Eco-cabins	84.01	5.10
Quarry Café	49.81	16.86
Quarry Shop	11.51	6.26
Eco-park	Not available	Not available
Off-site accommodation	Not available	Not available
Transport (truck)	12.46	3.14
Business travel	0	20.54
Staff personal travel to work		54.9
Wise (Electricity & Gen)	235.98	67.89
Total excluding WISE 'exceptional items'	970.70	198.58
Total	1214.36	266.62

4.2.1 Breakdown – all sites

Includes Main site, Quarry Shop, Cabins, Quarry Café, WISE

Source	Energy use (MWh)	CO ₂ e emissions (tonnes)
Total electricity imports	157.01	66.08
Electricity WISE	28.14	15.32
Diesel for Wise generator	207.83	52.58
Electricity exported	0.052	Inc below**
Diesel for generators inc cabins (elec)	40.07	10.13
Renewable elec generated*	26.22	1.77**
Wood fuels**	617.30	14.86
LPG	91.64	21.88
Mains gas (QC)	28.44	5.23
Direct emissions refrigeration	0	0.68
Road diesel-transport (truck)	7.94	2.01
Bio-diesel - transport (truck)	4.52	1.13
Petrol	5.31	1.29
Business travel - Flying	-	8.64
Business travel - Other modes	-	11.90
Staff travel to work	-	54.9
Subtotal electricity usage (excluding WISE)	222.24	76.22
Sub total electricity (including WISE)	459.21	144.11
Grand Total	1214.36	266.62

*Of the 26 MWh, 701 kWh was generated from CHP. Figure also includes 10.99 MWh of dumped heat (water and air)

**This includes woodchip used for CHP to generate electricity without using any heat generated by CHP.

4.2.2 Main site

Source	Energy use (kWh)	CO ₂ e emissions (tonnes)
Electricity Grid imports	88,556	48.19
Electricity V17 imports	35,677	0
Renewable electricity generated*	26,213	0
Electricity WISE	28,144	15.31
Electricity exported	52	Inc below**
Diesel for generator	30,016	7.78
Diesel for Wise generator	207,839	52.58
Wood fuels: Pellets	29,472	1.47
Wood fuels: Woodchip CHP**	69,910	1.77
Wood chip: Boiler	451,917	11.44
LPG Cooking	43,095	9.98
LPG Heating	40,009	9.32
Petrol	5,307	1.29

Operation of cold store	0	0.57
Installation of cold store	0	0.11
Heat pump	0	0.02
Transport (truck)	12.46	3.14
Subtotal electricity usage (excluding WISE)	180,410	55.97
Sub total electricity (including WISE)	418,393	123.87
Total	1,056,351	159.82

* includes dump heat

** CO₂ emissions based on biomass energy Centre figures, CO₂, not CO₂e

4.2.3 Eco-Cabins

Source	Energy use (kWh)	CO ₂ e emissions (tonnes)
Diesel for generator	10,056	2.35
Logs*	66,000	0.17
LPG cooking	8,537	2.57
Total	84,593	5.09

Biomass emissions are based on information from the Biomass Energy Centre website⁴ which does not mention logs explicitly. We therefore have calculated emissions arising from their transport to CAT. This is an area where perhaps further research is required.

4.2.4 Quarry Café

Source	Energy use (kWh)	CO ₂ e emissions (tonnes)
Grid electricity	6,000	3.261
Green Tariff Electricity	15,274	8.37
Mains gas	28,435	5.23
Total	49,709	16.86

4.2.5 Quarry Shop

Source	Energy use (kWh)	CO ₂ e emissions (tonnes)
Grid electricity	11,507	6.26
Total	11,507	6.26

4.2.6 Eco-park

Source	Energy use (kWh)	CO ₂ e emissions (tonnes)
<i>No data available</i>	<i>No data available</i>	<i>No data available</i>

The Graduate School occupies shared office space in a building at the Machynlleth Eco-park. This is not currently separately metered.

4.2.7 Off-site accommodation

Source	Energy use (kWh)	CO ₂ e emissions (tonnes)
<i>No data available</i>	<i>No data available</i>	<i>No data available</i>

4.2.8 Transport and business travel

Source	Energy use (kWh)	CO ₂ e emissions (tonnes)
Red (road) Diesel for truck	7.94	2.01
Biodiesel for truck	4.52	1.13
Business travel - Flying	-	8.64
Business travel - Other modes	-	11.90
Staff travel to work	-	54.98
Total	12,462.56	78.66

The travel and other effects of visitors and students to the centre is not yet evaluated.

4.2.9 Exceptional items

These are emissions outside CAT's normal operational activities. They are measured and reported here, but do not form part of the total against which CAT's reduction targets are calculated.

In 2008 energy was consumed in the construction of the Wales Institute for Sustainable Education (WISE).

Source	Energy use (kWh)	CO ₂ e emissions (tonnes)
Grid electricity - WISE	28,144	15.32
Diesel generators - WISE construction site	207,839	52.58
Total	235,983	67.90

5. Waste summaries

5.1 Landfill

	Tonnes
Main site landfill	36.94
Quarry Café landfill	4.19
Total	41.13

5.2 Skips

	Tonnes
Skips x 6	8.86

5.3 Hazardous wastes

	Quantity
Hydraulic oil	100 gallons

5.4 Recycling

	Tonnes
Main Site Glass	5.64
Main site paper	3.22
Main site cans	8.56
Total	17.42

5.5 Composting

CAT composts all its food and garden waste on site.

6. Water usage

Water used on site comes from CAT's own reservoir.

2008 - 12/1/09	Quantity cubic meters
<i>Unfiltered water</i>	8,848.535
<i>Filtered water</i>	1,138.635
Total water	9,987.17

7. Objectives & targets 2008

Minimising waste

A waste and recycling group was started on site, which looked at various issues to do with waste on site. The group visited local recycling centres with a view to gaining a better understanding of recycling. Waste surveys were carried out on site, and in office areas, signage and bin provisions were improved and a waste and recycling policy was introduced.

Maximising efficient use of natural resources

All energy & liquid fuel sources were recorded on a monthly basis and a detailed energy audit was carried out on the main site. Staff business and travel to work was recorded, a staff-travel survey conducted and a travel policy introduced. Regarding paper and printing, a paper and printing policy was introduced and much of the packaging used by the mail order serviced is recycled, with boxes being re-used on site and postage bags being sourced from the local community.

Pollution prevention

Additional training and various pollution prevention measures have been introduced.

8. Objectives & Targets 2009

1. Reduce total CO₂e emissions & energy usage by 5% by the end of 2009 compared to comparative data from 2008 (excluding WISE)
2. Reduce environmental impact of food purchasing
3. Fossil fuels – petrol – find alternatives to high petrol consumptive items
4. Fossil fuels – diesel – Monitor & reduce diesel usage
5. Paper – reduce paper usage
6. Landfill Waste – introduce sustainable procurement policy
7. Transportation – reduce impact of transport to the centre from staff, visitors, students
8. Reduce impact of staff business travel by introduction of travel policy & ensuring all staff trained
9. Reduce impact of purchasing by implementation of sustainable procurement policy

9. References

1. Defra 2009 Guidelines to Defra/DECC's GHG Conversion Factors for Company Reporting
2. LECs – 'Levy Exemption Certificates (LECs) are evidence of CCL exempt electricity supply generated from qualifying renewable sources. LECs will be redeemed by suppliers to HM Customs and Excise to demonstrate the amount of non-climate change electricity able to be levied that had been supplied to non-domestic customers in the given period' Carbon Trust 2009 website
3. Defra 2009 – Draft Guidance on how to measure and report your greenhouse gas emissions
4. Biomass Energy Centre – Carbon Emissions for different fuels - www.biomassenergycentre.org.uk