

# **CARBON REDUCTION MANAGEMENT PLAN**

**2010 - 2015**

## **Introduction**

1. The Climate Change Act 2008 aims to improve carbon management and help the transition towards a low-carbon economy in the UK. It sets the world's first legally binding reduction targets for greenhouse gas emissions of at least 80 per cent by 2050 and at least 34 per cent by 2020, against a 1990 baseline.
2. Taken as a whole, the HE sector has an annual energy consumption costing around £200m. Electricity and gas prices have seen significant volatility partly in response to increased climate change legislation. The HE sector occupies about 9% of the UK's total office space and has an estimated potential for cost effective energy savings of more than 20%, which could reduce the sectors estimated annual carbon footprint by about 3.3mtCO<sub>2</sub>.
3. HEFCE has signalled to HEIs a more demanding approach to carbon reduction. The grant letters from the Secretary of State for Innovation, Universities and Skills to HEFCE of 18 January 2008 and 21 January 2009 contained specific demands that incorporated the requirements of the Climate Change Act 2008.
4. Following the period of consultation on HEFCE's 2008 sustainable development strategy and action plan, HEFCE has asked HEIs to construct implementation plans to achieve carbon emission reductions, including timescales and resources. These carbon management plans, including targets, are required to be signed off by the HEI governing body.
5. The management plans must include clear responsibilities for carbon management, a commitment to monitor progress towards targets and a commitment to report reductions against targets annually.

6. All HEI carbon reduction plans are required to include a carbon baseline for 2005 which covers all scope 1 and 2 emissions from the HEI's non-residential estate. They should also include carbon reduction targets which :
  - cover scope 1 and 2 emissions, but may set additional targets for scope 3 emissions
  - be specific, measurable, achievable, realistic and time-bound
  - be set to 2020, as this is the timescale for interim government targets. HEIs may also set interim targets.
  - be publicly available.

### **The Institute of Education's carbon strategy and vision**

7. The Institute of Education is committed to sustainable development and has set out its strategic objectives in its Sustainability and Environmental Strategy. Energy management, waste management, procurement of goods, travel impacts and resource use all form part of this strategy and the Institute has embarked on delivering improvements in these areas. The Institute has already integrated sustainability into many of its operations and carbon management across the estate is a part of this process.
8. HEFCE recommends that the baseline for HEI carbon reduction plans should be 2005. The Institute had a Carbon Trust survey carried out in 2007, using 2006 data and has used this data for calculations and comparisons. However, HEFCE has subsequently set new 2005 baselines for all HEIs, using EMS data.
9. The Institute's Sustainability and Environmental Strategy commits the Institute to
  - influencing and changing behaviours through supporting new initiatives and the use of economic and other types of incentives and disincentives;
  - reducing resource use, pollution and atmospheric emissions through a variety of incentives and innovative approaches to improve purchasing, reuse and recycling, and decreasing the amount of materials sent directly to landfill;

- reducing atmospheric pollution and resource use by increasing the amount of renewable energy and alternative fuel types used, improving the purchasing processes, improving energy management and efficiency, and increasing awareness and responsibility;
- reducing atmospheric pollution and resource use, and improving the local environment, through encouraging more sustainable travel alternatives
- preventing pollution through the continual assessment, planning, implementation, operation, review and revision of internal procedures for all departments.

10. The Institute's low carbon vision is:

*To pro-actively manage carbon in an efficient and environmentally responsible manner; thereby reducing our environmental impact and our exposure to the cost of carbon.*

11. The Institute's Carbon Management Plan sets out an organisation-wide strategy for managing carbon emissions until 2015, including key carbon reduction targets and specific actions through which these targets can be met.

12. The Institute's key carbon reduction target:

*The Institute will reduce its annual CO<sub>2</sub> emissions by 45% by the end of 2020 academic year, compared to its 2005 Scope 1 and Scope 2 emissions baseline of 2,673 tonnes of CO<sub>2</sub>. In addition, the Institute will reduce its Scope 3 emissions, giving a cumulative aspirational target of for Scope 1,2, and 3 emissions reduction of 6,652 CO<sub>2</sub> tonnes by 2015.*

## Governance, ownership and management

13. The Institute has given strategic ownership of the carbon reduction programme to a Carbon Reduction Committee, which is a sub-committee of the Estates Committee. This sub-committee oversees the implementation of the programme and report on progress to the Estates Committee on an annual basis. The sub-committee, under the chair of the Head of Estates and Facilities comprises members of academic and support staff, the SU and members of the Institute's Sustainability Network.
14. The plan will also be owned at a senior management level by the Deputy Secretary (Estates Management), ensuring that the objectives of the plan are fully integrated with the Institute's planning. This will ensure that the plan can remain in focus and on track. She/he will have responsibility for the strategic direction and for the implementation and funding of projects. The Deputy Secretary (Estates Management) will be assisted in this by the Head of Estates and Facilities, the Estates Adviser and the Energy Manager.

## Carbon Reduction Baseline Identification

15. The development of new carbon reduction projects is linked to the Institute's strategic planning process, aligned to the Estates Strategy (2010 – 2015). The Institute's carbon emissions baseline includes emission sources from gas, electricity and water (utilities) used throughout the estate, the Institute's van, staff car travel, staff and student daily travel to the Institute, international staff and student travel and waste collected and sent to landfill.

Data	Owner	Sources	CO <sub>2</sub> conversion factors
Utilities use (gas, electricity, & water)	Estate Management Division	Invoices, meter readings	Electricity 0.537 kg CO <sub>2</sub> /kWh Gas 0.185 kg CO <sub>2</sub> /kWh Water 0.400 CO <sub>2</sub> /m <sup>3</sup>
Institute transport	Estate Management Division	Fuel purchase and mileage records	Diesel 2.63 kgCO <sub>2</sub> /litre Petrol 2.30 kgCO <sub>2</sub> /litre

Staff car travel	Finance Department	staff expenses	Diesel 2.63 kgCO <sub>2</sub> /litre Petrol 2.30 kgCO <sub>2</sub> /litre
Staff & student international travel	Faculties	Purchasing requisitions Student home locations	Passenger mile for long flights .18 kg CO <sub>2</sub>
Staff & student daily travel (public transport)	Estates Management Division	Registry records, Halls of Residence figures, car parking spaces	Passenger travel, by public transport .9kg per 10 miles
Waste management	Estate Management Division	Invoices, tonnage estimates for waste sent to landfill and recycling	Waste sent to landfill 447kgCO <sub>2</sub> e/tonne

### Breakdown of baseline CO2 emissions for 2005 (tCO<sub>2</sub>e)

#### Scope 1 & 2 emissions (confirmed SQWenergy report to HEFCE Jan 2010)

Utility	Energy Consumption		Cost		Specific Energy Consumption	CO <sub>2</sub> Emissions
	kWh/year	%	£/year	%	kWh/m <sup>2</sup>	
<i>Electricity (inc CHP &amp; grid)</i>	4,765,729	47.4%	£262,764	49.3%	112	2,567 tonnes
<i>Gas</i>	428,558	5.3%	£28,622	3.2%	13	87 tonnes
<i>Transport</i>						19 tonnes
<i>Total energy (excluding heat)</i>	8,073,926	100%	£291,386	100%	153	2,673 tonnes

#### Scope 3 emissions

Type of emission	Consumption	CO <sub>2</sub> emissions
<i>Heat from CHP</i>	2,879,639 kWh/year	532 tonnes
<i>Waste</i>	602 tonnes	269 tonnes
<i>Water</i>	22,653 m <sub>3</sub>	9.06 tonnes
<i>Institute transport</i>	1,200miles	.45 tonnes
<i>Staff car travel</i>	96,000 miles	19 tonnes
<i>Staff and student travel to the</i>	6,192,800 miles	557 tonnes

<i>Institute by public transport</i>		
<i>Staff and student international travel</i>	1,700,000 miles	463 tonnes

16. Scope 3 emissions are accurate for waste, hot water, water and Institute transport. Other Scope 3 emissions have been calculated as follows:

**Staff and student journeys to Institute:**

400 students walking and cycling (based in halls of residence) = 0 tonnes

5308 students by public transport -  $5308 \times .9\text{kg} \times 2 \times 40 \text{ weeks} = 382$  tonnes

811 staff by public transport -  $811 \times 1.8\text{kg} \times 3 \times 40 \text{ weeks} = 175$  tonnes

40 staff by car -  $40 \times 4.1\text{kg} \times 3 \times 40 \text{ weeks} = 19$  tonnes

**International travel**

792 international students -  $792 \times 275\text{kg} \times 2 = 436$  tonnes

Staff international travel -  $50 \times 275\text{kg} \times 2 = 27$  tonnes

17. Based on the Institute's 2005 emissions base line, two different consumption models have been projected; the Business As Usual (BAU) model which predicts the effect on cost and carbon emissions of taking no action to limit the organisation's increasing consumption of energy, whilst the Reduced CO2 Emissions model (RES) predicts the effect on cost and carbon emissions of reducing the emissions baseline by the targeted 45% over 15 years.

**Business As Usual model**

Aspect	Assumption
Gas unit cost	Rising 5% per year
Electricity unit cost	Rising 5% per year
Van fuel cost	Rising 5% per year
Gas consumption	Rising 2% per year
Electricity consumption	Rising 2% per year
Waste sent to landfill	Rising 1% per year

## Reduced CO2 Emissions model

Aspect	Assumption
Gas unit cost	Rising 5% per year
Electricity unit cost	Rising 5% per year
Van fuel cost	Rising 5% per year
Gas consumption	Falling 3.2% per year
Electricity consumption	Falling 3.2% per year
Waste sent to landfill	Falling to 0% by 2012

## Breakdown on calculated BAU and RES CO<sub>2</sub> emissions

Baseline year	Utilities	Waste to landfill	Institute transport	Staff car travel	Local travel	International travel	Annual total	Annual reduction target
2006/07	2,654	269	.45	19	557	463	3,962	3%
Future years	Business as usual annual increase							
	2.0%	1.0%	1.8%	1.0%	1.0%	1.0%		
2007/08	2707	271	.46	19	562	467	4027	3843
2008/09	2761	274	.47	19	568	472	4094	3727
2009/10	2816	277	.48	19.5	573	477	4163	3616
2010/11	2872	279	.48	19.8	579	481	4232	3507
2011/12	2930	282	.49	20	585	486	4304	3405
2012/13	2988	285	.50	20	591	491	4375	3300
2013/14	3048	288	.51	20	597	496	4449	3201
2014/15	3109	291	.52	21	603	501	4525	3105

18. The Value at Stake is the difference in emissions or costs between the BAU and the RES, the hypothetical potential value that could be obtained by undertaking a carbon management approach and implementing emissions reductions initiatives in order to reduce baseline emissions by 45% by 2020.

	2006/ 2007	2007/ 2008	2008/ 2009	2009/ 2010	2010/ 2011	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015
Total BAU (tCO <sub>2</sub> )	3962	4027	4094	4163	4232	4304	4375	4449	4525
Total	3962	3843	3727	3616	3507	3402	3300	3201	3105

RES(tCO <sub>2</sub> )									
VAS per year (tCO <sub>2</sub> )	0	184	367	547	725	902	1075	1248	1420
VAS agg savings (tCO <sub>2</sub> )	0	184	735	1282	2007	2909	3984	5232	6652

19. The total aggregated Value at Stake postulated from 2006 to 2015 carbon emissions is 6,652 CO<sub>2</sub>e tonnes.

20. To meet the Institute's carbon reduction target, a series of carbon saving actions have been generated and developed into fully costed projects, including:

- Introduction of heat exchangers
- Extension of Trend BMS management system
- Using networked software to shut down computers out-of-hours
- Introducing automatic half-hourly sub-metering of utilities in buildings
- Upgrading lighting and installing automatic sensors and controls
- Undertaking boiler upgrades and improving the insulation in buildings
- Installing voltage optimisation equipment in electricity sub-stations

21. Total aggregated emissions savings of 6,652 CO<sub>2</sub>e tonnes are predicted to be realised between 2006 and the end of 2015, with further savings annually thereafter as a result of the projects undertaken.

Carbon reduction projects	Capital cost estimate	Energy save	Annual carbon save	Status
Reduction in hot water storage	0	107,400 kWh	18 tonnes/yr	Completed 2008
Introduction of heat exchangers	£200,000		18 tonnes/yr	Completed 2010
Extension of Trend BMS management system	37,500			Completed 2010
Shorten heating period by 4 weeks for 20 Bedford Way	-		66 tonnes/yr	Ongoing
Replacement of chillers with	£750,000	20,665 kWh	11 tonnes/yr	Completed 2010

more energy efficient system				
Replacement of tungsten spotlights	£400	10,500 kWh	4 tonnes/yr	Ongoing
Use of voltage optimisation systems	£50,451	382,560 kWh	26 tonnes/yr	To be completed 2011
Replacement of obsolete fluorescent lights	£26,250	137,970 kWh	47 tonnes/yr	Ongoing
Replacement of low voltage tungsten halogen lighting	£6,450	32,360 kWh	11 tonnes/yr	Ongoing
Roof insulation	£40,000	15%	50 tonnes/yr	Unfunded
Computer out-of-hours shutdown	£5,200	105,000 kWh	56 tonnes/yr	Completed
Insulate pipe work, valves and flanges	£4,500	1.4%	18 tonnes/yr	Ongoing
Replace old gas boilers in 9 – 11 Endsleigh Gardens	£50,451	£5,000	2 tonnes/yr	Completed 2010
Share van with local college	0	£1,000	.2 tonnes/yr	Completed
Shared Energy Manager	£10,000 per year		Up to 200 tonnes /yr	Completed

### Carbon comparisons 2005 to 2009

22. Comparisons of 2005 and 2010 show a significant trend towards reduction of carbon emissions. Comparisons in relation to unit of income shows a marked decline from 0.0437 (kgCO<sub>2</sub>/£1) to 0.0293 ((kgCO<sub>2</sub>/£1). A similar comparison of emissions per student/staff numbers shows a decline from 718 (kgCO<sub>2</sub>/total staff and student) to 527 ((kgCO<sub>2</sub>/total staff and student).

23. An action plan, setting out specific targets with dates and progress is available on the Institute's website, on the Environmental and Sustainability page at <http://www.ioe.ac.uk/about/policiesProcedures/790.html>

	2005/06	2006/07	2007/08	2008/09

HEI income	60,967,000	64,250,000	69,057,000	77,212,000
Student FTE	2981	2858	2988	3442
Staff FTE	729	1013	811	857
Emissions scope 1 & 2	2667	2257	2557	2269
Emissions per unit income	0.0437	0.0351	0.0370	0.0293
Emissions per student / staff numbers	718	583	673	527

24. Although these results should be treated with some caution as the results show some volatility over the four years, the trend is in the right direction.

### **Procurement**

25. The Institute seeks to purchase goods and services from local or regional suppliers, as far as practicable, which cause the least harm to the environment. The impact of transportation distances of goods and services is also taken into account in determining sources of supply with priority given, where practicable, to locally based suppliers. The Institute of Education is committed to procuring 100% recycled / sustainable products where possible. To meet this objective the Institute has agreed that any account should be set up automatically to switch to recycled equivalent environmentally friendly and or recycled items.

26. In addition, the Institute requires its outsourced catering provider Sodexo to:

- Procure from local wholesalers where appropriate seasonal, locally grown organic produce and wines.
- Procure all pre-packaged foods i.e. sandwiches and containers for salads etc. from suppliers that use 100% biodegradable packaging.
- Consider when staff uniforms require replacement the resourcing and providing of Fair-trade cotton uniforms.

27. The Institute requires its' outsourced cleaning provider, ISS to:

- Procure and use environmentally friendly branded cleaning solutions only for example the Ecover range of professional cleaning products;

- Procure recycled toilet tissue and hand-towels;
- Consider when staff uniforms require replacement the resourcing and providing of Fair-trade cotton uniforms.

28. The Institute of Education has a contract with Sharp Electronic (UK) Limited for the supply of all fleet photocopiers throughout the Institute. The Institute requires all photocopiers supplied to be:

- efficient in their energy usage. Those classified as decentral copiers must be programmed to automatically revert to standby mode when no copying is taking place. The warm-up time from this mode should be in the order of two minutes.
- programmed to perform duplex copying as standard to limit paper usage. Single sided printing therefore should only be possible as a result of a one sided document being copied and or the default setting being changed by the user.

## **Benefits**

29. The anticipated benefits for the Institute in conducting a carbon reduction programme are:

- Raising awareness of climate change and carbon management at both strategic and individual levels across the Institute, and encouraging collective responsibility and action amongst staff and students.
- Helping to fulfil the Institute's strategic intentions set out in its sustainability and environmental strategy of reducing its environmental impact, specifically in the area of energy usage, travel and transport, waste, construction and design.
- Responding to stricter design controls for refurbishment and new construction projects, demanding BREEAM 'very good' for new builds and working towards 20% renewable energy consumption.

- Helping to fulfil the requirements for future HEFCE funding, particularly in the areas of environmental management and sustainability.
- Creating carbon emissions projects and business plans for the most viable reduction projects to allow external funding to be secured
- Planning the analysis of data for the Institute's newly installed automatic metering system
- Increasing awareness within the Institute of the costs and environmental impact of carbon emissions e.g. giving higher visibility to the EU energy performance of buildings directive which requires buildings over 10,000m<sup>2</sup> to have a Display Energy Certificate (DEC)
- Lowering our utilities consumption and increasing usage of renewable or CHP energy to lessen exposure to market volatility

## **Challenges**

30. Despite the best endeavours of the Institute to fulfil the requirement to reduce energy consumption, there remains a number of locational, building and strategic challenges which affect the success of the plan:

- Over 90% of the Institute's estate consists of grade II or grade II\* listed buildings. The ability to make these buildings more energy efficient is particularly difficult when secondary glazing and other energy saving methods are not appropriate.
- The Institute receives hot water and electricity from the Bloomsbury CHP system, which provides a cheap and efficient form of energy. This scheme has been in place for nearly 10 years and the Institute is in a PFI partnership for another 15 years. The Institute receives over 80% of its energy from the

scheme. This gives little freedom of movement to consider alternative forms of energy.

- Winter temperatures have shown great variability over the past few years. This impacts directly on the level of energy consumed and can dramatically affect year on year trends
- Good lighting is an essential part of our security strategy. The need for well lit corridors and public areas in our buildings is important, particularly when some corridors have only limited natural lighting. External lighting is also essential to ensure the safety of our staff and students during the winter months in our central London location.
- The Institute has plans within its recent strategic review and its international strategy to increase the number of international students studying at the Institute. It also envisages an increase in staff undertaking work overseas. Increased international travel will impact on levels of scope 3 carbon emissions.
- The Institute, unlike many other HEIs, has terms which extend throughout most of the year. The buildings are used from 9am to 9pm Monday to Friday and are usually open during the weekends for external customers. This gives little latitude to reduce the temperature in the buildings, or to cut energy usage.

### **Carbon reduction - communications strategy**

31. The Carbon Reduction Plan requires 'buy-in' from all staff and students, to ensure that carbon management remains at the core of the Institute's activities. The main challenge will be to keep up the momentum and visibility of the plan. In order to ensure that this is possible, effective branding and marketing of the plan

is essential. It is also imperative that the plan is not confused or blurred by other related savings initiatives.

32. The Institute will:

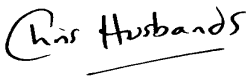
- Communicate with and inform all staff and students regarding the sustainability & environmental strategy and the carbon reduction plan.
- Work with the Sustainability Network to ensure that messages to staff are consistent and integrated.
- Promote carbon management issues to all members of the Institute and generate enthusiasm for carbon management
- Enable early recognition of risks and issues so that the programme's plans can be adapted where appropriate

33. Key issues in the communications strategy will be :

- The Estates and Facilities Project Officer and the Energy Officer will ensure that articles on progress and awareness issues are placed on the environmental pages of the Institute's website.
- A full staff and student environmental campaign will be launched across the Institute's estate encouraging building occupants not to overheat building in winter or overcool in summer, keep electricity usage to a minimum and explain the need for colleagues in offices which are rarely used to turn off their radiators when not using the room .
- Information screens on the concourse will, from time to time be used to remind staff and students of what they can do to reduce carbon emissions. The screens will also be used to show reductions in our carbon usage to encourage further participation in the scheme

- The Conference Office will ensure that publicity about our conference facilities includes information about environmental initiatives and expectations.
- We will engage with the Science Learning Centre in helping to promote bio diversity projects and other local initiatives.
- Reduce emissions associated with travelling and vehicles by reducing the need for travelling, encouraging alternatives to private car use and making use of alternative fuels
- The Estates Project Office will ensure that all new buildings and building refurbishment are undertaken to the best achievable energy standards.

Signed

Handwritten signature of Chris Husbands in black ink, with a horizontal line underneath the name.

**Professor Chris Husbands**  
**Director, Institute of Education**  
**7 March 2011**