* **[](http://www.napier.ac.uk/aboutus/sustainability/Pages/Sustainability.aspx)Green Gown Awards**
* **Carbon Reduction Category**
* **Summary**
* Between 2006/07 and 2009/10 carbon emissions associated with gas and electricity use at all Edinburgh Napier campuses reduced by 37% and 21% respectively. Reductions have been made by following a robust capital investment framework and a full programme of heating, lighting and general conservation initiatives. Staff and students are continually reminded to do their bit by switching off, especially around key events such as Earth Hour. Adjusted predicted results for 2010/11, on the back of opening our new Sighthill campus, are noted in table 1.
* **The Initiative**
* The initiative is on-going and is a holistic, sustained and sustainable approach to reducing carbon emissions at Edinburgh Napier. Reasons for completion are entirely intuitive, ensuring the University contributes to the carbon reduction targets set by the Scottish Government, linking to our UCCCfS commitment, following best practice taught to our students whilst ensuring efficient resource use at the University. The initiative is tied to educational campaigns with all staff and students, partnership working with organisations such as Salix, the Carbon Trust, our local Energy Saving Scotland Advice Centre Office, commercial organisations and of course other FHE’s.
* Our Carbon Management Plan, launched in March 2009, forms the basis of our forward plans. Specific projects, chosen by a representative group of staff from throughout the University, are highlighted throughout the document. Finance is sourced from internal ring-fenced capital budgets and Salix with consultancy support from the Carbon Trust. *Progress is reported annually to the*§ *Principal’s Executive Group via our carbon key performance indicator, and on-line monthly through our internal energy key performance indicator.*
* Work to date includes taking away or replacing old/ineffective heating, ventilation and air conditioning equipment, installing new boilers, modifications to heat distribution including installation of thermostatic radiator valves and local zone controls, lighting controls and increasing levels of roof and window insulation. Introducing and developing a centrally monitored Building Management System, monitoring progress through Optima software whilst following our Heating Policy. Our new Sighthill campus, open in January 2011, has extensive heat and electricity sub-metering installed allowing for in-depth analysis on a floor or occupancy level. We also installed a CHP at this campus.
* We are also striving to reduce carbon emissions in relation to all associated travel, reducing water consumption and waste sent to landfill. More information below.
* **Overall Benefits**
* Electricity and gas use accounted for 87% of carbon emissions during the baseline year for our Carbon Management Plan, 2006/07. As above, we are concentrating on all areas of carbon reduction but energy consumption has been given a special focus because of the Plan.
* We achieved the Carbon Trust Standard in 2010. Carbon emissions associated with energy consumption and owned and leased vehicles were independently assessed and proven to have decreased by an absolute 19% between 01/08/06 and 31/07/09. Linked to increased turnover during this period, a turnover linked reduction was valued at 24%.
* Overall reduction in carbon, associated with gas use, of 27% between 2006/07 and 2009/10. Adjusted predicted figures for 2010/11 noted in table 1.
* Overall reduction in carbon, associated with electricity use, of 21% between 2006/07 and 2009/10, again see table 1 for 2010/11 adjusted predicted figures.
* In full, table 1 below shows gas and electricity consumption from 2006/07, the baseline year for the Carbon Management Plan and the progress made in reducing associated carbon emissions. All electricity figures are marked in red. All gas figures are marked in yellow. Progressing from left to right the statistics show the actual usage and total carbon dioxide reductions for electricity and gas separately then combined. The ‘Index’ section shows the percentage reductions in carbon emissions i.e. between 2006/07 and 2010/11 total carbon reduction (adjusted predicted) is 24.1%.
* The predicted data for 2010/11 has been adjusted due to the ongoing rationalisation of the University estate. In 2010/11 we opened our new 25000 m2 campus at Sighthill designed to BREEAM excellent standard. Some other properties have been vacated or partially vacated but the net effect has been estimated at an increased operational area of 22% for the year and so the data is adjusted accordingly as shown below.
* **Table 1: Reduction of carbon emissions – cutting energy consumption and substituting energy sources**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Utility usage | | kg CO2 | | | | | |
| Year | Electricity kWh | Gas kWh | Electricity | Index | Gas | Index | Total | Index |
| 2006/07 | 9,032,456 | 17,749,507 | 4850429 | 100 | 3283659 | 100 | 8134088 | 100 |
| 2007/08 | 9,054,711 | 14,833,120 | 4862380 | 100 | 2744127 | 84 | 7606507 | 93.5 |
| 2008/09 | 7,910,532 | 12,503,477 | 4247956 | 88 | 2313143 | 70 | 6561099 | 80.7 |
| 2009/10 | 8,081,091 | 11,246,074 | 4339546 | 89 | 2080524 | 63 | 6420069 | 78.9 |
| 2010/11 Actual predicted | 8,962,405 | 14,031,047 | 4812812 | N/A | 2595744 | N/A | 7408555 | N/A |
| 2010/11 Adjusted predicted | 7,468,671 | 11,692,540 | 4010676 | 83 | 2163120 | 66 | 6173796 | 75.9 |

* **Specific Project Examples**
* BMS improvements to all sites has cost £75,000 to date. Carbon savings are linked to the statistics shown below.
* Our IT team have replaced most computers with energy efficient models. Of course we will notice the savings generated in the overall carbon reductions for all campuses but we do not have specific information relating to the computers alone.
* **Merchiston**
* Lighting control system. Cost £9,949.50. Annual carbon saving of 13.6 tonnes.
* Heating modifications cost £40,000.
* Quatroseal installation on 1,081 windows. Cost £50,616.92. Annual carbon saving of 166.7 tonnes. Tied into the operational improvements to the BMS at this campus, a saving of 3,510,126 KWh of natural gas has been saved between 30/06/09 and 30/06/11. Saving an overall 649 tonnes of carbon at this campus alone.
* Variable speed drives installed for mechanical ventilation systems and large pumps.
* Small photovoltaic array installed at the campus. Very small electricity generation but used by academics and students for educational gain.
* BMS control strategy standardisation. Cost £18,000. Annual carbon saving of 37.7 tonnes.
* Campus inverter drivers. Cost £26,519. Annual carbon saving of 40.3 tonnes.
* Lighting modifications in the library. Work currently taking place but estimations that this project will save 15 tonnes of carbon annually.
* **Sighthill**
* The building was awarded BREEAM excellent for design. Some design features including natural ventilation and use of natural daylight has been built into the campus.
* Lighting controls and sensors installed throughout the building.
* Finance contributed by Salix to install more efficient chillers. Cost £40,000. Annual carbon saving of 65.8 tonnes.
* During the move into the building, as part of the update of IT equipment, our IT team reallocated in excess of 130 surplus PC base units and 50 monitors to staff across many departments and sites. This has saved approximately £75,000, reduced associated disposal hazards and has ensured efficiency of the number of computers bought and used on site.
* We have installed a Combined Heat and Power plant at the. The CHP currently produces around 30% of the electricity used on campus with heat emitted from the plant pumped into the heating system. With 70% system efficiency, the installation of the CHP has reduced 164 tonnes of carbon emissions from the University between 31/12/10 and 30/06/11, its first six months of operation. The table below provides more information and shows the difference in carbon emitted from the gas input, compared to the carbon that we would have emitted should the university have used the gas input for heat, and an increased amount of electricity input for electricity use on the campus.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| * **CHP** | * Reading 31/12/10 | * Reading 30/06/11 | * KWh * Consumed | * KgCo2 * per KWh | * Tonnes Co2 * Equivalent |
| * Electricity Generated | * 52,173 | * 496,145 | * 443,972 | * 0.545 | * 242 |
| * Heat Generated | * 79,303 | * 754,140 | * 674,837 | * 0.185 | * 178 |
| * Gas Input | * 162,533 | * 1,545,623 | * 1,383,090 | * 0.185 | * -256 |

* **Craiglockhart and Craighouse**
* Lighting controls and sensors throughout common areas of the building at Craiglockhart.
* Centralisation of the BMS and general operational improvement to plant control at the Craiglockhart campus has resulted in a reduction of 990 tonnes of carbon emitted from the campus between 30/06/07 and 31/06/11.
* New boilers installed at Craighouse over the past two years. The boilers have contributed to overall carbon reductions measured for the campus. Cost £100,000.
* **Other Initiatives**
* We ran a full travel survey in March 2011. The survey covered staff business travel, student university travel and also the daily and term-time commute. Evaluation of the results is still ongoing but when completed we will be able to compare with similar calculations made during the creation of our Carbon Management Plan in 2009.
* The Property & Facilities Department of the University have recently decreased their fleet from nine to five vehicles. We will closely monitor the associated fuel reductions.
* Our current recycling rate is 45%. With new bins in place, and a retender of our waste contract proposed, throughout 2011/12 we will endeavour to follow the best practice demonstrate by other Universities by aiming for a recycling rate upwards of 70%.
* All information created within the Sustainability Office is posted on-line at [www.napier.ac.uk/environment](http://www.napier.ac.uk/environment) to encourage all staff and students to contribute and enter into two-way conversations with the team. We are investigating on-line real-time monitoring packages that could be installed onto the website and displayed at common areas on all campuses.
* **Significance for the Sector**
* Example of a holistic, sustained and sustainable approach to reducing carbon emissions.
* Significant impact on financial savings of over £180,000 per annum.
* External recognition through gaining the Carbon Trust Standard.
* Has enabled the University to promote further with all staff and students to demonstrate our achievements and in turn encourage all to contribute both at the University and at home.
* We are currently finalising collaborative arrangements with two other universities in Scotland to share our energy management expertise on a weekly basis. This would see core staff at Edinburgh Napier working with the institutions to reduce the environmental impact of their energy consumption. Of course, we will also gain by sharing their work and experience to date.