



The University of
Nottingham

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Annual Energy Report 2009/10

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2009/10 Energy Report

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Executive Summary

The University has published an annual report showing trends in our energy and water usage every year since 1998. Environmental issues have become of increasing importance globally and we have introduced additional data on relevant areas such as carbon dioxide emissions. Whilst the University has always actively managed its energy to reduce waste and minimise utility costs, the need to reduce carbon dioxide emissions is now driving our efforts in this area.

The University's Strategic Plan 2010-2015 commits the University to challenging reduction targets of 15% on energy and 20% on CO₂ emissions by 2014/15. The path to achieving these targets is detailed in the University's Carbon Management Plan (CMP). The CMP will provide a new programme from 2010/11 onwards for reducing our carbon emissions by improving energy efficiency and developing renewable energy systems.

The headline performance indicators from this year's energy report are as follows:-

- **Energy costs**, including taxes, were reduced by £2.0 million to £9.3 million. This was largely due to our policy of purchasing energy on a monthly basis.
- Overall **energy consumption** increased by 3% in 2009/10. Electricity consumption remained unchanged - an improvement on the average rise of 2.5% a year over the last four years – but gas consumption rose by 5%.
- Overall emissions of **carbon dioxide** from all energy sources rose by 1.76% due to increases in gas usage in the winter period and expansion of the estate and student numbers.
- **Water usage** increased by 13%, although most of this increase was due to 2008/9 figures including estimates of consumption that were artificially low.
- The overall premises Gross Internal Area (GIA) increased by 3%, and student numbers were up by 5.6%. The weather, as measured by 'degree days' was colder by 2.6% compared to 2008/9.

Introduction

The strategic management of energy is undertaken by the Environment Committee, and supported by an Energy sub-Group. The membership of the energy sub-Group for 2009/10 was as follows:-

Chris Jagger	Director of Estates
Keith Pitcher	Director of Sustainability
Tim Rudge	Energy Management Engineer
Mark Bonsall	Senior Engineer
Andrew Bryers	Asst. Energy and Environmental Manager
Deborah Kettley	Senior Management Accountant
Gavin Scott	Environmental Manager
Stephen Pickering	Associate Professor & Reader in Mechanical Engineering, School of 3M
Robin Wilson	Associate Professor, School of Built Environment
Jason Yarnall	BMS/Controls Engineer
Ellie Stone	Student Union Environment and Social Justice Rep.

The annual energy report is produced to provide statistical information over a rolling three-year period. The data includes all of the University's UK building stock, non-residential and residential, with the exception of student houses not located within our campuses.

It concentrates on three sections; the content in broad terms is:

Section 1 – Total Energy Report

Covering total energy costs by campus, floor area (square metres), and full-time student numbers set against the total University turnover.

Section 2 – Analysis of Energy Components

Covering the analysis of electricity, fossil fuels (gas and fuel oil) and water consumption and costs associated directly with the consumption.

Section 3 – Environmental Considerations

Covering carbon dioxide emissions and how the climatic conditions in the East Midlands and weather data affect the required heating load for the University.

Note that most figures relate to the University's financial year of August 1st 2009 to July 31st 2010, with the baseline for comparison being the previous (2008/9) financial year. Utilities continue to be procured via Notice Ltd, which is a wholly owned subsidiary of the University of Nottingham

Section 1 – Total Energy Report

1.A. - Energy and Water Costs Summary

Energy and water costs reduced from the record high of £10.21 million in 2008/9 to £8.34 million in 2010, a saving of £2.05million when including VAT and Climate Change Levy.

UK energy prices reduced gradually from August 2009 before bottoming out in March 2010. There was then a swift rise back to relatively high levels again. Our purchasing strategy of buying gas and electricity monthly allowed us to purchase much of our energy during this dip in the spring of 2010 and so minimise our costs. The University of Nottingham adopted this form of purchasing from October 2005, and although it is widely and successfully used by most private-sector energy buyers, is still relatively rare in the public sector.

Energy and Water Costs				Change
	2007/8	2008/9	2009/10	'08/9 to '9/10
University Park	£ 5,545,621	£ 5,800,298	£ 4,633,050	-20%
Sutton Bonington	£ 1,416,933	£ 1,471,426	£ 1,229,968	-16%
Jubilee Campus	£ 703,870	£ 812,197	£ 713,875	-12%
Others	£ 641,467	£ 688,071	£ 585,856	-15%
Medical School	£ 1,414,542	£ 1,439,585	£ 1,180,000	-18%
Total	£ 9,722,433	£10,211,577	£ 8,342,750	-18%

Figure 1.A.1 Table of energy and water costs for last 3 years split by campus.

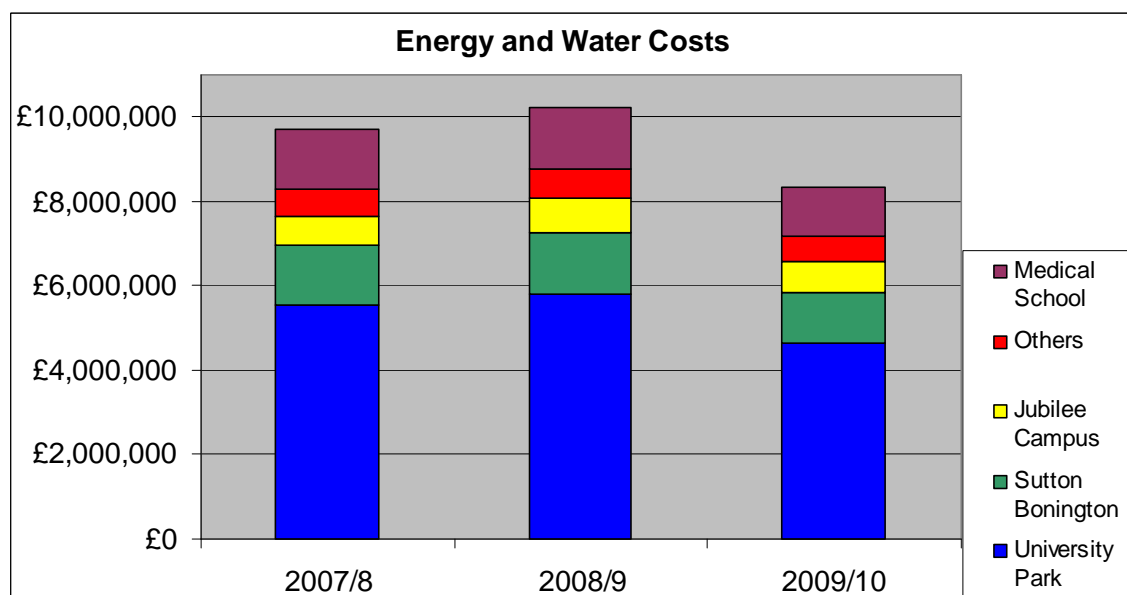


Figure 1.A.2 Graph of net energy and water costs for the last 3 years split by campus.

Note that these figures exclude VAT and Climate Change Levy, which are discussed on page 6.

1.B. – Utility costs per square metre for each Campus

Campus Costs	Floor Area	Cost/sq.m/annum			
		Electricity	Heating	Water	Total
University Park	316,309	£8.93	£3.32	£2.39	£14.65
Sutton Bonington	59,755	£12.00	£4.62	£3.96	£20.58
Jubilee Campus	59,682	£7.46	£1.63	£2.87	£11.96
Others	66,696	£6.00	£2.02	£0.76	£8.78
Medical School	75,429	£7.69	£6.92	£1.11	£15.72
Total	577,871	£8.60	£3.60	£2.25	£14.45

Figure 1.B.1 Table of energy costs per square metre, split by campus.

The overall floor area increased by 3.0% from 2008/9.

Note that if taxes (VAT and CCL, see below) are taken into account, our average utility costs are now £16.15 per square metre per annum.

1.C - Climate Change Levy (CCL) and VAT

VAT costs on energy were £885,000 in 2009/10, and CCL paid by Notice Ltd was £100,000, almost all of it for gas. This is because almost all of our electricity is 'green' and so is exempt from CCL.

The majority of tables in this report do not include VAT or CCL.

The Climate Change Levy (CCL) was introduced in April 2001. On April 1st 2010 the rates were kept at 0.164p/kWh on gas and 0.470p/kWh on the electricity costs of all non-residential properties, although 'green' electricity is exempt.

If the taxes were included in the total expenditure on utilities the totals can be seen below:-

	2009/10				2008/9
	Electricity	Fossil Fuels	Water	Totals	Totals
Utility Costs	£ 4,968,105	£ 2,081,399	£ 1,299,246	£ 8,348,750	£10,211,576
Climate Change Levy	£ 5,532	£ 94,532	-	£ 100,063	£93,750
Value Added Tax	£ 560,618	£ 323,961	-	£ 884,579	£1,074,596
Total	£ 5,534,255	£ 2,499,891	£ 1,299,246	£ 9,333,392	£11,379,922

Figure 1.C.1 Table of energy and water costs including Climate Change Levy and Value Added Tax.

1.D - 2009/2010 Net Costs Broken Down by Campus and Utilities

Energy and Water Costs	Electricity	Fossil Fuels	Water	Total
University Park	£ 2,825,400	£ 1,051,195	£ 756,455	£ 4,633,050
Sutton Bonington	£ 717,196	£ 276,305	£ 236,468	£ 1,229,968
Jubilee Campus	£ 445,349	£ 97,113	£ 171,413	£ 713,875
Others	£ 400,160	£ 134,786	£ 50,911	£ 585,856
Medical School	£ 580,000	£ 522,000	£ 78,000	£ 1,180,000
Total	£ 4,968,105	£ 2,081,399	£ 1,293,246	£ 8,342,750

Figure 1.D.1 Table of energy and water costs split by campus and by utility

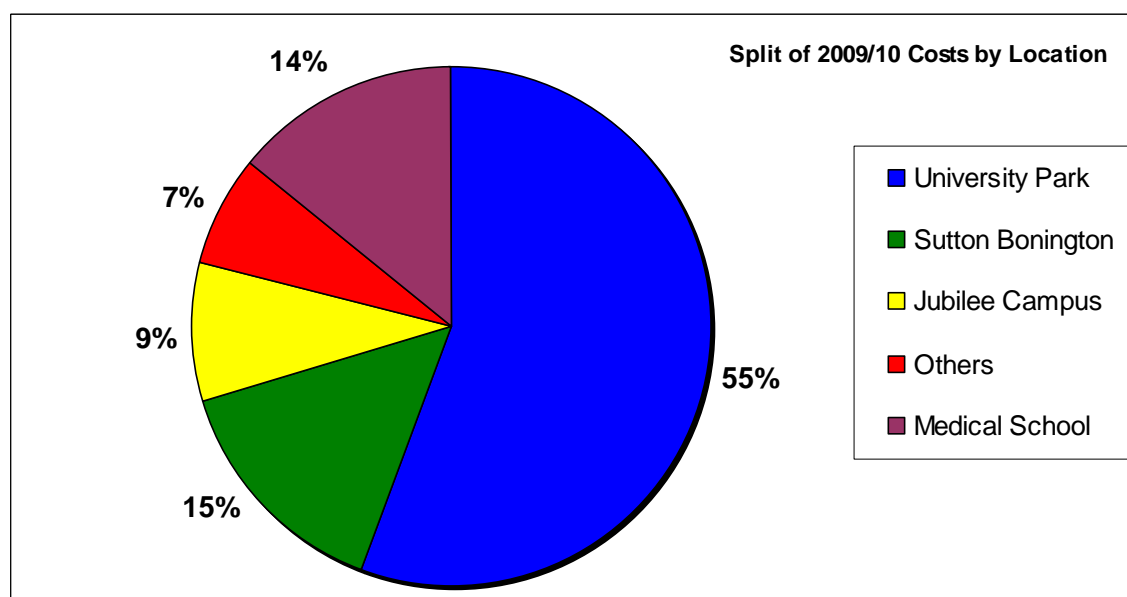


Figure 1.D.2 Chart of energy and water costs split by campus

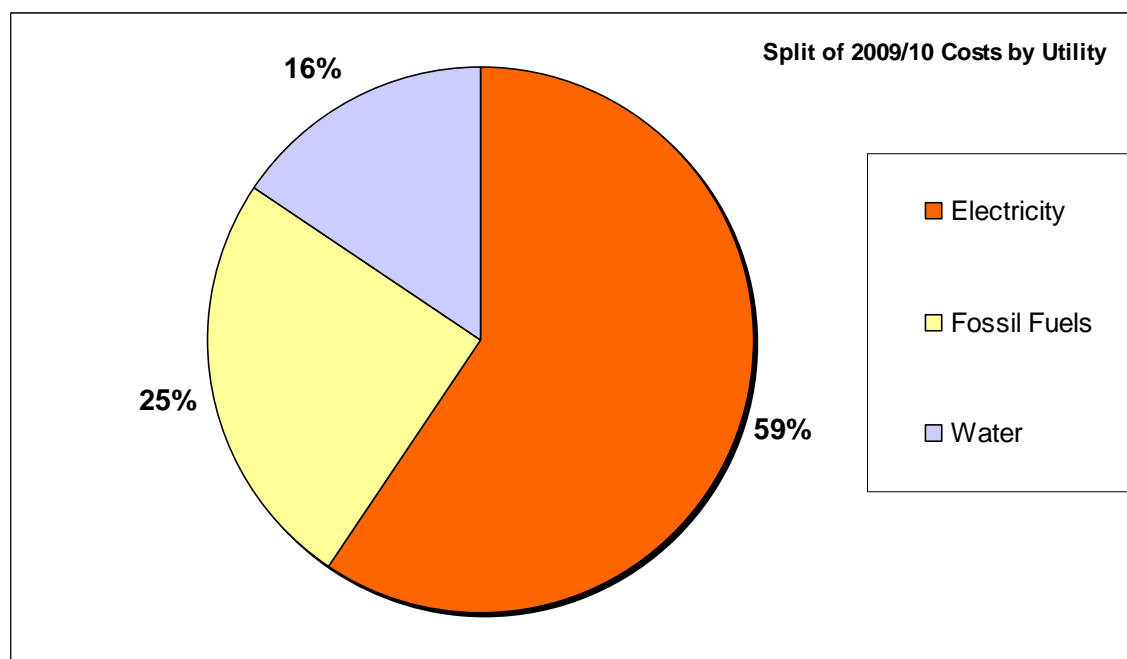


Figure 1.D.3 Chart of energy and water costs split by utility type

1.E - Energy Use Summary

The overall consumption of energy increased by 3%, equivalent to the 3% increase in premises floor area. Colder weather was experienced in 2009/10 compared to 2008/9, which would account for a 1.6% rise in energy consumption. This would suggest a year on year efficiency gain on an area basis of 1.6% if weather data is considered.

Overall energy consumption broke through 200,000MWh for the first time to reach 204,000MWh. Whilst 3,100MWh of this 5,900MWh rise was attributable to the colder weather, the balance was down to rises in gas use for heating (see section 2c). Electricity consumption was basically unchanged, an improvement on the gradual drift upwards that has occurred during the growth of the last few years.

In addition to floor area increasing by 3%, student numbers rose by 5.6%, indicating the pressure this puts on energy usage. Section 1K of the report has been expanded to allow comparisons against other Russell Group Universities.

Energy Consumption	MWh	MWh	MWh	Change
	2007/8	2008/9	2009/10	'08/9 to '9/10
University Park	111,718	114,187	115,790	1%
Sutton Bonington	28,605	26,702	29,428	10%
Jubilee Campus	10,742	12,079	12,874	7%
Others	11,812	12,450	12,899	4%
Medical School	36,403	32,671	33,037	1%
Total	199,279	198,089	204,028	3%

Figure 1.E.1 Table of energy usage for the last 3 years split by campus.

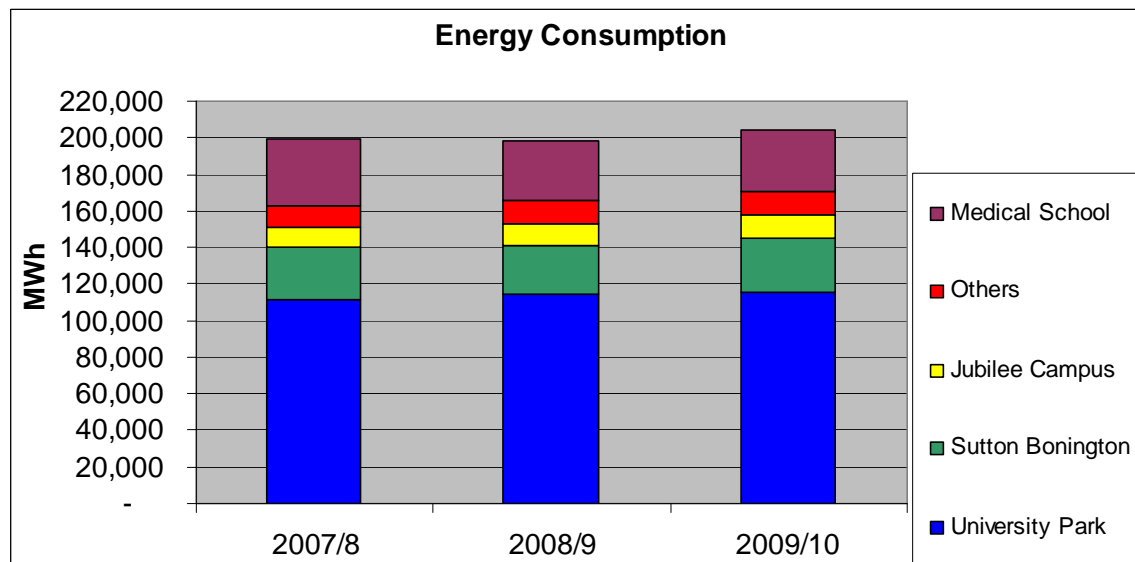


Figure 1.E.2 Graph of energy consumption for the last 3 years split by campus

1.F - Energy Use Breakdown by Campus and Utilities

Energy Consumption	MWh	MWh	MWh
2009/2010	Electricity	Fossil Fuels	Total
University Park	45,867	69,923	115,790
Sutton Bonington	11,339	18,089	29,428
Jubilee Campus	6,854	6,020	12,874
Others	5,709	7,190	12,899
Medical School	9,758	23,279	33,037
Total	79,527	124,501	204,028

Figure 1.F.1 Table of energy consumption split by campus and by utility

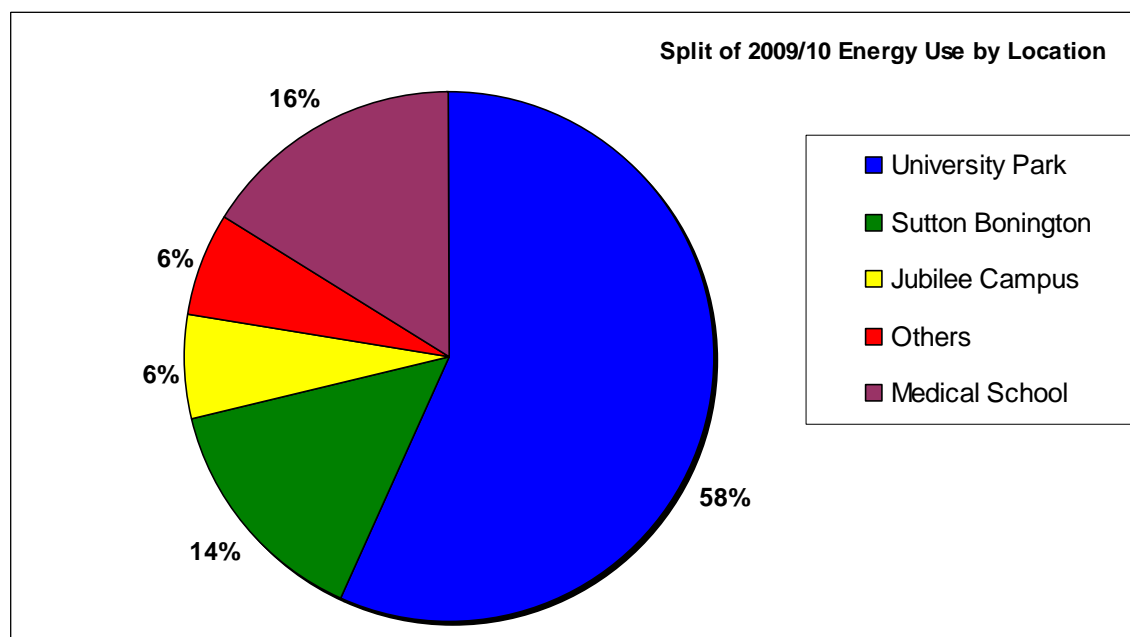


Figure 1.F.2 Pie chart of energy consumption split by campus

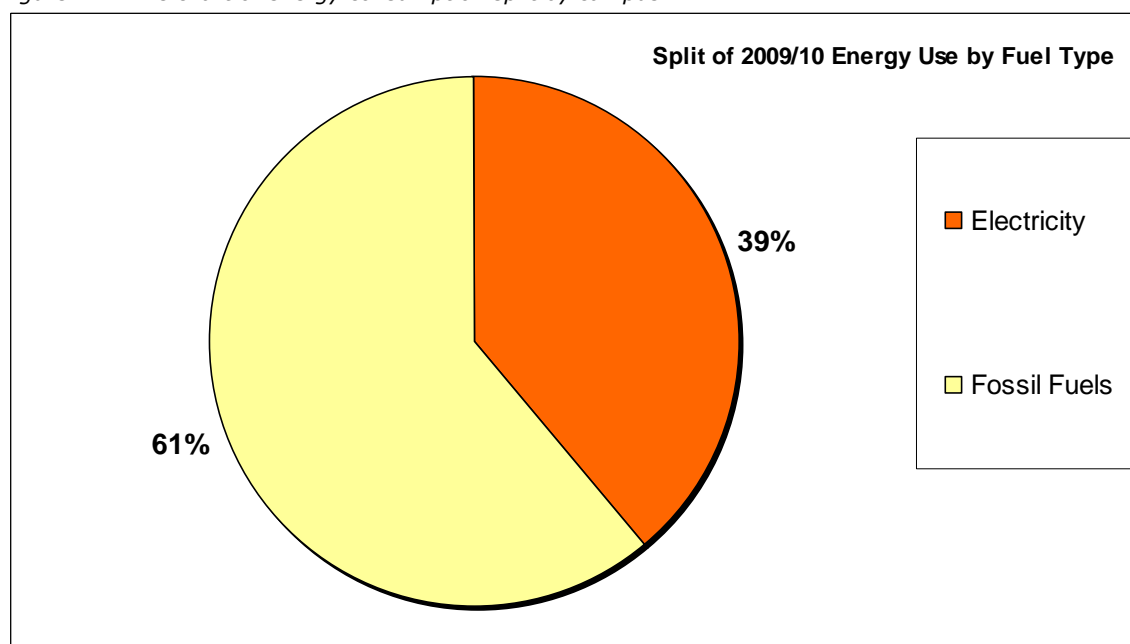


Figure 1.F.3 Pie chart of energy consumption split by utility type.

Note: Our 'fossil fuels' comprise 99.5% gas and 0.5% gasoil

1.G - Energy Usage and Cost Comparison with Gross Premises Area

	2006/7	2007/8	2008/9	2009/10	Change
Floor Area (sq.m.)	497,187	542,998	561,189	577,871	3.0%
Annual Energy Usage (MWh)	184,130	199,279	198,089	204,028	3.0%
Energy Usage Per sq. m. (kWh/m2)	370	367	353	353	0.0%

Figure 1.G.1 Table of last four years energy usage and floor area.

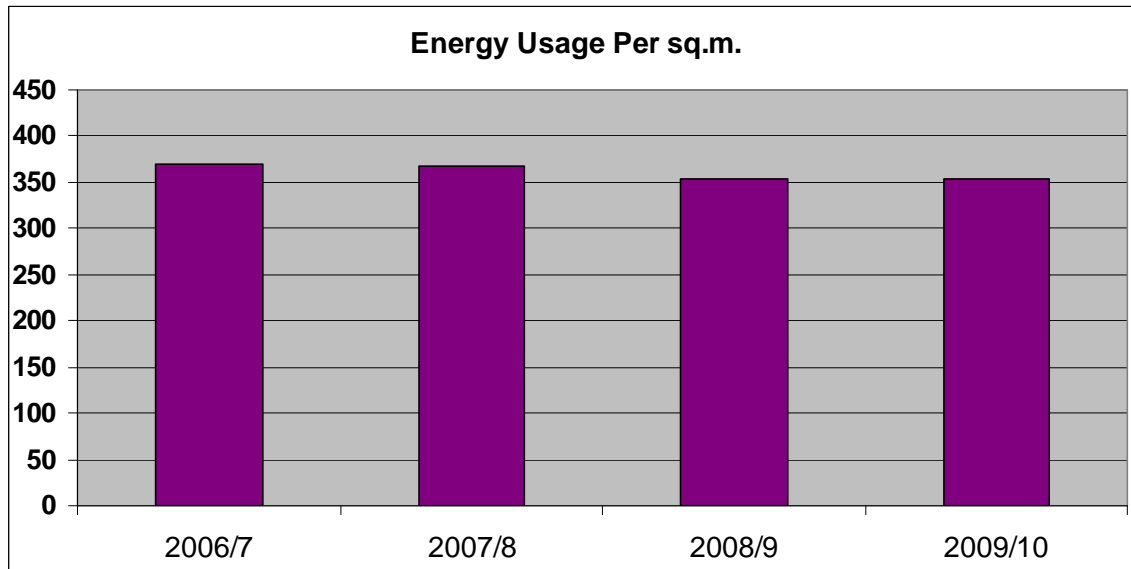


Figure 1.G.2 Graph of last four years energy usage per unit floor area.

The figures above indicate an absolute efficiency improvement of 4.6% over the last three years. If weather data is considered the efficiency improvement over three years is 18.4%.

	2006/7	2007/8	2008/9	2009/10	Change
Floor Area (sq.m.)	497,187	542,998	561,189	577,871	3.0%
Gross Energy and Water Costs	£ 7,549,000	£10,839,000	£ 11,380,000	£ 9,333,392	-18.0%
Utility Cost Per sq. m.	£ 15.18	£ 19.96	£ 20.28	£ 16.15	-20.4%

Figure 1.G.3 Table of last four year gross energy and water costs and floor area (excluding taxes).

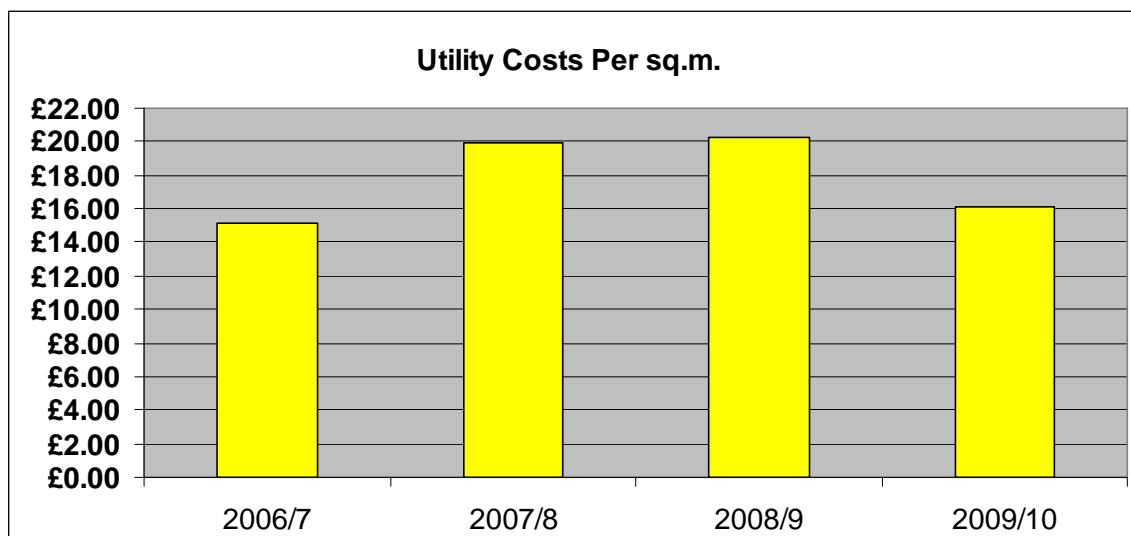


Figure 1.G.4 Graph of last four years energy and water costs normalised by floor area.

1.H - Energy Usage and Cost per FT Student

	2006/7	2007/8	2008/9	2009/10	Change
FT Student Numbers	25,762	26,608	27,575	29,131	5.6%
Annual Energy (MWh)	184,130	199,279	198,089	204,028	3.0%
Energy / Student (kWh)	7,147	7,489	7,184	7,004	-2.5%

Figure 1.H.1 Table of last four years energy usage and full-time student numbers.

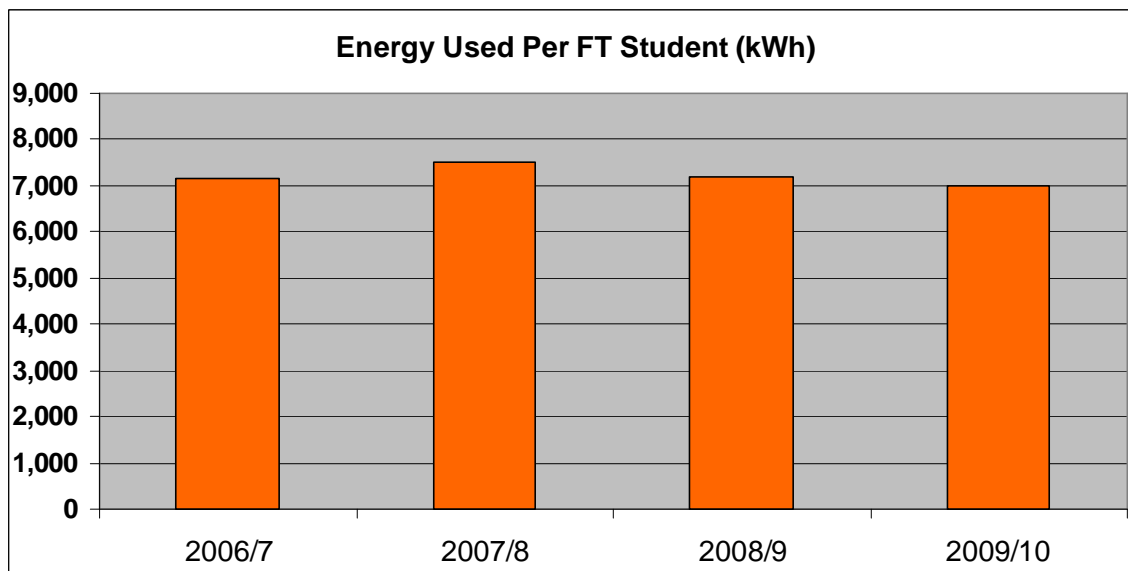


Figure 1.H.2 Graph of last four years energy usage per full-time student.

	2006/7	2007/8	2008/9	2009/10	Change
FT Student Numbers	25,762	26,608	27,575	29,131	5.6%
Energy and Water Costs	£ 7,549,000	£10,839,000	£11,380,000	£ 9,333,392	-18.0%
Utility Costs / Student	£ 293.03	£ 407.36	£ 412.69	£ 320.39	-22.4%

Figure 1.H.3 Table of last four years gross energy and water costs and full-time student numbers.

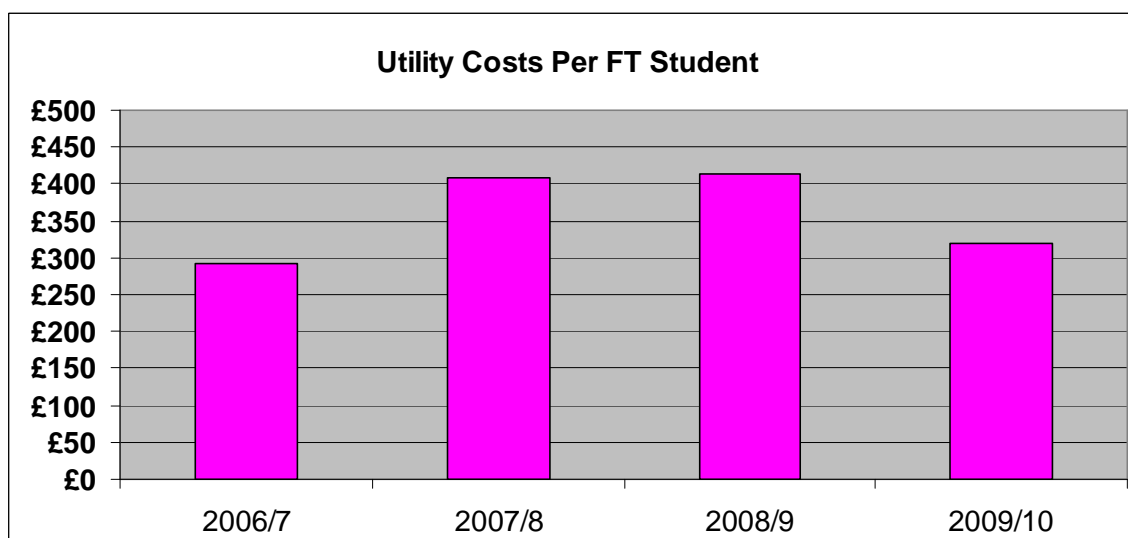


Figure 1.H.4 Graph of last four years gross energy and water costs per full-time student.

Note: The statistics on student numbers exclude students not currently studying in Nottingham.

1.I - Utility Costs as a Proportion of University Turnover

Percentage of Turnover (£ 000)	2006/7	2007/8	2008/9	2009/10	Change '08/9 to '9/10
Utility Costs inc. taxes	£ 7,549	£ 10,839	£ 11,380	£ 9,333	-18.0%
Total University Turnover	£ 383,351	£ 409,354	£ 448,700	£ 474,600	5.8%
Percentage	1.97%	2.65%	2.54%	1.97%	-22.5%

Figure 1.I.1 Table of last four years gross energy and water costs (including taxes) and total University turnover.

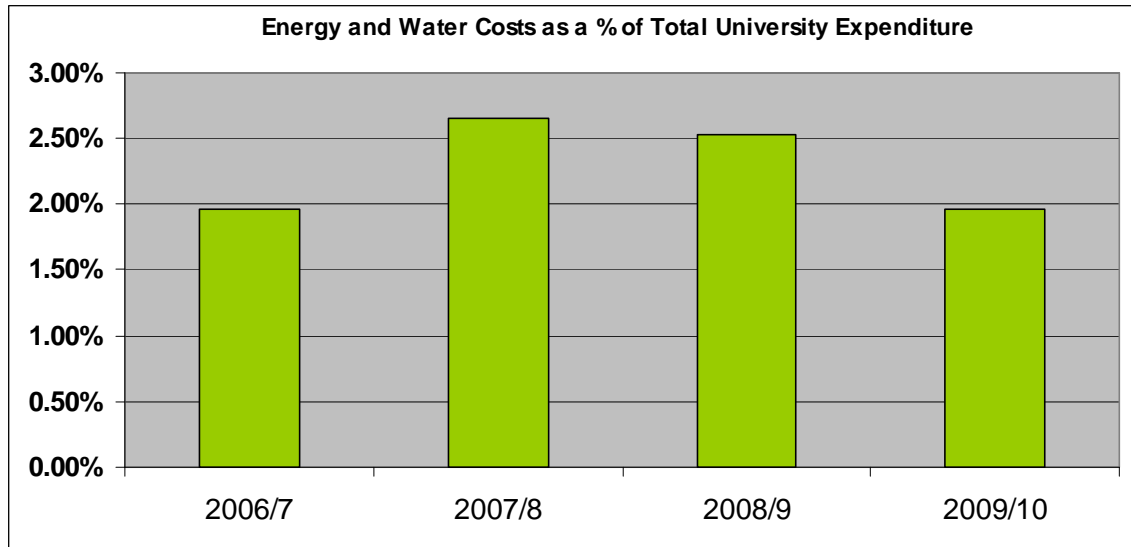


Figure 1.I.2 Graph of last four years gross energy and water costs normalised by total University turnover.

Utility costs as a percentage of turnover fell back below 2% again. The highest levels reached were 2.65% in 2007/8 and 2.67% in 2005/6.

1.J – Typical elements of Gas and Electricity Charges

The following table has been included to show the increasing proportion of energy costs that are due to non-energy elements such as transportation (costs paid to get the energy to site via the National Grid) and energy taxes. From next April, CCL will rise to 0.169p/kWh for gas and to 0.485p/kWh for electricity. VAT is set to rise from 17.5% to 20.0% in January 2011, and the new Carbon Reduction Commitment will effectively add 0.247p/kWh to gas and 0.649p/kWh to electricity when it is introduced.

Energy Prices in pence/kWh		
2009/10 University Park	Gas	Electricity
Energy	1.1800	4.1600
Transportation	0.4110	2.0000
CCL	0.1640	0.4700
CRC	0.0000	0.0000
VAT	0.3071	1.1603
Total	2.0621	7.7903

Figure 1.J.1 Table showing composition of gas and electricity prices.

1.K – Energy Costs Comparison to Russell Group Universities – 2008/9

The statistics in the next four tables provide a range of comparators to other major Universities, as reported in the EMS returns for 2008/9. Note that this is the most recent year where data is available for comparison, but is one year behind the most recent information presented elsewhere in this report.

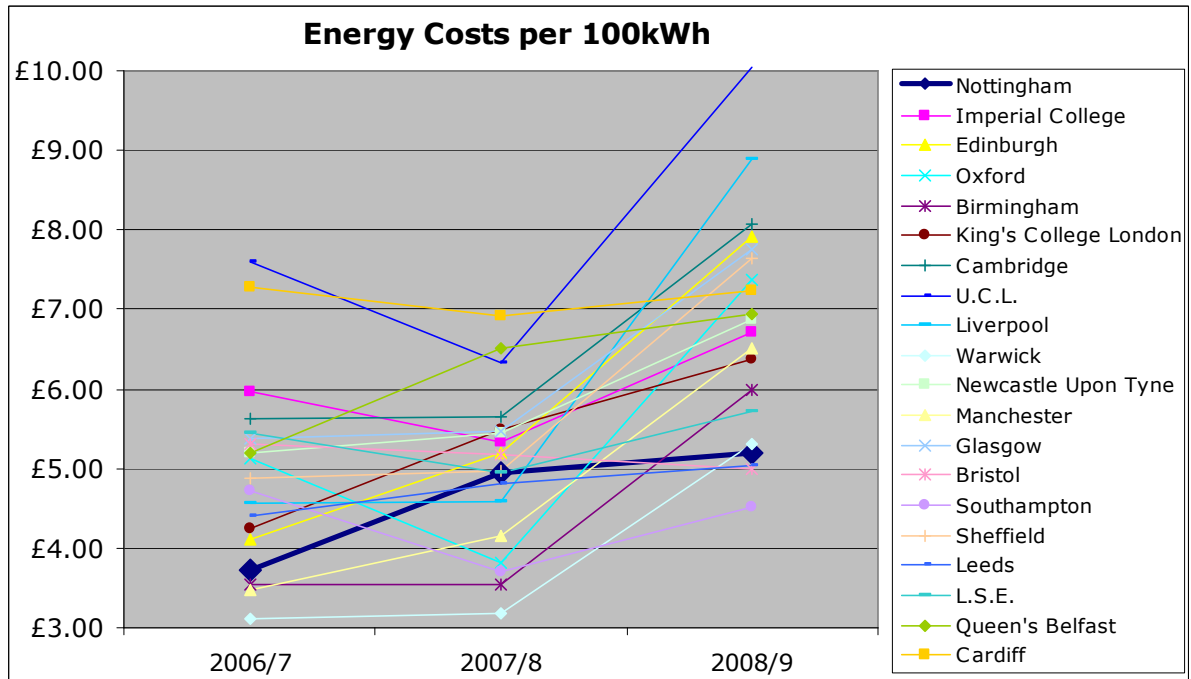


Figure 1.K.1 Graph of Russell Group Energy Costs per 100kWh.

The two graphs on this page provide further evidence that our policy of purchasing energy 'flexibly' rather than on conventional fixed-price contracts has provided us with both very competitive energy prices and less price fluctuation compared to other Universities.

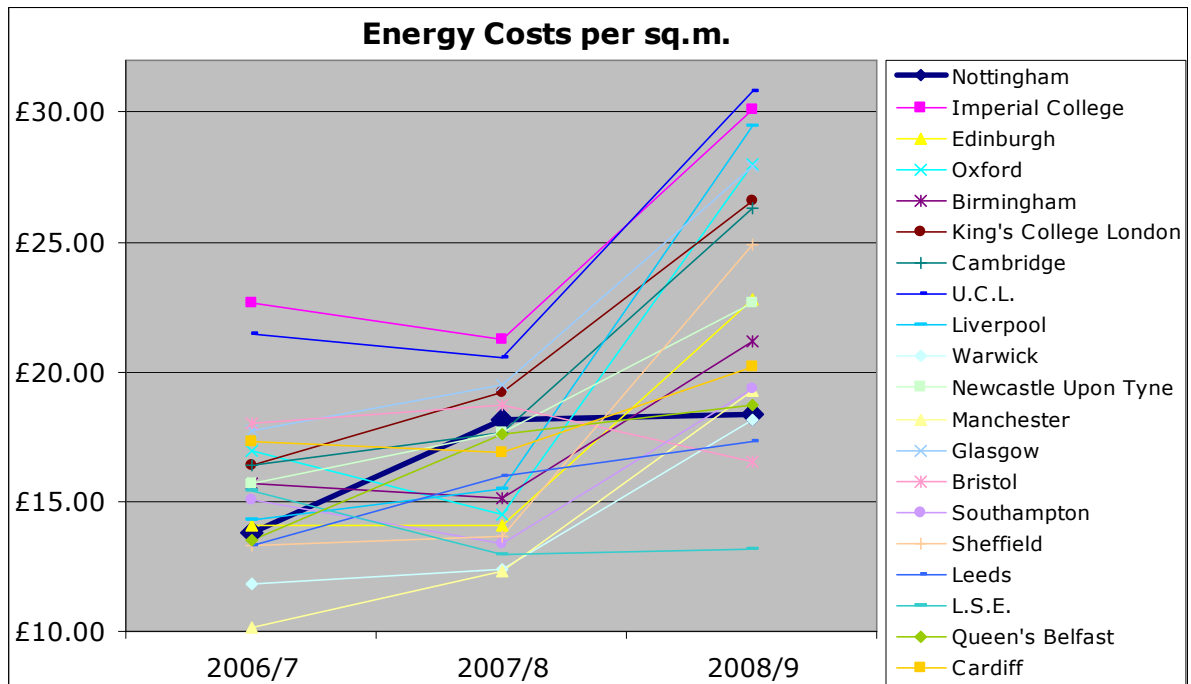


Figure 1.K.2 Graph of Russell Group Energy Costs square metre

1.L – Energy Efficiency Comparison to Russell Group Universities – 2008/9

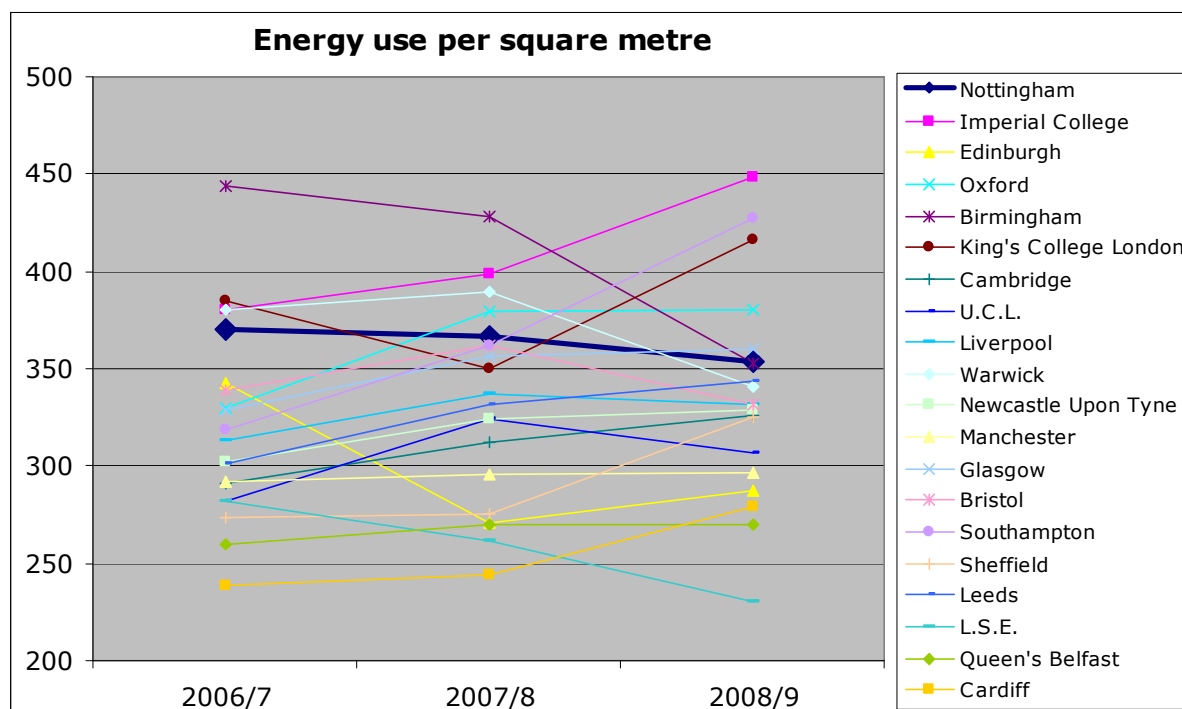


Figure 1.L.1 Graph of Russell Group Energy use per square metre.

The graphs on this page indicate that Nottingham's energy consumption per square metre and energy use per student is mid range within the Russell Group.

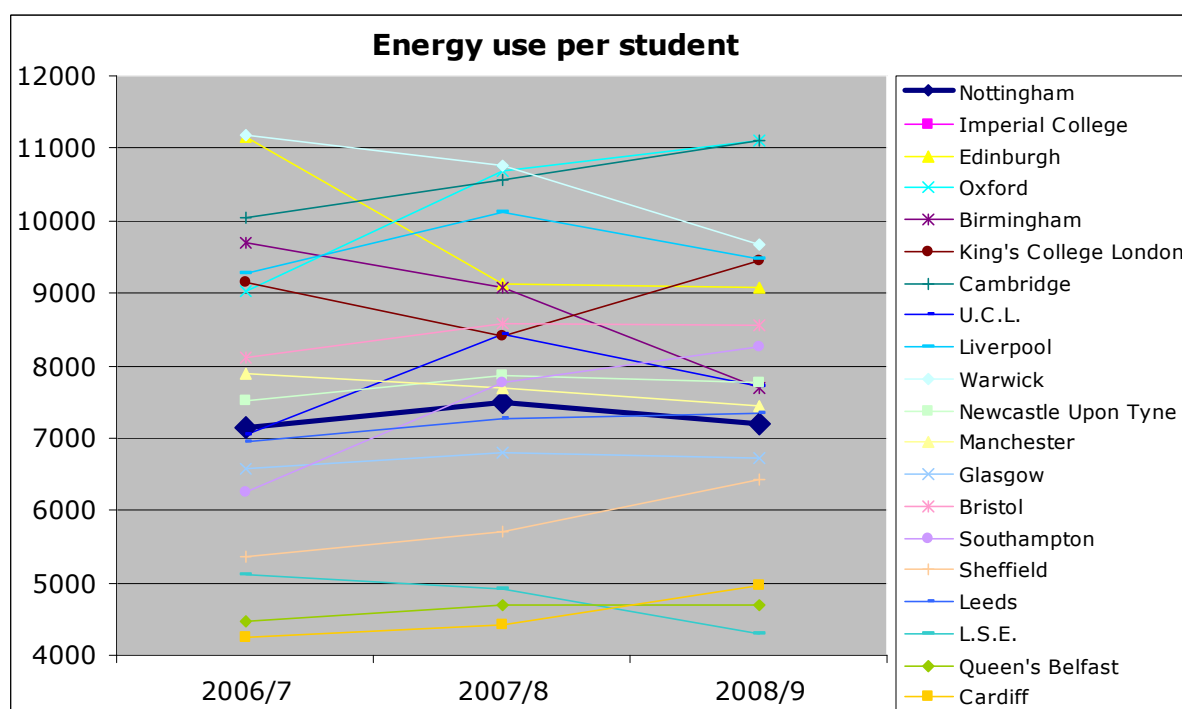


Figure 1.L.1 Graph of Russell Group Energy use per student (note Imperial is off the top of the scale at over 16,000kWh/student).

Section 2 – Analysis of Energy Components

2.A - Electricity Consumption

Total consumption of electricity was basically unchanged in 2009/10, which is an improvement on the average increase of 2.5% per year seen over the last four years. A contributor to the reversal of this trend may have been the collection of circa 2000 electrical heaters from University premises in January 2010.

At University Park, consumption dropped by 2%, whilst Jubilee Campus increased by more than most sites due to the addition of the new Nottingham Geospatial Building. In the 'Others' category, a number of small sites have been billed on estimates, and this has led to an apparent increase of 250 MWh, which accounts for much of the rise of 8%.

Electricity Consumption	MWh 2007/8	MWh 2008/9	MWh 2009/10	Change '08/9 to '9/10
University Park	46,046	46,862	45,867	-2%
Sutton Bonington	11,073	11,229	11,339	1%
Jubilee Campus	5,279	6,447	6,854	6%
Others	5,148	5,291	5,709	8%
Medical School	10,121	9,571	9,758	2%
Total	77,667	79,401	79,527	0%

Figure 2.A.1 Table of electricity usage for the last 3 years split by campus.

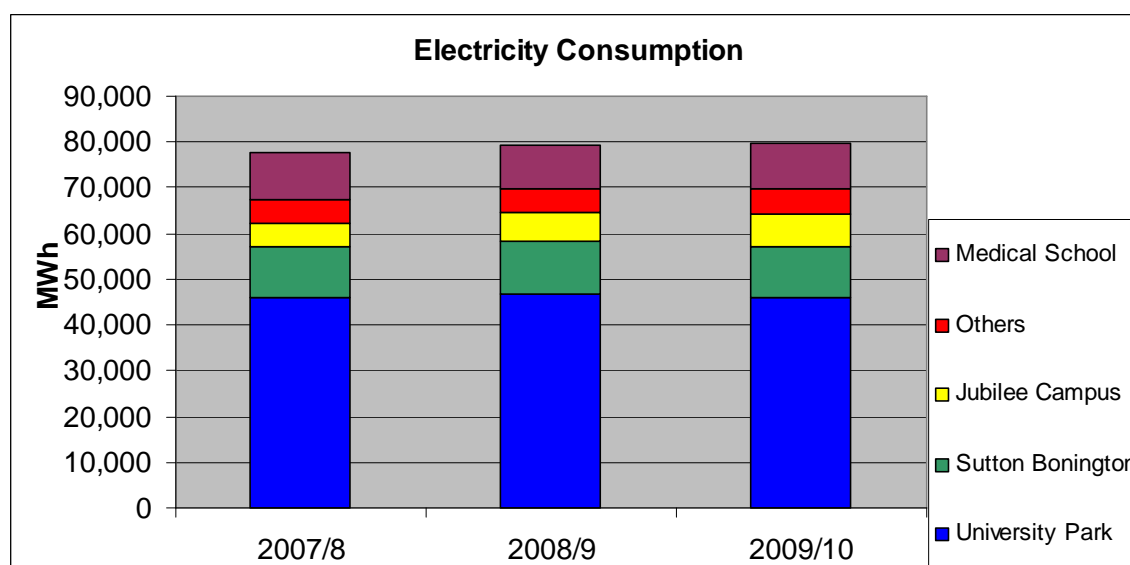


Figure 2.A.2 Graph of electricity usage for the last 3 years split by campus.

See Appendix A for a detailed breakdown of consumption on an account by account basis.

2.B - Electricity Costs

The University continued with the flexible purchasing policy first adopted in October 2005, by renewing our contract with GDF Suez Energy in January 2010. This meant that we were able to continue to purchase electricity in monthly tranches at opportune times, rather than annually. As a result, total net expenditure on electricity fell by £1.43 million (22%).

During the period, electricity prices for large annual contracts (baseload energy only) reduced steadily from 5.2p/kWh in August 2009 to 3.9p/kWh in March 2010, before rising sharply back to 5.0p/kWh by June 2010. On our 'flexible' contract, using monthly purchases, our most expensive month was December 2009 (4.45p/kWh), and September 2009 was picked up for just 3.34p/kWh back in July 2009.

Overall, the average price paid (excluding the Medical school, which is supplied via the NHS Trust) was 6.29p/kWh, including transportation costs which are an increasing component, and have now risen to 2.8p/kWh at University Park, and up to 4.0p/kWh at smaller sites. Transportation costs are paid to electricity distribution companies to get the energy to site via the National Grid.

The University's 'sub-100kW' sites (representing 36 smaller properties, such as sports grounds) continued into its second year with Southern Electric. All of the sites are priced individually, but unit rates are typically about 9.0p/kWh for day units and 5.5p/kWh for night units.

VAT and CCL add up to 26% to the net costs reported here.

Electricity Costs	2007/8	2008/9	2009/10	Change '08/9 to '9/10
University Park	£ 3,506,636	£ 3,807,325	£ 2,825,400	-26%
Sutton Bonington	£ 866,220	£ 944,564	£ 717,196	-24%
Jubilee Campus	£ 414,014	£ 519,428	£ 445,349	-14%
Others	£ 453,064	£ 464,792	£ 400,160	-14%
Medical School	£ 567,495	£ 659,585	£ 580,000	-12%
Total	£ 5,807,429	£ 6,395,694	£ 4,968,105	-22%

Figure 2.B.1 Table of net electricity costs (excluding taxes) for the last 3 years split by campus.

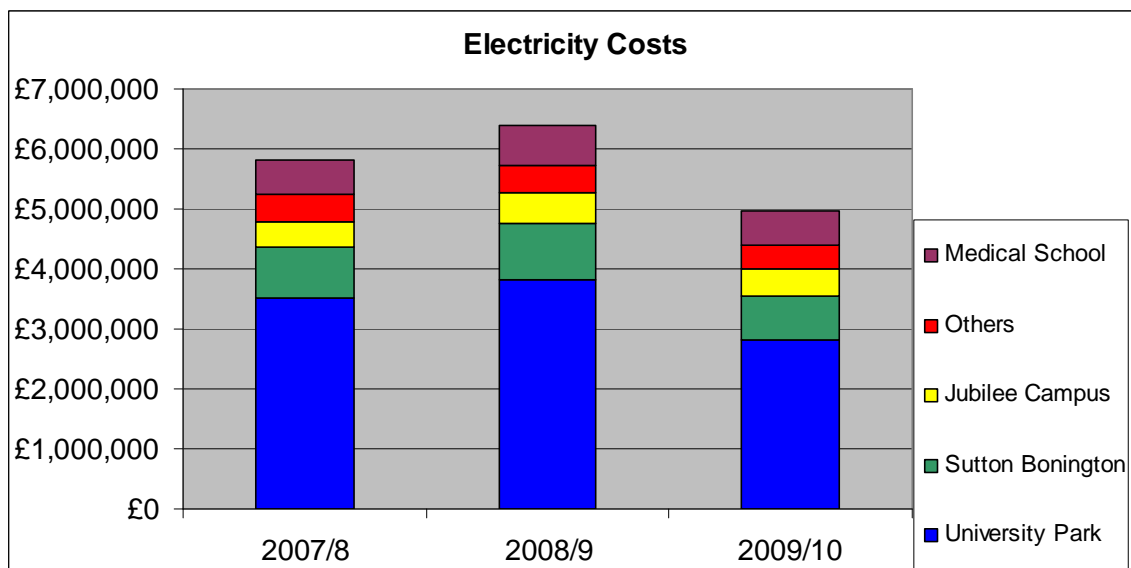


Figure 2.B.2 Graph of net electricity costs for the last 3 years split by campus.

2.C - Fossil Fuel Consumption

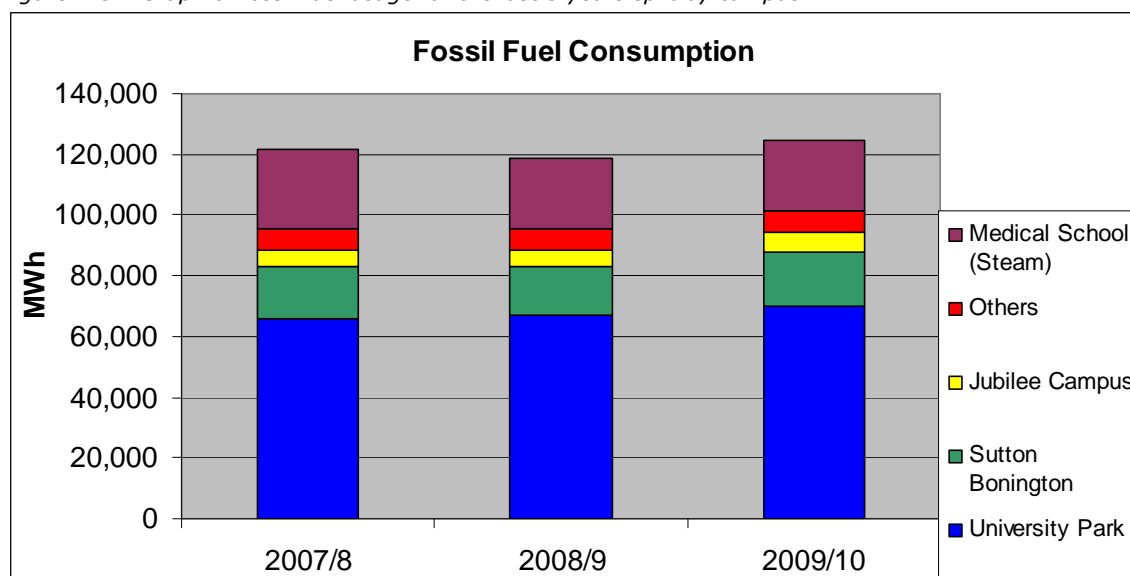
Consumption of fossil fuels rose by 5% in 2009/10, when the colder weather meant that a rise of 2.6% could have been predicted if all other factors remained equal. This is actually the first time for many years that our performance on fossil fuel consumption has worsened when the weather is taken into account.

Some of the increase in gas consumption is a result of removing supplementary electric heaters during the winter and turning up building temperatures to compensate. However, the particularly large increase at Sutton Bonington is largely down to the comparison with data for 2008/9 which was a low estimate provided by the supply company. A fairer comparison can be seen against the 2007/8 data, which shows a rise of 3.2% over two years.

Fossil Fuel Consumption	MWh	MWh	MWh	Change
	2007/8	2008/9	2009/10	'08/9 to '9/10
University Park	65,671	67,324	69,923	4%
Sutton Bonington	17,531	15,473	18,089	17%
Jubilee Campus	5,463	5,632	6,020	7%
Others	6,664	7,159	7,190	0%
Medical School (Steam)	26,282	23,100	23,279	1%
Total	121,611	118,688	124,501	5%

Figure 2.C.1 Table of fossil fuel usage for the last 3 years split by campus.

Figure 2.C.2 Graph of fossil fuel usage for the last 3 years split by campus.



See Appendix B for additional information showing a detailed breakdown of consumption on each account.

2.D - Fossil Fuel Costs

The University continued with the flexible purchasing policy first adopted in October 2005, by renewing our contract with GDF Suez Energy in January 2010. This meant that we were able to continue to purchase gas in monthly tranches at opportune times, rather than annually.

During the period, gas prices for large annual contracts (energy only) reduced steadily from 2.0p/kWh in August 2009 to 1.4p/kWh in March 2010, before rising sharply back to 1.9p/kWh by June 2010. On our 'flexible' contract, using monthly purchases, our most expensive month was December 2009 (1.58p/kWh), and September 2009 was picked up for just 0.90p/kWh back in July 2009.

Overall, the average price paid across the year (excluding the Medical school, which is supplied via the NHS Trust) was 1.54p/kWh, including transportation costs which have now risen to typically 0.36p/kWh. During the gas contract year (April 2009 to March 2010), savings of £524,000 were made by flexible purchasing, compared to buying all of our gas on 13th February 2009 when the contract was put in place.

VAT and CCL add up to 30% to the net costs reported here.

Fossil Fuel Costs				Change
	2007/8	2008/9	2009/10	'08/9 to '9/10
University Park	£ 1,294,418	£ 1,413,980	£ 1,051,195	-26%
Sutton Bonington	£ 346,546	£ 323,372	£ 276,305	-15%
Jubilee Campus	£ 110,910	£ 122,771	£ 97,113	-21%
Others	£ 143,077	£ 174,378	£ 134,786	-23%
Medical School (Steam)	£ 767,047	£ 702,000	£ 522,000	-26%
Total	£ 2,661,998	£ 2,736,501	£ 2,081,399	-24%

Figure 2.D.1 Table of net fossil fuel costs(excluding VAT and CCL) for the last 3 years split by campus.

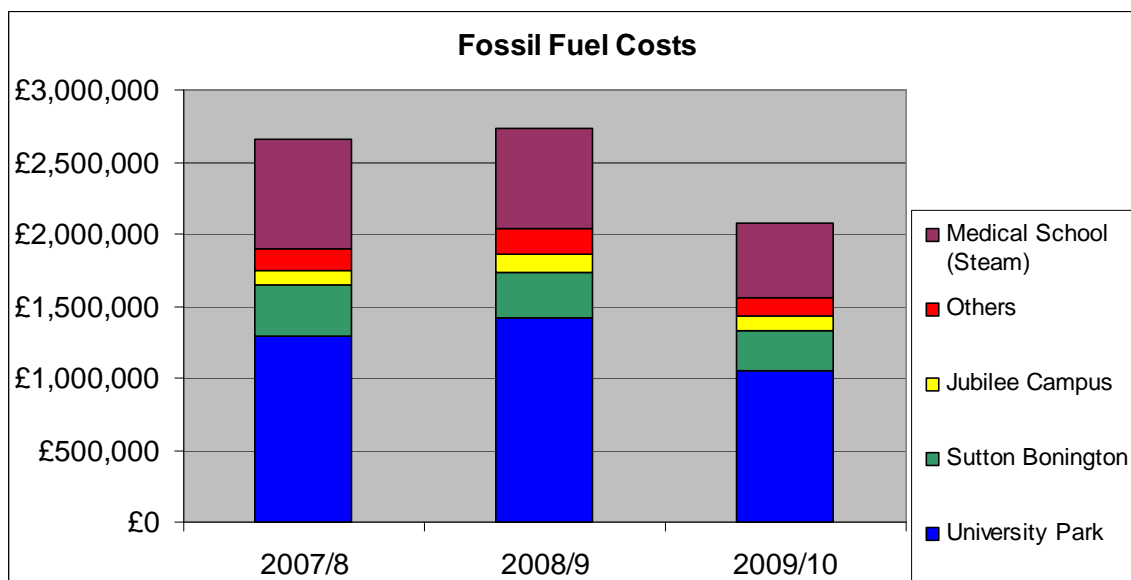


Figure 2.D.2 Graph of net fossil fuel costs for the last 3 years split by campus.

2.E - Water Consumption

Water consumption increased after having dropped during 2008/9. This was primarily because the data for University Park in 2008/9 now appears to have been artificially low. The main meter stopped working for several months during this period, and agreement was reached between the University and Severn Trent as to an estimated consumption to use. Additionally, there was a major leak at University Park in 2010 that added about 45,000 cubic metres to the consumption.

The three year comparison shows an overall reduction of 3%.

Water Consumption	cubic m. 2007/8	cubic m. 2008/9	cubic m. 2009/10	Change '08/9 to '9/10	Change '07/8 to '9/10
University Park	475,458	389,588	489,239	26%	3%
Sutton Bonington	134,277	141,907	136,755	-4%	2%
Jubilee Campus	84,037	93,768	84,248	-10%	0%
Others	11,841	12,333	13,190	7%	11%
Medical School	41,862	40,800	43,705	7%	4%
Total	747,475	678,396	767,138	13%	3%

Figure 2.E.1 Table of water usage for the last 3 years split by campus.

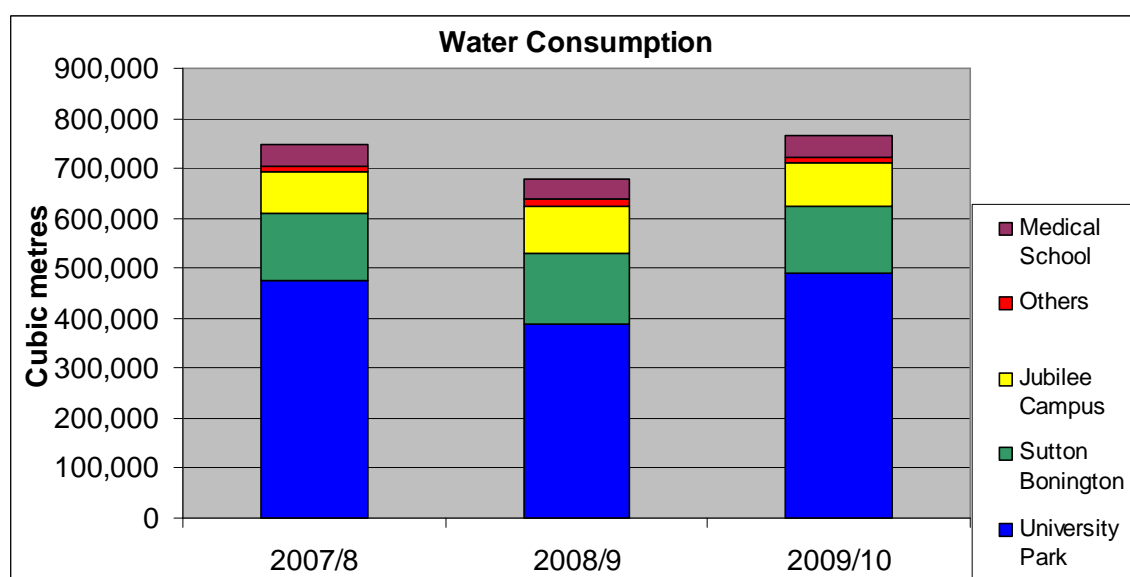


Figure 2.E.2 Graph of water usage for the last 3 years split by campus.

See Appendix C for a detailed breakdown of consumption on an account by account basis.

2.F - Water Costs

Severn Trent increased their prices for water supply and sewerage by around 4% in April 2009, on top of previous annual rises of 7.5%, 16% and 6%

The price of water supplied increased by 5.0% in April 2010 to 91.14p/m³ in summer and 48.83p/m³ in winter for large sites such as University Park. Sewerage rates at large sites were up 2.2%, to 83.68p/m³. Charges for the surface water drainage element, which is based on site area, actually decreased by 5.8% after having increased by 6.1% in April 2009.

Whilst the focus has been primarily on carbon reduction in the last couple of years, it is important that we continue to look for opportunities to reduce water costs as the water bill's share of total utility costs has risen from 13% in 2007/8 to 16% today.

Water Costs	2007/8	2008/9	2009/10	Change '08/9 to '9/10
University Park	£ 744,567	£ 578,993	£ 756,455	31%
Sutton Bonington	£ 204,167	£ 203,490	£ 236,468	16%
Jubilee Campus	£ 178,946	£ 169,998	£ 171,413	1%
Others	£ 45,326	£ 48,901	£ 50,911	4%
Medical School	£ 80,000	£ 78,000	£ 84,000	8%
Total	£ 1,253,006	£ 1,079,381	£ 1,299,246	20%

Figure 2.F.1 Table of water costs for the last 3 years split by campus.

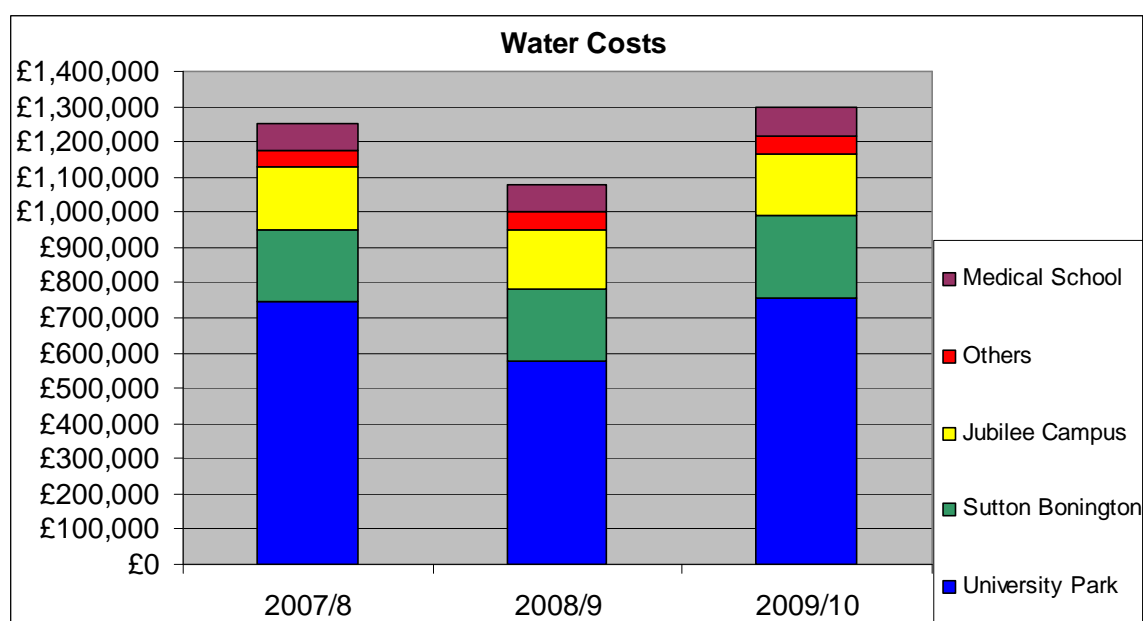


Figure 2.F.2 Graph of water costs for the last 3 years split by campus.

Section 3 – Environmental Considerations

3.A - Carbon Dioxide Emissions

Carbon dioxide emissions rose by 1.75% (1,146 Tonnes), due to the rise in gas consumption. Under the new University's Carbon Management Plan, ambitious targets are being put in place to reduce emissions by around 40% by 2020. This will necessitate annual reductions in carbon dioxide emissions of around 2,500 Tonnes per annum.

Following a change in guidelines from Hefce, the Carbon Dioxide emissions in this year's report are shown without any credits for the purchase of 'green' electricity. We did continue to purchase 'green', LEC-accredited electricity from GazdeFranceSuez throughout the period of the report, at a cost premium of 5% over CCL. Going forward the decision has been taken to cease the purchase of 'green' electricity, saving circa £170,000 per annum.

In the table and graph below, the Estates Management Statistics (EMS) emission factors have been used as shown:-

CO ₂ Emission Factors	2007/8	2008/9	2009/10
Electricity kg/kWh	0.523	0.541	0.542
Gas kg/kWh	0.206	0.204	0.205

Figure 3.A.1 Table of CO₂ emission factors for the last 3 years.

CO ₂ Emissions	Tonnes 2007/8	Tonnes 2008/9	Tonnes 2009/10	Change '08/9 to '9/10
University Park	37,610	39,087	39,194	0%
Sutton Bonington	9,403	9,231	9,854	7%
Jubilee Campus	3,886	4,637	4,949	7%
Others	4,065	4,323	4,568	6%
Medical School	10,707	9,890	10,061	2%
Total	65,672	67,168	68,626	2%

Figure 3.A.2 Table of CO₂ emissions for the last 3 years split by campus.

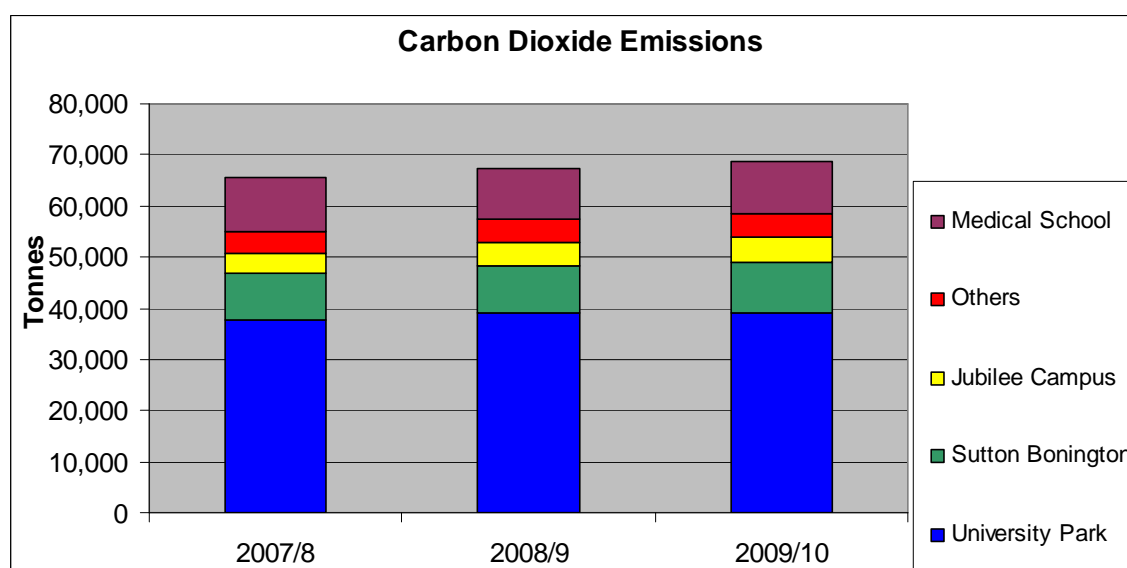


Figure 3.A.3 Graph of CO₂ emissions for the last 3 years split by campus.

3.B - Carbon Dioxide Emissions Breakdown by Campus and Utilities

CO2 Emissions 2009/2010	Tonnes Electricity	Tonnes Fossil Fuels	Tonnes Total	Prop'n Elec	Prop'n Gas
University Park	24,860	14,334	39,194	63%	37%
Sutton Bonington	6,146	3,708	9,854	62%	38%
Jubilee Campus	3,715	1,234	4,949	75%	25%
Others	3,094	1,474	4,568	68%	32%
Medical School	5,289	4,772	10,061	53%	47%
Total	43,103	25,523	68,626	63%	37%

Figure 3.B.1 Table of CO₂ emissions split by campus and by utility

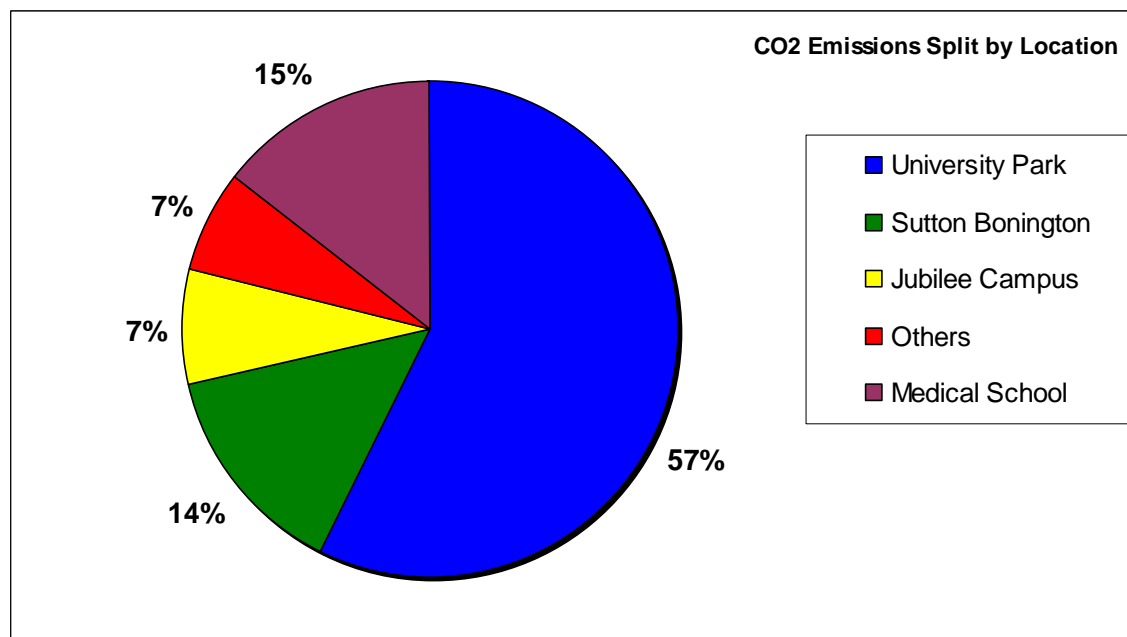


Figure 3.B.2 Chart of CO₂ emissions split by campus

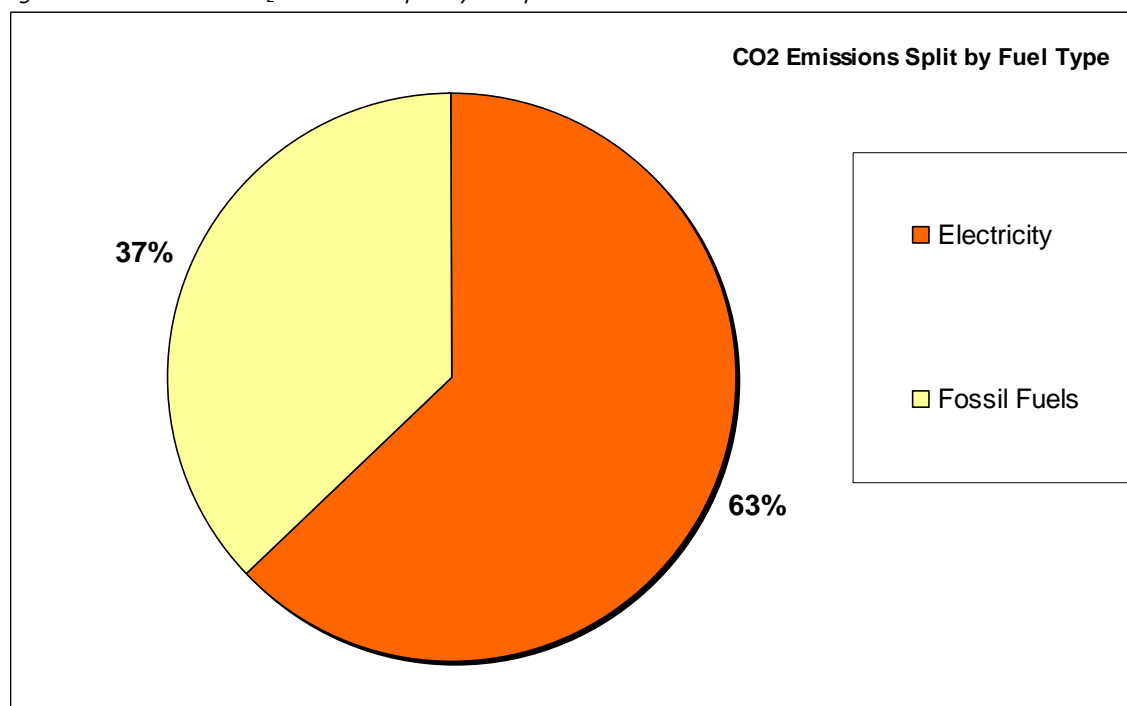


Figure 3.B.3 Chart of CO₂ emissions split by source fuel type

3.C - Weather Data – Degree Days

After an unusually mild autumn, January and February were the coldest for many years. Overall, the figures indicate that consumption of fossil fuels should have increased by about 2.6% from 2008/9 (which was itself a cold year). For the purposes of this report, 75% of the change in degree days has been used, as production of domestic hot water typically accounts for about 25% of usage.

Degree days are determined by comparing the mean daily temperature to a set temperature, in this case 15.5 Celsius. For instance, a day where the outside temperature averaged 5.0C would be counted as 10.5 degree days. The values are summated over a calendar month and the total provides a reasonably accurate guide as to the relative heating load that should be required.

	Deg. Days 20 Yr Avg	Deg. Days 2007-08	Deg. Days 2008-09	Deg. Days 2009-10	'08/9 to '09/10 Change
Aug	34	35	20	23	15.0%
Sep	74	66	68	62	-8.8%
Oct	159	136	186	126	-32.3%
Nov	266	246	264	211	-20.1%
Dec	339	331	370	387	4.6%
Jan	353	275	383	441	15.1%
Feb	304	300	327	362	10.7%
Mar	279	299	272	296	8.8%
Apr	212	233	165	198	20.0%
May	134	102	114	161	41.2%
Jun	70	65	65	54	-16.9%
Jul	34	36	29	21	-27.6%
Total	2,258	2,124	2,263	2,342	3.5%
Weather modifier (75%)					2.6%

Figure 3.C.1 Table showing last three years monthly degree days and average degree days.

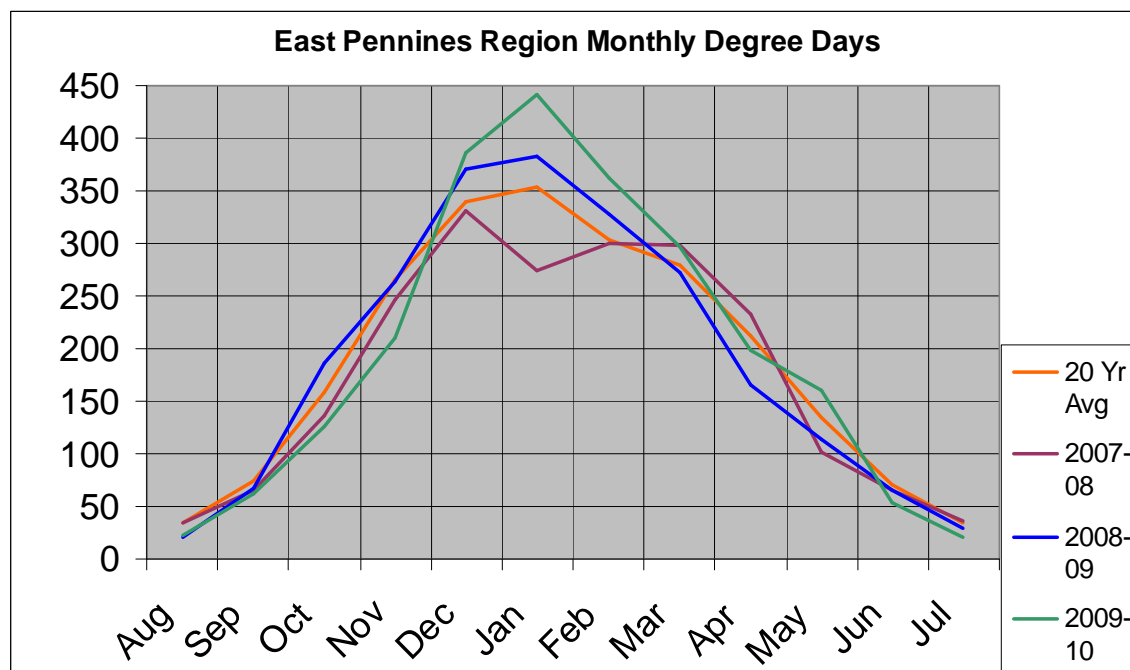


Figure 3.C.2 Graph showing last three years monthly degree days and average degree days

Section 4 – Appendices

4.A - Appendix A – Electricity Data

Electricity Invoices		2009/10	2008/9	% change	2009/10	2008/9	% change	
Main Campus		kWh	kWh	kWh	£	£	£	
University Park	1000	45,828,227	46,813,504	-2%	£2,821,763	£3,801,592	-26%	
Lenton Lodge	2251	22,800	24,812	-8%	£1,900	£2,536	-25%	
Lenton Eaves Cottage no.2	1464	13,000	21,287	-39%	£1,200	£2,330	-48%	
Redcourt Lodge	2222	2,317	1,623	43%	£287	£448	-36%	
Lenton Eaves Cottage no.1	1464	1,100	1,143	-4%	£250	£419	-40%	
Total of 5 accounts	Totals	45,867,444	46,862,369	-2%	£2,825,400	£3,807,325	-26%	
Electricity Invoices		2009/10	2008/9	% change	2009/10	2008/9	% change	
Sutton Bonington		kWh	kWh	kWh	£	£	£	
Sutton Bonington Campus	6800	10,595,531	10,733,731	-1%	£656,157	£875,274	-25%	
New Dairy		588,955	300,000	96%	£44,862	£45,000	0%	2008/9 estd
Eviton House (68 College Road)	5891	24,121	13,938	73%	£1,950	£1,481	32%	2008/9 estd
St.Michael's House (Flats 1-5)	6841	23,052	30,215	-24%	£2,522	£3,229	-22%	
Melton Lane Building A	5433	22,512	23,873	-6%	£1,875	£2,562	-27%	
Manor Farm NU Press 2	6910	17,342	15,988	8%	£1,520	£1,848	-18%	
Bunny Park Farm	6860	10,532	23,249	-55%	£1,014	£2,331	-57%	
Manor Farm NU Press 1	6910	10,106	7,135	42%	£955	£1,006	-5%	
St.Michael's Flats Nos 6&7	6842	8,592	8,523	1%	£1,443	£1,408	2%	
St.Michael's Flats Nos 8&9	6843	7,912	9,273	-15%	£1,378	£1,344	3%	
24 College Road	6805	6,083	5,749	6%	£566	£796	-29%	
Dairy Herdsman's House		5,771	8,859	-35%	£577	£1,140	-49%	
St.Michael's Close (Flats 10-15)	6840	5,512	4,358	26%	£553	£692	-20%	
40 College Road	6811	4,049	4,729	-14%	£430	£709	-39%	
45 College Road	6815	3,423	2,435	41%	£412	£716	-43%	
50 College Road	6819	2,505	4,005	-37%	£309	£677	-54%	
44 College Road	6814	2,501	33,157	-92%	£309	£3,610	-91%	
Manor Farm Pump House Kingston	6910	132	29	356%	£194	£415	-53%	
Manor Farm Soar Irrigation Pump	6910	28	26	8%	£170	£327	-48%	
Total of 19 accounts	Totals	11,338,658	11,229,271	1%	£717,196	£944,565	-24%	
Electricity Invoices		2009/10	2008/9	% change	2009/10	2008/9	% change	
Jubilee Campus		kWh	kWh	kWh	£	£	£	
Jubilee Campus Main supply	7000	5,896,178	5,494,400	7%	£380,632	£435,657	-13%	
Newark & Southwell Halls	7000	738,718	751,896	-2%	£45,953	£62,849	-27%	
Jubilee Sports Centre	7301	213,102	201,146	6%	£17,739	£20,922	-15%	
Charnock Ave Lighting	7201	5,818	0	-	£1,025	£0	-	
Total of 3 accounts	Totals	6,853,817	6,447,442	6%	£445,349	£519,428	-14%	
Electricity Invoices		2009/10	2008/9	% change	2009/10	2008/9	% change	
Others		kWh	kWh	kWh	£	£	£	
King's Meadow Campus	6901	3,363,571	3,256,829	3%	£216,996	£253,339	-14%	
Clinical Sciences (City Hospital)	3325	1,050,000	975,000	8%	£90,000	£110,000	-18%	Estimated
Derby Medical School	3561	894,795	865,447	3%	£61,064	£77,573	-21%	
Boat House	6321	102,140	30,659	233%	£7,650	£2,675	186%	2009/10 bills estd.
Grove Farm - Changing Rooms	6122	69,041	24,914	177%	£5,202	£2,421	115%	2009/10 bills estd.
Grove Farm - Old Farmhouse	6121	60,512	12,063	402%	£4,600	£1,295	255%	2009/10 bills estd.
14-22 Shakespeare Street	6101	59,201	64,438	-8%	£5,304	£6,624	-20%	
Sports Ground - Highfields	6311	48,753	18,227	167%	£4,479	£5,989	-25%	2009/10 bills estd.
Grove Farm	6123	46,107	3,908	1080%	£3,535	£649	445%	2009/10 bills estd.
8 Peachey Street	6102	14,731	12,916	14%	£1,329	£1,348	-1%	2009/10 bills estd.
Cumber Lodge	6900	0	14,475	-100%	£0	£1,598	-100%	
Unit 5, William Lee Buildings - SOL	6885	0	4,584	-100%	£0	£467	-100%	
Unit 6, William Lee Buildings - SOL	6883	0	4,209	-100%	£0	£438	-100%	
Unit 8, William Lee Buildings	6884	0	3,297	-100%	£0	£355	-100%	
Unit 8, Edison Village (Synergy Hou	6891	0	0	-	£0	£21	-	
Total of 15 accounts	Totals	5,708,850	5,290,967	8%	£400,160	£464,792	-14%	
Electricity Invoices		2009/10	2008/9	% change	2009/10	2008/9	% change	
Medical School		kWh	kWh	kWh	£	£	£	
Medical School		7,657,853	7,386,240	4%	£450,000	£514,705	-13%	Estd
Embedded units (Q.M.C.)		2,100,000	2,184,300	-4%	£130,000	£144,880	-10%	Estd
Totals	Totals	9,757,853	9,570,540	2%	£580,000	£659,585	-12%	

4.B - Appendix B – Fossil Fuel Data

Gas Invoices		2009/10	2008/9	% change	2009/10	2008/9	% change
Main Campus		kWh	kWh	kWh	£	£	£
Central Heating Station	1000	32,026,344	29,517,304	9%	£449,446	£566,156	-21%
Rutland Hall & Sherwood Hall	2191	3,166,894	3,194,587	-1%	£50,276	£87,700	-43%
Hugh Stewart Hall	2181	2,839,796	2,783,218	2%	£44,776	£59,224	-24%
Cripps Hall	2171	2,400,996	2,345,219	2%	£38,169	£50,627	-25%
Derby Hall	2121	2,108,221	1,939,086	9%	£33,460	£41,713	-20%
Bio-Molecular Sciences Ph.1	1353	1,916,780	1,782,754	8%	£30,233	£37,066	-18%
Bio-Molecular Sciences Ph.2	1353	1,860,638	1,729,250	8%	£34,332	£42,716	-20%
Lenton & Wortley Hall	2141	1,700,022	1,695,116	0%	£26,597	£36,595	-27%
Swimming Pool	1571	1,630,450	1,723,817	-5%	£24,586	£35,838	-31%
Willoughby Hall	2211	1,567,992	1,515,754	3%	£24,075	£32,582	-26%
Nightingale Hall	2161	1,542,162	1,687,019	-9%	£23,608	£37,169	-36%
Lincoln Hall	2151	1,457,976	1,486,749	-2%	£22,355	£32,185	-31%
Florence Boot Hall	2131	1,281,097	1,318,304	-3%	£19,768	£28,170	-30%
Ancaster Hall	2101	1,249,634	1,007,144	24%	£19,959	£21,476	-7%
Science area, MRI etc	1271	1,106,113	1,270,262	-13%	£17,415	£27,816	-37%
Boots Science Building	1581	1,094,179	1,110,177	-1%	£16,632	£23,681	-30%
Jesse Boot Conference Centre	1481	1,048,548	1,011,781	4%	£16,409	£21,758	-25%
Cavendish Hall	2111	1,036,773	1,050,459	-1%	£16,436	£23,923	-31%
Institute of Hearing Research	1401	755,550	865,487	-13%	£11,199	£18,016	-38%
Trent, Law & SS ext. etc	1101	679,575	592,902	15%	£11,040	£13,248	-17%
Wolfson Building	1421	597,406	459,410	30%	£9,139	£10,272	-11%
Sports Centre, Main Campus	1221	561,813	495,376	13%	£9,071	£11,356	-20%
Arts Centre & School of Music	1501	535,932	535,541	0%	£8,161	£11,477	-29%
Staff Club Lenton Mount, Hemsley	1181	523,207	532,716	-2%	£8,186	£11,357	-28%
Lenton Firs - Built Environment	1431	513,309	443,669	16%	£8,370	£10,351	-19%
D.H.Lawrence Lakeside Pavilion	1631	423,170	376,965	12%	£6,543	£8,237	-21%
Lenton Hurst	2411	309,842	444,007	-30%	£4,928	£9,120	-46%
Innovative Technology Research C	1641	266,482	203,653	31%	£6,380	£5,044	26%
Portland Building New ext.	1111	266,232	239,731	11%	£4,269	£5,309	-20%
Cripps Health Centre	1231	234,524	249,442	-6%	£3,753	£5,471	-31%
Redcourt	2221	231,775	277,331	-16%	£3,642	£5,905	-38%
MMMEM (Production Engineering)	1371	216,065	612,208	-65%	£3,667	£13,331	-72%
Cripps Hall Kitchen	2171	189,842	240,214	-21%	£2,881	£5,079	-43%
Environmental Education Centre (N	1439	181,699	147,406	23%	£2,994	£3,627	-17%
Lenton Grove (History)	1211	176,805	139,502	27%	£2,770	£3,183	-13%
Paton House (Built Env.)	1441	168,438	182,793	-8%	£2,685	£3,956	-32%
Sherwood Hall Kitchen	2200	148,664	187,596	-21%	£2,253	£3,947	-43%
Lenton Eaves (UNSSC)	1461	128,871	132,660	-3%	£2,647	£3,058	-13%
Rutland Hall Kitchen	2191	126,935	104,524	21%	£1,895	£2,140	-11%
Rutland Hall Extension HWS	2195	115,298	108,161	7%	£1,750	£2,343	-25%
Lenton Close Annexe (Cripps Hall)	2175	111,732	98,505	13%	£1,692	£2,106	-20%
Sports Centre Fitness Centre	1221	111,212	108,481	3%	£1,948	£2,536	-23%
Lincoln Hall Kitchen	2151	107,256	115,586	-7%	£1,693	£2,505	-32%
Cavendish Hall Ext.1994 HWS (Har	2115	104,574	103,382	1%	£1,620	£8,903	-82%
Lenton Fields (China House)	2163	99,993	71,421	40%	£1,889	£1,567	21%
Orchards	1161	97,902	87,112	12%	£1,562	£1,925	-19%
Portland Building Kitchen	1111	90,618	101,453	-11%	£1,370	£2,123	-35%
Sustainable Research Building	1436	89,518	103,332	-13%	£1,556	£2,480	-37%
Lenton & Wortley Hall Kitchen	2141	88,101	118,643	-26%	£1,261	£2,525	-50%
Cavendish Hall Kitchen	2111	86,811	101,756	-15%	£1,324	£2,116	-37%
Playgroup	1411	80,933	85,420	-5%	£1,248	£1,883	-34%
Warden's House Sherwood Hall	2207	63,807	68,110	-6%	£986	£1,468	-33%
Former Warden's House, Cavendis	2113	58,520	65,495	-11%	£910	£1,383	-34%
Lenton Lodge	2251	45,791	47,649	-4%	£736	£1,063	-31%
J.Boot C.C. Annexe (Cottage)	1482	43,795	50,844	-14%	£699	£1,073	-35%
Warden's House Rutland Hall	2194	42,520	43,238	-2%	£687	£967	-29%
Warden's House Ancaster Hall	2105	39,171	41,533	-6%	£619	£1,244	-50%
1 Nightingale Close (Nigh.Hall War	2321	32,563	34,907	-7%	£482	£729	-34%
Warden's House Florence Boot Hal	2133	32,344	24,957	30%	£481	£542	-11%
Paton Cottage	####	27,133	34,967	-22%	£407	£746	-45%
5A Wortley Hall Close (Eco-House)	2296	25,516	25,572	0%	£412	£542	-24%
New Eco-houses		24,483	14,630	67%	£338	£436	-23%
Lenton Firs Lodge West	2241	14,370	26,038	-45%	£231	£532	-57%
Energy Learning Unit (old Squash C	1223	10,977	5,746	91%	£186	£231	-19%
Sherwood Hall Laundry	2200	6,871	6,184	11%	£106	£133	-20%
Total of 65 accounts	Totals	69,922,559	67,324,256	4%	£1,051,195	£1,413,984	-26%

4.B - Appendix B – Fossil Fuel Data continued

Gas Invoices		2009/10	2008/9	% change	2009/10	2008/9	% change	
Sutton Bonington		kWh	kWh	kWh	£	£	£	
Main Boilerhouse	6800	9,864,017	8,180,661	21%	£147,211	£166,838	-12%	08/9 low due to estimates
Animal Houses Boilerhouse	6800	2,826,779	2,289,125	23%	£43,394	£47,750	-9%	
Plant Sciences	5711	2,373,166	2,371,742	0%	£37,789	£51,774	-27%	
Veterinary School	5721	1,913,599	1,614,331	19%	£30,492	£35,261	-14%	
Sports Hall SB (New)	5951	318,385	293,225	9%	£5,004	£6,315	-21%	
The Elms (Environmental Science)	5161	175,616	167,303	5%	£2,724	£3,538	-23%	
Eviton House (68 College Road)	5891	120,000	0	-	£1,850	£0	-	Estimated
Main Building (Sutton Bonington)	5011	92,058	91,381	1%	£1,403	£2,018	-30%	
St.Michael's Flats Nos 6&7	6842	76,896	70,321	9%	£1,318	£1,697	-22%	
Food Sciences Building	5701	62,805	62,265	1%	£928	£1,265	-27%	
Food Hall	5081	62,038	69,569	-11%	£927	£1,420	-35%	
Bonington Hall Laundry & Gym	5881	36,110	40,141	-10%	£541	£881	-39%	
Bonington Hall Warden's House	5842	29,254	25,276	16%	£471	£497	-5%	
52 College Road	6820	28,107	20,484	37%	£440	£392	12%	
24 College Road	6805	27,616	18,463	50%	£455	£419	9%	
St.Michael's House Flat 5	6841	26,801	28,485	-6%	£425	£607	-30%	
St.Michael's House Flat 2	6841	23,757	23,950	-1%	£379	£517	-27%	
St.Michael's House Flat 3	6841	16,636	18,579	-10%	£266	£400	-33%	
St.Michael's House Flat 1	6841	13,128	15,386	-15%	£218	£282	-23%	
St.Michael's House Flat 4	6841	6,198	3,690	68%	£99	£78	27%	
North Laboratory	5091	792	2,063	-62%	£12	£52	-78%	
South Laboratory	5051	63	63	0%	£1	£1	-19%	
Hathern House, Bon. Hall (4)	5831	0	0	-	£0	£0	-	
The Firs (Surgery No.2)	5233	0	0	-	£0	£0	-	
Old Sports Hall SB (VLA)	5221	0	-320	-100%	£0	£8	-100%	
Portakabins (T.C.R. unit)	5301	-546	55,107	-101%	£13	£1,207	-101%	
St.Michael's Flats Nos 8&9	6843	-3,919	11,393	-134%	£27	£174	-116%	
Total of 27 accounts	Totals	18,089,356	15,472,686	17%	£276,305	£323,377	-15%	
Gas Invoices		2009/10	2008/9	% change	2009/10	2008/9	% change	
Jubilee Campus		kWh	kWh	kWh	£	£	£	
Newark Hall	7130	1,236,348	1,249,019	-1%	£19,848	£27,324	-27%	
Computer Sciences (DCS) & The A	7040	804,805	599,800	34%	£12,805	£13,043	-2%	
Southwell Hall	7120	611,579	687,605	-11%	£9,690	£14,965	-35%	
Melton Hall	7110	600,889	645,073	-7%	£9,553	£13,946	-31%	
The Exchange (CTF)	7030	588,034	670,419	-12%	£9,532	£14,282	-33%	
Dearing Building (FOE)	7050	508,882	468,965	9%	£8,070	£10,153	-21%	
Business School South (New)	7080	456,170	504,004	-9%	£7,431	£11,228	-34%	
Business School North (SMF)	7020	447,546	356,829	25%	£6,970	£7,911	-12%	
Jubilee Sports Centre	7301	334,749	306,045	9%	£5,238	£6,970	-25%	
Grace Building	7350	250,000	0	-	£4,000	£0	-	Estd.
Catering (CCF) HWS	7040	138,295	144,271	-4%	£2,063	£2,949	-30%	
Grace Building Biomass	7350	43,018	0	-	£1,913	£0	-	
Total of 12 items		6,020,317	5,632,032	7%	£97,113	£122,771	-21%	
Gas Invoices		2009/10	2008/9	% change	2009/10	2008/9	% change	
Others		kWh	kWh	kWh	£	£	£	
King's Meadow Campus	6901	3,303,407	3,300,253	0%	£52,812	£72,333	-27%	
Clinical Sciences (City Hospital)	3325	1,750,000	1,700,000	3%	£40,000	£50,000	-20%	Estd
Derby Medical School	3561	1,201,489	1,045,595	15%	£18,872	£22,253	-15%	
14-22 Shakespeare Street	6101	269,676	233,434	16%	£4,344	£5,218	-17%	
Grove Farm OIL	6122	247,414	302,966	-18%	£10,870	£11,407	-5%	
Sports Ground - Highfields	6311	190,344	191,071	0%	£3,066	£4,062	-25%	
8 Peachey Street	6102	146,676	116,932	25%	£2,315	£2,528	-8%	
Boathouse OIL	6321	50,000	49,723	1%	£2,000	£1,426	40%	
Tea Room Sports Ground - Highfiel	6311	31,022	47,299	-34%	£507	£892	-43%	
Clumber Lodge	6900	0	139,747	-100%	£0	£3,325	-100%	
Unit 8, William Lee Buildings	6884	0	19,070	-100%	£0	£604	-100%	
Unit 6, William Lee Buildings	6883	0	4,938	-100%	£0	£127	-100%	
Unit 5, William Lee Buildings	6885	0	7,914	-100%	£0	£203	-100%	
Total of 13 accounts		7,190,028	7,158,943	0%	£134,786	£174,377	-23%	
Steam Used		2009/10	2008/9	% change	2009/10	2008/9	% change	
Medical School		kWh	kWh	kWh	£	£	£	
Medical School	3101	19,239,000	18,300,000	5%	£410,000	£552,000	-26%	Estd from Uni meters
Embedded Units (Q.M.C.)	3101	4,040,000	4,800,000	-16%	£112,000	£150,000	-25%	Estd
		23,279,000	23,100,000	1%	£522,000	£702,000	-26%	

4.C - Appendix C – Water Data

Water Invoices		2009/10	2008/9	% change	2009/10	2008/9	% change	
Main Campus		cubic m.	cubic m.	cubic m.	£	£	£	
Main Supply, Sth Entrance	1000	464,566	362,477	28%	£0	£0	-	Leak May10
Science Area	1000	10,751	7,820	37%	£0	£0	-	08/09 unusually low
Nightingale Hall	2161	5,798	9,360	-38%	£0	£0	-	
J.B.C.C. Banqueting	1481	2,269	2,711	-16%	£0	£0	-	
Lenton Hurst	2411	1,027	1,247	-18%	£0	£0	-	
Paton House (Built Env.)	1441	993	718	38%	£0	£0	-	
Lenton Eaves (UNSSC)	1461	902	760	19%	£0	£0	-	
Beeston Lane Gardeners' Compour	1511	542	429	26%	£0	£0	-	
J.B.C.C.	1481	464	2,123	-78%	£0	£0	-	
Redcourt	2221	451	463	-2%	£0	£0	-	
Lenton Firs - Built Environment	1431	444	400	11%	£0	£0	-	
Lenton Grove (History)	1211	422	369	14%	£0	£0	-	
Playgroup	1411	368	240	53%	£0	£0	-	
Lenton Lodge	2251	180	418	-57%	£0	£0	-	
5A Wortley Hall Close (Eco-House)	2296	63	54	15%	£0	£0	-	
Water+SWD Invoices	1000	0	0	-	£447,364	£286,713	56%	
TE & Sewerage	1000	0	0	-	£309,091	£292,280	6%	
Total of 17 accounts	Total:	489,239	389,588	26%	£756,455	£578,993	31%	
Water Invoices		2009/10	2008/9	% change	2009/10	2008/9	% change	
Sutton Bonington		cubic m.	cubic m.	cubic m.	£	£	£	
Landcroft Lane Meter	6800	124,711	131,048	-5%	£0	£0	-	
College Road Meter	6800	7,403	8,934	-17%	£0	£0	-	
St.Michael's House (Flats 1-5)	6841	4,561	1,838	148%	£9,929	£3,867	157%	
Bunny Park Farm	6860	80	88	-9%	£120	£131	-8%	
SB TE Costs	6800	0	0	-	£119,929	£108,000	11%	
SB Water Costs	6800	0	0	-	£106,466	£91,471	16%	
Trough, Kegworth Rd.	6910	0	0	-	£24	£21	15%	
Total of 7 items		136,755	141,907	-4%	£236,468	£203,490	16%	
Water Invoices		2009/10	2008/9	% change	2009/10	2008/9	% change	
New Campus		cubic m.	cubic m.	cubic m.	£	£	£	
Jubilee Campus main meter	7000	58,532	65,252	-10%	£0	£0	-	
Newark Hall	7130	13,881	15,730	-12%	£0	£0	-	
Southwell Hall	7120	7,140	9,681	-26%	£0	£0	-	
The Amenities Building	7330	1,652	957	73%	£0	£0	-	
International House	7320	1,385	938	48%	£0	£0	-	
Jubilee Sports Centre	7301	771	585	32%	£0	£0	-	
Sir Colin Campbell Building (Gatew	7340	501	600	-16%	£0	£0	-	
Nottm Geospatial	7350	371	0	-	£0	£0	-	
Charnock Ave Sports Pavilion	7201	14	27	-49%	£50	£107	-53%	
Jubilee Campus Costs	7000	0	0	-	£171,362	£169,755	1%	Group billing
Triumph House	6701	0	0	-	£0	£136	-100%	
Total of 11 items		84,248	93,768	-10%	£171,413	£169,998	1%	
Water Invoices		2009/10	2008/9	% change	2009/10	2008/9	% change	
Others		cubic m.	cubic m.	cubic m.	£	£	£	
King's Meadow Campus	6901	6,998	7,626	-8%	£37,163	£37,376	-1%	
Sports Ground - Highfields	6311	1,735	1,134	53%	£3,801	£2,392	59%	
Clinical Sciences (City Hospital)	3325	1,600	1,500	7%	£4,400	£4,000	10%	Estd
Grove Farm - Changing Rooms	6122	1,245	1,001	24%	£1,665	£1,265	32%	
Boat House	6321	1,100	339	225%	£2,634	£2,287	15%	
14-22 Shakespeare Street	6101	479	550	-13%	£1,062	£1,000	6%	
8 Peachey Street	6102	34	31	10%	£185	£161	15%	
Clumber Lodge	6900	0	130	-100%	£0	£175	-100%	
Unit 5, William Lee Buildings - SOL	6885	0	14	-100%	£0	£96	-100%	
Unit 8, Edison Village (Synergy Hou	6891	0	6	-100%	£0	£34	-100%	
Unit 6, William Lee Buildings - SOL	6883	0	4	-100%	£0	£100	-100%	
Unit 8, William Lee Buildings	6884	0	0	-	£0	£16	-100%	
Total of 12 accounts		13,190	12,333	7%	£50,911	£48,902	4%	
Water Recharges		2009/10	2008/9	% change	2009/10	2008/9	% change	
Medical School		cubic m.	cubic m.	cubic m.	£	£	£	
Medical School	3101	32,905	30,000	10%	£65,000	£60,000	8%	Estd
Embedded Units	3101	10,800	10,800	0%	£19,000	£18,000	6%	Estd
		43,705	40,800	7%	£84,000	£78,000	8%	

4.D – Appendix D – Summary of Renewable Energy and alternative energy technologies used in University Buildings

The University has been at the forefront of introducing and developing new and renewable energy technologies. As this technology has matured, it is now incorporated in all new build projects.

Existing buildings incorporating renewable energy technologies:-

- **Dearing Building** - 18kW peak photovoltaic cells producing 15,300kWh/annum of electricity
- **Business School North** - 24kW peak photovoltaic cells producing 20,400kWh/annum of electricity
- **Computer Sciences** - 18kW peak photovoltaic cells producing 15,300kWh/annum of electricity
- **Nottingham Geospatial Building** - biomass boiler producing 40,800 kWh/annum of heat
- **International House** - Lake Source Heat Pump producing 134,600kWh heating and 154,200 cooling
- **Amenities Building** - Lake Source Heat Pump producing 203,000kWh heating and 159,700 cooling
- **Sir Colin Campbell** - Lake Source Heat Pump producing 181,500kWh heating and 207,400 cooling
- **Lenton Firs** – 1.95kW peak photovoltaic cells
- **Marmont Centre** – 0.8kW peak photovoltaic cells, 0.108kW wind turbine, 15kW peak solar thermal hot water system
- **Sustainable Research Building** 8.96kW peak photovoltaic cells producing 7,100kWh/annum of electricity
- **Environmental Education Centre** 18kW peak photovoltaic cells
- **David Wilson Millennium Eco-House** – photovoltaic cells producing 1,250kWh/annum, a micro CHP system producing 1.2kW peak of electricity and 8kW of heat, and two wind turbines of 0.108kW peak and 0.24kW peak.
- **The BASF House** has a biomass boiler producing 15kW of heat and a solar thermal hot water system giving up to 470 litres of hot water.
- **The Tarmac House** has solar thermal panels providing 210 litres of domestic hot water, a biomass boiler with 1kW peak output, plus photovoltaic tiles providing 3,700kWh per annum of electricity (3.5kW peak).

New projects under construction are detailed below:

- **Engineering Sciences Learning Centre** - Ground Source Heat Pump producing 180,000kWh and 4,800kWh cooling
- **Humanities Building** – Ground Source Heat Pump (open loop)
- **Energy Technologies Building** - Bio oil CHP unit producing 400,000kWh of heat and 390,000kWh of electricity. There are also photovoltaic cells producing 11,400kWh of electricity
- **Maths extension** – Ground Source Heat Pump
- **Bio-energy Building** - biomass boiler producing 40,100 kWh of heating

4.E – Appendix E – Energy Initiatives during 2009/10

Because of the increasing importance of Sustainability issues, the University appointed its first Director of Sustainability in December 2009 and within the Estate Office the Energy and Environment functions have been combined into one team. The team has been working on improving all areas of the University's environmental performance, including development of the Carbon Management Plan. This Plan will direct our efforts towards achieving the major reductions in carbon dioxide emissions called for by the UK government and the University funding body, Hefce.

The University continued to use its Salix Fund of £375,000 for investment in energy-saving projects. The funding is effectively a zero-interest loan, with costs from energy savings being recycled to the fund for future use. Projects funded this year include:-

- BMS heating controls at Sutton Bonington Library
- External insulation at Derby Medical School
- Lighting controls in Pharmacy
- Lighting controls in Portland/Trent corridor

Additionally, the following projects that were not compliant with Salix's strict rules were funded directly by the Estate Office:-

- Electricity sub-metering at substation 16 on University Park (Boots Science Building)
- Connection to electricity tariff meters at King's Meadow Campus and Derby Medical School
- Connection to the largest 25 gas meters across the University via radio links to provide half-hourly data to the Estate Office.
- Installation of a Powerperfector voltage optimiser for I.T.R.C. building
- Lighting controls in Psychology stairwells and corridors

The commencement of the Carbon Management Plan from next year will allow for major new investment for carbon reduction initiatives. The full list of sections within the Plan covers:-

- Improvements to building fabric and insulation
- Laboratories
- Major equipment upgrades
- Behaviour change and awareness
- Boiler replacement
- Heating strategy
- Lighting upgrades
- Renewable energy projects
- Green IT
- Low Energy Strategies for activities within buildings.



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