

University reduces costs through commitment to saving water

A Case Study at the University of Glasgow

This Case Study demonstrates the cost savings and environmental benefits that can be achieved by adopting a long-term water minimisation campaign involving everyone on the site. A systematic approach allowed the University of Glasgow to reduce water use on its main campus by around 33% between 1993 and 2005, with minimal capital investment on water saving devices and new equipment. A visit from an Envirowise advisor, as part of the **big splash** initiative, has provided further impetus to achieve even greater savings in the future. The benefits to the University of Glasgow of better water management include:

- ✓ **Total cumulative cost savings of over £493 000**
- ✓ **Cumulative reduction in water use and effluent generation of over 329 700 m³**
- ✓ **Improved understanding and control of water use on campus**
- ✓ **On-going savings as part of a continual improvement process**



Background

The University of Glasgow uses large amounts of water at a cost of some £750 000/year. Water use is diverse and includes washrooms, restaurants, research and teaching facilities, grounds maintenance, heating and ventilation. With the help of Scottish Water and specialist consultants, the University has steadily reduced its water consumption over the last ten years, despite rising student numbers. The University employed a full-time Energy Conservation Officer in 1993 to review utility use and began an on-going water minimisation programme in 1994/95.

Responsibilities for the Environment

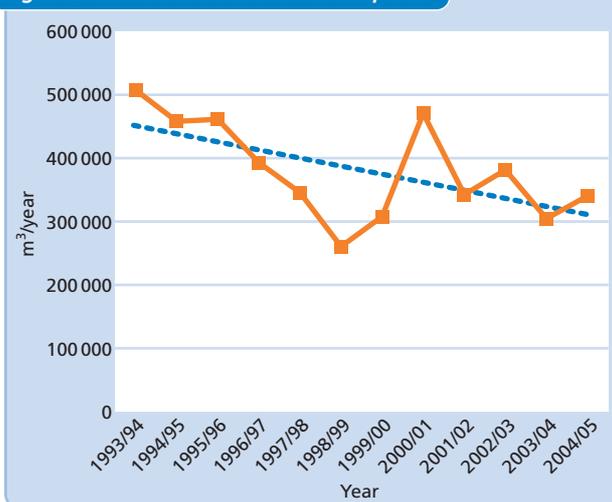
The University's Energy Management Policy¹ includes a commitment to reduce water consumption throughout all campus activities. The Energy Management Committee contains representatives from all aspects of university life and is chaired by a senior manager reporting directly to the governing body. The Committee meets twice a term to discuss initiatives and report on performance. The Energy Conservation Officer is responsible for day-to-day management of initiatives.

Staff and student awareness is considered essential to meet objectives. Induction training for new staff includes information about environmental issues and regular events help to involve students. For example, a campaign is run during Freshers' Week and an awareness video starring actor Richard Wilson (a past Rector) is available on the University website.

Water Saving Initiatives

Examples of the initiatives that have reduced consumption by around 33% since 1993/94 (see Fig 1) are described below. The associated cost savings and environmental benefits are summarised in Table 1.

Fig 1 Non-residential water consumption



Note: 2004/05 figure is provisional.

Domestic Water Use

One of the University's initial actions in 1995 was to fit 170 urinal controls (A). Almost ten years later, the University fitted 84 cistern dams, 322 push taps and two further urinal controls following a review of domestic appliances in a number of high-use buildings such as the Main Building and the Library (G).

Water Use in Science Departments

To encourage individual Science Departments to use water efficiently during research and teaching, the Energy Conservation Office offered financial incentives to promote the whole-life costing of equipment, goods and services. For example, distillation apparatus (stills) in many laboratories use large amounts of electricity and water to generate purified water for scientific and technical purposes. Replacing stills with filtration units based on reverse osmosis reduces both energy and water use. Through the incentive scheme, which offered departments subsidies of £500 - £2 000, 30 stills were replaced with filters between 1996 and 2003 (B).

Following this success, the University worked with the Chemistry Department to install new mechanical vacuum pumps as replacements for traditional bench-top water vacuum (venturi) systems (E).

The Science Departments also use substantial amounts of water for cooling or chilling equipment such as mass spectrometers and lasers. The University has encouraged consideration of water efficiency and four pieces of equipment have been fitted with closed-loop chiller units (D).

Estates and Buildings Department

Following a review of its services to staff and students, the Estates and Buildings Department has reduced water use by 7 300 m³/year (worth £8 248/year) through the installation of:

- time-controlled water flow valves to heating and ventilation systems in the Library and the main boilerhouse (C);

Table 1 Summary of on-going water saving initiatives

Year implemented	Initiative
1995	(A) Fitting urinal controls (170)
1996 - 2003	(B) Replacing laboratory stills with filters (30)
1999 - 2001	(C) Fitting time-controlled water flow valve
2001	(D) Installing closed-loop chillers on mass sp
2003	(E) Replacing venturi vacuum sets with mec
2003	(F) Right sizing Scottish Water meters
2004	(G) Fitting urinal controls (2), push taps (322)
2004	(H) Installing new heating pumps
2005	(I) Installing new vacuum pumps on heating
Total	

¹ See www.gla.ac.uk/events/energy/

- new heating pumps (H);
- new vacuum pumps on the heating system (I).

Right Sizing Water Meters to Save Fixed Charges

In 2003, the University commissioned Scottish Water to check that, based on measured water consumption, the 'right size of meter' was installed on selected buildings. The results were surprising. Of the 18 buildings examined, eight did not have the right size of meter. 'Right sizing' reduced fixed charges significantly at no cost to the University (F). Recent work with leak detection consultants has shown that checking overflows and pipework for leaks will lead to further reductions in network costs.

Visit from an Envirowise Advisor

As part of its commitment to do more, the University signed up to the Envirowise **big splash** campaign. An Envirowise advisor provided support to prepare a mass balance of water use on the campus to identify possible water losses and opportunities for cost savings. The advisor's report highlighted potential improvements worth over £116 000/year, including:

- more accurate determination of wastewater allowance for billing;
- installation of further water saving devices;
- switching from unmetered to metered supplies for certain properties;
- closer checking of water bills for anomalies.

Cost Savings and Environmental Benefits

The systematic programme implemented by the University has saved a total of £493 667 since 1994/95 (see Table 1). All of the initiatives required staff commitment, management support and departmental involvement. Two-thirds of the ideas had a payback period of less than two years.

A cumulative total of 329 709m³ of water and effluent have been saved (see Table 1). In addition, there are significant associated energy savings from the reduced need for water/effluent distribution and treatment.

Future Plans

Based on the findings from participating in the **big splash** initiative, the University intends to concentrate in 2005/06 on:

- reviewing metered and unmetered properties to optimise fixed charges for water supply and wastewater;
- reviewing the campus wastewater allowance to account for water losses to sewer (including cooling towers and grounds keeping);
- extending monitoring and control systems and developing real-time recording of water consumption data;
- investigating the application of sustainable urban drainage systems (SUDS).



	Annual savings		Cost (£)	Payback period	Cumulative savings ¹	
	Cost (£)	Water/effluent (m ³)			Cost (£)	Water/effluent (m ³)
	18 700	16 550	18 700	1 year	187 000	165 500
0)	4 520 ²	4 000	75 000	>10 years ²	20 340 ³	18 000
s to mechanical pumps/vacuum plant	5 825	5 154	2 500	6 months	10 700 ⁴	9 450 ⁴
ectrometers and lasers (4)	18 788	16 626	46 143	2.5 years	75 152	66 504
hanical pumps	36 000	31 860	72 000	2 years	72 000	63 720
	60 545	Nil	Nil	Immediate	121 090	Nil
2) and cistern dams (84)	6 815	6 030	5 805	10 months	6 815	6 030
	570	505	4 000	7 years	570	505
g system	1 853	1 640	2 750	1.5 years		
					493 667	329 709

¹ Up to 2005.

² Does not include substantial savings from reduced electricity use.

³ Based on average installation of 4.5 years.

⁴ Savings based on 1.8 years.

University of Glasgow

The University of Glasgow is one of the UK's leading universities and plays an important role in the cultural and commercial life of Scotland. Most of its 100 departments are located on the Gilmorehill campus in Kelvinside, with other specialist teaching units, research facilities and accommodation located around the city. The University has some 20 000 students and a staff of 5 700. It has an annual turnover of £285 million.



Comments from the University of Glasgow

Water conservation has reduced our expenditure greatly and this frees up money for future investments. The advisor's visit, as part of the **big splash** initiative, really highlighted the potential savings on our wastewater allowance and has set the agenda for this year's programme. We aim to concentrate on measuring our evaporative losses, improving our remote metering around the site and reviewing metering at our currently unmetered properties.



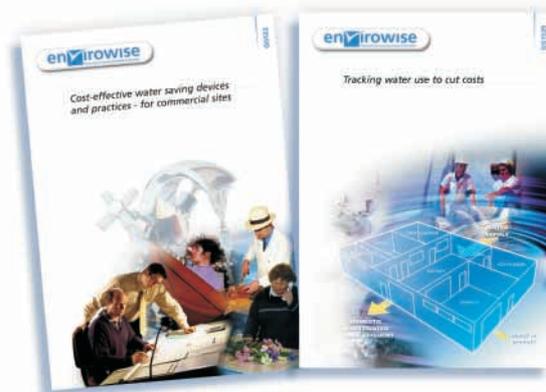
“ Water conservation has reduced our expenditure greatly...
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A Young

Mr A Young,
Energy Conservation Officer

Host Company:

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Useful publications from Envirowise

(GG522) - *Cost-effective water saving devices and practices - for commercial sites*

(GG152R) - *Tracking water use to cut costs*



If you are interested in finding out how to reduce water use and save your company money please contact Envirowise. Please call the Environment and Energy Helpline on 0800 585794 or visit our website (www.envirowise.gov.uk/water).



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Envirowise - Practical Environmental Advice for Business - is a Government programme that offers free, independent and practical advice to UK businesses to reduce waste at source and increase profits. It is managed by Momenta, an operating division of AEA Technology plc, and Technology Transfer and Innovation Ltd. Envirowise is funded across the UK by the DTI and Defra and the Business Resource Efficiency and Waste (BREW) Programme in England, the Scottish Executive in Scotland and the Materials Action Programme (MAP) in Wales. This publication was prepared with assistance from Enviromentor Limited.



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