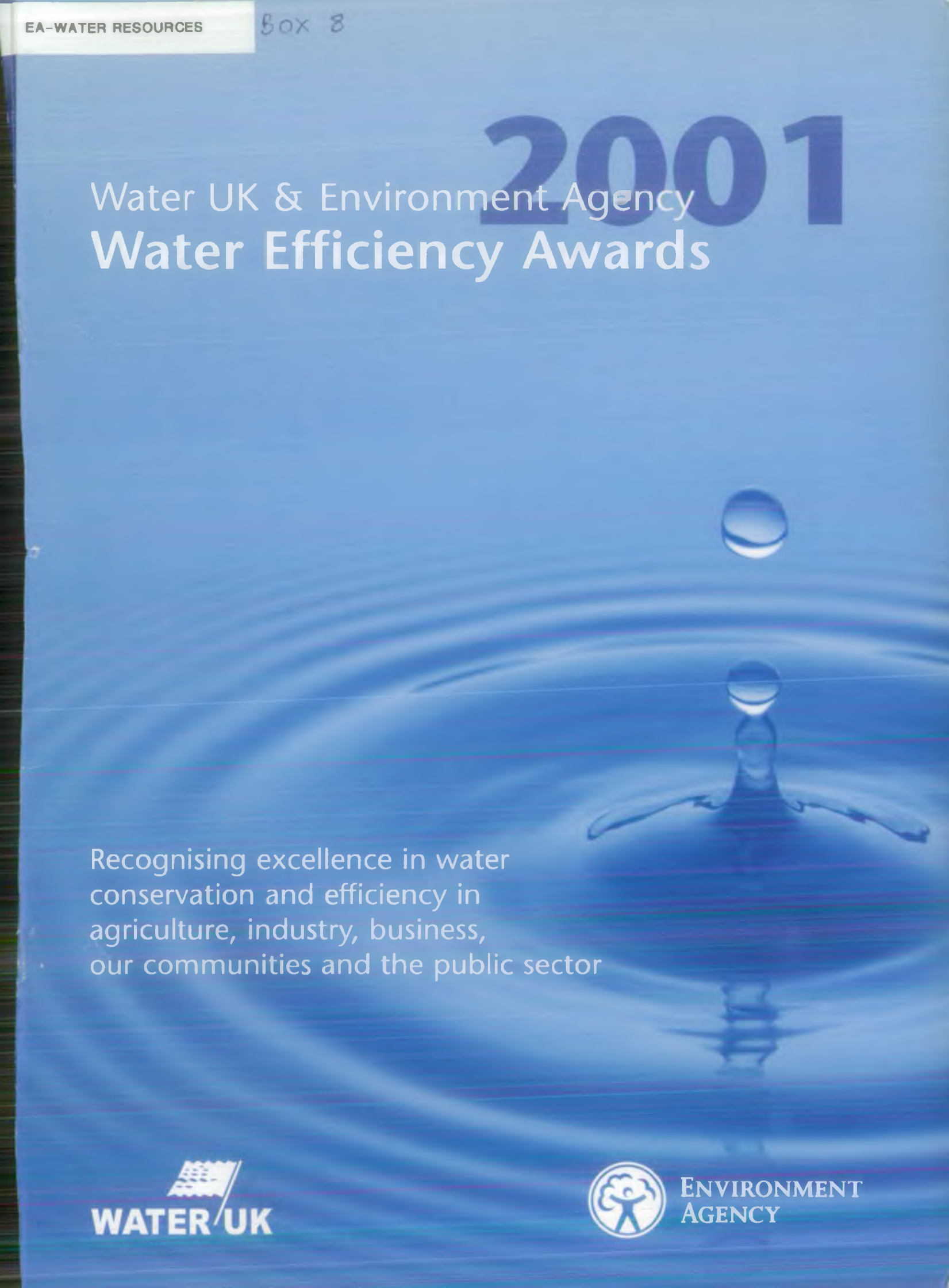
2001

Water UK & Environment Agency
Water Efficiency Awards



Recognising excellence in water conservation and efficiency in agriculture, industry, business, our communities and the public sector

WATER UK

ENVIRONMENT AGENCY

Foreword

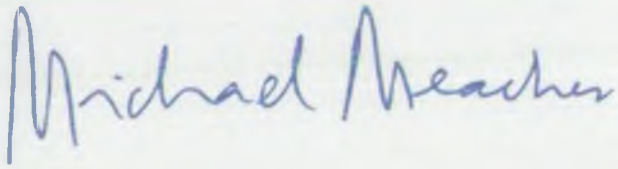
I am again delighted to have been asked to contribute to this booklet for the Water UK & Environment Agency Water Efficiency Awards 2001. Last year's Awards were the first to bring together and build on the success of Water UK's 'Waste Watchers Awards' and the Environment Agency's publication 'Saving Water on the Right Track'.

I was very pleased to learn that this year will see the active involvement of Ofwat who are supporting the development of a new Award category on Economic Research. There is also the introduction of an Agriculture & Horticulture category and the National Farmers' Union's involvement is similarly appreciated. Despite the other challenges that our agricultural industry currently has to face, it's heartening to note what many are achieving in water conservation and efficiency.

The other organisation that is taking an active role for the first time this year is Envirowise who are involved in the Industry & Business category. Their work has already resulted in substantial savings in water usage by industry and commerce and consequently in financial costs to firms.

More generally, we must all recognise that climatic and social changes are already having an impact on water resources in this country. In years to come they are likely to put our supplies under even greater pressure. This is something, therefore, that we all need to take seriously right now. That is why one of this Government's central objectives is promoting sustainable development, of which safeguarding water resources is an integral part.

And that is why these Awards are so important in showing what can be achieved. I commend other businesses and organisations to look and learn from these fine examples and examine how they can reproduce the performance of the best.



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Introduction

Now in their second year, the **Water UK & Environment Agency Water Efficiency Awards** recognise, reward and celebrate good practice in water efficiency and water conservation within agriculture, industry, business, our communities and the public sector.

This publication showcases the winning, commended and shortlisted entries to the 2001 Awards, demonstrating the wide variety of water conservation initiatives currently taking place in the UK across a range of organisations.

It is all too easy to assume that water is an endless resource, as neatly summarised in the words of one of our entrants this year, Voyager Foods Ltd, 'To our horror it was highlighted that most of our employees thought water was *free*'. But, as Michael Meacher has pointed out, climatic and social changes are already putting our water supplies under pressure.

Water efficiency is not only good for the environment but also for business or organisational efficiency. These Awards play a crucial role in developing understanding of what can be done and particularly the practical steps that can be taken. It is intended that this essential case-study resource of good practice will provide organisations with the inspiration and motivation to take up the challenge of water efficiency and implement water saving practices.

Partnerships, sharing information and expertise play an important role in achieving and promoting sustainable water management. This year, Water UK and the Environment Agency are delighted to welcome the support of Envirowise, the National Farmers' Union and Ofwat in the development of three of the categories.

This year's judging panel, chaired by **Charles Harries**, Special Projects Manager, Southern Water, comprised:

Dr Janet Asherson
Head of Environmental Affairs, Confederation of British Industry

Ian Barker
Head, National Water Demand Management Centre, Environment Agency

George Day
Head of Water Resource Economics, Ofwat

Dr Martin Gibson
Director, Envirowise

Rob Jarman
Head of Environmental Practices, National Trust

Michael Paske
Vice President, National Farmers' Union

Dr Giles Phillips
Head of Water Resources, Environment Agency

Pamela Taylor
Chief Executive, Water UK

Due to the breadth of entries from many different types of organisation, the judges faced a challenging task in identifying winning projects. This year's winners have all met the general judging criteria of water and financial savings achieved, consideration of wider environmental impact, innovative or creative approaches to traditional problems and consideration of customer issues where appropriate, as well as the criteria specific to their entry category.

Water UK and the Environment Agency would like to thank all those who took the time to enter projects this year and look forward to welcoming entries in the future.

Communication

This category looks to reward water efficiency projects where communication has played a major role in their success. The judges were looking for an integrated communications' programme which has provided added value to a programme of work or a specific project. Particular judging requirements included clear evidence of how the project was developed for the audience identified, what impact the project had and how the project was evaluated.

Three Valleys Water

commended

Clay Lane Environment Centre Outreach Programme

Three Valleys Water's Education Support Unit has developed an outreach programme within schools to increase awareness of water efficiency, teach children to use water wisely and make water issues relate more closely to National Curriculum teaching.

The water company's Education Support Unit is based at a purpose built Environmental Studies centre in the grounds of the Clay Lane Water Treatment Works in Hertfordshire. The centre's manager is a qualified teacher and is supported by education officers, retired teachers and final year university students. Schools visit the centre to learn about the treatment works and other water issues, including water efficiency, as part of the company's strategy to target children as 'next generation' customers.

After discussions with schools, it was discovered that visits to the centre can prove difficult for logistical reasons. In response, Education Support Unit staff decided to develop an alternative to work within schools: they designed an outreach teaching programme using the water efficiency theme.

The aim of the programme is to raise awareness of water usage, promote good habits and so reduce water waste. This is carried out in a way that is fun for the pupils, relevant for the teachers and in keeping with Three Valleys Water objectives. The Education Support Unit therefore designed a 'menu' of teaching options from which schools can choose – assemblies, short teaching sessions on specific water topics or longer sessions that span several teaching periods and include various practical tasks. For example, the Water Saving, Water Wasting assembly has been designed to be current, factual and relevant to the audience and to entertain the children. The presenters tease teachers by interviewing them about how they use water, and they make use of props such as toilets and taps.

'Three Valleys Water has listened clearly to what people want and is doing it with them, not at them'

Judges' Panel

The key messages communicated by the outreach programme relate to actions that children and teachers can take to reduce water consumption in their school and ideas that children can use to save water at home. Issues discussed include the waste from dripping taps, the importance of turning taps off properly, and savings that can be made by using the washing machine only when there is a full load. A new idea for the longer sessions is to encourage children to conduct a water audit at their school and present the results to their teachers. Children will be encouraged to identify areas where water consumption can be reduced, with the aim of saving money for the school.

The programme has been designed to offer the flexibility to be relevant and up to date with water related events. For example, on a local level, where the company has undertaken supply network rehabilitation work near the school, water company staff have used the assemblies to explain what is being done and then deliver a general talk about water issues.

The Education Support Unit has been overwhelmed with bookings for the outreach programme. In two years staff have delivered nine water days and 52 assemblies to schools in the Three Valleys Water area. By supporting these sessions with clear, simple, user-friendly activity sheets they have also ensured that teachers will continue to use water-related issues to cover various aspects of the National Curriculum. It is hoped that long after the visit, the next generation of customers will still be receiving the water efficiency message.

Alongside the outreach programme the centre runs a course for social inclusion groups and pupils with behavioural or learning difficulties. One of these groups has now worked at the centre each week for a term. As a part of this course, the pupils have conducted a water audit on the centre itself to identify areas where savings could be made, and they have been encouraged to repeat the exercise back at their own schools.

The next phase of the project is to establish whether actual savings are being made as a direct result of the outreach initiative. It is hoped that this can be achieved by comparing meter readings of schools before and after children have participated in the assemblies, classes and water audits.

At a glance

- Purpose-built Environmental Studies' centre promoting water issues to visiting schools
- Complementary outreach programme offering a 'menu' of water-related teaching options
- Vehicle to encourage schools to carry out their own water audit and further water-related studies

Bristol Zoo Gardens

shortlisted

'Green' Audit - the Water Message

As part of its 'Green' Audit, Bristol Zoo sought to cut its water consumption and increase awareness of water efficiency among staff and visitors. Through the design of its exhibits, water saving fittings and an extensive awareness campaign, it has achieved considerable savings and spread understanding of the importance of water conservation.

The zoo, which has 80 full time employees and receives over 700,000 visitors a year, is carrying out a 'Green' Audit and working towards ISO 14001 environmental accreditation. Following a review of water consumption, it decided to seek ways to reduce the amount of potable water used and costs by at least 10%. Two of its main exhibits have been used for this - the Seal and Penguin Coasts and the Conservation Education Centre.

The Seal and Penguin Coasts uses a salt water treatment system for its 650m³ pools which maintains water quality without the use of chemicals. Water from the pools is treated with ultra-violet, sand filtration and biological means before being reused. Occasionally the pools are topped up with fresh salt water. This process is described in detail to visitors to reinforce the water conservation message.

The Conservation Education Centre is a teaching resource to educate schoolchildren about water efficiency and other environmental issues. It includes water saving fittings in the toilets and a waterless hand-cleaning system for visitors to use after handling animals. Along with other buildings on the site, the centre uses water butts for garden watering.

With support from Bristol Water, all public toilets display water efficiency posters, and the zoo shop now sells cistern displacement devices. A campaign among staff to reduce water usage in cleaning procedures has also brought a drop in consumption through just small changes.

As a result of these actions total water consumption at the zoo has dropped by 42%, from 68,271m³ per year (1999/00) to 39,879m³ per year (2000/01).

'Low cost initiatives can achieve significant quantifiable savings. Reinforcement of staff awareness and integration of approaches can maintain these savings'

Bristol Zoo Gardens

At a glance

- 42% reduction in water consumption
- Water conservation message spread to staff and visitors
- Water management demonstrated as integral to the zoo's environmental policy

Essex & Suffolk Water

shortlisted

Water World Teaching Resource Pack

Essex & Suffolk Water developed the *Water World* teaching pack to raise awareness among primary schoolchildren of local and world-wide perspectives on water.

The promotion of water conservation is a key strategy for Essex & Suffolk Water in managing water resources in their region. To raise public awareness of the need for water efficiency, it produces various communications to target different groups - from house developers to homeowners, and from businesses to teachers and schoolchildren.

The *Water World* teaching pack is just one element of a broad initiative that includes school visits and tours of water treatments works. Its key objectives are:

- To create awareness of the importance and value of water for a healthy society, the economy and the natural environment
- To further understanding of individual responsibility towards achieving a sustainable environment through wise use of water
- To improve community links by supporting teachers in delivering the National Curriculum (Key Stage 2) elements that relate to water

The education team at Essex & Suffolk Water developed the pack in consultation with teachers working on placement at the water company, and during production it was sent to eight primary schools for evaluation.

Two separate teacher development days were used for the launch, with all primary schools in Essex & Suffolk invited. Schools who did not attend were offered a free pack by post. From a total of 468 primary shools, more than 300 applications were received. Feedback from the launch days was extremely positive, and although no formal evaluation has been made, it is clear from school visits that the pack has been well received and is being used in the classroom. This is most apparent among children themselves, who have been able to demonstrate knowledge contained within the pack.

At a glance

- Key Stage 2 teaching aid to communicate the importance and value of water
- Developed and tested with teachers and local primary schools
- Aims to improve links between the local community and the water company

Essex & Suffolk Water

shortlisted

Home Water Surveys

Through the Home Water Surveys, Essex & Suffolk Water has carried the water efficiency message direct to customers in their homes, raising awareness of water saving measures.

The project was designed to find a cost effective way to reach as many customers as possible with key messages about water usage and the savings they could make. Essex & Suffolk Water decided on a direct approach, seeking personal contact by telephone or on the doorstep to invite 20,000 customers to take part in the Home Water Surveys. Those who agreed were given a water survey pack and guidance on how to carry out their own home water audit or seek help from Essex & Suffolk's auditors. The pack included water saving devices: a Save-a-Flush cistern device, a shower flow bag and timer, tap washers, a drip gauge for taps, a hose-gun for the garden and a travel toothbrush carrying the message 'Turn taps off while brushing'.

The overall approach focused on motivating customers: the initial invitation had included a washing machine magnet with the message 'Don't start me until I'm full', and customers who returned their audit forms were rewarded with a printed tea towel to reinforce this message and another Save-a-Flush device. The project was also promoted through the local media and in schools.

In total 18,600 packs were delivered and 6,310 audit forms returned. An estimated 100m³ of water per day is being saved as a direct result of the project, although figures have yet to be fully analysed. More than 2,000 customers requested further information following the audit, demonstrating the level of interest that has been generated.

A follow-up survey revealed that the main reasons customers wanted to take part were: to save water, to provide information for Essex & Suffolk Water and to help the environment. The three devices customers thought most useful were the Save-a-Flush, the hose-gun and the shower timer.

At a glance

- Estimated total water savings of over 100m³ per day among domestic customers
- Direct personal contact made with 20,000 customers
- 18,600 customer survey packs delivered and 6,310 home audit forms returned

Community Projects

This new category recognises water efficiency and conservation projects that work for and with the local community. In particular, the judges were looking for activities that demonstrated collaboration and partnership and that have provided direct benefits to the local community in terms of environmental improvements, employment, access or financial savings.

Of the several projects entered for this category, the judges felt that only one satisfied what they were looking for in terms of meeting the overall and specific category criteria. However, the judges would like to encourage further entries under this category in the future.

Yorkshire Water

shortlisted

Working Together for Auditable, Economic Water Savings

Yorkshire Water joined forces with Hull City Council and the Government's New Deal Task Force to save water by auditing households, promoting water efficiency measures to customers and giving away cistern displacement devices to help cut consumption.

In order to pass on some of the benefits of the project to the local community, long term unemployed local people were recruited to carry out the audit. This provided work-based opportunities within a deprived area of Hull, with employees given comprehensive training on how to complete the home survey and provide customers with advice on saving water.

The household audit was used to check water-using fittings, provide information on water saving measures and supply and fit devices to cut water consumption in the home. It explained the importance of waiting for a full load before running the washing machine or dishwasher, the savings that can be made by using a garden water butt and the volume of water that can be wasted by taps, baths and garden sprinklers. Auditors checked each home to see that taps were not dripping and pipes were properly lagged to protect against bursts in winter. Where toilets had a cistern of 9 litres or more, the auditor fitted a 1-litre cistern displacement device. Information on the various water using devices and number of occupants in each home was also collected.

In total, 6,539 audits were completed and 7,351 cistern displacement devices installed. The information on occupant numbers was then used to calculate average water savings per household of 11.5 litres per day. These equate to a total overall saving of 75m³ per day. However, Yorkshire Water suggests that less quantifiable savings will also have occurred, such as changes in behaviour that will have made customers more water efficiency conscious.

Feedback both from households and auditors has been positive, and Yorkshire Water believes that the project has contributed to the development of a good customer interface, as well as providing work experience for long-term unemployed.

'This initiative demonstrates that offering a basic water audit and fitting cistern displacement devices is not only feasible, but economic too'

Yorkshire Water Services

At a glance

- Estimated water savings of 11.5 litres per household per day through installation of cistern displacement devices
- Provided job opportunities for the long term unemployed in an economically deprived area
- Water efficiency issues promoted in 6,539 homes audited by Yorkshire Water

Envirowise Industry & Business

Supported by Envirowise, this category recognises good practice water efficiency and conservation projects in industry and business in the UK. Projects covered a whole range of issues, from improving water consumption in manufacturing processes to facilities' management programmes, or internal communication activities that encourage staff to conserve water. Judges were looking in particular for innovation, creative solutions to traditional problems, clear evidence of process methodology and how the project was communicated both within the organisation and beyond.

F Smales and Son (Fish Merchants) Limited — winner

Water Minimisation in a Factory Environment

Hull-based fish merchant F Smales and Son has achieved significant reductions in water consumption and effluent by making low cost changes to its fish production methods and promoting water efficiency to staff.

The business handles 8,000 tonnes of fresh and processed fish every year. The factory uses water to clean fish and equipment and for general hygiene. Smales introduced the water minimisation project to reduce water and effluent costs and implement more environmentally friendly production practices.

'A textbook water and waste minimisation project'

Judges' Panel

Led by the company's waste minimisation champion, with advice and support from the Sea Fish Industry Authority (SFIA), the project aimed to reduce effluent strength and lower water consumption through three main activities:

- Sharing project goals with staff
- Setting water consumption targets
- Low-level capital expenditure on production processes

The involvement of personnel was key to the project's success. At the outset, a video was shown to all staff, to raise awareness of water efficiency issues and explain the importance of the water minimisation project to the company. All staff were invited to offer their own suggestions for ways in which the company might meet its project goals.

To address consumption, water meters were fitted within each section to quantify the amounts of water being used at each stage of the fish cleaning and production processes. These figures were then used to set consumption targets for each part of the factory. Section managers were given responsibility for meeting these new levels through good housekeeping, and the targets now form part of their key performance indicators within the staff evaluation process. Consumption dropped significantly once the targets had been implemented, through changes made in the fish production procedures:

- Filleters use water for cleaning and lubrication. Their hoses were fitted with manual triggers to enforce 'dry filleting' and ensure that water was not running continuously
- The factory freezer needed a continuous supply of water for cleaning. It was replaced by a Nitro Freezer, which is self-cleaning and so uses no water
- The fish washing process was altered so that water is only used on demand rather than running all the time
- An audit identified that one of the skinning machines was using three times as much water as the others. The machine was tuned to bring it back in line

Smales has also improved the quality of effluent leaving the site, as well as reducing effluent volume through lowering water consumption. Staff were asked to minimise the amount of waste entering drains, and many drains had new covers fitted so that solid waste would be retained on the factory floor.

In 1998, when the project began, annual water consumption at the factory was 66,536m³, with 85% of this volume leaving the factory as effluent. By 2000, this figure had been reduced to 40,409m³ – down 39%. Further improvements are predicted for 2001, with annual consumption expected to be around 36,248m³ (45% lower than the original consumption) and effluent levels correspondingly reduced. The water minimisation measures have saved the company around £30,000, and since a low initial investment was required, the project payback is estimated to be around one month.

At a glance

- Water consumption reduced by 39%
- Lower volume of effluent leaving factory site and improved effluent quality
- Savings of £30,000 and payback within one month

Paragon Group

commended

Water and Process Efficiency

Paragon Group is a laundry and textile rental operator supplying hotels, hospitals, restaurants, industry and the food sector. As part of its drive to reduce costs and seek environmental accreditation it has designed a new laundry process to cut water consumption, chemical usage and emissions without compromising wash quality.

The Water and Process Efficiency project was implemented at the company's Kingston laundry, where 23 staff handle more than 1.7 million pieces a year. The new laundry process design involves using less water in the first and second rinse stages of the wash. After rigorous testing, Paragon found that this was an effective way of cutting the amount of water required without compromising rinse quality. This has enabled Paragon to reduce water consumption by an average 26% (from 30 litres per kg of work washed in 1998/99 to 22.2 litres in 2000/01). Two further measures have been identified for potential savings:

- An in-house locking system is being introduced to prevent the washing machine starting up if the dump valve is open. This will ensure that clean water entering the machine at the beginning of the cycle does not go to waste
- A hydraulic system will be used to keep the dump valve shut during the wash cycle, so there are no leaks during the wash

The redesigned wash process has also reduced process time by between 2 and 10 minutes, and with less steam produced, total CO_2 emissions from the site are lower.

Savings on capital expenditure for linen have also been made by minimising chemical damage through less use of chemicals. This has other associated environmental benefits.

As a follow-up, the company has produced the *New Paragon Approved Wash Process Manual* to transfer the savings to other Paragon sites, and the laundry is considering the potential for using recycled water in the early stage of the wash cycle.

'We wanted to challenge traditionally accepted practices and to see if alternative theories would show savings'

Paragon Group

At a glance

- Water consumption of laundry wash cycle reduced by an average 26%
- Less use of chemicals through changes to the wash process
- Manual produced for transfer of savings to other company sites

J&A (International) Limited

shortlisted

Water Minimisation and Self Sustainability

J&A (International) Limited is a specialist printer using water efficient technology to develop its production processes and waterless alternatives to reduce environmental impact, improve conditions for staff and support its work towards ISO 14001 accreditation.

The company designs and manufactures printed labels and emblems for the laundry and workwear industries world-wide. Last year it produced more than 10 million transfers and 4 million emblems. The Water Minimisation project was designed to reduce water consumption and bring down the company's relatively high wastewater charges through installation of waterless urinals at the plant and the purchase of an automatic stencil developer.

The waterless urinal system has cut water consumption and achieved basic labour savings, reduced the amount of chemicals used for cleaning and created a more hygienic working environment for the staff.

The stencil developer has a built-in water re-circulation unit which uses greywater to wash the screens, with only one run of fresh water per cycle. This reduces consumption and accelerates the printing process since more print screens can now be washed simultaneously. Following the installation of this equipment, the plant's water consumption has been reduced by 69% and labour costs have been cut through increased automation. Wastewater charges have been reduced by 93% and project payback is expected within 18 months.

J&A has recently installed two reed beds to filtrate and purify the remaining effluent through natural processes and is looking into the possibilities of recycling water from these tanks and harvesting rainwater from plant buildings. Internal communication has been an important factor throughout the project, and the reed bed installation has been promoted externally via press releases to highlight the company's commitment to environmental management.

At a glance

- 69% reduction in water consumption
- 93% savings on wastewater bill
- Developed company awareness of environmental issues

Voyager Foods Limited

shortlisted

Water and Waste Minimisation

Voyager Foods joined a large-scale waste minimisation project to save water and bring effluent content within acceptable limits.

As one of ten small and medium-sized enterprises participating in Project CLEVER (Coastal Liquid Effluent Volume Reduction), the Sunderland based food factory worked with Northumbrian Water, the Environment Agency and its own 100-strong workforce to change practices and offset the impact of the Urban Waste Water Treatment Directive.

Voyager Foods cooks and processes 2,470 tonnes of raw chicken a year. It joined the project to cut water consumption and reduce the amount of solids and fats discharged into drains, following notification of an expected 30% rise in water and waste costs.

Voyager was asked by the Project CLEVER team to generate ideas for no cost or low cost measures to meet the project aims. It was soon realised that the input of the company's 100 staff would be crucial in identifying effective measures, so an awareness campaign was launched. This included:

- Sending a memo to all employees explaining water charges and how, together, they could save money for the company
- A 'corny caption' competition to encourage people to think about how to save water
- Discussions with staff and working alongside them to encourage ideas

As a result of the awareness strategy, many measures have been identified and low cost modifications or changes to work practice implemented. For example, the factory floors are now swept to remove solid waste before they are washed, hoses have been fitted with manual trigger nozzles so they no longer run continuously, and drain covers and catchpots have been upgraded to trap more solid waste.

Overall water consumption has been reduced by 14% and the level of solids and fats in effluent is now well within the required limits, bringing water and sludge treatment charges down by 39%.

Voyager Foods is now acting as mentor to other small manufacturing companies and the benefits of the project have been communicated in trade magazines.

*'To our horror it was highlighted that most of our employees thought water was **free**'*

Voyager Foods Ltd

At a glance

- Water consumption reduced by 14%
- Water and sludge treatment charges reduced by 39%
- Full staff participation in water saving initiatives

Walkers Midshire Food

shortlisted

Ham Shower Project

Walkers Midshire Foods has used simple modifications to its meat production system to reduce the amount of water used and increase productivity through shorter processing times.

The company set out to reduce costs in the factory, which each year produces 3,000 tonnes of high quality hams. During preparation, the hams are cooked and then have to be cooled within four hours to the required temperature for refrigeration. Until recently the cooling system involved showering the hams with water continuously over the four hours, with the showers delivering water at a rate of 3.80 litres per minute. It was this process the company investigated for potential savings, and they identified two areas for change.

First, the showers were fitted with new nozzles to lower the water delivery rate to 1.08 litres per minute. Then, instead of running continuously, the showers were adapted to operate intermittently, three minutes on, three minutes off. This has introduced a period of heat evaporation while the showers are off, and the hams take 15 minutes less to cool.

Together these measures have reduced water consumption by 64%, from 124 litres per ham to 45 litres. Since the modifications to the shower unit have also reduced process time, output has increased, resulting in total annual savings equivalent to £120,000.

The results of the project have been published in the company's internal newspaper and passed on to the other 15 companies within its business group. It has also been recognised externally, winning the company a Severn Trent Water Business Award.

'Other organisations should take a look at what they are doing. With very simple changes they have drastically improved water efficiency'

Judges' Panel

At a glance

- Water consumption reduced by 64% per ham produced
- Total annual water saving of £120,000
- Process time reduced by 15 minutes per 4-hour batch

NFU Agriculture & Horticulture

This new category is supported by the National Farmers' Union (NFU). It aims to recognise UK-based agricultural or horticultural projects that demonstrate water efficiency good practice. Entries were invited from all aspects of agriculture and horticulture. Entrants were asked to demonstrate how efficient planning of water use on the farm or holding has led to long-term savings. Judges were looking for details of how much water has been saved and what plans or thinking have been put in place to improve on these savings.

The judges were delighted with the standard of entry submitted to this new category and the replicability that the winning, commended and shortlisted projects demonstrate both for large and small agricultural and horticultural enterprises.

CA Strawson Farming Limited — winner

Farm Water Management

The water management programme on this Nottinghamshire farm has reduced water consumption and increased crop quality through changes to its vegetable washing and irrigation processes. It has also addressed environmental impact by making more efficient use of its own borehole supply and investing in staff training.

Awareness of water management issues at CA Strawson Farming was already high since water is a scarce resource in the area. In particular, the farm understands the impact of groundwater abstraction on the local environment. The water management programme was set up to find ways to make the business more efficient. It examined all aspects of water usage on the farm, identified potential savings and then introduced changes to work practices and the water supply infrastructure to cut consumption, improve the quality of its produce and make the farm more efficient.

CA Strawson Farming grows a wide range of crops, including carrots, potatoes and wheat, with a total production of 105,000 tonnes per year. It also has an outdoor pig breeding unit of 1,500 sows. Annual water consumption is around 450,300m³, with most of this being used for irrigation and vegetable washing. It is the modifications to these two processes that have brought the greatest savings.

Previously the farm used freshwater for vegetable washing and then let it go to waste; now the water for washing is recycled through the system in two different ways. For potatoes, the water is cleaned through a cyclone filtration system to separate off the solids and then re-used in the wash process. Periodically this water is changed for freshwater and the used water is carried by pipeline to a willow coppice and used for irrigation. Other vegetables are washed using a similar recycling method. Clean water is introduced via a hydro-cooler, re-used through brush and barrel washing and then recycled.

'This entry offers lessons for all farmers in the way that water efficiency measures have been applied across the whole of the business'

Judges' Panel

Upgrades to the crop irrigation system have made watering more efficient and reduced consumption still further. Through the installation of a number of weather stations the farm now receives more accurate information on irrigation requirements and has cut down on watering. At the same time it has replaced its gun irrigation system with booms. This saves water and electricity and ensures that the water is applied with greater accuracy to the base of the crop, further reducing wastage. The farm's agronomist has also received specialist training in irrigation techniques.

As a result of the water management programme, the supply to the pig breeding units has also been changed. Previously the pigs were supplied by mains water, but now groundwater is piped from the farm's own borehole. This involved inspection and maintenance of the farm's pipework, which reduced leakage.

Water consumption is now monitored via sub-meters at all points of use and the information gathered is used to create benchmarks for the future. The combined initiatives have delivered a 20% reduction in consumption as well as financial savings. Improved irrigation methods have also produced an increase in plant quality, making it easier to meet production targets.

CA Strawson Farming has also spread the water efficiency message both internally and externally. The farm organises visits from schools to communicate the effects of the water management programme and spell out associated environmental issues. The farm site has a dedicated training room and farm staff have received training on the environmental and economic benefits of more efficient water use. The effectiveness of this training is being monitored through staff targets to reduce water wastage.

At a glance

- 20% reduction in water consumption
- Recycling of water for vegetable washing
- More efficient irrigation produced better crops
- Ongoing staff training and public awareness programme

JR & M Weekes & Sons

commended

Dairy Farm Good Housekeeping

This small farm has demonstrated the potential for effective water management in a small-scale operation by developing its water infrastructure and introducing recycling to the dairy.

JR & M Weekes & Sons is a family run farm in South Wales, producing around 225,000 litres of milk per year as well as some lamb and beef. The farm has implemented various measures to reduce environmental impact and improve water efficiency. The latter is particularly important: not only must the farm provide a secure supply of drinking water for the animals and for running the dairy, but it also has to keep costs down.

Several measures have been designed to improve overall efficiency and reduce water wastage:

- The water distribution network supplying the animal drinking troughs is connected via pipework with an isolation valve on each leg. This ensures that the system can be carefully controlled since any leg of the network can be shut off
- All pipework above ground is lagged to protect against bursts and leakage during winter, and all visible pipes and troughs are inspected daily for leaks
- The farm recycles the water used for cooling the milk. Instead of letting the warm water from the plate cooler go to waste as it leaves the heat exchanger, it is collected and reused to clean the milking parlour. In winter this warm water is given to the cows to drink instead
- Since the field troughs do not need to be filled during the winter, the supply pipes are drained and given a thorough inspection

Future projects for the farm include the mapping of pipe routes on the farm to avoid damage from other activities.

'Our early ideas became daily practice as we saw them taking shape and bringing success'

JR & M Weekes & Sons

At a glance

- Prioritisation of water management within a family-run operation
- Cooling water reused to clean the milking parlour and supply animals with drinking water
- Efficient system for checking water distribution network

Notcutts Nurseries

commended

Water Recycling and Reuse

The use of slow sand filter recycling systems at Notcutts Nurseries has relieved an overstretched borehole supply, reduced water consumption and helped protect local jobs.

Notcutts grows three million container plants a year, producing conifers, shrubs, trees, climbers and herbaceous perennials at its 600-acre Suffolk site. The nursery has its own groundwater supply, but after three unusually dry years between 1989 and 1991 staff were concerned by the poor recovery rates of one of the boreholes. Since this was the principal source of irrigation water for some 700,000 or more of the containers, with 25 jobs directly dependent on the site, a solution to reuse water was clearly needed.

Notcutts' research revealed that slow sand filtration would be a practical solution that involved no hazardous chemicals. Using this method they could reuse water and reduce groundwater abstraction without compromising crop quality. As a result, all rainwater and irrigation runoff from the nursery is now recycled through the slow sand filter, saving between 20% and 30% of water each year.

Notcutts introduced hand-held probes to improve watering efficiency. The probes are used to monitor soil moisture levels throughout the year and the data collected is used to programme the irrigation equipment to ensure accurate watering.

Staff awareness of environmental issues has grown throughout the project and all staff have received training in water efficiency. Water consumption at the nursery has been reduced by 20% overall and there has been good recovery of groundwater abstraction points.

The slow sand filter has been promoted externally, to customers and students, and following its success, a similar system had been installed at the company's Surrey nursery, reducing water bills there by 62% and delivering payback of one year.

'Staff are willing to learn and implement new ideas, embracing change and making a positive contribution to the project'

Notcutts Nurseries

At a glance

- 20% reduction in total water consumption
- 20-30% of water now recycled through a slow sand filter
- Ensured continuity of employment and increase in staff awareness of environmental issues

Osberton Grange Farms

commended

Efficient Watering for Pot-grown Rhododendrons and Azaleas

This specialist grower of rhododendrons and azaleas has developed its irrigation system to use less water, reduce the amount of time spent watering and create healthier plants.

Osberton Grange Farms grows 170,000 rhododendrons and azaleas in pots each year for sale to garden centres. Following six years of trials, it has introduced new growing and irrigation methods which have cut water consumption through two principles: by reducing the water need and by applying irrigation water more effectively.

The water need of plants has been reduced by introducing a 'pot in pot' system first developed in Belgium. In direct sun, black plant pots can reach temperatures of up to 35°C, creating a high demand for water to keep the roots cool. With the pots sitting below ground level in pre-positioned larger pots, the roots stay cooler and require less water.

For irrigation the conventional overhead sprinkler has been replaced by a computer-controlled dripper system that waters the plants beneath canopy level so the water reaches the soil with less wastage. The system can be programmed to specific irrigation schedules to suit different plant types, and rather than running continuously it waters intermittently to ensure full absorption into the pot.

Together these measures have reduced water consumption by 60% and profits have increased through associated improvements in plant quality that have led to higher sales. Despite a considerable initial investment, the payback period is around three years. Other associated benefits include :

- Savings on electricity
- Watering man-hours reduced by 25-30%
- Less leaching of fertiliser into groundwater through more accurate watering
- Additional trees planted around the 'pot in pot' site provide shelter and grassy areas that encourage wildlife, including ground beetles, which eat vine weevil that are harmful to the commercially grown plants.

The farm is using its catalogue to communicate the environmental method of propagation to customers, and a web site is currently in production.

'The incentive was to make the production of high quality rhododendrons easier with less waste of water and labour'

Osberton Grange Farms

At a glance

- 60% reduction in water consumption
- Higher profits through 20% increase in plant quality
- Associated environmental benefits of accurate watering and landscaping to encourage wildlife

Palmstead Nurseries

shortlisted

Recycling and Computer Controlled VPD Watering

In order to expand their business without increasing water bills or overstretching a limited local supply, Palmstead Nurseries installed a rainwater recycling system for irrigation and innovative Vapour Pressure Deficit (VPD) equipment to increase the accuracy of watering.

The Kent nursery produces a million container shrubs each year and has plans for further growth. Increasing the use of the mains supply was not economically viable and, with awareness of potential water shortages, Palmstead decided to improve water efficiency.

A recycling system was constructed to harvest all drainage water on the site. Rainwater from building roofs (five acres) and runoff from container standing beds (15 acres) is now transferred by pipe to a holding lagoon, pumped into a six million gallon reservoir and then used for irrigation.

At the same time, the nursery purchased VPD controlled irrigation equipment, the first of three systems to be installed in the UK. The VPD system uses sensors to measure air temperature, relative humidity and plant leaf temperature to determine watering needs and then activates irrigation automatically.

With the two new systems in place the nursery has been able to expand from 8 acres to 20 acres and maintain an annual water usage level of 22,000m³, with 84% of volume now coming from the harvested supply. This has saved the equivalent of £30,000 per year in mains water costs. Payback on the recycling system is expected in four to five years and returns on the VPD equipment within two years.

Other benefits include:

- More accurate watering speeds the production cycle and improves yield
- Plants are of a better quality, therefore more saleable
- Staff have greater control over watering
- The site is drier and therefore more user friendly
- Watering labour costs have been reduced

The success of this initiative has prompted the nursery to research other possibilities, including the installation of a reed bed or a sand filtration system to clean the recycled water.

At a glance

- 84% reduction in mains water use through rainwater recycling
- Water consumption cut by 58% per acre
- Higher plant quality leading to increased sales

Ofwat Economic Research

Open to UK water companies and operators only, this new category is supported by Ofwat. It is looking for research projects that have significantly contributed to the understanding of the economics of water efficiency initiatives directed at household customers. Projects had to demonstrate a robust methodology for assessing the economics of water efficiency, in the context of balancing supply and demand. To be eligible for consideration under this category, project details needed to be in the public domain and identify the costs and resulting financial and water savings. This Award category was judged on the quality of the research and analysis, not solely by the amount of water saved.

Essex & Suffolk Water

winner

Sustainable New Homes

Essex & Suffolk Water installed and monitored a range of water efficient appliances in a housing development to produce a specification for new homes for use within the building industry and local town planning departments.

Through discussions with local planners, Essex & Suffolk Water discovered that developers were keen to build more water efficient homes but needed guidance on which products to use and the measures most acceptable to customers. To address these issues the water company set up the Sustainable New Homes project, in collaboration with the Building Research Establishment, to produce a specification for the construction industry.

The project team identified a housing development near Maldon as an ideal study location. Since the homes are housing association properties, it was thought that the lower water bills expected from the project would be attractive to the tenants.

The project had five objectives:

- To investigate the practical issues involved in specifying and installing various water efficiency measures
- To evaluate the effect of these measures on water consumption
- To determine user reaction to the measures
- To produce a specification for water efficient homes
- To disseminate results and anecdotal information to encourage the specification to be used for new buildings

The first two objectives were satisfied by installing a range of water efficient devices in the homes, monitoring their water consumption and comparing the results against control homes. Low flow or dual flush WCs, reduced flow showers, spray mixer or reduced flow rate taps and water butts were fitted in 12 test homes; 12 'standard' homes were used to draw comparisons. Three further homes were fitted with greywater recycling systems. All water using appliances in the homes were metered at the point of use and data was either continuously logged or read on a weekly basis for 14 months.

'It is possible to define an appliance specification for a water efficient home which is both financially viable and proven to reduce the amount of water used'

Essex & Suffolk Water

Questionnaires were used to determine tenants' reactions to the various measures. The first survey was conducted at the outset, in order to address any initial concerns. It also established data for each home on the number of occupants and how many additional water appliances (such as washing machines and dishwashers) had been installed. A second questionnaire was distributed towards the end of the project to collect tenants' reactions to the water-using appliances and to measure levels of acceptance.

Water savings in the test homes amounted to a total of 5% per person per day, equivalent to 23 litres per household per day over a standard home (based on new property occupancy of two people). Savings for each device were as follows:

- WCs in the water efficient homes used 10% less water per person than WCs in the control houses
- Water used for bathing in the water efficient houses was approximately 10% less per person than in the control houses
- The handwash basin taps in the water efficient homes used approximately 31% less water per person than those in the control houses

In order to produce a specification for water efficient new homes, a cost benefit analysis was carried out using the known savings. This analysis was used to rank the water saving measures from the most to the least cost effective. The results of the customer surveys were then applied to produce a ranking which included user satisfaction. The project recommends a specification of:

- Reduced volume WC (6 litre) and dual flush WC (6/4 litre)
- Low volume bath and water efficient showerhead
- Spray taps on handwash basin
- Water efficient dishwasher and washing machine
- Water butts for the garden

The project identified that savings on the water bill could be around £43 in the first year where specification appliances are installed rather than standard appliances.

These results have been disseminated through a forum organised by Essex & Suffolk Water to which house builders, housing associations, town planners and architects were invited. This has opened up discussions with local councils and it is hoped that water efficiency policies will now be included in local development plans in Essex.

At a glance

- Evaluation of water efficiency measures for new-build homes
- Specification for water efficient homes developed
- Results communicated to builders, housing associations, town planners and architects

Southern Water

shortlisted

Retrofit Dual Flush Study

This joint project between Southern Water and the Environment Agency tested retrofit dual flush conversion kits to establish how much they reduce domestic water consumption.

Five different commercially available kits were trialled and the results were used to calculate water and financial savings for metered households. Conversion kits were used as a cheaper alternative to replacing existing cisterns. Households were selected from some 400 of Southern Water's un-metered domestic customers, with the final selection of 33 based solely on the suitability of the home for installing monitoring equipment.

For each household, the trial toilet was fitted with a water meter and a data logger one month before the installation of the conversion kit. The water-flow through each cistern was then monitored before and after installation, over a nine-month period. All households were updated regularly through home visits, and 24-hour helplines were set up to provide customer support. Overall evaluation of the devices took account of ease of installation and operation, reliability and customer feedback, as well as actual water consumption.

The study, although based on a relatively small number of properties, identified average savings of 2.6 litres per flush, or 27%. Since toilet flushing accounts for around 30% of domestic water usage, this represents a potential reduction of around 8%, with an average annual saving of £17 for metered houses and a payback period of just over a year.

The study also measured savings to be made using the Save-a-Flush cistern displacement device. The 16 homes monitored showed an average drop in water consumption of 11%.

Preliminary results suggest that the cost of widespread installation of retrofit dual flush devices could be comparable to investment in more traditional water resource schemes, but it is acknowledged that further research is needed.

Southern Water has communicated the study's findings both internally and to customers.

At a glance

- Retrofit dual flush conversion kits evaluated
- 8% savings in household water identified, with financial savings for metered customers

Essex & Suffolk Water

shortlisted

Cost Effective Household Audits

Essex & Suffolk initiated this project to measure the effectiveness of four household water audit schemes.The objective was to develop a cost effective approach to future audits with sustainable water savings. In particular, Essex & Suffolk Water hopes to ensure that future audits will:

- Include components useful to customers
- Be well received by customers
- Save water or contribute to the water efficiency debate

The four household audit schemes analysed had been fairly similar in type: they had all been designed to educate customers about water efficiency and to encourage the use of water saving devices in the home. However, they varied in the type of area selected, household profile, socio-economic make-up and marketing approach. This had produced differences in take-up rates and the resultant water savings.

For each scheme the project team assessed audit components, calculating costs and water savings for each individual measure. They compared customer-related data and household survey results and used geodemographic analysis. Their main conclusions were:

- No particular group of customers can be targeted more effectively than any other group
- A mixed approach of letter, leaflet and telephone calls generates the best results
- The way in which the project is communicated and customers are motivated is more important than selecting specific customer groups

The components that will be included in the revised pack are: Save-a-Flush cistern displacement device; pack of tap washers of different sizes; shower flow rate assessment bag; drip gauge; shower timer; hose-gun; travel toothbrush; audit workbook and audit completion form.

From these conclusions a new approach to household water audits has been developed. This selects target groups by geographical area or Domestic Meter Area rather than by customer profile. The main marketing recommendations are to focus on educating customers and motivating them to take part in the audit. This modified household audit is currently being trialled more widely.

At a glance

- Previous household audit schemes evaluated
- Audit model refined for financial and environmental benefits
- Individual water saving measures compared

Public Sector & NGO's

This category recognises water efficiency best practice in public sector and non-government organisations. The category received entries from education institutions, local government, government agencies, NHS Trusts, military establishments, charities and the police. The entries ranged from educational initiatives to integrated water management programmes and installation of water saving hardware.

National Trust

winner

Towards a Waterless Estate

On its estate in Purbeck, Dorset, the National Trust has replaced conventional toilets with either waterless or low flush WCs in order to reduce water consumption, demonstrate water saving techniques to the public and trial new technology.

'An inspiring and challenging project; very much out in the public arena'

Judges' Panel

The National Trust is the largest landowner in the UK and, wherever possible, manages its land and buildings according to sustainability principles.

The Purbeck estate covers some 8,500 acres on the Isle of Purbeck. During 1999 and 2000 five innovative projects were implemented to guard against water shortages, especially in the summer season, and to protect the land against over-use of water and inappropriate discharges. The aim was to develop a waterless estate to minimise water use and wastewater production and to demonstrate sustainable water saving practices to the public. The projects include:

- Middlebere Holiday Cottages, Corfe Castle. These have no mains water or mains drainage but use a National Trust borehole with a limited supply. Self-composting toilets, which use only half a litre of water for flushing, were installed in the three cottages. Wastewater is filtered through a constructed wetland reed bed before being discharged into a natural reed bed and then into the Poole harbour reed beds. The conventional watertrap-type WC pans have proved aesthetically acceptable to cottage users.
- Spyway Farm, Langton Matravers. Each year around 10,000 young people learn to climb on the sea cliffs at Langton Matravers. Previously the site had no public toilets, but a self-contained composting toilet has now been installed in one of the barns. This uses no water (other than for handwashing).
- Shell Bay, Studland. This is the landing point for the ferry from Poole/Sandbanks, which brings in approximately 350,000 visitors per year. Until recently the lavatories serving the beach operated on a traditional flushing system with a cesspool sewage collection. Peak season visitors often suffered disruptions by lorries emptying the cesspool up to three times a day. In 2000 a new lavatory block was constructed with dry composting toilets and waterless urinals. Rainwater is harvested from the roof of the block to an underground storage tank, then treated with ultra-violet light for handwashing.
- Knoll Beach and Middle Beach, Studland. An estimated 600,000 people a year use these beaches. Waterless urinals and water saving WCs replaced traditional systems in 1999, with the flushing WCs being reduced from nine litres to four litres. A new minimal flush urinal for women has also been installed as an experiment and is being evaluated through user questionnaires. If successful, the urinal will be applied to other National Trust beach toilets.
- Studland Study Base. Constructed during 2000, this receives around 20,000 schoolchildren each year. It was built to demonstrate best environmental practice and was installed with composting toilets using only half a litre per flush. Other initiatives include wind and solar power, a ceramic wood-burning stove and heavy insulation.

All sites demonstrate to the public how water can be saved. Information is provided at the holiday cottages and within each cubical in the Shell Bay WCs. Educational leaflets explain the composting process at the Study Base, and an inspection hatch has been fitted so that the process can be viewed.

Since the installation of these devices, water consumption has reduced by 97% at these sites. This has been achieved without complaint from the public, and maintenance costs have remained unchanged. Installing the equipment required a high initial investment but was found to be the same as installing conventional systems.

At a glance

- Water savings of 97%
- Environmental benefits communicated to the public at all sites
- Women's minimal flush urinal being trialled at Studland beaches

South Yorkshire Police

commended

Water Conservation in South Yorkshire Police

The South Yorkshire Police Force has reduced its water consumption across all sites through a mixed approach, addressing areas of high usage, raising staff awareness and installing water efficient devices.

With 130 buildings housing 4,500 staff throughout the county of South Yorkshire, the Force uses considerable volumes of water – for offices, stables, sports grounds and car washing areas. This project set out to reduce water and sewerage costs and achieve lower consumption, in line with the Force's commitment to reduce environmental impact and its work towards Energy Efficiency Accreditation. It focused on three areas of activity: water invoice reviews, awareness campaigns and the installation of water saving devices.

Water invoices are now used to compare current water usage with historical data in order to identify buildings with abnormally high consumption. Problems such as wastage or leakage are immediately identified and facilities staff carry out remedial action.

All 130 of the Force's buildings have been audited to identify areas where savings could be made through the use of water saving devices. As a result, all urinals have been fitted with controllers, so flushing is kept to a minimum, and car washes on some sites now incorporate water recycling and re-use systems.

Staff awareness has been fundamental in helping the Force introduce measures to become more water efficient. As part of their induction programme, all new employees are made aware of environmental issues, including water efficiency, and encouraged to follow good housekeeping practices. Turning taps off properly and reporting possible points of water wastage are discussed, and key messages are continually reinforced through presentations and staff competitions. Posters and stickers supplied to the Force by Yorkshire Water are also used to promote water efficiency.

Since the implementation of this project, annual water usage has been reduced by 15%, with only a small investment.

'This is a good example of a large employer putting its house in order and involving its staff'

Judges' Panel

At a glance

- 15% reduction in water consumption across the entire South Yorkshire Force
- Ongoing staff awareness campaign for water saving initiatives
- Audits carried out on all 130 buildings

Corporation of London

shortlisted

Water Strategy

The Corporation of London's Water Strategy sought to reduce water costs using an integrated approach that included monitoring and targeting of consumption, site surveys and awareness campaigns.

The Corporation is the local authority for the City of London, with more than 3,000 employees spread across 24 departments. When this project started, it was spending more on water than the combined expenses of gas, oil and petrol. The energy management team therefore devised a two-phase strategy to reduce water consumption and associated costs.

The first phase involved building a water management database and using historical bills from the ten buildings with the highest consumption to identify potential rebates and other ways of reducing costs. This brought financial savings via sewage rebates, meter downsizing, a switch from rateable value to metered charging and correction of billing errors. It also identified areas of possible leakage or wastage that were then investigated. Total savings of £168,000 were achieved with little financial investment, but did require significant human resource. Of this amount, 11% was accounted for by the repair of leaks and bursts.

The second phase used a staff awareness campaign to encourage employees to identify potential savings through good housekeeping practices and installation of water saving devices. Public awareness has also been targeted through water conservation exhibitions held in the City of London's libraries. The water management database is being developed further as more information becomes available and site surveys are being used to identify opportunities for increased water efficiency. For example, the Barbican Arts Centre now has waterless urinals and flush controllers have been installed at Golden Lane Swimming Pool. Information about current projects, new ideas and concerns are also shared at regular staff meetings.

Since the implementation of the Water Strategy, annual water consumption across the Corporation's 26 sites has seen a 7% reduction overall, from 466,852m³ to 434,041m³.

At a glance

- Water savings of 32,811m³
- Awareness campaign targeted at staff and the public
- Water efficient devices now being installed in all Corporation buildings

HM Prison Wellingborough

shortlisted

Water Savings

HM Prison Wellingborough set out to reduce water consumption as a part of its overall commitment to waste minimisation. This issue became more pressing in June 1999 when a new accommodation building became operational, increasing the prisoner population by 180 to a total of 518.

The project targeted three main areas for savings: bathing, urinals and laundry facilities.

Baths in the older accommodation units were removed and replaced with showers that have percussion style controls. These use considerably less water than the baths and because they are of a high standard, the prisoners have accepted this cultural change and no vandalism has occurred.

Urinal controls were fitted in the 11 workshop areas of the prison to limit flushing times to hours of operation where previously they had flushed continually 24 hours per day, 365 days of the year. This has saved 277,920 litres per urinal annually – a reduction of 88%.

Water consumption has also been reduced by replacing the individual laundries within each accommodation unit with one central laundry for the whole prison.

Through sub-meter readings and monitoring of water invoices, it has been found that these measures have reduced monthly water consumption per prisoner place from around 12m³ to around 6m³. Wastewater charges show a corresponding reduction. This means that water consumption is now lower in the prison, despite the increase in prisoner numbers. Payback for the urinal controllers is estimated at four months; the shower blocks and laundry have expected payback periods of three years and four years respectively.

Prison staff have now taken their enthusiasm for waste minimisation beyond the prison environment and by becoming members of local environment groups the prison has won awards, including overall winner of the Northamptonshire Business Environment Awards.

At a glance

- 50% reduction in water consumption per prisoner place
- Annual savings of 277,920 litres per urinal through use of controllers
- Successes shared with fellow members of a local environment business group

Leicester City Council

shortlisted

Rainwater Harvesting at Humberstone Golf Course

Leicester City Council has reduced the volume of mains water used at Humberstone Golf Course through installation of a rainwater harvesting system.

The Council has already achieved accreditation under the EU Eco Management & Audit Scheme (EMAS) for its environmental practices, and because of the strict targets associated with EMAS, it has ambitious commitments to reduce water consumption and increase the use of greywater. The Energy Management section of the Council therefore set out to identify sites where water savings could be made.

Parks were targeted as areas of high consumption, largely due to irrigation, and Humberstone Golf Course was identified for improvement via a rainwater recycling scheme. The site used around 4,700m³ of mains water a year for irrigation and the Council aimed to reduce this by approximately 20%.

There was already a disused underground water storage chamber below the courtyard of the clubhouse, and a thorough survey showed that this 8,000-litre tank was ideally suited for incorporating into an automatic system consisting of a pump, filtration and controller. Rainwater is now collected from the roof of the clubhouse, stored in the underground tank and used to irrigate the course. The supply is supplemented with mains water only when the rainwater level in the tank is at a minimum.

The scheme has exceeded the 20% projected savings, although natural variations are expected through changes in annual rainfall. Despite the initial investment, the Council expects a payback period of around five years. The only additional maintenance requirement is a periodic inspection of the filters. If successful, this type of solution will be extended to other buildings that have a high demand for water.

The Humberstone Golf Course project has been promoted locally and nationally in trade magazines and on the radio.

'There is no need to use fresh drinking water to keep the grass growing'

Leicester City Council

At a glance

- 30% reduction in water consumption
- Blueprint scheme for future rainwater recycling projects
- Project results communicated locally and nationally via trade magazines and radio

QinetiQ & Amey plc

shortlisted

Water Efficiency at QinetiQ Firing Ranges

Amey plc has significantly increased water efficiency on QinetiQ firing ranges by developing a comprehensive maintenance programme and scrutinising water related charges.

QinetiQ manages around 20 firing ranges and airfields. The large sites are often in remote coastal parts of the UK, so the water distribution systems cover many square miles, serving remote toilet blocks and restrooms. Water is also used in evaluation exercises such as simulating tropical rainfall on munitions, or deluging jet engines to see how they operate in extreme weather conditions.

Amey is contracted to provide utilities management for QinetiQ and water efficiency is an important aspect of this service. Amey used the *TEAM EA* utility monitoring package to identify sites with abnormally high water consumption and then carried out remedial actions on three of the largest ranges.

Shoeburyness New Ranges is one of these sites, and is typical of results achieved at the other two. The Range was first sectionalised, through valving operations or submetering, to identify areas of high consumption. A 'listening' exercise was carried out and any leaks repaired, then the exercise was repeated to address any further weaknesses in the network. All existing water saving devices, such as Cisternmisers, were checked to ensure maximum efficiency, and an awareness campaign was launched. This targeted staff through posters and stickers produced by the Environment Agency and water efficiency articles in internal newsletters and other local publications.

Water consumption at Shoeburyness has been reduced by 70% as a result of these measures and savings have been considerable. Consumption is now continually monitored and targets have been set to maintain the savings.

At a glance

- 70% reduction in water consumption
- Programme to locate leaks and wastage on large remote sites
- Awareness campaign to support water efficiency measures

Research & Innovation

This category has been developed to recognise the contribution of both research and innovation to the understanding and development of approaches to water efficiency and water conservation. The judges were looking for entries which related either to specific projects requiring technical or technological innovation in order to achieve improved water consumption, or paper-based research on issues relating to implementing water conservation activities.

Dalgety Arable Limited & Fullpoint Probe Services — shortlisted

Electromagnetic Scanning of Crop Areas for Irrigation

This project aimed to provide a more accurate method of determining soil moisture deficits in order to achieve optimal irrigation levels for crops.

Dalgety Arable offers soil management and crop production advice to farmers and uses precision agriculture techniques to provide detailed growing information. For this project its DDF Agronomy Service team joined forces with Fullpoint Probe Services, which supplies neutron probes.

'Economic, agronomic and environmental benefits can be produced through the utilisation of existing knowledge and expertise combined with appropriate modern technology'

Dalgety Arable Ltd

Farmers use the information provided by neutron probes to keep soil moisture at the optimal level throughout a growing season and control the amount of water applied. This project takes the process a step further by using the probes to identify variations in soil conditions across the area of a single crop.

Since soil moisture deficits depend on soil type, the project team first needed to locate soil type changes across the crop area. They used an Electro Magnetic Induction (EMI) scanner to take readings and then 'zoned' the area according to the EMI readings. By analysing top-soil and sub-soil samples within each zone, they were able to site neutron probes accurately and provide the farmer with more exact soil moisture deficit information.

This technique, which was first used during the 2000 potato season at a Cambridgeshire farm, succeeded in preventing over-irrigation throughout the growing period. It not only saved water at the farm, but also eliminated the detrimental effects of overwatering and reduced soil erosion. Across the 570 acres of the project, irrigation water usage was reduced by an average of 1 inch per acre, representing an 11% drop in consumption. Usually the extra inch would have been applied in two applications, so further savings in terms of labour, time and machinery running costs were also made – a total of £17,100.

The project has been promoted to the agricultural trade press and to the farm's clients. Based on the results from 2000, the farm has placed a three-year order for the service and a neighbouring farm has adopted the programme.

At a glance

- Water application reduced by one inch per acre (11%) over the growing season
- Significant financial savings in water, machinery costs and labour
- Accurate watering reduces runoff and produces better quality crops

East of Scotland Water

shortlisted

Integrated Network Management Using Operational Performance Contouring

East of Scotland Water set up the Operational Performance Contouring (OPC) project to increase the efficiency of its distribution network and prioritise activity and investment.

The project recognises the need for an integrated approach to the management of the water supply infrastructure. Using OPC, East of Scotland Water planned to analyse the relative importance of the different factors that contribute to inefficiency in their water infrastructure assets. From this they would then compare various water efficiency options, such as active leakage control, pressure management and asset renewal, and formulate an effective network management plan.

The first stage of the project collected baseline data from a number of sources – leakage estimates, samples of the operating pressure in each water supply zone, numbers of burst repairs and all associated costs – and used them to assess the following factors:

- Current operating pressure
- Scope for pressure reduction
- Customer contacts
- Reported bursts
- Water quality failures
- Inferred leakage

These results were then collated and expressed in contour bands on a map of the distribution network. Data such as asset conditions, performance and risk assessment ratings was also shown.

Using this method, East of Scotland Water has been able to identify parts of the water distribution network that are inefficient or show marginal performance. These have now been targeted for action. A potential 81% water saving has been identified through the installation of pressure reduction valves, replacement of assets or active leakage control measures. The OPC data will be continually interrogated to check that burst frequency, customer contacts and other parameters have fallen as a result of actions taken, thereby demonstrating savings in water use.

The output of this analysis has been used in 2001 to determine efficiency driven capital investment and to contribute to the development of an objective, measurable and auditable asset management plan.

At a glance

- Method to assist in the drive for efficiency in managing the water distribution network
- Inefficient parts of the infrastructure identified and remedial options quantified
- Predictive technique to calculate future investment requirement

Elimileak Limited

shortlisted

Water Monitoring and Leak Alarm System

The Elimileak Water Monitoring & Leak Alarm System is a water management tool designed to alert customers to higher than expected water consumption, to prevent wastage and reduce associated water costs. The system works by monitoring the water flow in the supply pipe and setting off an alarm when unusually high flow is detected.

Elimileak aimed to create a device to keep a check on the water meter and transmit the data to a receiver at the client premises. In collaboration with Axminster Electronics it produced various prototypes, and in 1996 the first hard wire system went into production; in 1998 this was updated to a radio link system.

The Water Monitoring & Leak Alarm System monitors flow through the supply pipe using a sensor connected to the water meter. A transmitter within the water chamber sends data from the sensor to a receiver at the client's premises. The system is easily set up, with parameters of expected water demand. When readings go outside these parameters – usually through water wastage or damage to the supply pipes – an audible and visible alarm is activated, alerting the client to a problem.

The alarm has already proved its effectiveness at a primary school in the South West: soon after installation a one litre per minute leak was discovered. Left undetected this would have increased the school's overall consumption by 50%. Other clients include local councils, prisons and farmers.

At a glance

- Continuous monitoring of water flow via a supply pipe meter
- Alerts customers to possible leaks via an alarm system
- Significant water and cost savings demonstrated at client site

Essex & Suffolk Water — shortlisted

Microcomponent Analysis of Demand Change due to Metering and Water Audits

This research project was initiated by Essex & Suffolk Water to test the effectiveness of the *Identiflow* technique for quantifying reductions in water use after the installation of a water meter or the completion of a water audit.

Metering and water efficiency measures are key components of the company's Water Resource Plan, so it is imperative to understand their true impact. Using the *Identiflow* technique the project team set out to record flows and classify water using events for the following microcomponents: bath, shower, dishwasher, washing machine, internal taps, external taps and toilets. This measuring was carried out on 15 selected properties for the following situations:

- Before and after the introduction of metering
- Before and after a water audit
- Before, during and after the introduction of metering followed by an audit
- Before, during and after an audit followed by the introduction of metering

The main benefit of the project has been that the *Identiflow* technique has demonstrated how water use does change following audits and/or metering. Previous assumptions used to estimate frequency of use and water volumes in water audits can be validated, and for metering, previously unavailable information about how consumption changes can now be derived.

Reductions in total water use following an audit and following the installation of a meter were shown to be in the region of 10% each, with the meter being slightly more effective. Where a property had both an audit and a meter, the saving was significantly more than the combined total of the two measures (29%). The technique also provided detailed information on water consumption for the various microcomponents.

The results of the project are now being used to validate other audits carried out by the company and to develop their audit strategy. Essex & Suffolk Water also plans to use the *Identiflow* technique to compare actual water usage habits of households against the amounts customers say they use.

At a glance

- Established a means of quantifying reductions in water use after installation of a water meter or following a water audit
- Demonstrates increased savings following both meter installation and water audit
- Results used to validate previous estimates of savings

Hartlepool Water & Environment Agency — shortlisted

Study to Measure the Effectiveness of Alerting Customers to High Consumption

A 20-year-old system of alerting customers to sudden increases in water consumption has been analysed to quantify its effectiveness for water efficiency. The study was a joint collaboration between Hartlepool Water, the Environment Agency and project consultants, Halcrow Business Solutions.

Hartlepool Water has a policy of informing metered customers when their water consumption shows unusual increases. Usage levels are monitored by revenue clerks as they prepare bills. Any customer showing an excessive increase is sent a letter which alerts them to the possibility of leakage or wastage on their property and offers them free assistance from a leakage coordinator. Around 150 of these letters are sent out annually.

A survey was carried out among customers who had been sent an alert letter over the previous two years to determine whether the process had in fact detected leaks and wastage. The results showed that 35% of respondents had experienced a water leak through pipe failure and 23% had had an incidence of water wastage, for example due to a leaking cistern, faulty urinals or taps left running. The remaining 42% provided a reason for the increase in consumption, such as increased production, fire fighting demand and incorrect meter readings. The research also found that the letter encourages customers to monitor their own consumption more regularly.

For some of the leakage events identified, direct measurement and trend analysis were used to derive the volume of the leak and estimate potential water savings. These amount to 2.1% of total water consumption of the company's metered customers. The cost of the policy to the water company in terms of resources was calculated at £1.75 per metered customer per year, or £0.21 per m^3 of water saved. This compares favourably with other options for managing water supply and demand.

The results of the study are to be published for use by other water companies.

'A strong, low-tech approach'

Judges' Panel

At a glance

- 2.1% of water delivered to metered customers identified as possible leakage or wastage
- Accurate costing of existing policy (£0.21 per m^3 of water saved)
- Demonstrates that customers become more water efficient when alerted to high consumption

All other entries

Organisation	Entry
A Sanderson	Rainwater Harvesting System
ADAS Consulting Limited	Water Use Audits
AEP (Chippenham) Limited	Water Recycling and Reclamation
Anglian Water Services Limited	The Impact of Measurement Uncertainty on the Water Balance
Anglian Water Services Limited	FORWARD
Anglian Water Services Limited	Auditing Water Use on Water Treatment Works
Bradford Hospitals NHS Trust	Water Management Partnership
British Waterways	Improving Water Efficiency
Bryant Homes	Carastor
Carmarthenshire County Council	Corporate Water Efficiency Programme
Chamberlayne Farms Limited	Use of Local Spring Fed Supply
Coventry City Council	Ecobug Waterless Urinals
Crystal Presentations Limited	Water in the School Website
Durham County Council	Middlestone Moor and Catchgate New Sustainable Primary Schools
Elimileak South West	Water Conservation for Schools
Entec UK Limited	Quantification of the Savings, Costs and Benefits of Water Efficiency and the Implications for Charging
Essex & Suffolk Water	Promoting Home Water Surveys
Essex & Suffolk Water	The Water Efficiency Benefits of Household Water Butts
Essex & Suffolk Water	Sustainable New Homes Forum
Exhall Plating Limited	Water Control and Conservation
Gleeson City Living	Kennet Walk
Gleeson Homes	Netherne on the Hill
Gloucestershire County Council	Meadowside Primary School
Golden Grove Nursery	Water Collection, Recycling and Minimisation
Gusto Construction Limited	The Watertight Millennium Green
h_2go Limited	Kodak / h_2go Total Water Management Partnership
Hales Waste Control Limited	Recycling of Water
Holistic Creations Network	Platinum Level Service
HQ Royal Marines	Water Efficiency Campaign
Hydralube Limited	Hydradynamic Plasma Fluid Technology
ICI Imagedata	Improvement in Boiler Feedwater Quality and Treatment
Ipswich Borough Council	Ravenswood
Jaguar Cars Limited	Water Automatic Monitoring System
Knowsley Metropolitan Borough Council	Kirkby Municipal
Liverpool John Moores University	Reduction of Water Consumption at JMU
Lloyd Maunder Limited	Reducing Water and Effluent Cost in Poultry Processing
National Trust	The Use of Ground Water in Gardens
North of Scotland Water Authority	Achiltibuie Water
Northumbrian Water Limited	Project CLEVER (Coastal Liquid Effluent Volume Reduction)
Opella Limited	Ecofil

Water UK and the Environment Agency were encouraged by the range and breadth of entries to the 2001 Awards and that all these organisations are considering their approaches to effective resource management now and in the future. We would like to thank everyone who took the time to enter.

P A Moeman	Rainwater Collection and Reuse
Pechiney Aviatube Limited	Who's Stealing Our Water?
QV Foods Limited	Effluent Treatment and Recycled Water Plant
R Crumley	WC Flush
R & J M Place Limited	Recycling Water
Reading Borough Council	Water Audit
Rhondda Cynon Taff County Borough Council	Water Efficiency Project
Royal Horticultural Society Wisley	General Management and Reduction of Water Use
RSPB	Sandwell Valley Water Conservation
RSPB	Avocet Building Rainwater Recycling
S Hussein	Save-a-Little
SCA Packaging Edinburgh	Installation of Chiller Unit
Severn Trent Water	Birmingham City Council Project
Severn Trent Water	Green Steps Water Month Campaign
Severn Trent Water	Kings Mill Centre for Health Care Services Project
Severn Trent Water	The Cost Effectiveness of Birmingham Pressure Management Programme
Shetland Environment Agency Limited	Green Tourism Business Scheme
Solihull Metropolitan Borough Council	Water Conservation in Schools
South East Water	Water Efficiency - A Real Option?
South West Water & ADAS	The Ensus Farming Club
South West Water & SWEB	The Water and Energy Conservation Initiative
Southern Water	$H_2$0K Campaign
Southern Water	Water Efficient Schools
Southern Water	Own Water Use Minimisation
Taylor Group Diecasting	Water Conservation
Telford & Wrekin Council	Rainwater Harvesting Project
Terminal 5 Design Team	Combined Water Strategy
Thames Water	Watercycle - Water Efficiency at the Millennium Dome
Thames Water	Assessment of Individual Greywater Recycling Systems
The Metropolitan Water Company	Green Roof Water Recycling Scheme
Three Rivers Park	New Amenities
Trevor M Hunt Consultancy	Monitoring Levels, Leakage and Flows
Wandsworth Borough Council	Battersea Park
Wat-er-Save Services Limited	Primrose Valley Holiday Park
Water Support Services	Greywater Recycling System
Wildfowl & Wetlands Trust	Millennium Wetland
Wiltshire County Council	Aquasense
Wroot Water Systems	Water Application Systems for Leachate Water
Wroot Water Systems	Drip Irrigation
Yorkshire Water	Spreading the Word
Yorkshire Water	A Graphic Example of Water Efficiency

Water Efficiency Awards 2001 Supporters

Water UK and the Environment Agency are delighted to welcome the support of **Envirowise**, the **National Farmers' Union** and **Ofwat** in the development of three of the categories for this year's Awards.

Envirowise helps UK companies reduce costs and increase competitiveness by minimising waste and promoting sound environmental practices. Its success is measured by the savings made by industry and commerce as a direct result of the Programme's work, and so far, Envirowise has helped industry save more than £145m per year. The Programme works by promoting best practice to industry and commerce through free confidential advice and information. It also works closely with the many organisations to promote the benefits of waste minimisation and cleaner technology.

Water minimisation is one of the key elements of Envirowise in which industry can make substantial savings through low cost or no cost actions. Companies who have telephoned the Environment and Energy Helpline (0800 585794) have saved between 20 - 50% on their water bills. The Water UK & Environment Agency Water Efficiency Awards emphasises these important messages and rewards and celebrates good practice in water efficiency and water conservation. Previous participants have demonstrated that substantial cost savings can be made through complementary water savings measures and as such, Envirowise is pleased to offer the Industry & Business category its full support.

NFU is the leading democratic organisation representing the interests of farmers and growers in England and Wales.

Its central objective is to promote the interests of those agricultural and horticultural businesses producing high quality food, drink and crop products for customers both at home and abroad.

Central to this objective is its encouragement of environmentally-friendly and sustainable production farming practices, and a desire to ensure the long term viability of rural communities.

Membership of the NFU is voluntary and currently runs to over 140,000, which includes around 75% of full-time farmers and growers in England and Wales. There are over 63,000 Countryside members with an interest in rural land, but who do not depend on farming for a living.

The NFU, founded in 1908, does not receive support from public funds, neither does it support any one political party.

OFWAT (Office of Water Services) is responsible for ensuring that the water and sewerage companies in England and Wales provide a good quality, efficient service at a fair price.

Ofwat is a non-ministerial government department led by Philip Fletcher, the Director General of Water Services, which:

- sets limits on what the water and sewerage companies can charge
- ensures companies carry out their responsibilities under the Water Industry Act 1991
- protects the standards of service to customers and promotes economy and efficiency
- helps to make sure that effective competition can develop
- compares the performance of the companies, which helps the poor performers to rise to the standards of the best

Ofwat enforces the companies' duty to promote the efficient use of water by their customers. Ofwat expects companies to assess the role of the efficient use of water within the framework of a long-term plan to balance supply and demand. Companies therefore need to ensure that their strategies focus on what works best. Ofwat continues to work with the industry to establish better information and improve understanding of the cost effectiveness of measures for the efficient use of water by customers. Ofwat is therefore supporting the Economic Research category in this year's Water UK & Environment Agency Water Efficiency Awards.

Water UK represents all UK water suppliers and wastewater operators at a national and European level. We provide a positive framework for the water industry to engage with government, regulators, stakeholder organisations and the public. We actively seek to develop policy and improve understanding in areas that involve the industry, its customers and stakeholders.

Representing the industry

We are determined that the views of the water industry should be fully represented and that the expertise and resources of the industry be used towards developing sustainable and economically sound policies. Water UK takes a leading role in influencing decision-making at all levels and continues to open communication channels to improve understanding and bring positive change.

Working in partnership Water UK helps the industry develop by:

- Looking ahead to define and communicate policies at a national level
- Providing a forum for debate about water, wastewater and the future of utilities
- Being a focus for reliable information
- Caring for its reputation

Reaching beyond the industry

The water industry is highly regulated and Water UK has an essential role in helping to shape and improve the regulatory framework. However, our work extends far beyond this. Water UK actively seeks representation and partnership with organisations involved directly or indirectly with the water industry, from environment lobby groups to business forums and research institutions.

Building a forum for dialogue and information exchange

Water UK is dedicated to providing a forum for the water industry to engage with each other and to tackle together the key issues of the moment. Central to this work is the Information & Learning Programme, which includes the Water UK & Environment Agency Water Efficiency Awards.

The Programme offers a series of diverse activities designed to enable the water industry to share information on key topics affecting the sector now and into the future. Events draw together unique groups of industry experts, stakeholders, guardians and influencers of the water industry

Supporting information & learning in the water industry

Water UK is supported by organisations dedicated to promoting information and learning activity throughout the water industry. Their help is invaluable to us and without their support we could not have achieved the reach or the success which is enjoyed through the Information & Learning Programme.

To find out more about Water UK and its work consult www.water.org.uk.

"The Information & Learning Programme directly reflects the key policy themes of Water UK; looking after our customers, protecting our environment, working with communities, water and health and contributing to the UK economy. As a central part of our communication programme it will provide an important focus and source of information for all stakeholders in the water industry. We are committed to the Programme and to our partners who are playing such a key role in its development."
Pamela Taylor
Chief Executive, Water UK

ENVIRONMENT AGENCY

The Environment Agency for England and Wales is the statutory body with a duty to protect and improve the quality of air, land and water. The Environment Agency's vision for the environment and a sustainable future is:

A healthy, rich and diverse environment in England and Wales, for present and future generations.

The Environment Agency recognises that regulation alone cannot change people's attitudes or behaviour and it is committed to working in partnership with business, public bodies and community organisations to encourage people to change.

Water Resources

A key role for the Environment Agency is to protect the long-term future of the water environment while encouraging sustainable development. In England and Wales, as in many parts of the world, the balance between water supply and water demand is becoming more fragile. Reconciling the needs of the environment with the demands of society is becoming an increasingly difficult challenge.

The Environment Agency has recently published a Water Resources Strategy for England and Wales that provides a framework for water resources planning over the next 25 years and recommends a number of actions. The Environment Agency's vision for water resources for the next 25 years is:

Abstraction of water that is environmentally sustainable, providing the right amount of water for people, agriculture, commerce and industry, and an improved water-related environment.

National Water Demand Management Centre

The National Water Demand Management Centre (NWDMC) is the focal point within the Environment Agency for the science and practice of water demand management. The Centre's mission is:

To provide a focus for information and expertise to ensure acceptance of water conservation throughout society.

As a centre of expertise, the NWDMC is at the forefront of matters relating to national and international water resources, demand management and water conservation. It provides technical and practical advice to both the Agency and external bodies. The NWDMC's activities fall under four broad categories: advice; promotion; technical development; and research.

Through the NWDMC, the Environment Agency publishes a range of free publications on water conservation and water efficiency. To order any of the following publications, please contact the NWDMC (details below):

- *A scenario approach to water demand forecasting*, August 2001
- *A study of domestic greywater recycling*, April 2000
- *Conserving water in buildings*, September 2001
- *Demand Management Bulletin*, (Bi-monthly external newsletter)
- *Water Efficiency Awards 2000*, September 2000
- *Waterwise*, 1998

More information

For more information and free publications on issues relating to water conservation, water efficiency and demand management, please contact the NWDMC Helpdesk via email: paula.wood@environment-agency.gov.uk or telephone: 01903 832073. Alternatively, please consult www.environment-agency.gov.uk/savewater.

As well as managing water resources, the Environment Agency has responsibility for water quality, flood defence, fisheries, navigation, and other ecological and recreational uses of water. For information on these activities, please telephone the Environment Agency's general enquiry line on 0800 933 3111 or consult www.environment-agency.gov.uk.

Further Sources of Information

The following organisations can provide help and advice to companies on a range of environmental issues, including water minimisation and water conservation:

ARENA Network

ARENA Network provides guidance, information and practical assistance on a whole range of environmental and waste management matters to companies and other organisations throughout Wales.

www.arenanetwork.org

Tel: 01443 844 001

Business in the Environment

Business in the Environment is the business-led campaign for corporate environmental responsibility. Its aim is to inspire companies towards environmentally sustainable development.

www.business-in-environment.org.uk

Tel: 0870 600 2482

DEFRA

DEFRA's Water and Land Directorate is responsible for all aspects of water policy in England, including water supply and resources. The DEFRA / Environment Agency Water Conservation Research Database makes information from organisations and individuals carrying out research, trials or casework on water conservation available to the public.

www.defra.gov.uk/environment/water/index.htm

Envirowise

Envirowise helps UK companies reduce costs and increase competitiveness by minimising waste and promoting sound environmental practices.

www.envirowise.gov.uk

Tel: 0800 585 794

Global Action Plan

Global Action Plan is charity that helps people to take practical action for a better environment. Environment Champions is for companies who want to involve their employees in improving efficiency and cutting costs.

www.globalactionplan.org.uk

Tel: 020 7405 5633

Groundwork

Groundwork Environmental Business Services (ebs) provides practical support, advice, information and training to companies on environmental business issues.

www.groundwork.org.uk/business

Email: ebs@groundwork.org.uk

SEPA

The Scottish Environment Protection Agency (SEPA) is the public body responsible for environmental protection in Scotland.

www.sepa.org.uk/

Tel: 01786 457700

Watermark

Watermark is an initiative from OGCbuying.solutions to develop a database that will give the public sector reliable benchmarks to measure their water consumption against.

www.watermark.gov.uk

Tel: 0151 227 4262

Disclaimer

This publication gives guidance only. It should not be treated as a complete and authoritative statement of measures to be adopted and their results. You are advised to make your own investigations before deciding on any course of action. Water UK and the Environment Agency do not endorse the use, purchase and/or performance of the goods or services provided by companies mentioned herein.