

Greening the plant room

As part of our review of the environmental issues facing today's leisure managers Mick Owen has been down in the swimming pool plant room to find out where different approaches can benefit the planet, the user and the bottom line.

Managing a swimming pool plant room requires a mixture of higher level chemistry, local knowledge and an obsessive attention to the minutiae of valves, pipe-work and pH values; or so it seems to the uninitiated. On entering the world of chlorine, backwashing and pool tests The Leisure Review took the sensible step of consulting an expert guide and was pleasantly surprised when Robbie Phillips of the Swimming Teachers' Association (STA), one of the leading suppliers of pool plant operator training courses in the country, said the first step to a lighter touch on the planet was nothing more complicated than better education. "Most pools could be more environmentally friendly if they had more expertise at their disposal," he said. "Lack of knowledge leads directly to an unnecessary use of chemicals as poor fault identification and a limited awareness of potential solutions lead to poor practice." Pool chemicals cost money and Phillips' plea for more care with them at a time when budgets are under fierce scrutiny may seem set to be met with a positive reception. However, as better education requires funding and that represents an investment in people at a time when staff costs are under scrutiny, it remains to be seen where senior managers place their bets.

One of the challenges facing any non-expert manager is the proliferation of 'solutions' to the ecological challenge. As society moves ever closer to greener and more environmentally friendly behaviour it is important to ask questions about new products and services being promoted in the swimming pool industry and to challenge whether these new ideas actually live up to their green credentials. It is important to embrace new ideas to save resources and finances and a long-term view may be necessary to justify certain spending decisions. These decisions may be affected by potential spending cuts, especially for public authorities, but the principle should remain that investing to save will have long-term benefits that outweigh short-term squeezes on budgets. The key drivers include energy legislation, the climate change levy, new building regulations and the enhanced capital allowance.

Apart from investing in the human resource, managers of pool plant rooms have a number of ways of becoming 'greener' at their disposal, starting with reducing the reliance on burning fossil fuels in their primary heat sources. There is a range of renewable technologies available and these should be taken into account at the initial design stages of any project. Refurbishment and retrofit projects also provide opportunities for energy-efficient design led by the green agenda.

Heat pumps are becoming more popular as a renewable technology, whether air to air, air to water or using ground source technology where a local water source, such as a river, can be used to provide the heat source for a building or swimming pool. One example of this type of design can be seen at the River Crescent Complex, Trent Park in Nottingham, which won Beaver International a SPATA Gold Environmental Award for using the river Trent to supply a leisure centre that Beaver installed in a riverside apartment block. Two Calorex 25kW water-source heat pumps supplied by Certikin International were designed to collect low-grade energy from the river, which is then turned into a usable temperature and transferred or 'pumped' into the building's heating system at up to 55°C. It is such an efficient process that it can satisfy the leisure centre's 60ft heated indoor swimming pool, infinity spa and fitness studio at a lower running cost than a condensing gas boiler. Heat pumps operating in this way can reduce CO2 emissions compared to fossil fuels, with running costs reduced by up to 48% against oil and 22% against gas.

Renewable energy sources come in many guises. Leisure centres with large roof areas are obvious sites for solar panels, which can be installed to collect energy to heat pool and shower water or to supply energy back to the national grid. Heat can be generated from biomass, such as wood or straw, which is a wholly green method of producing heat if the biomass used is waste material. However, if material is specifically grown for biomass then it



The River Crescent Complex, Trent Park in Nottingham, which won Beaver International a SPATA Gold Environmental Award

"Whenever non-experts discuss pool filtration the word 'backwash' is invariably banded as war stories of emptied pools are shared."



Eco Glass Filter Media (EGFM) is the new environmentally friendly and cost-effective filter medium that provides a viable alternative to sand

Image courtesy of Total Pool Chemicals

may be questionable whether this should actually be used for agricultural purposes and, as biomass tends to be bulky, transporting it can be expensive; this means that it may not be suitable in urban centres. Add to this the challenges of storage and the need to modify the feed to the primary boiler, both of which generate additional costs, and it is clear that payback periods need to be worked out before taking the biomass route. Wind turbines are more straightforward and can be used to generate electricity but their performance will depend on the particular weather conditions.

Finding greener sources of energy is clearly desirable but the bigger driver is likely to be the search to find reductions in energy cost, water consumption and chemical usage. The development of a new generation of swimming pool chemical controllers can now achieve savings for the operator without compromising the quality of the bathing water. Using variable speed drives on pumps and fans can provide significant energy savings as they enable the speed of motors to be adjusted down when they are not required at full power. In the past motors would normally run at full speed 24 hours a day, seven days a week irrespective of demand. It is claimed that reducing the speed by 10% can result in a 25% reduction in energy consumption and the decision as to whether to use variable speed pumps (also called invertors) which convert direct current (DC) to alternating current (AC), must be balanced in the initial design process with expected bather loads and required water quality. Controllers are now available that can interface with recirculation pumps via variable speed drives.

The search for greener approaches – or at least more efficient and therefore cheaper approaches – is producing a whole list of innovations. When using ultra violet (UV) units as the secondary disinfection system lamp life can be optimised by controlling chlorine levels. When filters are backwashed correctly and only when required, additional water is not discharged unnecessarily and this can be assisted by using flow or turbidity meters. To achieve such benefits pools would have to ensure that flow meters are installed before adjusting water flow rates. The new generation of controllers also offer data logging to record all system operating parameters. Now that this can be monitored and systems adjusted via the internet there is less need for service engineers to be on site, which not only reduces operating costs but will also reduce the number of journeys made.

Some people argue that the chemical costs of running a pool are usually negligible in comparison with the overall costs of energy, labour and building maintenance. However, it must be worth exploring how to minimise the use of any resource without compromising safety. Chris Hayes, managing director of the Swimming Pool and Allied Trades Association (SPATA), makes the case for a relatively cost-free initiative to make the choice of disinfection less relevant: "With a concerted effort to get more pre-bathing showers we can reduce the amount of pollution on bathers' bodies and the need for disinfection. The ideal would be nude showering, which would make the whole body as clean as possible." Unfortunately the design of wet changing rooms and mixed shower areas will mean that this type of pragmatic advice goes unheeded and the debate on disinfection will continue.

Despite being a small part of the whole pool picture the supply of pool disinfection material and equipment is big business and generates a great deal of heat. Some voices within the industry argue for a move away from chlorine or bromine as a primary disinfectant. Other voices, notably the Pool Water Treatment Advisory Group (PWTAG) and SPATA, are clear that in commercial pools it is vital to maintain water quality to deal with the heavy usage from users. They argue that secondary systems, such as UV and ozone can play their part in reducing chemical usage to kill bacteria but must be used in conjunction with a primary disinfectant, such as chlorine. Other secondary systems, such as ionisers, can help reduce chlorine consumption but may not be cost-effective as they are not stand-alone systems; they must be used with a chlorine residual, albeit probably at a lower level than on a pool without an ioniser as they are not oxidisers. Alternatives to chlorine, often called chlorine-free systems, are worthy of investigation although the members of PWTAG (and it is pronounced 'Pew-Tag') are not convinced that these systems are effective. They are adamant that alternatives to chlorine will have to pass Organisation for Economic Co-operation and Development (OECD) tests for efficacy both in the laboratory, in peer review and in pool trials before being adopted across the industry.

No discussion of alternative disinfection systems can ignore on-site generation of sodium hypochlorite (chlorine) which is not a new technology but can help address green issues. The process involves passing a DC current through a brine (salt-saturated water) solution to produce sodium hypochlorite, which can then be used in disinfection systems. The process reduces the number of road deliveries of chlorine as the product is prepared on site when needed but it must be noted that on-site generation of sodium hypochlorite takes a lot of energy. It also requires increased on-site maintenance and a number of manufacturers will not warrant their stainless steel equipment when chlorine is being generated on site. As if this was not warning enough, hydrogen gas is produced during the process and it needs

The Leisure Review is supported by:



International Experts in Safety Training Solutions

The Leisure Review is written, designed and published by:



to be exhausted to atmosphere in a safe manner as, of course, it is highly flammable. But we did have to talk about it.

By the same token it would be remiss of any review of efforts to green swimming pool plant not to mention the move towards recycled material in filters. Traditionally sand has been used but now glass is growing in popularity as the alternative way to catch the waste material in the filters. Glass can be used instead of sand or zeolites (naturally occurring minerals formed by the alteration of volcanic ash in salt water in lakes or seawater). Perlite (a mined powder-like, volcanic rock material) is an alternative to Diatomaceous Earth in some filters. Such 'pre-coat' filters use less water than is required for backwashing sand filters and are from renewable sources.

Whenever non-experts discuss pool filtration the word 'backwash' is invariably bandied as war stories of emptied pools are shared. In the quest for greener plant the key message is that water used for backwashing the filters, which has traditionally run to a drain (hence the accidentally emptied pools), is now being recovered and following suitable treatment used to flush toilets and for washing down vehicles. By using water this way its whole-scale consumption is avoided, which saves on sewerage charges and the cost to return it to drinking-water quality. Generally it may be wise not to use too much of the treated water for use back in the pool but some backwash water can be used again. However, the expense of carrying out reverse osmosis has to be weighed against the cost of replacing the water. If the payback period is under fifteen years, then this would be a good benchmark. Rain water harvesting is becoming more common in commercial facilities to flush toilets and for irrigation of plants outside the venue but great care has to be taken with any water re-use, including rain water harvesting, to make it bacteriologically safe.

Having identified how the swimming pool industry can play its part in conserving resources, it is critically important that the use of these resources has to be thoroughly discussed at the initial design stage of each project. This will be a main driver to ensure the facilities are fit for purpose, as energy efficient as possible and able to reduce the need for expensive refurbishments at a later stage.

Mick Owen is managing editor of *The Leisure Review* and has served his time on the poolside and in the plant room.

The Leisure Review, October 2010

© Copyright of all material on this site is retained by *The Leisure Review* or the individual contributors where stated. Contact *The Leisure Review* for details.