



EARTHCHECK

REDUCING WATER CONSUMPTION (I)

BATHROOMS, KITCHENS AND LAUNDRIES

There are many areas within a tourism operation that consumes water. This fact sheet focuses on how you can reduce water consumption in facilities common to many tourism operations such as bathrooms, kitchens and laundries. Opportunities to reduce water use range from simple changes to procedures, to retrofitting old inefficient systems or installing new water efficient systems.

GENERAL CLEANING AND MAINTENANCE

Cleaning and maintenance is one issue which needs to be addressed across all aspects of an organisation. Some simple opportunities exist to reduce water use in cleaning, these include:

- Establishing procedures that specify chemical and water volumes to be used (or install automatic cleaning chemical dispensers) and dry cleaning with a broom before using a mop and bucket
- Requesting staff to minimise the number of flushes used to clean toilets
- Promptly repairing all leaks and faults (see *Factsheet 5: Leaks and Water Monitoring*) and displaying fault reporting contacts and phone numbers

BATHROOMS

Showering and the use of toilets by patrons is a major source of water consumption for most tourism operators that can generate large volumes of sewerage and grey water often requiring on or offsite treatment.

Showers

Install low flow shower heads (less than 9L per minute) or flow restrictors and encourage shorter shower times.

Special low flow showerheads that are compatible with instantaneous hot water systems may be required so they do not restrict the flow of water so much that the hot water system turns off.

To reduce shower times use signage, install shower timers or consider push button showers that deliver water for a set period.

Decreasing water flow and shower lengths will also result in less hot water being used and therefore will also save energy and reduce greenhouse gas emissions.

Basin taps

Install low flow taps (less than 9L per minute), flow restrictors (either at the end of the tap opening or in-line) or reduce water pressure.

Flow restrictors must be periodically cleaned and de-scaled to remain effective. Tamper-proof restrictors can be used if they are routinely removed.

Water pressure can be controlled by installing a pressure-reducing valve on the connection to the water main. The pressure should be set at the lowest water pressure that still allows equipment such as washing machines and dishwashers and fixtures to operate properly.

Other options for taps include timer taps (e.g. push taps) or sensors that turn taps on and off automatically.

Toilets

Install dual flush, low flow toilets or add a displacement device to toilet cisterns.

Water efficient toilets can use as little as 4 litres for a full flush and 2 litres for a half flush, which is less than half the water of a standard toilet. A cheaper alternative can be to add a displacement device in the cistern to reduce flush volume or to modify the float arm however if the bowl is not shaped to manage with reduced water flow the effectiveness of the flush may be affected.

Other options include aerobic composting toilets that require little to no water use or hand basins above the toilet cistern so basin water can be reused to fill the toilet cistern.

Urinals

Reduce urinal flush volume or timing, or retrofit urinals to accommodate low or no flow flushing.

Urinals can waste excessive amounts of water, even when they are not being used if they have a timed flush that operates automatically at regular intervals.



CASE STUDY:

Melia Bali, Nusa Dua
Indonesia

Melia Bali Villas and Spa Resort were able to reduce the volume of water consumed by its water fixtures, such as taps and showers, by reducing the incoming mains water pressure from 3.8 kg/cm² to 2.7 kg/cm². The cost to reduce the mains water pressure by 30% was negligible whilst it is estimated that it has reduced water consumption by 48,000 kL and **saved over US\$40,000 annually.**

Unfortunately, reducing the flush volume can lead to problems with odours and build up of uric acid, salt and lime scale in the pipework that can cause damage and blockages. It is important to find the right balance between reducing water consumption and increasing maintenance. Urinals may need to be replaced to accommodate low flushing volumes.

Options to reduce flush volume include installing low flush urinals, flow restrictors on the water inlet valve or reducing the timing of flushes. To reduce the number of times a urinal is flushed a hydraulic valve that operates in the water inlet pipework can be used that triggers the urinals to flush at specific times (e.g. when the hand basin is being used, or triggered by the bathroom door opening a set number of times).

Flushing can also be automated using sensors to detect movement for at least 5 seconds before it triggers a solenoid valve to allow a preset amount of water into the cistern which flushes when it becomes full.

Waterless urinals are now also available that use a range of technologies including:

- Oil based liquids in a replaceable cartridge through which urine and debris pass that traps odours. The fluid can be degraded quickly if the correct cleaning chemicals are not used.

- Urinal blocks housed in the urinal outlet containing microbial spores that breakdown the urine and then multiply preventing the build-up of sludge. They can also generate bacteria that cause odours so correct cleaning is essential.
- One-way valves that prevent odours from being emitted into the bathroom. They require urine crystals and debris to be removed and should not be allowed to become stuck open.

To reduce sludge build up in the pipework some waterless urinals are drained so urine and debris cannot collect. This should be carefully considered if retrofitting old systems with waterless models.

Alternative water supply and recycling for bathrooms

Consider harvesting rainwater for use in showers, hand basins or toilets.

Investigate the potential for wastewater recycling for use in toilets and urinals. Depending on water quality, wastewater may need to be treated for the health and safety of users. Hand basin wastewater may be able to be reused with minimal treatment (e.g. in gardens), however, other forms of wastewater may require more significant treatment. Consult a wastewater treatment specialist and conduct a risk assessment if considering reuse or recycling of wastewater.



CASE STUDY:

The Alto Hotel, Melbourne, Australia

The Alto Hotel in Melbourne had water consumption in 2008-09 of 123L per guest night!

ACTIONS TAKEN:

The Alto reduced water consumption by:

- Reducing tap water flow in its 60 bathrooms and kitchens from 9 to 6 litres per minute (L.p.m)
- Reducing shower water flow in its 58 bathrooms from 9 to 8 L.p.m
- Installing two 1500L rain water tanks to capture rain water for use in the cisterns in public toilets
- Installing piping to capture air conditioning condensation water which also feeds into the water tanks

KITCHENS

Review operational procedures and install water efficient fixtures and equipment.

Appliances and fixtures such as sink taps, dish and glass washers, ice machines and some cooking equipment such as woks can all use excessive amounts of water in commercial kitchens. Water wastage in kitchens can often be the result of staff habits, so increasing awareness about efficient water practices is a good way to start. Establish a set of kitchen procedures that are reinforced with training, signage and monitoring by management. These could include:

- Operating dish and glass washers only when fully loaded and on economy cycles where possible.
- Dry scraping dishes and cooking surfaces as soon as possible after use to prevent the waste hardening and becoming more difficult to remove. If manual pre-rinsing is necessary soak utensils and dishes in the sink rather than under a running tap.
- Making sure taps are not left running during food preparation e.g. rinsing fruit and vegetables in a water bath rather than running water.
- Reducing water lost through steam by keeping equipment covered when cooking and simmering instead of boiling where possible.
- Using the minimum amount of water necessary and keeping the lid on.
- Thawing frozen food in the refrigerator rather than under running water.
- Minimising the number of pieces of cooking equipment, to save on cleaning requirements.
- Dry cleaning with a broom before using a mop and bucket.
- Reporting and repairing water leaks and faults immediately.

Kitchens also have a number of water consuming fixtures and equipment such as taps, dish washers and ice machines. Where possible install water efficient equipment or reduce the frequency of use and the quantity of water used.

Kitchen sink taps

Install water efficient tap fixtures (less than 9L per minute) and review operational procedures.

If taps are frequently left on when not needed consider installing pedal taps (operated by foot or leg), or sensor taps that only turn on when required. Install water

efficient trigger guns on taps that can reduce water consumption by automatically shutting off when they are not in use.

Avoid the use of in-sink garbage disposal units that reduce the quality of your site's wastewater and use sink strainers to trap food scraps which should then be disposed of or composted.

Kitchen dishwashers

Reduce dishwasher use, ensure dishwashers are operating efficiently or replace inefficient dishwashers.

Ensure conveyor dishwashers are only running when necessary by linking an electronic sensor to the conveyors motor so it only operates when dishes are detected. The conveyor speed and the length of the cleaning cycles should be adjusted for the most efficient clean while still meeting hygiene standards.

Dishwashers should be well maintained, for example regularly check for leaks, ensure coils are free of lime deposits and the spray jets and filter are clean. Replace any missing or worn water jets.

Consider installing a collection tank so final rinse water can be reused for the initial rinse of the next wash and install flow restrictors on the rinse lines of older models of dishwashers.

Kitchen ice machines

Ensure only water efficient ice making machines are used and they are only operated as required.

Ice machines should have a closed cooling circuit. Some ice making machines are cooled via 'once through' cooling water, while closed circuit cooling water systems recycle water several times before it is discharged.

Consider using air-cooled ice machines rather than water-cooled ice machines which can use up to 10 times more water than similar sized air-cooled machines¹.

Adjust the ice machine to dispense only the amount of ice required and establish operational procedures to ensure ice machines are only used when necessary. For small amounts of ice, consider using existing freezers.



CASE STUDY:

The Taj Residency Bangalore

The Taj Residency Hotel have a collection tank on their dishwasher that enables the final rinse water to be reused for the dishwashers initial rinse saving 15L every cycle or 900L annually.

"Environment conscious equipment always turns out to be economical in the long run."

Arvid Sahai, Chief Engineer, The Taj Residency Hotel, Bangalore, India

Kitchen woks

Change operational procedures to reduce water use or install water efficient woks.

Water cooled woks used in Asian style kitchens can use significant quantities of water as the water is left running constantly to cool the area around the wok. Consider installing efficient water spouts that can be operated using the foot or leg, or spouts which when pushed to the side automatically turn off.

Alternatively, retrofit existing wok stoves or install waterless wok stoves.

Kitchen cleaning

Maintain good housekeeping procedures and consider kitchen design to reduce cleaning requirements.

Keeping kitchens tidy and well organised can help to reduce the amount of cleaning required, for example use drip trays or lips on benches to help reduce the amount of material landing on the floor.

Consider cleaning requirements in kitchen layout and design to reduce water consumption and labour, for example install durable and easy-to clean floor and wall surfaces and ensure equipment is easily accessible.

If large areas are hosed down consider using a water efficient high pressure cleaner that

can use up to 60 per cent less water, compared with using mains hoses². Food safety issues need to be considered as aerosols from spray can carry micro-organisms from the floor back onto equipment.

COMMERCIAL LAUNDRIES

Commercial laundries can use significant amounts of water for washing, drying in steam heated dryers and steam pressing. Staff and patron education is essential to improve water use efficiency.

Water efficient washing machines

Replace inefficient washing machines and only operate machines on water efficient settings and only when full.

Replace traditional vertical axis washers (top loaders) with high efficiency horizontal axis washers (front loaders) that can use two thirds less water³.

Many laundries use washer-extractor machines (rotating drum) which use fresh water for washing and rinsing. Water consumption can be reduced by as much as 70% by replacing these inefficient washers with continuous batch washers (tunnel washers) that use sensors to control the use of water and energy in line with volume. They also only use clean water for the final rinse, reuse the water for the wash cycle and have an extractor that reduces water retention in the linen, which means less energy is required for drying⁴.

Pre-sort laundry and select the type of wash cycle suitable to the level of soiling. Many laundries wash for longer than is necessary. Only operate washing machines when they are fully loaded or reduce water levels for partial loads. Regularly check that the water levels are correct while the machine is operating.

Use low-temperature detergents that not only reduce energy consumption but require less rinsing. Ensure detergents are dosed correctly as overuse not only increases costs but also increases rinsing requirements. Investigate cleaning chemical options that may help reduce water consumption, for example ozone is a very effective disinfectant that requires less rinsing saving up to 10% in water along with 30-90% less detergent⁵. It can also be used in cold water, saving energy.

Keep washing machines well maintained and carry out regular inspections for water leaks or faults.

Using a water softener to improve water quality can deliver a number of key advantages including:

- Reduced levels of detergent use, requiring less water to rinse
- Reduced scale build-up, which prolongs the life of machinery and reduces the likelihood of leaks

Water softeners require regular regeneration of ion exchange columns; make sure you:

- Check the salt levels on a daily basis
- Avoid manual or timed regeneration as this can be wasteful
- Replace the ion exchange resin when necessary

Alternative water supply and recycling for laundries

Wastewater from washers has the potential to be reused or recycled for use in areas such as gardening. Depending on the application, treatment such as micro or nano filtration or high pressure reverse osmosis may be required.

Consider harvesting rainwater for laundry washing.

Reducing washing requirements

Consider providing guests with the option of reusing towels and bed linen rather than replacing them every day to reduce the amount of washing required. Signage that promotes the environmental benefits of reusing linen may increase the effectiveness of this initiative.

If your operation is not well equipped for the volume of laundry it generates consider using commercial laundries that tend to be more energy and water efficient. It could save your operation time and energy, detergent, water and labour costs, however additional costs such as transport and the need to purchase additional linen will also need to be considered.

REFERENCES

¹ Brisbane Water ,2006, Commercial kitchens - Fact Sheet, Brisbane City Council, Brisbane, Queensland www.brisbane.qld.gov.au/bccwr/lib199/commercial_kitchens_factsheet.pdf

² Envirowise, 1998, Reducing the cost of cleaning in the food and drink industry, ETBPP GG154 www.envirowise.gov.uk

³ North Carolina Department of Environment and Natural Resources, 1998, Water Efficiency Manual For Commercial, Industrial and Institutional Facilities www.p2pays.org/ref/01/0069202.pdf

⁴ North Carolina Department of Environment and Natural Resources, 1998

⁵ North Carolina Department of Environment and Natural Resources, 1998