

# A sensible approach to savings

All too often water savings are identified but are never implemented. Guenter Hauber-Davidson examines how a water audit – a concept he loathes – can be done in a different way.

Start with the end in mind. Unless you truly just want to pass the audit, I prefer to call it a 'water savings assessment', which reflects far better that this is the beginning of the journey rather than the end.

You don't want to end up with yet another report that vanishes in your inbox or is buried at the bottom of the pile. The only way the study will save you water is if it shows where you can save water, what you will need to do, how much it will cost, how much it will save in total and how that compares to your pre-agreed implementation criteria. So how to go about it?

## 1. Define the goals

Why are you doing it? There are plenty of possible drivers: for compliance, to meet corporate sustainability goals/water reduction policy, to achieve a NABERS or Green Star rating, because everybody else does it, to meet stakeholder expectations, for PR/public image, to save costs, to overcome water restrictions, to ensure adequate supplies, to enable a future development.

Unless you are clear on these issues, you cannot direct a study to give you the outcomes you want – an action plan than can and *will* be implemented because it matches pre-agreed goals.

## 2. Management buy-in

Unless there is internal support all the way to the CEO to get serious about water savings goals – and have them defined and written down – you will come across stumbling blocks all the way along.

It is far easier to resolve these up front and play a hypothetical 'what if' scenario. What if the report identifies we can save 20 per cent of our water and our costs at a payback of 4.5 years? Who will pay for it? Where in the budget is this money? How will I have to plan ahead to have it allocated for next year? Who will approve

the project? What will the assessment criteria be? Are there initiatives with a special 'emotional attachment' – does the CEO want a rainwater tank, for example?

## 3. Plan for beyond the 'audit'

Assuming you are doing a water savings assessment because you want to save water – not just achieve compliance – ask yourself: What is going to happen once I have identified where I use more water than is needed and what I could do to

to verify success, to whom and why? Typical verification options include none really required (visual or perception only), checking the water bill, via a dedicated sub-meter, by usage studies or through process checks.

Last, ask what is the baseline you are reporting against – it is amazing how complex this gets once you delve into it.

## 4. What's important, what detail?

Depending on why you are assessing your consumption, you could directly hone in on some 'prime suspects'. Is there suspected leakage? Is there a process using a majority of the water? Do you know of major inefficiencies? Is the purpose to identify a rainwater harvesting scheme or connection points to a recycled water scheme?

Knowing these answers can save a lot of time and money by concentrating on the bits that are important. Conversely, if you need to reconcile and understand water consumption right across the site, you will need to prepare an assessment of all water uses.

## 5. Plan for the water savings assessment

Before you rush to the site, stay in the office and let your fingers and eyes do the walking. Get the water bills for the past 12 months or, even better, three years. Where applicable, get the actual bills, not just the entry from the accounting system. Is water billed on actual metered usage

data or on a pro rata split (such as net lettable area, NLA)? Does this cover the entire site – or more or less than it? Does any sub-metering or even smart metering data exist already?

Get at least the general layout and hydraulic plans that you can readily access. Fire evacuation plans can be valuable. Get a Google Earth shot (or another up to date

**Site Water Balance Model**  
Part I: Sanitary Water Uses

User Information	Description	No. of users	Usage pattern	% Female	% Male	Total users per day	Activity per day	Water use per day	Shower use per day
User Type 1	Office worker	100	9 day week	30%	70%	2.8	2.8	2.8	2.8
User Type 2	Shift worker	25	7 day week	30%	70%	2.8	2.8	2.8	2.8
User Type 3	Shift worker	250	13 day shift	30%	70%	4	4	4	4

**Details of Fixtures**

Fixtures	Type	No. at site	Flow full flush	Flow half flush
Fixture Type 1	Single flush	10	10	-
Fixture Type 2	Dual flush	20	9	4.5

**Urinals**

Urinals	Type	No. at site	Flow	Three Solenoid Flushes
Urinal Type 1	Flushed	5	5	-
Urinal Type 2	Timer	15	-	-

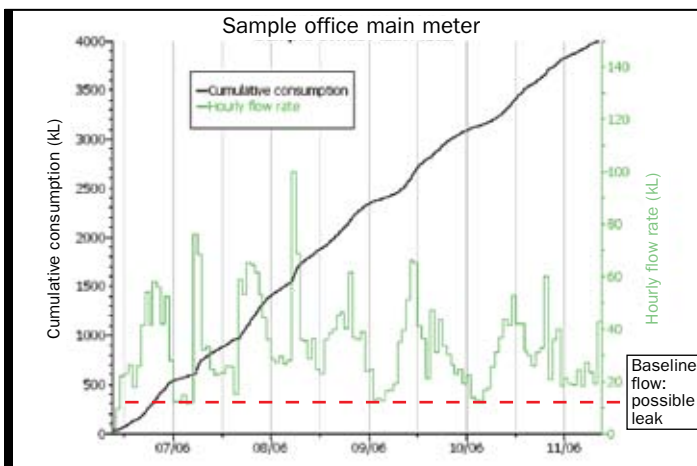
**Toilets**

Toilets	Type	No. at site	Flow rate
Assembly Toilet Type 1	Lower volume	5	10
Assembly Toilet Type 2	Single tap	10	12
Assembly Toilet Type 3	Flush	5	5
Stationary Toilet Type 1	Lower volume	4	10

**Shower**

Shower's Type 1	Type	No. at site	Flow rate	Shower duration (min)
Shower's Type 1	Unrestricted head	5	10	4
Shower's Type 2	Low-flow head	5	5	4

Partial sample input screen from a site water balance model.



Typical data obtained through a temporary logging exercise.

reduce my potable water consumption? Where will the money come from? Who will champion it? What internal resources will be available? How will the project be delivered (internal, nominated suppliers, turnkey or traditional through detailed design, specification and tendering, or a mixture of any of these)?

Importantly, also ask how you will need

aerial). Find out about any site development plans and check if there are existing water management plans. Begin preparing a simplified water supply schematic (single line diagram) and refine it after the site visit.

Finally, work out who's who in the zoo. Spend effort on this as it is the first part of building the all important buy-in.

## 6. Do the water savings assessment

Most of you would have already finished your 'audit' by now. Did you notice that we are half way through before we are even going to site? For good reason. If you skipped straight to here, we recommend you go back and read Steps 1-5.

Now start planning the visit with relevant people. Meet the facility manager (if that's not yourself) and anybody else who has been around the site for some time and knows something about its water use. This could be the cleaner telling you that leaking toilets take forever to get fixed. Gather whatever information you can extract from those sources relevant to site water usage, behaviour and attitude.

Assess all water using fixtures. Where possible, measure flow and flush rates. For amenity facilities and kitchenettes, this is easy; it's harder for industrial processes and 'wet' tenancies such as food outlets, restaurants, health clubs and the like. You need to look in detail at machine specifications and the type of operational requirements. Check fixtures such as pre-rinse spray guns, woks, and dish and glass washers as well. Observe general water use practices.

Visit cooling towers and assess their operation in terms of water (and energy) efficiency. Check the maintenance records. Irrigation use is another specialty area in its own right.

## 7. Prepare a site water balance

This step could be the hardest and may require assistance from a water savings engineer. The problem is that water consumption is almost always a two or three-dimensional assessment; it is usage rate multiplied by duration multiplied by frequency. Focus on the key areas identified in Step 4.

You want to gain a good understanding on where much of your water, and therefore costs, go. You might be lucky and already have some smart and sub-metering. This will help a lot, but can also make the task more difficult as you will now need to reconcile various flow accounts – and

you'd be surprised how often it just does not appear to make sense.

## Optional: Additional data/assessment

If you can and if the task warrants it, it is highly recommended to undertake at least a temporary (2-4 week) smart metering exercise for at least a few key streams. Using mini loggers attached to the main or key sub-meters provides a trace of the water consumption.

It provides conclusive evidence of any major leaks and highlights key water consumption patterns to help identify additional savings. This measure is especially recommended for streams with an erratic, unusually high or not clearly understood water consumption pattern.

The 'el cheapo' method of checking for leaks – by having the security guard read the meters at night when no flow is expected or by obtaining some overnight readings – all too often just does not work.

## 8. Key performance indicators

Treat them with caution. A 'good' KPI may not necessarily mean the facility is water efficient, nor does a 'bad' KPI necessarily mean it is inefficient. Properly used though, KPIs can be a valuable tool to help benchmark your operation as long as you know where your site is different. Ideal are similar facilities within one organisation, such as a number of commercial kitchens or laundries.

The finer or 'grainier' the KPI, the better. A KPI for water consumption in an office building as kL/m<sup>2</sup> NLA per year without knowledge of whether there is a food court or the occupancy rate, for example, is less useful than comparing water consumption through the cooling towers within the same city and type of buildings as L/m<sup>2</sup> per year.

## 9. Identify conservation measures

Now is the time to look at anything that has the potential to save water. Cast your net wide and think outside the square. Sometimes energy savings can be the easiest and most cost effective way to save water; cooling towers are a classic example.

Anything goes, from simple efficiency measures starting with flow controls for taps, water efficient toilets and urinals, to process changes (think cleaner production), from addressing abnormal water consumption and leaks to user awareness and behavioural changes,

from replacing potable water with sources such as rain or stormwater to recycling and sewer mining. Make sure you have a suitable demand matched with the water you intend to supply. The water balance from Step 7 will now come in handy.

Look at left field ideas too, such as firewater testing.

## 10. Summary and implementation plan

Now it is time to cost the water conservation measures and compare them to the associated savings in water, energy and other costs. Remember also to take into account additional costs, such as the special cleaning and maintenance for waterless urinals.

Then list all water conservation measures considered with their costs, savings and payback. You may want to group them into Tier 1 and 2 categories to show what can be achieved at a more common payback period versus more exotic options that might have merit based on grounds other than payback. Or they could be grouped to show the measures required for a certain NABERS Office Water rating versus the associated cost.

Finish off your water savings assessment with a clear forward action and implementation plan. If you followed these 10 steps, you would have this information already anyway. Now it's just a matter of framing your report around it to turn it into a call for action statement. Happy saving!

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