Reducing water use saves money, can enhance the reputation of a business and preserves natural resources. But where should a business start? This guide will help SME’s through the first stages of setting up a water efficiency strategy.

Water as a Resource
Water is often taken for granted: You turn on a tap, and as if by magic, it is there. However, water is a resource like any other, and hence its supply should be treated with respect.

As such, all businesses should make sure that their operations are as water efficient as possible. The benefits are clear:
- Save money
- Save carbon emissions
- Protect the wider environment
- Avoid potentially damaging leaks
This document provides a first step for businesses wishing to use water wisely, and achieve water efficiency in their organisation. It is supplemented by the following further Water Efficiency Guidance documents in the Castle Water SME Information Pack:
- Billing
- The Open Water Market
- Behaviour Change
- Site Walkthrough Checklist

The Water Management Hierarchy
The Water Management Hierarchy is a framework for prioritising water management and efficiency actions.

Keep the waste hierarchy in mind when undertaking water savings actions: those which deliver results closer to the top of the hierarchy should be preferred.

The Water Management Hierarchy: What should you consider?
Reduce costs and eliminate water waste to enjoy greater savings for your business

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Eliminate

Educate your staff to avoid using water where appropriate. Consider if the water using activity is actually required?

Alternative water use

Prevent the inappropriate use of mains (potable) water. Can you hygienically use an alternative water source in the activity?

Reduce

Consider options to improve water efficiency. Can existing fittings be upgraded to improve water efficiency?

Reuse

Can water efficiency be increased through its reuse? Consider if the reused water needs to be treated prior to reuse?

Recycle

Can water be recycled for use in another water using activity?

Disposal

Always dispose of water in a legal and environmentally responsible manner to avoid flooding, pollution or inconvenience to others.

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Step 1: Understand your water use
Once you have committed to begin saving water, the first step is to understand how water is used in your business. This should be started by asking the following questions:
- How is mains water supplied to site?
- Is there one or multiple supplies?
- Are there any alternative water supplies?
- How is water disposed of after use?
- Do you discharge wastewater (sewerage and trade effluent) to sewer and/or controlled water (river, stream, etc.)?
- Where is water used in your business (domestic use, process use, inside and outside)?

The final question will be key to improving your water efficiency. Typical water use areas for SME businesses include:
- Toilets and urinals
- Cooling water
- Washing hands
- Hot water/steam boilers
- Use in products (Ingredient)
- Drinking water fountains
- Rinsing products
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- Washing vehicles
- Watering landscaped areas
- Machine lubrication

A simple and effective tool for understanding your water use is a water balance model. Water balance models numerically account for:
- How water enters the site (mains water, other sources)
- How water is used within the site
- How water exits the site (sewer discharge, trade effluent)

The following steps outline how you can produce a water balance:
- Gather existing data on water use and costs (e.g., water, sewerage and trade effluent bills)

Step 2: Set Key Performance Indicators
Measuring water efficiency performance over different time periods helps to gain a better understanding of how your business uses water and where efficiencies can be made. This is best done through setting water management key performance indicators (KPIs), which are water use targets proportional to an applicable variable site activity indicator (such as production levels).

KPIs allow a business to:
- Establish baseline water efficiency performance
- Track changes in efficiency over time

- Identify the main water using activities, and try to quantify them (measure flows, manufactures data, rules of thumb such as 25 l/person/day for domestic amenities in sites with no canteen)
- Identify where existing water meters and submeters exist to assist in quantifying flows to different areas
- Bring this information together in a simple spreadsheet or in a block diagram to develop the water balance (example below)

One of the main benefits of a water mass balance is to identify any unexplained water consumption, such as leaky pipes.

A good water balance model, which accounts for at least 90% of your billed water consumption, will serve as a tool to understand and manage water use.

Water balance model

Water 100m³

- Cooling tower 10m³
- To atmosphere

- Toilets 10m³
- Facility cleaning 85m³
- Vehicle wash 5m³
- Leaks 5m³
- To sewer
- To ground / atmosphere

Top tip

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SME water efficiency: a step by step guide

Did you know?
A dripping tap can waste more than 60 litres of water a week? That’s the same as 39 bath tubs of water a year.

A key part of using KPIs as effectively as possible is to analyse them graphically, in order to visualise if they remain steady, increase or decrease over time. Also, high variation in a KPI graph can illustrate poor control over water use levels. An example of such a graphical analysis is below.

A general list of potential water efficiency technologies is presented over the page. Some of these (particularly urinals, taps, and toilets) will be universally applicable. However, others (particularly those regarding process water use) will be site specific. In order to tap into these (which depending on the site in question can deliver the most savings), advice can be sought from:
- A water retailer such as Castle Water
- Environmental consultants
- Technology suppliers

More complex sites can benefit from expert consultancy support for water efficiency. Castle Water is in a position to provide this to its customers.

Visit www.castlewater.co.uk/additional-services to find out more.

Step 3: Water efficiency action plan
Once the water balance has been constructed and a baseline water efficiency established by setting KPI’s, the goal is of course to improve performance.

There are many water saving techniques, so prioritisation is key, according to factors such as:
- The budget available for investment
- The water savings possible through each action
- Operational costs of any technology solutions
- Prioritising hot water savings (heating one m3 of water to 75°C can cost over £7)
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#### Urinals
- **Push button actuator:** User controlled flushing
- **Occupancy detector:** Infrared systems to sense when a urinal has been used
- **Waterless urinal:** Delivered through siphonic traps or deodorising pads

#### Taps and showers
- **Flow limiter:** An aerated or regulated flow device inserted in an existing tap
- **Replacement:** Replacing existing tapware with new water efficient models

#### Toilets
- **Low Flush Toilets:** Can save over 50% of water used per flush
- **Retrofits:** Minimise water use in existing toilets through flush volume restriction

#### Industrial / process
- **Flow controllers:** Devices to restrict flows in existing equipment
- **Nozzle & Sprays:** Purpose designed and targeted water efficient sprays
- **Clean-in-Place Systems:** Dedicated systems to clean large equipment

#### Leaks
- **Identification:** Metering data and water balance models to identify any leakage
- **Localisation:** Technology solution is available to pinpoint the location of leaks

#### Other
- **Monitoring and Targeting:** Tracking water consumption through metering data
- **Staff Awareness Training:** Controlling user-influenced water consumption
- **Water Management:** Actively following water use trends to drive efficiency

Leakage is a key area which should be addressed (if identified by a water balance model) in any effective Water Efficiency Action Plan. The water and costs savings possible through remediating even simple leaks are shown in the following image:

**Step 4: Consider alternative water sources**

Alternative water sources represent a different option to mains water. They are typically used for applications for which water treated to a high quality is not needed, including flushing toilets and urinals, grounds irrigation, and various process uses.

Alternative water sources include:
- **Rain and stormwater**
  - Water runoff from roofs or ground areas collected and stored for reuse
- **Boreholes**
  - Wells drilled to allow access to underground water sources
- **Surface water**
  - Water sourced from rivers, streams, etc.
- **Reclaimed water**
  - Water which has already been used in onsite processes, and is reclaimed for reuse (£7)

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<table>
<thead>
<tr>
<th>Alternative Water Source</th>
<th>Volume/Savings</th>
</tr>
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<tbody>
<tr>
<td>One drop/second</td>
<td>4.8 m³/year, ~£11/year</td>
</tr>
<tr>
<td>Drops breaking into stream</td>
<td>4.8 m³/year, ~£11/year</td>
</tr>
<tr>
<td>3mm stream</td>
<td>336 m³/year, ~£731/year</td>
</tr>
</tbody>
</table>
There are multiple potential benefits of using alternative water sources. These include saving money (through reduced mains water bills) and a reduced environmental impact (by using water which is only treated to the necessary quality, and hence results in lower treatment-based carbon emissions). However, they must be properly managed to ensure their safe use.

With this in mind, two British Standards are available for reference regarding the implementation and operation of different alternative water sources. These are:

- BS 8585:2009 for rainwater harvesting systems
- BS 8585:2010 for greywater systems

**Step 5: Drive continual improvement**

Steps 1 to 4 of this guide provide the basics for a SME who wishes to improve their water efficiency - and save money and improve environmental performance in the process. However, water efficiency should be seen as a continual process, in which improvements are monitored and continuous improvement driven.

**Top tip**

Progressively lowering your KPI water use targets is an effective means of driving continual improvements in water efficiency.
SME water efficiency: a step by step guide

Did you know?
According to UK government estimates deregulation in England will deliver around £200m of benefits to business customers, while Scottish Water claim since deregulation it was able to cut £100m from customer bills.
(source: http://www.chroniclelive.co.uk/special-features/water-deregulation-could-lead-great-11861165)

Who is eligible?
The changes apply to:
• Businesses, charities and public sector organisations; which are:
• Premises which are 'non-household' (used mainly for business purposes)

How the system works
There are two bodies involved:
• Regional water wholesalers
• Licensed water retailers (e.g. Castle Water)

Previously
Services could only be bought directly from your regional water wholesaler, tying you to services according to geographical location.

Now
Water retailers, such as Castle Water, buy services from wholesalers, who then sell the services in a competitive marketplace to businesses via water retail contracts. The physical nature and operation of the water and wastewater system does not change (i.e. the treatment plants, pumps and pipes which supply the water). All water and wastewater infrastructure is operated and maintained by your regional water wholesaler for sale by a licenced water retailer.