GIIRS Emerging Market Assessment Resource Guide:

Monitoring Water Use

What's in this Guide?

I. Definition: Water Use

A company's water use, usually measured in cubic meters (m^3),[1] represents the consumption of water in a given period. Water can be sourced from:[2]

- Municipal water supplies or other water utilities;
- Surface water, including water from wetlands, rivers, lakes, and oceans;
- Ground water (including wells);
- Rainwater collected and stored by the organization

Within an organization, water is typically consumed for industrial processes (e.g. manufacturing) as well as for building and sanitary use.

II. Why Monitor and Record Water Use?

Monitoring water use is the regular collection of information on the total amount of water drawn from all sources for any use during a given period. It enables a company to understand water use patterns and identify potential inefficiencies. Monitoring is also essential to setting reduction targets in water use.

Monitoring water use is an integral part of an Energy Management System (EMS). (For more information on implementing an EMS, please refer to "GIIRS EM Resource Guide: Environmental Management System.")

Here are some of the benefits of monitoring and recording water usage:

- Explain variations in water use, such as increased production or seasonality factors
- Understand potential risks and impacts associated with a company's water use

[1] 1 m^3 = 1000 liters = 35.3 ft^3 = 0.353 ccf = 264.2 gallons
[2] Global Reporting Initiative, www.globalreporting.org

- Identify inefficiencies and leaks
- Identify opportunities for water savings and set reduction targets
- Reduce risks associated with disruptions in water supplies or increase in cost of water

Finally, water costs don't just come from supply and subsequent discharge to sewer. Saving water can lead to reductions in electricity, gas, labor and chemicals (because more water usage often requires more heating, pumping and treating).[3]

III. How to Monitor and Record Water Use?

Water bills
When available, use water invoices or receipts from suppliers (utilities) over one or two years to determine your company's water use. This will give baseline usage information from which you can start determining overall use patterns: can your company explain increases, decreases, or steady levels? Are there seasonal effects?

Create an inventory of all water using activities[4]
Whether water bills are available or not, determine where, how, and when water is used in your facilities and buildings. Make sure to include all equipment used.

When possible, install sub-meter equipment to help quantify water use more granularly. Otherwise, you can estimate usage with methods such as such as:

- Measuring flow rates using buckets and a stopwatch;
- Estimating volume of daily use from toilets and faucets;
- Determining the capacity and load factor of the cooling tower;
- Measuring the irrigation area to determine water needs
- Calculating water use of operating equipment per cycle and cycle frequency

If your company has an industrial facility, once you establish your inventory, evaluate the results and compare them with your water bills. Are results comparable? If not, try to identify what major water using equipment you may have missed. This process can help you identify your company's largest water using activities and any major leaks.

If water is obtained from different sources (municipal water supply, harvesting of rainwater, own wells, etc.), measure or estimate the volume of water used from each source and add up the volumes.

[3] Sydney Water Best Practice Guidelines, http://www.sydneywater.com.au/
[4] US Department of Energy Best Management Practice: Water Management Planning http://www1.eere.energy.gov/femp/program/waterefficiency_bmp1.html

To Calculate Water Use[5]:

1. Make a spreadsheet or use an available spreadsheet. Label your spreadsheet columns, for example: A (water source), B (quantity), C (units), D (conversion factors), E (water, in kl or m^3).
2. Enter your water sources in column A.
3. Collect usage data for each of the water sources in column A. Make sure that the data collected are relevant to the reporting period. Enter the quantity of water in column B.
4. Enter in column C the units referring to the quantities entered in column B.
5. If the information on the water entering your boundary is not in your selected unit of measurement (kiloliters or cubic meters), enter conversion factors in column D. Multiply the value in column B by the conversion factor in column D for each of your water sources. Enter these values in column E.
6. Sum the values in column E to obtain the total water consumed in kl or m^3. List all types of energy that you use in column A.

Sample Water Use Calculation Table

Water Source	Quantity	Units	Conversion Factors*	Water in kl or m^3
Total				

*Conversion factors can be found at: http://www.unit-conversion.info/volume.html

Note: When calculating total usage, you do not need to include water that your company recycles and reuses on-site, since you have already counted this water when it first entered your company or when you extracted it.

IV. Implementing Water Conservation[6]

The first step to implementing water conservation programs is to monitor water use. Below are some additional recommendations to implement water conservation.

Water reuse and alternate water sources

Significant water savings can be achieved by ensuring that the quality of water is suited to the purpose. For *some* processes, pure or very clean water may not be required. Instead, water recycled

[5] UNIDO SME Indicator Primer

[6] IFC Environmental, Health, and Safety (EHS) Guidelines, www.ifc.org

from another process can be utilized. Either reusing wastewater or using alternative water sources (harvested storm or rain water, ground water) can help significantly reduce water use. For many rinsing or cleaning purposes, countercurrent or spray rinsing processes can be implemented.

Cooling systems
Cooling towers are mechanical devices that reject heat by evaporative cooling. One of the most common applications is heating, ventilating and air conditioning (HVAC) systems used in buildings. You can use a closed circuit cooling system (that is, a cooling loop) with cooling towers rather than a single pass system. Additionally, treated wastewater or condensate water could be used for cooling towers.

Equipment/facility maintenance
The following are some maintenance routines and best practices that can bring additional savings:

- Regularly maintain plumbing, and make sure leaks are found and fixed
- Install self-closing taps, automatic shut-off valves, spray nozzles, pressure reducing valves, and water conserving fixtures (e.g. low flow faucets, toilets…)
- Operate laundry machines and dishwashers on full loads, since it takes the same amount of energy and water as running them half full

Case Studies in Water Use Reduction

GIIRS Pioneer Company Pwani Oil Products Ltd., a manufacturer of edible oils and fats and laundry soaps in Kenya, achieved a 25% reduction in water use by fixing and sealing of leaks, on-site treatment and reuse of waste water, reuse of process water for flushing and cleaning, trapping of condensate and metering of all major water-consuming units.

Kandalama Hotel in Sri Lanka reduced water use by almost 10% by operating dishwashers at full capacity, operating laundry machines at full capacity, investing in new equipment (a dishwasher in the employees' kitchen), and training employees about using water efficiently. The hotel also improved the quality of waste water by segregating and adding an extra filter. The water is recycled for urinals and gardening.

La Pisqueña S.A. is a tannery in Peru that produces fine leather and semi-processed leather. As part of a Resource Efficient and Cleaner Production (RECP) program, La Pisqueña decreased its water consumption through implementation of water timers that allow for measurement and control of the feed-water (water fed to boilers for steam generation).

V. Additional Resources

For additional information on Resource Efficient and Cleaner Production (RECP) methods, refer to *Enterprise-Level Indicators for Resource Productivity and Pollution Intensity: A Primer for Small and*

Medium-Sized Enterprises, produced by the United Nations Industrial Development Organization (UNIDO) and the United Nations Environment Programme (UNEP), http://www.unido.org/fileadmin/user_media/Services/Environmental_Management/Cleaner_Production/SME_Indicator_Primer.pdf

World Business Council for Sustainable Development (WBCSD), Global Water Tool: http://www.wbcsd.org/work-program/sector-projects/water/global-water-tool.aspx

The Global Water Tool is a free tool for companies to map their water use and assess risks relative to their global operations and supply chains: http://www.wbcsd.org/work-program/sector-projects/water/global-water-tool.aspx