

WATER SUBMETERING FOR APARTMENT BUILDINGS

BY DON MILLSTEIN

As with electricity and natural gas, submetering technology can deliver efficiency and savings for water, too. Wireless systems monitoring consumption and detecting leaks at specific locations provide greater awareness of water use that can result in significant reductions. (They can also help save energy.)

Visualization and control

Two-way wireless submetering systems are already achieving proven results in multi-family housing, by providing both visualization and control capabilities to property owners, facility managers and tenants.

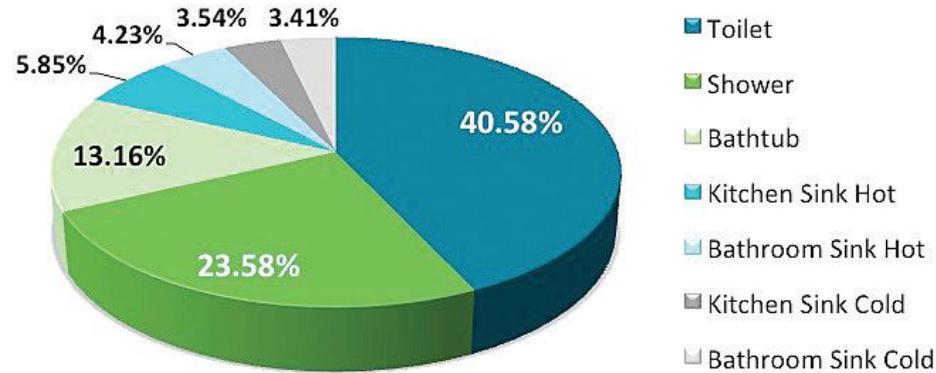
A comprehensive approach combines the wireless technology with 'smart' water meters and thermostats to enable daily water meter and leak detection reporting. The information delivered by such a system provides a basis for motivating both tenants and managers to make behavioural changes.





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FIGURE 1. Typical One-bedroom Point-of-use Consumption



Tenants are incentivized to conserve water, since they are held accountable for their individual use, while property managers can take proactive water-saving maintenance measures, since they receive the daily leak-detection reports.

Monitoring water use

The biggest water savings from submetering usually come via monitoring and reporting data from individual toilets, showers, sinks, etc., throughout a multi-family building. Low-cost, compact, battery-powered water

submeters are available that can monitor use for an entire apartment or at these individual ‘points of use.’

See Figure 1 for typical examples of water consumption measured at points of use in apartments. Toilets account for 40% of use, but more than 70% of leaks. To prevent overspending on water, it is important for property managers and tenants to identify and control leaks, mainly from toilets and, secondarily, from showers.

Wireless networks are used to communicate with water submeters and smart

thermostats, monitor data and transmit the information for billing and leak detection reporting. Two-way wireless facilitates easier and lower-cost installation. Battery-powered radios, integrated with the water submeters, report periodically throughout the day, without any need to run hardwiring in the plumbing system.

Data from throughout the building is collected at a central point called a gateway, then transmitted over the Internet to a cloud-based server for report generation. All of the wireless infrastructure and web-

based reporting can be fully automated, requiring no additional responsibility for the property manager, other than taking advantage of the resulting data and reports.

In addition to recording total water consumption, these systems can record the number and duration of water-use ‘events.’ Unusually long-duration events typically result from a leaking faucet or stuck toilet flapper valve. By flagging these, the system can generate a daily leakage report, providing a list of items requiring repair to the building manager.

Reducing water use

By way of example, a submetering system was recently installed in a multi-storey building with several hundred apartment units. Average daily consumption (ADC) was reduced to between 45 and 55 gallons. This was a remarkable result since, according to industry statistics, a typical one- or two-bedroom apartment with one bathroom uses nearly double that amount: about 70 to 90 gallons per day.

Further investigation determined the result was achieved through both (a) proactive repairs of water-wasting conditions and (b) tenants modifying their habits to



use less water in the first place.

Leak-detection technology influenced the day-to-day behaviour of building managers by enabling them to see and respond to incidents where water was being wasted. The maintenance team could review the reports and determine each type of leak, such as—for a toilet—a broken flapper valve, stuck chain or cracked fill valve. This way, the maintenance team could grab the exact replacement equipment it needed and fix the problem in an efficient manner.

In turn, the dramatic savings helped the property manager keep water and sewer bills as low as possible for residents, while reducing operating expenses and increase net operating income (NOI).

The system's web portal also allowed residents to view their water consumption history and make behavioural adjustments accordingly to lower their bills, in addition to benefiting from the managers fixing leaks more proactively.

Reducing energy use

While monitoring water consumption, 'smart' wireless meters can also evaluate such levels in each apartment and use that information as a proxy for detecting occupancy.

Water consumption can be monitored at each point of use.

If a unit goes 36 hours without water use, for example, the meter can assume no one is home. Then it can automatically adjust the unit's thermostat to a level that saves energy.

Smart thermostats allow apartment building owners to bill individual residents fairly and accurately for the heat they use. Acting as both thermostats and wireless repeaters, these devices provide run-time information that allows heating costs to be allocated to each tenant. And again, a customer-facing web portal provides clarity and transparency, so as to avoid tenant disputes.

In one building where water meters were used as occupancy sensors, residents viewed their consumption and adjusted their thermostats, both from within their apartments and remotely. They ended up saving 10% to 20% on their heating and cooling bills compared to apartments without submetering.

Another energy-saving benefit is the property manager's ability to manually control the thermostats. This is helpful when a vacant unit needs maintenance or upkeep. Rather than leaving on the heating or air conditioning in anticipation of work crews, whose schedules often change, the



▲ Besides controlling HVAC functions, smart thermostats can act as wireless transceivers for water consumption data.

property manager can remotely adjust the temperature set point in each unit only when it is needed.

Advanced wireless submetering systems can provide significant savings for both property managers and tenants. And as energy conservation initiatives continue to

be introduced, these systems will play an increasingly important role in complying with local standards. **EM**

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