

# Application Solution

## Utility Submetering

### Getting a Handle on Energy Usage

Whether ...

- You are responsible for facility management of a high-rise office or apartment building and are faced with rising energy bills and inconsistencies in tenants energy usage;
- You are in charge of energy management of a campus or industrial facility but without accountability for energy usage there is little incentive for users to conserve energy;
- You don't know if your recent energy retrofit is really paying off;
- You are charged with making your building(s) more energy-efficient but don't know where the best return on investment is;

... you probably know that energy savings on the order of 15% can be achieved when individual metering is in place but you are concerned about equipment and installation costs and disruption to the building's operation.

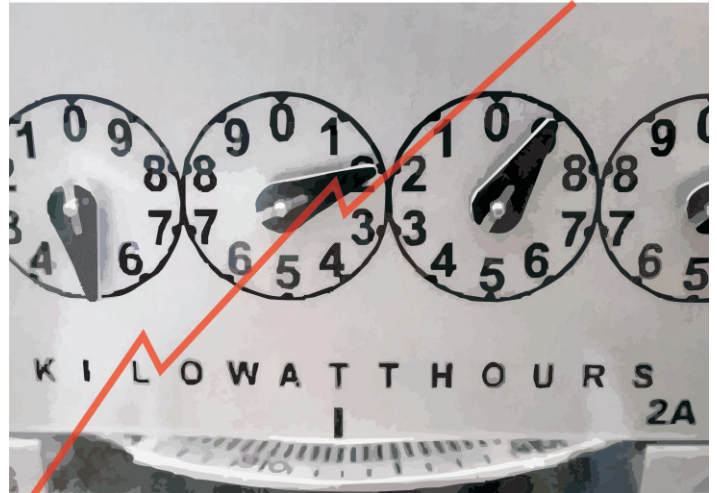
Fortunately, with recent availability of low-cost wireless sensing solutions, it is easy and affordable to install wirelessly networked metering solutions which make tenants or departments accountable for usage without disturbing building occupants.

### Sub-metering

Sub-metering is defined as individual tenant billing by utilities (electricity, gas and water.)

In most high-rise office and apartment buildings, utility use is monitored and billed for the entire building. Tenants are billed for the utility use on a per square foot basis as part of the rent or as a proportion of the common costs. This billing procedure does not encourage tenants to be more efficient in their energy use since they are not billed directly for usage.

Individual metering of each tenant space overcomes this problem. Individual metering removes utility costs from common building costs and reduces the risk to the building owner of non-payment by the tenant. Individual metering that removes utility costs from the standard rent will also make the property appear more competitive in the market place.



For the tenant, utility costs are charged on a more equitable basis; this is particularly important in mixed use/function buildings where energy usage of one or more tenants varies from the rest.

The ability to wirelessly transmit individual meter readings and make them available at a central location, accessible through the intranet or internet, makes sub-metering a cost-effective solution for building owners trying to manage utility costs and making their space more attractive to tenants.

### Cost Allocation and Accountability

Campus and industrial facilities are often metered centrally with no information to allocate the utility costs to departments, functions or manufactured products. Furthermore, meter reading is a tedious manual process and therefore not performed frequently.

For managers of campus facilities such as colleges, it is very difficult to come up with a reasonable method of allocation to buildings or departments. Since there is no accountability for energy usage, there is no feedback and incentive for users to manage energy wisely.

Similarly, managers of industrial facilities have no way to accurately assign energy costs to product lines which limits the ability of the company to determine the profitability of specific products or functions.

Most building owners and facility managers have established procedures (e.g., turning off lights, temperature setbacks) to minimize the waste of energy in their facilities. In most cases, it is difficult to determine whether procedures are being followed or whether faulty equipment is resulting in increased energy usage.

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Using wireless pulse counter modules from Spinwave Systems for electricity, gas, and water facility managers can easily assign utility costs to users within the organization and provide accountability for that usage. Wireless metering provides cost effective installation with plug-and-play connectivity without the need to install additional communication lines.

## Energy Management Programs – the Pitfalls

### Assessment – Establishing an “Energy Inventory”

Energy costs represent a significant expense for most commercial and industrial buildings. As building equipment ages (lighting, HVAC, etc.) it becomes prohibitively expensive to operate and it makes sense for building owners to invest in newer technologies and benefit from an attractive return on investment.

The first step in any energy management program, usually yielding the best return on investment, is a program to sub-meter energy usage and monitor environmental conditions (e.g. temperature, humidity, air quality) to provide a clear picture of comfort levels, where energy is being used, where energy can be saved and whether existing energy conservation procedures are being followed.

### ROI Analysis – Staying on Track

A good portion of energy retrofit projects either never achieve the projected pay-backs or fail to sustain initial savings due to ineffective means of monitoring and verifying energy savings.

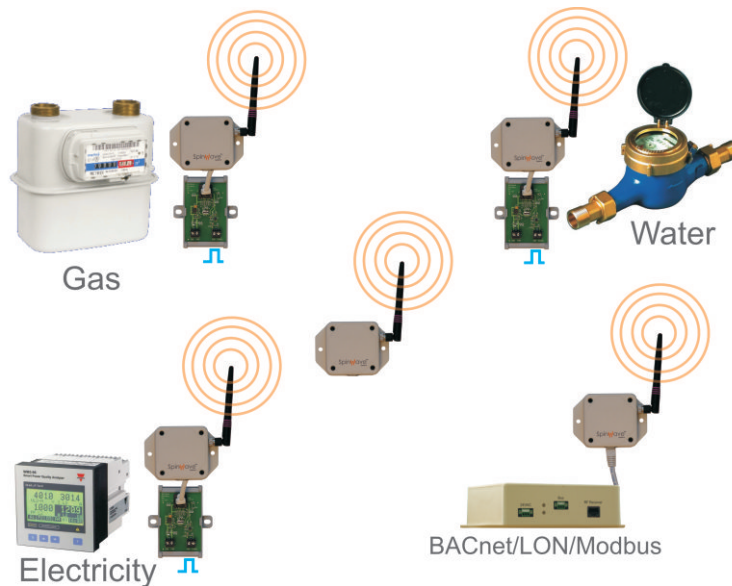
## Solution

In the past, the cost of monitoring and verification were cost prohibitive and many projects have been implemented without adequate monitoring technology in place, resulting in lower return on investment.

Effective measurement and verification of energy usage and indoor comfort levels not only ensures that installation and commissioning are done correctly, but also provides continuous feedback on the long term success of the energy retrofit while ensuring a comfortable and healthy environment for building occupants.

### A wide range of automated metering options:

All-in-one PC-based solution: Through an easy-to-install USB adapter, meter readings and sensor data are wirelessly made available to Spinwave's Monitoring Software running on a PC.



The Monitor Software notifies energy managers and facility managers through an email message as soon as a value drifts out the acceptable range (user configurable).

The Monitoring Software periodically uploads historic (CSV format) and current data (HTML format) to a web server for remote meter reading and comfort verification.

Building Automation System Integration: Spinwave's wireless pulse counters can be easily integrated with virtually any building automation system, PLC or SCADA software through Spinwave's wireless LON, BACnet, Modbus or direct I/O interfaces. Wireless metering data can be used for sub-metering reports and for load shedding strategies.

**The Bottom Line:** Spinwave's wireless sensor networks provide a non-intrusive, easy-to-install and cost-effective solution for reducing utility costs through accountability metering.

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