



MEASURE TODAY. ENSURE TOMORROW.

## Feeling the Heat?

### Commercial Energy Measurement Audits: Planning, Optimizing

Your organization invests a lot in its heating and cooling utility infrastructure. Insuring optimal performance can be an ongoing challenge. Responsible resource management, cost controls, reliable service delivery to clients (and proper payment for service) all require that facility management have a firm grasp on what's being generated, what's being delivered, and how that is measured. Confidence in your understanding of the system's performance translates directly to credibility with your team and all the constituents you serve.

The first step toward building this confidence and credibility is understanding your system's current production. Not the billing history, resource or maintenance cost, or design assumptions. Not the values on the equipment's rating plate, pump curve or theoretical performance under X conditions. What is it actually producing right now, under your operating conditions, your tenants' demand? The tools exist to measure where you need to, when you need to, delivering answers you, your team, and your customers can rely on.

#### Select the Tool for the Job

Whether developing a new baseline or getting an update on an existing system, understanding the tools available to you will help sharpen your objective, making the exercise a success. For existing systems, externally mounted transit time measurement is an excellent option. Portable ultrasonic (transit time) energy meters combine two simple measurements to produce real time production/consumption data from one point along the system. Surface mounted sensors (both flow and temperature), properly oriented, provide precise flow and differential temperature values, from which BTU/kW values are calculated. The first obvious advantage is installation- you are not intruding into the system in any way, other than by the temporary removal of some pipe insulation. The second is, or should be, portability- a handheld device, battery-powered, allows you to measure where the flow condition is optimal for measurement and also valid for your process. A serviceable portable instrument will also incorporate data logging capability, to capture performance in reference to specific times/demands. Spire offers such a device in its Regal Series RH40, which you can view here:

<https://www.spiremt.com/handheld-flowmeter-btu-rh40.html>

Again, understanding the tool will promote success. Instrument sensors perform one operation, and do that very well. Factory tested, independently verifiable, the values measured are the product of established science and attention to design. The instrument should guide you through the sensor placement, provide feedback about how well you've done, and when to adjust. The instructions should be clear on how much laminar flow (how much straight run of pipe) will yield the best results for you. With the sensors properly oriented, how accurately these sensors capture your specific system depends on the information you will provide. Pipe materials, diameters, thicknesses, and carrier fluid (water, glycol, etc.) have specific characteristics with respect to sound travel. These values, too, are a matter of established science, and preprogrammed into the instrument. You need only provide the actual type and diameter of the pipe, and the fluid, that you are working with. Familiar with the instrument, you and your staff can execute a credible audit whenever needed, gaining valuable insight into system performance.

#### Walk Your System

Equally important is familiarity with your system. There is typically one component of a heating or cooling system that gets the lion's share of attention, and if so, probably not for a good reason. It's the one with all the moving parts, the one with the most frequent maintenance schedule, the irritant in an otherwise relatively static system. But it's not the only component, and will not be the focus of your energy audit, at least immediately.



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Energy is carried in the piping system, so that is where you will find the BTUs you are looking for. Selecting the right spot in which to gather your information is critical to its validity. How well do you know the piping system? Do you have as-builts, and do they agree with your observations? What are your pipe materials, schedules and diameters? This is an excellent time to confirm (or correct) the information you think you know about your system. Surface mounted ultrasonic sensors are factoring all this into the measurement of the sound waves emitted through the pipe wall, through the liquid, and back again. Those values are ones you will be programming into the instrument you select. Entering correct values will ensure you aren't handicapping yourself before you even start. Flow direction is another seemingly mundane, but critical factor, and is easier to mix up than you might think. It is one matter to be in the mechanical room, where the path from and to the chiller system is fairly obvious, and quite another to be in some midlevel, windowless pipe run in the building's interior. As you walk your piping network, keep in mind the straight run of pipe required, and where you select to measure in relation to the production or delivery point. Also, walking your piping is a great opportunity to identify uninsulated sections that contribute to system inefficiency and unneeded expense.

#### The Power of Context

Having established a real time baseline system output, you can now review and validate your other sources of system information: design assumptions, resource consumption, equipment ratings, and customer billing can be assessed to confirm the quality of performance and identify areas for improvement. Armed with real time data, you can discuss system costs, performance and tenant billing with confidence. If your facility does not have permanent thermal energy measurement installed, or is not providing the level of confidence you need to succeed, you should consider instruments like Spire's TP10:

<https://www.spiremt.com/clamp-on-btu-meter-tp10.html>

which also allows quick installation, without opening the piping network. Expanding a system, adding a building, designing a new facility? You may want to consider these inline instruments, also from Spire, which offer their own benefits:

<https://www.spiremt.com/ultrasonic-heat-meter-280t.html>

<https://www.spiremt.com/t-mag-magnetic-btu-meter.html>

See our article on the permanent measurement system installed in one of the world's largest commercial projects- The Clock Tower in Mecca, KSA.

[https://spiremt.com/new-pdf/Abraj%20Al-Bait%20Update%202020\\_2.pdf](https://spiremt.com/new-pdf/Abraj%20Al-Bait%20Update%202020_2.pdf)

Thanks for reading!

*Uncertain about your energy measurement situation? Talk with us! Call Spire Metering Technology at 888 738 0188, option #2 or email [Support@spiremt.com](mailto:Support@spiremt.com). **Measure Today, Ensure Tomorrow!***

#### About the Author

John Downey is the Marketing Manager at Spire Metering Technology, a manufacturer of water and energy metering solutions. He entered instrumentation sales in 2002, serving the environmental treatment community, having worked previously with investor owned utilities on the implementation of AMR and revenue protection solutions. John currently serves on the board of the MAWEA.

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