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10 Reasons You Should Switch From Mechanical To Solid-State Meters

Mechanical water meters have faithfully served utilities for decades, becoming emblematic of a familiar and dependable approach to utility management. However, as the digital age continues to usher in transformative solutions, the juxtaposition between time-honored mechanical meters and contemporary solid-state metering technology becomes increasingly pronounced.

For many water utility professionals, mechanical meters offer the comfort of familiarity. This, in turn, makes the idea of upgrading to solid-state metering seem daunting. Driven by cutting-edge sensor technology and data analytics, solid-state meters offer numerous benefits too compelling to ignore. They are also a powerful tool for addressing the ever-rising challenges of growing populations, water scarcity, and aging infrastructure.

Some of the benefits of solid-state metering include:

Repeatability. Solid-state metering relies on digital signal processing and electronics to make measurements, resulting in better repeatability from product to product. This makes solid-state meter data more reliable and enables more accurate and meaningful data insights.

Accuracy. Solid-state meters offer more crisp measurement. Most mechanical meters have an R-factor of 160, while high-end meters have an R-factor of 500. The typical solid-state meter has an R-factor of 800. Similarly, solid-state meters can measure much lower flow rates than mechanical meters –– as little as 1 liter/hour (0.26 gallons/hour). The best mechanical meters can capture a minimum flow rate of 5 liters/hour (1.32 gallons/hour). This results in more accurate billing and protects revenue from uncaptured flow.

Longevity and maintenance. Sand particles or hard minerals such as calcium or lime in water can damage or build up on mechanical meters over time, which can exacerbate inaccuracies or cause them to fail altogether. The lack of mechanical parts means solid-state meters are less prone to corrosion and damage, allowing them to retain their accuracy and precision throughout their lifetime. This results in reduced maintenance and replacement costs for water utilities.

Remote reading. Solid-state meters are equipped with communication capabilities, such as radio frequency (RF), cellular, or internet connectivity. This enables remote reading of the meter data via automated meter reading (AMR) or advanced metering infrastructure (AMI) equipment, eliminating the need for manual readings. This saves time and resources, especially in areas where meters can be difficult to access or where meter units are installed across a wide area.

Data analytics. The data collected by smart meters can be analyzed to gain insights into consumption patterns, peak usage hours, and seasonal variations. These analytics help water utilities optimize their distribution networks, plan infrastructure upgrades, and implement demand-based pricing strategies.

Billing efficiency. With accurate and timely data from solid-state meters, billing processes can be streamlined, reducing billing errors and disputes. By making consumption data available through online portals, consumers can access their usage data and billing information, promoting transparency and awareness of their water consumption habits.

Environmental benefits. By reducing water losses through leak detection and promoting water conservation through better awareness, solid-state meters can contribute to overall water resource conservation and environmental sustainability.

Adaptability. One concern that plagues many utilities is that idea that the electronics that power solid-state meters cannot endure challenging environments, such as intense heat, frigid cold, oppressive humidity, or even interference from wild or domestic animals. While some solid-state meters will fail in harsh environments, manufacturers such as Itron offer specialized housings that can protect sensitive equipment, provided the vendor is made aware of the conditions a given meter is expected to operate in.

Flexible and transitional. As mentioned, solid-state meters are often compatible with AMR and/or AMI systems. This gives utilities the option of gradually transitioning from traditional manual meter reads to a more automated system.

Elevate personnel. Despite the higher levels of automation offered by solid-state meters, utilities are not likely to start laying off personnel after installing them. Instead, many operators who used to perform maintenance and meter reads can be elevated to positions involving data analysis and system management.

As the above makes clear, solid-state meters offer a range of benefits over mechanical meters. However, not all solid-state meters are made the same, and it is critical that water utilities work with vendors to understand the specific features, offerings, and specifications of their products. For example, Itron's wSource solid-state meters boast a battery life of up to 22 years and are interoperable with all open standards and non-proprietary communication protocols. By working closely with the right vendor and leaning on their unique expertise, water utilities can leverage solid-state meters to tackle complex and difficult problems to the benefit of their community and their bottom line.

Itron has been helping water utilities around the world better manage their distribution networks to help lower operating costs and increase revenue. To learn more about solid-state metering and how it can help your utility, download Itron's new white paper here. ■