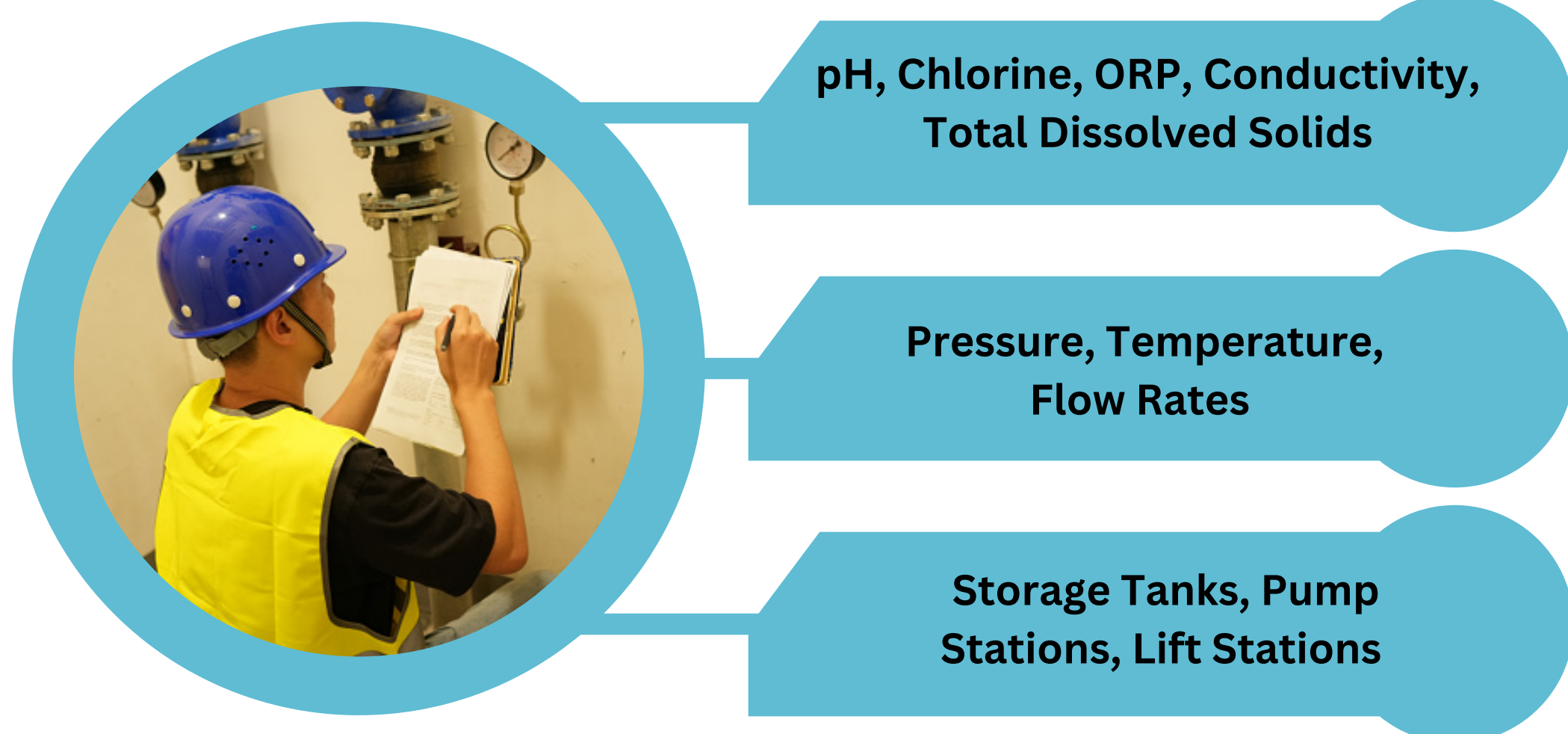


Data Collection for Water Utilities

In order to be financially successful and to ensure regulatory compliance, water utilities are required to collect, analyze, and report various amounts of technical data. This includes chemical and physical properties of the water, such as pH levels, chlorine, ORP, conductivity, total dissolved solids, and other properties.

Beyond water properties, water utilities must ensure the efficient and proper operation of their water treatment and distribution infrastructure, such as pipelines, storage tanks, and pumping stations. To enable this, measured properties include pressure, temperature, and flow rates. Moreover, predictive health of machinery, such as pumps, can be predicted and measured via vibration sensors.

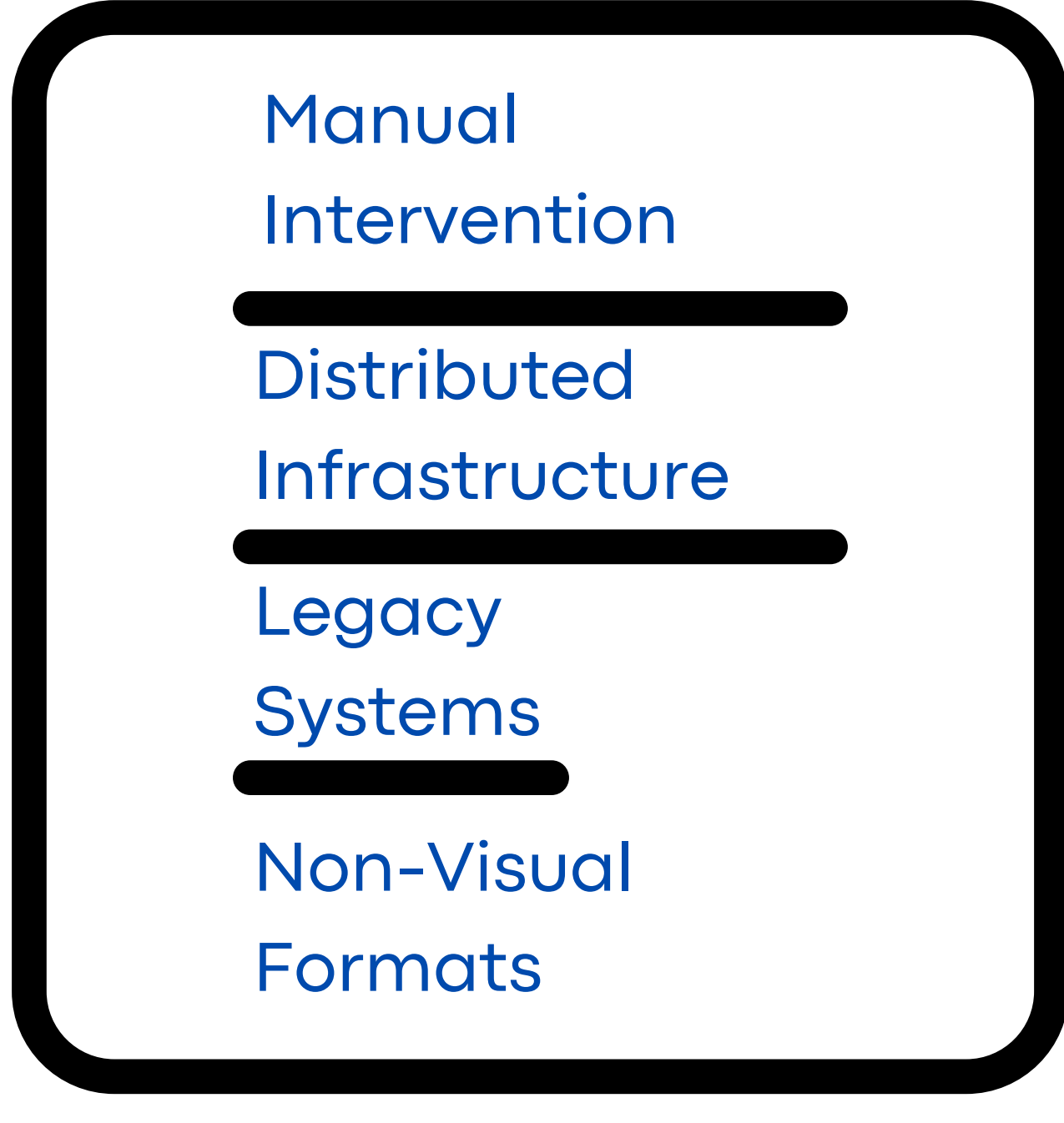


Challenges and Opportunities

What are some of the challenges and opportunities to measuring and capturing these data? For one, data collection is oftentimes manual, requiring personnel to take readings off of meters, valves, and displays. These displays are sometimes connected to a SCADA (Supervisory Control And Data Acquisition), which provides some reduction in the burden of labor, and yet sometimes these readouts are scattered throughout distributed infrastructure both outside of and within the plant. Moreover, oftentimes samples need to be sent to in-house or third-party laboratories, further increasing the cost and inefficiency of data collection – sometimes the these samples are sent to labs simply because the calibration of the measuring instrument cannot be verified.

Once these data are collected, they typically are not easily accessible or easy to read. Often, the data are kept on manual or computerized tables of data, which means that even once all the data are collected and centralized, reviewing them for compliance is laborious and expensive. Worse yet, because the data are not in visual form, it is difficult to spot trends or to use the data to predict future problems.

CURRENT STATE CHALLENGES



Solutions to Data Collection

How does one overcome these challenges and implement solutions to data collection? Let's weigh the pros and cons of three options: Manual, SCADA, and SPI's EdgeConnect.

The first option is to collect data manually. This requires no additional technical expertise and is easy to scale, although collecting large amounts of data at scale will get prohibitively expensive. The downside is that it provides no near real-time monitoring, remote access, or opportunity for efficiency improvement and regulatory risk mitigation.

A second option to consider is SCADA implementation. This will provide near real-time monitoring, remote access, and the opportunity for efficiency improvement and regulatory risk mitigation. However, the downside is that up-front capital investments are required, as well as specialty technical expertise. Moreover, the costs can continue to be high even after the capital investments are made, as per-seat licenses are expensive and need to be annually renewed. Lastly, SCADA packages do not include smart sensors that are pre-calibrated with EPA approved methods for regulatory compliance.

The third option to consider is SPI's EdgeConnect. This provides all the benefits of a SCADA system: near real-time monitoring, remote access, and the opportunity for efficiency improvement and regulatory risk mitigation, but our suite of sensors are smart sensors (can report immutable data to the cloud), and come with built-in EPA methods that support regulatory compliance. Additionally, there are no up-front capital costs required, and the scaling costs are low as there are no licensing costs required. And none of this needs any specialty technical expertise - all of our technology is plug and play and supported by SPI's technical team.

These pros and cons are summarized below. This article is intended to educate you the reader to deciding on the best option for adding remote connectivity to your municipal water infrastructure. We are available to answer your questions anytime.

	"Good" (Manual)	"Better" (SCADA)	"Best" (SPI)
Near real-time monitoring	No	Available	Available
Increased efficiency and safety	No	Yes	Yes
Smart sensors with pre-calibration	No	No	Yes
Supports regulatory compliance	No	No	Yes
Remote access	No	Central plant: Yes Remote sites: No	Yes
Cost	Low Initial Cost High Cost to Scale	High Initial Cost High Licensing Costs	Low Initial Cost No Licensing
Cybersecurity	N/A	Established security protocols	Established security protocols
Technical expertise required	Not required	Necessary	Not required