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F R O S T & S U L L I V A N

# Excellence in Water Resourcefulness Award:

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**Network Intelligence**  
Warren County Water District,  
Simpson County District, and  
Butler County Water System (WSB)

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## BACKGROUND AND COMPANY PERFORMANCE

### Introduction

Sustainability is the avoidance of depleting natural resources to maintain an ecological balance and access to them for future generations. Aging infrastructures and climate change have caused damage that threatens water sustainability. Undetected and unaccountable pipes create issues with locating faults, delaying repair times, increasing maintenance costs, and reducing efficiency. As a result, water municipalities are experiencing higher operating costs, excessive treatment capacities, steeper water bills, and loss of revenues.

Climate change has caused erratic weather patterns in some regions, threatening the integrity of pipelines and increasing the risk of water shortages and flooding. Sustainable management of water and sanitation is one of the United Nations' Sustainable Development Goals. The Council on Foreign Relations<sup>1</sup> predicts a 20% drop in renewable water sources for every one-degree Celsius increase in the global average temperature. However, the Paris Accord will not do enough to reverse the impact of climate change, and declining reserves will increase water prices globally, hurting low-income households the most. The United States saw the average water and sewer bill increase by approximately 3.6% in 50 metropolitan areas in 2019.<sup>2</sup>

The state of Kentucky has waterpipes that date as far back as the 1960s. According to a report from the Kentucky Water Resource Information System, non-revenue water (NRW) loss reached 24% in 2018, which far exceeds the national average of 16%. These losses were a result of unaccounted water main breaks and leaks, inaccurate meter readings, and water line flushing, which mainly result from inadequate system visibility.

To improve overall visibility for the water network, 3 counties in South Central Kentucky considered deploying a permanent solution to controlling water losses and deferring water line replacements when possible. These counties' communities grew, resulting in more households, difficulty recruiting enough staff, and inability to cover the costs of manual water meter readings. The state lost experienced operators and technicians because of retirements and a competitive job market, leading to the need for an automated and intelligent system.



1 [Water Stress: A Global Problem That's Getting Worse | Council on Foreign Relations \(cfr.org\)](https://www.cfr.org)

2 [Water costs are rising across the U.S. — here's why - CBS News](https://www.cbsnews.com)

## FOCUS ON THE FUTURE AND BEST PRACTICES IMPLEMENTATION

The Warren County Water District, Simpson County District, and Butler County Water System (WSB) came together to improve water resourcefulness in their community by deploying advanced meter readers (AMRs) and advanced meter infrastructures (AMIs) across the territory. The WSB had 4 clear objectives for deploying AMR and AMI systems:

1. Reducing meter reading costs
2. Increasing bill accuracy
3. Enhancing customer service
4. Reducing water loss

Combined, the WSB serves 40,800 residential, agricultural, commercial, and industrial customers. All 3 counties have diverse pipeline material and hard-to-access rural areas, making it difficult to identify leaks and issues in a timely and cost-effective manner. The WSB chose Itron as its technology partner to deploy both systems across its 2,100-mile combined distribution main because of its acoustic leak sensor technology integrated with the AMR system. Through this system, the WSB can lower its operating costs and NRW and enhance its customer service. The system allows for hourly interval water consumption data.

The project is part of the WSB water accountability program, which stretches over 63 district metered areas and comprises the following:

- ▶ A dedicated leak detection team
- ▶ Geographic information system mapping
- ▶ Supervisory control and data acquisition
- ▶ Lift and shift data logging
- ▶ Ground microphones
- ▶ Valving techniques to identify leaks

Frost & Sullivan recognizes WSB as the recipient of the 2022 Excellence in Resourcefulness for Water for its community-oriented water conservation programs. The table below lists the criteria measuring WSB's success for water resourcefulness.

	Poor	Fair	Good	Excellent
<b>SOCIAL IMPACT</b>				
Improving customer awareness and participation				✓
Enabling behavioral changes for reducing waste through customer engagement and technology-driven programs				✓
<b>BUSINESS IMPACT</b>				
Strengthening the utility company's brand image as a leader in sustainability				✓
Achieving operational efficiency because of a successful sustainability strategy				✓

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## Social Impact

### *Serving the Community and Lowering Customers' Bills*

Deployment began in October 2018, starting with Butler County and continuing into Warren and Simpson Counties. As of 2022, the WSB installed 38,700 endpoints and 13,600 acoustic leak sensors. The sensors look at the variation of sound to determine the type of leak, allowing them to identify more surface line leaks and small leaks. Customers receive daily and hourly metering data and can get a leak repaired in a timely manner. Earlier, the WSB would not be aware of a problem until the customer complained about a high bill. Now, the WSB can act proactively instead of reactively to customer issues.

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A powerful example is a school in Butler County that learned about sudden high usage. Upon investigation, the school found that its ice machine had broken and was wasting 300 gallons of water per day. Another customer complained about an unusually high bill. The WSB printed out a graph to determine and map when high water usage took place, which was while the resident was at work, making it a case of water theft (by a neighbor).

To enhance the customer experience, the counties will roll out a customer-friendly web portal in 2023, which is in its testing phase. This portal will help customers to understand water usage issues on their own.

In total, the sensors have identified 916 customer-side leaks, which is equivalent to more than 20.6 million gallons of water in savings.

These leaks would have otherwise gone undetected without investments in AMR and AMI. In return, savings from NRW can be useful for financing infrastructure developments that serve the community.



## Business Impact

### Efficient Operations and Sharing Best Practices

On the utility side, the counties have detected 371 leaks, which is equivalent to 76 million gallons of water and \$123,000 in savings. Water sources include streams, lakes, wells, springs, mines, cisterns, and reservoirs. The WSB purchases wholesale water and produces water. A more efficient water supply means lower costs. The operating costs that eliminating water losses would save will help the county generate the capital to finance infrastructure developments to support its growing community. In addition, the leak detection crew has become more efficient, cutting down truck time by almost 70%.

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The counties have established long-term plans to develop analytics and use cases with the collected water data. A representative from the WSB stated, “We are still early on with this. We are actively building a data set and see tremendous potential for further water conservation.”

The WSB is taking a leadership role in water infrastructure modernization and is among the first rural utility organizations to deploy AMR/AMI at a large scale. The group has received invitations to rural water conferences to present their successes with leak sensors and share implementation best practices.



## CONCLUSION

The WSB is a powerful example of a rural community with a strong interest in water conservation. Facing difficult issues regarding NRW and staff shortages, the WSB invested in the future of the community. These counties have some of the lowest water rates compared with neighboring regions because of sound preventative repair management and early leak detection programs. For its overall strong performance, WSB is deserving of Frost & Sullivan's 2022 Excellence in Resourcefulness for Water.

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