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Award Application

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Automated Water Meter System

2.

The City of Olathe recently transitioned its approximately 35,000 water meters to a fully automated system. Under the new system, meters do not need to be read manually by City staff; instead, the meters automatically send usage information through an Automated Water Information system. The City was able to avoid taking on new debt by financing the project through a performance contract with Johnson Controls.

3.

The intent of this initiative was to modernize the meter reading system and reduce the cost of acquiring monthly meter reading for billing purposes, without incurring additional debt. Meter replacement started in April 2010, and was completed in December 2010—three months ahead of schedule. In all, 34,840 meters were replaced during that time period. Systems are currently being implemented to fully utilize the data and maintain the system.

It was anticipated that a reduction in cost would be achieved through more accurate readings of water usage, which also would enable the City to produce only the amount of water actually being used. The manufacturer guaranteed 98.5 percent of the meters would provide usage data within a three-day window, associated with the end of the billing cycle. Currently, 99.9 percent of the meters provide data for monthly billing purposes.

4.

Customers have gained access to actual water usage data that had not been available previously. This information may help them identify leaks or other problems in their home systems. Also, the ability to tell when water is running constantly in a home could be an indicator of someone falling and being hurt and unable to respond. The initiative is a necessary step toward providing customers their own real-time usage data.

The financial health of the community has also improved with this project, by allowing the City to tackle a necessary infrastructure improvement without adding new debt.

5.

- **How is it a quantum leap of creativity?**

Performance contracting is an innovative way to finance the selected projects. Energy and operational savings realized from the use of more efficient equipment are used to pay for a project. The City of Olathe was the first in Kansas to take on such a large-scale project involving energy efficiency.

Automated Water Meter System

Staff has also developed processes to sum the daily water usage volume, allowing regular reports to be produced that compare water production and assist with wastewater flow monitoring. This year, to validate the actual usage of irrigation systems, staff used the meter usage data to evaluate customers who failed to have the backflow preventer for their irrigation system tested. This provided the City with an opportunity to adjust the language for irrigation systems that may have been disconnected or eliminated without that knowledge.

- **Who has benefited from the innovation?**

Customers have gained access to actual water usage data that had not been available previously. This information may help them identify leaks or other problems in their home systems. The initiative also is a necessary step toward providing customers their own real-time usage data.

The City now has near real-time data at its finger tips. Staff is able to identify instances where customers are unknowingly using water, and assist them with managing their monthly water charges.

The City no longer has estimated usage due to weather or other obstacles. With nearly 100 percent of the meters reading every four hours, usage charges are calculated more quickly and only a trace percentage are estimated. Usage charges are more accurate because the human-error factor has been removed. Therefore, fewer questions about usage and fewer adjustments to bills arise.

- **How was the innovation initiated and implemented?**

The City replaced and upgraded its metering system and recaptured lost revenue without taking on new debt. The City can now more easily locate continuous usage and assist customers in determining the cause. Olathe now receives 99.8 percent of its meter readings through the fixed network meter reading system, eliminating the monthly task of manual reading. Daily water consumption is also tracked and compared with water-production information to assist with assessing system leakage and water loss. Johnson Controls was the consultant used for this project.

- **What risks were associated with planning and developing the innovation?**

It was a remarkably smooth transition. The City experienced a few small delays in selecting the towers for the system's radio antennas, but it generally went as planned. Programming was necessary to interface the utility billing system with the new meter information; however, the programming was not unexpected and it was relatively smooth.

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- **What was the environment in which the innovation was created and sustained?**

Many of Olathe's existing water meters were between 15 and 20 years old. Because meters become less accurate over time, residents were being billed for less than what they were actually consuming, causing the City to lose revenue. The City estimates a loss of approximately 2.5% of its water each year due to these faulty meters, equaling an total revenue loss of approximately \$240,000 annually.

By transitioning to the automated system, the City uses a fixed base, two-way system of reading meters, rather than the drive-by radio readings and manual readings of meters that had traditionally been used. Signals can now be sent or received at meters from antennas on four towers throughout the City. Base stations at these towers gather the information and pass it directly to City servers. This eliminates the need to go out and manually read meters, and has greatly reduced the number of times the City has had to estimate accounts. The City is also able to remotely identify leaks, meters that have been tampered with, as well as backflow situations.

- **What were the execution costs and savings?**

The total cost of the project is \$12 million. Increases in revenue and efficiencies related to the project are expected to pay for this project in 11 years.

Guaranteed benefits associated with the project are \$17,418,208 over 12 years. In addition to the planned savings, the City realized \$197,617 in sales of the brass meters and cast iron lids. The City also identified 215 accounts that were mislabeled in the billing system with 5/8-inch meters when they really had 1-inch meters. Fixing this error in the billing system will result in \$16,000 in annual revenue that was previously missed. With the completion of the Automated Meter Information (AMI) system, four of the eight total meter reading staff positions were reassigned to other duties. Of the four remaining positions, two were reclassified to maintenance worker positions, responsible for terminating or activating service to new/delinquent customers. The other two positions were reclassified as meter technicians for troubleshooting and maintaining the AMI system. Additionally, all of the new meters are under warranty. Therefore, the annual cost for replacing dead, worn out meters has been deferred.

- **What lessons were learned that could be shared with other local governments?**

This project has applicable lessons that can benefit any local government operating a water utility.

Automated Water Meter System

- **Which department and/or individuals championed the innovation?**

The project was championed by the Public Works Department. The staff person most involved with the project is Merv Gleason, mgleason@olatheks.org.

Attachment

Mention to a homeowner that you're going to replace the water meter in his or her front yard and watch the cringing at the thought of what's going to happen next.

Multiply that by 34,850 and you get an idea of what might have been ahead for the City of Olathe as it replaced all of its residential, commercial and industrial water meters during 2011.

You wouldn't think it would be easy to replace that many meters, largely without notice and with minimal complaint, but that's just what happened.

The new meters are capturing lost revenue for the City while improving service to customers. The new meters are equipped with radio transmitters that enable the City to monitor daily usage and adjust production accordingly. And, as a bonus, the \$12 million project was completed three months early.

Replacing the meters was part of a package of infrastructure improvements the City deemed necessary as a means of making new businesses feel welcome and expanding the tax base to make Olathe a more affordable place for its residents to live.

However, because of restricted resources, the City had to commit to making the enhancements without raising taxes or taking on more debt—a daunting, but not impossible task.

“What we were trying to do, given the scarcity of resources, was to put together a package of improvements that would increase energy efficiency in our buildings, but at the same time, not have it incur a lot of debt that would force out the growth-related projects that we anticipated we had to build in the near term,” said Merv Gleason, deputy director, Olathe Public Works.

The City determined that performance contracting was a way to finance selected projects. In this method, energy and operational savings realized from the use of more efficient equipment are used to pay for the project. The City of Olathe is the first in Kansas to take on such a large-scale energy efficiency project.

The project's \$12 million cost is being underwritten by the State of Kansas' Facility Conservation Improvement Program. The project will not be a burden to the City's taxpayers, as the City will reimburse the State with the savings it expects through increased energy efficiency.

After identifying more than 20 possible energy conservation ideas, the City selected Johnson Controls to determine the projects on which to move forward—and to recommend others that weren't on the list but should have been.

Johnson Controls selected nine targets, including one not on the original list—replacing the City's water meters—that was expected to reap the biggest financial reward.

Many of Olathe's water meters were 15-20 years old. And because meters become less accurate over time, residents were being billed for less than what they actually were consuming and the City was losing revenue. The City had been losing about 2.5 percent of its water each year because of faulty meters, an annual revenue loss of about \$240,000.

Increases in revenue and efficiencies related to the project are expected to pay for the \$12 million project in 11 years. And, if revenue and gains from efficiencies fall short of expectations, Johnson Controls will make up the difference.

After paying for the improvements, the new revenue will be applied to making additional improvements that will help manage Olathe's growth and enhance residents' quality of life.

“This has put us in a cycle where we are going to be virtually self-sustaining in our ability to provide this greater level of customer service, where otherwise we never would have caught up,” Gleason said.

Because the new meters are fully automatic, City workers who formerly read meters across the City have been reassigned to more strategic duties. Fuel and vehicle expenses and have been reduced, as have carbon dioxide emissions.

Revenue generated by the water meter upgrades is funding other energy-efficiency projects, including:

- *solar panels that provide hot water for the City’s car wash*
- *a system that burns waste oil from City vehicles to heat the City’s welding shop*
- *controls that turn vending machines off when no one is around, and on again when they’re needed*
- *new boiler and radiant heaters*
- *variable frequency drives on large pump motors at the City’s wastewater treatment plant.*

“From just about every angle you look at this, it has been a success for us,” Gleason said. “And I would most certainly recommend performance contracting as an option that any municipal government should look at very closely to see if it will work for them, because it has worked for us.”