

City of Bartlesville
Water Distribution System



Energy Efficiency Business Case
For
Automatic Meter Reading (AMR)/Automatic Meter
Information (AMI) System

DWSRF Project No. P40-1021401-05

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Introduction

This Business Case is prepared to present the long-term advantages and efficiencies offered in the implementation of an Automated Meter Reading/Automatic Meter Information (AMR/AMI) System for the City of Bartlesville for DWSRF funding approval for the captioned project. This Business Plan is organized and presented in the following outline form:

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General Description of Water System

The City of Bartlesville owns and operates a water treatment and distribution system that serves a population of approximately 50,000 people, located in Washington, Osage and Nowata Counties. The water facility is identified by ODEQ as facility OK1021401. The water utility is one of the most important services provided by the City of Bartlesville to its citizens. Reducing operating costs and improving service through increased efficiencies is a goal of the city.

Purpose

The purpose of the AMR/AMI system is multi-functional. Reduction in cost of operation, better customer interface, energy savings, and conservation of resources are the primary objectives. This plan will describe the perceived advantages of improving services through automatic reading and remote reporting provided by the AMR/AMI system.

Auditing or accounting for water use is a high priority. Minimizing the unaccounted water loss in the system is critical due to the following issues:

1. High cost of water treatment chemicals,
2. The amount of electricity consumed in the pumping and treatment of water,
3. Conservation of raw water resources,
4. Cost associated with the creation and removal of bio-solids created by the treatment process,
5. Controlling overall cost to the customer,
6. Minimize the need to unnecessarily expand the water treatment and distribution systems because of unnecessary or excessive water loss,
7. Maintain adequate operational pressure in the system.

Existing System

The City of Bartlesville has approximately 15,250 metered customers. Approximately 13,600 are residential customers and 1,650 are commercial and industrial customers. The age of the water meters range from a low of 5 years to a high of over 25 years. All of the residential meters are positive displacement type meters with a typical service life of 15 years. Older meters tend to lose accuracy with time and in some cases quit completely, creating an unknown amount of water loss in the distribution system due to bad meters. The increased average meter age, coupled with the inaccurate measurement, creates an upward spiral in water loss. Implementing a meter change out program will reduce the amount of water loss due to inaccurate water meters.

Automatic Meter Reading/Automatic Meter Information System

The AMR/AMI project consists of the complete replacement of all of the meters within the water distribution system. The project will include a complete AMR/AMI system with two-way communications between the City's water utility and the customer's water meter. The City of Bartlesville intends to install either a fixed based or mesh type AMR/AMI network. Either of these systems is capable of allowing water utility staff to interrogate and collect real time readings on individual meters from the office. The systems will also allow the city's customer to log onto their individual account and check their water usage, other data and trends, and receive email notifications from the City.

The city will prepare a bid request with specifications outlining the two available technologies. Prices will be submitted with each bid request detailing the price and advantages of each vendor's product. The city will evaluate the bid proposals based on price, product features, expandability, product history, usability, web portal, functionality, reliability and experience of the vendor. This procedure will create a competitive atmosphere, ensuring the city gets the most features for the best price.

Project Benefits

The City of Bartlesville is expecting to realize several benefits with regards to installation of the AMR/AMI system. These benefits can be outlined in the following areas:

1. Improved Customer Service
2. Manpower
3. Fuel and Vehicle Savings
4. Energy Savings
5. Reduced Water Loss

A more detailed explanation of each area is as follows.

Improved Customer Service

The customer will be able to monitor their water usage on an hourly, daily and monthly basis. The customer will be able to securely access their individual accounts through an Internet web site. The customer will also be able to identify abnormal water use and receive notifications in the event of leaks and high consumption. They will also be able to monitor their total usage and resulting bill, thus allowing them to create a budget for their water usage. Another feature that will benefit the customer is the elimination of misread meters due to human error resulting in water bills that are incorrect. The AMR/AMI system allows the meter reading to be collected electronically without human intervention. This improved accuracy will reduce the time the customer and utility company spend in re-reading meters and correcting bills. High usage can now be easily identified, giving the customer information and control over their water usage.

Manpower

The City will realize a savings in manpower by eliminating the need to read meters on a monthly basis. The City currently employs four (4) meter readers. Meter reading duties will no longer be needed with the implementation of the new

AMR/AMI system. These employees will be re-tasked to other duties within the water department. The total number of employees will eventually decrease through attrition. The Water Utilities Department will realize a savings in direct salaries, benefits and reduction in worker compensation claims. Elimination of the meter reading task will result in an annual savings of \$ 165,000.

Additionally, staff members of the City's Water Distribution Department complete approximately 1,500 meter related service calls per month. These calls include meter re-reads, checking for leaks, meter installation and replacement, emergency turn off/on, delinquent disconnects and reconnects, and transfers in and out. A typical service call is estimated to take approximately .5 man-hours. These meter related service calls are expected to be reduced by 70% with the implementation of the AMR/AMI system. Manpower savings realized because of this reduction will be approximately 6,300 man-hours per year or \$98,469.

The savings listed above do not include any reduction in administrative staff time currently utilized to resolve meter reading issues with customers. The total annual savings for all known items listed above is \$263,469 annually.

Fuel and Vehicles

The City has 69 meter routes that contain 15,250 meters. All of these meters are read on a monthly basis. Meter readers are also tasked with completing meter reading checks to insure accuracy. City vehicles, driven by meter readers, average 41 miles per route per month for a total of 34,000 miles per year. At \$3.00 per gallon, and using the average miles per gallon of the four (4) vehicles, the current estimated annual fuel expense is \$9,120.00. Using the IRS allowance (\$0.55/mile) for the value of miles and vehicle wear, this translates to an estimated annual savings in this area of \$18,700.

The meter related service calls noted above require Water Distribution Department Staff to drive approximately 3.5 miles per work order. Using the IRS allowance, the

number of service calls expected annually, and anticipating the 70% reduction listed above, it is expected that the city will realize a vehicle savings of approximately \$24,255 per year.

Energy Savings

In 2011 the City of Bartlesville produced 2.45 billion gallons of water for their customers. The 2011-2012 Water Plant Budget contains \$2,767,114 for water production. Of that amount, it is estimated that \$1,523,612 will be expended for utilities and chemicals (*Energy Cost*). The AMR/AMI system is estimated to reduce the loss of water in the following areas:

<i>Item</i>	<i>Reduction Percentage</i>
<i>Improved leak detection & early notification</i>	<i>3%</i>
<u><i>Customer education and conservation</i></u>	<u><i>1%</i></u>
<i>Total</i>	<i>4%</i>

Using the current energy cost, a 4% reduction is equivalent to an annual savings of \$60,944.

Reduced Water Loss

Meter replacement is projected to improve the accuracy of recording water usage by 10%. Financial records for FY 2010-2011 show water revenues at \$ 8,267,297. This number ignores write-offs and bad debts not collected. The value of increased data collection and reporting accuracy at 10% is equivalent to an annual revenue increase of almost \$827,000.

Summary of Benefits

<u>BENEFIT</u>	<u>ANNUAL SAVINGS</u>
Customer Service	Not Quantified
Manpower	\$ 263,469
Fuel & Vehicle Savings	\$ 42,955
Energy Savings	\$ 60,944
Annual Savings	\$ 367,368
Improved Meter Accuracy (Increased Revenue)	\$ 827,000
TOTAL ANNUAL BENEFIT REALIZED	\$1,194,368

Business Plan Summary

This business plan presents the advantages of implementing an AMR/AMI system, which includes and provides for enhanced customer service, reduced water loss, improved leak detection capability, reduced manpower, fuel, vehicle, and energy savings. The total annual savings to the City of Bartlesville is estimated to be \$367,368. The total annual benefit realized from the project is estimated to be \$1,194,368. The project cost is estimated to be \$3,900,000 as outlined in the Technical Memorandum dated February 10, 2012. This analysis confirms the proposed projects viability to the City of Bartlesville and it's water customers. The City of Bartlesville therefore requests ODEQ approval of this proposed plan, prepared by our consultant, Holloway, Updike and Bellen Inc.