

Longtown Rural Water & Sewer District No. 1
Water Distribution System



Energy Efficiency Business Case
For
Automatic Meter Reading (AMR)/
Advanced Metering Infrastructure (AMI) System

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Prepared By:



Clay McAlpine

Clay McAlpine, P.E., L.S.
Vice-President



Holloway, Updike and Bellen

**Consulting Engineers
Muskogee · Broken Arrow**

905A South 9th Street
Broken Arrow, Ok 74012
CA# 219, Exp. 6/30/2013

Introduction

This Business Case is prepared to present the long-term advantages and efficiencies offered in the implementation of an Automated Meter Reading/Advanced Metering Infrastructure (AMR/AMI) System for the Longtown Rural Water & Sewer District No. 1 for DWSRF funding approval for the captioned project. This Business Plan is organized and presented in the following outline form:

INDEX

Introduction	2
General Description of Water System	3
Purpose	3
Existing System	4
Automatic Meter Reading/Automatic Meter Information System	4
Project Benefits	5
<i>Improved Customer Service</i>	5
<i>Manpower</i>	6
<i>Fuel and Vehicle Savings</i>	6
<i>Energy Saving</i>	7
<i>Equipment Replacement</i>	7
<i>Reduced Water Loss</i>	8
<i>Summary of Benefits</i>	8
Business Plan Summary	8

General Description of Water System

The Longtown Rural Water & Sewer District No. 1 owns and operates a water treatment plant and distribution system that serves a population of approximately 4,700 people, located in Pittsburg County. The water facility is identified by ODEQ as facility OK1020623. The water utility is one of the most important services provided by the Longtown Rural Water & Sewer District No. 1 to its citizens. Reducing operating costs and improving service through increased efficiencies is a goal of the District.

Purpose

The purpose of the Automatic Meter Reading/Advanced Metering Infrastructure (AMR/AMI) System is multi-functional. Reduction in cost of operation, better customer service and interface, energy savings, and conservation of resources are the primary objectives. This plan will describe the perceived advantages of improving services while reducing cost 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 the District 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 Longtown Rural Water & Sewer District No. 1 has approximately 2,062 metered customers. Approximately 2,055 are residential customers and 7 are commercial customers. The age of the water meters in the system range from a low of 15 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 the most accuracy on low flow conditions with some losses also noted on the high flow. They will also fail to record any use in some cases, creating an unknown amount of water loss in the distribution system due to aging 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/Advanced Metering Infrastructure 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 District's water utility and the customer's water meter. The Longtown Rural Water & Sewer District No. 1 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 District's customer to log onto their individual account and check their water usage, other data and trends, and receive email notifications from the District.

The District 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 District 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 District gets the most features for the best price.

Project Benefits

The Longtown Rural Water & Sewer District No. 1 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 District will realize a savings in manpower by eliminating the need to read meters on a monthly basis. The District currently employs five (5) part-time 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 part time employees will eventually decrease through attrition. The Water District 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 \$28,070.

Additionally, staff members of the District's Water Distribution Department complete approximately 70 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 1.0 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 840 man-hours per year or \$10,700.

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 \$38,770 annually.

Fuel and Vehicles

The District has 2,062 meters. All of these meters are read on a monthly basis. Meter readers are also tasked with completing meter-reading checks to insure accuracy. The meter readers use three (3) District vehicles to read the water meters on a monthly basis. It is estimated that the employees will average 150 miles per vehicle per month for a total of 5,400 miles per year. Using an average of 12 miles per gallon for the three (3) vehicles, the current estimated annual fuel expense is \$490, using a fuel cost of \$3.25/gallon. 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 \$2,970.

The meter related service calls noted above require Water Distribution Department Staff to drive approximately 10 miles per work order or 8,400 miles per year. Using the IRS allowance, the number of service calls expected annually, and anticipating the 70% reduction listed above, it is expected that the District will realize a vehicle savings of approximately \$3,234 per year.

Energy Savings

In 2011 the Longtown Rural Water & Sewer District No. 1 produced approximately 114.0 million gallons of water for their customers. The 2011-2012 Budget contains \$400,000 for water production. Of that amount, it is estimated that \$115,000 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>	3%
<u><i>Customer education and conservation</i></u>	2%
<i>Total</i>	5%

Using the current energy cost, a 5% reduction is equivalent to an annual savings of \$5,750.

Equipment Replacement

The District replaces approximately 2 meters per month as a result of meter failure or malfunction. The cost of the meters, associated materials, vehicles, and manpower required to replace these meters is estimated to be \$465 per month. This represents a ongoing cost of \$5,580 per year, which will be eliminated with the replacement of the water meters.

Reduced Water Loss

Typical water loss in a rural water district system is approximately 15-20% per month. The meter replacement is projected to improve the accuracy of recording water usage by 10%. Financial records for FY 2010-2011 show water revenues at \$939,557. The minimum revenue based on the number of meters is \$662,004 per year. Revenue for water used above the minimum amount is between \$280,000 and \$300,000 per year. The value of increased data collection and reporting accuracy at 10% is equivalent to a projected annual revenue increase of almost \$30,000.

Summary of Benefits

<u>BENEFIT</u>	<u>ANNUAL SAVINGS</u>
Customer Service	Not Quantified
Manpower	\$ 38,770
Fuel & Vehicle Savings	\$ 6,240
Energy Savings	\$ 5,750
Equipment Replacement	\$ <u>5,580</u>
Annual Savings	\$ 56,340
Improved Meter Accuracy (Increased Revenue)	\$ <u>30,000</u>
TOTAL ANNUAL BENEFIT REALIZED	\$ 86,340

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 Longtown Rural Water & Sewer District No. 1 is estimated to be \$56,340. The total annual benefit realized from the project is estimated to be \$86,340.

The estimated annual savings do not take into consideration such things as:

- Growth in the system (increase in the number of meters)
- Continued decline in meter accuracy
- Increase in chemical costs
- Increase in utility rates
- Replacement of vehicles and equipment
- Increases in employee benefits
- Vehicle and employee liability

These undermined factors will increase the total realized annual benefits over time. The total project is estimated to cost approximately \$675,000 as outlined in the Technical Memorandum dated August 8, 2012. The project is estimated to reach the break-even point within 7-9 years, given the above assumptions. The anticipated project life is estimated to be 20 years. This analysis confirms the proposed projects viability to the Longtown Rural Water & Sewer District No. 1 and it's water customers. The Longtown Rural Water & Sewer District No. 1 therefore requests ODEQ approval of this proposed plan, prepared by our consultant, Holloway, Updike and Bellen Inc.