

Business Case Examples



- A business case may have many formats. EPA does not endorse any specific format.
- These examples follow the essential components of EPA's June 22, 2009 guidance for GPR business cases (http://www.epa.gov/water/eparecovery/docs/2009_6_22_GPR_Q_A.pdf)
- Project level data for business cases may include annotated engineering reports, water or energy audit information, and/or results of water system tests that may exist in project files and be summarized and referenced in the business cases.

Example #1: Pipe Replacement

Example #2: Existing Water Meter Replacement

Example #3: Storage Tank Replacement

Example #4: Treatment Process Selection

Example #5: Pump and Motor Replacement

PIPE REPLACEMENT

Summary

- Replacement of 24,000 feet of pre-1930s lead-jointed cast iron (CI) distribution pipe with new 8-inch to 16-inch ductile iron (DI) pipe to eliminate the loss of 115 million gallons of water per year (MGY), equal to 10% of total production and 52% of total system water loss.
- Loan amount = \$2,500,000
- Water saving (green) portion of loan = 100%
- Annual water savings = 115 million gallons (MG)

Background

- The water system includes approximately 80 miles of CI and DI distribution pipe ranging from 6 to 16 inches in diameter. The treatment plant processes an average of 3 million gallons per day (MGD) or 1,095 million gallons per year (MGY).
- As part of a water loss management plan,¹ trends in distribution pipeline repairs from 2007 were evaluated to identify potential pipeline replacement projects. It was determined that the pre-1930s distribution pipe incurred the most repairs.
- The pre-1930s pipe account for 17% (13.6 miles) of the 80 miles of distribution pipe. This project will replace 24,000 feet of pipe with 8-inch to 16-inch DI pipe.

Results

- 175 pipeline repairs were made during 2007; the highest frequency of repairs was in the pre-1930s pipes and equally distributed among all sizes.²
- The system asset management plan shows the distribution system and the schedule of pipe replacement as well as the pipe break distribution frequency by the age of pipe.³
- Avg. 8.36 leaks per mile by the length of pipe.
- Avg. leak volume is 3.1 million gallons (1,067 GPM using Greeley's formula).

Calculated Water Loss

- 37 leaks * 3.1 million gallons per leak = 115 MGY from the leaking from pipes scheduled for replacement.
- To calculate overall water loss, subtract the water billed/consumed: 1,095 MGY - 876 MGY = 219 MGY of water pumped is lost (20%).
- The estimated 115 MGY of water loss from the pre-1930s pipe is 52% of the overall water loss of the system: $115 / 219 = 52\%$.

Conclusion

- By replacing the 24,000 feet of pipe the system anticipates conserving 115 MGY (52% of overall water loss). The cost to pump/treat water is \$1.53 per 1,000 gallons. Cost savings from reduced leaks are estimated at \$175,950 (115,000 gallons * \$1.53).
- Additional benefits include reductions in unnecessary pumping and operation and maintenance expenditures, and eliminating potential health hazards associated with waterborne pathogens entering the water distribution system.

1 Water Loss Management Plan for the Hypothetical Drinking Water System. February 2008.

2 Water Loss Management Plan for the Hypothetical Drinking Water System. February 2008.

3 Asset Management Plan for the Hypothetical Drinking Water System. Updated August 2008.

STORAGE TANK REPLACEMENT

Summary

- Replacement of water storage Tank A will improve water efficiency of the system by eliminating 7.2 million gallons of annual water loss and provide additional water storage capacity.
- Loan amount = \$510,000
- Water savings (green) portion of loan = 100%
- Annual water savings = 7.2 million gallons (MG)

Background

- Tank A is 150 feet below Tank B. This configuration prevents water from flowing out of Tank A when Tank B is at normal operating levels (pressure difference of 65 pounds per square inch).
- Due to the current configuration, the water in Tank A stagnates and loses its residual chlorine. The tank must be emptied and refilled weekly to ensure that potable water is available.
- Approximately 7,200,000 gallons of water (5.9% of current use) is drained annually from the 150,000-gallon Tank A.

Results

- Replacing Tank A with a larger storage tank at the same elevation as Tank B will enable both tanks to drop and fill at similar levels, thus reducing the 7,200,000 gallons of stagnant water that must be discarded annually.
- The annual water savings are calculated at \$55,000. The simple payback period on this investment is less than 10 years.¹

Conclusion

- Construction of a new water storage tank is the most cost-effective and sustainable solution.² The new storage tank will save 7,200,000 gallons of water each year and reduce the system's treatment costs.
- With a capacity of 340,000 gallons, the new tank will decrease water waste, improve service pressure, and increase the reliability of the system's infrastructure.
- Implementing the project will delay the need for plant expansions and will reduce the amount of water taken from the source water body, which is important for maintaining the quality of its habitat, especially during droughts.

¹ Preliminary Engineering Report for the Storage Tank Replacement Project. March 2009.

² Preliminary Engineering Report for the Storage Tank Replacement Project. March 2009.

TREATMENT PROCESS SELECTION, CONTINUED

Benefits

- With limited water resources and the need to conserve the water supply, the water system selected the groundwater blending option since it will not increase overall water consumption.
- Another benefit of the groundwater blending is that the vadose zone of the aquifer is a desirable mixture of sand and unconsolidated clay that will naturally filter out much of the TOC and DBPs in the treated surface (recharge) water.
- An additional benefit is that incorporating groundwater into the potable water supply may improve its taste.

Conclusion

- The groundwater blending technique was chosen over a GAC filter because the GAC system was determined not feasible due to backwash water waste, additional energy consumption, the life-cycle costs of the system, and the size of the filter required.
- The installation and operation and maintenance total life cycle costs for the blending treatment option selected is \$31.14 million versus \$87.2 million for a GAC treatment system.⁶
- Blending groundwater instead of using a GAC system will avoid the withdrawal of 620 million gallons each year from the surface source, save \$108,500 in energy costs, and will help maintain the riparian habitat of endangered wildlife. It will also avoid the purchase of GAC equipment and its associated operation and maintenance costs.

⁶ Life Cycle Cost Analysis for DBP treatment options. December 2008.