

WATER CONSUMPTION DROPS – BUT THE PRICE RISES: HOW CAN THIS BE?

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Fred Mercer had recently retired and for his first home project, he purchased two water efficient toilets and two shower heads. He thought he would conserve water for the community and save money at the same time. However, he was disappointed when after six months of use his new toilets and shower heads showed impressive water conservation but hardly any reduction in the water bill.

This case examines the ethics of selling resource efficient toilets and shower heads that do not work as promised; the conventional billing methods for water use through fixed and variable components; financial analysis of the leading water firm and the characteristics of its business model; the drastic need for capital improvements in the water infrastructure along with consumer choice; and income tax benefits reported by the water industry.

“Why is my water bill hardly going down? I spent almost \$1,000 for two new toilets and two shower heads. The water consumption is down as the salesman promised, but the bill barely decreased.” Fred knew he should calm down and not raise his voice to the clerk on the other end of the phone. This was his second call in six months over a high water bill.

“Sir, we have checked the meters and the bill calculation and every number is correct. I can only tell you we have had other customers with decreasing water consumption with little reduction in their bills. I know I should not tell you this, but based on rate increase proposals before the town council, your water bills are going up in the near future” the voice on the other end of the phone responded.

“What is the name and phone number for the operations manager for the water utility? I just can’t stand still after spending that amount and now I hear that my

water rates are going up. I am on a retirement income and that \$1,000 was a big hit to my budget. Now you are telling me that my rates will increase”.

Fred thought there had to be some recourse for his problem. He had never paid close attention to his water consumption bill and he had been happy to have the water available whenever it was needed without any worry or concerns.

Fred Mercer retired last year and during that first year of retirement he had looked for projects around his house. He had been aware of recommendations to cut down on his home's use of water, mainly in the toilet operation. Fred's home was 40 years old and the two toilets were 40 years old, each one using five gallons of water per flush. Fred decided to replace the two toilets. He checked the ratings of the toilets for flush and he purchased the new efficient models for \$270 each. Delivery, installation, removal, and taxes brought the purchase to \$900 for both toilets. To save on water heating and consumption, he added two new shower heads that promised more efficient showers. Fred's total water equipment investment was \$1,000.

Fred replaced his toilets and shower heads in June, but had to wait for the September billing to see any benefits from his home improvement. When the September bill arrived he compared it to the earlier four quarterly bills. Water consumption is typically seasonal with higher consumption in the summer months mainly from lawn watering. Fred compared his recent usage to the September quarter a year ago. Sure enough the water consumption had gone down by 12%, but the actual water bill decreased only 2%. Fred thought there might be some smoothing of the toilet operation and the use of estimates of actual water usage by the water company. He thought he would wait until the next quarter's bill to see real improvement.

When the December bill came in he compared it to the prior December to measure any drop in usage. Again, there was an 18% drop in the water consumption matched by a 5% drop in the bill. Something was wrong in either the measurement of water consumed or the billing practices of the local water agency. Fred thought that after making a \$1000 investment in his two toilets and shower heads he should see bigger drops in his water bill. He vaguely remembered the plumbing salesman saying he could save up to \$90 (DeSenne, 2014) per year per toilet, thus offering a five year payback on the \$900 investment. He was determined to get an explanation for this discrepancy.

THE WATER INDUSTRY

According to the Value Line Survey (Water, 2013), the water industry is heavily fragmented, made up of local water agencies run by municipalities and a small number of investor firms. There are nearly fifty thousand public water systems in the United States, with forty-five thousand (over 90%) serving communities of less than ten thousand citizens.

The Value Line Survey itself follows only eight investor owned firms with three firms having market capitalizations over one billion dollars. Only one firm, American Water Works, has revenues over one billion (Appendix A). Value Line quotes civil engineering groups (Buried, 2011) that estimate the US must spend \$1 trillion over the next 25 years to upgrade the water system. How will that \$1 trillion be raised? Will the few investor owned firms acquire hundreds of local municipal water agencies and merge them into efficient regional water agencies, or will the municipal agencies try to go it alone and continue as they have operated for decades on small local scales?

Investment in our water infrastructure has been deferred for decades. Compared to the visible decay in our roads and bridges, our water system is mostly underground and out of sight. Out of sight is out of mind. The water system provides clean water for drinking, cleaning, suppression of fires, and facilitates growth in our communities. Much of the pipe system dates back to the late nineteenth and early twentieth centuries, and it is time to replace those pipes and systems. These investments were made by earlier generations and given to us; it would be unthinkable that we leave the cost of repair for future generations to bear.

Delaying the current need to replace water systems would only increase the repair bills each year and more than likely mean more outages, deteriorating water service, added damages through flooding and sinkholes, and disrupted businesses. Ideally we should use funds to replace the pipe at the end of its life right at the time it is economical to replace rather than repair pipe systems. Vast sums of investment funds are needed in three areas: 1) to replace aging pipe, 2) to expand water systems to allow growth of communities, and 3) to provide for higher standards of drinking water.

Who will pay this imposing bill? Certainly it will be the consumers or citizens of the communities. American Water Works Association, a trade group, estimates

that communities with pressing needs could see water bills triple for the average household. Higher usage rates or higher taxes are expected, with payments going to the local municipal agency or possibly a profit oriented firm listed on the New York Stock Exchange.

This long term bill will be especially burdensome on smaller communities as over 90% of water agencies service small communities with fewer than ten thousand consumers. Often these communities are spread out over a large area, requiring more miles of pipe per consumer. The community has fewer people to assume this investment burden and the cost per consumer will be steep.

The need for funding to replace pipe systems will continue over the next three decades. Often the pipe systems have been installed over several generations and those layers of pipe will fail or be ready for replacement over time measured in decades. Communities will face large investment needs for the next thirty years. It is not a case of making a large investment in year one and then relaxing for the next twenty years. It is a payment scheme requiring large payments every year.

MUNICIPAL AGENCY VERSUS PROFIT ORIENTED FIRM

Larger investor owned firms that have greater access to capital are generally more capable of making mandated and other necessary infrastructure upgrades to both water and wastewater systems. In addition, water utilities with large customer bases, spread across broad geographic regions, may more easily absorb the impact of significant variations in precipitation and temperatures, such as droughts, excessive rain, and cool temperatures. Larger utilities generally are able to spread support services over a larger customer base, thereby reducing the costs to serve each customer. Since many administrative and support activities can be efficiently centralized to gain economies of scale, companies that participate in industry consolidation have the potential to improve operating efficiencies, lower costs per unit, and improve service at the same time.

The investor owned model also has access to capital markets and the ability to raise huge funds for investment. With a trillion dollar need for capital improvements hovering over the US water system, easy access to the bond and equity markets is part of the funding solution. The investor owned model also pays high income taxes to the federal and state governments along with property taxes to the local municipality.

If an investor owned firm acquired scores of local water agencies, some of the economies of scale and efficiencies would come from reductions of employees at the agencies. Costs go down for the consumer at the cost of local employment.

The municipal model has the benefit of being managed by local employees and there is no profit level that must be earned as the municipal agency sets rates equal to expected costs. The municipal agency does not have to consider dividends paid to owners. Also, with the consolidation of local water agencies, there is the possibility that the management of the local agency would reside thousands of miles away with no local connections. The municipal water agency has limited access to capital markets, and would have to raise funds through taxation or higher water billing rates.

Local municipalities that are strapped to fund education, road repair, and senior housing could see the sale of the water system as a salvation. The municipality could avoid making the large investments in the water system over the next twenty five years and it would receive two future cash flows. The first cash flow would be from the sale of the water system to the investor owned firm. Another cash flow would be generated as the municipality receives a long term annuity in the form of property taxes and possible payments in lieu of taxes. The initial payment and the annuity of property taxes would provide the cash needed for those pressing needs on the municipalities.

BILLING FOR WATER SERVICES

Consumers will be disappointed when they install water saving devices, like new shower heads and toilets, and expect the water bill to decrease as much as the water consumption decreases. Most water billing schemes have a fixed part of the billing just for the connection to the water supply, and this charge appears even if no water was drawn. There is a fixed fee just for the connection, and then a variable billing is for the actual water consumed.

The following rate schedule is from the South Central Connecticut Regional Water Authority in New Haven County, Connecticut. For a 5/8" meter, the quarterly service charge is \$49.79 plus a cost of consumption of \$3.1416 per 100 cubic feet of water. The \$49.79 charge is the fixed cost to the consumer. Assume Fred's house used 1,000 cubic feet of water in the quarter. His bill would be \$49.79 plus 10 X \$3.1416 or \$49.79 plus \$31.42 equaling \$81.21. If Fred cut his water consumption in half from his new shower heads and toilets, his bill would drop to

\$65.50 or a drop of 19% (\$49.79 plus 5 x \$3.1416 equals \$49.79 plus \$15.71 for a total of \$65.50). His water consumption is cut in half but the water bill goes down by only 19%. No wonder Fred and his neighbors are confused when they try to adopt conservation concepts with less water usage and they see only a fraction benefit from the amount of water conserved.

APPENDIX A
American Water Works Company, Inc.

R. McDonald – Water Consumption Drops – But the Price Rises: How Can This Be?

Selected Financial Data (000,000)

From the income statement	2013	2012	2011
Operating revenues	2,902	2,877	2,666
Operating expenses			
Operation and Maintenance	1,313	1,350	1,302
Depreciation and amortization	408	382	352
General taxes	235	221	210
(Gain) Loss on asset dispositions	925	(839)	(993)
Total operating expenses	1,956	1,952	1,863
Operating Income	946	925	803
Total other income (expenses)	(340)	(294)	(299)
Income from continuing operations			
before income taxes	605	631	504
Provision for income taxes	236	257	199
Income from continuing op.	369	374	305
Income (loss) from discontinued operations	0	(16)	5
Net income	369	358	310
Diluted EPS	2.06	2.01	1.75
From the cash flow statement			
Cash flow from operating activities	956	808	775
Adjustments:			
depreciation & amortization	408	382	352
provision for deferred income taxes	251	200	195
Capital expenditures	(929)	(925)	(766)
Dividends paid	(213)	(158)	(150)

APPENDIX A (continued)

**American Water Works Company, Inc.
Selected Financial Data (000,000)**

From the balance sheet	2013	2012	2011
Total property, plant, equipment	12,391	11,739	11,021
Total assets	15,070	14,719	14,776
Total stockholders' equity	4,728	4,445	4,240
Long term debt	5,213	5,191	5,340

Source: 10K statements for 2013, 2012, and 2011 from American Water Works Company.

REFERENCES

Buried No Longer- Confronting America's Water Infrastructure Challenge.
American Water Works Association. 2011.

DeSenne, Mike. Invest a Tax Refund in Your Home: \$500 Projects. *Houselogic*.
January 14, 2014.

Water Utility Industry. Value Line. October 18, 2013, 1770-1778.

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