

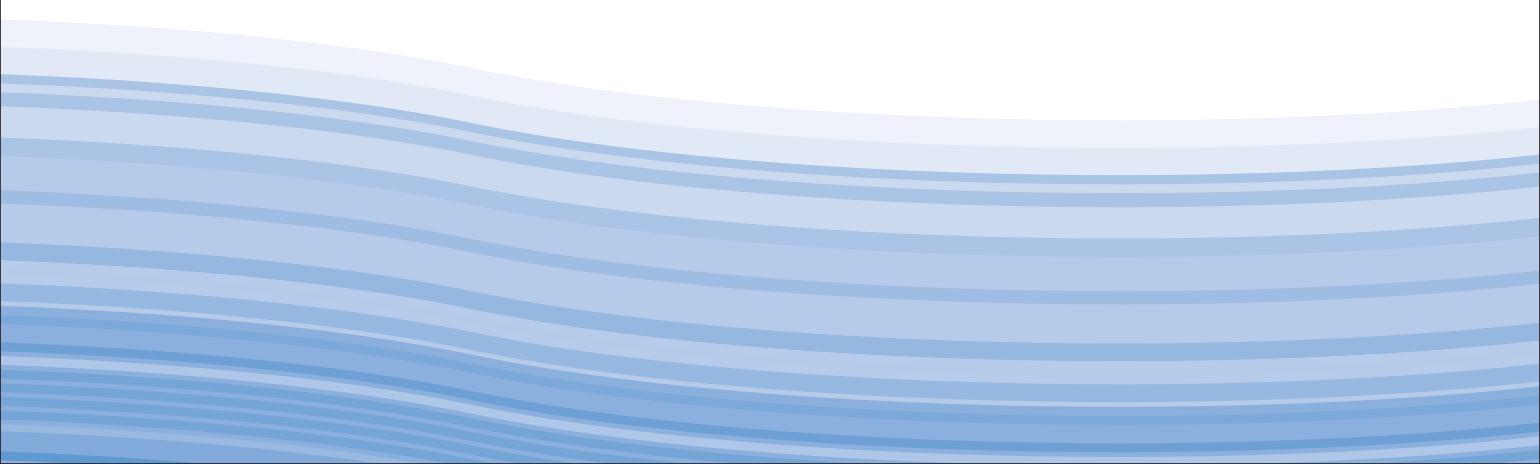


PACIFIC
INSTITUTE

BEYOND PRIVATIZATION:
RESTRUCTURING WATER SYSTEMS
TO IMPROVE PERFORMANCE

Gary Wolff, Eric Hallstein

DECEMBER 2005



**BEYOND PRIVATIZATION:
RESTRUCTURING WATER SYSTEMS
TO IMPROVE PERFORMANCE**

DECEMBER 2005

© Copyright 2005, All Rights Reserved

ISBN No. 1-893790-11-8

ISBN-13 No. 978-1-893790-12-4

Pacific Institute for Studies in Development, Environment, and Security
654 13th Street, Preservation Park
Oakland, California 94612
www.pacinst.org
Phone 510-251-1600
Facsimilie 510-251-2203

Editor

Ian Hart

Designer

Bryan Kring, Kring Design Studio, Oakland, CA

Copy Editor

Joe Sadusky, Kring Design Studio, Oakland, CA

Printing

Alonzo Printing Co., Inc., Hayward, CA



PACIFIC
INSTITUTE

BEYOND PRIVATIZATION: RESTRUCTURING WATER SYSTEMS TO IMPROVE PERFORMANCE

Gary Wolff, Eric Hallstein

DECEMBER 2005

ABOUT THE PACIFIC INSTITUTE

Founded in 1987 and based in Oakland, California, the Pacific Institute for Studies in Development, Environment, and Security is an independent, nonprofit organization that provides research and policy analysis on issues at the intersection of sustainable development, environmental protection, and international security.

The Pacific Institute strives to improve policy through solid research and consistent dialogue with policymakers and action-oriented groups, both domestic and international. By bringing knowledge to power, we hope to protect our natural world, encourage sustainable development, and improve global security.

More information about the Institute, staff, directors, funders, and programs can be found at www.pacinst.org and www.worldwater.org.

ABOUT THE AUTHORS

Gary Wolff

Gary Wolff, P.E., Ph.D., is the principal economist and engineer for the Pacific Institute. Dr. Wolff is an expert in the economics and engineering of the water sector, including conservation, end-use efficiency, privatization, and incentive policies. His work also encompasses issues outside the water sector, such as the application of financial portfolio theory to utility planning, environmental tax policies, pesticide regulation in California, and green building technologies.

His professional career has included solar energy construction contracting, water quality regulation for the State of California, serving as a design engineer at a wastewater treatment plant and as founder and president of an engineering consulting firm, a post-doctoral fellowship at the Center for Conservation Biology at Stanford University, and a visiting professorship at the Graduate School of International Policy Studies at the Monterey Institute of International Studies.

Dr. Wolff's experience with local government and special districts is also extensive: He was appointed by Governor Schwarzenegger to the San Francisco Bay Regional Water Quality Control Board, the state agency that regulates surface and groundwater quality in the nine-county Bay Area; he is the chair of the

community advisory committee to the Castro Valley Sanitary District; the past president of the Alameda County Recycling Board, a County Charter Agency; and past chair of the East Bay Municipal Utility District Water Demand Management Advisory Committee.

Dr. Wolff received a Doctoral degree in Resource Economics from the University of California at Berkeley, a Masters Degree in Civil and Environmental Engineering from Stanford University, and a Bachelors Degree in Renewable Energy Engineering Technology from Jordan College.

Eric Hallstein

Eric Hallstein is pursuing his Ph.D. with the Energy and Resources Group of the University of California at Berkeley. Mr. Hallstein holds an M.S. from the Energy and Resources Group and a second M.S. from the Department of Civil and Environmental Engineering at the University of California at Berkeley. He received his A.B. in East Asian Studies from Harvard University. Prior to returning to Berkeley for his doctorate, Mr. Hallstein was a project leader in the San Francisco office of the Boston Consulting Group, a management consulting firm serving Fortune 200 companies.

ACKNOWLEDGEMENTS

The people listed below generously found the time to provide information or peer review comments on drafts of this report. Their input was made individually, not on behalf of their employers or any organization. The content of the report and any errors, of course, are entirely the responsibility of the authors. We are very grateful to Robert Abrams, Karen Bakker, Peg Becker, Janice Beecher, Irene Blakely, Nick Cain, Patrick Cairo, Carlton Curry, Elaine Engelke, Evan Fulton, Sergio Gaitano, Stephen Gasteyer, Art Gaterman, John Gibler, Peter Gleick, Dennis Grzezinski, Steve Grossman, Amy Harcourt, Adele Hurley, Jim Harnum, Ian Hart, George Hartwell, Emily Huntoon (with Senator Tom Harkin), Yoric Knapp, Emily Lee, Sue McCormick, Corky Overmeyer, Meena Palaniappan, Joyce Powell,

Glenn Pratt, Steve Quick, Randy Ray, Robert Reed, Darcy Rowe, Derek Scheer, Gary Shawver, James Warner, Jim Swenson, and Steve Zimmerman. We are also grateful to peer reviewers and participants in this project who chose to remain anonymous.

Finally, we are thankful to the Joyce Foundation for supporting this project and for recognizing the importance of providing local decisionmakers with unbiased information about how they can improve water system performance.

CONTENTS

Abbreviations and Acronyms	VII
Abstract	VIII
Executive Summary	1
Challenges	1
Privatization: A Silver Bullet?	2
Six Determinants of Success	4
Recommendations	6
Conclusion	8
Chapter I: Introduction to the Guidance Manual	9
Why Read This Report?	9
How Is This Report Different?	10
Municipal-level Water Challenges	11
Privatization: A Silver Bullet?	13
Beyond Privatization	14
Best Practice Restructuring Process	16
Other Guidance Documents	19
Chapter II: Symptoms of Under-performance	21
1. Unsatisfactory Service Quality and Scope	24
2. Poor Regulatory Compliance	24
3. Insufficient Local Control	25
4. Current Service Prices Too High	26
5. Future Service Prices Too High	28
Chapter III: Causes of Under-performance	31
1. Inefficient Staffing	31
2. Insufficient Funds	33
3. Poor Asset Management	34
4. Ineffective Performance Measurement and Reward	35
5. Limited Transparency and Public Participation	37
Chapter IV: Solutions to Improve Performance	39
Solutions for Inefficient Staffing	40
Solutions for Insufficient Funds	45
Solutions for Poor Asset Management	52
Solutions for Ineffective Performance Measurement and Reward	57
Solutions for Limited Transparency and Public Participation	65
Chapter V: Conclusion and Recommendations	73
Conclusion	73
Recommendations	74
Appendix A: Primer on Municipal-level Water Challenges	83
Financial Challenges	83
Drinking Water Quality Challenges	85
Ambient and Raw Water Quality Challenges	85
Combined Sewer Overflow Challenges	87
Separate Stormwater System Management Challenges	89

Appendix B: Current Role of the Private Sector 91
 Current Global and US Water Markets 91
 The Regional Water Market and Some of the Private Players 93
 Comparing the Efficiency of Private and Public Utilities, in General 96
 Inherent Difficulties of Comparing the Cost of Private and Public Options 99
 Use of Eminent Domain to Purchase Water Utilities 102

Appendix C: “Sunshine Laws” for the Focus Area 105

References 109

List of Tables

Table 1: Cost Drivers for Three Forms of Utility Organization 16
 Table 2: Details for Upper Midwest Examples in Manual 22
 Table 3: Akron Public Utilities Bureau Training Hours During Pilot 40
 Table 4: Advantages of Consolidation or Regionalization 48
 Table 5: AWWA and WEF Performance Indicators 59

Table A - 1: Infrastructure Investment Estimates by State (2005) 84
 Table A - 2: References for Additional Water Quality Data in the Study Area 87

Table B - 1: Ownership of Community Drinking Water Systems 94
 Table B - 2: Investor-owned Utilities (IOUs) Regulated at the State Level 95
 Table B - 3: Contract Operations by Larger Water Companies in the Upper Midwest 96
 Table B - 4: Cost Drivers for Three Forms of Utility Organization 101

List of Figures

Figure ES - 1: Guide to Solution Options 4
 Figure ES - 2: Avoiding False Starts When Restructuring 5

Figure 1: Forms of Private Sector Participation 15
 Figure 2: Major Steps in the Restructuring Process 17
 Figure 3: The Role of Perceived Value (Perceived Worth) 27
 Figure 4: Capital Intensity of Major Utilities in the United States 34
 Figure 5: Guide to Solution Options 39
 Figure 6: Ann Arbor Public Service BEFORE Reorganization 50
 Figure 7: Ann Arbor Public Services AFTER Reorganization 51

Figure A - 1: Quantities of Public Supply from Ground and Surface Water 86
 Figure A - 2: Combined Sewer Systems in the US 88

Figure B - 1: Cost versus Form of Ownership, All Community Water Systems in the US 98
 Figure B - 2: Cost versus Form of Ownership, Small Community Water Systems in the US 98
 Figure B - 3: Number of Waterborne-disease Outbreaks Associated with Drinking Water, by State 99

List of Sidebars

Sidebar 1: Definitions 11
 Sidebar 2: Forced Restructuring 22
 Sidebar 3: Willingness to Pay for What? 29
 Sidebar 4: Water System Functions at the Municipal Scale 42
 Sidebar 5: Lansing Board of Water and Light Becomes Regional Service Provider 48
 Sidebar 6: Risk-based Asset Management for a Water Supply Pipeline 55
 Sidebar 7: CitiStat: The Value of Intensive Performance Measurement 58
 Sidebar 8: Perceptions about Consultation Processes Are Critical 66

Sidebar B - 1: Brief Profiles of the World’s Largest Private Water Companies 92
 Sidebar B - 2: Peer-reviewed Statistical Analysis of Operational Efficiency 97

ABBREVIATIONS AND ACRONYMS

AOC: Area of Concern

ASCE: American Society of Civil Engineering

AWWA: American Water Works Association

BCDES: Butler County Department of
Environment Services

BLS: Bureau of Labor Statistics

BMP: best management practices

BOT: Build-Operate-Transfer

CEQA: California Environmental Quality Act

CEX: Consumer Expenditure Survey

CNES: The Citizen's Network for Essential Services

CSO: Combined sewer overflow

DB: Design-build

DBB: Design-bid-build

DBO: Design-build-operate

DO: Design-operate

DWSD: Detroit Water and Sewerage Department

EMC: Environment Management Corporation

EPA: Environmental Protection Agency

GASB: General Accounting Standards Board

GATS: General Agreement on Trade in Services

IBNET: Water and Sanitation International
Benchmarking Network

ICLEI: International Council for Local
Environmental Initiatives

ICMA: International City Managers Association

IJC: International Joint Commission

IOU: Investor-owned utility

IRR: Internal Rate of Return

LCC: Life Cycle Costing

OMI: Operations Management International

MGD: million gallons per day

MMSD: Milwaukee Metropolitan Sewerage District

MSGP: Multi-sector general permits

MS4: Municipal separate storm sewer system

MTBE: Methyl tertiary butyl ether

NOI: Notice of Intent

NRC: National Research Council

O&M: Operations and maintenance

OMI: Operations Management International

OSHA: US Occupational Safety and Health
Administration

ppb: Parts per billion

PPP: Public-private partnership

PSP: Private sector participation

RCAP: Rural Community Assistance Partnership

RFP: Request for proposal

SDWA: Safe Drinking Water Act

SDWIS: Safe drinking water information system

TDML: Total daily maximum load

TRC: Technical Advisory Committees

URL: Universal record locator

US: United States

WEF: Water Environment Federation

ABSTRACT

Water managers face significant challenges meeting the water supply, wastewater collection and treatment, and stormwater management needs of the communities they serve. Numerous solutions have been proposed, including the controversial action of significantly increased private sector involvement, known generally as privatization.

The debate over privatization has overshadowed discussion of the determinants of performance. This document is unique in that it argues that “public versus private” is not the bright line that separates success from failure. Instead, performance depends on effective staffing, consistent public support for sufficient funding, better asset management systems, performance measurements and rewards, and more stakeholder involvement and transparency.

This report provides a framework for urban and rural municipal-level public decisionmakers to assess problems, identify possible solutions, and choose among these solutions. It provides practical information and examples about improving the effectiveness of water, wastewater, and stormwater systems, whether public or private. To illustrate critical points, the report offers numerous examples from the upper Midwest: the US states of Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio, and Wisconsin, and the Canadian province of Ontario. However, the manual’s lessons extrapolate to other regions of the United States, and beyond.

EXECUTIVE SUMMARY

Challenges

FOUR RELATED CHALLENGES are prompting water utility restructuring in the United States and Canada, according to our research: chronic under-investment, regulatory standards and requirements, heightened national security concerns, and limited financial resources.

Chronic Under-Investment

Water-related services are capital-intensive compared to other utilities such as electricity, natural gas, and telecommunications. Measured by the ratio of net utility plant capital costs to annual operating revenues, water utilities are more than twice as capital-intensive as electricity and nearly three times as capital-intensive as natural gas. Due to many years of under-investment — often in underground assets like water pipes and sewers — the US Environmental Protection Agency (EPA) estimates that \$68 billion of water and wastewater infrastructure investment is needed over the next twenty years in the seven US states covered in our research (ASCE, 2005).

Regulatory Standards and Requirements

Municipalities and drinking water utilities are still responding to the 1996 amendments to the Safe Drinking Water Act (SDWA), and a significant number of EPA Region 5¹ (upper Midwest) community water systems still do not meet all EPA health-based standards. Region 5 faces the challenge of ensuring safe water to over 41,000 non-community (e.g., schools, rest stops) water systems, roughly 40% of the non-community water systems in the entire US. These non-community systems typically serve a limited number of people on a year-round basis and require extensive technical assistance relative to the number of people served.

Furthermore, Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin contain 358 of the roughly 750 combined wastewater/storm

¹ Iowa is located in EPA Region 7.

water systems in the US (Environmental Integrity Project, 2005). Many of these systems have not yet met minimum federal standards for preventing discharges or received approval for long-term plans to prevent stormwater overflows.

Heightened National Security Concerns

The US EPA Action Plan (2004b), a collaborative effort between the EPA, federal partners, the water industry, public organizations, and the emergency response community, identifies critical research and technical support needs in the area of infrastructure protection. Implementation of the plan will affect nearly every municipality in the US, almost certainly without full federal funding.

Average rate increases of about 3% above the rate of inflation for the next 20 years could fund current estimates of needed improvements. Some communities, however, cannot afford to pay that much, and other communities require even higher rate increases to meet their needs.

Limited Financial Resources

Cities are financially hard-pressed. The most recent National League of Cities financial survey (Pagano, 2004) found that 63% of municipal finance officers believed their cities were less able to meet financial needs than in the previous year, and 61% felt that they would be less able to meet needs in 2005 than in 2004. An even higher percentage (74%) of responding Midwest financial officers felt economic conditions were deteriorating rather than improving. Even those cities and special districts that provide water sector services paid for primarily by their customers (rather than via taxes) are reluctant to raise rates, both because it is politically unpopular and because water and wastewater rates have increased on average two percentage points faster than the rate of inflation since at least 1998.

Average rate increases of about 3% above the rate of inflation for the next 20 years could fund current estimates of needed improvements. Some communities, however, cannot afford to pay that much, and other communities require even higher rate increases to meet their needs. In addition to direct financial limitations, public or political perception problems often exist as well, which involve shortsighted emphasis on minimizing rate increases without considering the benefits that might be obtained if rates were raised and spent effectively.

Privatization: A Silver Bullet?

Numerous strategies have been proposed to meet these challenges, including privatization, regionalization, consolidation, and municipalization.²

The Privatization Debate

Privatization³ of water and wastewater services is hotly debated. Proponents have typically argued that the private sector will deliver more or better services per dollar of cost and often claim that private sector involvement is the best solution for all challenges. Opponents argue that the profit motive will eventually lead to higher rather than lower costs; that workers will lose their jobs or benefits; and that local control over decisions will be diminished or lost. Proponents argue that

² See Sidebar 1 for definitions of these and related terms.

³ See Gleick et al. (2002) for discussion of the many variations of private involvement, and for some specific suggestions about how to simultaneously manage water as an economic and a social good.

water services should be supplied by businesses, like food, energy, and other essential goods. Opponents often feel that water is too essential and fundamental a public good to allow much private involvement. Experience summarized or cited in this report helps to clarify these issues. But some of the issues are still unfolding. For example, no one knows how current or future versions of the General Agreement on Trade in Services (GATS) will affect municipal-level utility decisions when international water companies are involved.

The number of contracts for operation of publicly owned assets tripled in the US between 1997 and 2002 (Reinhardt, 2003). The three largest contracts in the US for operation of publicly owned wastewater assets are located in the Upper Midwest: Gary and Indianapolis, Indiana; and the Milwaukee, Wisconsin Metropolitan Sanitation District. One of the largest, most recent, and most closely watched contracts for operation of publicly owned water assets in the US is also in the region: Indianapolis, Indiana. At least six large or medium-sized companies operate in the region, including the three largest water companies in the world: Veolia Environment, United Water (a branch of Suez, headquartered in Paris), and American Water (a branch of the German firm RWE).

Nonetheless, the heightened interest in privatization has not led to widespread privatization of water systems. There are only about 91 contracts for operation in the region out of more than 4,000 publicly owned systems (see Appendix B), although as noted above some of these contracts are very large even by national standards. And in Ohio, only three changes in system ownership took place in the 1990s; two municipalizations⁴ versus one privatization (personal communication, Grossman, 2005).

There are, nonetheless, nearly 4,000 small private water systems in the region, mostly owned by local businesses or groups in situations where water is incidental to the business, such as mobile home parks or homeowners associations. Based on national statistics, these small systems probably serve only 15% of the population in the region. In some states, such as Michigan and Minnesota, these systems are so uncontroversial that they are not economically regulated at the state level, though they are subject to water quality regulation. Even in states that regulate investor-owned water companies, most systems are below the state-by-state size thresholds for economic regulation. Only about 200 investor-owned water and wastewater systems are economically regulated in the upper Midwestern focus area of this study.

Beyond the Debate Over Privatization

Our analysis of utilities in the Midwest and elsewhere shows that some accepted wisdom should be rethought. Specifically, we find that private sector involvement is not the bright line between success and failure. Researchers have statistically analyzed the question of economic efficiency but have found no clear evidence that private companies are more economically efficient (see Appendix B). As discussed at greater length in this report, both public and private forms of organization have economic advantages and disadvantages. Neither seems to have an inherent efficiency advantage, overall. The bottom line seems to be that public and private agencies both benefit from improvements driven by some form of

... both public and private forms of organization have economic advantages and disadvantages. Neither seems to have an inherent efficiency advantage, overall.

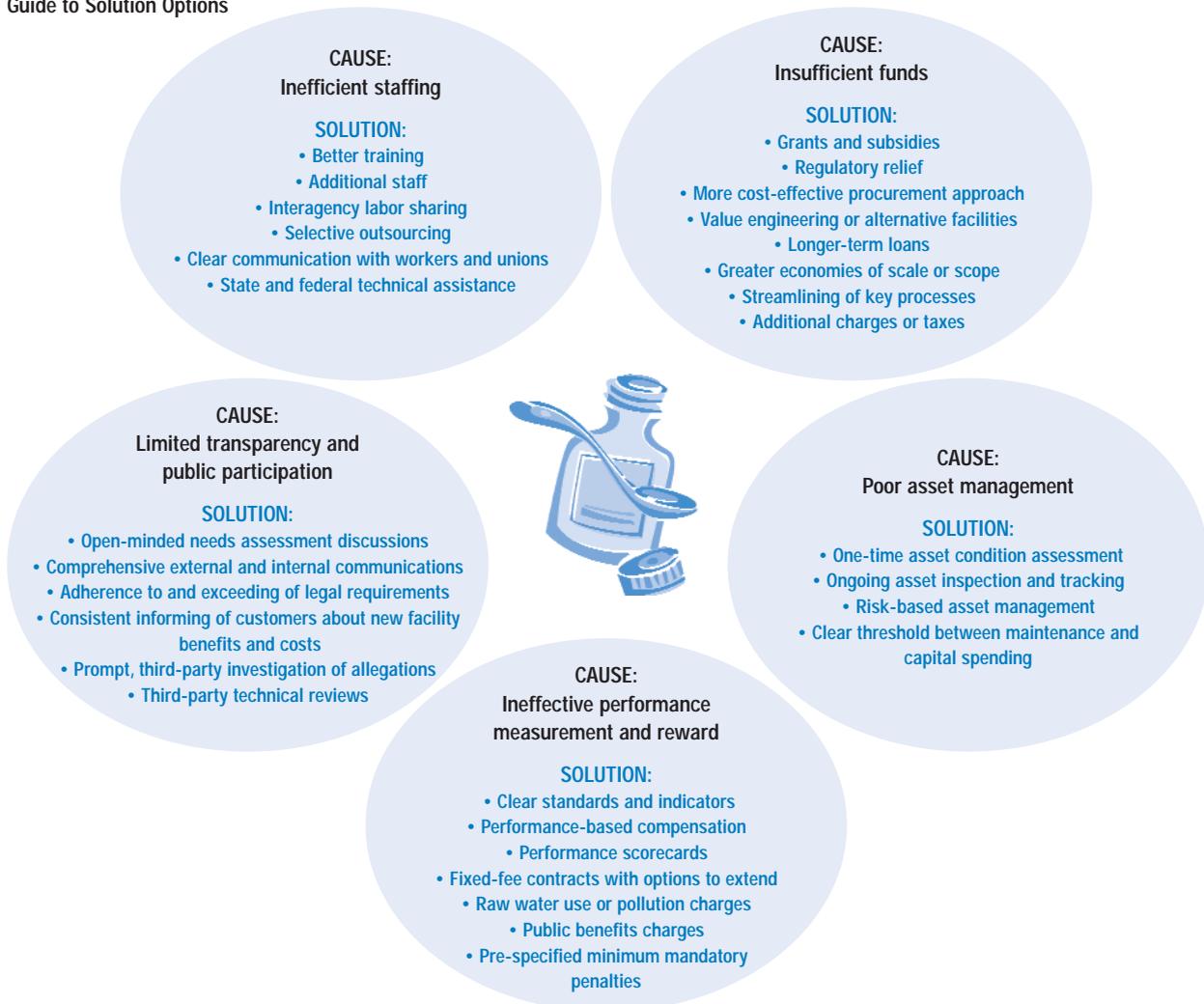
⁴ Municipalization—public purchase of investor-owned water utilities—is not uncommon. At least two cities in Illinois (Pekin and Peoria) have tried to purchase their local divisions of American Water, and Beloit and Ripon, Wisconsin have either recently purchased or are in the process of purchasing privately owned water systems in their communities.

competition or comparative measurement. A decision on whether or how to involve the private sector needs to be made on a case-by-case basis based on local values and conditions. What works for one community may not work for another.

Six Determinants of Success

Our research found six characteristics of high-performance organizations, all of which may be present in public or private (or mixed) forms of organization. Five of the determinants are permanent features of successful organizations: effective staffing, consistently sufficient funding, detailed asset management systems, performance measurements and rewards aligned to organizational objectives, and decision processes that are transparent and open to the public. Figure ES-1 shows these determinants in their negative form—that is, as causes of problems that require solutions. The bulleted items in each bubble in the figure are solution categories discussed in detail later in this report.

Figure ES-1
Guide to Solution Options



The sixth determinant is relevant to the process of restructuring. Successful organizations avoid what we call “false starts.” Figure ES-2 shows a process that will be effective if one begins at the “effective start.” An ineffective and sometimes disastrous beginning is labeled “false start.” The false start is typically a situation where one or more community leaders decide they know the problem and the answer (often, “hire a private company”) and proceed to push that solution through the political process. Because many members of the community are not yet clear that a problem exists, what its symptoms are, what the causes of the symptoms are, and what the range of solution options is, they are often disengaged from the restructuring process, at least initially. When they become involved, they are often disgruntled because these questions have not been answered. Political and legal fights may then erupt, often focused around the role of the private sector. Lawsuits may be filed or referenda to restrict the power of elected officials may be placed on the ballot.⁵

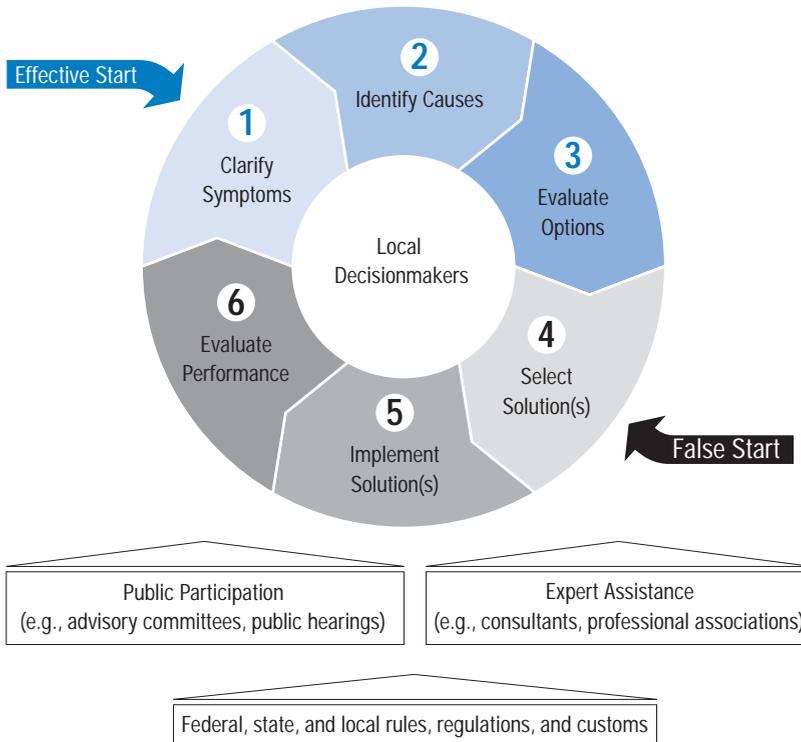


Figure ES-2
Avoiding False Starts When Restructuring

- Focus of Manual
- Limited Discussion

Figure ES-2 shows six steps that our research found are typical of successful processes regardless of a municipality’s size, problems, or choice of solution. The first three steps are often neglected and are therefore discussed extensively in this report. False starts or incomplete processes can lengthen, increase the cost, or increase the contentiousness of restructuring. Process is an area where some communities have been penny-wise but pound-foolish. A complete, well-thought-out process that is rigorously followed will benefit any community, regardless of size.⁶

⁵ New Orleans, Louisiana and Stockton, California voters approved referenda that require direct approval of the voters for city contracts in excess of a specified dollar sum. Both referenda were in response to false starts in water system restructuring. A judge nullified the contract with a private company in Stockton for operation of the water, wastewater, and stormwater systems shortly after it was awarded, but appeals of the decision have been filed and are not yet resolved.

⁶ Small communities facing severe resource constraints will still fare better if they perform each step in a very simple way rather than skipping any of the steps.

There are many ways to succeed so long as major mistakes discovered in other venues are avoided.

Figure ES-2 depicts a cyclical process, because even after successful restructuring there is need for continuous improvements and adjustments to avoid another major restructuring in the future. Commonly, restructuring becomes necessary when this sort of a continuous, iterative improvement cycle has broken down and originally small problems have become large ones. The resulting crisis and sense of urgency often leads decisionmakers into the “false start” mistake.

Recommendations

This report recommends actions that decisionmakers should make, and others that they should avoid, grouped under the six determinants of success. The “Do” items emphasize positive actions, while the “Don’t” items highlight larger mistakes to avoid during water system restructuring. Our primary objective is to help communities learn from the experiences of others. There are many ways to succeed so long as major mistakes discovered in other venues are avoided.

Some of the recommendations clearly demonstrate that the choice of public or private form of organization is not critical to performance.⁷

For example, in the area of **adequate funding**, we recommend: *Do look for and capture economies of scale and scope*. Small communities are perhaps the most challenged, financially, in the focus area of this study. One very effective way to reduce cost is to identify and capture economies of scale or scope through cooperative arrangements or outright consolidation with other public agencies or private companies. The Lansing, Michigan Board of Water and Light achieved greater economies of scale in its core operations through a combination of retail contracts to manage other operations, wholesale contracts to resell water, and asset transfers from other municipalities to the Board. Other functions without economies of scale, like water distribution, remained with the towns. Similarly, the “hub and spoke” area project in Minnesota has allowed the towns of St. Michael, Albertville, and Hanover to benefit from economies of scale captured by a private company that serves all three towns. As in the Lansing example, however, some functions remain in the hands of each town because there were no economies of scale affecting those functions.

In the area of **performance measurements and rewards**, we recommend: *Do measure and reward (or penalize) performance*. Management structures that do not measure and reward achievement of performance objectives inevitably become inefficient. Performance bonuses are one way of rewarding private companies, as is allowing them to keep any cost reductions they achieve below a fixed fee that is paid for their services. Both of these techniques have been used successfully in the Milwaukee Metropolitan Sewerage District (MMSD) contract for operations. Performance penalties in a contract, such as those for odor complaints in the Sioux City contract, are also beneficial. But performance measurement, rewards, and penalties are also appropriate in public systems. The City of Baltimore CitiStat system has saved more than \$100 million since its inception in 2001. And Louisville Water, a public corporation, has

⁷ Although that choice is an important value decision in some communities.

used bonuses at all levels of the utility to increase efficiency and to create a culture of performance among its staff. In the case of public utilities, even if cash bonuses are not legal or appropriate, promotions and continued employment can be clearly linked to achievement of performance objectives.

In the area of **transparency and public participation**, we recommend: *Do communicate clearly and consistently with workers and unions if jobs will be transferred between employers.* The MMSD developed a standard form contract that was reviewed and approved by the union prior to solicitation of proposals for operations. The Indianapolis wastewater contract; the Butler County and Akron, Ohio public agency restructurings discussed in this report; and the transition from private to public operation in Hamilton, Ontario had similarly consistent communications with workers.

Unfortunately, the Indianapolis water transition involved conflicting communications about benefit levels for workers that created tension that could have been avoided. The operations contract called for the value of benefits to be maintained while the mayor had previously stated that benefits would be unchanged. To this day, the contractor and the union differ on how to calculate the value of benefits. As a result of this inconsistent communication, a federal mediator has been required to help with the labor contract negotiation, seventeen complaints have been filed with the National Labor Relations Board, former employees have sued over their dismissal, and the loss of staff and turnover in management have been so significant that some people are asking whether the utility has sufficient institutional memory to function well in the future.

It is important to note that these examples do not show any pattern with respect to the question of public versus private operations. Successful labor transitions took place from public-to-private, public-to-public, and private-to-public management. The unsuccessful example was a private-to-private transition, but we know that such transitions have taken place successfully in other circumstances. The bright line between success and failure for labor transitions is **not** public versus private; instead, the key is clear and consistent communication with workers and unions.

A final example, with regard to **avoiding false starts**, is our recommendation: *Do not assume the private sector is inherently more efficient or less costly.* Statistical analysis does not support this claim (see Appendix B). There are cost factors that both drive up and drive down private company costs relative to public agency costs. When cost savings exist, they result from some specific circumstance that can be identified and evaluated, not an inherent advantage of private over public. For example, the successful bidder in Stockton, California is far more experienced than other bidders and public agencies at operation of a particular type of wastewater process — experience that allowed them to bid \$20 million less for capital improvements than the second-lowest proposal and to provide financial guarantees for their proposed method of wastewater treatment.

When cost savings exist, they result from some specific circumstance that can be identified and evaluated, not an inherent advantage of private over public.

... allowing values and beliefs to overshadow the factual and analytical part of the decision often leads to costly outcomes that polarize and divide communities.

Conclusion

The debate over water privatization has overshadowed discussion of methods for achieving real, tangible performance improvements regardless of whether the utility is public, investor-owned, or somewhere in between. While values and beliefs certainly have their place in any decision about utility restructuring, allowing values and beliefs to overshadow the factual and analytical part of the decision often leads to costly outcomes that polarize and divide communities. Experience in the upper Midwest shows better-performing utilities:

- have staff in the right numbers and of the right kind
- know what assets they own and the condition of those assets
- are consistently funded at adequate levels because they use a wide range of techniques to control costs and to maintain financial credibility with their communities through continuous communication
- measure performance and provide rewards or penalties as appropriate in order to ensure that staff at all levels are encouraged to either improve the quality or reduce the cost of service
- make decisions in open processes, with transparency and public participation and periodic third-party reviews, thereby avoiding even the appearance that corruption or “private agendas” are driving the decision process, and
- if restructuring is needed, avoid a false start by identifying the symptoms and underlying causes of the problems people are facing — and discussing the full range of solutions that might be implemented — *before* deciding to undertake potentially controversial actions such as changing from a public to private or a private to public utility structure.

The choice of public versus private structure is important because it involves social values such as public health, affordability of essential services, and the general approach of each community to satisfaction of basic needs. But our research shows that with respect to performance — how much or how many services get delivered per dollar of rates paid by customers — the choice of public versus private is not nearly as relevant as the bulleted points above.

CHAPTER I

INTRODUCTION TO THE GUIDANCE MANUAL

Why Read This Report?

“The water crisis is mainly a crisis of governance.”⁸

WATER UTILITIES IN THE United States face significant challenges. Most managers and public officials responsible for municipal water services are looking to improve efficiency — that is, to deliver more or better services per dollar of cost. Some have suggested that involving the private sector will increase efficiency. This report provides guidance on restructuring water utilities for better performance, including but not limited to issues such as involvement of the private sector (see Sidebar 1 for definitions of key terms). This report suggests a best practice restructuring process, offers general guidelines drawn from our research, and includes specific solutions drawn largely from water utilities in the Upper Midwest (Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio, Wisconsin, and the province of Ontario). The manual’s lessons may be applied to other regions of the United States and Canada, and perhaps beyond, as long as the reader adjusts for differences in financial, legal, and regulatory circumstances.

The individual solutions discussed in this report will not apply in every community. Nonetheless, at least some of the solutions presented and lessons learned from our research in the upper Midwest are relevant for all communities, whether they are urban, rural, large, or small.

⁸ *The Dialogue on Effective Water Governance, Update (2002)* (A joint initiative of the United Nations Development Program, the Global Water Partnership, and the Institute for Local Environmental Initiatives)

This report includes information on the following topics:

- A “best practice” restructuring process
- Discussion of common issues and their underlying causes
- Specific solutions to these problem causes, with examples
- General guidelines in the form of Do and Don’t lists
- Navigation to additional sources of information
- Review of municipal-level water challenges (details in Appendix A)
- Review of the private sector in the upper Midwest (details in Appendix B)
- Reference list of “sunshine laws” by state (Appendix C)

The report does not cover technical details of water operations. Rather, the report presents policy-level information useful to community leaders and water managers.

How Is This Report Different?

Most of the [Canadian] municipalities, which have restructured their water supply services ... conducted a broad-based review of their water supply options. In some cases, the process led to unexpected outcomes; what appeared to be the most desirable option at the start proved not to be the preferred option, upon careful study (Bakker and Cameron, 2002, p. 10).

The consequent polarized debate fails to adequately discuss the variety of solutions available to municipalities facing significant water sector problems.

Most reports discussing water privatization take one of two polar views: privatization is either the answer or a disastrous mistake. This report is different in two respects. First, we view privatization as just one type of restructuring (see Sidebar 1), albeit one with special social, political, and economic issues associated with it. We find that other issues are more important to the performance of a utility. Second, our research shows that the binary framework for discussing privatization is a red herring. The consequent polarized debate fails to adequately discuss the variety of solutions available to municipalities facing significant water sector problems.

This report discusses how municipal decisionmakers can improve the performance of their water, wastewater, and stormwater utilities, when those utilities or the community are experiencing significant problems, whether those utilities are public or private. The following key questions framed the research we conducted:

- 1 What are the problem symptoms municipalities are experiencing?
- 2 What are the root causes of these symptoms?
- 3 What potential solutions, including private involvement, might address each cause?
- 4 What serious mistakes should communities avoid when restructuring?

Sidebar 1: Definitions

Restructuring: In this report, we use the term “restructuring” to refer to the transformation of a public or private utility organization in any of the ways described below.

Privatization: “Privatization” refers to the transfer of some or all of the assets or operations of public systems into private hands. There are numerous ways to privatize water, such as the transfer of the responsibility to operate a water delivery or treatment system, the transfer of physical asset ownership along with operation responsibilities, or even the sale of non-physical assets such as water rights to private companies. These changes are sometimes referred to as privatization, or as public-private partnerships (PPPs), or as private sector participation (PSP). We use the term “privatization” to refer to this entire category of options.

Consolidation: “Consolidation” is the mutually agreed upon merger of systems. A consolidation may consist of, for example, two private water utilities merging, or a government entity taking over the assets and operations of another government entity. Consolidation is generally viewed as a broader process than “regionalization” and may encompass mergers among systems in geographically non-contiguous or even distant locales (NRC, 2002).

Regionalization: “Regionalization” is typically a consolidation among contiguous or nearby systems, whereby one or more communities turn over their assets and accept less or no control over system decisions, in favor of another public agency or regional authority (NRC, 2002). However, regionalization can also occur between private rather than public utilities or can involve decentralized ownership, operation, or control of at least some system assets. For example, it is common for cities to own and operate sewer or water distribution systems that are connected to regional wastewater or water treatment plants.

Contract Operations or Management: Although contracts for operation or management of publicly owned assets are usually with private companies, such contracts have been used between government agencies. These allow more local ownership and control than consolidation of public systems and can create competitive pressure on the public operator or manager.

Municipalization: “Municipalization” is, in essence, the opposite of “privatization.” Municipalization refers to a municipality attempting to negotiate purchase of a privately owned utility company, often with the power of eminent domain supplying a fallback position if negotiations fail.

Municipal-level Water Challenges

Based on our research, four categories of challenges are prompting water utility restructuring in the United States at a municipal level. The challenges are A) chronic under-investment, B) strict regulatory standards and requirements, C) heightened national security concerns, and D) limited financial resources. Appendix A: Primer on Municipal-level Water Challenges, provides much more detail.

A. Chronic Under-investment

Water-related services are capital-intensive compared to other industries such as electricity, natural gas, and telecommunications. Measured by the

ratio of net utility plant capital costs to annual operating revenues, water utilities are more than twice as capital-intensive as the second-most capital-intensive utility sector evaluated (electricity) and nearly three times as capital-intensive as the least capital-intensive utility evaluated (natural gas). Due to many years of infrastructure under-investment—often in underground assets like water pipes and sewers—the US Environmental Protection Agency (EPA) estimates that an additional \$68 billion of infrastructure investment is needed over the next twenty years in the seven US states covered in our research (ASCE, 2005).

B. Strict Regulatory Standards and Requirements

Municipalities continue to face strict drinking water and raw water quality regulations as well as increasingly tough standards for combined sewer overflows and separate stormwater systems. The 1996 amendments to the Safe Drinking Water Act (SDWA) are the most recent significant legislation affecting drinking water quality, and they in turn have prompted a number of regulatory actions to which drinking water utilities are still responding.

Only slightly greater than 95 percent of community water system customers in EPA Region 5⁹ now receive water meeting all EPA health-based standards (EPA, 2002). Region 5 faces the additional challenge of ensuring safe water to over 41,000 non-community (e.g., schools, rest stops) water systems, roughly 40 percent of the non-community water systems in the entire US. These non-community systems typically serve a limited number of people on a year-round basis and require extensive technical assistance relative to the number of people served.

The Environmental Integrity Project (2005) reports that Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin contain 358 of the roughly 750 combined wastewater systems in the US. In comparison to the 3-10 million gallons of sanitary sewer overflows estimated to occur each year in non-combined systems, 850 million gallons per year of overflows are estimated for combined systems (EPA, 2004a). Many of these systems have not yet met minimum federal standards for preventing discharges or received approval for long-term plans to prevent overflows.

C. Increased National Security Concerns

“We’re ... taking significant steps to strengthen our homeland protections—securing cockpits, tightening our borders, stockpiling vaccinations, increasing security at water treatment and nuclear power plants.”

— President George W. Bush
June 6, 2002 (quoted in EPA, 2004b)

The US EPA Action Plan (2004) is a report based on a collaborative effort between the EPA, federal partners, the water industry, public organizations, and the emergency response community to address terrorism-related security concerns. The plan identifies critical research and technical support projects in the areas of physical and cyber infrastructure protection; contaminant identification; monitoring and analysis; treatment, decontamination, and disposal; contingency planning; infra-

Region 5 faces the challenge of ensuring safe water to roughly 40 percent of the non-community water systems in the entire US.

⁹ Iowa is located in EPA Region 7.

structure interdependencies; and risk assessment and communication. Although the exact implications of this plan for every municipality are hard to predict given the dynamic and evolving nature of protecting the nation's water infrastructure, implementation of this plan's methodologies, tools, and other products will affect nearly every municipality in the US, almost certainly without full federal funding.

D. Limited Financial Resources

Cities are financially very hard-pressed. The most recent National League of Cities financial survey (Pagano, 2004) found that 63% of municipal finance officers believed their cities were less able to meet financial needs than in the previous year, and 61% felt that they would be less able to meet needs in 2005 than in 2004. An even higher percentage (74%) of responding financial officers in the Midwest felt economic conditions were deteriorating rather than improving. Even those cities and special districts that provide water sector services paid for primarily by their customers (rather than via taxes) are reluctant to raise rates, both because it is politically unpopular and because water and wastewater rates have increased on average two percentage points faster than the rate of inflation since at least 1998.

Although average rate increases of about 3% higher than the rate of inflation for the next 20 years could fund current estimates of needed improvements, some communities would face much higher rate increases to meet their needs, and some communities cannot afford to pay 3% more than inflation. In addition to direct financial limitations, a public perception problem often exists as well, which involves a shortsighted emphasis on minimizing rate increases without considering the benefits that might be obtained if rates were raised and spent effectively.

In addition to direct financial limitations, a public perception problem often exists as well ...

Privatization: A Silver Bullet?

Numerous strategies have been proposed to meet these challenges, including privatization, regionalization, consolidation, and municipalization.¹⁰ Privatization of water and wastewater services is hotly debated. The issues involved are discussed at length in Gleick et al. (2002). Proponents have typically argued that the private sector will deliver more or better services per dollar of cost and often claim that private sector involvement is the best solution for all challenges. Opponents argue that the profit motive will eventually lead to higher rather than lower costs; that workers will lose their jobs or benefits; and that local control over decisions will be diminished or lost. Experience summarized in this report and others that we cite helps to clarify these issues. But some of the issues are still unfolding. For example, no one knows how current or future versions of the General Agreement on Trade in Services (GATS) will affect municipal-level utility decisions when international water companies are involved.

The following text provides essential background information about the role of private companies in water services in the upper Midwest. Appendix B presents additional detailed information on this topic, including some original research performed in this project.

¹⁰ See Sidebar 1 for definitions of these and related terms.

At least six large- or medium-sized companies operate in the region, including the three largest water companies in the world ...

In the US, interest in privatization of water and wastewater utilities, and to a much lesser extent in stormwater management, increased significantly in the 1990s. Private companies saw an opportunity for profit in managing or owning water services, and they entered or expanded their presence in the market (NRC, 2002). The number of contracts for operation of publicly owned assets tripled in the US between 1997 and 2002 (Reinhardt, 2003). The three largest contracts in the US for operation of publicly owned wastewater assets are located in the Upper Midwest: Gary and Indianapolis, Indiana; and the Milwaukee, Wisconsin Metropolitan Sewerage District. One of the largest, most recent (2002), and most closely watched contracts for operation of publicly owned water assets in the US is also in the region: Indianapolis, Indiana. At least six large- or medium-sized companies operate in the region, including the three largest water companies in the world: Veolia Environment, United Water (a branch of Suez, headquartered in Paris), and American Water (a branch of the German firm RWE).

Nonetheless, the heightened interest in privatization did not always result in more privatizations in every state. In Ohio, for example, two municipalizations versus one privatization occurred in the 1990s (Grossman, 2005).¹¹ There are only about 91 significantly sized contracts for operation in the region out of more than 4,000 publicly owned systems, although as noted above some of these contracts are very large even by national standards. Medium-sized to smaller communities and systems have not had the same profit-attraction for private water companies as larger communities, although that may be changing.

Nonetheless, nearly 4,000 small private water systems operate in the region. Local businesses or groups for whom water service is incidental, such as mobile home parks or homeowners associations, own many of these systems. Based on national statistics, small systems probably serve 15% of the population in the region. In some states, such as Michigan and Minnesota, these systems are so uncontroversial that they are not economically regulated at the state level. (They are subject to federal and state water quality regulation.) Even in states that regulate investor-owned water companies, most systems are below the state-by-state size thresholds for economic regulation. Only about 200 investor-owned water and wastewater systems are economically regulated in the upper Midwest focus area for this study.

Beyond Privatization

Our analysis of utilities in the Midwest and elsewhere shows that some accepted wisdom should be rethought. Specifically, we find that private sector involvement is not a “bright line” between success and failure. Our research suggests that the debate over privatization has overshadowed influential drivers of success: effective staffing, consistent community support for adequate funding, detailed asset management, performance measurements and rewards aligned to organizational objectives, and processes that are transparent and open to the public. We discuss these drivers of success in detail in this report.

One of the points often lost in the debate is that many types of privatization exist. Figure 1 depicts the many ways that public and private organi-

¹¹ Municipalization — public purchase of investor-owned water utilities — is not uncommon. At least two cities in Illinois (Pekin and Peoria) have been trying to purchase their local divisions of American Water, and Beloit and Ripon, Wisconsin have either recently purchased or are in the process of purchasing privately owned water systems in their communities.

zations can be mixed to create a complete water system. The horizontal axis describes ownership of assets, with full public ownership at the left and full private ownership at the right. The vertical axis describes management of those assets, with full public management at the bottom and mostly private management at the top. The top end of the figure, however, does not represent full private management of assets, because there is widespread recognition around the world, including top managers at private water companies, that some dimensions of water management (e.g., water quality standards) are inherently public in nature and cannot be relinquished to private companies operating in unregulated markets.

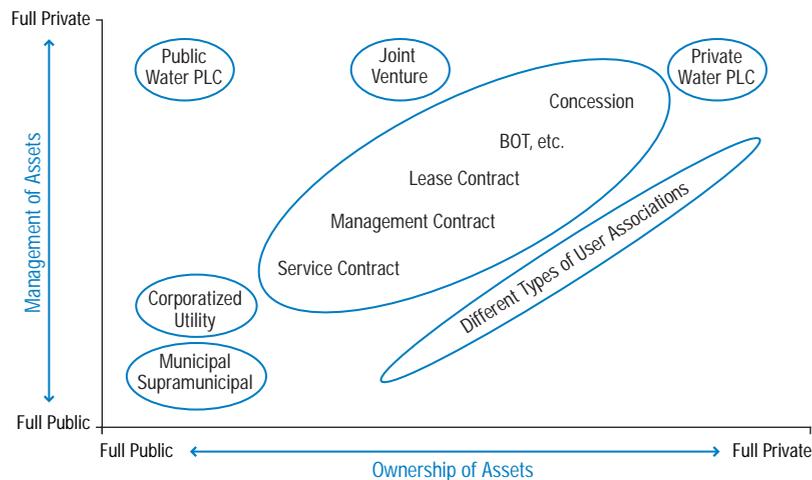


Figure 1
Forms of Private Sector Participation

Source: Modified from Blokland et al. (1999)

The figure shows many more forms of organization than typically exist in the upper Midwest or in the US in general. For example, water companies in Australia are publicly owned corporations while water companies in Denmark are usually corporations owned in part by government and in part by private investors. Publicly owned corporatized water utilities are rare in the US, although some, such as Louisville Water, do exist. User associations, often composed of owners of irrigated farmland, exist in rural areas in the US but are rare in urban areas. The most common forms of organization in the US are municipal utilities that both own and operate assets, service or management contracts for publicly owned assets, and investor-owned utilities that own and operate assets under some degree of public regulation (labeled “Private Water PLC” in Figure 1).

One aspect of private involvement that the figure does not show is the role of private vendors or suppliers. This is a common private sector role throughout the world and across all forms of utility organization. Consultants provide design services; contractors construct or repair assets; and vendors supply chemicals or energy. The figure shows only those situations in which a vendor or supplier has an ongoing role in operation or ownership of assets, such as in build-operate-transfer (BOT) arrangements, etc. In these arrangements the private supplier may own the asset for 5-50 years, with transfer of ownership to the public only at the end of the contract term. Or the public may own the asset from the

Top managers at private water companies recognize that some dimensions of water management (e.g., water quality standards) are inherently public in nature.

Researchers have statistically analyzed the economic efficiency of utility organization but found no clear evidence to support the claim that one form is inherently more economically efficient ...

beginning but the supplier is responsible for operation for a specified period of time (e.g., in design-build-operate (DBO) contracts).

Researchers have statistically analyzed the economic efficiency of these forms of utility organization but found no clear evidence to support the claim that one form is inherently more economically efficient than any other (see Appendix B for details).¹² As summarized in Table 1, all forms of organization have economic advantages and disadvantages. The table lists the likely impact of various cost drivers on the financial performance of municipal (public), investor-owned (private), and contracts with private companies for operation or management of publicly owned assets (contracts). The table helps to explain why researchers have not found a clear economic advantage for any of these forms of organization. Some factors tend to increase cost (+); others tend to lower cost (-); and yet other factors have cost impacts that depend on circumstances (0). For example, private companies have a profit requirement that public utilities do not, which increases their cost relative to public agencies. But the risk averseness of public utility staff can sometimes lead to more staff than is strictly necessary or to over-design of some facilities, a countervailing cost factor.

Table 1
Cost Drivers for Three Forms of Utility Organization

Cost Driver	Public	Private	Contracts ¹
Competitive Pressure	0	0	-
Profit Requirement	-	+	+
Profit Motive	0	0	-
Risk Aversion	+	0	0
Economies of Scale & Scope	0	0	0
Income Tax Status ²	-	+	+
Property Tax Status ²	-	+	0
Debt Service Tax Status ²	-	+	0

- 1 This column addresses contracts with private companies for operation or management of publicly owned assets, not contracts between government entities.
- 2 There are higher costs in these categories for private companies, but these costs also generate a benefit for taxpayers in the form of tax revenue.

The bottom line seems to be that public and private agencies both benefit from improvements driven by some form of competition or comparative measurement. A decision on whether or how to involve the private sector needs to be made on a case-by-case basis. Every community and private organization has a unique set of values, experiences, and assets. What works for one community or company may not work for another.

Best Practice Restructuring Process

Process can significantly impact the outcome of restructuring. Yet the leaders of restructuring initiatives often neglect to clearly define, implement, and enforce an effective process. Poor process can lengthen, increase the cost, and increase the contentiousness of restructuring. We learned that successful restructuring initiatives often have similar processes, regardless of a municipality’s size, problems, or choice of solution. Figure 2 shows the six major steps in what we recommend as a

¹² Additional statistical analysis would be useful, but suitable data is difficult to obtain. In particular, DBO contracts are reported to save money but have not been analyzed rigorously across a suitable data set.

“best practice” restructuring process: 1) clarify symptoms, 2) identify causes, 3) evaluate options, 4) select solution(s), 5) implement solution(s), and 6) evaluate performance.

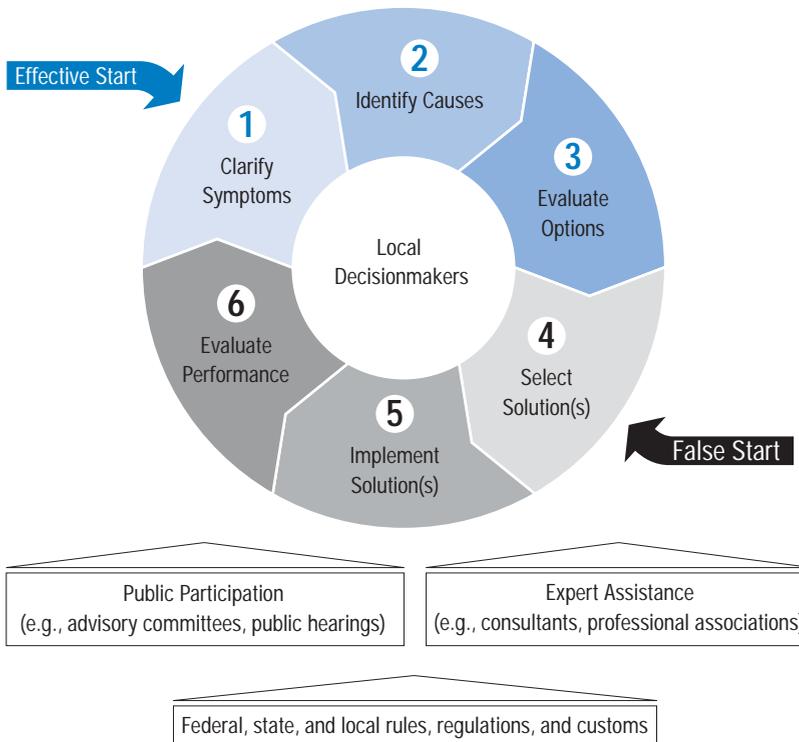


Figure 2
Major Steps in the Restructuring Process

■ – Focus of Manual
■ – Limited Discussion

The six steps are shown in the circular portion of the figure. A management team typically has an “effective start” and a successful conclusion to its restructuring process if it initiates open discussion with the public and expert advisors about the issues creating concern or hardship for the community (e.g., poor water quality). We call these issues “symptoms” because they are the outward signs of more fundamental causes, such as extensive pipe corrosion due to previous neglect. We identified five categories of symptoms¹³ that prompted the restructuring examples or attempts discussed in this report: Peoria and Pekin, Illinois; Indianapolis, Indiana; Sioux City, Iowa; Ann Arbor, Lansing, and Detroit, Michigan; St. Michael, Albertville, and Hanover, Minnesota; Akron and Butler County, Ohio; Hamilton, Ontario; and Milwaukee, Wisconsin.

The second and third steps involve identifying and fully understanding the underlying causes of the symptoms and evaluating a full range of potential solutions. Some management teams have gotten off to a “false start” that led to a very difficult or unsuccessful situation by assuming that they know the problem and the solution — e.g., hiring a private company or taking control of a privately owned system — without going through the first three steps in Figure 2.

Symptoms are the outward signs of more fundamental causes, such as extensive pipe corrosion due to previous neglect.

¹³ The five symptom categories are unsatisfactory service, poor regulatory compliance, insufficient local control, current prices (rates) too high, or projected future prices (rates) that will be too high. They will be discussed in detail in Chapter II.

... some functions, such as water quality standards, must be performed by public agencies.

These steps also involve clarifying the potential roles of the public and private sector and the various levels of government involved. For example, some functions, such as water quality standards, must be performed by public agencies. Typically these are federal- or state-level, but for some water quality standards, such as taste or odor, local government may choose to impose stricter standards or more frequent monitoring requirements, etc. This is not a function that can be performed by private companies. Chapters II, III, and IV discuss the many issues that are best addressed during the first three steps in Figure 2.

The fourth through sixth steps in Figure 2 involve creating the criteria for and using these criteria to select one or more solutions, implementing the solution(s), and periodically evaluating the performance of the system. This report primarily focuses on the first three steps, because our research showed they are often neglected, and refers readers to material already available on the fourth through sixth steps. However, our conclusions include lessons relevant to these steps in restructuring.

One such lesson from the City of Hamilton, Ontario is relevant to our Step 5 (implementation of the chosen solution). The city used a formal process to implement its decision to re-bid an operations contract in 2004. In the first part of the Hamilton process, potential private operators were pre-qualified through site visits of facilities they operate, background reference checks, and so on. Only four of seven companies reviewed in this way were pre-qualified. In the second part, technical proposals were reviewed against requirements stated in advance. One of the four pre-qualified companies failed to submit their technical proposal on time, an automatic disqualification. Another failed to pass the technical review. A third passed the review. The fourth pre-qualified firm chose to withdraw from the process.

Finally, Hamilton opened the sealed financial proposal from the one firm that was pre-qualified, was timely, and scored adequately on the technical proposal evaluation. At that point, the city chose to reject all proposals, because the financial proposal of \$50 million per year was far in excess of the previous contract's annual fees of around \$24 million per year. They felt that negotiating downward from \$50 million would never compete with public operation estimated to cost \$27 million per year, so the negotiations were not worth the effort.¹⁴

Using a highly structured implementation process prevented a political free-for-all when an unanticipated event occurred: the \$50 million bidder attempted to get a court to force the city to negotiate with them. The city argued that doing so would violate the implementation process rules they had established. If they waived the rules in order to negotiate, why not also look at the proposal from the bidder who failed to submit on time? In either case, how would citizens know that corruption was not involved in the change of rules? The Hamilton example demonstrates that an early description of and commitment to a process, the six steps we show and the details within those steps, can prevent a community from becoming polarized and can help the community work through to a successful outcome, even if entirely different than anticipated at the outset

¹⁴ This information was provided by Jim Harnum, Director of Water and Wastewater for the City of Hamilton, in July of 2005. He also reported that the city's annual cost estimate for public operation of \$27 million, made at the time of the decision to undertake public operation in late 2004, had been achieved for the first half of the year.

We represent the restructuring process with a circle because, even after successful restructuring, there is need for continuous improvements and adjustments to avoid another major restructuring in the future. Commonly, restructuring becomes necessary when this sort of a continuous, iterative improvement cycle has broken down and originally small problems have become large ones. The resulting crisis and sense of urgency often leads decisionmakers into the “false start” mistake.

The cyclical process depicted in the figure is embedded within a larger context. State and federal regulatory requirements, for example, can affect every part of the restructuring process. Public hearings and discussions among decisionmakers typically have advance notice and other requirements that will vary by municipality. Some solution options (e.g., design-build contracts) are not legal in some states. Each of these constraints creates a unique context for the six-step process in each community, and the details of the process should be tailored appropriately in order to give the restructuring effort the best chance of succeeding.

Other Guidance Documents

Additional documents offer guidance on privatization and related topics. A full reference list is provided at the end of this manual. Some of the most relevant publications are listed below. We are not endorsing the contents of these publications.

- The Urban Water Council of the US Conference of Mayors has prepared a *Mayor's Guide to Water and Wastewater Partnership Service Agreements* (2005), which includes an excellent discussion of many of the terms and conditions in such agreements, prepared by persons who generally believe that increased private involvement in water systems in the US is desirable. The report is available at <http://www.usmayors.org/uscm/urbanwater/MayorsGuidetoContracts.pdf>.
- Public Citizen (2005) presents an anti-privatization perspective with examples from the US in *Waves of Regret: The Failure of Water Privatization in the US*. This report and others with a similar perspective, but mixed US and international content, are available at <http://www.citizen.org/document>.
- The Water Partnership Council presents a pro-operational contract perspective in two US-focused reports: *An Evaluation of Public-Private Partnerships for Water and Wastewater Systems* (2005) and *Establishing Public-Private Partnerships for Water and Wastewater Systems: A Blueprint for Success* (2003). The 2005 report is a survey with useful information and some limitations (e.g., relatively small sample size and potential for selection bias; that is, the poll did not include terminated partnerships). The 2003 report presents important concerns that have been raised about contracts for operation of publicly owned assets, based on interviews with 30 community leaders and industry experts. Both reports are available at <http://www.waterpartnership.org>.

- Kessler (2004) describes the main rationales for using the private sector to deliver water, sanitation, and electricity services in an international context and evaluates them in theory and practice in *The Pros and Cons of Private Provision of Water and Electricity Service: A Handbook for Evaluating Rationales*. The report is available at http://www.servicesforall.org/html/Services/Water_Electricity_Service.shtml.
- Bakker et al. (2004) provides a general overview of existing public-private arrangements in Canada, evaluates the key drivers and barriers for such arrangements as an instrument for sustainable water management, and summarizes different public-private models applied in Canada and worldwide.
- The Pacific Institute introduced a set of principles for water privatization (Gleick et al., 2002) in *The New Economy of Water: The Risks and Benefits of Globalization and Privatization of Fresh Water*. This report has been widely reviewed and commented on worldwide. The principles are fairly general but provide a starting point for systematic and rational discussion of the conditions under which private involvement in the water sector can be consistent with the overriding public interests that exist in that sector (e.g., public health, equitable access to essential resources, etc.). The report is available through the Pacific Institute Web site at <http://www.pacificinstitute.org>.
- The World Bank (1997) addresses topics ranging from selecting an option for private sector participation to what a privatization arrangement should include, again in an international context. The toolkit assumes that privatization has been chosen as the most appropriate solution option and is strongest with regard to the range of contract options that are available. An updated toolkit is planned for release in late 2005. The draft of the update included an emphasis on stakeholder involvement that was not present in the 1997 toolkit.

CHAPTER II

SYMPTOMS OF UNDER-PERFORMANCE

IN OUR RESEARCH, we identified a few common symptoms of utility under-performance: 1) unsatisfactory service quality or scope, 2) poor regulatory compliance, 3) insufficient local control, 4) current service prices that are too high, and 5) future service prices that are estimated to become too high.

We have chosen the word “symptoms” because they are like what a physician observes when a patient needs medical help. The physician’s job includes diagnosing the cause of the patient’s illness (e.g., an infection causing the swelling) and treating the underlying cause with any of the many therapies available. Chapters III and IV review causes and potential solutions for the symptoms discussed in this chapter.

The report focuses on the symptoms most often leading to restructuring. Ideally, community leaders will work proactively to identify and implement timely, appropriate solutions before symptoms become extreme. The extended timeline (1-4 years) and high cost (many millions of dollars for large municipalities) of restructuring frequently mean that decision-makers waited too long to act. With one exception (Sidebar 2), restructuring does not occur unless a utility system is in serious trouble or looks as if it is.

Sidebar 2: Forced Restructuring

Even if nothing is “broken” per se, restructuring may still be necessary and valuable. An external event or the expiration of a contract may force a community to consider restructuring.

In Indianapolis, the private water company’s parent company was required by the courts to sell their Indianapolis assets to maintain competitiveness after a proposed merger. Indianapolis had the choice of not acting—thereby allowing another company to purchase the assets—or purchasing the assets. Indianapolis chose to purchase the system assets and hired a private operator.

Some communities are legally required to solicit bids or proposals when a contract of a specified type or size expires. The area around Sioux City, Iowa (Siouxland) recently faced this choice. Although the previous contractor’s services and fees had been reasonable, the community decided to investigate other contractors and a new, expanded scope of services. Similarly, Hamilton, Ontario solicited proposals for operation and management of public assets from private contractors in 2004 because their previous contract term was ending. Surprisingly, for financial and process integrity reasons, they ended up returning management and operations to public forces, a decision that was prompted by external events rather than a problem with the previous structure.

Table 2
Details for Upper Midwest
Examples in Manual
(Continued on Next Page)

- 1 “W” means water and “WW” means wastewater.
- 2 Siouxland includes Sioux City and Sergeant Bluff, Iowa; North Sioux City and Dakota Dunes, South Dakota; and South Sioux City, Nebraska.

Table 2 summarizes the examples used in the remainder of the report. The table lists each example by location, the number of people served by a utility, the current type of service and who operates that service, and the type of restructuring. We have also provided what we argue are the primary drivers of restructuring, based on interviews and other case study materials.

City, State (or Province)	Number Served	Service (Contractor) ¹	Restructuring (Dates)	Primary Driver(s) of Restructuring
Pekin, IL	~34,000	W (Illinois-American Water)	City proposal to condemn and purchase local private system under litigation.	1) service quality and 3) local control
		WW (United Water)	Contracted for private operation (1993) and extended for two years (2003).	4) current and 5) future rates
Peoria, IL	~100,000	W (Illinois-American Water)	City litigated to enforce contractual right to repurchase system sold by city in 1889. Has chosen to not repurchase now.	3) local control

City, State (or Province)	Number Served	Service (Contractor) ¹	Restructuring (Dates)	Primary Driver(s) of Restructuring
Indianapolis, IN	~1.1 M	W (Veolia)	Municipalized assets, then contracted for operation (2002).	4) current and 5) future rates; also, external events
		WW (United Water)	Management contract for operations (1993) and collection (1996). Renewed 10-year contract (1998).	4) current and 5) future rates
Siouxland, IA, SD, NE ²	~500,000	WW (American Water Services)	Contracted for private operation (1982). Selected new private contractor (2004).	1) service quality and 5) future rates; also, external events
Ann Arbor, MI	114,000	W, WW (Public)	Consolidated and streamlined W and WW.	4) current and 5) future rates
Detroit, MI	~4.2 M	W, WW (Public)	Significantly upgrading infrastructure and asset management systems.	3) compliance and 5) future rates
Lansing, MI	119,000	W (Public)	Regionalized.	1) service quality and 5) future rates
"Hub and spoke" area project				
Albertville, MN	~5,000	W, WW (Veolia)	Private operation (1996).	1) service quality, 2) compliance,
Hanover, MN	~1,400	W, WW (Veolia)	Expanded to Albertville and Hanover, plus customer service functions (1998).	4) current rates, and 5) future rates
St. Michael, MN	~11,000	W, WW (Veolia)		
Akron, OH	220,000	W, WW (Public)	Reorganized and restructured internally.	4) current rates
Butler County, OH	100,000	W, WW (Public)	Re-engineered key processes.	1) service quality and 3) compliance
Milwaukee Metro. Sewerage District (MMSD), WI	~831,000	WW and Bio-solids Mgmt (United Water)	Management contract for operations (1998).	5) future rates
Hamilton, Ontario	~490,000	W, WW (Public)	Contracted for private operation (1994). Proposals solicited (2004), but operation returned to public (2005).	1) service quality and 5) future rates; also, external events

1. Unsatisfactory Service Quality and Scope

The range and quality of services provided by a water system may be inadequate. In some places, not everyone has access to piped water that is suitable to drink. In other places, wastewater systems overflow with raw sewage during or after storms into streets or other places where they harm habitat or human use of natural features (e.g., beaches on the Great Lakes). Some level of overflows may be acceptable, depending on circumstances. But a service standard or public expectation may exist that is not being satisfied. Similarly, busy intersections that flood during rainfall events typically are not satisfactory to the public and may prompt a demand for better services and restructuring of flood control management if that is necessary for safe travel in the community.

Odor and taste of drinking water were important service-level issues in the Indianapolis drinking water system. Water taste, odor, and color complaints were also important in Atlanta, Georgia, where the water operations contract was eventually terminated after fewer than five years of a 20-year agreement.

Specific service failures need to be documented.

Specific service failures need to be documented. Which services need to be improved? Which customers are dissatisfied, and is the extent of dissatisfaction enough to justify restructuring the entire system? Although most water systems in the US operate reasonably well, in the year 2000 9% of Americans were drinking water that did not fully meet health and safety standards for maximum contaminant levels, and there were more than 1.7 million people whose homes did not have basic indoor plumbing (Gasteyer and Vaswani, undated).

Advocates of contracts for private operators also point out that their customers are mostly satisfied, by noting for example that 91% of the 489 water and wastewater contracts that came up for renewal between 1998 and 2001 were renewed (Water Partnership Council 2003).¹⁵ Service-based customer dissatisfaction that is widespread enough to be the primary driver of restructuring is not common.

2. Poor Regulatory Compliance

Failure to comply with regulatory or other third-party standards has in part prompted a number of privatization efforts. Of course, water customers are unlikely to be satisfied with a system that fails to comply with applicable laws and regulations, so there is some overlap of this category with the previous one. Nonetheless, from the customer perspective, failure to comply with external standards often looks very different from failure to respond to a broken water main in a timely fashion.

The first contract operation of a publicly owned wastewater treatment plant in the US — Burlingame, California in 1972 — was prompted by effluent discharge violations and odor complaints. Gary, Indiana hired a private company to operate the city sewer network, and eventually its treatment facilities, at least in part in response to regulatory violations and a court-approved consent decree specifying remedial actions. Augusta, Georgia hired a private wastewater treatment plant operator in 1999 after being fined \$160,000 by the state for lax enforcement of pre-

¹⁵ About 75% of contracts were renewed by negotiation, 10% renewed by competition, 6% won by a competing company, and approximately 8% taken back into public operation.

treatment standards that apply to industrial facilities that discharge into the sewer system. And more recently, violations of wastewater discharge requirements were a concern in Stockton, California, where the wastewater and water systems and stormwater monitoring program were contracted to a private company in 2003.

3. Insufficient Local Control

The symptoms that lead a community to believe more local control is necessary are complicated and often interrelated with other problems. Water system decisions have broad public consequences beyond direct costs and benefits for customers. Public health is affected by drinking water quality and availability and wastewater system overflows or treatment problems. Transportation and land use are strongly affected by flood control and runoff management services. And environmental and associated values (e.g., fishing, water contact recreation, etc.) are also strongly dependent on how much water is taken from or discharged into natural water bodies.

Some people believe for these reasons that private companies should have no involvement with water systems other than as suppliers to public enterprises. Other people believe that public regulation of privately owned water companies adequately protects (or should protect) the public interest. We find this most often true when regulators or contract compliance staff are empowered by consistent and clear regulations or contract specifications that are readily enforceable.

In some cases, a community has decided to pursue more direct, local control of water-related decisions. Strategies for greater local control include municipalization, as was proposed by separate actions in both Peoria and Pekin, Illinois. Increased local control could involve purchase of assets, such as took place in Indianapolis, but with subsequent operation by a private contractor (Sidebar 2). It could also be a return to public operation after ten years of private management, as took place in Hamilton, Ontario earlier this year.

Even if individual service quality problems have been addressed, people may continue to believe that there is inadequate service responsiveness overall. Or even if third-party requirements (such as environmental regulations) are being satisfied, the community may also value the flow regime (or water quality) of local water bodies from which raw water is taken (or into which wastewater is discharged). A city dependent on fishing or tourism would be understandably concerned by sewer system overflows, even if those overflows were below regulatory thresholds for reporting or remedial action.

Local control concerns are often related to rates. Local governments that own water system assets and operate them with their own employees or through contracts have complete authority over rates as well as costs and tracking systems. When local governments do not own water system assets, rate regulation usually takes place at the state level, and local governments can only comment on proposed rate increases. In Michigan and Minnesota, where significant private water and wastewater systems are rare, state government does not economically regulate private water

Water system decisions have broad public consequences beyond direct costs and benefits for customers.

companies. Although the lack of state oversight potentially increases local control over private utilities, the need for local supervision creates a demand for economic regulatory skills that most small communities do not have. These communities may prefer to control assets and costs directly through public operations. The Citizen's Network for Essential Services (CNES) developed a set of regulatory principles for communities attempting to deal with privatization, available at <http://www.servicesforall.org/html/water>.

In some cases, especially in smaller systems, state agency economic review is comparative in character and does not provide detailed breakdowns of actual costs in the concerned community. It can understandably be frustrating to find that local rates are higher than in neighboring communities, but not extraordinarily so, without knowing why they are somewhat higher (e.g., valid cost reasons or excessive profit). Similarly, it may be frustrating to have to negotiate changes in service with a private company that neighboring communities have direct control over.

4. Current Service Prices Too High

In the heat of ideological debates about private versus public water management, available objective tools often go unused.

A desire to reduce the price or cost of service — and thereby reduce or control the financial burden on customers — has motivated many restructuring efforts. Fortunately, there are objective standards that can be used to evaluate prices and costs. One can compare prices with similar communities, although no two communities make a perfect comparison. Many of the state economic regulators listed in Appendix B provide comparative price data on their Web sites. One can also assess whether costs are reasonable for the services delivered. Again, state regulators may be able to help, or engineering firms or municipal utilities may be available to help benchmark utility costs. In any event, there are objective tools available that are all too often not used in the heat of ideological debates about private versus public water management.

A very common claim associated with the current cost of service is that employees are not working very hard. One can attempt to assess this by calculating various performance measures, such as the amount of wastewater treated per wastewater treatment plant employee, or the length or surface area of streets monitored per employee in a stormwater quality program, and comparing these measures with performance in similar communities. One can also compare lost workdays per employee per year reported to the US Occupational Safety and Health Administration (OSHA) or the training hours per employee per year in order to see whether investments in employee training are reasonable relative to best practice communities or if those investments are paying off in the form of superlative safety performance.

Although objective indicators of prices and cost factors can and should be calculated, this symptom (prices too high) also includes subjective judgments that customers are paying a) more for services than they are worth or b) more than they can afford. Worth and affordability are not objectively defined. The information below helps to discuss these topics productively. Figure 3 represents perceived worth (perceived value) versus price and cost. Community members and leaders need to think about the relative size of these three items as they develop their opinions about

whether the price of water services is reasonable or not. For example, the MMSD has invested \$2.2 billion since 1993 in order to reduce combined sewer overflows from an average of 50+ times per year to an average of 2-3 times per year (Grzezinski, personal communication, 2005). Nonetheless, the public seems to believe that any overflow represents a failure. But the cost of eliminating all overflows may be far beyond the public's willingness to pay—a question that apparently has not been asked of the public and might dramatically change their perception of the value of overflow reduction work performed to date.

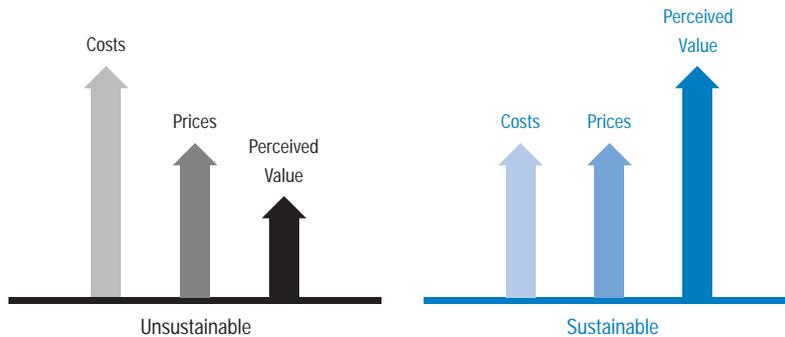


Figure 3
The Role of Perceived Value
(Perceived Worth)

Source: Moss et al. (2003)

The graphic at the left shows an unsustainable situation — all too common in the less-developed world and some parts of the US — where the prices customers pay are inadequate to cover costs, and customers nonetheless believe they are paying too much. A vicious downward spiral characterizes many poorly managed water systems. In this situation, maintenance is deferred and eventually the system fails because revenue was inadequate to sustain the system. In turn, customers perceive the system as being of poor quality and do not want to pay for it. The graphic at the right shows a sustainable situation in which the prices customers pay are adequate to cover costs and customers realize that the value of services delivered is even higher than the price they are paying.¹⁶ One characteristic of a well-managed system is that perceived value is greater than both prices and costs. In some cases, the perception that current prices are too high is a problem of perception rather than an objective statement about costs or prices relative to other communities.

One characteristic of a well-managed system is that perceived value is greater than both prices and costs.

The second subjective judgment that is intertwined with these issues is whether current prices are affordable. What is affordable is most often defined relative to customer income but can be defined in other ways (e.g., relative to the tax or bond financing capacity of a community). The SDWA amendments of 1996 created the possibility of exemptions from the drinking water standards for small communities (fewer than 10,000 persons) based on state-defined affordability thresholds. Searching the word “affordability” at <http://www.epa.gov> leads to a wealth of information on this topic.

A common affordability threshold is 2% of household income. If the annual sum of water and wastewater charges is less than this amount, water and wastewater services are labeled affordable. Defined on a community basis, a common threshold is 2% of **median** household income. If

¹⁶ The value of a purchase to a buyer is typically more than the price paid for it. Consider how many of your purchases you would have made even if the price had been a little more. Economists call the value greater than the price paid “consumer surplus.”

total community spending for water and wastewater services is less than this level, the services are considered affordable for the community as a whole. Of course, subsidized rates might be necessary for some lower-income households, but higher-income households may be able to support those subsidies without exceeding the household affordability threshold for the community as a whole. There are many other definitions in use, including some that specifically exclude urban areas in an attempt to identify the most financially pressed small and rural communities.

Using these standards, most US households can afford water and wastewater services at current prices.¹⁷ The Bureau of Labor Statistics consumer expenditure survey (CEX) includes data on the percent of income spent for a wide variety of goods and services. One category is “water and other public services,” which includes water, wastewater, and other sanitation services like solid waste removal or street sweeping. Data from the survey can be looked at in a variety of ways, including by region and by income quintile (i.e., lowest 20% through highest 20%). Tables 45 and 52 of the 2003 survey (available at <http://www.bls.gov/ce/home.htm>) show 0.8% of income nationwide spent for water and other public services. Table 52 provides the regional breakdown: 0.5% in the East, 0.8% in the Midwest, 0.9% in the South, and 0.9% in the West. Table 45 shows the breakdown by income quintile: 1.0% in the lowest, 0.9% in the 2nd and 3rd quintiles, 0.8% in the 4th quintile, and 0.6% in the highest quintile.

Our point is that people who claim that existing rates are not affordable should be required to explain what threshold they are thinking of ...

If the 2% threshold were gospel, rates would need to double before they became unaffordable for the lowest income quintile. However, the 2% threshold is a matter of opinion. Our point is that people who claim that existing rates are not affordable should be required to explain what threshold they are thinking of, and for whom they think rates are unaffordable (e.g., lowest-income families, median family, etc.). How many households or businesses are affected in the community? Only by developing such numbers can one later judge whether a solution option is working or not. Local, customer-specific analysis is needed. For example, the Rural Community Assistance Partnership has documented that rural residents pay on average, as a percentage of income, three times as much as urban residents. Even more worrisome are those households living near the poverty line (say, less than \$10,000 per year) and paying 8.4% or more of income for water and wastewater services (Robin, 2005).

5. Future Service Prices Too High

Even if current prices are reasonable and affordable, estimated future prices may seem too high. This is one of the most difficult categories of symptoms because it involves uncertain price forecasts and subjective opinions about affordability. Transparent and thorough breakdowns of financial forecasts — especially when the projections contrast sharply with a community’s desired outcomes — into future costs, prices, and affordability by customer class are very important for three reasons.

First, such detail allows the community to evaluate and communicate the true merits of the problem. Not everyone is willing to trust experts who

¹⁷ That most people are well-fed is no consolation to the hungry. Despite the statistics presented in the text, significant numbers of Americans in the lowest income quintile (20%), especially in rural areas, do face affordability problems. McCarthy et al. (2004) found that affordability was an issue for 13% of the urban population but 33% of the rural population in a sample of 384 villages and cities in Ohio, using data from Ohio EPA and the 2000 Census.

say, “Rates will rise 300% unless we do X or Y.” Without widespread belief that the problem is real and must be addressed, sooner or later those who do not want change can derail the restructuring process. And there is often at least one powerful group that does not want change.

Second, if the desired outcome is control of future price increases, what level of control will be considered a success? Would a doubling of rates be acceptable? What can the community or its most financially vulnerable members afford? What are the benefits that will be received from new facilities or services? If some people consider removing arsenic from drinking water unaffordable, do they fully understand the costs of the diseases and ailments associated with drinking too much arsenic?

Perhaps the community is willing to pay much more for new facilities if new services are also provided. Sidebar 3 presents an example from Thailand that demonstrates the importance of comparing the value of services with their price, instead of focusing on price alone. Clearly, Thailand and the focus area of this study are very different, but as the story illustrates, people act like people everywhere.

Understanding *why* prices will rise dramatically helps one identify the best solution.

Sidebar 3: Willingness to Pay for What?

A water supply project in northeast Thailand was intended to provide clean drinking water at the lowest possible cost, because people in the area were poor. Because groundwater is abundant in the region, the technology chosen was hand pumps. After about five years most of the hand pumps were not working. In a follow-up phase, motor pumps provided water to community standpipes. Again, the project failed. Five years after implementation, 50% of the systems were not working at all and another 25% operated intermittently.

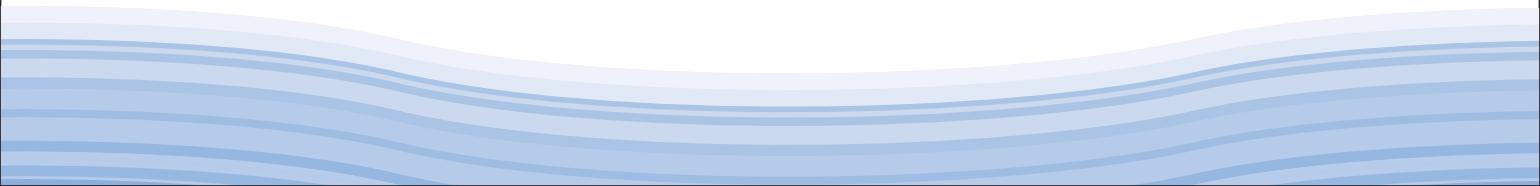
The failures were attributed to technologies that were too complex to maintain and to the inability of villagers to pay for improved water supplies. Gradually, however, it became apparent that the main problem was not the capabilities of the villagers but the fact that the service being offered

was not what they wanted. They did not want hand pumps, which were not considered an improvement over the traditional rope-and-bucket system. And standpipes, being no closer than traditional sources, also did not offer much benefit. Only piped water to yard taps could meet people's aspirations.

In the next project, yard taps were allowed, with the users paying the full costs of connections. Five years later the verdict was in: 90% of the systems were functioning reliably, 80% of the people were served by yard taps, meters had been installed, and locally adapted charging systems had been developed. Not only were the systems well maintained, but because the service was so popular, many systems had extended distribution lines to previously un-served areas (World Bank, 1992).

Third, understanding *why* prices will rise dramatically helps one identify the best solution among the options. Very different solutions are appropriate if price increases will result from a loss of subsidies rather than a real increase in costs. For example, most people are unaware that wastewater treatment plants built in the 1970s and 1980s had 87.5% of their costs paid for by federal and state grants, allowing artificially low sewer rates for customers across the country. If costs are not changing, but who

is going to pay will change, public education and information will be potential solutions. And if costs are truly rising, increases due to high construction costs have different solutions from increases due to high financing costs. High construction costs might be addressed by using a design-build (DB) approach rather than the traditional design-bid-build (DBB) approach. But if financing were the problem, federal or state assistance via revolving loan funds or other programs would be appropriate.



CHAPTER III

CAUSES OF UNDER-PERFORMANCE

EACH OF THE SYMPTOMS in Chapter II can have one or more causes. In this chapter we describe five of the most important causes of poorly performing water systems: 1) inefficient staffing, 2) insufficient funds, 3) poor asset management, 4) ineffective performance measurement and reward, and 5) limited transparency and stakeholder participation. We mention examples of these but do not provide much information about the examples until solutions to the problems are presented in Chapter IV.

1. Inefficient Staffing

Inadequate skills are a significant cause of problems in small communities, because small operations cannot support large staffs. Water management involves a wide range of specialized skills, and new applications of those skills are required over time.

For example, engineers experienced in traditional runoff control often do not know how to design or implement low-impact development techniques like grass-lined swales and bio-retention cells. Similarly, water supply engineers often do not know how to design or implement a successful water-use efficiency program. Water-use efficiency improvements often take place on the customer side of the meter, and a utility's engineers may not have the skill set to manage these interactions.

Private companies often claim to have superior management skills in one or both of the following areas: design-build (DB) construction projects and ongoing operations. The first claim is not difficult to imagine. Such skills are often located in the private sector. Few municipalities have a

stream of construction projects constant or large enough retain top design and construction management talent.

The second claim is more complicated. Private companies replacing a public operation often retain existing line-level staff and bring in only top managers or specialists in specific areas (e.g., instrumentation). In concept, there is no reason that public entities cannot hire top managers or specialists directly—so long as they are large enough—if inadequate skills in these categories are the key cause of the symptoms that are prompting a restructuring.

In practice, though, public managers often work in a different context from one that they would face if employed by a private company. In practice, there are many reasons that a public utility may suffer from excessive staff or staff with the wrong skills. For example, civil service rules, political interference from above, or non-cooperation from those below may prevent a skilled public manager who knows staffing levels are too high from reducing those levels. Without strong support from top managers or elected officials, they may not be able to use their knowledge and skill to develop greater workforce productivity.

Inefficient staffing—whether too many or the wrong types of staff—can lead to any of the symptoms in Chapter II. A technically competent wastewater treatment plant supervisor may not know how to work with the public to resolve odor problems, resulting in customer dissatisfaction. A water supply manager may know how to fix broken or leaky pipes but not know how to do so under busy city streets in the most efficient way, causing current prices to be too high. A city manager or city council might not have the skills (or courage, but that is another matter) to persuade the community that a rate increase to pay for maintenance of underground pipes will actually cost the community less in the long run than low rates today and more frequent pipe problems later.

Even the largest public or private companies do not employ top experts on staff for every potential issue. Consultants are used when necessary, and staff is trained in new issue areas as they emerge. Well-run organizations understand their own competence and limitations and bring in outsiders or invest in their staff as appropriate. This is why a recent American Water Works Association document on performance indicators (Crotty, 2004) includes organizational development as one of five categories of indicators,¹⁸ and training hours per employee as a specific indicator within that category.

Of course it is true that a large private company may have skills and capabilities in-house that a small community does not have, making a relationship with that company an effective choice for solving a problem caused by inadequate skills. But a small private company might not have the skills or capabilities needed, so it is not the private character of the company that solves the problem, it is the capabilities of that company. Nor is the size of the company always the key. Small companies sometimes have more expertise in a topic than a larger competitor, or their staff may be more available than those of a larger company.

Well-run organizations understand their own competence and limitations and bring in outsiders or invest in their staff as appropriate.

¹⁸ The other four are customer relations, business planning and management, wastewater operations, and water operations.

2. Insufficient Funds

Financial constraints are a common cause of numerous problems; however, the likelihood of such constraints will depend on local circumstances. City or county departments depending on general fund support are often more financially limited than enterprise-funded utilities (e.g., supported by water or sewer user charges). Consequently, initiatives requiring city or county department resources such as more-stringent runoff management regulations may be relatively more difficult to implement.

That said, situations certainly exist where the opposite is true. An enterprise-funded operation may have no increase in revenues annually, while tax revenue may rise with property valuations. In some communities, the loss of a major utility customer may have a larger impact on an enterprise-funded utility than on overall tax revenues. It should also not be lost that, in the absence of a growing customer base, the ONLY way a utility can assure an increase in revenue from customers is through community support for a rate increase.

When financial resources really are insufficient and community support for rate increases is not forthcoming, grant funding and regulatory relief are the only solutions.¹⁹ Neither public nor private utilities can print money. Both, however, have mechanisms for raising investment capital. In the US, private investment capital is unambiguously more expensive than money raised through municipal revenue or general obligation bonds (NRC, 2002), so private financing will not solve this problem (in some states, private firms may be able to help secure state or federal grant funds).

On the other hand, claims of inability to pay or non-affordability are often exaggerated. As noted in the discussion of symptoms, these claims deserve careful examination. There may not be a financial resource problem. Instead, there may be a communications or incentive problem (see the discussion of performance measures and rewards in Chapter IV). This is true whether utility operations are public or private.

Similarly, the estimated cost of new facilities may be higher than is really necessary. For example, upgrading a new drinking water treatment plant might break the bank, while installing high-quality water filtration or reverse osmosis units in every building in town would not. A lack of planning cost-estimating skills or a lack of engineering knowledge and experience at the regulatory level may be the critical limitation rather than financial limits. Decentralized wastewater was prohibited as an option for years in Ohio because the regulators did not know how to ensure those kinds of systems worked properly. Only after the Rural Community Assistance Partnership (RCAP) and other community interests formed a working group with the regulators to work through the technology concerns did the state begin to permit these less-expensive wastewater management options (Gasteyer, 2005).

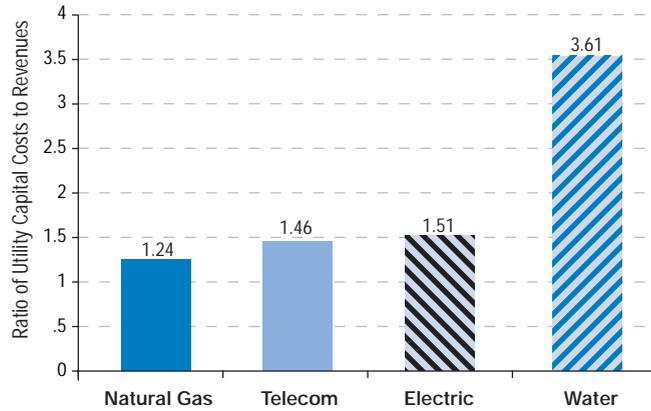
¹⁹ As described in Chapter IV, the Federal Safe Drinking Water Act amendments of 1996 create an exemption procedure for small communities that cannot afford to comply and that implement an approved alternative approach to public health protection.

3. Poor Asset Management

Water-related services are capital-intensive compared to electric, natural gas, and telecommunications in the United States — see Figure 4 (NRC, 2002). Measured by the ratio of net utility plant capital costs to annual operating revenues, water utilities are more than twice as capital-intensive as the second-most capital-intensive utility sector evaluated (electricity) and nearly three times as capital-intensive as the least capital-intensive utility evaluated (natural gas).

Figure 4
Capital Intensity of Major Utilities
in the United States

Source: Adapted from Table 5-1, NRC (2002)



Operating Revenue (\$B)	62.6	113.2	217.8	2.8
Net Plant Capital (\$B)	77.7	165.8	328.2	10.1
Ratio of Plant Capital to Revenue (\$B)	1.24	1.46	1.51	3.61

Many water assets — pipelines and stormwater culverts— are underground, where it is easier to neglect their maintenance than more visible, above-ground assets. Underground assets also have long lives, typically in excess of 50 years and sometimes as long as 100 years. Generations of customers and their elected representatives can defer maintenance and be long gone before pipes begin to break, collapse, discolor water, or create other symptoms that cannot be ignored. Typically, asset management is framed in terms of structural failure (e.g., reliability and catastrophe). An equally critical measure is the service delivery quality. Having perfectly reliable (100%) service at less than acceptable quality (e.g., rust or cloudiness caused by decaying pipes) is not effective asset management.

Concerns over the condition of municipal assets led, in part, to General Accounting Standards Board (GASB) Rule 34. This rule requires communities to inventory, capitalize, and depreciate fixed assets.²⁰ While the rule was not necessarily hard to comply with for some public water and wastewater utilities, especially those that have historically been operated as enterprise funds (separate from general funds), the rule has created new burdens and new understanding for government units that have either not tracked these asset values in the past or lumped all fixed assets (water and non-water) together in a single accounting category.

²⁰ Public entities can avoid assigning capital and annual depreciation values to assets if they implement an optional “modified approach” that includes an asset management system which 1) contains an up-to-date inventory of assets, 2) performs conditions assessments of assets and summarizes the results using a measurement scale, and 3) annually estimates the cost to maintain assets at a condition level established by the public entity.

Many people think the primary consequence of poor asset management is a high revenue requirement to offset escalating maintenance costs. This is a serious problem, but poor asset management also leads to the other symptoms in Chapter II: customer dissatisfaction, failure to comply with third-party requirements, and concerns about the adequacy of local control. Poorly managed pipes and pumps can fail suddenly at particularly bad times (e.g., a water pipe that bursts in front of a busy store during holiday shopping, or a culvert failure that floods a busy intersection). Effective asset management systems (see Chapter IV) base maintenance decisions not just on the direct cost of asset maintenance but also on an assessment of indirect, consequence-related costs.

Poor asset management can cause a water system to violate drinking water or wastewater discharge standards. Even the most skilled operators cannot reliably perform when the equipment they depend on is poorly maintained or is not the right equipment for the challenges they face. The Atlanta water system contract that was terminated prematurely did not address the pre-existing condition of assets adequately, leading to complaints about the color of the water, response time for repairing leaks, significant costs for responding to those complaints, and, ultimately, a dispute about who was responsible for those costs. In Atlanta, there was no clear, pre-agreed-upon answer to when a pipe needed to be replaced at municipal expense and when the pipe should be maintained, perhaps repeatedly, at private expense.

Asset-related service problems in a privately owned utility often prompt local government to want to control investments and their maintenance. But even when the public owns system assets, control over their condition in an operational contract is complicated. For this reason, some people believe that public ownership and operation provides greater local control. After all, if private companies neither own nor operate assets, whatever level of control exists is in public hands. But if an effective asset management system is not in place, any water system owner has less control over customer satisfaction, third-party compliance, and current and future costs of service than they imagine that they do. Inadequate asset management by a public agency can lead, in practice, to a low level of control over service quality, regulatory compliance, and ultimately, costs and prices.

If an effective asset management system is not in place, any water system owner has less control than they imagine.

4. Ineffective Performance Measurement and Reward

Most utilities deliver the basic services specified in their charter. Surprisingly often, utilities do not have clearly specified indicators or standards to describe or guide performance. For example, a wastewater treatment plant may have occasional odor complaints from neighbors. If a utility does not track the number, dates, and times of complaints it cannot calculate a baseline for historical levels of odor performance. Even when the data do exist, an associated performance standard might have been specified (for example, “no more than seven odor complaints per year”).

There are many cases in which the precise size of a facility or the number of workers needed to operate a facility is a matter of judgment. The

financial systems that overlay facility sizing and operational decisions like these create incentives that can have perverse impacts on the efficiency of performance. Simply changing from public to private or private to public might not solve the performance problem, or it might lead to a different but equally harmful performance problem. Several financial structures exist for public and private firms, and the key is to establish structures and performance mechanisms that reward behavior consistent with the long-term objectives of the community.

Public operators are rarely rewarded for controlling costs but are punished if services are not satisfactory. Their incentive, most of the time, is to err on the side of spending more rather than less.

A private operator under a fixed-fee contract with an annual escalator to account for inflation has the opposite incentive. Cutting costs directly increases profits or makes a reserve available to respond to unforeseen expenses without reducing profits. The incentive is to err on the side of spending less rather than more. Yet consistently spending less on a quarterly or short-term basis may not, in fact, lead to the lowest long-term costs.

A private utility under rate-of-return regulation—like many energy utilities in the US—has different incentives. If the rate of return on invested capital is guaranteed, the incentive is to invest capital. Capital-intensive solutions are pursued rather than labor-intensive ones, such as purchasing new pumps when labor-intensive overhaul of the old ones would be less expensive.

Sometimes operational costs are a straight pass-through, so there is no financial reward for cutting costs. If a cost-plus approach is used, a percentage level of profit is typically allowed on all expenses, so an incentive exists to overspend on both capital and expenses. The cost-plus approach (sometimes called the “operating ratio” approach) to regulating private companies has the same incentive problem as a public utility—a tendency to play it safe and spend more.

Non-financial and indirect financial incentives also exist. Private water companies have an incentive to keep their customers happy, even if that costs them money at times, because complaints hurt their reputation. The influence of such customer feedback can also apply to public agencies if they are publicly compared with comparable agencies.

Elected officials are typically reluctant to raise rates because voters tend to punish those who do. But there are able leaders who have convinced voters that paying more now was well worth the effort. The officials of the Milwaukee Metropolitan Sewerage District, for example, have convinced their customers to invest \$2.2 billion plus interest in sewers and treatment facilities to control combined sewer overflows (CSOs). Opposition to rate increases is much weaker when the public can be shown performance statistics that demonstrate that previous rate increases were well spent, yielding measurable benefits.

5. Limited Transparency and Public Participation

A decisionmaker or politically active group may initiate a discussion about restructuring for ideological reasons. A city council member may believe that private sector participation will increase efficiency, without being completely clear about what type of efficiency improvements will occur (e.g., labor resources, capital spending, etc.). Similarly, there are local leaders who have led efforts to buy out or prevent private companies from having any involvement in local water management because they believe that the profit motive is harmful or too hard to control in the water sector.²¹ Everyone is entitled to their opinion, and our point here is not about these or other opinions per se.

While ideology and values certainly have their place in municipal decisionmaking, our point is that there are strongly held beliefs by some players in the water sector that may limit the necessary fact-finding and open discussion necessary to achieve success. Conflicts between those who hold these beliefs are a common cause of the symptoms in Chapter II. *Unless a majority of moderately inclined decisionmakers insist that the facts be respected, and differences of opinion investigated thoughtfully, real solutions will not be found.* Instead, lengthy and costly political and legal battles will occur that are peripheral to solving the real problems.

The recent privatization dispute in Stockton, California exhibited this pattern. The initial rationale for privatization was three-fold: failure to fully comply with wastewater discharge requirements, current prices that were perceived by some as too high, and the mayor's strong ideological belief that private entities are more efficient than public ones. After several years of effort, the city council decided on a 4-3 vote to approve an operational contract without California Environmental Quality Act (CEQA) review. Although many hours of public hearings were held just prior to the decision, they were held too late and with too many restrictions to effectively engage the public or to make transparent the connections between symptoms, causes, and the particular solution proposed. The council decision was made only a few weeks before a citywide measure was voted upon that would have required citizen approval of large city contracts. After the council approval and the passage of the measure sponsored by disgruntled citizens, a judge voided the council approved contract because CEQA review had not been performed. Operation had already been transferred to private hands, where it still resides, but a series of appeals are in process.

On a parallel track, the cost of city operations fell significantly during the several years Stockton took to explore and develop an operations contract. By the time the contract was approved, the cost of public operation had fallen significantly. And if the opponents of privatization prevail in court, the city will be forced to take back operation of the system, an expensive action. Even if the city prevails, large sums of money are being spent on the legal action, and the contractor's ability to proceed with facility improvements that will improve wastewater quality has been hampered. In all, the unresolved conflict between stakeholder groups in Stockton is slowing or preventing the initial symptoms from being cured. Indeed, perhaps the situation is worse than in the beginning, since the future of the Stockton system is now in the hands of a judge.

²¹ For example: "Why does somebody need to make money on your water?" said Dick Hierstein, city manager of Pekin, IL, which wants to buy back its water system from Illinois American Water. "Does somebody need to make money off the air you breathe? It is as simple as that."

Limited transparency and stakeholder participation create a decisionmaking environment within which corruption is hard to identify.

Limited transparency and stakeholder participation also create a decision-making environment within which corruption is hard to identify. The US has relatively low levels of corruption by international standards, but it is most certainly not absent. Public officials have voted for projects or contracts that were not in the public interest but instead created profits for friends or illegal payments or kickbacks to the officials themselves. Such votes may involve international private companies or just reflect “good old boy” networks. Public Citizen (2005) reports a number of water-related corruption incidents in the US. For example, the mayor of Bridgeport, Connecticut was convicted in US District Court for extortion and bribery in connection with taking kickbacks for steering a city contract for operation of its wastewater treatment plant to a particular contractor. A related company in New Orleans pleaded guilty to charges of bribery, paying a fine of \$3 million for its actions with regard to a contract for the city’s wastewater sewer services. And the mayor of East Cleveland, Ohio was indicted in US District Court in April 2004 for, among other things, taking payoffs disguised as consulting fees from a vendor who was seeking to operate the city’s water department.

Corruption can cause any of the symptoms described in Chapter II. Even when corruption is not present, lack of transparency in decisionmaking often leads to accusations of corruption. These accusations in turn can polarize a community and increase the likelihood that conflict-resolution mechanisms will fail in a way that has significant costs.

For example, the decision by the Lawrence, Indiana City Council in 2001 to give control of the city’s waterworks to a newly formed company, Lawrence Utilities LLC, for up to 50 years in a no-bid contract certainly supports the appearance of corruption. Mayor Deborah Cantwell, who was elected in 2003 against the 16-year incumbent mayor who supported the contract, claims that corruption was involved and that Lawrence Utilities has paid \$4 million in consulting contracts to companies controlled by former city workers and has used a web of companies to pay for personal real estate deals. The community and city council are deeply divided over the situation. The FBI is investigating the no-bid contract and other municipal financial dealings under the former mayor (Indianapolis Star, 2004). Whether wrongdoing occurred or not, the city and citizens of Lawrence are incurring significant costs and are distracted from solving the real water sector problems they face.

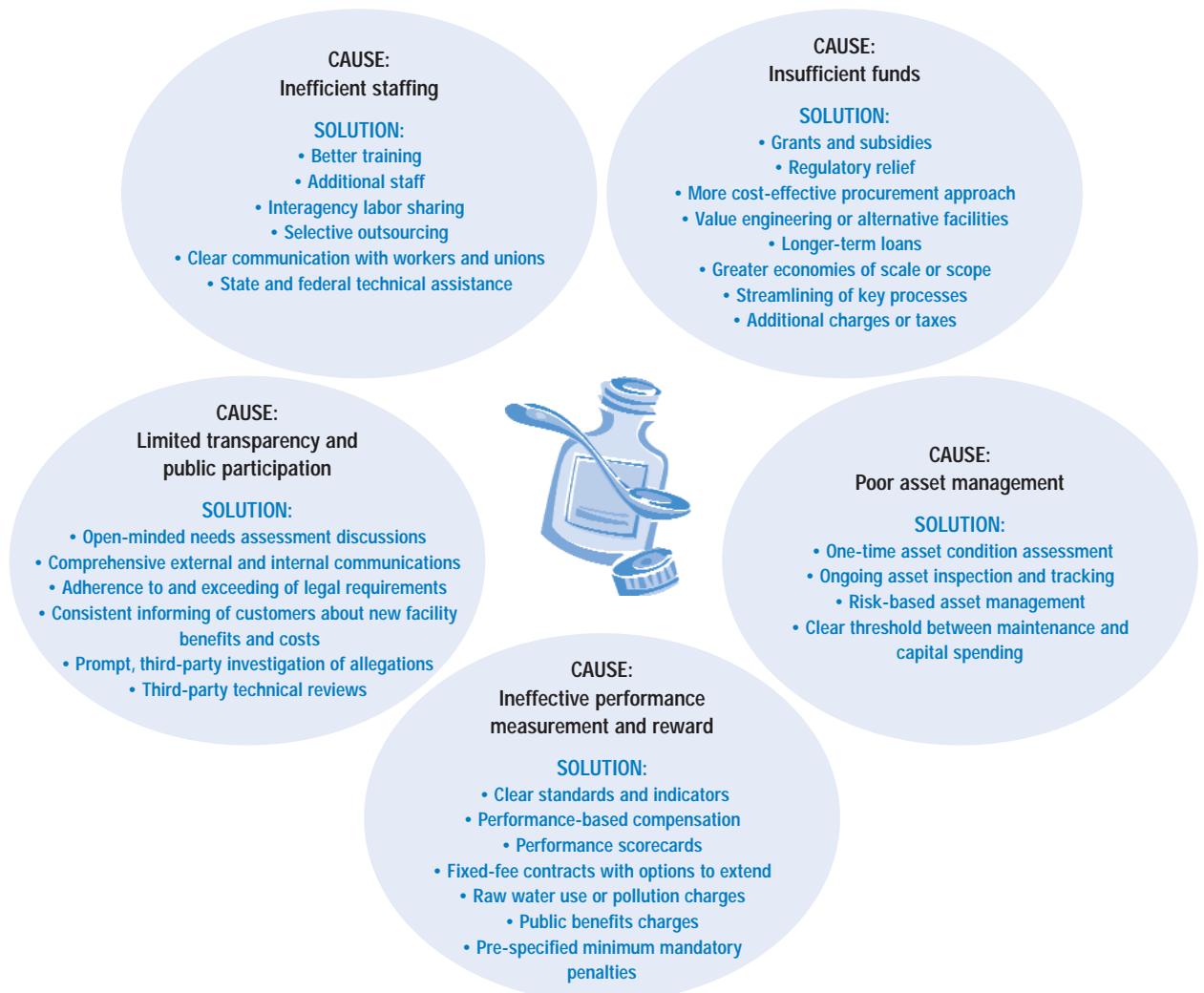
By contrast, the City of Hamilton, Ontario made decisions in 2004 described in Chapter IV that prevented even the appearance of corruption during a contentious decisionmaking process. Whether citizens of Hamilton agree with the Council decision or not, they avoided the complications and expenses described in the negative examples above.

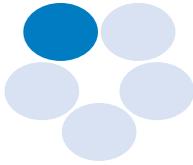
CHAPTER IV

SOLUTIONS TO IMPROVE PERFORMANCE

IN THIS CHAPTER, we outline a range of solutions to the causes of problems described in Chapter III. Most but not all options apply to both public and private utilities. Figure 5 is a guide to the chapter, which does not need to be read sequentially.

Figure 5
Guide to Solution Options





Solutions for Inefficient Staffing

The first two solutions we discuss, better training and hiring additional staff, both have cost and time tradeoffs. Better training can help existing staff achieve a higher level of performance in existing jobs or learn an entirely new skill, but such training often takes considerable time and resources. Hiring new staff can quickly supply necessary skills; however, such a move may not be affordable for small communities. Selective outsourcing will provide the skills almost immediately. In the short run, the fees associated with outsourcing (e.g., consultants) may seem prohibitive, but such outsourcing does not result in a permanently larger payroll. For qualifying municipalities, state or federally supported technical assistance can provide low-cost assistance with a timeline subject to the resource constraints of the agency. The next few paragraphs provide detail on each of these solutions.

Better Training

Additional staff training may solve a problem without restructuring. Treatment plant operators may be capable of producing high-quality water or effluent under most conditions, but they may fail to do so under more difficult circumstances such as unusually wet weather. Additional training in process control, with or without supplemental process control equipment, may solve this problem. Training appropriately tailored to the management level of the personnel is extremely important. For senior management, many of whom are typically promoted from more technical positions, training may need to specifically focus on skills such as executive leadership that were unnecessary in previous positions.

The Akron Public Utilities Bureau in Northeast Ohio was able to reduce their headcount and improve performance through better training. In 1997 the Bureau had the highest water rates and the second-highest sewer rates in the state for like-sized utilities. Based on a competitive gap analysis, the Bureau established a goal of reducing the number of employees from 508 in 1997 to 351 by year-end 2003. The Bureau’s strategy was to rely on attrition to downsize the workforce, eliminate work silos, and implement a flexible worker concept. These techniques are often used by private operators when they contract to run a previously public operation but must retain the existing workforce.

The Bureau purposefully did not use employment buyouts, because the utility wanted to keep the knowledge and skill of experienced employees (Monteith, 2005). In a successful pilot, the Bureau found they had to increase training hours significantly, as summarized in Table 3.

Table 3
Akron Public Utilities Bureau
Training Hours During Pilot

Source: Monteith, 2005

Year	Hours of Training	Employees	% Total Staff Hours
2001	<500	75	<0.4
2002	3054	69	2.4
2003	3777	62	3.3
2004	3945	61	3.5 (est.)

The Bureau did take some missteps, learning through trial and error the importance of training tailored to employees and their jobs. After an initial and relatively unsuccessful approach to training in which employees learned a wide range of skills, the Bureau focused training on more specific areas and with greater sophistication.²² The Bureau also contracted with a local university to provide specialized training and worked closely with it to develop training directly applicable to its work needs.

United Water, the private operator that assumed management of Indianapolis's wastewater facilities, similarly increased employee training opportunities after taking over operations in 1994. The firm created skill enhancement and salary improvement opportunities that in part led to significant reductions in employee grievances and lost-time accidents. Grievances averaged 43 per year from 1991 through 1993 but declined to an average of 2 per year from 1994 through 2001. Lost-time accidents averaged 131 per year from 1991 through 1993 and declined to an average of 25 per year from 1994 through 2001 (Water Partnership Council, 2003).

Additional Staff

Retraining employees is not always the solution, especially when the timeline is tight or the skill needed is highly technical. For municipalities large enough to justify the expense, hiring new staff with specific expertise can be an effective way to close a skill gap. For example, inadequate maintenance of underground assets is a common cause of the fifth symptom: that future rates are projected to be unaffordable. The best solution could be to hire an engineer with significant experience in underground pipe inspection and maintenance as well as asset management systems more generally.

The need for new skills to meet new needs is particularly important when a transition occurs from public to private:

When a public utility's operations are handed over to the private sector, the public agency's importance in running the agency does not diminish, but the way the agency performs its role changes dramatically. For the local government, it becomes a question of contract management versus traditional program management. When a contractor provides the operations, the local government organization's focus is on contract management. The talents and skills needed for contract management are significantly different from the talents and skills needed for traditional operations management (NRC, 2002, p.66).

The Milwaukee Metropolitan Sewerage District's experience is instructive in this regard. They established a multi-person contract compliance group including significant in-house legal resources when they entered into a 10-year contract with United Water in 1998. The group was staffed with the equivalent of 3-4 full-time staff persons. Given that they anticipated saving roughly \$1 million per month by contracting services, the expense of this commitment seemed reasonable.

²² Note that this approach may make sense for larger utilities with more specialized staff. Smaller water systems and utilities, conversely, may find they are in need of more generalized training for employees so that they are prepared to address a wide range of issues.

Using highly qualified staff to oversee the contract is another form of guarantee or insurance with respect to contract performance.

Similarly, in states like Michigan and Minnesota where economic regulation of water does not occur at the state level, local government must be particularly diligent in assuring that they have personnel on staff with the skills to create and manage complicated contractual arrangements. Even in states with state-level economic regulation, additional staff may be justified and should be considered—especially when a private sector contract is created that is claimed to save large sums of money. Using highly qualified staff to oversee the contract is another form of guarantee or insurance with respect to contract performance.

Selective Outsourcing

In general, outsourcing is most useful when either the job does not require a full-time position or the business function is not core to the organization. Some small communities employ civil engineering firms to staff their public works departments. Other organizations identify their core competencies—what the utility does best, such as treating water or fixing main breaks—and selectively outsource all other non-core functions. Consultants and contractors work with core municipal staff to provide all necessary functions (see Sidebar 4). Regulatory compliance reporting is sometimes outsourced. Permanent staff perform water quality sampling and monitoring, but a consultant keeps up to date with relevant laws and handles the regulatory submittals.

Sidebar 4: Water System Functions at the Municipal Scale

1. Capital improvement planning and budgeting
2. Finance of capital improvements
3. Design of capital improvements
4. Construction of capital improvements
5. Operation of facilities
6. Maintenance of facilities
7. Water quality or quantity sampling, analysis, and reporting
8. Pricing or rate decisions
9. Management of billing and revenue collection
10. Management of payments to employees and contractors
11. Ongoing risk management (insurance, etc.)

Adapted from Gleick et al. (2002)

The Butler County Department of Environment Services (BCDES, <http://www.des.butlercountyohio.org>), a public utility in southwestern Ohio serving over 100,000 residents with water and sewer services, used selective outsourcing to control costs and improve its cash flow. In 1995, BCDES had some financial difficulties compounded by disputes with various regulatory agencies and customer and environmental groups. By 2004, BCDES had a sound financial plan, a capital improvement plan with a 10-year horizon, a diverse and well-trained staff, and a communications plan that kept employees and customers well-informed. BCDES outsourced payment processing to banks through a lockbox contract that resulted in faster and more efficient receipt of customer payments. BCDES also outsourced collections from delinquent accounts, which increased collection by nearly 60 percent (Parrott and Young, 2005).

Contracts to operate and maintain public assets, even large ones such as in Indianapolis and Milwaukee, can be thought of as selective outsourcing if only a few of the numerous functions within water systems are covered by the contract. Contracts for outsourced services should specify not just the services in detail, but also the skills or credentials company personnel must have (e.g., certified treatment plant operator grade IV) and in some cases the specific people involved. For example, the contract between the Milwaukee Metropolitan Sewerage District (MMSD) and United Water specifically names the project manager for United Water. The company cannot reassign that person without written approval of MMSD (as actually occurred on November 13, 2000). This condition apparently does not exist in the Indianapolis Water contract with Veolia, and Veolia has been criticized for changes in its management team.

Contracts for outsourced services should specify not just the services in detail, but also the skills or credentials company personnel must have ...

Communicate Clearly With Workers and Unions

The effectiveness of workers depends at least in part on their attitude toward their employer. A critical factor in shaping worker morale is the perception that the employer is (or is not) a straight-talker who will tell you what is going on and will not change stories later. This is important at the time of a restructuring, as well as on an ongoing basis.

Clear communication with workers and unions was part of the Butler County and Akron successes described above. The MMSD was also very clear during its contractual process for wastewater operations, including distribution of a proposed labor contract to be used by the successful contractor. After review and discussion, the unions involved were satisfied their members' interests would be protected.

In the contract for wastewater and collection services in Indianapolis, the local union was similarly and also successfully involved. Steve Quick (personal communication, 2005), president of the American Federation of State, County, and Municipal Employees Local 725, described the relationship between United Water, the city, and the union in the following way:

Initially the union was up in arms about the idea of privatizing wastewater. Eventually, the union decided to put in a bid with the private player, United Water. When United Water won the contract, the transition was seamless — only the location of the admin-

istrative offices was different. The union was involved from the beginning. We could obtain any information needed from the city and the city paid for a consultant to work with us. We also had a joint union management team. The mayor did this right and started working with the union from the very outset. He had the vision for how to work together, talented people on the staff to get the job done, and he invested in building relationships with us.

By contrast, communications between the City of Indianapolis, Veolia, and employees in the water contract (both union and non-union) have been unclear and contentious from the beginning. When the city purchased the private water utility (Ni-Source), the mayor stated in writing (see <http://www.watercompanysuit.com>) that employee benefits would be unchanged. When the city solicited proposals for private operation of the purchased assets, it required that the value of employee benefits be maintained, which is a different standard. It is possible that the proposals from operating companies were not all based on one or the other standard, but were mixed, creating an “apples-to-oranges” comparison of the costs of the proposals. We have been told conflicting stories in interviews.

According to Robert Reed of the National Conference of Firemen and Oilers Local 131 in Indianapolis (personal communication, September 2005), workers find it hard to trust any of the communications they receive from Veolia management or the city because of the problem described above, subsequent dramatic reductions in force (more than 50% loss of Local 131 jobs) and in the value of benefits, numerous changes in management personnel within Veolia since 2002, and the decision of city staff to avoid involvement in labor complaints raised by union members.²³ According to Reed, benefits in a soon-to-be finalized union contract are “in no way equal” to previous benefits, and non-union employees have lost even more. (Another source indicated that the value of benefits is equal to that which prevailed before the restructuring. But there is apparently no agreed-upon method for calculating the value of benefits before and after.) According to Reed, morale is very low, and the skilled people who have made the operation work on a day-to-day basis for up to 30 years are leaving the operation rapidly.

It is extremely important to recognize that the water system restructuring in Indianapolis was *not* from public to private hands. Instead, operations went from private to private hands, and assets went from private to public ownership. Privatization per se was not the cause of the labor problem here; instead, poor communications and an unwillingness of the city to “fight the fires” when they first broke out have caused the situation to become increasingly heated, creating reputational damage for the private contractor and the city and real financial and psychological hardships for the workers.

State or Federally Supported Technical Assistance and Grants and Subsidies

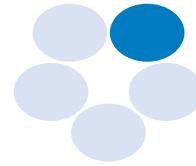
Another alternative is to pursue technical assistance through state and federally supported programs, most of which are available only to smaller communities. The Rural Community Assistance Partnership (RCAP) is an excellent entry point to these programs. RCAP’s work in the upper

²³ The union asked the city to help resolve a series of complaints but was told the city would not “serve as a mediator” between workers and their employer (Veolia). The union had no alternative but to file 17 complaints with the National Labor Relations Board. They prevailed in 14 of those complaints (Robert Reed, personal communication, September 2005). Federal mediation has been required over the last year to bring the current labor contract negotiation to its present status.

Midwest takes place through its partners: Great Lakes RCAP headquartered in Fremont, Ohio (<http://www.glrcap.org>), and Midwest Assistance Program (MAP) in New Prague, Minnesota (<http://www.map.org>). RCAP has field workers who provide technical assistance, training, and financial assistance to small, rural communities throughout the country on water, wastewater, solid waste, source water protection, watershed management, and comprehensive community development and planning. The assistance RCAP provides touches all parts of water systems, including operator training, community water board training, financial management, water systems management, and operations and maintenance. Through this comprehensive approach, RCAP aims to help communities maintain community infrastructure to improve rural quality of life.

Solutions for Insufficient Funds

Two of the solutions discussed in this section, grants and subsidies and regulatory relief, are most applicable to small municipalities. We found that several of the other solutions, including developing a more cost-effective procurement approach, value engineering or using alternative facilities, creating greater economies of scale or scope, and streamlining key processes, are more likely to yield significant returns for larger municipalities. Yet these solutions may take significant time and resources to implement successfully. Given public resistance to raising rates or taxes, we recommend exploring other solutions before choosing to solve funding problems through increased revenues.



Grants and Subsidies

RCAP helps communities to find resources needed for critical water and wastewater improvements. Potential funding sources include the Clean Water and Safe Drinking Water State Revolving Funds that were developed to capitalize improvements in access to and quality of water and sanitation programs, and the United States Department of Agriculture Rural Utilities Service, which provides a combination of loans and grants to rural communities for the same purpose. Additionally, funds are available for infrastructure, including Community Development Block Grants and grants from agencies such as the Indian Health Service. The latter is targeted toward American Indian reservations and tribal communities. Additionally, Great Lakes RCAP and MAP will help communities to access regional EPA resources and state resources available through the state departments of health or environment. Great Lakes RCAP and MAP directly control revolving loan funds that can help communities with small amounts of bridge financing to pay for studies or other requirements necessary to receive larger loans and grants.

Regulatory Relief

The Safe Drinking Water Act (SDWA) amendments of 1996 created the possibility of exemptions from the drinking water standards for small communities (fewer than 10,000 persons) based on state-defined affordability thresholds. Relief is available to public, private, and public-private organizations.

The province of Ontario recently proposed similar regulatory relief. This proposal is in the context of small communities responding to relatively new regulations (Regulation 170) created in the aftermath of the “Walkerton incident” in 2000, where negligence by the public operator of a small water treatment facility led to 7 deaths and 2,300 illnesses from *E. coli* and *Campylobacter jejuni*. Ontario’s environment minister stated in the proposal for new regulations that Regulation 170 often made things worse in small communities by forcing scarce funds to be spent inappropriately. The proposed new rules would create site-specific, risk-based rules overseen by local public health units.

More Cost-effective Procurement Approaches

Some of the savings reported by municipalities who work with private operators are from the use of design-build (DB) contracts for construction rather than the traditional approach of separate design and build contracts. The DB approach has been avoided recently in the US because the designer/builder is not responsible for operation and consequently may make decisions inconsistent with efficient long-term operation, such as using inferior materials. In the US, the design-build-operate (DBO) approach has been used more recently to both reduce these risks and capture potential cost savings.²⁴

In Stockton, California, the successful bidder for a water, wastewater, and stormwater management contract bid \$20 million less than other bidders for expansion of the wastewater treatment plant. The successful bid proposed to use a treatment process that some critics argued would be inadequate. The successful bidder, who had more experience with the proposed system than the city or other bidders, provided financial guarantees for system performance.²⁵

It may be possible to achieve the risk reduction benefit of a DBO approach without actually coupling operations. In September 2003, Veolia Water won a \$14 million DB contract for a new 3.6-million-gallon-per-day (MGD) regional wastewater treatment plant serving the area around Cle Elum, Washington (upper Kittatis County). The project was completed ahead of schedule and on budget. Impressed by this performance, the City Council granted Veolia a 10-year operating contract (Veolia, 2005). A firm’s desire to maintain its reputation and compete for the operations contract may be sufficient, in at least some cases, to motivate high-quality work under a DB contract.

Value Engineering or Alternative Facilities

Developing lower-cost engineering solutions can also lead to significant cost savings. Many rural communities in the US, especially those that have been served historically by septic systems, now need to implement more effective technologies. “Condominial sewers” were created in response to this problem in peri-urban areas of Latin America. Condominial sewer laterals run from house to house to house, eventually joining a trunk sewer under a street. The number and length of laterals and trunk mains can be substantially reduced by this approach, lowering both direct costs to residents for connecting their sewer to the main and maintenance cost by the sewer district. The condominial approach requires collaboration by groups of neighbors, because a clog at any place

24 Using the DBO approach for new facilities does not require existing facilities to be operated privately as well. Those who claim supposed economies of scale by combining new and existing facility operations often do not present credible evidence to support those claims.

25 A financial guarantee of performance does not eliminate the environmental risk involved. The city’s failure to separately address environmental impact should the system fail to perform as guaranteed was part of the rationale for a judge to void the contract.

in the lateral blocks all homes up the lateral. These groups of neighbors must function like a homeowners association that maintains common assets such as an entrance road or pool.

Other creative engineering approaches can also reduce costs. For example, water losses in distribution can be reduced not just through repair of leaking pipes, but by operating at lower pressure some of the time. This can reduce the size of new water supply or potable water treatment plants by getting more end-use out of the existing supply of treated water. It may be possible to reduce wet weather overflows from combined or separate sanitary sewer systems by real-time electronic monitoring of capacity utilization in the pipes. This can reduce the size of new sewers or wastewater treatment plants. Water conservation is often less expensive than new water supply, although many engineering firms that are not experienced in water conservation programs would say otherwise.²⁶ And source water protection to prevent pollutants from entering raw water supplies has been found to be much less expensive than complying with US EPA's filtration requirements²⁷ (from which a waiver can be obtained if source water protection measures are adequate). There is also a significant body of literature about the effectiveness of utilizing riparian buffers to mitigate stormwater runoff, especially in the upper Midwest, where land tends to be relatively inexpensive and the ecology lends itself to reconstructing wetlands.

Capital costs can also be analyzed into essential and non-essential components and scheduled to occur over time in ways that allow deferral of some spending if growth or other needs develop more slowly than initially anticipated. These are standard techniques that most engineering firms are familiar with. But they require more engineering effort to analyze and implement and therefore might require more spending for pre-design analysis than is normally the case.

Longer-term Loans

Just as homeowners can lower their monthly payments through longer-term loans, municipalities can in concept do the same. The United States Department of Agriculture's rural development housing program offers loans with repayment periods of up to 40 years. Amortizing a pipeline with a 70-year life over 30 years may make the new pipeline unaffordable. But under a 40-year term it might be affordable. For example, a 40-year loan reduces the annual expense of new assets by 10% as compared with a 30-year loan term (assuming a 5% interest rate for illustration purposes).

Greater Economies of Scale or Scope

A recent survey of the literature on regionalization and consolidation (Beecher, 1996; and Table 4) suggests that consolidating water system operations and/or management may represent a viable alternative from several perspectives, one of the most important of which is achieving greater economies of scale or scope. Economies of scale imply that the unit cost of providing service will decline as a single provider delivers more services. Economies of scope imply that unit costs of providing two services will decline if one provider (or facility) can supply both services.

²⁶ See Gleick et al. (2003) for a demonstration that about 1/3 of Californian urban water supply can be conserved for less than new supply over the next few decades, as the state's population grows from 34 million to more than 50 million. This finding is now widely accepted but was not identified in numerous previous studies by analysts who did not consider the "co-benefits" of water conservation such as energy when hot water is conserved or wastewater treatment costs when less water is used for sanitation or cleaning.

²⁷ The most famous example is that of New York City, which found that source water protection in upper New York State is literally billions of dollars less costly than filtration after pollution has occurred.

For example, the combined cost of wastewater disposal and water supply may decline if a wastewater reclamation (recycling) facility is constructed that provides water for landscape irrigation.

Table 4
Advantages of Consolidation or Regionalization

Source: Modified from Beecher (1996)

Management Dimension	Advantages
Economic	Economies of scale and scope (lower unit costs)
Financing	Access to capital and lower cost of capital
Engineering	Operational efficiency and technological improvement
Natural resources	Resource management and watershed protection
Federal standards	Compliance with standards at lower cost, greater capacity development, and greater affordability of water service

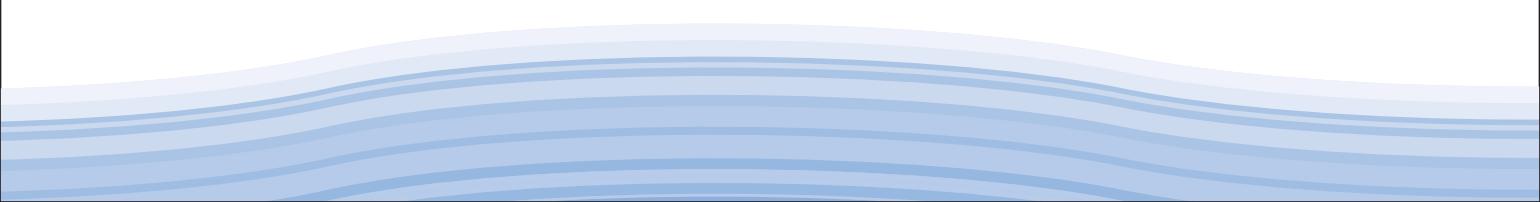
Private companies typically achieve greater economies of scale as they grow, whether organically or through acquisition. The growth of public utilities, however, is usually limited by growth in the population served. That said, public utilities can get access to greater economies of scale and scope in several ways, including by working with a private company that operates systems or facilities in many locations. Regional agencies or county governments can also expand their service area (see Sidebar 5).

Sidebar 5: Lansing Board of Water and Light Becomes Regional Service Provider

The Lansing Board of Water and Light (<http://www.lbwl.com>), the largest municipally owned electric utility in Michigan and third-largest electric utility in the state (also the largest ground-water system in Michigan), has successfully achieved greater economies of scale in its core water-related operations through a combination of retail contracts to manage other operations, wholesale contracts to resell water, and asset transfers from other municipalities to the Board. In the late '80s, when discussions began between the Lansing Board of Water and Light and other regional entities, many of the other small cities and townships had separate, relatively simple systems of distributed wells; were challenged with the increased regulatory complexity and limited staff to run their systems efficiently; and faced increasing pressure on their water supplies because of the rapid pace of building and desire for improved water quality.

By contrast, the Lansing Board of Water and Light had a centrally collected and conditioned ground-water (well) system serving the City of Lansing and

Watertown and Delhi Townships. Through a multi-stakeholder process with representatives from every local government, the Board eventually assumed responsibility for the retail operations of several local water utilities (DeWitt Township, Alaidon Township, and Bath Township), completed asset transfers from Bath Township and DeWitt Township, and entered into a long-term contract operations arrangement with the City of Dewitt that may ultimately result in another asset transfer. Additionally, "sale for resale" agreements now provide the Board's treated water to Lansing Township, Delta Township, Meridian Township, and the City of East Lansing. The communities in the region have benefited from Lansing's centrally treated well system and management expertise. At the same time, the Lansing Board of Water and Light has benefited because of greater economies of scale driven by the larger size of its operations, its ability to leverage back-office functions (such as billing) across a greater number of customers, and the ability to run its key assets much closer to capacity (McCormick, 2005).



In the St. Michael “Hub and Spoke” Area of Minnesota, contracts with Veolia Water have reportedly created substantial economies of scale for the towns of St. Michael, Albertville, and Hanover. Scale-related benefits include the following:

- Centralized operation of one main water treatment plant. The Joint Powers Water Plant serves the three member communities, and the St. Michael Wastewater Treatment Facility is a 2.5 MGD wastewater treatment facility serving St. Michael, Hanover, and a rural township area. These facilities result in significant cost savings by sharing personnel (e.g., project manager and all operations staff) as well as other operational efficiencies (e.g., shared equipment).
- Centralized management of several back-office functions including bookkeeping, office management, and utilities billing, creating significant cost savings from shared personnel (e.g., shared office manager and administrative assistant) and overhead.
- Access to Veolia Water’s bulk purchasing power (e.g., for chemicals), support technology, and management expertise, resulting in cost savings estimated by the company at between 30% and 50% for key services and supplies.

Where economies of scale were not available, as was the case with the water distribution systems, each town has individually decided how to manage that part of the operation. Albertville, for example, does their own water and wastewater distribution. Both St. Michael and Hanover have contracted for these services.

The current relationship between Veolia Water and these towns started in January 1996 as an operations-only contract for the then-0.8 MGD St. Michael Wastewater Treatment Facility. Over time, as Veolia Water built its record of performance and developed relationships with the administrators in each town, the contract gradually expanded, first in January 1998 as a Joint Powers project to operate a joint water utility for the communities, then in 1999 to also take on overall management of the operation. Currently there are three separate contracts: one with the Joint Powers Water Board and separate contracts with the cities of St. Michael and Hanover.

These efforts have been successful by numerous measures, including the Minnesota Pollution Control Agency Compliance Award for seven of the past eight years, the National American Water Works Association (AWWA) Safety Award (2004), and the Central Section of Minnesota AWWA Consumer Confidence Report Award (2000). The wastewater treatment plant discharge compliance record has reportedly been near perfect, and several engineering awards have been received for technologies in use at the facility (such as reed bed technology) (Browning, 2005).

Streamlining Key Processes

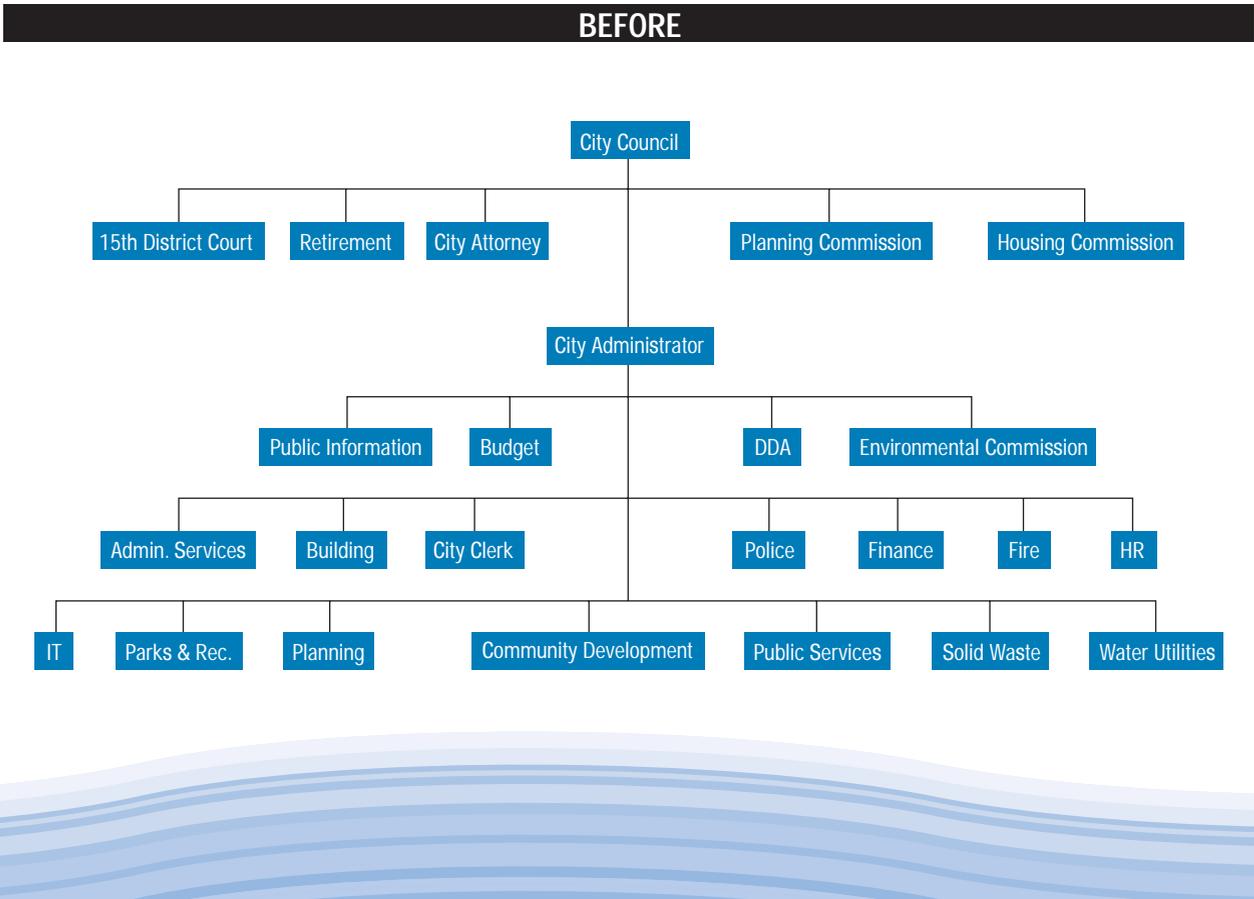
Identifying and streamlining core processes can reduce some combination of maintenance, other operational, and long-term capital costs. Such streamlining may also free up staff time for other tasks. The Butler County Department of Environmental Services eliminated some staff

positions and freed up labor hours for key laboratory staff through various streamlining initiatives. BCDES transferred many preventative maintenance functions, such as oil and greasing equipment, from the maintenance staff to the wastewater plant operators. BCDES also transferred water system bacteria sampling from laboratory staff to water system operations staff. At one of BCDES's major wastewater treatment facilities, the operators implemented a different method of treatment. The new method created conditions that were favorable for less sludge production, which lowered disposal costs and required less energy (Parrott and Young, 2005).

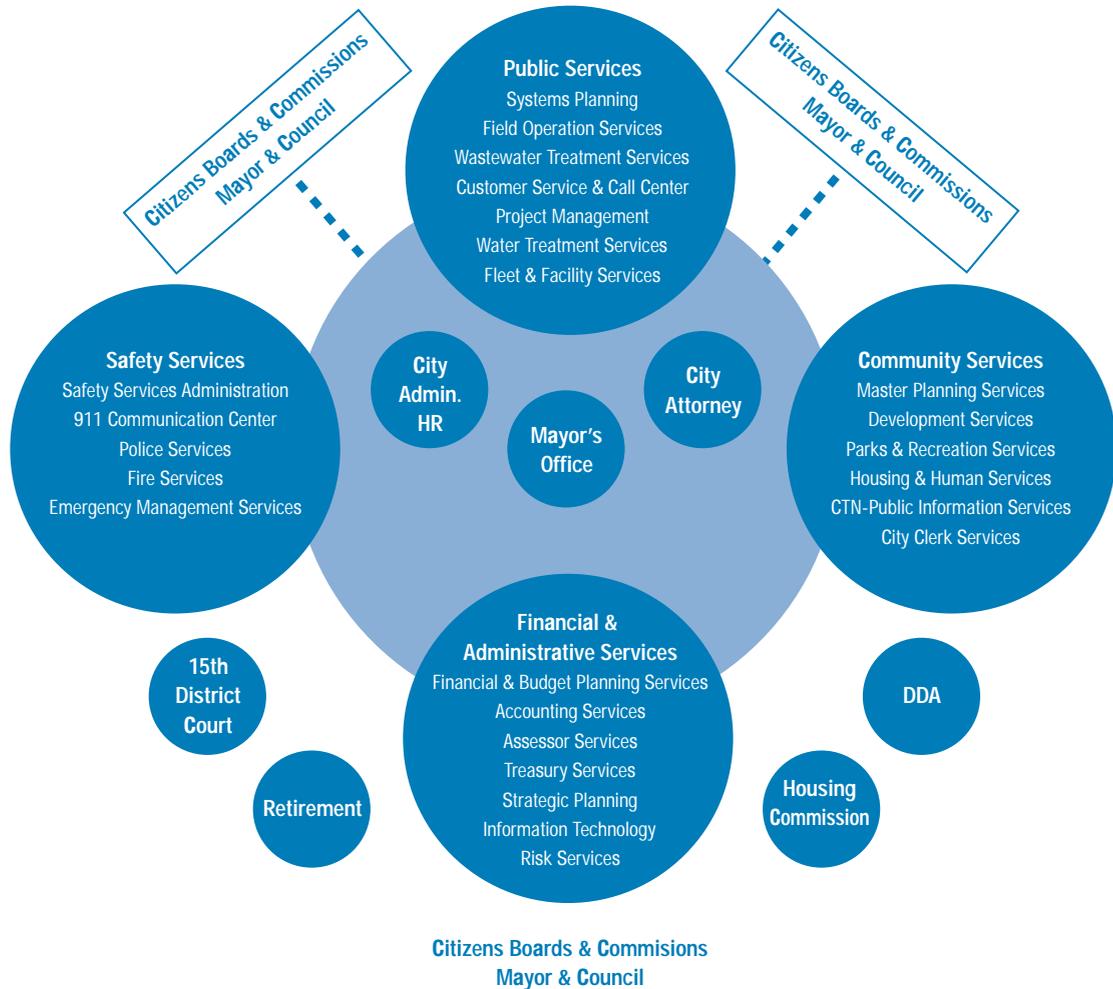
Over the course of the last five years, the City of Ann Arbor has consolidated a wide variety of services into a Public Services Area (<http://www.ci.ann-arbor.mi.us/PublicServices>). This consolidation has led to significant streamlining of key processes in two ways (Figures 6 and 7). First, departments in the city have been able to combine and streamline such cost centers as customer service, administration, and planning. The cost savings have likely been very significant because the city has placed under one roof a very large number of services: park maintenance; forestry; natural area preservation; street lighting; signals; signs; radio communications; street maintenance; solid waste and material recovery activities; and all water, wastewater, and stormwater distribution and collection. Second, the Public Services Area tasks groups of employees to look at certain jobs, standardize job descriptions, and eliminate non-value-added activities. Sue McCormick, the Service Area Administrator, estimates that these sorts of streamlining activities have resulted in operational savings of 20 percent or more. Often this sort of activity also results in the added benefit of making cross-funding of job classes easier, with a resulting avoidance of painful layoffs (McCormick, 2005).

Figure 6
Ann Arbor Public Service
BEFORE Reorganization

Source: McCormick, 2005



AFTER



Increase Charges or Taxes

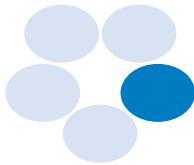
In some cases it will be necessary to increase water or sewer charges or local taxes used to support water-related functions. Although estimated investment needs in the Upper Midwestern States are daunting (see Appendix A), average revenue increases of 3% per year greater than the rate of inflation would be adequate to fund the \$68 billion-over-20-years estimate of needs (Albee, 2005). Although such rate increases are not desirable, they may be acceptable in many communities or on a statewide basis; in fact, water and wastewater rate increases from 1998 to 2004 in the US have averaged about 2% more than the rate of inflation (Raftelis, 2004).

Experience has shown that water users are often willing to pay for improvements in water and sanitation when the services are reliable and the cost of delivering services is reasonably transparent and understandable to customers. Experience also suggests that people and businesses

Figure 7
Ann Arbor Public Service
AFTER Reorganization

Source: McCormick, 2005

will pay more for water without significant resistance when they receive new or improved services that they desire. This suggests that dissemination of detailed information about the improvement in service — and the capital investments needed to create those improvements — is essential to public acceptance of increases in overall water prices. The new or improved services should be clearly described and rate changes should be phased in with strong education and information programs describing the changes and their reason (Gleick et al., 2002). Even when rate increases are primarily motivated by cost increases, linking the rate increase to improvements in service creates a performance incentive for the water supplier and increases the value of water and water services to users.



In the US, neither public nor private utilities seem any more experienced or skilled at asset management.

Solutions for Poor Asset Management

The solutions for poor asset management presented in this section are organized from easiest to hardest to implement. Small municipalities, communities that have recently municipalized their water services, or communities that simply do not have a good inventory of their water assets should consider a one-time asset condition assessment — at a minimum. At the other end of the scale, risk-based maintenance and replacement scheduling is more difficult and complicated to implement. But it will be especially valuable in older communities with aging underground assets, of which there are many in the upper Midwest. Based on our research, neither public nor private utilities in the US seem any more experienced or skilled than the other at capturing the economic benefits of improved asset management.

One-time Asset Condition Assessment

At a minimum, a one-time asset condition assessment should be performed: a utility must know what it has before knowing what it needs. A condition assessment typically involves condition/deficiency analyses, criticality, vulnerability, risk assessments, and remaining useful life and repair evaluations for all major assets (Carollo Engineers, undated). A thorough condition assessment allows managers to anticipate the end of asset life spans and to plan preventive maintenance, rehabilitation, and replacement projects. More critical or vulnerable assets may warrant additional investment or priority in time.

Direct observation and assessment of asset condition also reduces the risk associated with having a private company or other governmental entity (e.g., regional agency) operate, lease, or purchase the system. This is a critical aspect of contracting that has been discussed extensively by private operators and potential customers, since the Atlanta water contract was canceled at least in part because the condition of underground assets was a continuing and costly source of tension (Chapter III).

The asset condition assessment will also help an agency to meet the Government Accounting Standards Board's Statement 34 (GASB 34) requirements. GASB 34 requires state and local governments to list long-run infrastructure assets and their value in annual financial statements, or to use a modified approach which requires the reporting utility to provide the following information (Lowdon and Brydon, 2003):

- A complete asset inventory and classification system
- A full condition assessment every three years
- Summary of the results highlighting any influencing or extenuating factors
- An estimate of annual funds needed to maintain the assets in a serviceable state, at or above the level identified in the condition assessment
- Comparison of the estimate of annual funds needed to the capital expended in each of the past five reporting periods.

Listing assets and their values pursuant to GASB 34 does not *require* field inspection of all or most assets; however, field inspection is likely to increase the accuracy of estimates. Increased accuracy is useful for GASB, for planning purposes, and will enormously enhance the quality of technical and price proposals if proposals from private operators are solicited.

Ongoing Asset Inspection and Tracking

While still not a full management system, a permanent asset inspection and tracking system offers multiple benefits to an organization, including but not limited to the following:

- Provides necessary data to perform maintenance and replace assets based on actual rather than assumed or expected condition
- Helps organizations to create accurate capital budgets and forecasts
- Becomes a core business process and a reliable management tool
- Over time, builds a robust database for making risk-based maintenance and asset management decisions, as described in the next section of this chapter.

An asset inspection and tracking system consists of developing a classification system, identifying all assets, compiling historical data (e.g., expenses and associated actions), and creating processes for the ongoing inspection and tracking of asset conditions. Mesa Consolidated Water District (Mesa), a special district headquartered in Costa Mesa, California that provides retail potable and reclaimed water to about 23,500 accounts, successfully created a unified asset inventory as part of its permanent tracking system. While Mesa maintained a replacement and reserve fund, neither the board nor staff was confident that the annual appropriations were sufficient. After creation of the fully integrated database, including details on the number and condition of such assets as the physical pipe segments, Mesa's managers have much greater confidence that decisions are made based on reliable and accurate data (Harlow et al., 2003).

Kevin Young, the managing director of a water and wastewater utility serving 500,000 people in Australia, cited two common types of poor asset management, both of which could be addressed with permanent asset inspection and tracking systems. He refers to the first type as

“proactive euthanasia,” referring to the practice of replacing assets before they need replacement for any one of several reasons. Typical reasons for early replacement include funding that has already been committed or a regulator that has approved an amount of spend-or-lose money for replacement. The second type of poor asset management is the use of inappropriate benchmarks to drive spending. As he says,

I'm in constant amazement that comparisons are drawn between [two utilities] and the utility with older assets and poorer soils is criticized for having a higher level of breaks. The reality is the utility with the older pipes may be twice as efficient and be implementing excellent asset management. A drive by the utility with older pipes to achieve comparable results will drive significant increases in customer bills which isn't traded off by benefits to the community or the environment. It is clearly a case of 'one size (or measure) does not fit all' (Young, 2005).

An asset inspection and tracking system will avoid or reduce proactive euthanasia by basing replacement timing on observed condition rather than assumptions about useful asset lives and can facilitate appropriate benchmarking by obtaining enough information that one can make appropriate comparisons.

Risk-based Asset Management

Risk-based asset management uses information on the probability and consequences of asset failure to determine the best replacement or rehabilitation schedule for each major asset. When the data and analytical resources are available, risk-based asset management offers many potential benefits (Carollo Engineers, undated):

Risk-based asset management uses information on the probability and consequences of asset failure to determine the best replacement or rehabilitation schedule for each major asset.

- Cost savings
- Increased accuracy in financial planning and budgeting
- Improved regulatory compliance
- More reliable protection of public health
- Increased levels of service
- Maximum performance
- Effective, integrated communication
- Inter-functional cooperation and integration.

Several variations and levels of complexity exist for how to most effectively use risk-based asset management. The basis for any of these variations is the numerical quantification of risk. Numerical calculation of risk requires separating risk into two components: a probability of occurrence and a consequence of occurrence. “Risk cost” is the product of the probability and the consequences of the risk. Typically, risk cost is measured in units of dollars, the probability in units of occurrences per year, and the consequences in dollars. Sidebar 6 describes how a utility in Australia

used risk-based asset management to make a correct, but not obvious, decision about the replacement of an above-ground supply pipeline.

Sidebar 6: Risk-based Asset Management for a Water Supply Pipeline

A water utility in Australia had a key water supply pipeline that was worrisome because it was made of lead-jointed steel and ran above ground for much of its route. Ground movement caused temperature changes and joint stresses, resulting in annual maintenance and repair costs of about \$0.4M.

Staff considered replacing the line with buried pipe at a cost of \$10.4M, which would avoid the \$0.4M annual expenditure. Based on annual savings of \$0.4M, the 20-year internal rate of return (IRR) on the investment is negative 2%, not even a break-even proposition for the utility's customers (IRR calculations are performed by and explained in the help menus of most spreadsheet programs).

Staff was aware that the location of the pipe was subject to rare flooding. In fact, in their research, they came across an event that had been totally forgotten due to turnover. The pipe had washed out in a flash flood in the early 1950s during a 100-year storm. As a result, 50,000 customers were without water for 14 days and numerous businesses had to close their doors.

If the same flood were to occur today, 90,000 customers and numerous businesses and industries would be affected. Staff calculated the impacts, including:

- Cost of mobilizing every water tanker available and tankering water to the area
- Expected claims for the loss of production, etc.
- Estimated value of residential customer water interruption—very high for such a long-duration outage
- Costs of emergency response to pipe failure over and above routine response.

The total cost was estimated at \$60M. Now staff had the information they needed to calculate the risk cost of ownership quite simply—a consequence of \$60M with a probability of 1% per year based on the 100-year storm. So the risk cost of owning the pipeline was \$0.6M a year, which, like the maintenance cost, could be avoided by burial.

So the burial cost of \$10.4M would result in the avoidance of \$1M annually: \$0.4M in O&M cost plus \$0.6M in risk cost. The new 20-year internal rate of return was 7%, which management felt represented a good investment of customer dollars. This time, after quantifying risk, the right decision was reached: replace the line.

(Example modified from Harlow, 2005).

Agencies typically have assets representing various combinations of probability and consequence, although the categorization and associated spending on each category of assets is frequently intuitive and sub-optimal. For example, utilities have a few assets whose consequences of failure are very high. In asset management terms, these are “critical” assets. Utilities do not want these assets to fail and are consequently willing to invest a lot of money to maintain contingency plans, to over-engineer them, to replace them relatively frequently, or to construct redundant facilities.

Utilities usually have many assets that are less critical. Utilities might just do normal maintenance on some, or even mostly ignore them until failure is imminent (Harlow, 2005). For non-critical assets, that may be a reasonable choice.

Risk-based asset management quantifies and makes more rigorous these types of management decisions. It requires reliable data on an agency's assets, the analytical skill to do some of the necessary financial modeling, and a commitment from the management team to use the methodologies in key decisions. For example, too much redundancy will drive up direct costs to the utility. But too little redundancy will impose excessive "consequence-of-failure" costs on customers.

Small utilities may find it appropriate to use a relatively simple form of risk-based asset management that focuses on critical assets. Larger utilities may have the resources and staff to manage most of their assets in this manner. Where the data is not yet available, a utility can start with developing an ongoing asset inspection and tracking system and over time building the necessary database for employing a risk-based asset management system.

The Detroit Water and Sewerage Department (<http://www.dwsd.org>) sits at the very high end of the size spectrum for public utilities and, as one would hope, has invested significantly in its asset management system.²⁸ The utility provides service to approximately one million people in Detroit and three million people in neighboring southeastern Michigan communities throughout Wayne, Oakland, Macomb, St. Clair, Lapeer, Genesee, Washtenaw, and Monroe counties. The 1,071-square-mile water service area, which includes Detroit and 124 suburban communities, makes up approximately 43% of the state's population. Nonetheless, the system does not yet fully implement the risk-based asset management approach described in this section.

The asset management system is used to produce a five-year capital improvement program, the most recent of which runs from fiscal years 2006 through 2010. The DWSD's current capital improvement plan totals \$2.4 billion over the next five years with \$534 million budgeted for water and sewer projects in FY 2004/2005. For all funded projects in the FY 2005-2007 timeframe, 2% of expenditures will go to directly mandated projects; 44% to projects mandated by regulatory requirements to maintain compliance; 40% to projects required to maintain or improve system reliability and/or capacity; and 15% to projects that utilize technological advances to improve operational efficiency, worker productivity, and/or management effectiveness.

Some might claim or expect the private sector to be more advanced in this regard. But few of the contracts we reviewed (Gary, Indiana; two contracts in Indianapolis, Indiana; Sioux City, Iowa; Milwaukee Metropolitan Sanitation District, Wisconsin; and Hamilton, Ontario) required or even mentioned risk-based asset management. The 2002 Management Agreement between Veolia Water and Indianapolis states that life cycle costing (LCC) will be used to help evaluate program options. LCC was used in only a limited fashion through 2004 and more use has occurred in 2005. Given that these contracts include the three largest wastewater operational contracts in the US and a large water contract, that some of these contracts are very recent (the Sioux City and Hamilton contracts were developed in 2004), and that the three largest water companies in the world are parties to at least one of these contracts, it seems fair to say that the private sector in the US has also failed to fully implement risk-based asset management.

²⁸ Detroit's investment includes work with private companies. They have contracted the design-build of a new water plant to one firm, and entered into a maintenance contract with a second firm (Cairo, 2005).

Clear Threshold Between Maintenance and Capital Spending

The “capitalization limit” is the dollar amount below which a new asset, regardless of its useful life, is written off as an expense rather than being capitalized and depreciated. For financial reporting purposes, such a limit is often considered a convenience to avoid having to keep track of and depreciate a potentially huge number of assets that might not be significant in the larger effort of managing a utility.

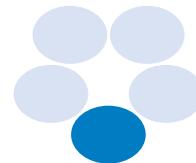
The capitalization limit can also matter in agreements between private operators and public agencies. Contracts are often structured such that the municipality agrees to pay for all major capital expenditures while the private operator is responsible for maintenance and operating expenses. This potentially creates a perverse incentive for both the private operator and the public agency to nickel and dime each other by classifying as many costs as possible into the category they are not responsible for. In order to control this incentive problem, a clause is usually added to the contract that reads something like the following:

Preventive, routine and non-routine maintenance for the project shall be provided by the CONTRACTOR. CONTRACTOR will pay up to \$3,000.00 for each routine and non-routine maintenance event. Each maintenance event will include the single expenditure or the aggregate sum of related expenditures per occurrence for each item, process or system. CITY shall be responsible for the entire expense of Capital Expenditures. Capital expenditures mean any expenditures ... that cost more than three thousand dollars (\$3,000) (Sioux City Operation and Maintenance Services Contract, 1995, p. 6).

The capitalization limit itself varies from contract to contract depending on local practices and the size of the agency or contract (as measured by annual payments or revenue). The limit in the contracts we reviewed varied between \$3,000 and \$75,000. A contract clause of this type helps to control, but does not entirely remove, the conflicting incentives of operator and owner. Several small, discrete maintenance expenses, such as the replacement of many pumps that might take place over the course of a year, can be bundled to appear as related expenses for a single system. Or a city can unfairly insist that a failing pipeline that should be replaced as a capital expense is a recurring maintenance expense. Contract clauses like the one above are useful but do not provide the benefits of a one-time or regular full system assessment of assets.

Solutions for Ineffective Performance Measurement and Reward

Solutions to ineffective performance measurement and reward fall into two general categories: creating clear performance standards and indicators, and rewarding good (or penalizing poor) performance. The first solution discusses standards and indicators. The last three solutions in the section — performance-based compensation, raw water use or pollution charges, and pre-specified minimum mandatory penalties — fall into the latter category. Even more so than the solutions presented in other sec-



tions, we would expect organizations to employ some combination, if not all, of the solutions presented.

Clear Standards and Indicators

Being effective is difficult if performance is not measured or good performance is not rewarded. Customer service expectations, for example, can be described and staff can be judged against those expectations. A well-designed and properly implemented performance measurement system can enable better performance by improving communication to stakeholders, helping inform and evaluate resource allocation decisions, providing employees with feedback on the work they are performing, and creating the basis for benchmarking against other organizations. A performance measurement system will include both indicators (the variable to be measured) and standards (the values of those variables that are considered “good”). Sidebar 7 provides an example of how such systems can work.

Sidebar 7: CitiStat: The Value of Intensive Performance Measurement

CitiStat is the Baltimore city government’s signature management initiative, a citywide program designed to utilize intensive performance measurement of all municipal agencies and achieve real-time sharing of data to propel the mayor’s agenda and bring about operational cost savings, revenue enhancements, and improvements in the quality of municipal services. Baltimore’s Department of Public Works’ Bureau of Water and Wastewater (<http://www.ci.baltimore.md.us/government/dpw/water.html>), which is responsible for the operation of a water distribution system that supplies water to over 400,000 accounts and has an annual operating budget of roughly \$250 million, was one of the inaugural agencies included in the CitiStat process in 2000.

CitiStat’s efforts to quantify outcomes fall into three general categories: financial, operational, and service.

- *Financial impacts.* The CitiStat team regularly calculates or attempts to estimate the financial impacts of initiatives undertaken as a result of the program.
- *Operational impacts.* CitiStat tracks information for almost 300 separate citizen service request categories.

- *Service impacts.* Since 2003, over 3,700 citizen satisfaction surveys have been conducted to gauge the public’s perception of municipal services and identify performance and perception problems.

Cumulatively, the aggregate financial impacts of CitiStat-related initiatives have been estimated to be \$13.2 million in fiscal year 2001, \$43.7 million in fiscal year 2002, and almost \$100 million in fiscal year 2003.

Specific to the Bureau of Water and Wastewater, the introduction and monitoring of activity standards for operations such as meter reading led to the complete elimination of structural overtime for this function. In fact, no bureau meter reader has received overtime in almost three years — spanning 12 consecutive billing quarters, all while reducing the number of employees performing this activity. Similarly, significant benefits have been achieved in other areas of the bureau, providing compelling evidence about the value of measurements systems and clear performance indicators.

(Example modified from Gallagher, 2005).

Specifying an appropriate set of performance standards and indicators may require considerable effort and refinement. Indicators must be both observable and measurable. The challenge is to select a set of standards and indicators that is sufficiently detailed to be meaningful for management and oversight decisions and which is, at the same time, available and attainable at a reasonable cost. A few dozen robust measures of performance are usually superior to larger numbers of indicators or standards.

Documents that provide both in-depth discussion and comprehensive lists of performance measures—in the abstract—include Alegre et al. (2000) and Matos et al. (2003). Table 5 lists the AWWA and Water Environment Federation (WEF) benchmarking performance indicators for water and wastewater utilities. Lafferty and Lauer (2005) provide data on numerous US water utilities in comparison with the indicators in Crotty (2004). The public utility commissions listed in Appendix B sometimes provide comparative data for economic measures. A World Bank initiative, known as the Water and Sanitation International Benchmarking Network, is publicly available at <http://www.ib-net.org>. Benchmarking is a growing field and the data available will likely increase significantly in the next few years.

Business system or process	Performance indicator(s)
Organizational development	<ul style="list-style-type: none"> • Organizational best practices index • Employee health and safety severity index • Training hours per employee • Customer accounts per employee • Water delivered per employee • Wastewater processed per employee
Customer relations	<ul style="list-style-type: none"> • Customer service complaints • Technical water quality complaints • Disruptions of water service • Residential cost of water or sewer services • Customer service cost per account • Billing accuracy
Business management	<ul style="list-style-type: none"> • Debt ratio • System renewal/replacement rate • Return on assets
Water operations	<ul style="list-style-type: none"> • Drinking water compliance rate • Distribution system water loss • Water distribution system integrity • Operations and maintenance cost ratios • Planned maintenance ratio
Wastewater operations	<ul style="list-style-type: none"> • Sewer overflow rate • Collection system integrity • Wastewater treatment effectiveness rate • Operations and maintenance cost ratios • Planned maintenance ratios

Table 5
AWWA and WEF
Performance Indicators

Source: Crotty, 2004

Comparison with other utilities is not always helpful, because each system is somewhat unique. But defining and measuring a utility's own performance is always useful ...

Comparison with other utilities is not always helpful, because each system is somewhat unique. But defining and measuring a utility's own performance is always useful, whether the system is public or private. Some examples of standards or indicators in existing contracts for Indianapolis and Sioux City are discussed below.

The Indianapolis contract for water system operation, approved in 2002, contains both some clear and unclear standards.²⁹ First, the standards for customer service and distribution system breaks were very clear and specific, including rapid response for emergencies (e.g., 1 hour for customers without water, or flooding that is damaging property or causing a safety concern) and same-day response (4-8 hour window) for less-severe problems such as low pressure, slow leaks, or service starts.

Second, the issue of water taste and odor during summer months is addressed much less clearly. It is mentioned in three places in the contract. Exhibit 1 notes that it is a "significant concern." The efforts of the previous operator are described qualitatively in a few sentences (for example, adding algaecides to the reservoirs). The new contractor is required to "allocate sufficient resources to continue these treatment methods." But the previous treatment methods are not described in enough detail for one to enforce the requirement. Section 4.01(a)(27)(M) requires the contractor to invest at least \$17 million over the 20-year term of the contract to address taste and odor issues. Section 4.05(b)(4)(m) clarifies that this spending is in addition to the requirement to continue previous efforts. Collectively, these specifications provide enough structure for the contractor and city to make progress, but they also leave plenty of room for error and subsequent finger-pointing if a widespread odor or taste event were to occur. Other deliverables were also unclear with respect to report period, completeness, and time to correct any deficiency. More care was needed when the contract was drafted so that all parties could know what is required or desired.

Sioux City, Iowa was apparently very concerned about odors from wastewater facilities. The new contract accordingly includes a 16-page exhibit (Q) that specifies in detail the obligations of the private contractor with respect to odor control, at both existing and future facilities. The exhibit includes operational requirements at specified facilities (e.g., treatment plant, pumping stations, collection system), monitoring and reporting requirements, customer service requirements (e.g., creation of an odor hotline), creation of a neighborhood advisory committee, and so forth. The specific American Society for Testing Materials standards for odor measurement are named. Penalties for odor events as defined by the methods are specified — e.g., the first six odor events per calendar year less than 24 hours in duration do not incur a penalty, but the seventh or more events each calendar year incur a penalty of \$500 each. Pre- and post-construction odor studies are required, and the content of the studies is specified in detail.

Like the customer response standards in the Indianapolis water contract, Exhibit Q to the Sioux City contract is an excellent example of focused use of performance indicators and standards. Most of the contracts we reviewed did not address critical performance issues thoroughly. In those cases, specifying and implementing standards or indicators is the cure,

²⁹ These are located in the contract in Exhibit 1, "Performance Standards and Guarantees."

and whether that involves public or private entities is not the key point. In the Hamilton, Ontario example, the anticipated outcome was a private operator. The final outcome was public operation, but under the detailed specifications that had been prepared to ensure comparable proposals from companies. The effort to prepare those specifications was worthwhile, despite the surprise ending.

Performance-based Compensation

Performance-based compensation is a logical extension of the performance measurement concept. These payments can take the form of bonuses paid to employees who meet or exceed certain goals, or promotions within job categories that are based on performance rather than duration of employment. Direct payments (e.g., bonuses) can also be used as an incentive to encourage an organization or utility to perform as desired.

The Louisville Water Company is a municipal corporation owned by the city of Louisville, Kentucky that provides water services to over 260,000 retail accounts and six regional communities through wholesale agreements. Louisville Water successfully used an employee incentive award to help improve accomplishment of long-term strategic goals. The incentive award is an annual bonus paid to full-time employees at the end of the year, and payment varies depending upon how many goals are achieved. The goals are established at the corporate level, and each full-time employee receives the same amount of bonus. The goals that compose the employee incentive award include the following:

- *Financial.* Operations and maintenance cost per customer
- *Customer.* Customer satisfaction for service customers (from an external customer survey)
- *Employee.* Safety (number of vehicular accidents and number of injuries on duty)
- *Business process.* Distribution water quality (turbidity, chlorine, and coliform).

This employee incentive program, in conjunction with another one targeted at executives, appears to have played a key role in helping the organization to achieve its long-term strategic goals. In fact, the corporation achieved some of the targets earlier than expected and, consequently, established new goals in the bonus program to ensure continuous improvement (Freeman and Heitzman, 2005).

Contracts with private companies often include bonus payments for exceeding minimum contract standards. For example, the MMSD has paid at least two \$50,000 bonuses and withheld a third bonus to United Water, the private operator of their wastewater treatment plant.³⁰

Contracts can also include bonus payments for exceeding minimum environmental standards. For example, a wastewater discharge standard protects downstream beaches from significant health risks. Nonetheless, some level of risk usually exists at the acceptable discharge standard,

Most of the contracts we reviewed did not address critical performance issues thoroughly.

³⁰ Since 1999, up to 20% of contractor fees can be based on performance incentives under IRS Guidelines (Cairo, 2005).

Performance “scorecards” published periodically can be used along with or instead of performance bonuses.

because zero risk is usually unaffordable. Bonus payments for higher-quality discharges during heavy-use periods at downstream beaches may be economically and socially appropriate in such circumstances.

Performance Scorecards

Performance “scorecards” published periodically (e.g., annually) can be used along with or instead of performance bonuses. Although we found no examples of this practice in the upper Midwestern states or Ontario, this practice has been used successfully in Australia, the United Kingdom, and other parts of the world. Australian water utilities are municipal corporations governed by a technical board appointed by the state within which they operate. They are responsible for paying dividends to the State Treasury and for providing the services and service quality desired by their customers. Standardized performance measurements are required by the state government, which are used by customers and senior managers to evaluate the performance of each utility. Reportedly, doing well in these appraisals has become a significant driver for utility boards and senior managers (based on discussions by author Wolff with utility and Australian Water Association staff in Brisbane, Sydney, and Melbourne in July and August 2005).

Fixed-fee Contracts with Options to Extend

Most contracts with private companies for operation of facilities in the US are on a fixed-fee basis, with annual adjustments for inflation. This type of contract provides some protection against increased fees due to the profit motive, in contrast to increased fees due to increases in cost. Unlike investor-owned utilities, which are typically granted some amount of profit above documented costs, contract operators take the risk that their profit will be less (or they might actually lose money) if costs rise more than the sum of the inflation adjustment plus reductions in cost they achieve through ongoing efficiency. If the fixed fee is re-established frequently enough through a competitive process (e.g., every 5-10 years), this approach provides a strong incentive for cost control.

On the other hand, there are ample opportunities in longer-term contracts (e.g., 10-20 years) for significant increases in fees that do not reflect increases in costs. Changed circumstances typically allow an operator to pass through new costs, and the auditing process to ensure that only new costs are passed through requires a level of expertise that not all communities (especially smaller communities) have or can afford. For example, determining the appropriate overhead charge level from a foreign headquarters to its operating divisions around the world (a legitimate category of expense) is not easy. Ambiguities in a contract can also lead to change orders that contain more profit than would be the case in a competitive situation. After all, even if the municipality feels the change order contains such excess profit, the direct cost of arguing the point or the costs incurred by not resolving the issue quickly may be even larger than the excess profit.

Shorter contract durations allow the competitive process to re-set the fixed-fee base rate often enough that large excess profits are unlikely. On the other hand, frequent proposals create process and perhaps transition

costs for the municipality and reduce the value and attractiveness of the contract to the private sector (e.g., to shareholders) since the value of an asset is typically calculated as the net present value of the future stream of profits. Profits beyond the expiration of signed contracts are usually heavily discounted since they may never materialize.

One way of creating tolerably good incentives is a fixed-fee contract for a relatively short duration (5-10 years), with options to extend for similar durations thereafter at the discretion of the municipality. In essence, the option to extend is used as a possible performance bonus for the private contractor, held in reserve by the municipality as a bargaining chip.

Raw Water Use or Pollution Charges

Regulators usually address environmental quality concerns by imposing requirements on service providers. Examples of regulatory requirements are drinking water quality standards, wastewater discharge quality standards, and environmental assessments during project development. In recent years, environmental regulators have begun to explore ways to complement these standards with economic regulations that promote environmental quality. Thoughtful, well-designed economic regulation can reinforce environmental standards and encourage utilities to go beyond compliance.

Raw water use and pollution charges are one such way of encouraging water utilities to go beyond compliance. Many countries in the Organization for Economic Cooperation and Development (OECD) or the European Union (EU) have adopted pollution or raw water extraction charges. Brazil, Colombia, and Mexico also have environmental and resource charge systems to some extent. The Mexican system includes a 2% surcharge on water bills with revenue used to support the national forests that protect raw water quality in upstream areas. Arcata, California supports its municipal flood control program with an annual charge on each square foot of impermeable surface rather than an annual charge based on the size or valuation of each parcel. In most cases, these charges are small and are based on cost recovery considerations rather than the environmental damage caused by the activity involved. Nonetheless, the charges serve as a very clear signal of the performance that is being sought.

This solution option is rarely used at the municipal level, but there is no reason in principle that it cannot be. Raw water extraction or pollutant discharge fees can be charged to the system operator, whether public or private, as an incentive to reduce water loss between extraction and customers (often called “unaccounted-for water” or “non-revenue water”) or to reduce pollution below state-permitted levels. This approach creates a performance incentive for the utility and an additional revenue stream for local government. If additional revenue is not required, or is legally not permitted, other revenue streams (e.g., franchise fees or ad valorem surcharges for general expenses) can be reduced accordingly.

Most contracts for private operation of wastewater facilities include a clause that grants additional compensation if wastewater flows or strength (typically measured as biological oxygen demand or total suspended solids) increase during the term of the contract. Raw water or

One way of creating tolerably good incentives is a fixed-fee contract for a relatively short duration (5-10 years), with options to extend used as a possible performance bonus

pollution discharge fees are no more complicated to administer than this existing contract feature. This solution option is a feasible way of enhancing performance if water distribution losses or local environmental quality are important local objectives.

Public Benefits Charges

Public benefits charges are common in the power sector at the state level. However, they can be used at the local level as well. Public benefits charges on kilowatt-hours of electricity sold are common in those parts of the United States that have deregulated electricity. Since deregulated energy utilities are driven by the profit motive, and they make more money if they sell more energy, their performance is typically measured and rewarded by growth in sales or revenue. This implicit performance system may be out of line with social objectives. Revenue from public goods charges is often used to promote and support social objectives such as energy conservation, investments in renewable energy sources, or subsidies for low- and fixed-income households. That is, revenue from public goods charges is used to create a second parallel set of performance measures and rewards.

Even fully public water utilities sometimes face perverse incentives, such as the loss of revenue that can accompany successful water conservation programs.

Public benefit charges can also be imposed on each unit of water sold or wastewater discharged, household served, or other politically acceptable measure of whom is receiving service. Even fully public water utilities sometimes face perverse incentives, such as the loss of revenue that can accompany successful water conservation programs. A public benefits charge can help to offset perverse incentives by separately funding the programs that will lead to revenue loss. This is easy to imagine if the water utility is privately owned or operated. Water conservation program staff supported by the charge might be public employees or employees of a different company from the one that sells water. But it can be also done in a purely public operation by separating conservation and water supply staff, by establishing separate funding sources for each, and by measuring the performance of these groups of staff independently.

Public benefits charges can be applied to flood control and runoff management problems as well. For example, non-structural flood control systems — sometimes called “low impact development” (see <http://www.low-impactdevelopment.org>) — often have environmental benefits or fewer downstream impacts than traditional, structural solutions. Low impact development techniques like grass-lined swales, bio-retention basins, and permeable road surfaces reduce flooding downstream and improve water quality. But cities and developers are under pressure to minimize the initial financial cost of their projects. A public benefit charge can be used to improve the performance of developers and municipal staff who manage storm water. It is typical to charge developers a fee that supports the extension of public drainage systems to newly developed properties. Adding a public benefits surcharge to that fee, with revenue used to subsidize low-impact development, will reward low-impact developers and penalize those who wish to continue to build in the old ways that promote runoff.

Pre-specified Minimum Mandatory Penalties

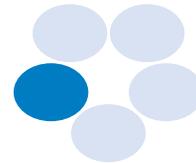
Effective regulatory schemes allow penalties to be imposed on utilities — public and private — that violate regulatory standards. The penalties can be specified in contracts with private companies or via laws that apply to all utilities. In many regulatory systems, maximum penalty limits are specified to prevent administrative authorities from taking excessively strong action. Penalty levels beneath statutory ceilings, however, are rarely specified, because the actual damages and appropriate penalty are highly context- and case-dependent. Nonetheless, minimum penalties can be specified that do not prevent higher penalties from being imposed if justified and that send a clear signal that some types of performance failures are simply unacceptable.

For example, the Sioux City, Iowa wastewater contract specifies that each odor violation beyond seven per year will be penalized at \$500 per event. This specification is administratively effective because it reduces the effort required to determine a penalty. If the penalty is high enough, it will create a revenue stream to pay for the additional work involved when violations are found. It also creates financial and psychological incentive effects. If violating a standard saves \$400 per day, a \$500-per-day minimum penalty may effectively deter such violations. But even if violating a standard saves \$1,000 per day, the immediate and non-negotiable existence of a \$500 penalty increases the appearance of wrongdoing, which has the soft psychological effect of deterring such behavior. In the Sioux City case, the contractor (American Water Services) is probably more concerned about the impact on their reputation of receiving a penalty than the size of the penalty.

A very effective example of a penalty of this type exists in Copenhagen, Denmark. Under Danish law, water utilities are taxed euro 0.7 per cubic meter of all water sold if their piped water system leakage rate exceeds 10%. This penalty is quite significant because water is priced at about euro 4 per cubic meter. The penalty is about the same size as the two general taxes on water: a 20% national value-added tax and an 18% state tax.

Solutions for Limited Transparency and Public Participation

The solutions in this section discuss how to create a transparent and open process as well as what to do when, occasionally, problems arise. The openness and clarity of the decision process is essential for stakeholders. Being right is not enough. Broad stakeholder participation is widely recognized as the best way of avoiding these problems. It ensures that diverse values and varying viewpoints are articulated and incorporated into the process and provides a sense of ownership and stewardship over the process and resulting decisions. It builds consensus to the extent possible and lays the groundwork for more effective disagreement when disagreements inevitably occur.



Open-minded Needs Assessment Discussions

“In a public utility, customers are its shareholders and they should be involved in key decision-making.”

— Sue McCormick, Public Service Areas Administrator
Ann Arbor (2005)

The openness of the decision process is essential for stakeholders. Being right is not enough: perceptions also matter (Sidebar 8). Some of the bitterest opposition to water sector privatization has occurred because someone believed they were being railroaded. Unless most stakeholders agree that the decision was made for legitimate reasons, they will often find a way to sabotage decisions during implementation or to reverse them later. The most important step in the restructuring process is to discuss needs and solutions in an open-minded manner.

Sidebar 8: Perceptions about Consultation Processes Are Critical

Many privatization efforts have failed to include adequate consultation. Privatization decisions that are strongly opposed after they are made, or that are ultimately reversed, involve weak consultation processes almost by definition. For example, the 1993 Buenos Aires privatization did not involve consultation with consumers and community groups. As a result, these groups refused to support full cost pricing for new water connections, and many consumers refused to pay for new connections. This in turn created cash-flow problems for the private operator and a political problem.

Similarly, a contract for water and wastewater services recently signed by Stockton, California was

developed through a process that was perceived by labor unions and some citizens as inadequate. As a result, legal challenges are underway and a referendum was passed that prevents large contracts from being approved in the future without citizen approval. Consultation processes viewed as inadequate by any important stakeholder group are in some sense inadequate. The test of adequacy is whether people accept the decision as something they can “live with,” or make strenuous efforts to reverse or sabotage the effort after a decision is made.

The Lansing Board of Water and Light employed a very open process for decisionmaking, an openness which appears to have contributed significantly to the positive outcome. As a first step in the process, the utility hosted a regional forum for city officials and regional water planners to have an open-minded discussion about the challenges faced by the region in the coming years. A task force, comprised of both technical and policy experts from interested communities, was then created to assess the various options possible and to ultimately draft an RFP to consider the options and costs for a regional approach to water supply development. After completion of the study, task force members from various communities joined local communities for public town hall-type meetings to discuss the study results and a proposal to create a regional water authority. Ultimately, the Mid-Michigan Water Authority—a planning authority with no taxation ability—was created in order to build a strong network in the communities and to build trust among members of the community to enable cooperative projects (McCormick, 2005).

In Ohio, the Toledo Public Utilities (<http://www.ci.toledo.oh.us>) have done three things they argue have been particularly effective in creating successful public involvement programs:

- made public involvement a priority in every step of their projects, beginning with the awareness of bids and contracts
- used surveys to gauge the public's level of understanding of key issues
- developed community advisory committees to provide citizen input throughout the process (Williams, 2005).

Comprehensive Internal and External Communications Efforts

Comprehensive communications efforts are also essential when a water system is restructured, for the same reasons identified in the preceding section. This point applies to every contracting process where public operation is about to be replaced by private operation. It also applies when a public entity re-engineers itself. The Butler County Department of Environmental Services, briefly described in the efficient staffing section of this chapter, also developed a very effective communications strategy

The BCDES external communications strategy acknowledged that the public had significant concerns about what the utility was doing, and included the following:

- *Regular customer summit.* BCDES holds an annual summit with its customers using focus groups to collect qualitative feedback about customer service, education programs, policies, and procedures, as well as to receive the customer's general perceptions about BCDES.
- *Customer surveys.* BCDES conducts regular mail-in customer surveys to provide more quantitative data, which is instrumental to the long-term strategic planning and capital improvement planning.
- *Biosolids focus group.* In conjunction with the environmental management system, BCDES holds periodic discussions with stakeholders regarding biosolids. This allows BCDES the opportunity to hear concerns regarding this issue from local farmers, residents, and public officials.
- *Public advisory group.* BCDES holds semi-annual meetings with the primary purpose of receiving ideas from customers regarding organizational brochures and other public education material.
- *Regular communication with the Governing Board.* BCDES works very hard to communicate with the county administrator and the Butler County Board of Commissioners. Quarterly reports outline the accomplishments and challenges that the utility faces so that the Board is never caught off guard if there is a controversial or financial issue that arises.

- *Other communication outlets.* BCDES has maintained a continuing dialogue with homeowners associations and has one-on-one meetings with large users, which have proven critical in gaining information about their particular needs.

Internally, BCDES potentially faced significant resistance from the labor union, because their re-structuring strategy required some reorganization of how employees were assigned to specific jobs. BCDES overcame this challenge by inviting the union to the table and including them in many ways other than the usual tri-annual contract negotiations (Parrott and Young, 2005).

Communications with workers and unions, or about labor issues in general, are a subset of the many types of communications that need to be managed successfully. The previous section on communications with workers and unions provides some very important examples in the upper Midwest of successes and failures in this regard.

Adherence to and Exceeding of Legal Requirements

Numerous laws and regulations exist to ensure that decisions by public officials are based on information available in the public domain. For example, public hearings are often required prior to an action, and ex parte communications (communications outside the public hearing) are either prohibited or must be publicly revealed prior to the action. These laws and regulations are typically established by states and vary among states. Appendix C is a resource guide to the key “sunshine laws” in the upper Midwest. The appendix does not attempt to summarize these laws, but it is a legal entry point for both local officials who may not know which laws to consult, and community members who feel their local officials are perhaps not being transparent enough.

Most of these laws share a very practical objective: to ensure that interested parties can review the basis for claims that an action is in the public interest. Because the public interest is inherently a subjective judgment, interested parties often disagree about the decisions themselves. But transparency in decisionmaking helps to ensure that the public can evaluate the quality of decisions made by their officials and subsequently support or replace them as appropriate.

Involving private companies creates a tension with respect to transparency that needs to be managed effectively.

Involving private companies creates a tension with respect to transparency that needs to be managed effectively. Because companies are directly competing for business in other communities, details of their existing operations are of interest to their competitors. Unlike public operations, there is a competitive advantage for private operators to maintain confidentiality about the most effective technologies or practices they have discovered or developed. Similarly, they may want to make it difficult for their competitors to obtain the names and salaries of their best staff. Given that these resources — innovative technology or practices and highly effective staff — are two of the strongest reasons to consider private sector involvement, the public has a legitimate need to know about these resources in order to make contract renewal or new contract decisions.

In some cases, public officials can review information without public disclosure, at least for some period of time. For example, it is almost always legal for cost proposals to be kept confidential during contract negotiations. But they should be released once a recommendation or decision is made. In some cases, a third party is engaged to review confidential information and provide a summary to public officials, which is entered into the public record. This permanently protects confidentiality but ensures that the general public and the officials have the same information available to them.

One can also give a public entity additional authority to review private records under specified circumstances, but not under normal circumstances. Contract language often requires financial records to be open but may not address records of affiliated companies with which a public contract does not exist. Lack of access to the records of affiliated companies when credible corruption charges exist — as has happened in Lawrence, Indiana (*Indianapolis Star*, 2004) — is an avoidable contract failure.

Apparently, municipal contracts are not always made public. In Ontario, for example, one of the recommendations of the Walkerton Inquiry (O'Connor, 2002) was that municipal contracts with external operating agencies should be made public. We certainly agree that such disclosure is essential to prevent corruption or the appearance of corruption. Contracts should be made public even if state laws do not require them to be. It may be necessary in some places to obtain the explicit permission of the private party, in the contract itself, to do so.

Transparency is also important on an ongoing basis. The essence of corruption is that private parties are receiving more public funds than they deserve. Patronage employment is a form of corruption that applies to public agencies at least as much as it applies to private companies. Employees who are paid but are not working, hiring practices that allow relatives or friends to be hired even when they are not the most qualified, and similar hiring practices are forms of corruption. Well-run water utilities, departments, and companies have been required by either their management or their public sector clients to have records and procedures in hand by which they can demonstrate that their procurement and hiring practices occur at arms length. Failing to make these records and procedures available, even if state law does not require that, is an avoidable and potentially costly mistake.

Codes of conduct or ethics can also help to create a shared culture of transparency, where people inside and outside an organization know what is expected of them. In states where treatment plant operator certification is required, statewide codes are sometimes created and taught as part of the certification process. For example, the California Water Environment Association recently (May 2005) offered a training course on “ethics, transparency, accountability, and the wastewater field” entitled “Living in the Fishbowl.”³¹ Municipal government can require its own staff, contract companies, or even investor-owned utilities within their political jurisdiction to comply with statewide codes or their codes and process requirements.

The recent decision of the Hamilton, Ontario City Council is an example of a strong commitment to transparency in process. The city was the first

Patronage employment is a form of corruption that applies to public agencies at least as much as it applies to private companies.

31 The course announcement also recognizes how even the appearance of corruption can harm the capacity of water agencies or companies to succeed: “The training will give you real-world insight and examples that show the link between ethics and public perceptions of our jobs and how being in the public eye can make a difference in how you, your agency, and the industry are valued today and in the future.”

Establishing and adhering to decision process rules (a self-imposed code of conduct) is one way of ensuring maximum transparency.

in Ontario to engage a private contractor to operate its facilities over a decade ago. It recently took back over operation of those facilities after an unsuccessful proposal process for continued operation by a private contractor. The process was lengthy and thorough, as described in Chapter I. Public operation was not envisioned as the outcome at the outset of the process. However, when the only proposal that met all non-financial criteria turned out to cost \$50 million per year versus the previous contract of \$24 million per year, the city was forced to consider alternatives to continued private operation. Public operation was an alternative, as was a change in the rules of the process to permit negotiation.

The city ultimately chose public operation, in part because doing so was most consistent and transparent with the pre-approved and stringent process. For example, one proposal was disqualified and returned unopened because it was submitted one hour after the deadline for submittals. If the city had chosen to negotiate with the company that provided a \$50 million proposal, one could argue that they should have also allowed the other late proposer a second chance as well. Although changes in the rules during the process was within the city's legal power, it chose not to do so because that opens the door to charges of corruption, undue influence, lack of transparency, unfairness to some stakeholders, and so forth. Establishing and adhering to decision process rules (a self-imposed code of conduct) is one way of ensuring maximum transparency.

Consistently Inform Customers about New Facility Benefits and Costs

At some point, most water utility service managers and governing officials will need to raise prices to address infrastructure renewal, enhanced security precautions, and regulatory compliance demands. Although these costly investments may be necessary to maintain reliable and safe water service, the added costs are often hard for many governing officials and customers to accept. After all, knowing when a rate increase is needed and when it is due to mismanagement or corruption is not easy to determine. And the information provided at the time of the rate increase proposal is particularly suspect if the supposed needs have not been discussed publicly at least several times before. A recent article in the American Water Works Association (AWWA) Journal summarized the importance of discussing both costs and benefits with customers:

In order to avoid rate shock, managers and other water professionals must effectively focus communication efforts on the value of the service provided. By identifying and articulating such benefits, we can hope to steer the focus of public discourse from solely the cost to also the value provided by the expenditures (Raucher, 2005).

One best practice is to include public stakeholders on project teams and to specifically have conditions safeguarding public engagement in any RFPs or other sourcing documents.

One characteristic of a well-managed system is that the customer's perception of value is higher than both the cost and the price of the service provided. A well-developed and executed communication strategy with a

utility's customers can often help to change perception within a community about the prices paid for water services. Two recently completed AWWA reports on this topic — *Avoiding Rate Shock: Making the Case for Water Rates* (2004) and *The Value of Water: Concepts, Estimates and Applications for Water Managers* (2005) — provide additional detail and discussion.

Third-party Technical Reviews

No communications plan can communicate what its creators do not see. Third-party technical reviews expand everyone's understanding of a situation and encourage public participation. Third-party reviews of privatization proposals have occurred in at least New Orleans, Louisiana; Stockton, California; and Milwaukee, Wisconsin. The New Orleans review by a community foundation found several deficiencies in the procurement documents that contributed in part to the decision to terminate the procurement process. The Stockton review by the Pacific Institute suggested that unless California Environmental Quality Act (CEQA) review were performed (a 30-60 day task), the contract might be invalidated by a court. This later occurred, although appeals continue.

Two third-party reviews have taken place in Milwaukee: a performance evaluation of United Water (Theiler et al., 2003) and an independent audit of the Milwaukee Metropolitan Sewerage District (MMSD) (Theiler et al., 2004). Among other findings, the performance evaluation recommended increased attention to non-critical asset maintenance and capital improvements — a specific point within one of our cause and solution option categories. The audit focused on the causes of combined sewer overflows in May 2004 and provided detailed recommendations on how to reduce future overflows, their impact, and the public's understanding of the causes and cures for such overflows. In both reviews, United Water and MMSD were both complimented and constructively criticized as appropriate. Given that the issue of overflows was a very significant concern to the community, and some had claimed the overflows resulted from United Water's profit motive, the third-party reviews greatly assisted in clarifying the symptoms (which included not just overflows but public misunderstanding about the overflows), their real causes, and some of the better options for solving these problems.

Another benefit of third-party reviews during the course of a contract, or periodically in the case of a public operation, is that outsiders can judge the success or failure of the performance monitoring system (indicators and standards). If effective performance or the causes of non-performance to date are not transparent to outsiders, changes need to be made. Interestingly, the contracts we reviewed — Indianapolis and Gary, Indiana; Milwaukee, Wisconsin; Sioux City, Iowa; and Hamilton, Ontario — did not require periodic self-assessments,³² independent third-party assessments, or any efforts to review and publicly report on performance or performance metrics over time. The old (1995) Sioux City contract required the contractor to make at least three suggestions for improving services by November 1 of each year. The new contract (2005) no longer includes any such language.

The City of Indianapolis has used a variation on the idea of independent third-party reviews, in one case very successfully and in another case with

Contracts we reviewed did not require periodic self-assessments, independent third-party assessments, or any efforts to review and report on performance over time.

³² Third-party review of the Milwaukee contract was performed, but it was not required by the contract.

limited results. As part of the relationship with United Water to manage the city's wastewater facilities, the city instituted a Technical Advisory Committee composed of experienced professionals in the community. The Committee was apparently such a success that the City went on to formally require, as part of the contract, that Veolia Water use a similar mechanism for oversight of the water system. Unfortunately, despite the inclusion of this clause in the contract, the water system advisory panel was initially understaffed and had very limited public exposure. Only in recent years has the Committee been staffed and able to perform as originally anticipated (Pratt, personal communication, 2005).

Prompt Third-party Investigations of Allegations of Corruption

Prompt investigations of allegations by credible third parties are important.

Even the appearance of corruption is a serious matter, because it can lead to both withdrawal of public support for needed actions (e.g., investment in aging infrastructure) and a collapse of rational discourse between important stakeholder groups. Prompt investigations of allegations by credible third parties are important. The Lawrence, Indiana situation mentioned in Chapter II—a no-bid contract of up to 50 years awarded in 2001 to a newly formed company—is currently being investigated by the FBI. Since criminal charges may be involved, the investigation can be expected to take some time. The Lawrence example is a failure in this regard if concerns about corruption were voiced at the time of the decision or shortly thereafter. By the time the FBI or District Attorney, etc., is involved, local government and stakeholders have failed to ensure adequate transparency and participation.

In general, where corruption or the appearance of corruption exists, other credible and unaffiliated organizations might be willing to investigate such charges (e.g., the ethics committee of a professional association in the water sector).

Managers also need to be willing to act promptly even if criminal actions did not occur or have not been proven. The City of Toronto water department recently fired six employees and suspended another four without pay based on complaints made to the city's fraud and waste hotline. An internal investigation has been turned over to Toronto police. The mayor indicated that the employees who were fired had violated conflict of interest rules and other city policies.

CHAPTER V

CONCLUSION AND RECOMMENDATIONS

Conclusion

THE DEBATE OVER water privatization drowns out discussion of methods for achieving real, tangible performance improvements regardless of whether the utility is public, fully private, or somewhere in between. Including or excluding the private sector in the ownership or operations of water systems is a decision with analytical and value components. In the end, values will influence any decision. Some communities or leaders value limited government and private sector involvement. Others value direct public control through ownership and operation.

As de Bono (1985) says:

If information is sufficient to make a decision for us then we, as humans, are superfluous. We are only called in to make decisions when an analysis of information is insufficient — that is to say, when we have to speculate or guess or apply human values and emotions. So the human element in decisions is vital. In the end all decisions are emotional (p. 115).

However, allowing values and ideology to overshadow the factual and analytical part of the decision often prevents success. Thoughtful discussions and fact-finding will pay large dividends in the long run. Such discussions and fact-finding in the upper Midwest found that better performing utilities:

- have staff in the right numbers and of the right kind
- know what assets they own and the condition of those assets

In the end, values will influence any decision. However, allowing values and ideology to overshadow the factual and analytical part of the decision often prevents success.

- are consistently funded at adequate levels because they use a wide range of techniques to control costs and to maintain financial credibility with their communities through continuous communication
- measure performance and provide rewards or penalties as appropriate in order to ensure that staff at all levels are encouraged to either improve the quality or reduce the cost of service
- make decisions in open processes, with transparency and public participation and periodic third-party reviews, thereby avoiding even the appearance that corruption or private agendas are driving the decision process
- if restructuring is needed, avoid a false start by identifying the symptoms and underlying causes of the problems people are facing — and discuss the full range of solutions that might be implemented — *before* deciding to undertake potentially controversial actions such as changing from a public to private or a private to public utility structure.

Our research shows that with respect to performance, the choice of public versus private is not nearly as relevant as other factors.

The choice of public versus private structure is important because it involves social values such as public health, affordability of essential services, and the general approach of each community to satisfaction of basic needs. But our research shows that with respect to performance — how much or how many services get delivered per dollar of rates paid by customers — the choice of public versus private is not nearly as relevant as the bulleted points above.

Recommendations

The primary objective of this report is to report and promote those actions that will enhance performance of public and private organizations providing water-related services. We did not cover all the details that senior managers in larger organizations might like; it would take hundreds of pages and repeat information that is already available from industry associations and other sources. Instead, we have attempted to present the key information that will benefit public officials and the interested public when water system restructuring is being considered.

Our recommendations are presented below in the form of “do” and “don’t” statements, organized into the six bullet-pointed determinants of success discussed throughout this report. The “do” items emphasize positive actions that will enhance performance whether a public or private vehicle is chosen. The “don’t” items summarize the larger mistakes to avoid during water system restructuring that emerged from our research. Our primary concern is to help communities learn from the experiences of others. There are many ways to succeed so long as major mistakes discovered in other venues are avoided.

Avoid False Starts

Do involve people with a wide variety of backgrounds and agendas in the analysis of symptoms and root causes. People’s perspectives naturally

tend to reflect their professional training and may also reflect their own personal agendas (e.g., job security). A widely representative group of people will tend to synthesize these perspectives into more-robust, and perhaps unexpected, solutions. Broad participation also builds support for potentially controversial solutions and reduces the cost of defending decisions after they are made. The Lansing Board of Water and Light successfully used a task force to develop a regional solution that captures economies of scale but maintains local control.

Do identify exactly which problem symptoms restructuring must solve.

The Milwaukee Metropolitan Sewerage District (MMSD) knew their primary challenge was to control the cost of constructing and operating new facilities to reduce combined sewer overflows. Consequently, they focused on solutions that seemed likely to control cost and reduce financial risks. Detroit, Michigan knows that their asset base is very large and costly; consequently, they are focused on developing a better understanding of the condition of their assets and development of plans for future repair, maintenance, replacement, or expansion of assets.

Do figure out community willingness to pay for various levels of service improvements when improvements are planned.

“Technocrats” often decide the level of service they think involves a reasonable balance of benefits with costs. For example, the MMSD has spent more than \$2.2 billion to reduce sewer overflows from 50+ per year to around 2-3 per year. And Sioux City, Iowa’s specifications for odor control at their new wastewater treatment plant suggest that no more than six odor complaints per year are acceptable. But in Milwaukee, some citizens have perceived even a few overflows per year as too many, and some citizens in Sioux City may feel the implicit standard for odor control is too lax. An important part of the restructuring process is to be sure that community members are aware of the benefit-cost trade-offs involved in selecting a targeted service level, and that the final choice of service level reflects community values, not just technical expert opinions.

Do figure out affordability for community groups and sub-groups if current or future rates are believed to be too high.

Unless a community knows who will have a hard time paying projected future rates, it cannot work effectively to prevent that hardship from occurring. In addition, affordability includes some subjective opinions, so clear descriptions of assumptions and results of analysis are especially important. The Rural Community Assistance Partnership (RCAP) has assisted many small communities to define and respond to affordability problems.

Do not jump to solutions before considering symptoms, causes, and the full range of solution options.

Stockton, California had minimal community involvement prior to issuance of a request for proposals. That is, the decision that a private operator was the best solution was made without the informed consent of a wide range of stakeholders. This is an example of the “false start” problem described in the best practice process, above. The consequence has been a costly court battle and approval of a citizen referendum that requires all future large contracts to obtain citizen approval. This is arguably a poor way to run a city, but a majority of citizens felt it was the only way they could affect the political process.

Do not assume the private sector is inherently more efficient or less costly. There is no published statistical analysis to support this claim. There are cost factors that both drive up and drive down private company costs relative to public agency costs. When cost savings exist, they result from some specific circumstance that can be identified and evaluated, not an inherent advantage of private over public. For example, the successful bidder in Stockton, California is far more experienced than other bidders and public agencies at operation of a particular type of wastewater process — experience that allowed them to bid \$20 million less for capital improvements than the second-lowest proposal and to provide financial guarantees for their proposed method of wastewater treatment.

Do not assume public agencies can be as efficient as private ones without a strong culture of performance and rewards for performance. Although it is true that many of the methods of improving efficiency can be executed by private companies or public agencies, implementing such changes in public agencies requires a strong culture of performance that is too often absent. In both Akron and Butler, Ohio, the key to achieving better performance was to undertake time-consuming and challenging culture changes, with some mistakes along the way.

Do not let estimates of cost savings dominate decisions. There is more than one reason a community might want (or not want) private involvement in their water system. Estimates of future cost savings from any course of action, private involvement or otherwise, are uncertain for a variety of reasons and become more uncertain during the planning period (e.g., 10-30 years). It is important to make such estimates and to include them in the decision process. But the fallacy of misplaced concreteness should be avoided. Estimates are only as good as the assumptions and data involved and are only one dimension of an important decision with non-financial consequences for the community. Promising enormous savings, then having to raise rates later because the assumptions underlying the estimates turned out to be incorrect,³³ undermines community support for needed investments over time.

Do not assume the private sector can or will carry risks at lower cost than public sector. This may have been true a few years ago when private companies were very eager to enter the water market, but the appetite for risk of private companies seems to have recently declined dramatically. Both Sioux City, Iowa and Hamilton, Ontario report companies asking for significant payments if they are to take on risks normally carried by the municipal owner of assets. In Hamilton, the final decision to return to public operation was driven in large part by the fact that the “risk premium” included in the one proposal that met all technical standards was approximately \$25 million per year, which was equal in size to the city’s previous annual payment for private operation and its own estimate of the annual cost for operation with public forces. Companies may be capable or willing to bear risks for less than a municipality can, but there should be a plausible rationale for that (e.g., preferential rates from insurers due to a company’s operating history or size) rather than assumption.

33 About \$38 million of estimated operational savings in the 20-year Stockton contract resulted from assumed future rates of inflation well below the average actual rate in the last 20 years. If future inflation is like past inflation, none of these operational savings will materialize; in fact, private operation may cost about \$2 million more than public operation was estimated to cost (Wolff, 2002).

Staff Effectively

Do improve worker productivity and reduce excess jobs (if any) by investing in human resources. There are many reasons that public agencies can develop too many or the wrong kind of staff over time. Paradoxically, investing in people can be the best way to effectively reduce a workforce, either through attrition or transfer to more appropriate jobs elsewhere in government service. The Akron Public Utilities Bureau in Northeast, Ohio learned that training tailored to their employees and their jobs, including development of a specialized training program with a local university, was an effective way to reduce labor costs with no harm, and many benefits, for workers.

Do consider outsourcing non-core functions. Hiring a private contractor to operate an entire system can be an appropriate solution. But so can outsourcing of non-core functions rather than the entire operation. The Butler County, Ohio Department of Environment Services helped control its operating costs by outsourcing payment processing, a non-core function that others are more efficient at doing.

Do communicate clearly with workers and unions, if large numbers of jobs are transferred between employers (e.g., public to private, or private to private during a contract transition). The MMSD developed a standard form contract that was reviewed and approved by the union prior to solicitation of proposals for operations. The Indianapolis Wastewater contract had similarly effective and clear communications. Unfortunately, the Indianapolis water transition involved conflicting communications about benefit levels for workers that created tension that could have been avoided. (The operations contract called for the value of benefits to be maintained, while the mayor had previously stated that benefits would be unchanged. To this day, the contractor and the union differ on how to calculate the value of benefits).

Do plan for additional contract management personnel if outsourcing, especially full operational contracts. As a taskforce of the National Research Council has pointed out, the skills to manage a contract are entirely different from those required to manage an operation. The MMSD budgeted for a contract management team staffed at a level equivalent to three to four full time employees. This expense was small compared with their anticipated savings of \$1 million per month.

In smaller communities, invest in staff capacity to manage technical specialists and contractors. Smaller communities cannot afford multiple employee teams to manage contracts. In some cases, employees responsible for contract management have many other unrelated duties. Given these time constraints, ensuring that staff has been professionally trained in contract management (there are numerous courses offered on this topic) is likely to be an extremely effective financial investment.

Do not punish public employees who take reasonable risks in an attempt to control costs. Those who have worked for public agencies know that risk-taking is not often rewarded. It is critical that public agency employees be encouraged and empowered to take reasonable risks

without fear that their careers in public service will forever be damaged should negative results occur. Senior managers and elected officials need to support social entrepreneurship. Although this topic has been widely discussed and was mentioned by several interviewees, we unfortunately did not find any clear-cut examples of how a public agency can implement this cultural change.

Do not assume that companies or managers within one company are the same. The particular people involved in any situation are a critical element of success or failure. The MMSD contract requires that replacement of the local private company manager must be approved by MMSD, an action that has taken place once without event. The Indianapolis contract for water operations does not seem to have this type of clause, and some citizens in Indianapolis have blamed changes in the private company senior management team for a variety of problems. We cannot evaluate the accuracy of these claims, but note that it is not unusual in some types of contracts to specify named persons who will perform the contracted-for services, precisely because the choice of manager or professional can be critical to getting the desired results.

There are also examples of companies that did well in City A but not in City B, while another company did well in B but not in A. There are a variety of possible explanations for such patterns of performance, but some causes that should be considered by anyone thinking of contracting for services are the cultural fit between a community and the various proposers and the particular persons proposed to manage the services.

Ensure Consistent and Adequate Funding

Do control costs by looking for and capturing economies of scale and scope. Small communities are perhaps the most challenged, financially, in the focus area of this study. One very effective way to reduce cost is to identify and capture economies of scale or scope, through cooperative arrangements or outright consolidation with other public agencies or private companies. The Lansing Board of Water and Light reportedly achieved greater economies of scale in its core operations through a combination of retail contracts to manage other operations, wholesale contracts to resell water, and asset transfers from other municipalities to the Board. Some other functions, primarily in distribution, remained with the towns. The “hub and spoke” area project with Veolia has reportedly allowed the towns of St. Michael, Albertville, and Hanover to benefit from the economies of scale within Veolia.

Do control costs through innovative procurement structures. One of the drivers of private sector involvement has been the potential for cost reduction from using the design-build (DB) approach rather than the traditional design-bid-build (DBB) approach. But DB involves some risks that DBB does not, which is one reason that DB is not legal in some states. The design-build-operate (DBO) approach is one way of addressing the risk issue associated with DB, but there are other innovative procurement structures that may also reduce cost and manage risk effectively. Sioux City, Iowa is using a design-operate (DO) approach rather than DBO, because DB is illegal in Iowa. And a DB approach, with an option to award an operational contract if the DB work is completed in a superlative manner, has been used in Cle Elum, Washington.

The incentive power of the operational option was apparently used successfully to offset the incentive for the DB contractor to use lower-quality materials or otherwise cut corners in design and construction.

Do maintain financial credibility by discussing the value of water services with customers periodically. Customers are well aware of the bills they receive. They think less often about the benefits of the services they receive. Discussing with customers the value of these services, and the value of other services that might be provided, provides a pathway for continuous improvement in the services offered. It also builds a mutual understanding of the cost of maintaining the system, which in turn makes rate increases when needed much more politically palatable. This communication effort should be part of an ongoing, permanent communication program, as in some examples discussed below.

Do not fail to control costs by assuming that bigger is always better. Economies of scale are important to identify and capture. But they do not always exist or sometimes exist but are difficult to capture. They may not be relevant to all functions or services, or the effort to develop economies of scale may not have a large impact on the organization if the costs represent a very small portion of the overall organization's costs. Focus on functions where there are clear economies of scale and where the impact is greatest on the overall financials. For example, Newport, Kentucky sold its system to another public agency in an attempt to reduce costs through consolidation but has since incurred large rate increases.

Do not fail to control costs by underestimating potential contract risks. Entering into a contract involves risk, just as getting married creates a risk of divorce that does not exist for single people. A good contract is essential; but enforcing or defending even a good contract can be costly. Although termination for convenience options with a lump sum termination payment—a recent innovation in these types of contracts—make exiting a contract relatively simple legally, they still involve costs and risks. Every transition, whether from public to private or private to private hands, etc., involves risk.

Advocates of private contracts sometimes claim that the private utility or private operator is assuming all risks. That is simply not possible. For example, although the transfer of risk to the private contractor in the City of Stockton water/wastewater/stormwater agreement is quite impressive, the city has nonetheless been involved in litigation over the contract since it was awarded. Entering into the contract created a risk that did not exist prior to the contract award.

Manage Assets Better

Do inspect all assets, especially underground, periodically and especially when considering a contract. One of the biggest drivers of future water utility costs is the current poor condition of assets, especially underground assets that have not been visually or otherwise inspected in many years. Atlanta, Georgia found to its regret that the relatively unknown condition of its underground water assets was a constant source of tension with the company hired to run its water system; eventually, the contract was terminated at least in part due to arguments over who should bear the costs of repairing these assets. Even if an operational contract is

Entering into a contract involves risk, just as getting married creates a risk of divorce that does not exist for single people.

not being considered, periodic inspection of every asset in the system is one of the most important steps a utility can take to control future costs.

Do tailor the asset management system to the needs of your utility. Well more than half the cost of most water systems is related to capital investments and their maintenance. If you do not know their condition based on direct observation or testing — especially underground assets — neither public nor private operators will be able to control costs or prevent unexpected service problems. That said, it would be inappropriate for a small rural system to employ fully developed risk management tools, just as it would be inappropriate for a very large utility to be satisfied with an accurate inventory of assets. For example, Detroit, Michigan, a large city with millions of customers, used a relatively complex combination of risk-based asset management tools to create its capital improvement plan; by contrast, Mesa Consolidated in California, a small utility with fewer than 25,000 accounts, has limited itself to ongoing asset inspection and tracking.

Do not under-invest in capital projects because it is easier to do so. This decision is usually in part a public decision, even when a private operator or utility is involved. It takes political will to make long-term investments. It is difficult to raise rates. Nonetheless, that is sometimes necessary. Greater efficiency or other techniques to reduce cost cannot solve all problems without rate increases. The MMSD, for example, seems to have controlled costs by hiring a private contractor but also needed to spend \$2.2 billion, plus interest, to upgrade wet weather sewer facilities. While not an easy process, the officials of MMWD were able to work with their community to develop support for these expenditures.

Do not sell public assets without a buyback clause in the contract. As Pekin, Illinois has discovered, using eminent domain to condemn and purchase the assets of an investor-owned water utility is not simple. Although Peoria, Illinois has recently chosen not to purchase the assets of the investor-owned water utility that serves them because the appraised value was too high, their right to purchase those assets was established by an old contract in which they sold the original public system to the predecessor of the current investor-owned utility. Their situation, legally, has been easier than that of Pekin, Illinois. Newport, Kentucky recently sold its water system to a regional agency, which has since raised rates far more than was expected at the time of sale. If Newport had the authority to repurchase those assets, they would have more options to control recent or future rate increases.

Do not think excluding the private sector from water system operations or management maximizes public control. Ownership of assets and responsibility for day-to-day operations are dimensions of control. But inadequate skill or poor knowledge of the condition of assets, which means they might break or fail to operate unexpectedly, are also dimensions of control. Excluding the private sector does not address all factors that reduce control over the system. For example, in the Atlanta, Georgia water contract, neither the city nor the private contractor had much control over costs associated with deteriorating underground assets. Increased control of assets requires at minimum that you know with certainty which assets exist and their condition, regardless of ownership.

Measure and Reward Performance

Do measure and reward (or penalize) performance. Management structures that do not measure and reward achievement of performance objectives inevitably become inefficient. Performance bonuses are one way of rewarding private companies, as is allowing them to keep any cost reductions they achieve below a fixed fee that is paid for their services. Performance penalties in a contract, such as those for odor complaints in the Sioux City contract, are also beneficial. But performance measurement, rewards, and penalties are also appropriate in public systems. The City of Baltimore CitiStat system has saved more than \$100 million since its inception in 2001. Louisville Water in Kentucky, a public corporation, has used bonuses at all levels of the utility to increase efficiency and to create a culture of performance among its staff. In the case of public utilities, even if bonuses are not legal or appropriate, promotions and continued employment can be clearly linked to achievement of performance objectives. In all cases, these measures and rewards need to be tightly linked to the overall strategic goals of the municipality or organization.

Do focus performance specifications on critical issues. It is not possible to measure every performance dimension, especially in smaller communities. But one can focus performance specifications, and rewards or penalties as appropriate, on the most critical issues identified in the best practice process described above. In Sioux City, Iowa, for example, the contract for operation of a new wastewater treatment facility includes an 18-page specification addressing odor control.

Do report performance measures to the public periodically. Public reporting of performance measures is an effective way to keep managers, both public and private, on their toes. The Australian water industry has used this technique to ensure that its publicly owned water corporations are nonetheless subject to competitive pressure from the public. For example, if a water retailer is slower in responding to customer complaints than other retailers in other cities, citizens and businesses will know that and can question whether it is reasonable or not, given local circumstances.

Do consider preparing operational specifications suitable for a contract, even if private operation is not being considered. Hamilton, Ontario made an interesting discovery in late 2004. When they did not obtain a desirable bid for continued operation of a system that had been operated privately for more than a decade, they decided to operate the system with public forces in accordance with specifications they had prepared for solicitation of bids. The existence of the specifications is anticipated to create greater accountability for the public operation than would normally exist. Although this situation was accidental in Hamilton's case, it suggests that preparation of operational specifications for a system may be beneficial even when private operation is not being considered. Doing so can also serve as an objective basis for performance measurements and rewards or penalties, as described above.

The public is unlikely to respond positively when asked to support a rate increase if they have not heard from you in years.

Make Decisions in Open and Transparent Processes with Public Participation

Do maintain public involvement and communications on a permanent basis, not just during restructuring. Public involvement and communications is important on a permanent basis, not just during restructuring. Both Butler County and Akron, Ohio have developed extensive communications plans and procedures that they report have been well worth the effort, both during and since they restructured their water systems. All of the problem discussed in this manual — especially labor relations and inadequate public support for needed investments — will be easier to solve if continuous communications have been taking place. The public is unlikely to respond positively when asked to support a rate increase if they have not heard from you in years.

Do avoid even the appearance of corruption. Even the appearance of corruption can create enormous costs for a community. For example, people may refuse to support rate increases even though they know new capital facilities are needed. One way to prevent even the appearance of corruption is to strictly adhere to a formally adopted decision process. Hamilton, Ontario did this and has survived a difficult transition — including some legal challenges — with minimal cost and political upheaval. Another way to prevent corruption is to be certain that sufficient time, competition, and public notice are involved with restructuring decisions. Some of these characteristics were not part of the decision process in Lafayette, Indiana; Stockton, California; or Indianapolis, Indiana. All three communities have subsequently become embroiled in costly legal and political conflicts, including accusations of corruption.

Do perform periodic third-party assessments. External review is more credible than internal review, although the latter is also important. The City of New Orleans and the MMSD have successfully used third-party reviews to improve their performance and to build credibility across a wide range of stakeholders. The technical advisory committees (TAC) in the City of Indianapolis were specified in the operating contracts for this purpose. The TAC for the wastewater contract seems to have functioned reasonably well in that regard, but initial understaffing and commitment to the TAC function in the water contract has been a problem. Contracts should include a requirement for external review, and public agencies should commit to periodic external review as well. Unfortunately, the contracts we reviewed did not include this type of requirement.

Do exceed minimum legal requirements. In some states, contracts for municipal operations are not necessarily public documents. Similarly, codes of conduct for municipal employees are often not required by law. But exceeding the minimum legal requirements can greatly enhance the credibility of a utility or government agency, creating social capital that is valuable when a serious problem emerges. The City of Toronto, for example, recently fired employees for violating a code of conduct related to possible corruption, even though the employees had not yet been indicted or convicted. Similarly, there is much to be gained and little to be lost by making all final city contracts public.

APPENDIX A

PRIMER ON MUNICIPAL-LEVEL WATER CHALLENGES

THE WATER SECTOR IS traditionally described as involving water supply, wastewater management, and stormwater management functions. This report addresses all three categories of services to the extent that municipal levels of government (cities, counties, and special districts) are grappling with a variety of problems. We do not, however, address all issues in the water sector. For example, the Great Lakes states and some Canadian provinces are currently working to develop rules and procedures governing export of water from the region. Although this issue has implications at the local level, local government does not have direct authority over exports. Consequently, we do not discuss internal water exchanges.

This appendix expands on three of the four challenges discussed in the report: 1) chronic under-investment, 2) regulatory standards, and 4) limited financial resources. We have combined the discussion of challenges 1) and 4) into a sub-section titled “Financial Challenges.” We have split the discussion of challenge 2) into four parts: “Drinking Water Quality,” “Ambient and Raw Water Quality,” “Combined Sewer Overflows,” and “Management of Separate Storm Sewer Systems.” We have not expanded on the discussion of challenge 3) national security concerns, beyond that provided in the body of this report.

Financial Challenges

At present, cities are financially hard-pressed. The most recent National League of Cities financial survey (Pagano, 2004) found that 63% of municipal finance officers believed their cities were less able to meet financial needs than in the previous year, and 61% felt that they would

be less able to meet needs in 2005 than in 2004. An even higher percentage (74%) of responding financial officers in the Midwest felt economic conditions were deteriorating rather than improving.

Public spending on water systems “continues to increase and it represents a growing share in the total spending relative to other municipal infrastructure” (Allbee, 2005). Furthermore, the financial burden for water system spending has shifted toward local government (away from state and federal government) over the past few decades, although this needs to be kept in context: 90% of overall spending for these systems from 1956 to 1994 (about 1 trillion 1997 dollars) was derived from local government funds. Interestingly, capital spending for water and wastewater systems has remained in the \$18-20 billion per year range since the 1970s (in constant dollars). Growth in spending has primarily been in operations and maintenance (O&M) (Allbee, 2005).

Looking forward, there seem to be both capital and O&M spending gaps, defined as the differences between the current annual spending levels and expert estimates of needed spending over the next 20 years. For example, the US Environmental Protection Agency (EPA) has estimated these gaps in water and wastewater services (combined) at about \$11 billion per year for capital facilities and \$15 billion per year for O&M; or about \$224 billion and \$309 billion in total over 20 years (EPA, 2002).

Other estimates vary from these, with at least one claim that nearly a trillion dollars of additional investment will be needed in the water sector in the next 20 years (ASCE, 2005). Table A-1 presents state-by-state estimates of total drinking and wastewater investment needs (not gaps) from the 2005 American Society of Civil Engineers (ASCE) infrastructure “report card.”

Table A-1
Infrastructure Investment Estimates
by State (2005)

These represent 12.7% and 12.8% of nationwide water and wastewater needs, respectively, documented in EPA (2002).

State	Costs of Needed Infrastructure Improvements (billions of dollars over 20 years)	
	Drinking Water	Wastewater
Illinois	\$ 6.15	\$11.89
Indiana	\$ 1.70	\$ 7.22
Iowa	\$ 2.85	\$ 1.95
Michigan	\$ 6.79	\$ 4.09
Minnesota	\$ 3.01	\$ 2.31
Ohio	\$ 4.95	\$ 8.72
Wisconsin	\$ 3.10	\$ 3.33
Totals	\$28.55	\$39.51

These financial challenges are significant overall, but local agencies and companies need to develop detailed estimates that reflect their particular circumstances. Furthermore, average revenue increases of 3% per year above the rate of inflation would be adequate to fund the needs estimated by EPA (Albee, 2005). Although such rate increases are not desirable, they are also not necessarily a problem. In fact, water and wastewater rate increases from 1998 to 2004 have averaged about 2% more than the rate of inflation (Raftelis, 2004). And a growing population or local

economy may cause revenue to increase even when rates do not. Unfortunately, some communities—especially those with decaying underground infrastructure—have higher needs than average and will “virtually bankrupt themselves by failing to grasp their situation until the problems of aging become visually self-evident” (Albee, 2005).

Drinking Water Quality Challenges

The US has regulated drinking water quality longer than any category of pollutants, since it affects public health directly. The 1996 amendments to the Safe Drinking Water Act (SDWA) are the most recent significant legislation affecting drinking water quality, and they in turn have prompted a number of regulatory actions to which drinking water utilities are still responding. Such actions include but are not limited to:

- Reduction in the arsenic standard for drinking water from 50 parts per billion to 10 parts per billion (ppb).
- A disinfections rule for groundwater. Groundwater is usually free of pathogens (for example, bacteria and viruses), but some recent evidence suggests that disinfection is appropriate under some conditions.
- Rules related to the potential presence of lead in drinking water from lead piping. This is particularly relevant for old water systems or those serving older homes.
- Disinfection byproducts rules. Chlorinated compounds are widely used to kill pathogens, but they also combine with naturally occurring organic compounds to create byproducts with long-term health effects such as increased risk of cancer. The disinfection byproducts rules address alternative approaches to disinfection, such as ozone or ultra-violet light, and reduction of disinfection byproducts through better control or use of different types of chlorine compounds.
- Various studies and monitoring requirements for MTBE (methyl tertiary butyl ether, a gasoline additive), perchlorates, radionuclides, and radon. These compounds are present in groundwater in some communities, due to either natural causes or leaks from underground storage tanks.

In addition, the 1996 SDWA amendments required source water assessments to be performed by all drinking water systems in the US by 2003. These assessments are intended to prevent contamination of drinking water supplies, since prevention is usually much less expensive than cleanup after the fact. The assessments include commitments to ongoing management efforts to prevent source water pollution and emergency response plans. These assessments are the reason that many water supply utilities have become more involved in watershed management activities and stakeholder-based watershed councils in recent years.

Ambient and Raw Water Quality Challenges

The quality of ambient water (“natural” water in the environment) is closely related to the quality of raw water that enters drinking water

treatment plants prior to distribution to customers. Raw water quality affects the cost of drinking water treatment and the need to invest in new or upgraded facilities. Poor ambient water quality can also indirectly affect the cost of wastewater treatment or stormwater management, because regulations governing discharges have to become more stringent to protect or restore ambient waters.

EPA Region 5 (<http://www.epa.gov/region5/water>) supports a variety of water programs and activities that affect the states of Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin³⁴ and the 35 federally recognized tribes located within the region. EPA Region 5’s 2002 State of the Water Report (<http://www.epa.gov/region5/water/pdf/sotw2002.pdf>) discusses the major sources of drinking water contamination and the challenges the region faces in ensuring a safe water supply.

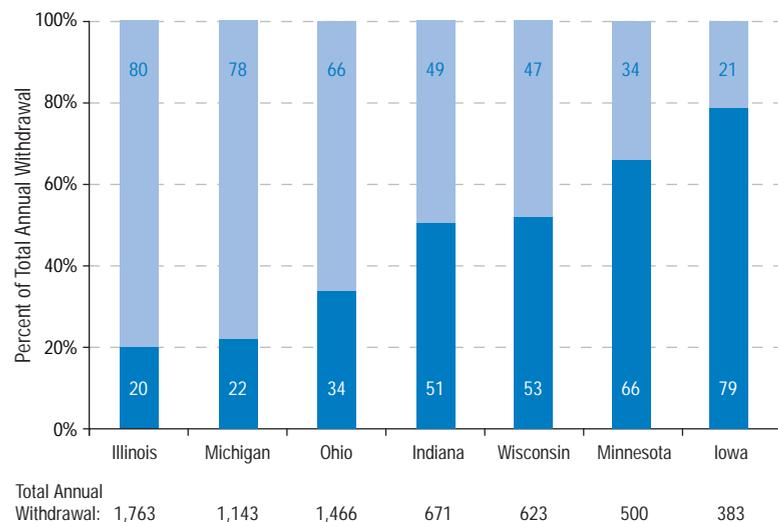
According to that report, over 95% of community (residential) water system customers currently receive water meeting all EPA health-based standards. (About 54,000 community water systems exist in the US). Region 5, however, faces a unique challenge in ensuring safe water in over 41,000 non-community (non-residential, such as schools and rest stops) water systems. These comprise about 40 percent of the non-community water systems in the entire US. These non-community systems typically serve a limited number of people on a year-round basis and require extensive technical assistance relative to the small number of people served.³⁵

Surface and ground water resources are abundant in the region and are therefore subject to pollution from permitted discharges; fuel spills or leaking storage tanks; waste disposal; and agricultural, industrial, and municipal stormwater management practices. Because water sources vary by state (see Figure A-1), different states face different vulnerabilities. Surface water pollution is relatively more important to water supply in Illinois water systems than in other states, for example, while ground water pollution is relatively more important in Iowa than in other states.

Figure A-1
Quantities of Public Supply from Ground & Surface Water

■ Surface Water
■ Ground Water

Source: USGS, 2004.



³⁴ Iowa is located in EPA Region 7.

³⁵ The EPA does not regulate systems with fewer than 25 customers.

Impaired ambient waters are listed by each state or EPA region pursuant to the Clean Water Act, Section 303(d). Listed waters are subject to an additional level of regulation beyond standard permit requirements. This additional level is the development of Total Maximum Daily Load (TMDL) estimates for pollutants that are causing impairment and allocation of responsibility for reducing pollutant discharges among the parties that contribute to the impairment. Table A-2 contains the current Web sites featuring impaired water lists for each state in the focus area. It also includes the Web site for a similar list of Areas of Concern (AOCs) prepared by the International Joint Commission (IJC), a US-Canadian entity created by international treaty that works to protect water quality in the Great Lakes watershed.

State or Region	World Wide Web Universal Record Locator (URL)
EPA Region 5	http://www.epa.gov/owow/tmdl/
Illinois	http://www.epa.state.il.us/water/tmdl/status-list.html
Indiana	http://www.in.gov/idem/water/planbr/wqs/303d.html
Iowa	http://www.iowadnr.com/water/tmdlwqa/wqa/303d.html#2004
Michigan	http://www.michigan.gov/deq/0,1607,7-135-3313_3686_3728-12711--,00.html
Minnesota	http://www.pca.state.mn.us/water/tmdl/index.html#tmdl
Ohio	http://www.epa.state.oh.us/dsw/tmdl/
Wisconsin	http://www.dnr.state.wi.us/org/water/wm/wqs/303d/303d.html
Great Lakes Region, including Canadian Provinces	http://www.ijc.org/rel/boards/annex2/aoc_map.html

Table A-2
References for Additional Water Quality
Data in the Study Area

Combined Sewer Overflow Challenges

Many stormwater and wastewater systems in large cities involve “combined” sanitary and storm sewers. One hundred or more years ago, treatment of these waters was a distant possibility while combined sewers were far less expensive to build and maintain than separate sewers for sanitary and storm waters. When the need for treatment became clear, it was often much less expensive to build larger treatment facilities and treat the combined waters rather than dig up streets in order to create separate sewer systems. Unfortunately, because large but infrequent storms create much larger flows than systems are designed to handle, combined sewer overflows have become a significant water quality problem in the US.

These overflows contain raw sanitary sewage diluted with rainwater. They carry pathogens and other pollutants and can create numerous health, environmental, and economic problems. Although the science on this topic is still incomplete, Great Lakes beach closings are believed to be related to overflows.

There are about 16,000 wastewater systems in the US, of which approximately 750 are combined systems. Combined systems are typically located in large cities and are estimated to serve roughly 40 million people. They overflow about 850 million gallons per year of untreated water. Separate sanitary sewer systems also overflow, because storm water can infiltrate their pipes; but by comparison, only 3-10 million gallons of sanitary sewer overflows occur each year in non-combined systems (EPA, 2004). A list of combined systems is at http://cfpub.epa.gov/npdes/cso/demo.cfm?program_id=5. Figure A-2 demonstrates that most of these systems are located in the Northeast, Great Lakes States, and Pacific Northwest. The Environmental Integrity Project (2005) (<http://www.environmentalintegrity.org>) reports that 358 of these systems are located in Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin. Many of these systems have not met minimum federal standards for preventing discharges or received approval for long-term plans to prevent overflows.

Figure A-2
Combined Sewer Systems in the US

Source: <http://cfpub.epa.gov/npdes/cso/demo.cfm>



Bypassing or blending combined sewer flows during peak storm events is controversial. Bypassing refers to the practice of discharging some flows without treatment. Blending refers to the practice of treating portions of the flow to different levels (e.g., secondary, primary, initial screening and grit removal, none) and blending it prior to discharges. Typically, such measures are taken only during peak storm events when high flows can wash biological organisms essential to the treatment process out of the plant and when backing up the wastewater system is viewed as an unacceptable health risk. Alternative solutions include expanding storage capacity prior to the treatment plant so that excess flows can be retained until the peak of the storm has passed, rebuilding sewers to separate storm and sanitary components, and reducing flow through disconnection of the structure-related roof and foundation drains.³⁶ The practices of bypassing or blending are not standardized, and in late 2003, the EPA proposed regulations to make the practices uniform. Facing significant opposition, the EPA has since withdrawn the regulations.³⁷

The general public's expectations about the performance of major investments contribute to the combined sewage overflows issue. Most individ-

³⁶ Several Michigan communities are pursuing this last approach as the least-cost alternative. Removal at the source may eliminate both collection system and treatment investment. Such source reduction can also be done in conjunction with system storage to optimize investment and operating costs (McCormick, 2005).

³⁷ EPA announced on May 25, 2005 that the agency will not finalize the proposed policy on blending. The official EPA press release stated: "Blending is not a long-term solution. Our goal is to reduce overflows and increase treatment of wastewater to protect human health and the environment."

uals incorrectly believe that long-term, large capital investments completely eliminate the risk of overwhelming a system. Combined sewer systems are not designed to accommodate the largest imaginable storm event. Doing so would be a poor use of public funds. There is always some size of storm that will disrupt the normal operating process of a combined sewer system or force bypasses or blending actions that potentially have public health and environmental implications. In Milwaukee, after investing \$2.2 billion since 1993, which reduced sewer overflows from an average of 50+ times per year to an average of 2-3 times per year (Grzezinski, personal communication, 2005), the public seems to believe that any overflows at all represent a failure. Failure to communicate adequately with the public about these issues has created many problems, as noted specifically in the Mayor's Independent Audit Committee Final Report (Theiler, 2004) on the performance of the Milwaukee Metropolitan Sewerage District.

Separate Stormwater System Management Challenges

Storm water, even when collected separately from wastewater, can have significant environmental and public health impacts. Most water discharges occur at a "point source," a single point such as a treatment facility where relevant inflows and outflows are relatively easily identified and monitored. Other pollution vectors, such as stormwater runoff from agricultural or industrial lands, are considered "non-point sources," sources that are spread over disparate and much less easily defined area. Specific regulations apply to non-point sources of water pollution.

Multi-sector general permits (MSGP) regulate eleven categories of stormwater discharge from 30 industrial sectors.³⁸ In addition, the EPA regulates discharges from some municipal separate storm sewer systems (MS4s). Agricultural stormwater discharges and return flows from irrigated agriculture are exempt from permit requirements under the US Clean Water Act. Some states do regulate pollution from agricultural sources.

MS4s include all drainage facilities regardless of ownership, even when those facilities have only surface drainage or ditches. Larger MS4s (those serving communities greater than 100,000 persons) were regulated commencing over ten years ago in Phase I of the federal stormwater program. Smaller MS4s in specified census bureau tracts, construction sites from one to five acres in size, and MS4s deemed by state or federal regulatory agencies to present a threat to environmental quality are regulated in Phase II, which was implemented in the past few years. In some states, Phase II requirements are being phased in, with full coverage not expected until 2007.

The primary method to control the quality or quantity of stormwater discharges is through best management practices (BMPs). BMPs may vary by category of land use and by location. General permit coverage requires an applicant to describe the BMPs to be applied, the performance measures and monitoring used to demonstrate compliance, and the implementation schedule of the BMPs. These items are included in a Notice of Intent (NOI) to comply with the general permit that is filed by the owner

³⁸ See <http://cfpub.epa.gov/npdes/stormwater/swcats.cfm> for a list of the categories.

of the MS4. The BMPs for MS4s fall into six EPA-specified categories of minimum control measures that every regulated MS4 must address:

1. Public education and outreach on stormwater impacts
2. Public involvement and participation
3. Illicit discharge detection and elimination
4. Construction site stormwater runoff control
5. Post-construction stormwater management in new development and redevelopment
6. Pollution prevention and good housekeeping for municipal operations

Although few cities have delegated responsibility to private companies for management of MS4s that satisfies these requirements, private companies are willing to provide this service. For example, Stockton, California has contracted with OMI/Thames Water to perform this work along with operation of the water and wastewater systems. Furthermore, small communities have in many cases employed private companies or consultants as managers of specialized city functions (e.g., a public works department may be staffed by an engineering firm under contract). In these cases, successes or failures in stormwater management often depend directly on the private party's performance.

APPENDIX B

CURRENT ROLE OF THE PRIVATE SECTOR

THIS APPENDIX PRESENTS some global and regional statistics on private sector participation in water management, specifically analyzing the claim that private operations are more efficient than public ones. Researchers have statistically analyzed the question of economic efficiency but have found no clear evidence that one form is more efficient than another. Some good reasons underlie this finding, as discussed below. Furthermore, there are some inherently difficult issues in comparing economic performance that local decisionmakers should be aware of. The decision to employ or not employ a private company is far too often fixated on cost issues to the detriment of other considerations (e.g., quality of service).

Current Global and US Water Markets

Public water companies provide 95% of water and wastewater services worldwide by some estimates. But the number of people served by private companies grew from 51 million people in 1990 to nearly 300 million in 2002. Six water companies alone expanded from 12 countries in 1990 to over 56 countries by 2002 (CPI, 2003).

These statistics portray the rapid global growth of private involvement in the water sector — growth that was led by Suez and Vivendi (now Veolia Environment) from France and RWE from Germany (owner of Thames Water in Britain). In the last few years, however, growth has slowed or at least changed course as some high-profile contracts have been cancelled (e.g., the water contract in Atlanta) and multinationals have sold some of the assets they previously purchased (e.g., Veolia Environment sold the equipment business part of US Filter). Many of these changes have involved service companies focusing more clearly on their service contract operations, with parallel divestiture of equipment and materials suppliers that they purchased in the rapid 1990s global consolidation of water companies. A description of the three companies as of 2004 is provided in Sidebar B-1.

Sidebar B-1: Brief Profiles of the World’s Largest Private Water Companies

	Veolia Environment	Suez	RWE
Services	Environmental services Water Waste management Energy services Transportation	Energy and environmental services Environment: water, sanitation and waste Energy: Electricity, gas	Three core businesses Electricity, gas, water RWE Thames Water is RWE’s water business
US operations	Five US subsidiaries Veolia Water North America Onyx–Superior Services Onyx North America Connex North America Dalkia North America	Owns 100% of United Water Active in 18 states, many on East Coast Other key brands present in US markets Ondeo (entire water cycle), Degremont (water treatment), and SITA (waste)	RWE Thames Water acquired American Water Works in 2003 Active in 30 states and 3 Canadian provinces
Key metrics	FY04 Global sales: \$20.3B Water: \$8B Water is 40% of sales and 49% of EBIT Total employees: 252,000 Water: 68,000 Operates in over 70 countries	FY04 Global sales: \$33.4B Environment: \$9.3B Environment is 28% of sales and 25% of EBIT Total employees: 160,700 Operates in over 30 countries	FY04 Global sales: \$35.1B Water: \$3.4B Water is 22% of sales and 43% of EBIT Total employees: 160,700 Water: 17,500 Operates in over 20 countries
Comments	Independent from Vivendi Universal starting 2004 Sold non-core US assets in 2004 <ul style="list-style-type: none"> • USFilter for \$975M • Culligan for \$612M Recent 50-year water contract with Shenzhen, China	Sold non-core US assets in 2004 <ul style="list-style-type: none"> • Sold 295 stake in M6, a French communications company In 2004, United Water acquired IOU New York South County for \$3M	In 2003, acquired American Water Works In 2003, divested majority stake in US hard coal and gas producer CONSOL

Note: Unless otherwise specified, all dollar figures assume an exchange rate of 0.82 euros/dollar.
 Source: All data courtesy company Web sites: <http://www.veoliawaterna.com>; <http://www.suez.com>; <http://www.rwe.com>.

The equipment and materials dimension of the water business is now going through a similar wave of divestitures, mergers, and acquisitions. As the author of a recent survey of the US water industry (Maxwell, 2005) said:

The much ballyhooed “foreign invasion” of the [US] water industry has now clearly reversed direction, with major US industrial corporations moving to assume control of many of the major companies and assets in the water treatment and purification [equipment and materials] businesses. Veolia, Suez, and most of the British water companies are exiting [equipment and materials] water businesses in the United States rather than acquiring them, while industrial firms such as General Electric, Danaher, ITT, Pentair, and Siemens are emerging as the new diversified water companies (p. 32, [words in brackets] added for clarity).

Estimates of the percentage of water services that are provided by private companies in the US vary, depending on source. For example, the International Council for Local Environmental Initiatives states that private companies owned or managed about 15% of the industry at the start of 2003 (CPI, 2003). By contrast, Veolia Water reported in 2004 that public-private partnerships and investor-owned water utilities make up 10% of the U.S. municipal water market (Edwards, 2004). These estimates are consistent with the percentage of the US population served by privately owned community water systems:³⁹ 40,282,683 persons out of a total US population of 295,934,143 (13.6%).

The statistics look different if one examines the number of systems rather than people served. There are about 54,000 community drinking water systems and about 16,000 wastewater systems in US (EPA, 2003 Community Water System Survey⁴⁰), with private systems serving about 16% of the population (different from but consistent with the numbers above). But because many very small or rural systems have private ownership or management, EPA subsequently estimated that 57% percent of all water systems are privately owned (EPA, 1999).

Reinhardt (2003) provides another interesting, but different, statistic. He says that private firms operated some aspect of at least 2,400 publicly owned water and wastewater facilities in 2002.⁴¹ This number sets a lower bound on the number of contracts in place. The Water Partnership Council (2003) has summarized similar data from 1997 through 2002 and reports that the number of contract operations of public facilities more than tripled over that five-year time period (from 775 in 1997 to 2,400 in 2002).⁴² In terms of people served, Gasteyer (2005) reports that contract operations served 4,192,722 in 2000, or about 1.4% of the US population in that year. This implies that contract operations are serving far fewer people than private, investor-owned utilities.

One reason for the recent rapid growth in private operation of publicly owned facilities is a series of changes in regulations. During the early 1990s, the Bush and Clinton administrations signed Executive Orders that removed several regulatory and legal restrictions on this type of contract. For example, the tax code was changed so that cities could use tax-exempt bonds to finance improvements that would be operated under contracts with private parties in excess of five years.⁴³ Tax-exempt status allows municipalities to borrow money at lower rates than private companies, since those who hold the bonds do not pay federal or state income taxes on the interest they receive. Private companies who had previously complained that contracts limited to five years did not allow them to recoup their costs became more interested in the US water market.

The Regional Water Market and Some of the Private Players

Private companies are significant players in the focus area of this manual: Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio, Wisconsin, and the province of Ontario. The three largest privately operated wastewater facilities in the US are located in the region: Milwaukee, Wisconsin; Indianapolis, Indiana; and Gary, Indiana.⁴⁴

39 Extracted from the 2000 Census and US EPA Safe Drinking Water Information System (SDWIS) data by Gasteyer (2005)

40 <http://www.epa.gov/safewater/cwssvr.html>, accessed July 5, 2005.

41 American Water Services is the fee-for-service subsidiary of American Water, an investor-owned water utility. American Water (2002) reports that American Water Services generated \$222 million of revenue in 2002 from 800 operation contracts in the US and Canada, for 700 water facilities and 300 wastewater facilities owned by others. Veolia (2003) reported US revenues of \$380 million in 2003 from 42 wastewater facilities and 26 water facilities. They also report that Suez-owned United Water (not to be confused with Veolia-owned United Water in Australia) had US-source revenues of \$180 million in 2003.

42 It is possible that the surveys performed by Public Works Financing that underlie this trend have become more comprehensive over time, picking up some contract operations in later surveys that were missed in earlier ones. Even if this is the case, the rate of growth from 1997 to 2002 was very rapid.

43 In 1997 the IRS extended the relevant contract limit to 20 years (approved Revenue Procedure 97-13).

44 All operated by United Water.

The Milwaukee wastewater contract and the Indianapolis water contract have been both widely publicized and watched closely by proponents and opponents of privatization. Milwaukee signed a 10-year contract in 1998 with United Water Services to run the city's sewage collection and wastewater treatment systems. In 2002, Indianapolis signed a 20-year contract with Veolia Water to operate and manage its water system.

But some forms of privatization are not new to the area. In fact, United Water began operating a wastewater treatment plant for the City of Indianapolis in 1993, United Filter began operating the wastewater facility in Sioux City in 1982, and investor-owned water utilities have existed in the area for more than a hundred years. Two of our examples are the efforts to repurchase private water company assets by the cities of Peoria and Pekin, Illinois under differing legal conditions.

We attempted to quantify the two primary types of private involvement in the focus area: 1) privately owned utilities, and 2) contracts for private companies to operate publicly owned facilities or systems. Within the first category, some systems are economically regulated at the state level, although most are not. Tables B-1, B-2, and B-3 summarize our findings. Keep in mind that the tallies shown present the number of systems privately owned or operated, not the number of people served.

Table B-1 lists the number of privately and publicly owned community water systems by state (Gasteyer, 2005). Precise data were not available for Ontario, but only six privately owned systems are reported in an inventory of systems for the province.

Table B-1
Ownership of Community Drinking
Water Systems¹

Notes:

- 1 Data for the states from Gasteyer (2005).
- 2 PricewaterhouseCoopers (2002) reports there are only four privately owned water and two privately owned wastewater systems in Ontario; all small. They also report that more than 400 communities are served by public systems in Ontario, but do not provide a count of the systems themselves.

State or Province	Privately Owned	Publicly Owned
Illinois	511	1,016
Indiana	439	376
Iowa	344	759
Michigan	701	633
Minnesota	243	635
Ohio	928	219
Ontario ²	6	400+ communities served
Wisconsin	510	534
Totals	3,682	4,572+

Table B-2 lists the approximate number of privately owned water and wastewater utilities that are economically regulated at the state level, obtained from state regulatory agency records or personal communications with staff. As noted in the national discussion above, US EPA reports that the vast majority of privately owned systems are small. The vast majority of these systems apparently fall below the economic regulatory thresholds, when such thresholds exist. Note that Michigan and Minnesota do not provide economic regulation of investor-owned water utilities at the state level regardless of size (Beecher, 2000).

State or Province	Water	Wastewater	Regulatory Web Site or Primary Source ¹
Illinois	47 ²	19 ²	http://icc.state.il.us
Indiana	27 ³	46 ³	http://www.ai.org/iurc/
Iowa	3 ⁴	0	http://www.state.ia.us/government/com/util/util.html
Michigan	0	0	No economic regulation of W & WW IOUs ⁵
Minnesota	0	0	No economic regulation of W & WW IOUs ⁶
Ohio	20	9	http://www.puco.ohio.govs
Ontario	0	0	No economic regulation of W & WW IOUs ⁷
Wisconsin	8 ⁸	0	http://psc.wi.gov/
Totals	105	74	

In the United States overall in 1995, 46 state commissions regulated approximately 8,750 water utilities, while 28 state commissions regulated approximately 2,150 wastewater utilities. Twenty-four state commissions had jurisdiction only over investor-owned utilities, 21 state commissions had jurisdiction beyond investor-owned utilities, and five state commissions had no jurisdiction (Beecher, 2000). Economic regulation in those states without jurisdiction, and probably of small utilities in other states, is within the local police power of municipal government. Legal review of existing constitutional, statutory, and case law materials indicates that local governments in Michigan and Minnesota have broad powers that originate under constitutional and statutory delegations to local governmental units (e.g., counties, cities, townships, etc.) that authorize a broad authority to act under home rule concepts. These powers are adequate to include local water utility regulation and are not preempted by any currently existing state statutes that limit regulation of rates and other economic matters to the state level. That said, there are no extant cases of local regulation of private water utilities that have resulted in reported court decisions that address the subject and specify whether, and to what extent, such regulation is permissible. Nevertheless, a fair inference from existing constitutional, statutory, and case law materials is that local governments in Michigan and Minnesota enjoy regulatory power over water utilities that operate within their jurisdiction, and judicial review of the exercise of such authority in relation to rate-setting and similar issues will be deferential to the local governmental action, should the issue arise (Abrams, personal communication, 2005).

Table B-3 describes the contracts for operation of publicly owned facilities by the larger water companies that are operating in the upper Midwest. United Water, Veolia Water, and, to a lesser extent, American Water identify their municipal operations on their Web sites. Indianapolis Water also has a Web site (with links to Veolia) that has one of the most complete public records for meeting transactions, incentive awards, and operational reports with fiscal data available to the public. This level of transparency is laudable and an important public service. Public visibility

Table B-2
Investor-owned Utilities (IOUs) Regulated at the State Level

Notes:

- 1 W = Water; WW = Wastewater
- 2 There are 14 regulated utilities that provide both water and wastewater services, so the total for Illinois is 53, not 66.
- 3 Based on our interpretation of 2003-2004 annual report data for regulated water rates in Indiana.
- 4 Iowa American Water Company, serving Davenport, Bettendorf, and Clinton, is the only investor-owned water utility meeting the size requirement to be regulated in Iowa (Harvey, personal communication).
- 5 Commencing in 1995, Michigan does not regulate rates or other economic aspects of privately owned water and wastewater utilities.
- 6 Minnesota does not regulate rates or other economic aspects of privately owned water and wastewater utilities.
- 7 PricewaterhouseCoopers (2002) reports that there are only 4 privately owned water and 2 privately owned wastewater systems in Ontario; all small.
- 8 Two of these are larger utilities that also sell energy (Superior Water Light and Power, and Wisconsin Gas). In addition, Alliant Energy sold its water department in Beloit to the municipality in 2004 and was in the process of selling its water department in Ripon to the municipality in early 2005 (Engelke, personal communication).

is very important if public trust is to be achieved. Operations Management International (OMI) and Environment Management Corporation (EMC) are also significant players in the upper Midwest but do not provide this information via the Web.⁴⁵

Table B-3
Contract Operations by Larger Water Companies in the Upper Midwest¹

State or Province	Veolia	United Water	OMI	American Water Services	EMC	Totals
Illinois	5	2	1	1	16	25
Indiana	2	5	0	1	19	27
Iowa	4	0	3	1	0	8
Michigan	1	0	6	0	0	7
Minnesota	7	0	0	0	0	7
Ohio	4	0	0	0	0	4
Ontario	9	0	1	1	0	11
Wisconsin	1	1	0	0	0	2
Total	33	8	11	4²	35	91

- Notes:
- 1 Tallies are approximate and do not reflect the size of each operation. Sources of data: <http://www.veoliawaterna.com/project/projmap.asp>; <http://www.unitedwater.com/locatns.htm>; <http://www.amwater.com/awpr/index.jsp>; Irvine, personal communication; Hayden, personal communication.
 - 2 The parent company of American Water Services, American Water, is an investor-owned utility serving at least 6 communities in Iowa, 11 in Illinois, 20 in Indiana, and 29 in Ohio.

There are no comprehensive or credible estimates available of the number of communities in the focus area that are *considering* privatization. Evidence is anecdotal and sometimes incorrect. For example, one source suggested that Cincinnati might be considering privatization. A public relations representative for the city said this was pure rumor. Newspaper reports that Detroit was considering privatization were apparently better-founded; a city public relations representative (Daisy, personal communication) said that the mayor had suggested privatization as a possible option during a recent campaign, but that the City Council has since taken a position against it. The city is pursuing best private industry practices, however, in order to ensure that public operations are as efficient as possible. This is an example of how public agencies are subject to non-market competitive pressures (Wolff and Palaniappan, 2004) and may respond by re-engineering their operations rather than privatizing.

Comparing the Efficiency of Private and Public Utilities, in General

“A sample of such partnerships realized average savings of 24 percent over the period 1992-1997 ...” (Water Partnership Council, 2003, p. 13).

“After a decade or more of living under the threat of privatization, most public agencies and utilities have made substantial progress in terms of understanding needed productivity improvements and cost reductions—a sort of ‘de facto’ privatization. One way or another, water and wastewater agencies are gradually becoming more competitive and efficient” (Maxwell, 2005, p. 32).

Proponents of privatization often claim that private companies are more economically efficient than public operations since they are subject to competition and because the public sector, in general, has been slow to implement productivity and quality improvement strategies and approaches that have been used in the private sector for decades. Proponents of privatization (Water Partnership Council, 2003) often

⁴⁵ Basic information on these companies can be found at: <http://www.omiinc.com> and <http://www.emcinc.com>.

emphasize what they perceive to be several inherent disadvantages of public utilities:

- Bureaucratic requirements and procedures that often hamper pursuit of least-cost options
- Restrictions on procurement and capital expenditures
- Limits on pay raises
- Prohibitions against incentive compensation

Opponents of privatization often claim the opposite: that including profit in the cost of services increases the price paid by customers, and that public entities are not shielded entirely from competitive pressures. The literature on water utility prices and costs does not contain any statistically valid analysis to support either point of view. Sidebar B-2 summarizes the findings of key papers that have been published in peer-reviewed academic journals.⁴⁶

⁴⁶ McGuire/Malcolm Pirnie (2002) claim the private sector is 19% less costly than the public sector, but this figure is based on case studies rather than statistical analysis.

Sidebar B-2: Peer-reviewed Statistical Analysis of Operational Efficiency

The question of whether public or private utilities are more efficient is a complicated one to answer. Researchers have tried to analyze this question for nearly three decades and have concluded that while private firms may claim improved efficiencies, there is little statistical evidence to support those claims.

Crain and Zardkouhi (1978) produced one of the earliest papers on the relative efficiency of public and private water utilities in the US. Recognizing that “the property rights theory of the firm, which has a long and famous doctrinal history, wants badly for a properly specified empirical test,” they proceeded to provide that test for 1970 and 1975 operating data provided by the American Water Works Association. The theory predicts that private utilities should be more efficient than public ones, and indeed they found that privately owned utilities had lower operating costs than their public counterparts. Feigenbaum and Teeples (1983) examined essentially the same data but used a more general mathematical method. They did not “find significant differences in the cost functions of government versus private operations.” That is, they demonstrated that Crain and Zardkouhi’s result did not always follow from the data but was only found when the data were processed in a particular, probably inaccurate, way. Byrnes, Grosskopf, and Hayes (1986) used an entirely different modeling approach and essentially the same data and found “no evidence that publicly owned utilities are more wasteful or operated with more slack than privately

owned utilities.” Their work independently confirmed that of Feigenbaum and Teeples and independently rejected Crain and Zardhouhi’s finding.

Fox and Hofler (1986) also found no statistical difference in the efficiency of public and private firms. More recently, Estache and Rossi (2002) used 1995 data on 50 water companies in 29 Asian and Pacific Rim region countries and a variety of mathematical approaches in order to obtain robust results that are very unlikely to depend on the approach used. Their analysis “confirms the US results and suggests that efficiency is not significantly different in private and public companies.”

Furthermore, they point out, like Wolff and Palaniappan (2004) and this report, that competition matters more than ownership. Public utilities can be made subject to non-market competition. For example, if they have to compete with the possibility of privatization, they will need to, as Estache and Rossi put it, “catch up or die.” Public utilities are also subject to “yardstick competition” where their performance is periodically compared with that of other utilities, public and private. Managers of public organizations that do not measure up in these comparisons may lose their jobs or choose or be forced to improve organizational performance. These are plausible explanations of the statistical findings that are not accounted for in theory-based claims that private companies must be more efficient.

Gasteyer (2005) has also looked at this question, using data from the US Census. He compared average monthly water rates paid by county in the US with the percentage of privately owned community drinking-water systems in those counties. He found no correlation between these statistics. For all systems, there was a slight tendency toward lower costs for privately owned systems (Figure B-1). But for smaller systems, there was a slight tendency toward higher costs (Figure B-2). The appropriate interpretation of these findings is that we cannot say anything in general about the relative efficiency of publicly and privately owned community drinking water systems in the US, although some people have tried to spin statistically insignificant patterns such as those in these figures into proof that public or private is superior.

Figure B-1
 Cost versus Form of Ownership, All
 Community Water Systems in US

Source: Gasteyer, 2005.

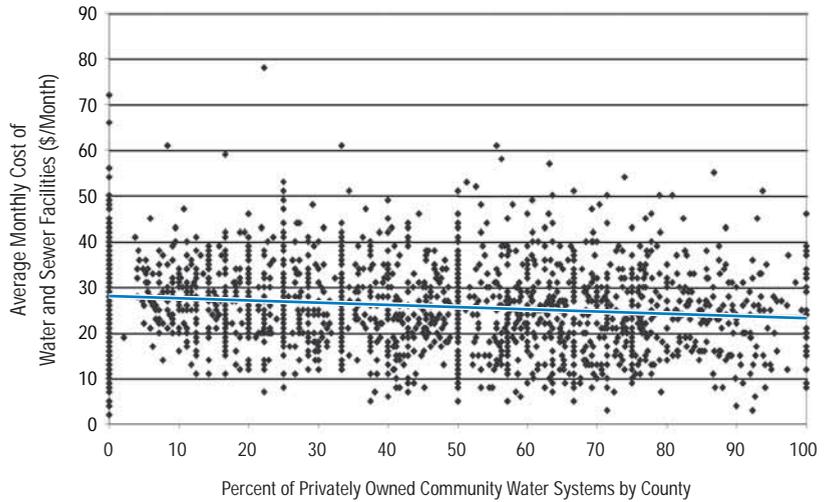
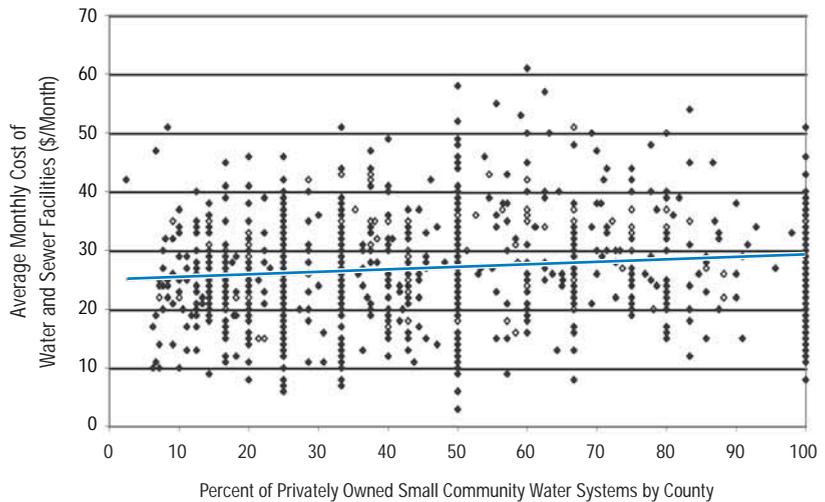


Figure B-2
 Cost versus Form of Ownership, Small
 Community Water Systems in the US

Source: Gasteyer, 2005.



Likewise, looking at water systems serving fewer than 10,000 customers, Gasteyer (2005) found little relationship between private or public ownership and violations of SDWA environmental and public health rules and regulations. What stands out with regard to these regulatory requirements is that smaller utilities, whether private or public in ownership, are more likely to be in violation of the standards.

A 2001-2002 study (Blackburn et al., 2004) of the number of waterborne-disease outbreaks associated with drinking water in the US, by state, found that the number of such outbreaks in those years was notably higher in the upper Midwest, as a region, than in other parts of the country (Figure B-3). This may reflect the large number of small systems in these states and other states with highly dispersed populations.

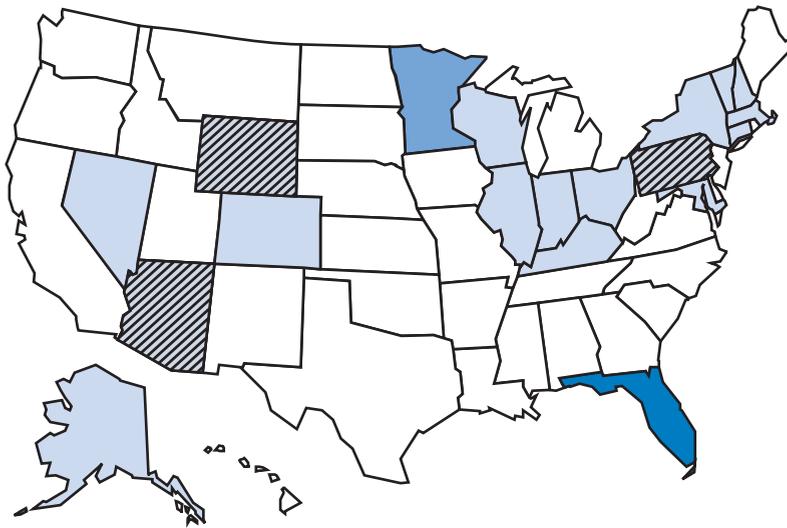


Figure B-3
Number of Waterborne-disease Outbreaks Associated with Drinking Water, by State, 2001-2002

Number of Outbreaks	Number of States
≥4	1
3	1
2	3
1	14
0	31

Note: Numbers are dependent on reporting and surveillance activities in individual states and do not necessarily indicate that more outbreaks occur in a given state.

Source: Modified from Blackburn et al., 2004.

Inherent Difficulties of Comparing the Cost of Private and Public Options

Despite these statistics, advocates and opponents of private involvement provide examples to support their point of view. For example, the Water Partnership Council (2003, p.13) claims that contract operations “typically result in cost-savings of 10-40 percent” and provides some examples. Specific claims are also made, such as the statement on United Water’s Web site that the City of Gary, Indiana “is guaranteed” \$30 million of savings under their contract.⁴⁷ By contrast, organizations like Public Citizen and some civic leaders (e.g., some in Pekin and Peoria, Illinois, and New Hampshire⁴⁸) offer counter-examples⁴⁹ and argue that profit requirements and the profit motive must increase costs and prices. How is one to evaluate this evidence?

First, one should accept that there are inherent and perhaps insurmountable obstacles to comparing the cost of two courses of action when only one course has occurred or will actually occur. Saying that a community saved money over the last decade involves comparing actual expenses against a “might have been” scenario. And saying that a community will save in the future involves comparing two projections, both of which are fictional in some sense.

⁴⁷ Similarly, the City of Indianapolis (1999) claims it saved \$78 million through wastewater contracts.

⁴⁸ The New Hampshire Business Review (2005) discusses a recent study that found higher rates for private providers in New Hampshire. These issues are not simple, since private providers in New Hampshire not only have higher rates but also have higher costs since they pay property taxes not paid by public suppliers.

⁴⁹ For example, Public Citizen cites Washington Courthouse, Ohio, as having saved \$500,000 in the two years after purchasing its potable water system from an investor-owned utility in 1991.

Second, cost estimates should be compared on an “apples-to-apples” basis, which is hard to do. Comparing planning-level capital cost estimates against actual bids is not a fair comparison. Planning-level estimates are developed for capital improvement budget purposes and are often intentionally high because it is embarrassing for a public employee to request budget increases later (this is one form of risk-averse behavior, a factor that can increase public utility costs). The best way to evaluate capital cost savings is by comparing actual bids or cost proposals against actual bids, cost proposals, or after-completion costs for similar capital facilities elsewhere. Even then, there will be differences. But like buying or selling a home, one can learn more from carefully analyzing comparable sales than by talking casually with home brokers (who may talk your property up to get the listing or talk it down to make a quick sale).

Third, when comparing future costs, it is important to be aware of the inflation assumptions. Many operational contracts are based on an initial fixed annual fee with subsequent annual adjustments for inflation, either in general or for energy or for some mix of indices. No one has a crystal ball about future inflation. The most neutral assumption is probably to assume that future inflation will be much like past inflation. Wolff (2003) found in an evaluation of the proposals for private operation of water and wastewater facilities in Stockton, California that the operational cost savings over 20 years were slightly negative (-\$1.7 million) when future inflation was assumed to be like past inflation. Consultants to the city assumed lower rates of inflation and found operational cost savings of \$39 million in year 2002 dollars.⁵⁰

Finally, one has to be sure to be aware of different forms of risk when comparing cost estimates. For example, NRC (2002) provides two examples of design-bid-operate (DBO) contracts that may have saved 16% and 41% compared with the traditional approach of design-bid-build (DBB) and operate with public staff. These savings are consistent with those touted by the Water Partnership Council, above. But this is not news. The design-build (DB) approach to procurement has always been lower-cost than the traditional approach of separate design and construction contracts.

The DB approach, however, involves greater risks because the customer does not have control over design details or, in the extreme case, may be forced to accept a design they do not like or trust. Separate design and build contracts also reduce the chance of corruption, an infrequent but very costly event. The practice is sometimes politically controversial because it is sometimes perceived as favoring larger contractors to the exclusion of smaller entities. It is also thought in some states to conflict with the requirements of low-bid laws intended to “level the playing field.” Other states do not see that requirement as an obstacle. More information is available at http://govtsecurity.com/mag/design_build_not.

The DBO approach has been used in recent years to offset the incentive for a DB contractor to cut corners and also because the approach can save money on reduced interest during shorter construction periods. If the contractor must operate the facility for a substantial period of time under a fixed-fee type of contract, they have an incentive to balance cost-cutting during construction against maintenance and operational costs in later years. The DBO approach and related procurement innovations discussed

⁵⁰ Some advocates of privatization in Stockton went further and added up the consultants' projected savings over the next 20 years but did not adjust them to a value in year 2002. This yielded an impressive projected operations and capital improvements savings, combined, of \$175 million. Calculated on a net present value basis, as Wolff and consultants did in the finer print of their reports, yielded the much lower combined figure of \$86 million in year 2002 dollars. Standard financial analysis requires one to account for the earning power of money over time by comparing “net present value” dollars—that is, the lower figure.

in this report⁵¹ hold great promise. But until projects built under them have operated for 15-20 years, they involve uncertainties that could have cost consequences.

Even when guarantees are provided, it can be costly or impractical to enforce them. The City of Phoenix recently awarded a DBO contract for a new water treatment plant. During contract negotiations, the low bidder decided to withdraw their bid. The city was forced to consider — at some expense and with a time delay — whether to attempt to force the low bidder to deliver on their bid. Eventually, the city chose not to and negotiated successfully with another bidder. But the example shows that guarantees are not risk-free. They have to be enforced, and doing so takes time and money.

These points should not lead one to believe that private companies cannot save money for municipal government; whether they do or not has no general answer based on the best analysis to date. Cost savings depends on circumstances and how risks play out over time, not simply on the choice between public and private. In practice, whether a course of action will increase savings or costs may be indeterminable.

If one wants to perform a very detailed cost comparison, they should be certain to address at least the cost factors listed in Table B-4. These factors affect how much customers will ultimately pay. Some factors tend to increase cost (+); others tend to lower cost (-); and yet other factors have cost impacts that depend on circumstances (0). For example, as noted in Sidebar B-2, public utilities can be subject to non-market competitive pressure. And investor-owned utilities might not be subject to such pressure if the state or other economic regulator is accommodating or incompetent when rate reviews occur.

Cost Driver	Public	Private	Contracts ¹
Competitive Pressure	0	0	-
Profit Requirement	-	+	+
Profit Motive	0	0	-
Risk Aversion	+	0	0
Economies of Scale & Scope	0	0	0
Income Tax Status ²	-	+	+
Property Tax Status ²	-	+	0
Debt Service Tax Status ²	-	+	0

It is also important to think separately about private companies’ profit requirements, which is definitely a cost that public entities do not incur, and their profit motive, which has more complicated impacts. Companies certainly want to increase their profits, a factor that would — in isolation — lead companies to pad pass-through expenses or push prices up. But the profit motive also motivates legitimate cost-cutting measures that municipal government cannot or will not engage in (e.g., procurement practices that are simpler and less costly for subcontractors). The profit motive can also lead a company to keep profit margins low per contract in the hope of expanding profit overall through expanded market share. The profit motive in a fully competitive market drives costs and prices

Table B-4
Cost Drivers for Three Forms of
Utility Organization

Notes:

- 1 This column addresses contracts with private companies for operation or management of publicly-owned assets, not contracts between government entities.
- 2 There are higher costs in these categories for private companies, but these costs also generate a benefit for taxpayers in the form of tax revenue.

⁵¹ Examples of innovations include the DBO contract recently signed in Sioux City and a DB with operational contract awarded later as a reward for successful completion of the DB project, used in Cle Elum, Washington.

down, not up. The profit motive in a monopoly drives prices up. Because the water sector is a natural monopoly overall — but one with the possibility of competition “for the market” and the possibility of non-market competitive pressures like benchmarking between communities — the profit motive has complicated impacts on cost and price that depend on local circumstances, rules, and contracts.

Use of Eminent Domain to Purchase Water Utilities

The cities of Pekin and Peoria, Illinois have been separately engaged in legal struggles with Illinois American Water, an investor-owned utility, over purchasing the utility assets. Because they reflect actions contrary to the trend toward increased private involvement, we thought these were interesting examples of restructuring. We discovered some important legal issues that local government should be aware of that apply to changes in asset ownership over time. Although it is customary in US DBO contracts for the assets to be owned by the municipality from the outset, there are contracts in which the assets are owned by the private company until the end of the contract term. In such contracts, many of the issues discussed below would apply.

Peoria’s right to purchase private assets was established under an old (1899) contract through which they sold public assets to American Water’s predecessor. The courts upheld the repurchase clause in the contract, although American Water disputed it. While Peoria has recently chosen to not re-purchase those assets because they were deemed too expensive,⁵² Peoria seems to be in a stronger position to determine future asset ownership than Pekin because Pekin has no such contractual history. The city has tried to use eminent domain to purchase the assets, and its attempted action is currently being litigated.

A recent law review article (Saxer, 2005) delineates the issues of concern with regard to the use of eminent domain to expropriate privately owned utilities. The central example of the article was the attempted condemnation by Corona, California of Southern California Edison facilities (the dispute was settled in 2003 without a decision being rendered). In general, the use of eminent domain power to provide for public utilities such as light, heat, water, and power is widely recognized. Usually, however, it is not expressly provided in the governing constitutional and statutory provisions that eminent domain can be used to acquire an ongoing utility. There are a few states that do have express provisions. One such provision in Indiana specifically authorizes the use of eminent domain to acquire a plant and facilities from a public or private utility so long as it is within the city limits. The City of Fort Wayne, Indiana relied on that provision in 2003 when it tried to acquire part of a private water and sewer utility.

More generally, Saxer traces the practice of public condemnation of private utilities to the mid-19th century and demonstrates that the practice is generally accepted historically, with courts uniformly finding that obtaining public ownership of utilities is a sufficient public purpose to support the exercise of eminent domain. In the past half-century, there is some division of states on the issue, with some states encouraging such condemnation by statute and other states limiting it. A few states require

⁵² The contract specifies that if the city wishes to purchase assets it must pay the price specified by a three-member panel composed of one member chosen by each party and a third chosen by those two. The two members chosen directly provided greatly different values, and the final value specified by the panel was much greater than the city believed it should be. The contract allows the city to consider exercising its option (and re-estimate the value of the system) every five years.

a finding of “necessity” as a pre-condition for exercising eminent domain.⁵³ In the condemnation of an existing utility, it is possible to argue a lack of necessity since the public already is being served, albeit by the private utility. The majority of states, however, defer to the judgment of the condemning agency on its finding of necessity, but a few might allow this issue as a challenge to condemnation of the private utility.

Illinois apparently is among those states that limit local authority, although not over a finding of necessity. Instead, the Illinois Commerce Commission has established a standard that the condemnation must be in the public interest. Pekin has floundered on this standard because it has not determined how to or who would operate the assets after condemnation, and in particular has not addressed the issue of rate protection for water system customers outside Pekin City limits (Abrams, personal communication, 2005).

Saxer also documents a social trend occurring at the state level in the US that local decisionmakers should be aware of: municipalities attempting to negotiate purchases of privately owned utility companies, while keeping the power of eminent domain as a fallback position if negotiations fail. Stated differently, the Pekin and Peoria examples are not isolated. For example, the City of Nashua, New Hampshire is negotiating with Pennichuck Corporation, the owner of a local water company, to purchase the company and then transfer ownership of it to a regional water district created by neighboring New Hampshire communities. Beloit, Wisconsin recently purchased water assets from Alliant Energy, and a similar process is reportedly underway in Ripon, Wisconsin.

The broader trend in municipal buy-backs is documented empirically using survey data supplied by the International City Managers Association (ICMA) in Hefetz, Warner (2005). There is some activity in the power sector. After experiencing problems with Montana’s largest provider, NorthWestern Energy, the city of Great Falls, Montana is also pursuing the idea of publicly owned power in order to provide its citizens with a stable supply of electricity at reasonable rates.

A final example of the trend toward municipalization is taking place in Massachusetts, where cities are voting to support state law changes to clarify a town’s right to municipalize. By passing a bill that “explicitly states that the incumbent utility must sell its assets to the municipality, once a fair value has been established for the existing infrastructure,” cities and towns are hoping to own their own electric companies and take over electricity distribution. Privately owned utility companies fear such government ownership and have resisted selling their assets to cities, arguing that public ownership will not provide the promised reliability, adequate customer service, or reduced prices. This is precisely the case made successfully so far by Illinois-American Water (see <http://www.amwater.com/awpr/ilaw/news/news4141.html>), a case that the City of Pekin intends to appeal to the Illinois Supreme Court (Ray, personal communication, 2005).

53 Limiting local authority to condemn is one means of preventing local officials with hidden agendas from abusing their authority or attempting to squeeze inappropriate concessions from utilities.



APPENDIX C

"SUNSHINE LAWS" FOR THE FOCUS AREA

THE FOLLOWING SECTION lists the most important laws governing transparency in public decisionmaking in Illinois, Indiana, Iowa, Ohio, Michigan, Minnesota, Wisconsin, and Ontario (Abrams, personal communication, 2005).

Illinois

CHAPTER 5. GENERAL PROVISIONS, OPEN MEETINGS, OPEN MEETINGS ACT (Sunshine Law), § 5 ILCS 120/1. [Policy]	§ 5 ILCS 120/2.05. [Recording of proceedings]
	§ 5 ILCS 120/2.06. [Written minutes]
§ 5 ILCS 120/1.01. [Short title]	§ 5 ILCS 120/2a. [Closed meetings]
§ 5 ILCS 120/1.02. [Definitions]	§ 5 ILCS 120/2b. [Repealed]
§ 5 ILCS 120/2. [Open meetings]	§ 5 ILCS 120/3. [Noncompliance; civil action]
§ 5 ILCS 120/2.01. [Meeting times and places]	§ 5 ILCS 120/4. [Penalty]
§ 5 ILCS 120/2.02. [Notice]	§ 5 ILCS 120/5. [Severability]
§ 5 ILCS 120/2.03. [Schedule of meetings]	§ 5 ILCS 120/6. [Home rule units]
§ 5 ILCS 120/2.04. [Notice requirements, additional]	

Indiana

TITLE 5. STATE AND LOCAL ADMINISTRATION
 ARTICLE 14. PUBLIC PROCEEDINGS
 CHAPTER 1.5. THE INDIANA OPEN DOOR LAW

Burns Ind. Code Ann.

§ 4-22-2-16. "Governing body," "public agency," and "official action" defined—Compliance With Open Door Law

§ 5-14-1.5-1. Intent of chapter—Construction

§ 5-14-1.5-2. Definitions

§ 5-14-1.5-3. Meetings of governing bodies of public agencies to be open—Secret ballot vote

§ 5-14-1.5-4. Agenda—Posting of copy—Action by agenda number—Memoranda of meeting—Inspection of minutes

§ 5-14-1.5-5. Notice of meetings

§ 5-14-1.5-6. [Repealed.]

§ 5-14-1.5-6.1. Executive sessions

§ 5-14-1.5-6.5. Meetings of governing bodies with employee organizations

§ 5-14-1.5-7. Action for declaratory judgment or injunction

§ 5-14-1.5-8. Meetings to be accessible to individuals with disabilities

Iowa

Open Meetings Law—Iowa Code (2004)

21.2 Definitions

21.4 Public notice

21.5 Closed session

21.6 Enforcement

Michigan

Sunshine Law/the open meetings act

15.261. Short title; suppression of local regulations; requirement of greater degree of openness.

15.262. Definitions

15.263. Meetings open to public; place of holding; persons permitted to attend; decisions of public bodies; deliberations of public bodies; conditions for attendance; prohibition; addressing of meetings; addresses to legislature; exclusion; limitations; boards, commissions, and panels; inapplicability; insurer associations; committee actions; social or chance gatherings; conferences; veteran's trust fund board of trustees; inapplicability when emergent need considered

15.264. Public notice; contents; posting

15.265. Necessity for notice; regular meetings; posting; contents; change in schedule; rescheduled regular or special meeting; subcommittees of public bodies; conference committees of legislature; inapplicability of subsection; reconvening of recessed meeting; legislature, inapplicability of 18-hour requirement; emergency sessions; meeting; notice; publication; Open Meetings Act, compliance

15.266. Mailing of notices; procedure; payment of fee; news media, provision of copy of notice without charge

15.267. Closed sessions; roll call vote; separate set of minutes

15.268. Closed sessions; permissible purposes

15.269. Minutes

15.270. Decisions; presumption as to adoption; action challenging validity of decision in violation of statute; commencement; limitations of actions to invalidate decisions; venue; reenactment of disputed decision in conformity with statute; effect

15.271. Action to compel compliance or enjoin non-compliance; jurisdiction and venue; mandamus in court of appeals; recovery of costs and attorney fees

15.272. Violation; misdemeanor; penalty; second violation

15.273. Civil action against public official; damages; costs and attorney fees; single action against official for single meeting; limitations; joinder of action for damages with other actions

15.273a. Selection of president by governing board of higher education institution; violation; civil fine

15.274. Repeal

15.275. Effective date

Minnesota

Open Meeting Law

MEETINGS OF PUBLIC BODIES, CHAPTER 13D
OPEN MEETING LAW

13D.01 Meetings must be open to the public; exceptions

13D.02 Meetings conducted by interactive TV; conditions

13D.03 Closed meetings for labor negotiations strategy

13D.04 Notice of meetings

13D.05 Meetings having data classified as not public

13D.06 Civil fines; forfeiture of office

13D.07 Citation

Ohio

Sunshine Law

TITLE 1. STATE GOVERNMENT

CHAPTER 121. STATE DEPARTMENTS

ORC Ann. 121.22 (2005)

§ 121.22. Meetings of public bodies to be public; exceptions

Wisconsin

GENERAL ORGANIZATION OF THE STATE,
EXCEPT THE JUDICIARY
CHAPTER 19. GENERAL DUTIES OF PUBLIC
OFFICIALS

OPEN MEETINGS OF GOVERNMENTAL BODIES

Wis. Stat. § 19.84 (2004)

19.80. Penalties

19.81. Declaration of policy

19.82. Definitions

19.83. Meetings of governmental bodies

19.84. Public notice

19.85. Exemptions

19.87. Legislative meetings

19.88. Ballots, votes, and records

19.96. Penalty

19.97. Enforcement

19.98. Interpretation by attorney general

Ontario

R.S.O. 1990, c. E.2, s. 207, EDUCATION ACT, PART VI, BOARDS, ACCESS TO MEETINGS AND RECORDS, 207. [MARGIN NOTES: Open meetings of boards; Closing of certain committee meetings; Exclusion of persons; Inspection of books and accounts],

S.O. 2001, c. 25, s. 239, MUNICIPAL ACT, 2001, PART VI PRACTICES AND PROCEDURES, MEETINGS, 239. [MARGIN NOTES: Meetings open to public; Exceptions; Other criteria; Resolution; Open meeting; Exception],

R.S.O. 1990, c. L.28, s. 40, NORTHERN SERVICES BOARDS ACT, PART II AREA SERVICES BOARDS, 40. [MARGIN NOTES: Procedures; Chair; Acting chair; Quorum; Majority vote; Meetings open; Meetings conducted by distance communication; Minutes to be made available; Improper conduct], REVISED STATUTES OF ONTARIO

R.S.O. 1990, c. P.44, s. 16.1, PUBLIC LIBRARIES ACT, PART I PUBLIC LIBRARY SERVICE, GENERAL, 16.1. [MARGIN NOTES: Open and closed meetings; Open meetings; Improper conduct; Closed meetings; Other criteria; Resolution; Open meeting; Exception], REVISED STATUTES OF ONTARIO

REFERENCES

- Abrams, Robert, Professor of Law at Florida A&M University. Personal Communication, June 2005.
- Agreement for Operation and Maintenance Services*. City of Sioux City, Iowa. 1995.
- Alegre, H., W. Hirner, J.M. Baptista, and R. Parena. *Performance Indicators for Water Supply Services*. International Water Association. London. 2000.
- Allbee, Steve. America's Pathway to Sustainable Water and Wastewater Systems. *Water Asset Management International*, 1 (1): 9-14. 2005.
- ASCE. *The Report Card for America's Infrastructure: 2005*. American Society of Civil Engineers. Washington, DC. See <http://www.asce.org/reportcard/2005/states.cfm>. 2005.
- Bakker, Karen, David Cameron, and Adele Hurley. *Public Private Partnership: An Instrument for Water Supply Management*. Munk Centre for International Studies. University of Toronto. Toronto. 2004.
- Bakker, Karen, and David Cameron. *Good Governance in Municipal Restructuring of Water and Wastewater Services in Canada*. Working Paper #1, Program on Water Issues, Munk Centre for International Studies, University of Toronto. Toronto. 2002.
- Beecher, J.A. *The Regionalization of Water Utilities: Perspectives, Issues, and Annotated Bibliography*. The National Regulatory Research Institute. Columbus, Ohio. 1996.
- Beecher, J.A. NAWC Forum Paper. National Association of Water Companies. Washington, DC. 2000.
- Blackburn, Brian G., Gunther F. Craun, Jonathan S. Yoder, Vincent Hill, Rebecca L. Calderon, Nora Chen, Sherline H. Lee, Deborah H. Levy, Michael J. Beach. *MMWR Surveillance Summaries* 53(SS08); 23-45. Available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5308a4.htm#fig2>. October 22, 2004.
- Blokland, M., O. Braadbaart, and K. Schwartz (editors). *Private Business, Public Owners: Government Shareholding in Water Enterprises*. Ministry of Housing, Spatial Planning and the Environment. The Hague, the Netherlands. 1999.
- Browning, Kelly. Project Manager, Veolia Water Joint Powers Project. Personal Communication, August 2005.
- Byrnes, Patricia, Shawna Grosskopf, and Kathy Hayes. "Efficiency and Ownership: Further Evidence." *The Review of Economics and Statistics* 68 (2): 337-341. 1986.
- Carollo Engineers. *Asset Management Services*. Fountain Valley, California. Undated.
- Center for Public Integrity. *The water barons: How a few powerful companies are privatizing your water*. Center for Public Integrity. Washington, DC. 2003.
- Crain, W. Mark, and Asghar Zardkoohi. *A Test of the Property-Rights Theory of the Firm: Water Utilities in the United States*. *Journal of Law and Economics* 21: 395-408. 1978.
- Crotty, Pat. *Selection and Definition of Performance Indicators for Water and Wastewater Utilities*. American Water Works Association and American Water Works Association Research Foundation. Denver, Colorado. 2004.

- Daisy, Mike, Public Relations Office, City of Detroit. Personal Communication, 2005.
- de Bono, Edward. *de Bono's Thinking Course*. Facts on File. New York. 1985.
- Dialogue on Effective Water Governance, Update*. United Nations Development Program. New York. 2002.
- Edwards, Scott. *The Road Less Traveled, Until Now*. Veolia Water North America. Available at <http://www.veolia.waterna.com>. 2004.
- Engelke, Elaine, Wisconsin Public Service Commission, Personal Communication, 2005.
- Environmental Integrity Project. *Backed Up: Cleaning Up Combined Sewer Systems in the Great Lakes*. Washington, DC. 2005.
- Environmental Integrity Project. *Weathering the Storm: Controlling Storm Water Pollution in the Great Lakes States*. Washington, DC. 2004.
- Estache, Antonio, and Martin A. Rossi. *How Different is the Efficiency of Public and Private Water Companies in Asia?*. *The World Bank Economic Review* 16 (1): 139-148. 2002.
- Feigenbaum, Susan, and Ronald Teeple. *Public Versus Private Water Delivery: A Hedonic Cost Approach*, *The Review of Statistics and Economics* 68 (2): 337-341. 1986.
- Fox, W., and R. Hofler. *Using Homothetic Composed Error Frontiers to Measure Water Utility Efficiency*. *Southern Economic Journal* 53 (2): 461-77. 1986.
- Freeman, Nora F.C. and Gregory D. Heitzman. "Standardizing Performance Indicators for Water and Wastewater Utilities." In Seidenstat, Paul, Michael Nadol, Dean Kaplan, and Simon Hakim (eds.). *Management Innovation in U.S. Public Water and Wastewater Systems*. John Wiley & Sons, Inc. Hoboken, New Jersey. 2005.
- Gallagher, Matthew D. "Bringing a New Level of Efficiency and Effectiveness to Baltimore City's Water Utility." In Seidenstat, Paul, Michael Nadol, Dean Kaplan, and Simon Hakim (eds.). *Management Innovation in U.S. Public Water and Wastewater Systems*. John Wiley & Sons, Inc. Hoboken, New Jersey. 2005.
- Gasteyer, Stephen, Assistant Professor of Human and Community Development, University of Illinois at Champagne-Urbana. Personal Communication, 2005.
- Gasteyer, Stephen, and Rahul T. Vaswani. *Still Living Without the Basics in the 21st Century: Analyzing the Availability of Water and Sanitation Services in the United States*. Rural Community Assistance Partnership. Washington, DC. Undated.
- Gleick, Peter H., Dana Haasz, Christine Henges-Jeck, Veena Srinivasan, Gary Wolff, Katherine Kao Cushing, and Amardip Mann. *Waste Not, Want Not: The Potential for Urban Water Conservation in California*. Pacific Institute for Studies in Development, Environment, and Security. Oakland. 2003.
- Gleick, Peter H., Gary Wolff, Elizabeth L. Chalecki, and Rachel Reyes. *New Economy of Water: The Risks and Benefits of Globalization and Privatization of Fresh Water*. Pacific Institute for Studies in Development, Environment, and Security. Oakland. 2002.
- Grossman, Steve, Executive Director, Ohio Water Resources Development Authority. Personal Communication, 2005.
- Grzezinski, Dennis, Commissioner, Milwaukee Metropolitan Sewerage District. Personal Communication, 2005.
- Harlow, Kenneth V. *Risk Business: Two Case Studies in Asset Risk Management*. *Water Asset Management International*, 1 (1): 5-8. 2005.
- Harlow, Kenneth V., Margaret Rutledge, and Dan Bunce. *Integrated Asset Management for Optimized Decision-Making*. American Water Works Association. Joint Management Conference. 2003.
- Harnum, Jim, Director of Water and Wastewater, City of Hamilton, Ontario. Personal Communication, 2005.
- Hayden, Tanya, EMC Corporation. Personal Communication, May 2005.
- Heftez, Amir and Mildred Warner. "Privatization and Its Reverse: Explaining the Dynamics of the Government Contracting Process." *Journal of Public Administration Research and Theory* 14 (2): 171-190. 2004.
- Indianapolis Star*. "Ex Lawrence Mayor at Center of FBI Investigation." April 8, 2004.
- Indianapolis Star*. "Lawrence to Sue Water Firm." April 23, 2004.
- Irvine, Lori, Public Relations Office, OMI. Personal Communication, March 2005.
- Kaplan, Ryan, Minnesota Attorney General's Office. Personal Communication, May 2005.
- Kessler, Tim. *The Pros and Cons of Private Provision of Water and Electricity Service: A Handbook for Evaluating Rationales*. Citizen's Network for Essential Services. 2004.
- Lafferty, Angela K., and William C. Lauer. *Benchmarking Performance Indicators for Water and Wastewater Utilities: Survey Data and Analyses Report*. American Water Works Association. 2005.

- Lowdon, A., and W.G. Brydon. *Asset Management: The Importance of Lifecycle Analysis in The Strategic Planning Process*. American Water Works Association. Joint Management Conference. 2003.
- Matos, Rafaela, Adriana Cardoso, Richard Ashley, Patricia Duarte, Alejo Molinari, and Andreas Schulz. *Performance Indicators for Wastewater Services*. International Water Association. London. 2003.
- Maxwell, Steve. "How Big is the Water Business?" *Journal of the American Water Works Association*. January. American Water Works Association. Denver. 2005.
- McCarthy, John, Anna Mehrotra, Stephen Gasteyer, Rahul Vaswani, and Blanca Surgeon. "The Price of Good Water: Water and Sanitation Affordability." In *Rural Matters*, Spring 2004: 8-13. Rural Community Assistance Partnership. Washington DC. 2004.
- McCormick, Sue, Director of Ann Arbor Public Services Area. Personal Communication, July 2005.
- McGuire/Malcolm Pirnie. "Watercourse: Navigating Your Utility's Future." American Water Works Association. Denver. 2002.
- Monteith, Randall A. "From 'Command and Control' to a Team-Based Organization: Challenges Associated with the Reorganization of a Large Water Utility." In Seidenstat, Paul, Michael Nadol, Dean Kaplan, and Simon Hakim (eds.). *Management Innovation in U.S. Public Water and Wastewater Systems*. John Wiley & Sons, Inc. Hoboken, New Jersey. 2005.
- Moss, Jack, Gary Wolff, and Graham Gladden. "Valuing Water for Better Governance." Available at <http://www.pacinst.org>. 2003.
- National Research Council (NRC). *Privatization of water services in the United States: An assessment of issues and experience*. National Academy Press. Washington, DC. 2002.
- "State survey finds higher rates among for-profit companies." *New Hampshire Business Review*. April 29, 2005.
- Pagano, Michael A. *City Fiscal Conditions in 2004*. National League of Cities. Washington, DC. 2004.
- Parrott, James A. and Sharma L. Young. "Current Trends in Public Utility Management and Inventive Strategies for Major Challenges." In Seidenstat, Paul, Michael Nadol, Dean Kaplan, and Simon Hakim (eds.). *Management Innovation in U.S. Public Water and Wastewater Systems*. John Wiley & Sons, Inc. Hoboken, New Jersey. 2005.
- Pratt, Glenn, Executive Director, Indianapolis City Sierra Club. Personal Communication, July 6, 2005.
- PricewaterhouseCoopers (PWC). *Organization of Municipal Water and Wastewater Systems in Ontario*. Ontario Ministry of Public Infrastructure Renewal. Toronto. 2002.
- Public Citizen. *Waves of Regret: The Failure of Water Privatization in the US*. Oakland, CA. 2005.
- Quick, Steve, President, AFSCME Local 725 (Indianapolis, IN). Personal Communication, July 2005.
- Raftelis Financial Consulting. *Water and Wastewater Rate Survey*. American Water Works Association. Denver. 2004.
- Raucher, Bob. *The Value of Water: What It Means, Why It's Important, and How Water Utility Managers Can Use It*. Journal AWWA, 97 (4). 2005.
- Ray, Randy, City Attorney, City of Peoria, Illinois. Personal Communication, 2005.
- Reed, Robert, Local 131, Indianapolis. Personal Communication, 2005.
- Reinhardt, William G. *PWF's Seventh Annual Outsourcing Survey*. Public Works Financing: 1. 2003.
- Rubin, Scott J. "Census Data Shed Light on US Water and Wastewater Costs." *Journal of the American Water Works Association*. April. American Water Works Association. Denver. 2005.
- Saxer, Shelley Ross. *Government Power Unleashed: Using Eminent Domain To Acquire A Public Utility Or Other Ongoing Enterprise*. 38 Indiana Law Review 55. 2005.
- Seidenstat, Paul, Michael Nadol, Dean Kaplan, and Simon Hakim (eds.). *Management Innovation in U.S. Public Water and Wastewater Systems*. John Wiley & Sons, Inc. Hoboken, New Jersey. 2005.
- Theiler, Don. *Mayor's Independent MMSD Audit Committee: Final Report*. Milwaukee Metropolitan Sewerage District. Milwaukee. 2004.
- Theiler, Don. *United Water Performance Evaluation Final Report — Milwaukee Metropolitan Sewerage District*. King County Department of Natural Resources and Parks. Seattle, WA. 2003.
- US EPA. *Report to Congress: Impacts and Control of CSOs and SSOs*. EPA 833-R-04-001. Environmental Protection Agency. Washington, DC. 2004a.
- US EPA. *Water Security Research and Technical Support Action Plan*. Environmental Protection Agency. Washington, DC. 2004b.

- US EPA. *State of the Waters 2002: Region 5*. September 2002.
- US EPA. *National Characteristics of Drinking Water Systems Serving Populations Under 10,000*. July 1999.
- US Geological Survey. *Estimated Use of Water in the United States in 2000*. As found at <http://water.usgs.gov/pubs/circ/2004/circ1268/>. 2004.
- Urban Water Council. *Public/Private Partnerships in Municipal Water and Wastewater Systems: Case Studies of Selected Cities*. As found at <http://www.usmayors.org/uscm/urbanwater/documents/uscsfcvr.htm>. 1997.
- Veolia press release. *Veolia to sell portions of US Filter, focus on long-term operating contracts*. September 24, 2003.
- Veolia press release. *Veolia water picks up operations agreement after designing and building wastewater plant in Cle Elum, Washington*. May 24, 2005.
- Water Partnership Council. *Establishing Public-Private Partnerships for Water and Wastewater Systems*. Water Partnership Council. Washington, DC. 2003.
- Water Partnership Council. *An Evaluation of Public-Private Partnerships for Water and Wastewater Systems*. Water Partnership Council. Washington, DC. 2005.
- Westerhoff, G.P. *The use and management of service contracts: Participation in the private sector. International Report*. International Water Association. London. 2000.
- Westerman, Nicole, Dean Kaplan, and Michael Nadol. *Wall Street Bond Rating Agency Perspectives on Capital Program Best Practices*. American Water Works Association. Joint Management Conference. 2003.
- Williams, Robert R. "Citizen Participation in Wastewater Projects." In Seidenstat, Paul, Michael Nadol, Dean Kaplan, and Simon Hakim (eds.). *Management Innovation in U.S. Public Water and Wastewater Systems*. John Wiley & Sons, Inc. Hoboken, New Jersey. 2005.
- Wolff, Gary, and Meena Palaniappan. *Public or Private Water Management? Cutting the Gordian Knot*. Journal of Water Resources Planning and Management. January/February. 2004.
- Wolff, Gary. *Independent Review of the Proposed Stockton Water Privatization*. Pacific Institute for Studies in Development, Environment, and Security. Oakland. 2003.
- World Bank. *The World Development Report 1992: Development and the Environment*. Oxford University Press. New York. 1992.
- World Bank. *Toolkits for Private Participation in Water and Sanitation*. World Bank. Washington, DC. 1997.
- Young, Kevin. *Dispel the Myths: Asset Management — A CEO's Point of View*. Water Asset Management International 1 (1): 2-3. 2005.



**PACIFIC
INSTITUTE**

654 13th Street, Preservation Park, Oakland, CA 94612
Phone: (510) 251-1600 • Facsimile: (510) 251-2203
Email: info@pacinst.org • Main Website: www.pacinst.org

ISBN No. 1-893790-11-8
ISBN-13 No. 978-1-893790-12-4