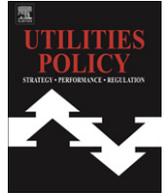


Contents lists available at [SciVerse ScienceDirect](http://www.sciencedirect.com)

## Utilities Policy

journal homepage: [www.elsevier.com/locate/jup](http://www.elsevier.com/locate/jup)

# Structure, regulation, and pricing of water in the United States: A study of the Great Lakes region

Janice A. Beecher\*, Jason A. Kalmbach

*Institute of Public Utilities, Michigan State University, USA*

## ARTICLE INFO

### Article history:

Received 30 March 2012  
Received in revised form  
1 August 2012  
Accepted 4 August 2012

### Keywords:

Water  
Pricing  
Regulation  
United States

## ABSTRACT

The structure and regulation of the U.S. water industry is more complex than is often apparent and pricing practices vary substantially. While not representative of the region or nation, a survey of the largest water systems in the wider Great Lakes region is illustrative as well as revealing of salient considerations within the sector. Data from Wisconsin provide additional perspective with regard to trends in costs and prices for water. The context of rising costs and prices, and growing concerns about accountability and sustainability, suggests consideration of pricing practices as well as the role of economic regulation in the water sector.

© 2012 Elsevier Ltd. All rights reserved.

## 1. Introduction

The U.S. water industry is structurally complex. With about 50,000 community drinking water supply systems operating under a variety of ownership forms (U.S. EPA, 2009), the industry appears structurally fragmented and institutionally pluralistic. Closer examination reveals an industry that is also bifurcated, particularly in terms of system size but also in terms of system ownership. According to the U.S. Environmental Protection Agency (EPA), about 9 percent of the systems serve almost 90 percent of the U.S. population served by water utilities (U.S. EPA, 2009). Another bifurcation is between public and private ownership, which divides the total number of water systems about equally. Privately owned systems, however, account for a much smaller market share as measured by water sales (8.6 percent) or total revenues (about 13 percent). Only 22 percent of privately owned systems (11 percent of all systems) operate on a for-profit basis; the rest operate as not-for-profit systems or ancillary systems attached to an entity whose primary function is not drinking water supply.

Although private water utilities were prevalent in the industry's origins (Baker, 1897), municipal ownership dominates the U.S. water sector today, owing to the local nature of water resources; the intimate connections between water services, public health,

and local economic development; and the desire for local control of water monopolies and the prices they charge to constituents (see Masten, 2011). According to one analysis of the industry's turning point, the threat of municipal takeover in the early 1900s became a self-fulfilling prophecy when private companies began under-investing in the communities they served (Troesken and Geddes, 2003). Municipalization of utilities also coincided with more assertive local regulation (Troesken, 1996), which eventually supplanted much of state oversight.

In general, water utilities in the United States remain vertically integrated, providing supply, treatment, transmission, and distribution functions. An important structural dimension of the water industry that is masked by the EPA's inventory of systems is the operational consolidation among systems through common ownership or physical interconnection. The larger private water utilities, in particular, are incorporated as multistate holding companies that operate multiple community water systems, in some cases under consolidated rates or single-tariff pricing (Beecher, 1999). Many larger municipal water systems also provide wholesale and retail water services outside of their jurisdictional boundaries.

Although the wholesale water market is underappreciated by industry analysis, nearly 8670 water systems (approximately 18 percent) rely primarily on purchased water and 23 percent of total community water supplies are not withdrawn but purchased (most is treated or "finished" water). Wholesale deliveries from 2851 systems (5.8 percent) account for more than 47 percent of all water delivered (U.S. EPA, 2009). Wholesale sales for the largest systems,

\* Corresponding author. Tel.: +1 517 355 1876; fax: +1 517 355 1854.  
E-mail address: [beecher@msu.edu](mailto:beecher@msu.edu) (J.A. Beecher).

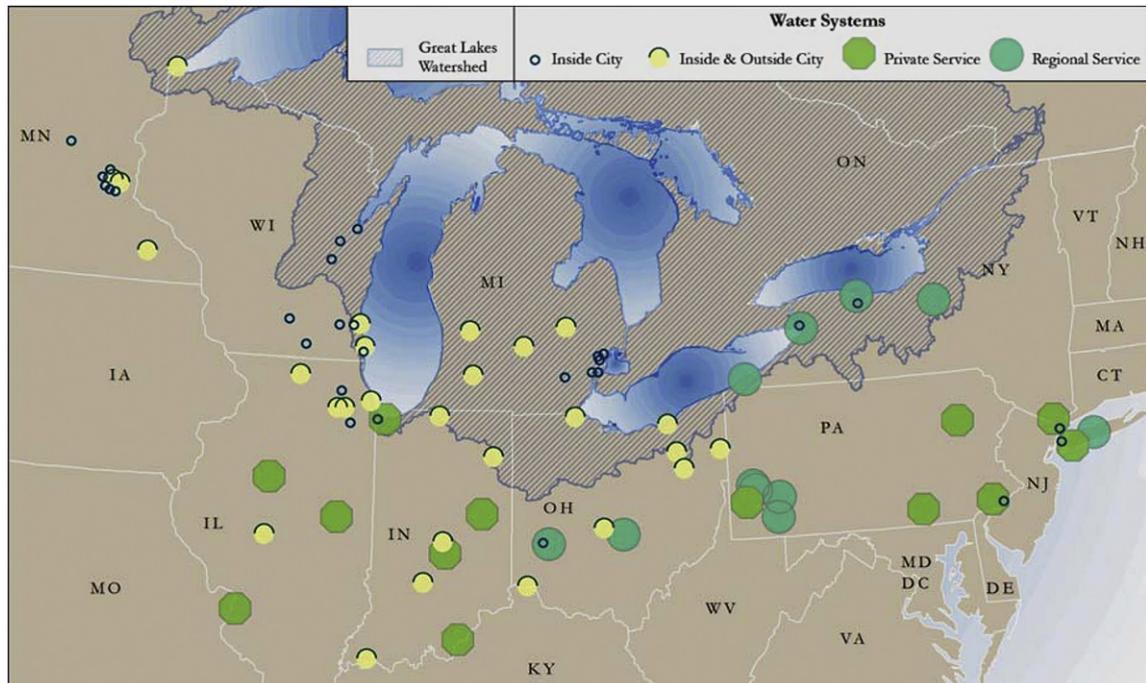


Fig. 1. Map of water systems surveyed.

which utilize surface water supplies, account for a quarter of revenues from water sales. In other words, the U.S. water industry is more interconnected than might be recognized.

The structural character of the industry is also related to the nature of economic regulation. Privately owned water utilities are almost invariably regulated by state public utility commissions. Only a handful of commissions (Georgia, Michigan, Minnesota, North Dakota, South Dakota, and Washington, D.C.) have no authority over the sector (Beecher, 2011a). Several states, however, have authority that extends to certain non-private systems.<sup>1</sup> Wisconsin is unique nationally in having comprehensive authority for the municipal water sector. State economic regulation of the water sector follows the traditional rate-base/rate-of-return (RBROR) methodology that prevails in the United States for distribution oriented electricity and natural gas utilities (see Beecher, 2011b). Water utilities are quintessential monopolies and regulation provides a proxy for competition in the context of market failure. Regulators ensure that spending is prudent and prices are just. A challenge for water-sector regulators is the contrast between larger utilities and the many small private companies that lack scale as well as technical, financial, and managerial capacity (U.S. EPA, 1999). Returns to scale for the water sector are significant but not unlimited because economies in production and treatment are offset by diseconomies in water distribution (see Abbott and Cohen, 2009).<sup>2</sup>

Regulation probably has more influence than the industry's ownership profile implies. Many private utilities (the unit considered by economic regulators) operate multiple water systems (the unit considered by environmental regulators). The uniform systems of accounts for water utilities developed by the National Association of Regulatory Utility Commissioners (NARUC, 1996) as well as the "utility basis" for ratemaking (AWWA, 2000) and other

generally accepted regulatory practices are used by many unregulated water systems.<sup>3</sup> These practices include cost-based or full-cost water pricing (Beecher, 2011b), with limits to subsidies and transfers that distort price signals and undermine efficiency in both production and consumption. Economic regulation exerts an administrative cost and is itself an imperfect institution. When well implemented, however, regulation can promote contemporary efficiency and sustainability goals for all water systems, regardless of ownership structure.

The water industry's complex structure is a challenge for both public policy and empirical investigation. Survey sampling, validity, and reliability limitations make generalization problematic. Several water rate surveys have been published over the years. Some are national in focus (e.g., Raftelis, 2010) while many others are more regional or state specific.<sup>4</sup> The quantitative research on how price and income affect consumer behavior is also extensive (see Dalhuisen et al., 2003; Olmstead and Stavins, 2007). Although water demand is *relatively* price inelastic, it is not perfectly so and both rate levels and rate structures influence consumption behavior. Growing concerns about water resources, along with rising prices, are bringing increasing attention to the dynamics among cost, price, demand, and the financial sustainability of water systems.

Although water rate studies abound, few appreciate the intricate details within this salient but rather obscure and arcane area of policymaking. This study opted for a stratified approach that deliberately sacrifices representativeness in return for a more in-depth and hopefully insightful analysis of industry structure, economic regulation, and pricing practices. The methodology underscores the importance of accurate and thorough data collection for capturing the complexity of utility ratemaking practices. In

<sup>1</sup> A survey of state public service commissions (IPU 2011) reveals 13 states regulate municipalities under certain conditions, with fewer still regulating cooperative (9) and not-for-profit systems (3).

<sup>2</sup> Diminishing returns to scale are also a consideration in electricity distribution (Kwoka, 2005).

<sup>3</sup> The term "best practices" is intentionally avoided here because of its highly subjective and transient nature. "Generally accepted" implies wide practice of a method that has been subjected to professional scrutiny and, most likely, judicial review.

<sup>4</sup> See Environmental Finance Center (2011) for a profile of Georgia water rates; see Tighe and Bond (2010) for an overview of water rates in Massachusetts.

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات