

Can water be the new gas?

Emerging investment
opportunities in US water
infrastructure of the future



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Introduction



The traditional US water utility operating model is facing multiple internal and external challenges – including significant under-investment over the past few decades, low innovation in the sector and aging infrastructure. Additionally, water utilities need to address other complex issues such as water scarcity, climate change and new regulations. Despite these challenges, the traditionally capital-intensive, risk-averse and highly fragmented US water sector has significant potential for transformation and growth, as utilities begin to respond to growing investor pressure to address weak balance sheets, rising capital expenditure requirements and the introduction of new technologies.

That potential has not gone unnoticed. The water sector has witnessed significant merger and acquisition (M&A) activity in the past, with major water utilities continuing to remain optimistic on tuck-in M&A opportunities, particularly on the municipal and wastewater side. Supportive legislation such as fair market value rules, along with growing capital and innovation requirements – pension issues, environmental compliance, budget constraints, lack of operational experience – is driving a significant uptick in potentially willing sellers in the market. Other utility subsectors, particularly electric utilities, may see these assets and businesses as opportunities to plug the gap in earnings being created by falling electricity demand and lower traditional sales in the US. The water sector's attractiveness is driven by a monopolistic service model, high barriers to entry, low commodity price exposure, increasing public and regulatory support for investments, and steady regulated returns.

The water sector could follow the path of the adjacent natural gas sector. For example, the significant rise in natural gas supply in the US resulted in lower and steady commodity prices over the past five to eight years. This development, along with stricter environmental regulations, led to bankruptcies at many coal companies, a decline in traditional oil and gas rig counts, and

coal-driven power generation businesses becoming financially distressed at various electric utilities. However, a few bellwether electric utilities formulated multiple investment strategies to take advantage of low natural gas prices and the fuel's growing usage. These included acquisition of gas local distribution companies (LDCs), upstream investments, acquisition and development of midstream infrastructure, and building more gas-based power plants. Similarly, water infrastructure may provide multiple investment avenues for other utilities, energy companies and private equity investors given its attractive risk-reward profile.

The large number of relatively small, fragmented water and wastewater systems has resulted in significant inefficiencies in the current marketplace. Larger utilities, including both electric and gas companies, may have better access to capital and technologies to fulfill the necessary infrastructure upgrades in the sector. Furthermore, as the water sector matures, the focus will expand beyond upgrading infrastructure to include adopting a “utility of the future” operating model. This model will concentrate on emerging issues in the sector, including more informed customers, data-driven analytics, new products and services, and stronger cybersecurity – all capabilities and platforms that forward-thinking electric utilities are currently building.

In this paper, we provide an investor's guide by exploring the outlook for water and wastewater utility sectors in the US, key drivers for investments by electric and gas utilities and other energy companies, and comparison with other utility subsectors. We also provide a detailed framework of key considerations for company management to make strategic decisions on these assets, focusing on regulatory, investment and risk parameters.

Market outlook

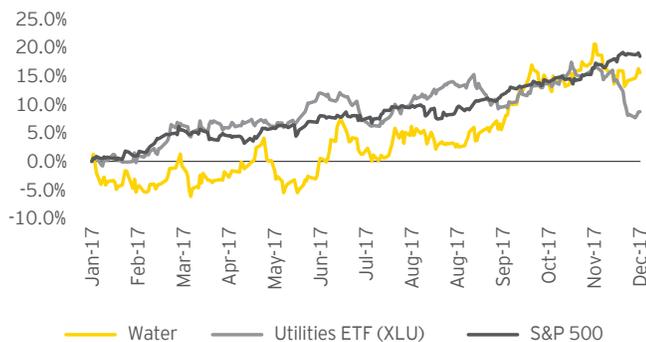
The US water and wastewater industries are highly fragmented, and they include ownership by both municipalities and investor-owned companies. The US Environmental Protection Agency (EPA) estimates that approximately 84% of the community water market is served by municipal systems, and almost all (98%) of the wastewater systems are government-owned.

The water utilities sector is a relatively lower risk group in the equity markets, driven by strong credit ratings, defensive business models, constructive regulations and significant investment opportunities. During 2017, investor-owned water utility stocks had an average share price return of approximately 16%, vs. 9% for diversified electric and gas utilities. These compare with the 18% performance of broader markets (S&P 500).

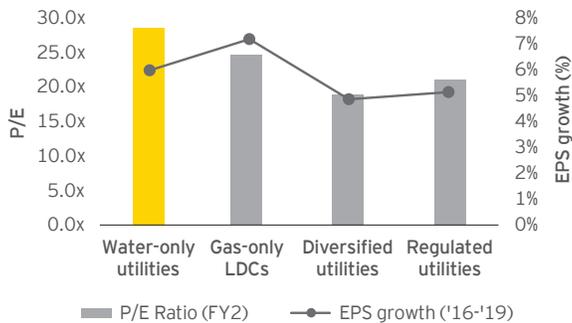
The relatively small group of publicly traded water utilities is expected to grow their earnings at an average CAGR of approximately 6% over 2016-19, vs. the historic growth of approximately 10% over the past five years. However, one of the nation's largest water utilities continues to forecast 7%-10% annual EPS growth going forward. Strong earnings growth is driven by rate base investment, acquisitions and privatization of the sector. On allowed return on equity (ROE), water utilities on average received an ROE of 9.57% in rate cases decided in the first three quarters of 2017, only modestly lower than the ROEs of 9.74% and 9.75% for electric and gas utilities.

For more details on the outlook of electric and gas utilities, please read our recent thought leadership report, [As business fundamental shift dramatically, how do utilities expand their value proposition?](#)

Average share price performance of investor-owned water, electric, and gas utilities vs. S&P 500 (2017)

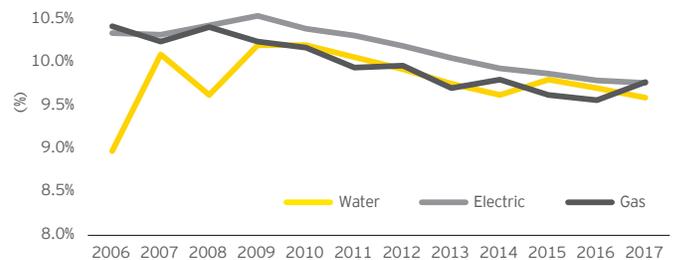


Average P/E ratio and EPS growth estimates of various utility subsectors (ratio on two-year forward consensus EPS)



Source: ThomsonOne; SNL Energy (S&P Global Market Intelligence); EY analysis.
 Note: the water sector estimates are calculated using data from 9 prominent investor-owned water utilities. P/E ratios for utility sectors are as of December 2017.¹ See "Notes and sources" section for more details on the subsector categorization.

Average allowed ROEs as authorized by state regulators for US electric, gas and water utilities (2006-17 YTD*)



Source: RRA (S&P Global Market Intelligence); EY analysis.
 *Note: 2017 averages are based on rate cases resolved by September 2017.



Investment drivers

Multiple tailwinds currently exist to invest in the water and wastewater sector in the US, largely driven by the fragmented nature of the industry and the significant gap between the available capital and investments required. Key investment drivers include:

Continued growth amid scarcity and stagnant demand

While the per capita water consumption in the US has leveled off, the availability of only a fixed renewable water supply is creating a demand gap. Water demand continues to be strong in those parts of the country that have the lowest natural water availability, with aquifers being drained significantly faster than they are being replenished. However, water utilities have achieved sales growth in the past through a combination of organic customer growth and acquisitions – from municipalities that are not able to afford the necessary upgrades and expansions.

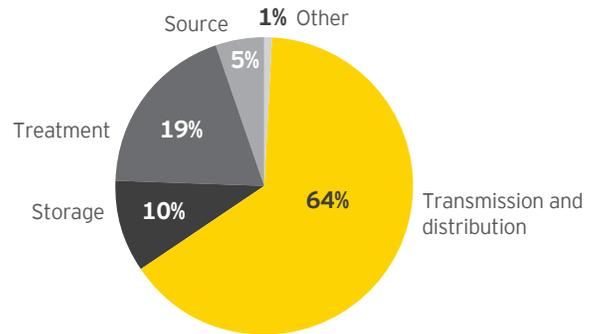
Opportunity

- Water conservation and reuse
- Aquifer recharge
- Desalination
- Off-grid water systems
- Resource monitoring and monetization with smart meters
- Wastewater-to-energy solutions

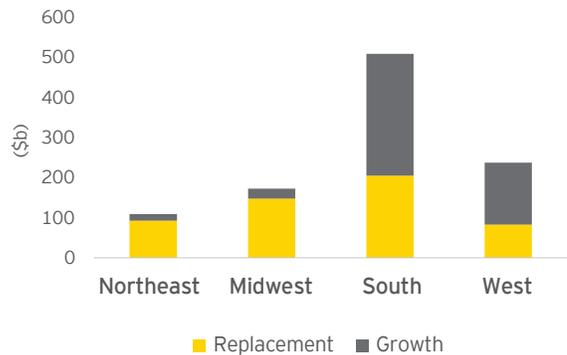
Significant infrastructure requirements to fuel growth

The aging water and wastewater infrastructure in the US requires immediate modernization and replacement, spanning across the investor-owned, municipal and cooperative-owned water utilities. In a recent national assessment, the EPA estimated that the nation's water utilities will need approximately \$384b in infrastructure investments over the next 20 years – for pipes, treatment plants, storage tanks and other key assets. However, a recent report by American Water Works Association² estimates that investment needs for buried drinking water infrastructure will total more than \$1t nationwide over the next 25 years, assuming pipes are replaced at the end of their service lives and systems expand to serve growing populations (see regional breakdown in chart on the right). The American Society of Civil Engineers (ASCE) agrees with the need for investment: its 2017 Report Cards for America's Infrastructure³ gave drinking water and wastewater infrastructure a grade of "D" and "D+," respectively.

Breakdown of capital expenditure requirements for US drinking water systems (2011-30)



Aggregate needs for investments in water mains, by US region (2011-35, US\$b)



Source: EPA; American Water Works Association; EY analysis.

Opportunity

- Decentralized systems
- Innovation and operational efficiency in transportation
- Infrastructure analytics (e.g., leak detection)
- Energy-efficient technologies
- Waste-to-energy solutions

Highly fragmented industry ripe for consolidation

The EPA estimates that there are more than 50,000 community water systems and 20,000 community wastewater systems in the US. More than half of these are small systems (serving a population of fewer than 500) that are often capital-constrained, and therefore unable to finance the necessary infrastructure upgrades to provide sustained quality service. These financial constraints, along with supportive regulations, are driving municipalities to consider selling more of their assets. These conditions should capture the attention of investors in other industries, such as electric and gas utilities and other energy companies that may want to consider acquiring these water-based assets and businesses.

Opportunity

- ▶ Better financial planning, operational restructuring, consolidation
- ▶ New business models (e.g., water as service)
- ▶ Improving economic viability of small community water utilities



Supportive regulations to increase industry attractiveness

The need for substantial new water infrastructure investments is continuing to capture the attention of many state regulators. While still trailing behind the electric and gas utility sectors in the number of regulatory mechanisms available to them, water utilities are seeing more constructive frameworks emerge to enable investments.

- ▶ In constructive jurisdictions, state commissions are encouraging investments in aging infrastructure through regulatory policies such as the implementation of streamlined infrastructure surcharges, ROE-adders for certain types of investments and consolidation of rates.
- ▶ Consolidation in the sector is also enabled by recent fair market value laws, which allow investor-owned utilities to include in their ratebase the value of these assets based on an appraisal determination, as opposed to the book value. Currently, six states have this mechanism in place: California, Illinois, Indiana, Missouri, New Jersey and Pennsylvania. However, not all laws are created equal, and the benefits in some states have been limited by the associated rules. (See "Appendix" for more details).
- ▶ Allowed ROEs for water utilities are only modestly below those of gas and electric utilities, though we believe the risks are much lower. The water sector just does not have a similar potential for negative events as do the gas or electric sector (e.g., explosions from blowing gas, vault fires, electrocutions, fracking accidents).

Smart investment to drive upside in earnings growth

A large percentage of water utilities in the US have little data on their distribution operations and still rely on manual meter reading for billing. However, this is changing fast as utilities increasingly deploy smart water infrastructure with sensors and two-way communications. According to a recent survey of 340 water utilities across the US conducted by the Northeast Group LLC, 80% of respondents are either already investing or looking to invest in smart water infrastructure to improve their operations.⁴ As this trend continues, US water utilities are projected to invest approximately \$8.3b in smart infrastructure over the next 10 years, according to the Northeast Group.



Comparison with other utility subsectors

The water and energy (electric and gas) utility sectors operate in different environments. Along with the differences in the ownership structures (public or private), utilities differ in returns and rate structures, size and numbers of players, and state regulatory requirements.

High-level comparison between different utility subsectors			
Criteria	Electric	Gas	Water/waste water
Ownership	Primarily served by investor-owned utilities (IOUs). There are more than 3,000 electricity providers, with only 6% investor-owned. However, these investor-owned companies serve 70% of customers. Other customers are served by municipal utilities (15%) and distribution cooperatives (13%).	Primarily IOUs. More than 200 local energy companies deliver natural gas to 95% of customers in the US.	Primarily public. There are more than 50,000 community water systems and 20,000 community wastewater systems in the US. The majority of these community water systems are government-owned, and the remaining are privately or investor-owned.
State regulation	<ul style="list-style-type: none"> Focus on rates and returns (ROE) for IOUs IOU rates are approved by state regulators 	<ul style="list-style-type: none"> Focus on rates and returns for IOUs IOU rates are approved by state regulators 	<ul style="list-style-type: none"> Focus on water quality Regulation of the different systems aligns with the ownership model (i.e., IOUs go through state regulators, municipal utilities through local or regional government, co-ops through boards).
Allowed ROE (%)	The allowed ROE for electric utilities in 2016 averaged close to 9.77%, vs. 10.37% in 2010. For electric transmission, FERC-approved ROEs include incentives for participation in RTOs and for specific reliability-focused projects, resulting in higher ROEs.	The allowed ROE for gas utilities in 2016 averaged close to 9.54%, vs. 10.15% in 2010. For gas pipeline ROEs, the majority of cases are resolved by “black box” settlements. However, in two 2016 fully litigated rate cases, FERC approved ROEs of 10.55% and 11.55%.	The allowed ROE for water utilities in 2016 averaged close to 9.68% vs. 10.18% in 2010.
Demand growth	Due to increased energy efficiency, electricity sales have steadily fallen, with <1% annual load growth estimated as the “new normal.” However, the growing penetration of distributed generation will further put pressure on this growth estimate going forward.	Gas consumption in the residential and commercial sectors is expected to remain largely flat as a result of efficiency gains. Industrial consumption is expected to grow at approximately 1.2% per year over the next few years.	Per capita daily water consumption in the US has been declining for decades. Significant declines have occurred in the largest categories of use, including thermoelectric power, irrigation, public supply and industrial.
Key investment areas	Expected 2017 capital expenditures for the 53 investor-owned gas and electric utilities is around \$117.5b – an all-time high for the sector. While annual investments are expected to fall slightly over the next two years, spending is likely to remain higher than the past averages. Investments are primarily focused on infrastructure upgrades to aging transmission and distribution systems; building new natural gas, solar and wind generation; and implementation of new technologies.		According to the EPA, the drinking water and clean water (i.e., sanitary sewer) segments will require \$384b and \$271b, respectively, over the next 20 years – implying \$33b of required annual spending.

Source: RRA (S&P Global Market Intelligence); American Public Power Association; American Gas Association; EPA; EY analysis.

To summarize, the water industry is a relatively lower-risk sector (e.g., water leaks vs. high-impact electric failures or gas leaks) with allowed ROEs in line with other peer utility sectors. In addition, the cost of water as a commodity is lower compared with peer utility commodities, and the low adoption of technology in the water industry provides more investment potential than the peer utility sectors.

Water utility of the future

The introduction of new digital technologies will drive a long-term transformation of the water industry, similar to the rise of smart networks in the electric and natural gas utility sectors. The current fundamental challenges for water companies, including the rising costs of operations, water scarcity and changing customer behavior, will likely be somewhat mitigated by the adoption of smart devices and advanced IT/communications networks. The technological advances in cloud computing, along with advanced analytics capabilities, are enabling water utilities to better use their data: improving efficiency, mitigating risks and allowing improved understanding of their customers. However, utilities and local governments vary in the adoption speed of these new technologies as they are driven by the availability of capital and understanding of the benefits of modernizing their networks. New investors or third parties can help accelerate these technology adoptions by providing the required capital.

To survive the sector's numerous challenges, water utilities will need to move from their traditional business model of simply delivering the required service to a more customer-centric model – similar to the reinvention electric utilities are undergoing now. They will increasingly need to focus on implementing new technologies, from Internet of Things (IoT)-enabled smart meters to remote monitoring applications, allowing customers to track their usage. Given the increasing cost pressures caused by the infrastructure upgrade requirements, innovative technological solutions that support lowering operational costs will be key going forward. However, as utilities move toward becoming data- and customer-driven companies, cybersecurity will need to be at the top of the agenda for their management teams.

Key elements of the "water utility of the future"	
Elements	Description
Informed customers	Customers are becoming more informed on activities affecting them. They expect access to real-time updates on work and outages, along with an overall better customer experience. Social media coverage will become extremely critical to public perception, response, and overall state and federal emergency action plans.
Data-driven decisions	Investment will be informed by customer needs and the operational performance of the utility – with advanced analytics enabling the discovery of focus areas for utilities. Exploring the full potential of internal and external data to enable new levels of customer satisfaction and performance will be required. IoT, SCADA and instrumentation create greater opportunity for real-time data collection, predictive action and asset maintenance.
Customer and products	These companies will need to view their business as a continual production line creating high-quality products and services for customers – more than just distributing water. Many peer electric utilities across the US are beginning to address stagnating revenue from electricity sales by developing new products and service offerings, e.g., energy services, home solutions, digital infrastructure.
Enabled field workforce	A performance-driven field workforce directed by the intelligent control center to effectively and safely carry out high-value work will become a norm.
Cybersecurity focus	Cybersecurity is a major concern for the water sector, as with other critical infrastructure sectors. These companies will require extensive external audits of IT networks and systems to identify risks and develop strategies to combat threats.



Risks for investors

Key risks for the water and wastewater sectors			
Risk	Description	Degree of impact	Risk mitigation activities for investors
Capital-intensive industry	<ul style="list-style-type: none"> ▶ The water sector is characterized by long gestation periods and capital intensity; desalination plants often entail large capital costs and the risk of cost overruns for project sponsors. ▶ The Capex/OCF* ratio for water utilities was 1.2x in 2016, higher than previous levels of <1.0x and those for electric and gas utilities. 		Prioritize projects based on returns and benefits to customers. The priority should move from maintaining reliability of service at the top end of the spectrum to providing value-added services to customers.
Lack of scalability	<ul style="list-style-type: none"> ▶ The highly fragmented and localized nature of the industry requires industry participants to customize their service offerings. This reduces profitability and inhibits scalability. ▶ Many mid-sized water technology companies sell non-differentiated products and services, giving rise to intense competition and low growth prospects. 		Invest in systems that provide services in familiar areas, such as an electric utility acquiring water assets in its service territory.
Cybersecurity	<ul style="list-style-type: none"> ▶ Given the trend toward smart water networks and IT/operational technology convergence, the attack surface for critical infrastructure is growing for utilities. 		Use lessons learned by electric utilities to implement the right security measures.
Strict regulations and high standards of compliance	<ul style="list-style-type: none"> ▶ The water utility industry is highly regulated by the EPA and state governments, potentially requiring companies to allocate higher amounts of capital for regulatory compliance. ▶ Water recycling and regulations for discharge and new contaminants are resulting in the need for intensified treatment of wastewater. 		Develop a deep understanding of compliance requirements before investments.
Decline in revenue due to water conservation and low tariff rates	<ul style="list-style-type: none"> ▶ The decrease in household size and increased use of water-efficient applications have resulted in reduced consumption of water by residential consumers in the US. ▶ Water rates must accommodate the incremental funds spent to upgrade infrastructure as US water infrastructure continues to age. ▶ Flat rates remain the most prevalent pricing structure in the US. However, tiered or block-rate structures have gradually become more common. 		Maintain margins by focusing on operating costs (e.g., minimize leaks, optimize the organizational structure).
Political risks	<ul style="list-style-type: none"> ▶ Privatization of water utilities is a highly complex and difficult political proposition despite favorable financial and economic factors. ▶ Political opposition is likely to be driven by the fear of high tariffs due to the end of direct and indirect state subsidies to publicly owned utilities 		Work with regulators and local governments to develop investor- and customer-friendly regulations going forward.

*OCF: operating cash flows. As a company's Capex/OCF ratio rises above 1.0, the implication is that the company is increasingly likely to require new external financing.

-  Critical issues/high criticality/not desirable
-  Some issues/medium criticality/partially desirable
-  No issues/low criticality/very desirable

Summary



The US water sector is transforming. The need for significant capital investments for the replacement and development of infrastructure, paired with favorable regulations, is creating opportunities for new investors into the sector. As water systems reach the end of their service lives across the US, an estimated \$1t in new investment could be required to rehabilitate the current water infrastructure over the next two decades. Beyond infrastructure, the water sector needs focused investment in innovative technologies and new approaches. Because many key electricity and gas utilities have more maturity in grid modernization, digital technologies, decentralization, energy efficiency, time-of-use pricing and more, they possess compelling advantages as potential suitors for water assets – they can make the water utility of the future defined by smart water networks a reality.

Water companies have increasingly turned to consolidation and partnership strategies to handle their significant capital expenditure plans, higher debt costs and a risk-averse equity environment. These capital requirements could also present opportunities for other utility subsectors, especially electric utilities, which are looking for business diversification to sustain their earnings. The allowed ROEs for investor-owned water utilities are in line with the other electric and gas businesses, with similar risk-reward profiles and regulatory frameworks. Hence, we are beginning to see electric and gas utilities invest in the water sector in the US. While consolidation plays have been in place for quite some time, the water sector offers a significant opportunity for gas and electric utilities to expand upon their existing capabilities in similar low-risk, regulated return businesses.

Appendix

Fair valuation laws					
State	Legislation	Legislation passed	Qualifying system	Buyer	Seller
California	Public Water System Investment and Consolidation Act of 1997	1997	Water only	Not specified	Not specified
Illinois	Public Act 098-0213	2013	Water or wastewater	30,000 or more customer connections	7,500 or fewer connections
Indiana	Act 98 (SB 257)	2016	Water or wastewater	A public utility; a municipally owned utility; or not-for-profit utility that provides water or wastewater service; or a regional sewer or water district	“Distressed” utility serving not more than 5,000 customers
Missouri	Section 393.302.1 Acquisition of small water utilities, establishment of ratemaking rate base procedure	2014	Water or wastewater	A public utility that provides service to more than 8,000 customer connections, is not a sewer district, public water supply district, or municipality that owns its own water or sewer system	8,000 or fewer connections
New Jersey	Water Infrastructure Protection Act	2015	Water only	Must be equal to or larger than the number of connections be acquired	Population less than 270,000
Pennsylvania	Act 12	2016	Water or wastewater	System parameters not defined	System parameters not defined

Source: RRA (S&P Global Market Intelligence); legislative filings; EY analysis.

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Notes and sources

¹ (A) Regulated electric utilities and gas LDCs: These companies largely own network assets, including electric transmission and distribution wires and natural gas distribution assets. They feature commission-regulated rate structures that may or may not include decoupling provisions. (B) Diversified utilities: These companies operate a diverse portfolio of businesses, including regulated and unregulated components. Regulated businesses include traditional electric transmission and distribution and gas distribution. Unregulated businesses might include merchant power, international businesses and nonutility ventures such as mining or construction as part of their portfolio.

² American Water Works Association, *Buried No Longer: Confronting America's Water Infrastructure Challenge*.

³ American Society of Civil Engineers, *2017 Infrastructure Report Card*.

⁴ "US water utilities to invest \$8.3 billion in smart water infrastructure by 2027," *Northeast Group, LLC press release*, 13 July 2017.

Other sources

1. Energy Information Administration (EIA)
2. Environmental Protection Agency (EPA)
3. American Water Works Association (AWWA)
4. ThomsonOne
5. SNL Energy (S&P Global Market Intelligence)
6. Company disclosures
7. EY analysis



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