

Part 4: Cash flow, debt and equity financing, and revenue requirements

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MICHIGAN STATE UNIVERSITY

4.0 Utility, enterprise, or investment basis: private and some public

$$RR = r_a (RB) + O\&M + D + T$$

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here*

where:

RR = total test year (annualized) revenue requirements

r_a = authorized (not guaranteed) rate of return to compensate debt holders and equity shareholders

RB = rate base (original cost of invested utility plant in service net of accumulated depreciation and adjustments)

O&M = operation & maintenance expenses, including administrative & general

D = depreciation and amortization expense

T = taxes other than income and income tax expense

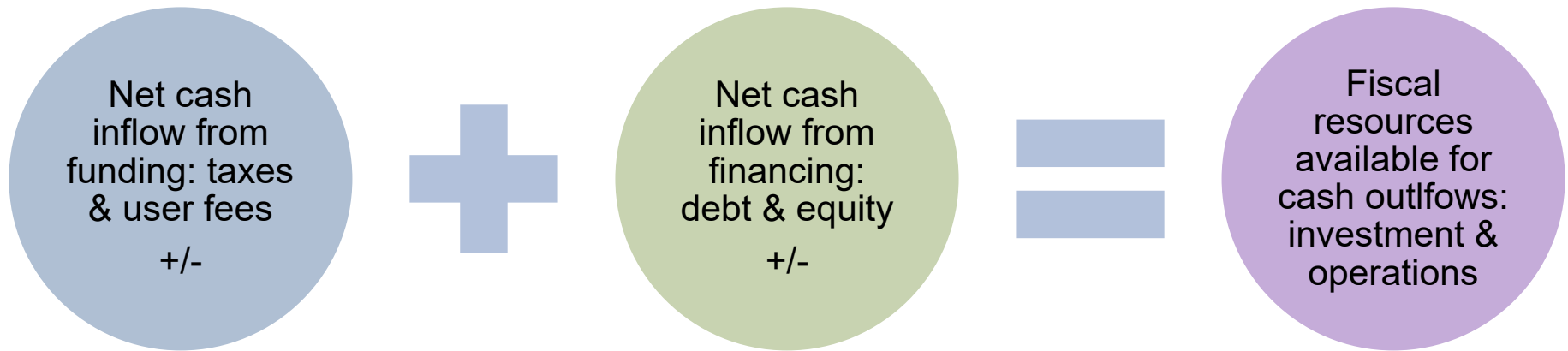
Cost-based rates and revenue sufficiency are a function of both the numerator and denominator:

$$\frac{\text{Revenue requirements (RR)}}{\text{Estimated sales (billing determinants)}}$$

4.0 Financing topics

1. Cash-flow statement
2. Utility ownership structures
3. Corporate governance and accountability
4. Financial regulation and reporting
5. Financial risk disclosure
6. Financial and economic performance metrics
7. Debt financing and credit ratings
8. Equity financing and cost of equity models
9. Return on equity calculation
10. Capital structure
11. Weighted cost of capital
12. Returns and regulatory risk
13. Regulatory performance incentives
14. Regulatory lag and returns
15. Deriving revenue requirements
16. Income deficiency and revenue conversion
17. Rate-case scenarios

4.1 Cash flow from funding and financing



4.1 Cash-flow statement

- Cash-flow statement
 - ▶ Reports a company's cash inflows and outflows for a specified period, usually a year – analogous to a checking account
 - ▶ Starts with a balance at the beginning and ends with a balance at the end (net change)
 - ▶ Relates to balance sheet and income statement data, removing non-cash items
- Costs and cash flow
 - ▶ Costs may be capitalized (balance sheet) or expensed (income statement)
 - ▶ Capitalized costs are expected to provide benefits for more than one year (CFI)
 - ▶ Expenses are incurred on an ongoing basis to maintain assets & operations (CFO)
- Cash-flow analysis and perspectives
 - ▶ Evaluate a company's cash-management activities and abilities
 - ▶ Assess the company's ability to pay dividends and to pay creditors
 - ▶ Better understand the changes of assets and liabilities occurring during the period
- Cash flow is classified according to three activities
 - ▶ Operating, investing, and financing

4.1 Cash-flow activities

- Cash-flow from operating activities (CFO)
 - ▶ **Cash in:** sale of goods or services, interest revenue, dividend revenue
 - ▶ **Cash out:** inventory purchases, payroll, taxes, interest expense, other (utilities, rent, etc.)
- Cash-flow from investing activities (CFI)
 - ▶ **Cash in:** sale of plant assets, sale of a business segment, sale of investments in equity securities of other entities or debt securities (other than cash equivalents), collection of principal on loans made to other entities
 - ▶ **Cash out:** purchase of plant assets, purchase of equity securities of other entities or debt securities (other than cash equivalents), loans to other entities
- Cash-flow from financing activities (CFF)
 - ▶ **Cash in:** issuance of own stock, borrowing (bonds, notes, mortgages, etc.)
 - ▶ **Cash out:** dividends to stockholders, repaying principal amounts borrowed, repurchasing business' own stock (treasury stock)

Source: <https://www.analystforum.com/forums/cfa-forums/cfa-level-i-forum/91311493>

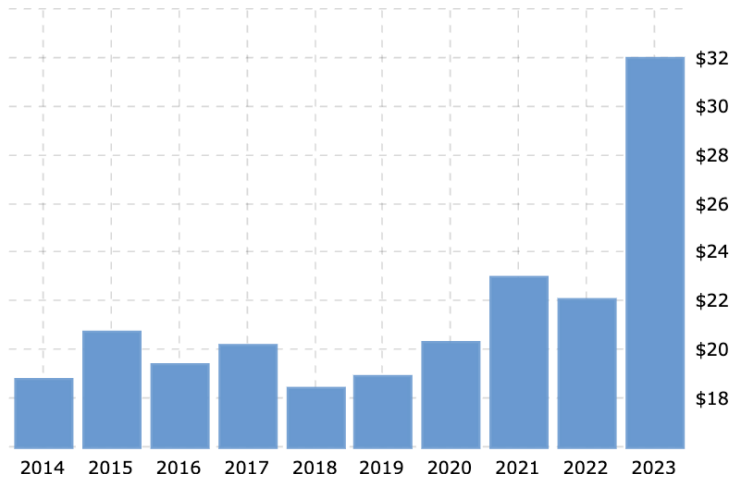
4.1 Cash-flow illustration (indirect method)

	Cash flow (\$USD in thousands)	\$ inflow (+) or outflow (-)	Category	Activity
1	>Cash balance at beginning of period	\$ 0		
2	Cash flows from operating activities			
3	Operating revenues	\$ 40,000	Funding	Customer payments
4	Operating expenses	(24,000)	Spending	Operations
5	Depreciation and amortization	6,000	Funding	Noncash expense
6	Interest expense	(5,000)	Financing	Debt compensation
7	Other income	1,000	Funding	Non-operating revenues
8	>Net cash from operating activities	\$ 18,000		
9				
10	Cash flows from investing activities			
11	Purchase of utility plant assets	(17,000)	Spending	Asset purchase
12	Sale of utility plant assets	1,000	(Spending)	Asset sale
13	>Net cash from investing activities	\$ (16,000)		
14				
15	Cash flows from financing activities			
16	Proceeds of short-term debt	1,000	Financing	Bank credit line
17	Proceeds of debt securities	20,000	Financing	Bond issues
18	Proceeds of equity securities	8,000	Financing	Stock issues
19	Repayment of long-term debt	(21,000)	Financing	Repayment of bonds
20	Dividends paid to shareholders	(14,000)	Financing	Equity compensation
22	Contributed capital from grants	2,000	Funding	Government subsidies
23	Contributions for construction	1,000	Funding	Customer contributions
24	Advances for construction	1,000	Financing	Customer advances
25	>Net cash from financing activities	\$ (2,000)		
26	>Cash balance at end of period	\$ 0		

4.1 York: net cash flow over time (operating, investing, financing)

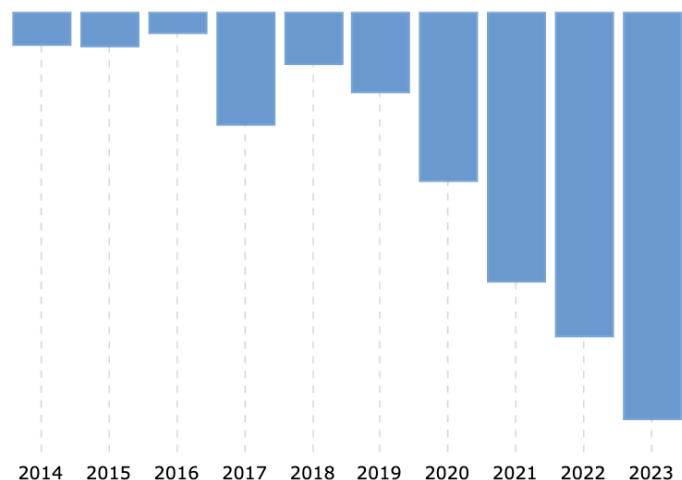
YORW - Cash Flow from Operating Activities

Annual Values (Millions of US \$)



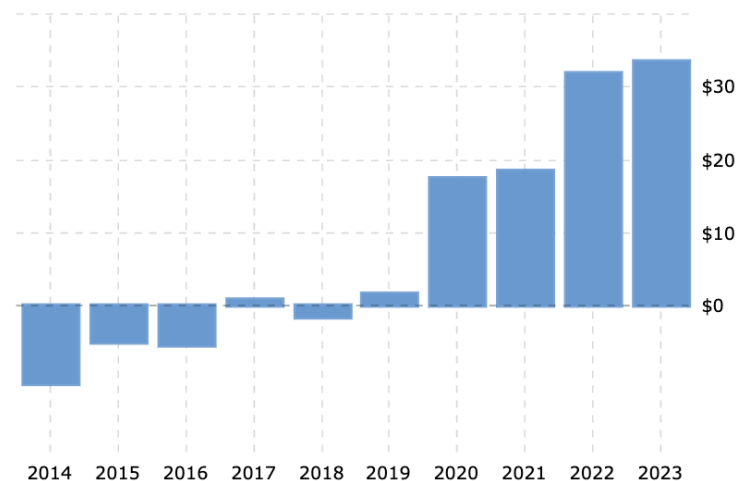
YORW - Cash Flow from Investing Activities

Annual Values (Millions of US \$)



YORW - Cash Flow from Financial Activities

Annual Values (Millions of US \$)



4.1 York: cash-flow statement (10-K)

THE YORK WATER COMPANY

Statements of Cash Flows (In thousands of dollars, except per share amounts)

	Year Ended December 31	
	2018	2017
CASH FLOWS FROM OPERATING ACTIVITIES:		
Net income	\$ 13,376	\$ 12,974
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation and amortization	7,010	6,769
Stock-based compensation	80	46
Increase in deferred income taxes	58	2,484
Other	295	54
Changes in assets and liabilities:		
Increase in accounts receivable and unbilled revenues	(483)	(572)
Decrease in recoverable income taxes	-	282
Increase in materials and supplies, prepaid expenses, regulatory and other assets	(6,094)	(507)
Increase (decrease) in accounts payable, accrued compensation and benefits, accrued expenses, deferred employee benefits, regulatory liabilities, and other deferred credits	4,508	(2,018)
Increase (decrease) in accrued interest and taxes	<u>(378)</u>	<u>599</u>
Net cash provided by operating activities	<u>18,372</u>	<u>20,111</u>
CASH FLOWS FROM INVESTING ACTIVITIES:		
Utility plant additions, including debt portion of allowance for funds used during construction of \$128 in 2018 and \$483 in 2017	(16,882)	(24,602)
Acquisitions of water and wastewater systems	-	(472)
Cash received from surrender of life insurance policies	<u>108</u>	<u>-</u>
Net cash used in investing activities	<u>(16,774)</u>	<u>(25,074)</u>
CASH FLOWS FROM FINANCING ACTIVITIES:		
Customers' advances for construction and contributions in aid of construction	1,998	1,642
Repayments of customer advances	(409)	(413)
Proceeds of long-term debt issues	28,762	22,878
Repayments of long-term debt	(25,691)	(17,533)
Borrowings under short-term line of credit agreements	-	1,000
Changes in cash overdraft position	301	769
Repurchase of common stock	-	(1,263)
Issuance of common stock	2,024	1,905
Dividends paid	<u>(8,583)</u>	<u>(8,229)</u>
Net cash provided by (used in) financing activities	<u>(1,598)</u>	<u>756</u>
Net change in cash and cash equivalents	-	(4,207)
Cash and cash equivalents at beginning of period	<u>2</u>	<u>4,209</u>
Cash and cash equivalents at end of period	<u>\$ 2</u>	<u>\$ 2</u>

4.1 Exercise: utilities and cash flow

- Cash flow is used to measure and evaluate financial performance
 - ▶ Cash flow (CF) does not equal net income or profit
 - ▶ Free cash flow (FCF) does not incorporate financing activities (e.g., debt-related)
 - ▶ For capital-intensive utilities, free cash flow may be negative

		Cash provided by operating activities	Plus net cash from investing activities	= Free cash flow
1	2017	\$20,111	(\$25,074)	?
2	2018	\$18,372	(\$16,774)	?
		Cash provided by operating activities	Plus net cash from investing activities and financing activities	= Net change in cash
3	2017	\$20,111	(\$25,074) + \$756	?
4	2018	\$18,372	(\$16,774) + (1,598)	?

4.2 Comparing utility ownership models

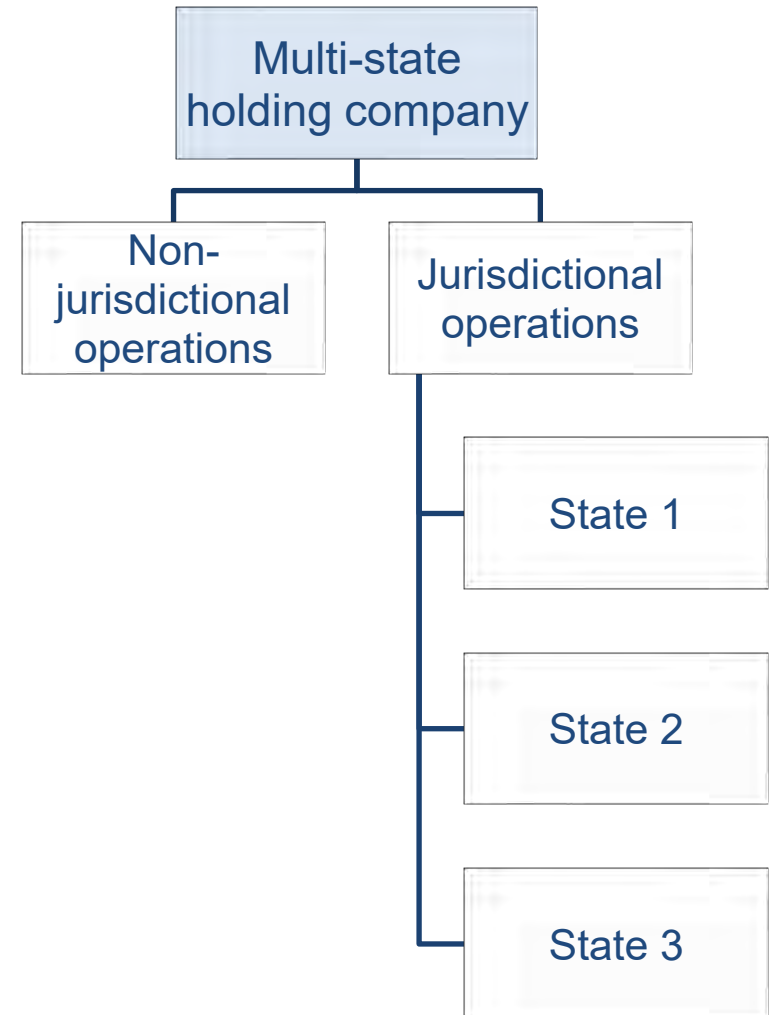
	Publicly owned	Cooperatively owned	Privately owned
Classification	Governmental	Nongovernmental not-for-profit	Nongovernmental for-profit
Ownership	Government-owned department, division, or enterprise	Member-owned cooperatives, associations, other NFPs	Investor-owned corporation or private proprietor
Governance structure	Elected officials (councils), local boards, and commissions	Member boards of directors	Corporate boards of directors and governmental regulators
Orientation	Constituent service	Member benefits	Shareholder returns
Responsible owner of assets	Unit of (local) government	Member-owners or shareholders	Investors in publicly traded or private equity
Tax status of operations	Tax-exempt but may make payments in lieu of local taxes	Tax-exempt but may make payments in lieu of local taxes	Pay income, property, and other taxes on private corporations
Distribution of profits	May retain reserves or make transfers to parent governments	Proportionate to member shares and subject to federal tax policy	Regulated returns based on capital invested in utility plant (rate base)
Sources of funding	Citizen ratepayers and taxpayers (including grants and other contributed capital)	Member ratepayers and taxpayers (including grants and other contributed capital)	Customer ratepayers with limited funding from contributed capital (including grants)
Means of financing	Debt, government equity, advances, and reserves	Debt, member equity, and advances, and reserves	Debt, investor equity, advances, and reserves
Financial rules	Governmental Accounting Standards Board (GASB)	Financial Accounting Standards Board (FASB)	Financial Accounting Standards Board (FASB)
Financial regulation	State-level as applicable	State-level as applicable	Federal Securities and Exchange Commission (SEC) if publicly traded
Economic regulation	Sometimes and conditional	Sometimes	Always for monopolies

4.3 Corporate governance and accountability

- Synergies between regulators and corporate boards
 - ▶ Shareholders and directors also provide performance incentives
 - ▶ Executive compensation committees
- Accountability under Sarbanes-Oxley (2002)
 - ▶ Protects investors but may affect cost of capital
 - ▶ Separation of advisory and audit functions
 - ▶ Improves transparency and accountability
 - ▶ CEOs and CFOs certify reporting
 - ▶ Cost of compliance may be high – who should pay?
- Risk management and asset protection
 - ▶ Segregation, firewalls, and ring fencing based on business activity
 - ▶ Review of and conditions on mergers and acquisitions, including convergence
 - ▶ Audits of multi-state holding company and affiliate transactions
- New emphases
 - ▶ Cyber-security disclosures for public companies – SEC statement and guidance (2018)
 - ▶ Environmental, social, governance (ESG) reporting – SEC Finalized Rules (March 2024)
 - ▶ Disclosure of climate risks, resilience planning, and affordable access (SDGs)

4.3 Oversight of complex utility entities

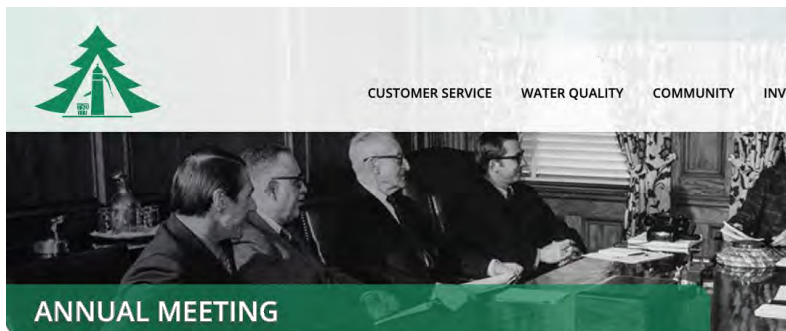
- Public Utility Holding Company Act (1935)
 - ▶ PUHCA was repealed in 2005
 - ▶ Not applicable to water sector (AWK, Essential)
- Issues raised by multi-state, multi-utility (inter-jurisdictional) holding companies
 - ▶ Scale and limits to scale
 - ▶ Tracking and allocation of costs
 - ▶ Affiliate transactions
 - ▶ Private equity and “flippers”
 - ▶ Foreign ownership
 - ▶ Overhead and executive compensation
 - ▶ Auditing – XBRL could facilitate
- Cost allocations determine (NRCAM, 2003)
 - ▶ Level of total state costs for multi-state utilities (holding companies)
 - ▶ Regulated (versus unregulated) component of total state costs
 - ▶ Intrastate (versus interstate) regulated component of total state costs
 - ▶ Revenue requirement by category of service



4.3 York: corporate governance

- Board of Directors
 - ▶ Operates under specific corporate governance principles and guidelines based on the Company's Bylaws, Standing Resolutions, and Policies
- Nomination and Corporate Governance Committee (“the Committee”)
 - ▶ Monitors, develops and makes recommendations to the Board of Directors based on these principles and guidelines
- Some of the principles and guidelines are listed below
 - ▶ Board Selection
 - ▶ Director Independence
 - ▶ Board Leadership Structure
 - ▶ Board Role in Risk Oversight
 - ▶ Board Committees and Functions
 - ▶ Related Party Transactions
 - ▶ Communication With the Board of Directors
 - ▶ Executive Sessions of the Board
 - ▶ Stock Ownership
 - ▶ Code of Ethics
- Source: York Water Shareholder Meeting (2018)

4.3 York virtual annual shareholder meeting (2023)



Home > Investor Relations > Annual Meeting


Annual Meeting 2024

May 6, 2024 at 1:00 PM

The Appell Center for the Performing Arts
50 North George Street
York, PA 17401

Doors open at 11:30 AM. A boxed lunch will be provided at 12:00 PM. **Reservation is required.**
Please RSVP to Molly Houck at 717-718-2942 or mollyh@yorkwater.com.

ANNUAL MEETING DOCUMENTS



READ OUR LATEST ANNUAL REPORT.

2023 will be remembered as a year of impressive growth and execution of asset plans as we responded to a drought emergency. York Water experienced historic growth in corporate revenue, capital placement, and earnings. This was also the year that we executed our drought response plan operating both the Susquehanna River Pump Station and the Lake Redman Pump Station in order to keep enough source water flowing to the Grantley Road plant. The drought we experienced tested both operational and financial resources.

[Read the Annual Report >](#)

2023 10-K REPORT

The annual report on Form 10-K provides a comprehensive overview of the company's business and financial condition and includes audited financial statements.

[Read the 10-K Report >](#)

FIND OUR 2024 PROXY HERE.

The York Water Company Proxy provides our shareholders with the information they need to make informed votes at our annual meeting.

[Read the Proxy >](#)

4.3 York: audit committee

- The Audit Committee (the “Audit Committee”) of the Board of Directors (the “Board”) of The York Water Company (the “Company”) is appointed by, and acts on behalf of, the Board.
- The Audit Committee’s purpose shall be:
 - ▶ To assist the Board in its oversight of (1) the accounting and financial reporting processes of the Company and the audits of the financial statements of the Company and its subsidiaries and (2) the Company’s compliance with legal and regulatory requirements;
 - ▶ To interact directly with and evaluate the performance of the independent auditors, to determine whether to engage or dismiss the independent auditors and to monitor the independent auditors’ qualifications and independence; and
 - ▶ To prepare the report required by the rules of the Securities and Exchange Commission (the “SEC”) to be included in the Company’s annual proxy statement.

Q. How do board governance and regulation complement each other?

4.3 York: code of conduct (2014)

- The reputation and integrity of The York Water Company (the “Company”) are valuable assets that are vital to the Company’s success”
 - ▶ Each officer of the Company will be asked to certify on an annual basis that he/she is in full compliance with the Code of Conduct and related policy statements

- Code subsections
 - ▶ Violations of law
 - ▶ Conflicts of interest
 - Outside activities/employment
 - Civic/political activities
 - Loans to employees
 - ▶ Fair dealing
 - ▶ Proper use of company assets
 - ▶ Delegation of authority
 - ▶ Handling confidential information
 - ▶ Handling financial information

- The foregoing are set forth as guidelines for the principal executive officer and financial employees, but, are, in fact, statements of mandatory conduct

THE YORK WATER COMPANY Policy	
Approved by: Board of Directors	File: Code of Conduct
Date: February 24, 2003	
Revision: July 7, 2014	Page 1 of 5
CODE OF CONDUCT	
<p>The reputation and integrity of The York Water Company (the “Company”) are valuable assets that are vital to the Company’s success. Each employee and Board member of the Company, including each of the Company’s officers, is responsible for conducting the Company’s business in a manner that demonstrates a commitment to the highest standards of integrity. No Code of Conduct can replace the thoughtful behavior of an ethical employee or Board member. The purpose of this Code is to focus employees and Board members on areas of ethical risk, provide guidance to help employees and Board members to recognize and deal with ethical issues, provide mechanisms for employees and Board members to report unethical conduct, and foster among employees and Board members a culture of honesty and accountability. Dishonest or unethical conduct or conduct that is illegal will constitute a violation of this Code, regardless of whether such conduct is specifically referenced herein.</p>	

4.3 York: whistleblower policy

WHISTLEBLOWER POLICY CONTACT INFORMATION

The York Water Company is committed to high standards of ethical, moral, and legal business conduct. In line with this commitment, and York Water's commitment to open communication, this policy aims to provide an avenue for employees to raise concerns and reassurance that they will be protected from reprisals or victimization for whistleblowing.

This whistleblowing policy is intended to cover protections for those who raise concerns regarding The York Water Company, such as:

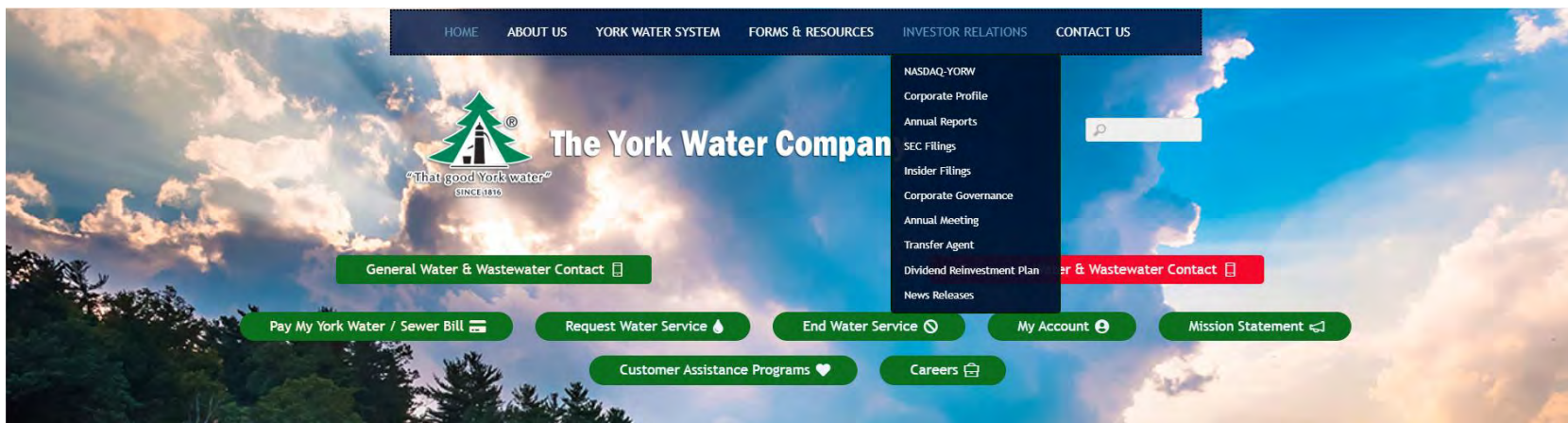
1. Incorrect financial reporting;
2. unlawful activity;
3. activities that are a violation of York Water policy, including the Code of Conduct; or activities, which otherwise amount to serious improper conduct.

Reporting – The whistleblowing procedure is intended to be used for serious and sensitive issues. Such concerns, including those relating to financial reporting or unethical or illegal conduct, may be reported directly to the Corporate Compliance Officer, Natalee Colón, nataleec@yorkwater.com, or the Chairman of the Audit Committee of the Board of Directors, Steven Rasmussen, stever@adamsec.coop.



4.4 Financial regulation and reporting

- Common elements of financial statements required of publicly traded companies
 - ▶ Risk factors overview – relevant to evaluating risk and the cost of capital
 - ▶ Balance sheet – informs the derivation of the rate base
 - ▶ Income statement - informs the derivation of revenue requirements
 - ▶ Cash-flow statement – useful in the assessment of financial health
 - ▶ Managerial and operating information – useful in auditing
 - ▶ Notes and footnotes to all financial statements – useful for analysis
 - ▶ Auditor’s opinion – useful for compliance assessment
 - ▶ CEO and CFO certification – required by Sarbanes-Oxley
- Financial reports are under the "investor relations" tab on company websites



4.4 Notes to financial statements (Deloitte, 2012)

- Factors affecting the content of notes for regulated utilities
 - ▶ Investment in plant
 - ▶ Capitalization
 - ▶ Regulation
 - ▶ Conflicts with GAAP

- Notes on utility statements that differ from non-utility disclosures
 - ▶ Accounting policies
 - ▶ Regulatory assets and liabilities
 - ▶ Rate matters
 - ▶ Retained earnings
 - ▶ Commitments
 - ▶ Contingencies
 - ▶ Jointly owned plants
 - ▶ Long-term contracts for purchases (e.g., power or water)
 - ▶ Business segments

4.4 Certification of financial reports

EXHIBIT 31.1 CERTIFICATIONS

I, Jeffrey R. Hines, certify that:

1. I have reviewed this report on Form 10-K of The York Water Company;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a) designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c) evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d) disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of registrant's board of directors (or persons performing the equivalent function):
 - a) all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b) any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 11, 2019

/s/Jeffrey R. Hines
Jeffrey R. Hines
President and CEO

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the Registration Statements on Form S 3 (File No. 333 213942) and Forms S-8 (File Nos. 333 191497 and 333 211287) of The York Water Company of our report dated March 12, 2019, relating to the financial statements, the financial statement schedule and the effectiveness of internal control over financial reporting, which appear in this Form 10-K.

/s/Baker Tilly Virchow Krause, LLP
York, Pennsylvania
March 12, 2019

EXHIBIT 32.2

CERTIFICATION PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report of The York Water Company on Form 10-K for the period ending December 31, 2018 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Matthew E. Poff, Chief Financial Officer of the Company, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to my knowledge:

- (1) The Report fully complies with the requirements of Section 13(a) of the Securities Exchange Act of 1934; and
- (2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

THE YORK WATER COMPANY

/s/Matthew E. Poff
Matthew E. Poff
Chief Financial Officer

Date: March 11, 2019

4.5 Financial risk disclosure

- Utility companies have a unique risk profile that limits risk
 - ▶ Generally less risky than other investment sectors due to essentiality and monopoly
 - ▶ Utility managers tend to be risk averse – more aligned with bondholders
- Risk issues are different for bondholders and equity shareholders
 - ▶ For bondholders, risk is only to the downside – default only and no upside
 - ▶ For shareholders, risk is symmetrical – with upside and downside earnings potential
- Investment risk to utility shareholders
 - ▶ Likelihood that an investment's actual return will differ from expectations ("non-normal")
 - ▶ Includes the possibility of losing some or all of the original investment
- Types of risk for diversified equity investors – based on portfolio theory
 - ▶ Systematic – relevant (e.g., inflation, interest rates, tax policy, war, pandemic)
 - ▶ Sector-specific – may be relevant (e.g., technological disruption, restructuring, policies)
 - ▶ Firm-specific (idiosyncratic) – *irrelevant* (e.g., project-related, regulatory decisions)

Q. How does regulatory risk affect utilities?

4.5 Financial disclosure relevant to ratemaking

- Financial statements
 - ▶ Financial filings and notes are key to understanding financial accounting details and the company's financial position
 - ▶ Relevant ratemaking issues (e.g., rate base and operating expenditures) may be discussed in the notes but not in the rate filing – and may lead to discovery of issues
 - ▶ Regulatory auditors might also want to listen in on corporate earnings calls
- Management discussion and analysis (MD&A)
 - ▶ Corporate message
 - ▶ Narrative explanation of financial performance
 - ▶ Discussion and overview of operations
 - ▶ Relevant trends, uncertainties, and risks
 - ▶ Regulatory environment and ratemaking
- Pandemic was a known risk
 - ▶ NARUC Resolution (2005) and tabletop exercises with stakeholders
 - ▶ More emphasis on workforce than ratepayer impact
 - ▶ Should shareholders share the burden?

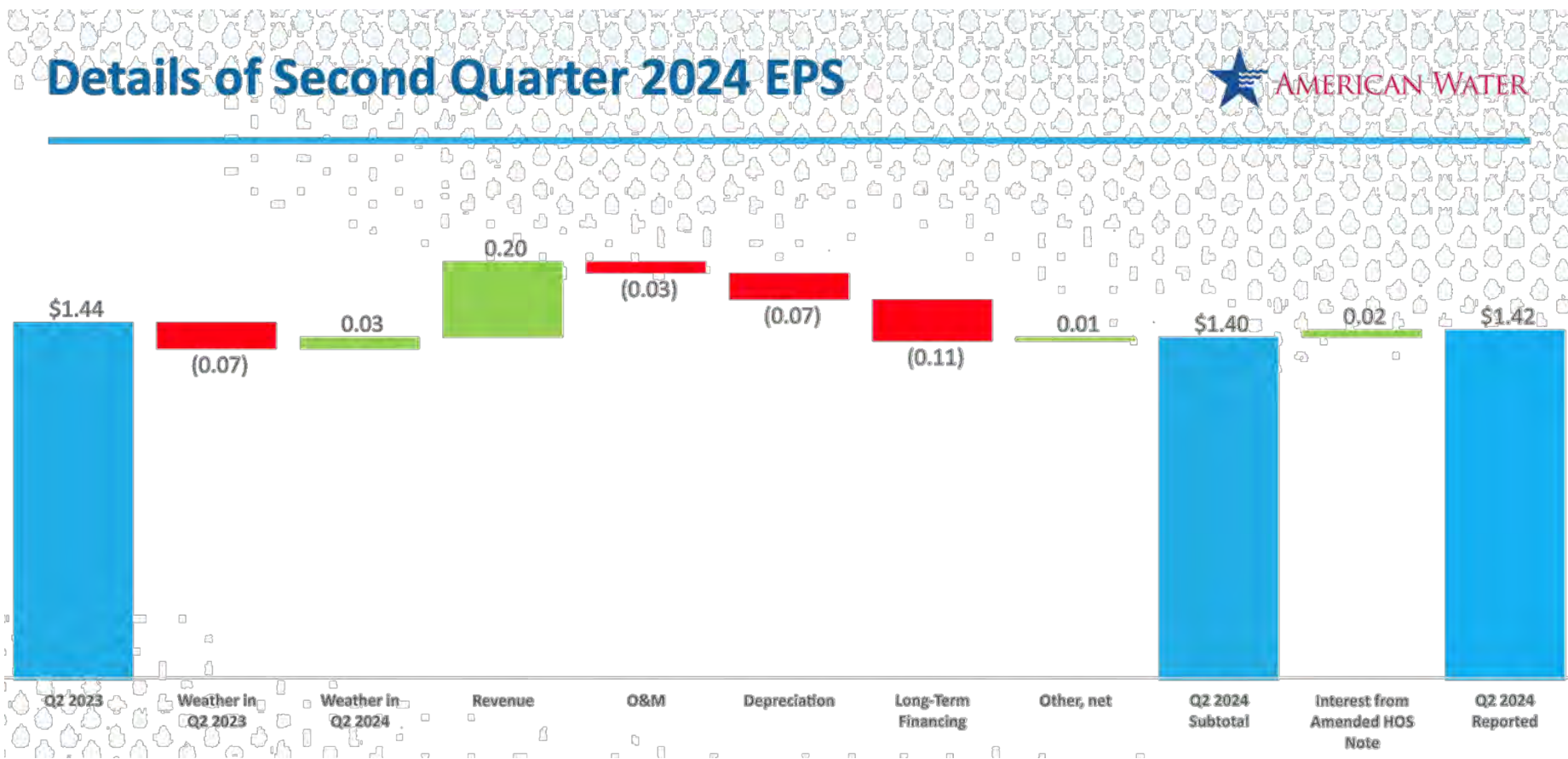
4.5 Pandemic as a known risk (NARUC, 2005) ⓘ

- Resolution for State Commissions' Action Relative to Pandemic Preparedness...
 - ▶ WHEREAS, A pandemic will cause severe economic and social disruption including travel bans, school, government and business closings, cancellations of major events and significant worker absenteeism; and
 - ▶ WHEREAS, Water, electricity, natural gas, and telecommunications services will play a critical role in effectively responding to a potential pandemic; and
 - ▶ WHEREAS, Plans to respond to health and bioterrorism hazards have been developed by companies for continuity of operations as part of State and federal initiatives supporting the Bioterrorism Act of 2001; now therefore be it
 - ▶ RESOLVED, That the National Association of Regulatory Utility Commissioners (NARUC), convened in its November 2005 Annual Convention in Indian Wells, California, encourages State commissions to initiate dialogue no later than first quarter 2006 and/or continue current communication with their regulated companies about their continuity of operations planning including ensuring that critical personnel receive inoculation on a priority basis as they relate to a potential pandemic; and be it further
 - ▶ RESOLVED, That such plans be reviewed and updated on an annual basis, be robust in assuring staffing for critical functions through cross training, permit modification of operation to enhance telecommuting or remote dispersal of personnel to minimize disease transmission, and be responsive to the potential of travel restrictions affecting the general movement of the population.

Sponsored by the Ad Hoc Committee on Critical Infrastructure

Adopted by the NARUC November 16, 2005

4.5 Factors affecting earnings per share (AWK, 2022)



4.5 York: matters affecting operations (10-K, 2018)

- Important matters that may affect what will actually happen...
 - ▶ changes in weather, including drought conditions or extended periods of heavy rainfall;
 - ▶ levels of rate relief granted;
 - ▶ the level of commercial and industrial business activity within the Company's service territory;
 - ▶ construction of new housing within the Company's service territory and increases in population;
 - ▶ changes in government policies or regulations, including the tax code;
 - ▶ the ability to obtain permits for expansion projects;
 - ▶ material changes in demand from customers, including the impact of conservation efforts which may impact the demand of customers for water;
 - ▶ changes in economic and business conditions, including interest rates, which are less favorable than expected;
 - ▶ loss of customers;
 - ▶ changes in, or unanticipated, capital requirements;
 - ▶ the impact of acquisitions;
 - ▶ changes in accounting pronouncements;
 - ▶ changes in the Company's credit rating or the market price of its common stock; and
 - ▶ the ability to obtain financing.

4.6 Select economic and financial performance metrics

Concept	Name	Numerator	Denominator
Capital intensity	Assets to sales ratio	Total assets	Annual operating revenues
	Plant to sales ratio	Utility plant	Annual operating revenues
Productivity	Asset turnover	Annual operating revenues	Total assets
Leverage	Debt ratio	Long-term debt	Total assets
	Debt equity ratio	Long-term debt	Shareholder equity
Liquidity	Current ratio	Current assets	Current liabilities
Profitability	Profit margin	Net income	Annual operating revenues
	Ret. earnings to equity	Retained earnings	Shareholder equity
		(Net income + depreciation expense)	Annual operating revenues
		Earnings before interest & tax (EBIT)	(Total assets – current liabilities)
	Overall return	Net op. income (EBIT - income taxes)	Rate base
	Return on equity	Net income	Rate base
Operational efficiency		Annual operating revenues	Annual operating expenses
		O&M expense	Units sold
		A&G expense	Total O&M expense
		Customers	Employees
		Employees	Units sold
		Units sold	Units produced
Effective prices		Revenues from class	Units sold to class

4.6 Financial performance metrics

This is the greatest income stock of all time (and you've probably never heard of it)

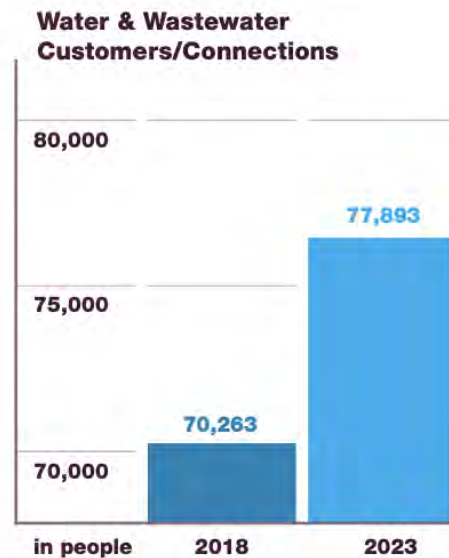
Although it doesn't have a high yield or a 65-year streak of boosting its base annual payout like P&G, a case can be made that small-cap [water utility stock York Water \(YORW -0.25%\)](#) is the greatest dividend stock of all time.

The reality is few folks have probably ever heard of York Water. This is a company that provides water and wastewater services to 51 municipalities spanning three counties in South-Central Pennsylvania. Last year, the company's biggest acquisition totaled \$12 million and netted it approximately 1,800 new wastewater customers. In other words, York Water is about as off-the-radar as they come for public companies.

But get this: York Water has been paying an annual dividend to its shareholders since James Madison was president back in 1816. This [206-year \(and counting\) streak of rewarding its shareholders](#) is more than six decades longer than **Stanley Black & Decker**, which has been paying its shareholders a dividend for 145 consecutive years. Stanley Black & Decker is [No. 2 on the list of longest consecutive payouts](#).



4.6 General performance metrics

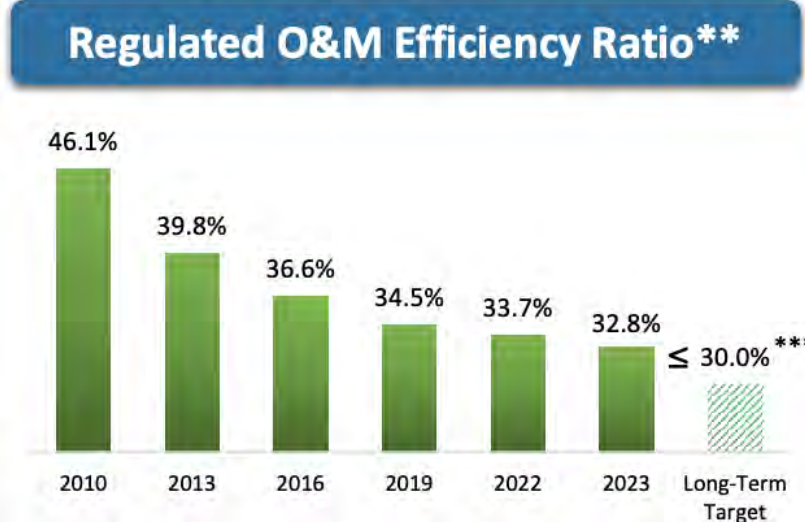


4.5 Poll: Efficiency metrics

- Which of the following is *not* a measure of efficiency?
 - A. Energy expenses/water produced
 - B. Employees/customer connections
 - C. Peak load/average load served
 - D. Operating expenses/operating revenues

4.6 Measuring efficiency

- O&M/revenues is not a measure of efficiency
- Efficiency is measured in terms of costs relative to outputs
- What might affect this “efficiency ratio”? (hint: what drives costs?)



Adjusted operations and maintenance expense – Regulated Businesses	\$966	\$961	\$959
<i>Less:</i>			
Impact of adoption of ASU 2017-07**	-	16	12
Adjusted operations and maintenance expense – Regulated Businesses (c)	\$966	\$945	\$947
Adjusted operating revenues—Regulated Businesses	\$2,186	\$2,498	\$2,749
<i>Less pro forma adjustment:</i>			
Pro forma adjustment for impact of the TCJA***	89	124	161
Adjusted pro forma operating revenues—Regulated Businesses (d)	\$2,097	\$2,374	\$2,588
Adjusted O&M efficiency ratio—Regulated Businesses (c)/(d)	46.1%	39.8%	36.6%

4.7 Debt financing and credit ratings

- Debt (“leverage”) provides financial capital to support operations
 - ▶ Long-term and short-term instruments and hybrids
 - ▶ Short-term debt may be converted to long-term debt
 - ▶ Includes bonds and loans, including government loans
 - ▶ Revenue bonds are secured by a revenue stream, as from utility sales
 - ▶ Debt limitations and coverage may be specified in bond covenants
- Publicly and privately owned utilities are rated in terms of risk
 - ▶ Fitch, Moody's, and Standard and Poor's
 - ▶ Favorable credit ratings can lower the cost of debt (interest rate)
 - ▶ Commissions are also rated in terms of “regulatory climate”
 - ▶ Increasing attention to social (ESG) issues
- Principal payments on debt
 - ▶ Explicit in cash needs basis but implicit in utility basis (may have interest-only debt)
- Interest payments on debt
 - ▶ Not reflected in net operating income (revenues-expenses)
 - ▶ Actual interest paid may reflect non-utility operations so cost must be calculated
 - ▶ Affects calculation of income taxes and net operating income (synchronization)

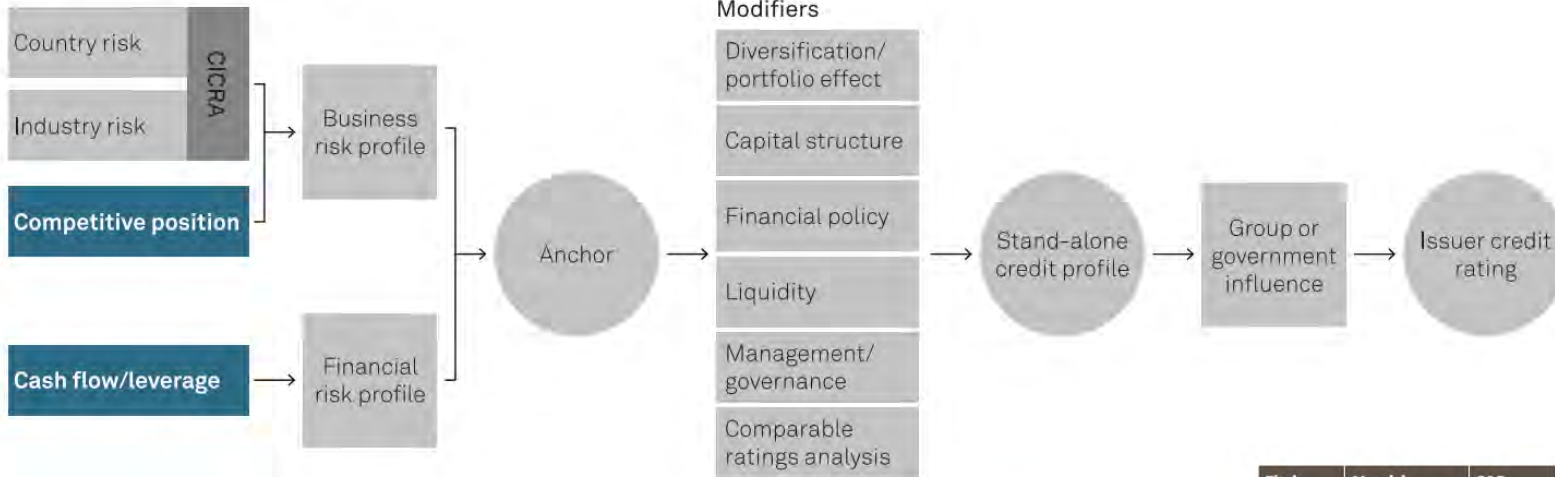
4.7 General indicators of debt burden

- Two measures of debt burden: debt outstanding and debt service (GFOA, 2000)
- Debt outstanding is the total dollar amount of principal that must be paid as measured in relative terms by
 - ▶ Debt as a percentage of the fair market value (FMV) of taxable property
 - ▶ Debt per capita or as a percentage of personal income per capita
- Debt service (principal and interest payments) is the allocation of current resources that are otherwise unavailable for other expenditure purposes
 - ▶ Debt service as a percentage of property tax revenue
 - ▶ Debt service per capita or as a percentage of personal income per capita
 - ▶ Debt service as a percentage of general fund revenues
 - ▶ Debt service as a percentage of general fund budgeted expenditures
 - ▶ Debt service as a percentage of operating expenditures

Q. Should regulators seek favorable credit ratings to lower the cost of debt?

4.7 Credit ratings and risk (S&P)

Corporate criteria framework



Source: S&P Global Ratings.

	Fitch	Moody's	S&P	Status
Investment Grade <i>(Lowest risk/cost)</i>	AAA	Aaa	AAA	Prime
	AA+	Aa1	AA+	High Grade
	AA	Aa2	AA	
	AA-	Aa3	AA-	
	A+	A1	A+	Upper Medium Grade
	A	A2	A	
A-	A3	A-		
Non-Investment Grade	BBB+	Baa1	BBB+	Lower Medium Grade
	BBB	Baa2	BBB	
	BBB-	Baa3	BBB-	
	BB+	Ba1	BB+	Non-Investment Grade Speculative
	BB	Ba2	BB	
	BB-	Ba3	BB-	
In Default <i>(Highest risk/cost)</i>	B+	B1	B+	Highly Speculative
	B	B2	B	
	B-	B3	B-	
	D	C	D	In Default

Credit ratings below B-/B3/B- and above D/C/D not included in above chart

4.7 Credit ratings and metrics (Moody's, 2017) ⓘ

Exhibit 1

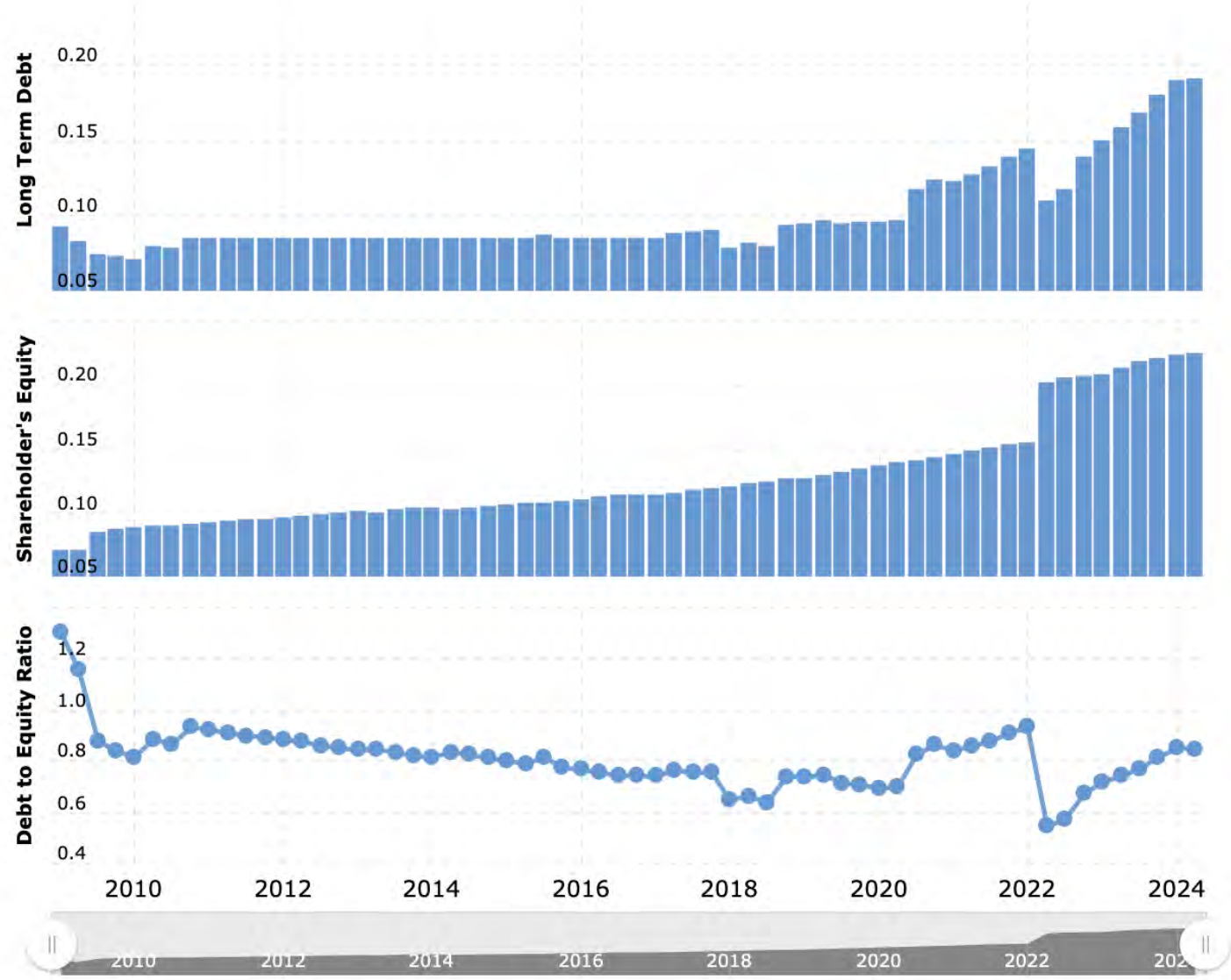
Aggregate Metrics by Rating Category

	EBITA / Average Assets	EBITA / Interest Expense	EBITA Margin	Operating Margin	(FFO + InExp) / IntExp
Aaa	12.3%	11.5	30.6%	25.4%	17.2
Aa	10.2%	13.9	19.5%	17.4%	15.2
A	10.8%	10.7	15.8%	14.9%	13.1
Baa	8.7%	6.3	13.9%	12.0%	8.1
Ba	8.5%	3.7	13.3%	11.5%	5.1
B	6.7%	1.9	11.2%	9.0%	2.9
Caa-C	4.1%	0.7	7.0%	4.6%	1.6

Source: Moody's Financial Metrics™

FFO / Debt	Retained Cash Flow / Net Debt	Debt / EBITDA	DEBT / Book Capitalization	CAPEX / Depreciation	Revenue Volatility
41.5%	31.4%	1.9	35.1%	1.1	6.8
43.4%	30.1%	1.8	31.0%	1.3	8.6
34.1%	27.3%	2.3	40.7%	1.3	7.4
27.1%	25.3%	2.9	46.4%	1.2	10.7
19.9%	19.7%	3.7	55.7%	1.2	14.3
11.7%	11.5%	5.2	65.8%	1.1	18.7
4.6%	5.1%	8.1	89.3%	0.8	18.9

4.7 York: long-term debt over time



4.7 York: long-term debt

224. LONG-TERM DEBT - Account Nos. 221.0, 222.0, and 224.0

(Excluding Advances from Affiliated Companies)

1. Give below the particulars indicated of the long-term debt at end of year represented by unmatured obligations issued or assumed by the respondent, exclusive of advances from affiliated companies.
2. Group entries according to accounts and show the total for each account.
3. For obligations assumed by the respondent show in Column (a) the name of the issuing company and the class and series of such obligations.
4. For Receivers' Certificates show the name of the court and date of court order under which such certificates were issued.
5. If respondent has pledged any of its long-term debt securities give particulars in a footnote, including name of the pledge and purpose of pledge.
6. If interest expense was incurred during the year on any obligations retired or reacquired before end of year, include such interest expense in Column (g).
7. If interest has matured but is unpaid on any obligation, state in a footnote the class, series and principal amount of such obligation and the amount of interest matured thereon.

Line No.	Class and Series of Obligations (a)	Nominal Date of Issue (b)	Date of Maturity (c)	Principal Amount Authorized (d)	Outstanding Per Balance Sheet* (e)	Interest For Year		Held By Respondent	
						Rate (f)	Amount (g)	As Reacquired. Lg.-Term Debt (h)	In Sinking & Other Funds (i)
1	Obligations Other Than PENNVEST	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX
2	Account 221								
3									
4	Sr. Notes Series A	1989	2019	6,000,000	6,000,000	10.17	610,200		
5	Sr. Notes Series B	1989	2019	5,000,000	5,000,000	9.60	480,000		
6	Sr. Notes Series C	1990	2020	6,500,000	6,500,000	10.05	653,250		
7	Sr. Notes Series D	1993	2022	7,500,000	7,500,000	8.43	632,250		
8	4.75% Ind. Dev. Bonds	2006	2036	10,500,000	10,500,000	4.75	498,750		
9	Variable Rate Pedfa Series A	2008	2029	12,000,000	12,000,000	3.43	411,337		
10	5% Sr. Notes Series 2010A	2010	2040	15,000,000	15,000,000	5.00	750,000		
11	4.5% Pedfa Series 2014	2014	2038	14,880,000	14,870,000	4.50	669,150		
12	4% - 4.5% YCIDA Series 2015	2015	2045	10,000,000	10,000,000	4 - 4.5	425,044		
13									
14									
15									
16	Account 224								
17	Committed Lines of Credit	2008	2019/2020	41,500,000	8,507,719	Libor plus 1.15-1.25%	233,908		
18	Total Obligations Other Than PENNVEST			128,880,000	95,877,719		5,363,889		
19	PENNVEST Obligations	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX
20									
21	Account 224								
22	1% Pennvest Loan	1999	2019	800,000		1	540		
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37	Total PENNVEST Obligations			800,000			540		
38	TOTAL OBLIGATIONS			129,680,000	95,877,719		5,364,429		

* Total amount outstanding without reduction for amount held by respondent.

4.7 York: bond assessment and issuance (2010)

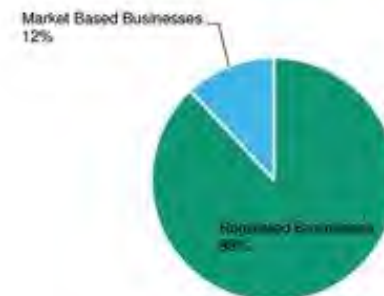
Popular Name	York Water 987184AA6 5.0% 10/01/2040 Corporate Bond	Very Good Macroaxis Rating
CUSIP Number	987184AA6	
Bond Issue ISIN Code	US987184AA61	
S&P Rating	A-	
Maturity Date	10/01/2040	
Issuance Date	10/08/2010	
Coupon	5.0 %	
Reference Treasury Coupon	3.0 %	
Is Bond Convertible	No	
Is Bond Callable	Yes	
Next Call Date	10/01/2015	

4.8 Equity financing and cost of equity models

- Equity investors may be individuals or shareholders – not just listed companies
 - Including large institutions (such as pension funds and insurance companies)
- Cost of equity capital compensates investors by providing a return on investment
 - Depreciation expense is the return of their investment over time
- Cost of equity is based on "comparable risk"
 - Models require assumptions and subjective judgment
 - Impactful in terms of revenue requirements and often controversial
- Risk is generally lower for regulated than non-regulated (competitive) companies
 - Utilities are valued for stable and high dividends, especially during volatile markets
 - Protective role of the compact

Exhibit 3

The vast majority of American Water's operating revenue is derived from low-risk regulated utilities

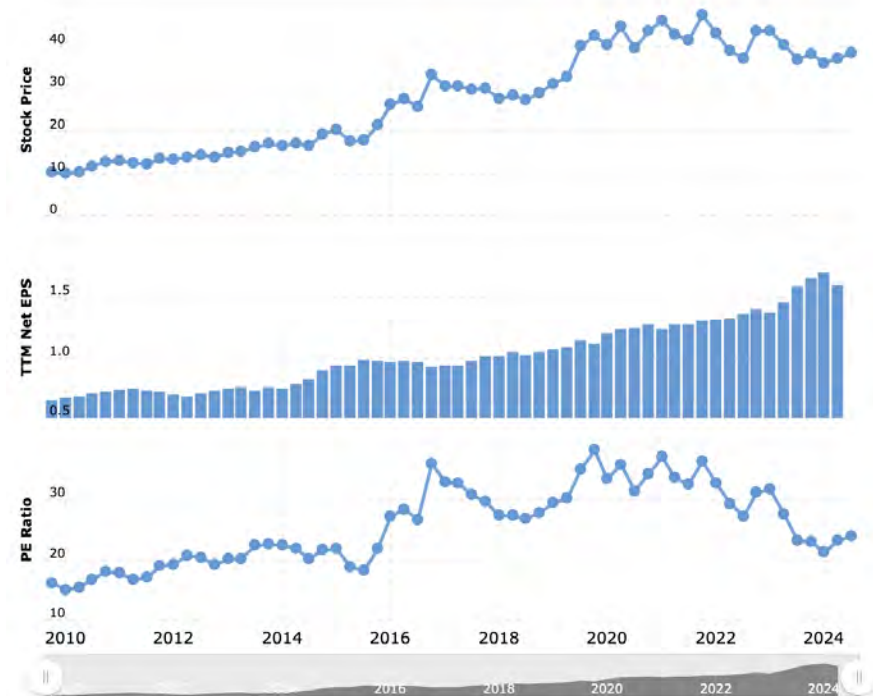


4.8 Cost of equity models (based on Deloitte, 2012)

- Discounted cash flow (DCF) or dividend discount model
 - ▶ $\text{ROE} = \text{dividend over share price} + \text{growth}$
 - ▶ Observed current annual dividends divided by current market price plus expected annual rate of growth measured in terms of dividends, earnings per share, or book value
- Capital asset pricing model (CAPM)
 - ▶ $\text{ROE} = \text{risk-free rate} + \text{overall market risk (beta)}$
 - ▶ Assumes that the expected rate of return consists of a risk-free return (adjusted for inflation) plus compensation for risk (market-based premium)
 - ▶ Beta is a measure of systematic (non-diversifiable) risk by which a stock is compared to the overall market; a lower beta reflects relatively lower risk (and potential return)
- Risk-differential or risk-premium method
 - ▶ $\text{ROE} = \text{risk-free rate} + \text{premium}$
 - ▶ Risk premium compensates investors for added risk and measured by the difference between the risk-free rate and average of returns for the industry
- Price-to-earnings ratio
 - ▶ Based on earnings from some past period and concurrent or present market prices
- Comparable earnings or opportunity cost
 - ▶ Considers what the invested capital would have earned in enterprises with similar risks
 - ▶ May be used to set “generic returns” for sector (e.g., Florida, Massachusetts for water)

4.8 York: price to earnings (P/E) ratio

- The P/E ratio essentially measures market expectations of a company.
- York Water has a P/E ratio that is roughly in line with the water utilities industry average (28.5).
- Its P/E ratio suggests that York Water shareholders think that in the future it will perform about the same as other companies in its industry classification.
- If York Water actually outperforms its peers going forward, that should be a positive for the share price.
- York Water trades on a P/E ratio of 30.5, which is above the US market average of 16.8. With debt at prudent levels and improving earnings, it's fair to say the market expects steady progress in the future.
- Source: Simply Wall St. (1/18/19)

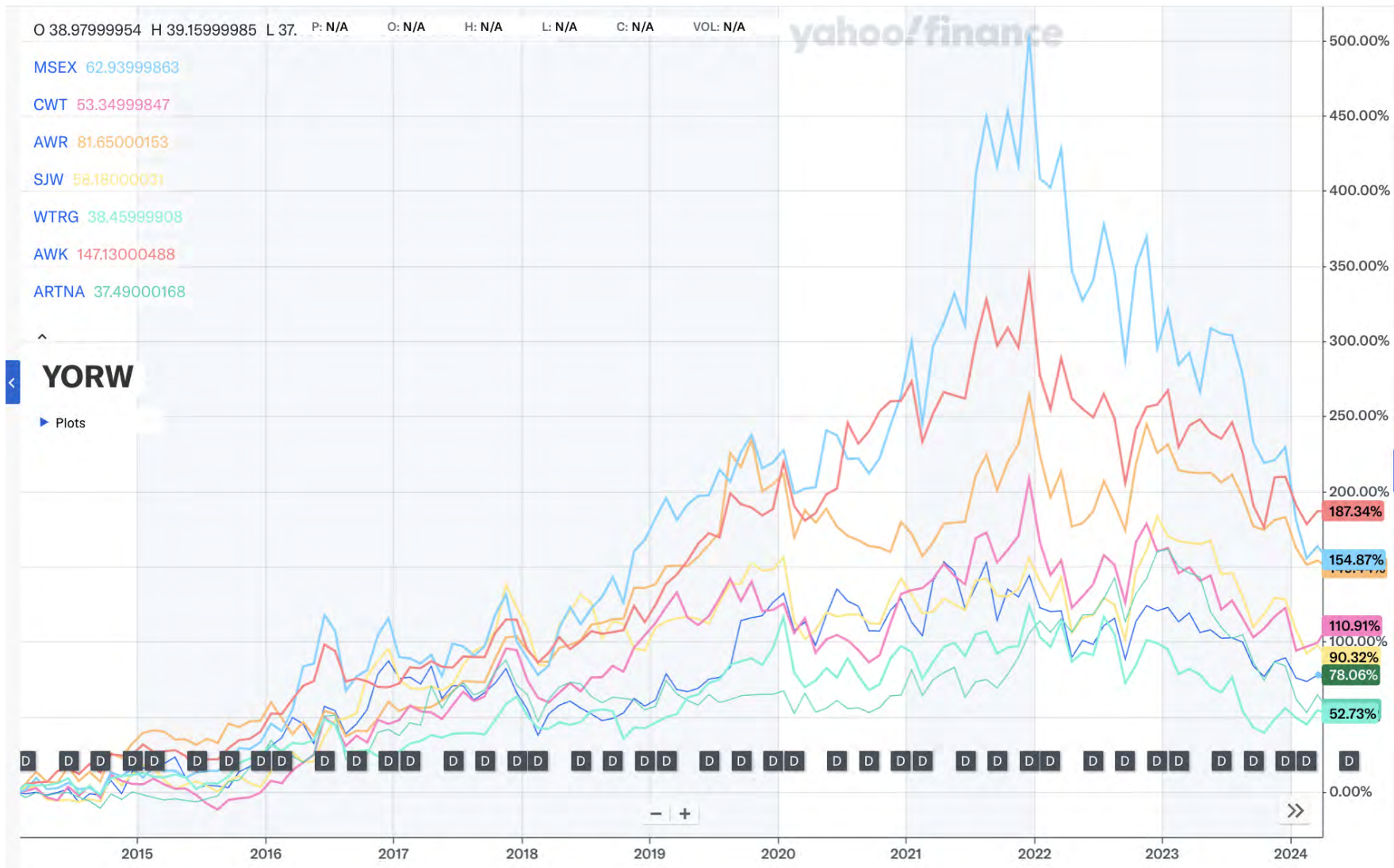


4.8 York: beta over time

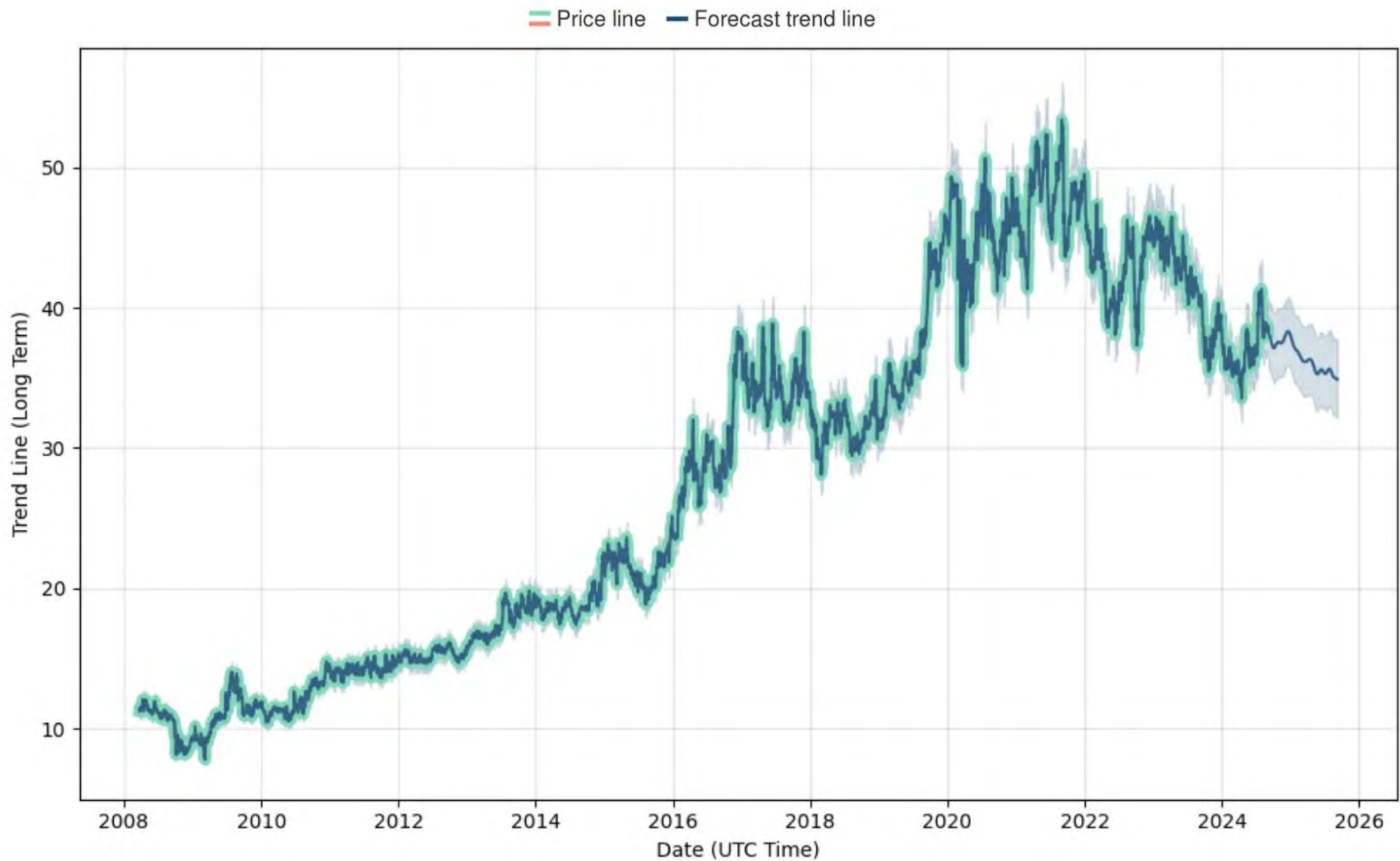
- “Beta is a measure of risk commonly used to compare the volatility of stocks, mutual funds, or ETFs to that of the overall market. The S&P 500 Index is the base for calculating beta with a value of 1.0. Securities with betas below 1 have historically been less volatile than the market. While securities with betas above 1, have historically been more volatile than the market. The beta is calculated using data over a 5-year period” (Zacks).



4.8 York: comparative stock prices



4.8 York: stock price history and forecast



4.9 Return on equity (ROE) calculation

- Pennsylvania PUC approach
- The ROE is calculated using two DCF models for DSIC utilities
 - ▶ To calculate the current dividend DCF: $K = D1/P0 + G$
 - ▶ To calculate the 52-week average dividend DCF: $K = D0/Pa + G$
- Definitions
 - K = Cost of equity
 - D1 = Dividend expected during the year = $D0 + \frac{1}{2}g$
 - D0 = Latest indicated dividend, obtained from Yahoo! Finance
 - g = Expected 5-year dividend growth rate base of barometer group, obtained from Value Line Investment Survey
 - P0 = Current price of the stock, obtained from Yahoo! Finance
 - Pa = Average of high and low stock price over the latest 52-week period, obtained from Yahoo! Finance
 - G = Average of 5-year expected earnings growth rate forecasts obtained from a reputable online source

Note: dividend per share/price = D/P = yield

4.9 ROE calculation (continued)

- CAPM uses the yield of a risk-free interest-bearing obligation plus a rate of return premium that is proportionate to the systematic risk of an investment
- The following formula is used to calculate CAPM:
$$K = R_f + \beta(R_m - R_f)$$
- Three components are necessary to calculate the CAPM cost of equity:
 - β = Beta, a measure of systematic risk for each stock
 - R_f = The risk-free rate of return, 10-year U.S. Treasury yields are used for R_f ; yields are taken from the previous two quarters and forecasted next four quarters
 - R_m = Total return of the equity market as determined by the SBBI Yearbook
- Commission determines the ROE used for DSIC purposes based on the range of reasonableness from the DCF barometer group data
- CAPM data, recent ROEs adjudicated by the Commission, and informed judgment
- Source: PA PUC, Report on the Quarterly Earnings of Jurisdictional Utilities for the Year Ended September 30, 2018.

4.9 ROE calculation (Pennsylvania PUC)

Historic Water Industry DCF and CAPM Average ROEs

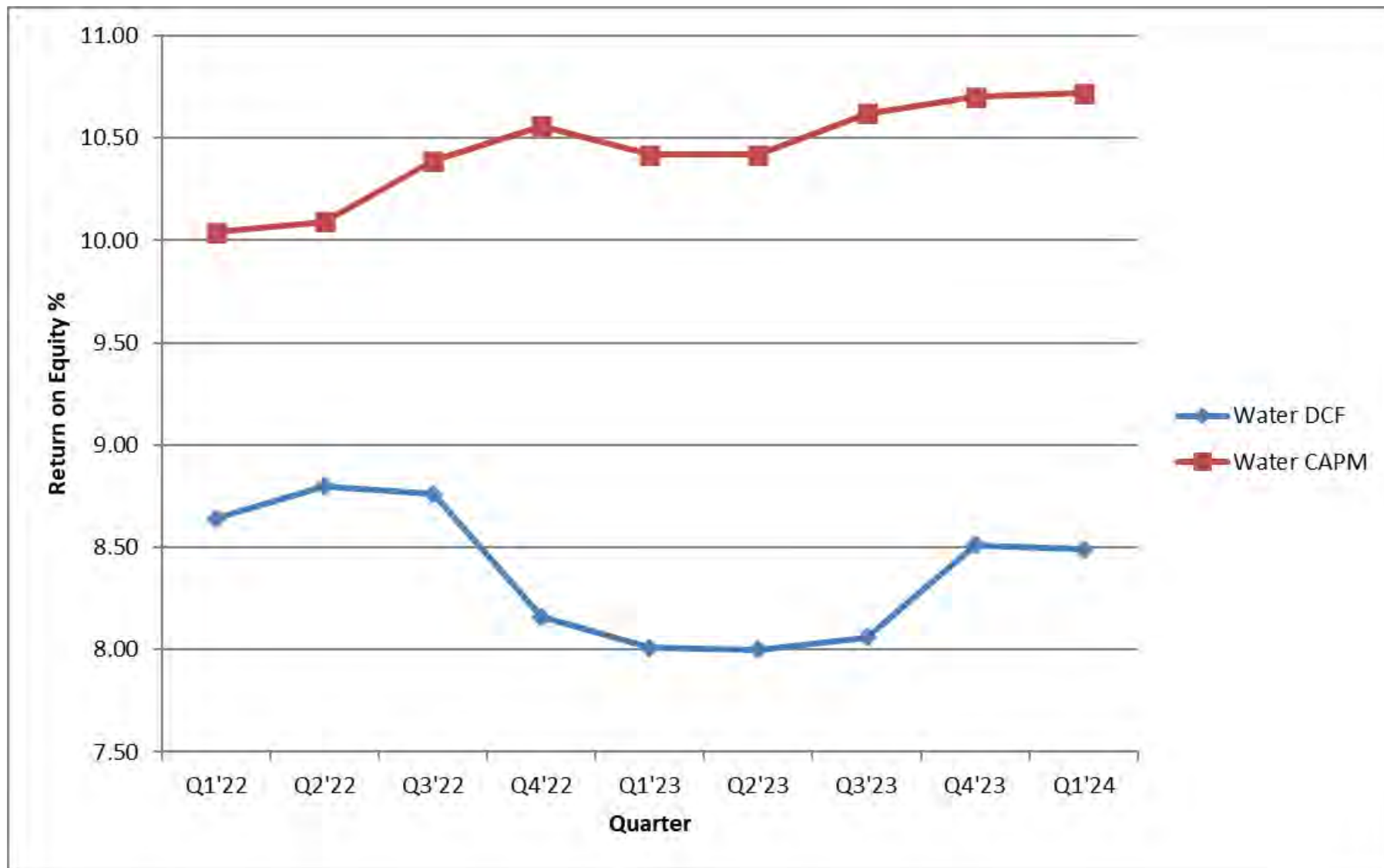
Water		
	DCF	CAPM
Q1'18	9.67	9.93
Q2'18	9.58	9.48
Q3'18	9.67	9.50
Q4'18	9.35	9.23
Q1'19	9.30	9.02
Q2'19	9.17	8.62
Q3'19	9.16	8.55
Q4'19	8.87	7.95
Q1'20	9.10	9.46

Adjusted and approved ROE

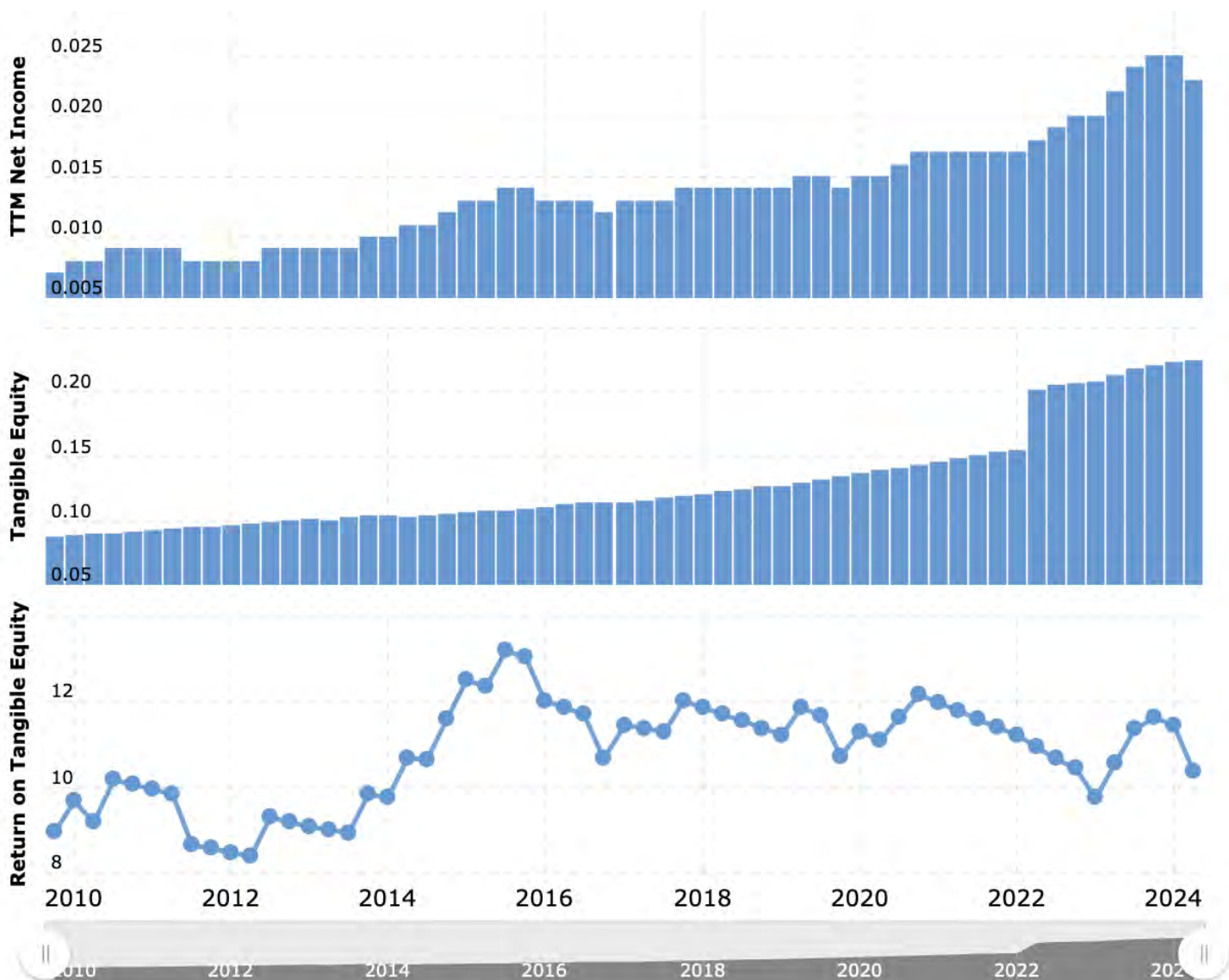
WATER		
PA American Water Company	7.56	9.90
PA American – Wastewater	7.56	9.90
AQUA Pennsylvania	8.31	9.90
AQUA Pennsylvania – Wastewater	8.31	9.90
York Water Company	12.39	9.90
SUEZ Water Pennsylvania Inc.	11.30	9.90
Columbia Water Company	3.42	9.90
Newtown Artesian Water	6.06	9.90

Market Based Returns on Common Equity ¹	
December 17, 2018	
<u>Water Company Barometer Group</u>	
	Cost Rates %
(1) Current DCF	9.59
(2) 52-Week Average DCF	9.74
(3) Average DCF	9.67
(4) Market Indicated Common Equity Cost Rate Range @ 1 standard deviation around the mean. ²	8.57-10.76
(5) CAPM Check of DCF Reasonableness	9.50
(6) Recent Commission Approved ROEs ³ : *None within last two years	*
(7) Distribution System Improvement Charge (DSIC) Return ⁴ :	9.95%
<u>Barometer Group Companies</u>	
American States Water Company	
Middlesex Water Company	
California Water Service Group	
Aqua America, Inc.	
American Water Works Co., Inc.	
¹ As calculated by the Bureau of Technical Utility Services	
² Standard Deviation of 14 DCF observations	
³ ROEs from base rate cases within last two years, fully litigated or stipulated for DSIC purposes	
⁴ Commission authorized Return on Equity (ROE) for DSIC purposes	
Any questions concerning DSIC should be directed to Andrew Herster of the Bureau of Technical Utility Services at (717) 783-5392.	

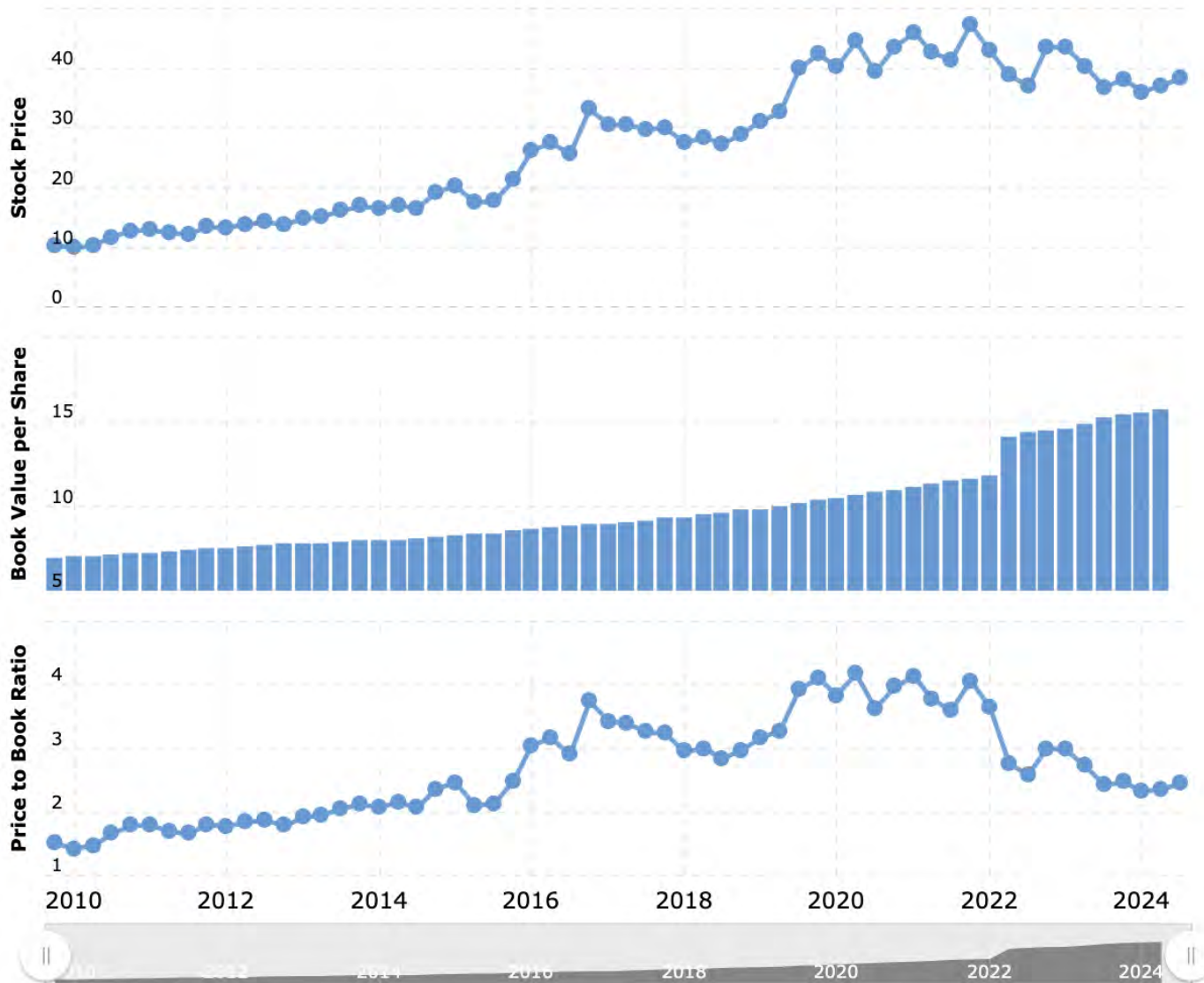
4.9 DCF vs. CAPM average ROEs (Pennsylvania PUC)



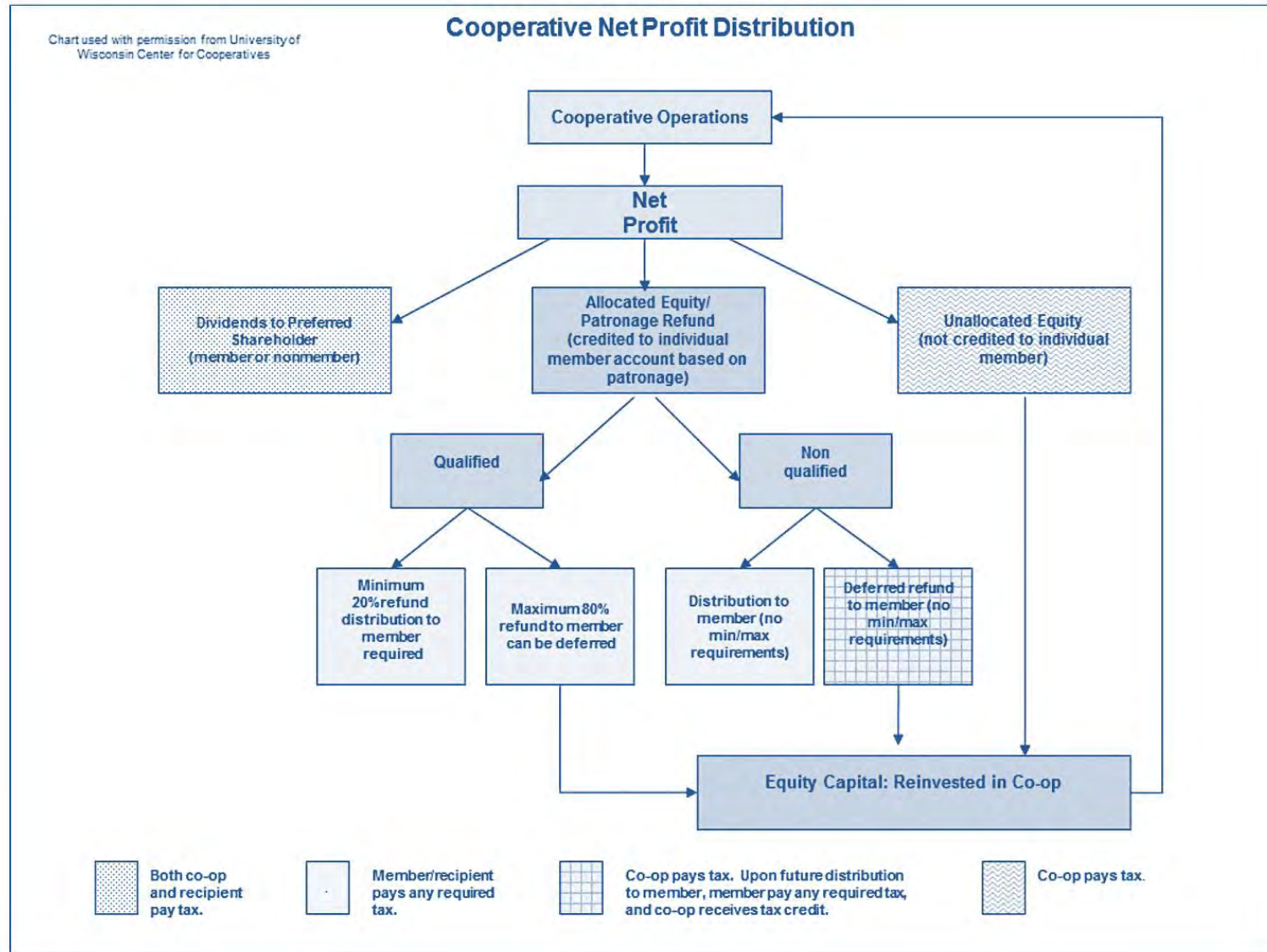
4.9 York: net income, equity, and returns



4.9 York: price-to-book ratio



4.9 Fund distributions by cooperatives (Lund, 2013)

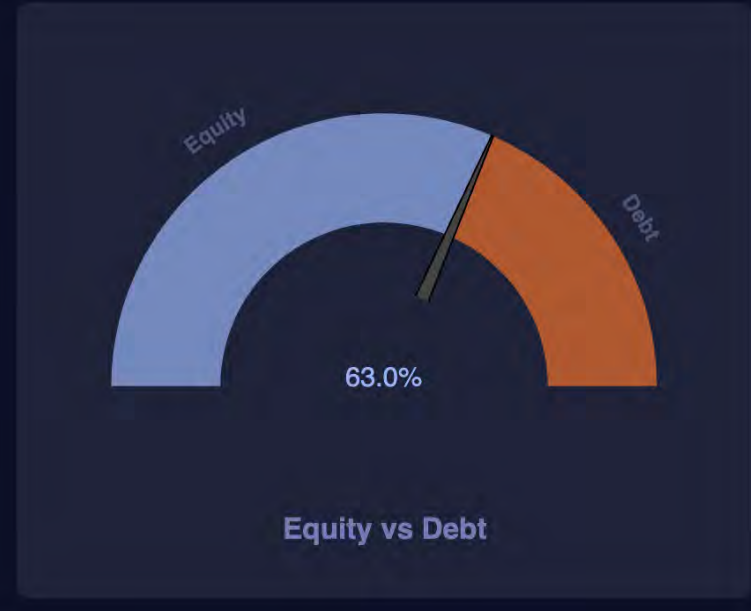
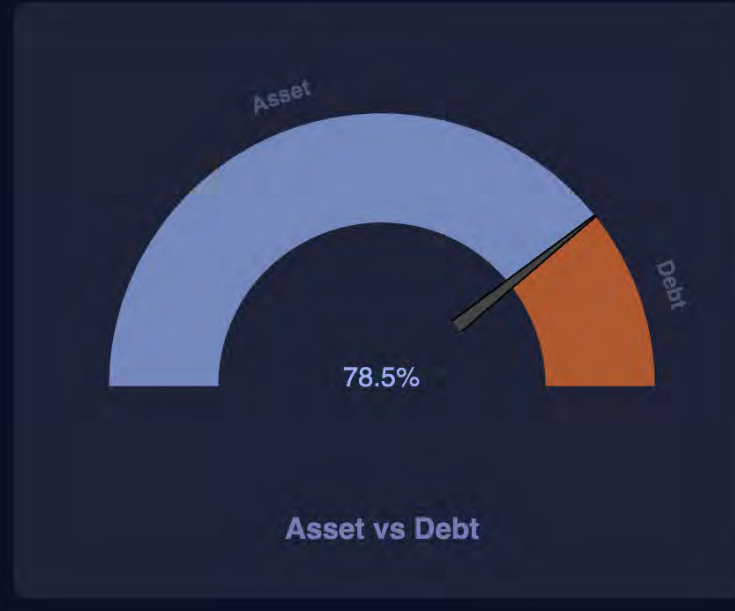


4.10 Capital structure: debt and equity

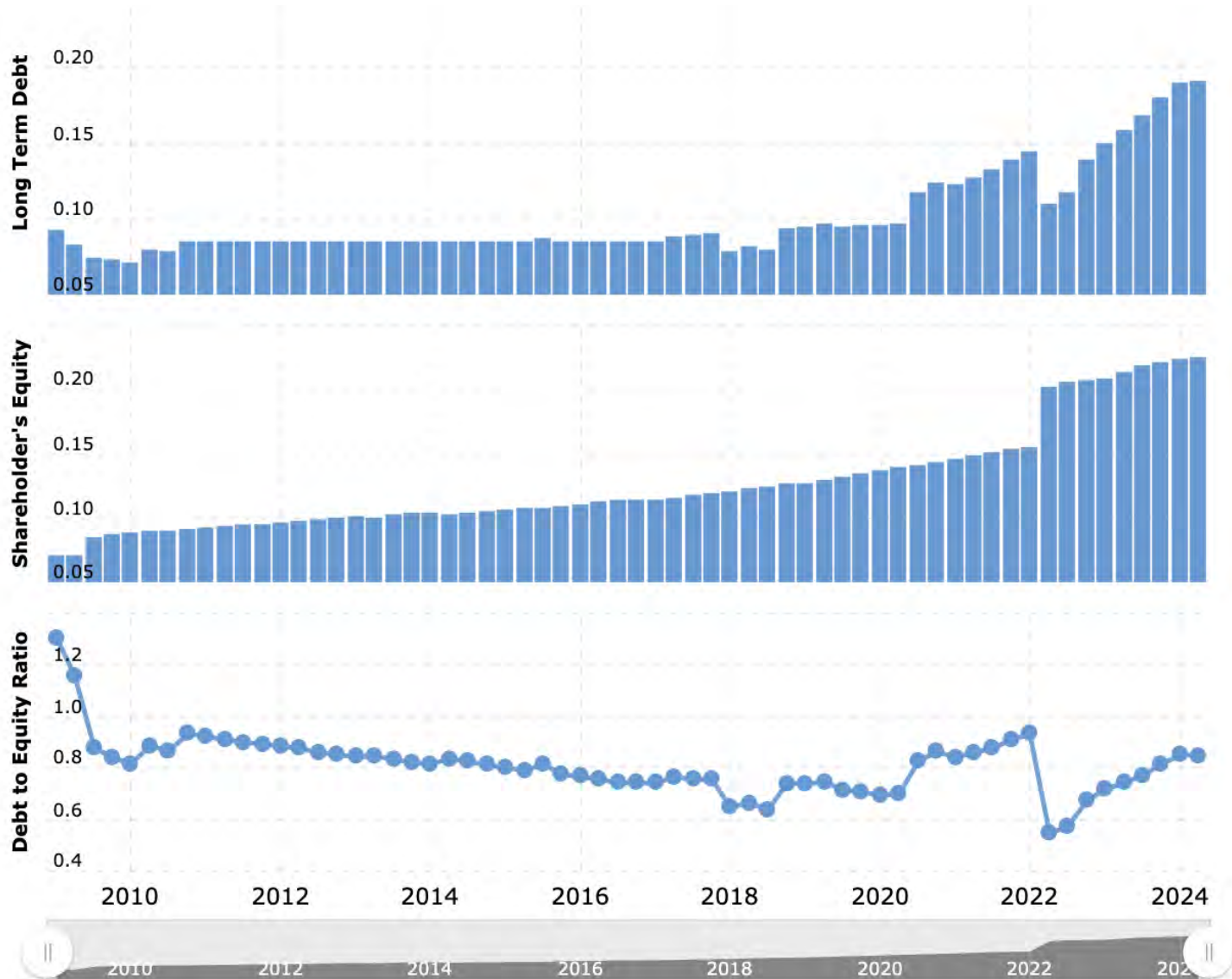
- Capital structure
 - ▶ Combination of investor-supplied debt and equity on a rolling basis to support capital investment needs of the utility, balancing cost and risk
 - ▶ Found on the company's balance sheet: capital assets = debt + equity
 - ▶ Reviewed by regulators in rate cases and when approving major issuances
- Capitalization ratios
 - ▶ Debt-to-equity ratio
 - ▶ Long-term debt ratio
 - ▶ Debt to capitalization ratio
- Capital structure generally is optimized in the range of 45-55 or 55-45
 - ▶ To maintain investment quality credit ratings
 - ▶ To maintain sufficient capital investment
 - ▶ To maintain low overall financial costs relative to risk
- Imputing the capital structure
 - ▶ "If the utility's proportion or cost of debt is significantly different than that indicated as industry averages, the auditor may wish to consider using [imputing] a hypothetical capital structure, in lieu of the actual capital structure" (NRCAM, 2003)

4.10 Capital structure: debt and equity

York Water's financial leverage is the degree to which the firm utilizes its fixed-income securities and uses equity to finance projects. Companies with high leverage are usually considered to be at financial risk. York Water's financial risk is the risk to York Water stockholders that is caused by an increase in debt. In other words, with a high degree of financial leverage come high-interest payments, which usually reduce Earnings Per Share (EPS).



4.10 York's capital structure: debt and equity



4.10 Equity and debt on the balance sheet

- Equity Capital
 - 201. Common Stock Issued
 - 202. Common Stock Subscribed
 - 203. Common Stock Liability for Conversion
 - 204. Preferred Stock Issued
 - 205. Preferred Stock Subscribed
 - 206. Preferred Stock Liability for Conversion
 - 207. Premium on Capital Stock
 - 209. Reduction in Par on Stated Value of Capital Stock
 - 210. Gain on Resale or Cancellation of Reacquired Capital Stock
 - 211. Other Paid-In Capital
 - 212. Discount on Capital Stock
 - 213. Capital Stock Expense
 - 214. Appropriated Retained Earnings
 - 215. Unappropriated Retained Earnings
 - 216. Reacquired Capital Stock
 - 218. Proprietary Capital (for proprietorships and partnerships only)
- Long-Term Debt
 - 221. Bonds
 - 222. Reacquired Bonds
 - 223. Advances from Associated Companies
 - 224. Other Long-Term Debt

4.10 York: statement of retained earnings

223. STATEMENT OF RETAINED EARNINGS SUPPORTING SCHEDULE Account Nos. 214.0 and 215.0

1. Dividends should be shown for each class and series of capital stock. Show amounts of dividends per share.
2. Show separately the state and federal income tax effect of items shown in Account No. 409.0.

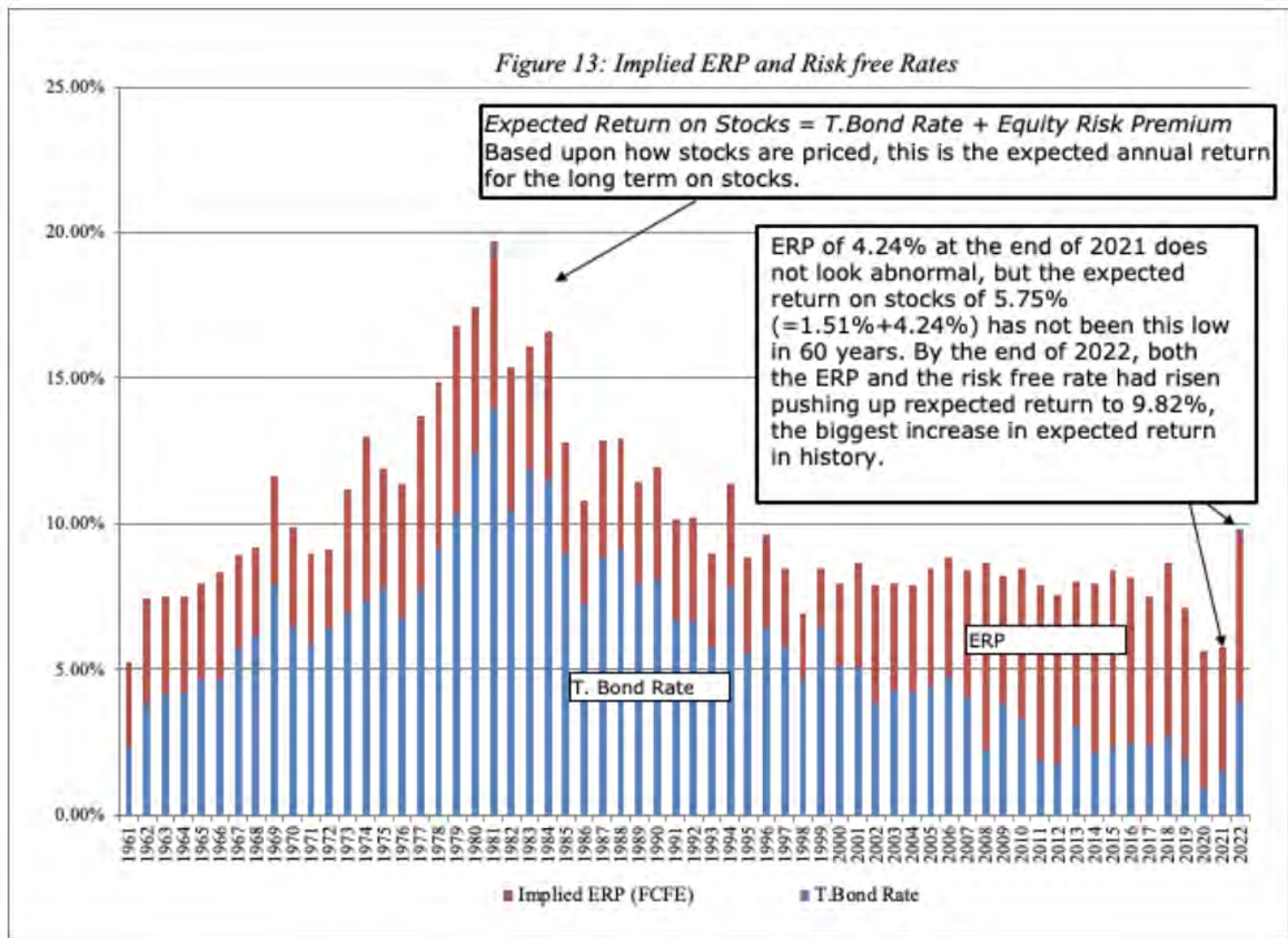
Line No.	Item (a)	Amounts (b)
1	Unappropriated Retained Earnings Account No. 215.0:	XXXXX
2	Balance Beginning of Year	40,667,290
3	Changes to Account:	XXXXX
4	Adjustments to Retained Earnings *	
5	Credits	
6	Debits	
7	Balance Transferred From Income	13,732,338
8	Total Unappropriated Retained Earnings	54,399,628
9		
10	Appropriated Retained Earnings Account No. 214.0:	XXXXX
11	Total Appropriations of Retained Earnings	
12	Dividends Declared:	XXXXX
13	Preferred Stock Dividends Declared	
14	Common Stock Dividend Declared	(8,689,651)
15	Total Dividends Declared	(8,689,651)
16	Total Appropriated Retained Earnings	(8,689,651)
17	Total Retained Earnings	45,709,977

* Requires Commission approval prior to use.

4.11 Weighted cost of capital

- Cost of capital (debt and equity) is informed by finance (vs. accounting)
- Cost of debt: risk-free rate plus credit risk premium
 - ▶ Calculated based on utility data
 - ▶ Lower cost reflects lower risk (first in line)
- Cost of equity: risk-free rate plus equity risk premium
 - ▶ Modeled based on market data
 - ▶ Higher cost reflects higher risk (last in line)
- Weighted cost of capital: weights cost by proportion of debt and equity
 - ▶ May or may not include short-term debt
 - ▶ Preferred stock may be included but doing so is uncommon
 - ▶ Customer advances can provide a repayable but cost-free source of capital
- Optimal capital structure is assessed based on weighted cost of capital
 - ▶ Utilities should maintain a capital structure than minimizes capital costs and is flexible enough to raise funds from any capital class at a reasonable cost (Deloitte, 2012)
 - ▶ Cost of debt is lower and has tax advantages, lowering revenue requirements
 - ▶ But too much debt exposes equity shareholders to more financial risk and thus raises the cost of equity capital (i.e., an inflection point)

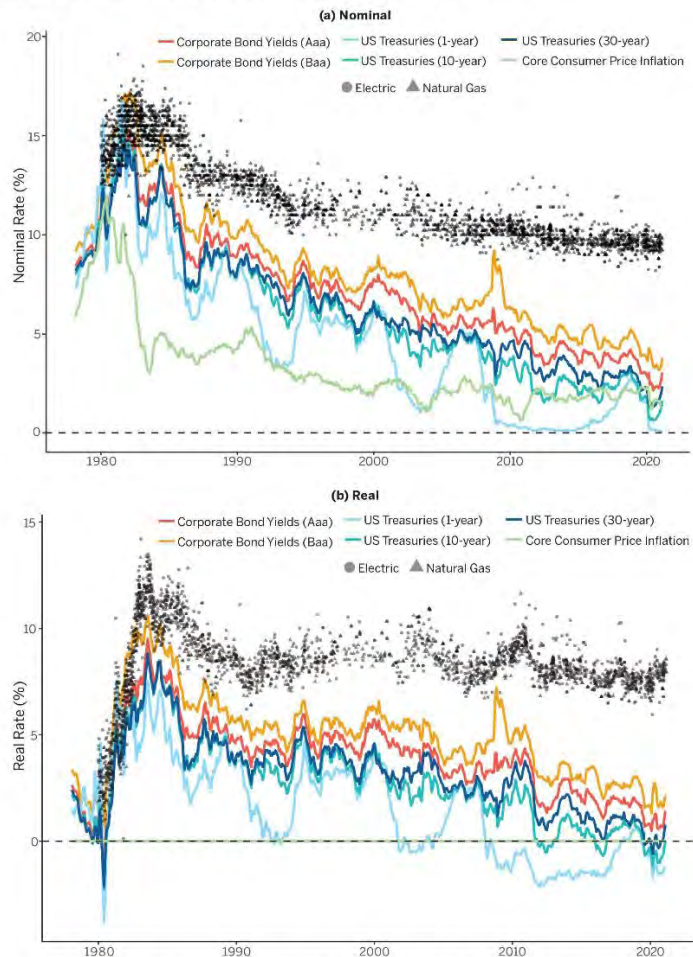
4.11 Equity risk premiums in U.S. markets



<https://pages.stern.nyu.edu/~adamodar/>

4.11 Equity risk premiums in the energy sector (ROEs)

Figure 3. Return on equity and financial indicators: Nominal and real



Notes: These figures show the approved return on equity for investor-owned US electric and natural gas utilities. Each dot represents the resolution of one rate case. Real rates are calculated by subtracting core CPI. Between March 2002 and March 2006 30-year Treasury rates are extrapolated from 1- and 10-year rates (using the predicted values from a regressing the 30-year rate on the 1- and 10-year rates).

Sources: Regulatory Research Associates (2021), Moody's (2021a, 2021b), Board of Governors of the Federal Reserve System (2021a, 2021b, 2021c), and US Bureau of Labor Statistics (2021).

Reproduced from Dunkle Werner, K., & Jarvis, S. (2022). *Rate of Return Regulation Revisited*

4.11 Exercise: weighted (average) cost of capital



$$WACC = (E/(D+E)) K_E + (D/(D+E)) K_D (1 - t)$$

		Amount	Percentage	Rate	Weighted cost
1	Equity	\$127,014,672	56.98%	9.67%	?
2	Debt	\$95,877,719	43.02%	5.59%	?
3	Total	\$222,892,391	100.00%		?

4.11 York: capital structure and weighted cost

21-Capital structure

Line no.	Acct.	Item	2018		
1		Equity Capital and Liabilities			
2	201.0	Common Stock Issued	83,574,663		
3	213.0	Capital Stock Expense	(2,269,968)		
4	215.0	Unappropriated Retained Earnings	45,709,977		
5		>Total Equity Capital	127,014,672		
6					
7		Long-Term Debt			
8	221.0	Bonds	87,370,000		
9	224.0	Other Long-Term Debt	8,507,719		
10		>Total Long-Term Debt	95,877,719		
11					
12		>TOTAL CAPITAL	222,892,391		
13					
14		COST OF CAPITAL			
15		Authorized Return on Equity (DCF)	9.67%		
16		Effective Interest Rate on Debt	5.59%		
17					
18		CAPITAL STRUCTURE	Percentage	Rate	Weighted Cost
19		Percentage Common Equity Capital	56.98%	9.67%	5.51%
20		Percentage Long-Term Debt	43.02%	5.59%	2.41%
21		>Total	100.00%		7.92%

4.12 Return and regulatory risk

- Key conceptions of returns
 - ▶ Cost of capital is a finance concept – an efficient return (markets)
 - ▶ Return on capital is an accounting concept – a measurable return (data)
 - ▶ Authorized return is a policy concept – a fair return (regulators)
- Regulatory risk includes both process and political factors
 - ▶ Regulatory policies and decisions can mitigate the effects of all other forms of risk
 - ▶ Regulatory risk a firm-specific risk that is irrelevant to diversified investors
- Fair return is not determined by risk models
 - ▶ Authorized returns typically exceed the cost of capital (dynamic) and can be affected by self-reinforcing circularity

Q. What explains the spread between yields and authorized ROEs?

4.12 Core regulatory precedents on rates of return

- Fifth Amendment to the U.S. Constitution (“takings clause”)
 - ▶ Returns to investors cannot be “confiscatory” and must be “compensatory”
- *Bluefield Water Works & Improvement Company vs. Public Service Commission of West Virginia* (1923)
 - ▶ “The return should be reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties.”
- *Federal Power Commission vs. Hope Natural Gas Company* (1944)
 - ▶ “Under the statutory standard of “just and reasonable,” it is the result reached, not the method employed, which is controlling... It is not theory, but the impact of the rate order, which counts. If the total effect of the rate order cannot be said to be unjust and unreasonable, judicial inquiry under the Act is at an end.”
 - ▶ “The return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital.”

4.12 Authorized, earned, and allowed returns

- Returns compensate debt holders and equity shareholders
 - ▶ $\text{Net operating income} / \text{rate base} = \text{overall rate of return (ROR)}$
 - ▶ $\text{Net income} / \text{equity capital} = \text{return on equity (ROE)}$
- Authorized return
 - ▶ Authorized return must be compensatory under the U.S. Constitution (minimum or floor)
 - ▶ Returns are authorized and should be reasonable *but are not guaranteed*
 - ▶ Reasonable opportunity is afforded by test year, grossing up, and cost-adjustment mechanisms
- Earned return
 - ▶ Expressed as a percentage of the rate base
 - ▶ Utilities must "reach" for their authorized return and may not be able to earn it
 - ▶ Earnings will be affected by operational inefficiency/efficiency, cost inflation/deflation or sales erosion/growth
- Allowed return
 - ▶ What regulators will tolerate in terms of earned above authorized returns
 - ▶ Allowed returns may exceed authorized (for a time) – suggesting low regulatory risk unless and until regulators intervene
 - ▶ Earnings above authorized returns call for rate adjustments

4.12 Fair returns

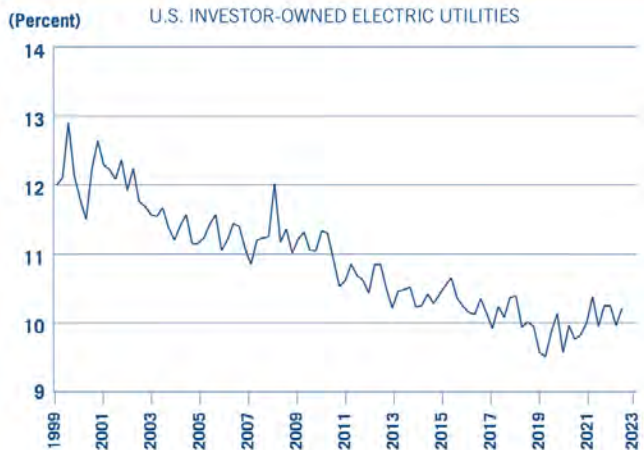
Regulatory consideration of policy	^	Excessive or extortive return	An economically inefficient return
	^	Incentive or bonus return	A return with a premium to motivate desired performance
	^	Fair return	A return with a premium to motivate beneficial investment
Regulatory consideration of risk	^	Compensatory return	A return based on the cost of equity including an equity-risk premium
	^	Risk-free return	A return based on the yield on risk-free securities*
	^	Confiscatory return	A return below the cost of capital (unconstitutional taking)**

* Government-owned and not-for-profit utilities are generally insulated from equity risk.

** For an investor-owned utility that still faces equity risk, any return below the cost of equity would be considered confiscatory.

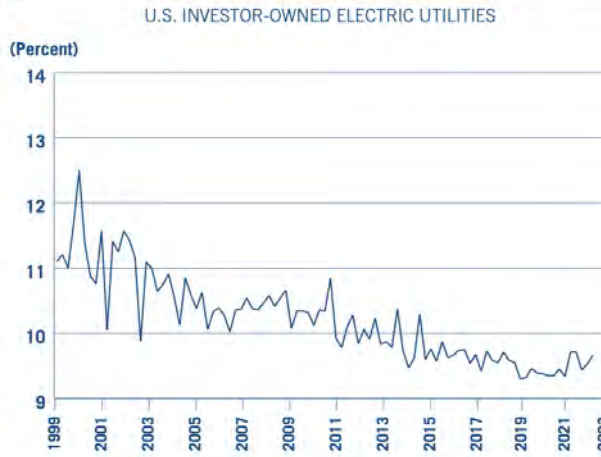
4.12 Requested and authorized returns for electric utilities (EEI)

Average Requested ROE



Source: S&P Global Market Intelligence/Regulatory Research Assoc. and EEI Finance Department.

Average Awarded ROE



Source: S&P Global Market Intelligence/Regulatory Research Assoc. and EEI Finance Department.

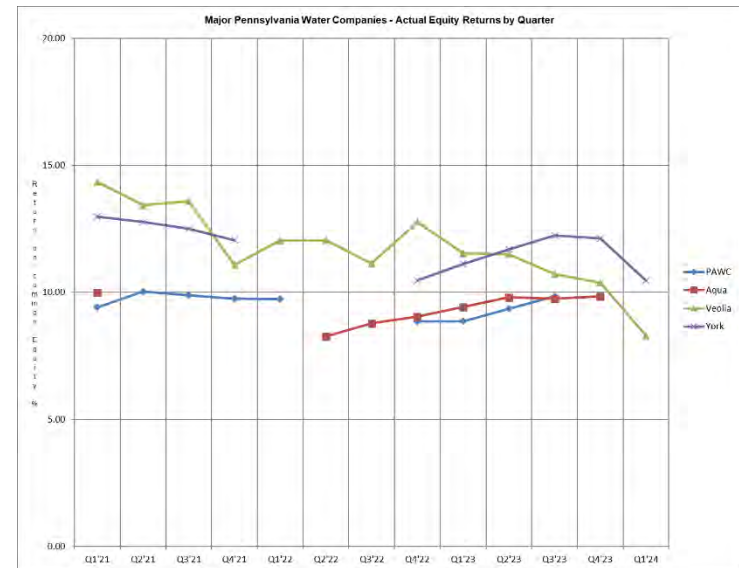
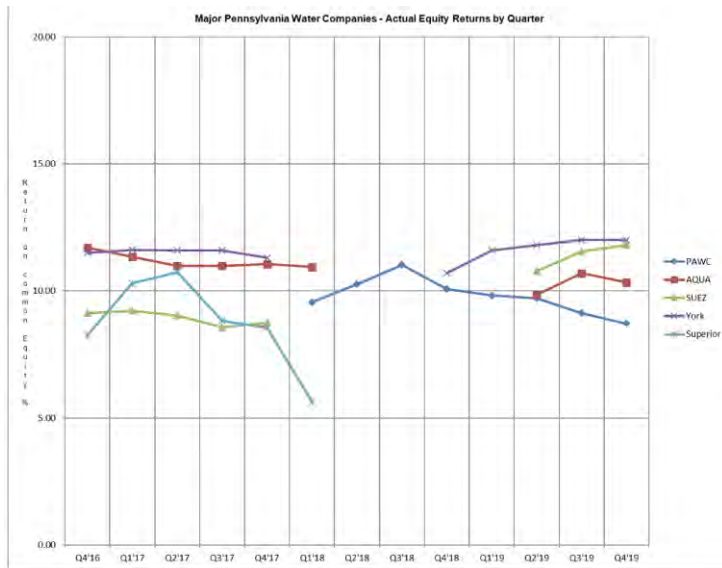
10-Year Treasury Yield



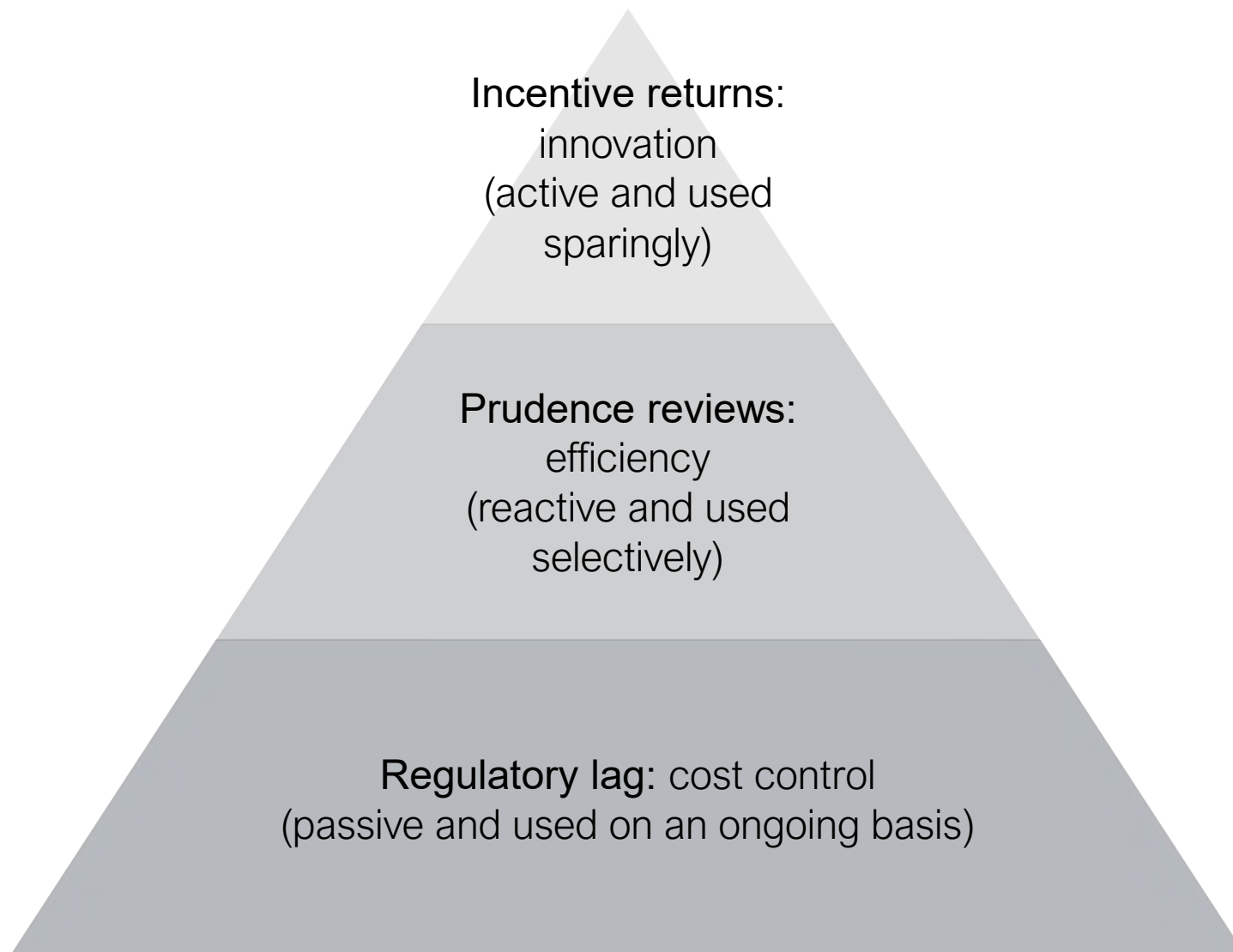
Source: U.S. Federal Reserve.

4.12 York: quarterly earnings report

- ISSUE ¶43. Quarterly Earnings Report (QER) filed with the PUC.
 - ▶ The Joint Petitioners acknowledge the issue raised by I&E regarding how utilities should present financial results of operations adjusted on a ratemaking basis for future plant additions. In the event the PUC issues a final order that adopts the I&E position on the QER Issue, York will comply with the PUC’s final directives.



4.13 Regulatory performance incentives



4.13 Performance-based (incentive) regulation

- *"All regulation is incentive regulation"*
 - ▶ Regulation should always be about performance and related standards, accountability, and incentives
- Variations and alternatives to traditional regulation
 - ▶ Price-cap regulation, multi-year ratemaking, formula ratemaking, and profit sharing
- Cost-of-service ratemaking is the starting point
 - ▶ Even for alternative methods (e.g., price-cap regulation)
- Regulatory methods can be refined to send clear signals
 - ▶ Metrics for prudent and efficient performance are essential
 - ▶ Positive and negative performance incentives (risk), including returns
 - ▶ Recognize asymmetrical information favoring regulated utilities
- Uses of financial and economic metrics by utilities and regulators
 - ▶ To track and compare performance over time and among utilities
 - ▶ To screen and monitor as part of viability assessment and capacity development

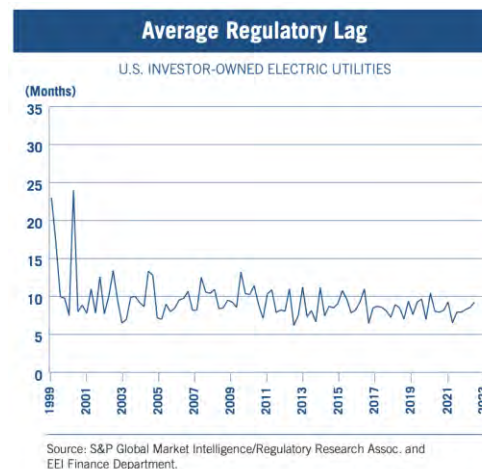
Q. What performance metrics should utilities and regulators use?

4.14 Role of regulatory lag

- Allred Kahn (1971) on regulatory lag
 - ▶ Lag should be “regarded as not a deplorable imperfection of regulation but as a positive advantage. Freezing rates for the period of the lag imposes penalties for inefficiency, excessive conservatism, and wrong guesses, and offers rewards for their opposites”
 - ▶ See also, E. Warren, E. Bailey, P. Joskow, M. Porter, F. Welch, D. Dismukes
- Considered by some as a “blunt” policy instrument
 - ▶ Price-cap regulation formalizes regulatory lag
- Utilities, rating agencies, other interests promote “constructive” practices to reduce regulatory lag – and thus revenue and earnings risk
 - ▶ Key rationale is that more automation will reduce rate case frequency and expense
 - ▶ Policymakers have to consider the potential cost of shifting risk, weakening incentives, reducing oversight
 - ▶ Competitive firms also face information asymmetry and pricing lag
- Utilities rationally try to alleviate lag and maintain earnings
 - ▶ May spent more effort on reducing lag than reducing costs (lean practices)
 - ▶ Methods include cost-recovery and revenue-assurance mechanisms
 - ▶ Certain and expedient cost recovery and rate case time limits (“shot clocks”) shift burdens of proof and risks from utility investors to ratepayers

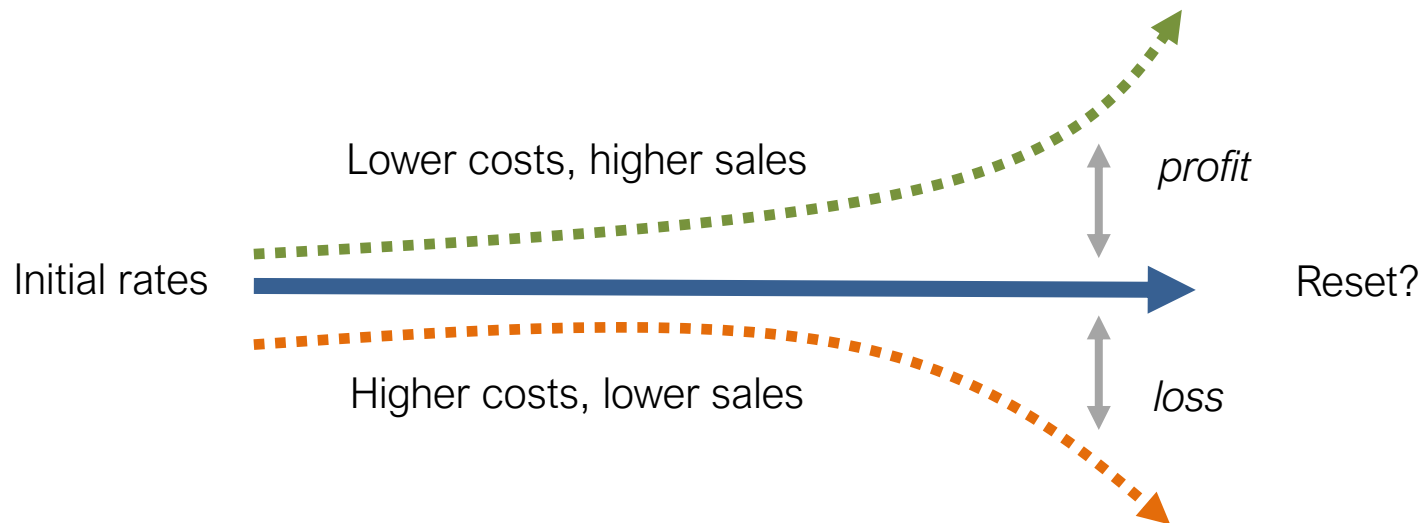
4.14 Definitions of regulatory lag ⓘ

- Formal definition of regulatory lag
 - ▶ Period between a change in costs or revenues (+/-) and a change in authorized prices charged to ratepayers of a regulated utility (regulatory)
- Alternative conceptions of regulatory lag
 - ▶ Period between when an unregulated firm and a regulated firm could put in place a defensive price adjustment (economic)
 - ▶ Period between rate filing and rate authorization (procedural)
 - ▶ Period associated with decision-making process delays (bureaucratic)
 - ▶ Period associated with test years or adjustment mechanisms (rate policy)
 - ▶ Period associated with financial conditions affecting realized returns (financial)
 - ▶ Period between rate-case decisions when prices are capped (practical)



4.14 Regulatory vs. utility lag

- Lag presents upside and downside potential – lag “cuts both ways”
 - ▶ During lag, some forces work to the advantage of utilities - utilities should “resort” to rate cases only when necessary (F. Welch, 1954)
- Not all lag is regulatory – “utility lag” may signal managerial deficiencies
 - ▶ Managers are responsible for proactively managing changing conditions and risks
 - ▶ Regulated firms have unique opportunities and tools to address lag
 - ▶ For non-private utilities, making timely adjustments may be easier



4.14 Regulatory lag and returns

- Regulators should address lag
 - ▶ When it materially jeopardizes the reasonable opportunity to earn a fair return
 - ▶ Under-earning may be more likely to be addressed than over-earning (asymmetry)
- How regulated utilities can address lag
 - ▶ Better forecasting, strategic management, subsequent cost control
 - ▶ Accounting for elasticities and other relevant factors
 - ▶ Making timely, complete, and convincing regulatory filings
 - ▶ Adoption of emerging technologies and practices

Efficiency trend between rate adjustments

		Increasing operational efficiency	Decreasing operational efficiency
Cost and sales trends between rate adjustments	Falling costs and/or rising sales	Achieving returns is likely	Achieving returns is possible
	Rising costs and/or falling sales	Achieving returns is possible	Achieving returns is unlikely

4.15 Deriving revenue requirements

- For non-private utilities
 - ▶ Revenue requirements = cost of service including reserve requirements
 - ▶ Debt service coverage ratios (DSCR) may be used (CFR §1718) – see Part 2
- For regulated private utilities
 - ▶ Revenue requirements = profit + expenditures based on the cost of service
- Utility revenue requirements
 - ▶ Level of gross income from sales needed to recover prudent, necessary, and economical operating and capital expenditures, including debt repayment and a reasonable return to equity investors
 - ▶ Reflects what is known and measurable in terms of cost of service for the rate year, as established by the budget (nonregulated) or test year (regulated)
 - ▶ Sets a reasonable opportunity for full-cost recovery – but no guarantee
- Revenue requirements reflect adjustments to current levels at current rates
 - ▶ Based on the cost of service and set for a test or rate “year” going forward
 - ▶ Difference between current revenues and revenue identify shortfall or excess
 - ▶ Must be multiplied by a conversion factor to achieve new levels and rates

4.15 Factors affecting revenue requirements

Factors raising revenue requirements

Increased capital expenditures
 Increased operating expenditures
 Accelerated depreciation
 Increased tax rates
 Efficiency losses
 Higher rates of return

Factors lowering revenue requirements

Decreased capital expenditures
 Decreased operating expenditures
 Decelerated depreciation
 Decreased tax rates
 Efficiency gains
 Lower rates of return

Q. How are regulated utilities motivated to improve efficiency?

4.15 Transfer from utility funds (non-private)

- Types of transfers
 - ▶ Direct cost reimbursement for goods or services
 - ▶ Return on capital investment (assets)
 - ▶ Finance-related risk compensation
 - ▶ Local franchise fees
 - ▶ Payments in lieu of taxes (PILT, PILoT)
- Payments in lieu of taxes
 - ▶ Substitute for property taxes
 - ▶ May be less than corporate assessments
 - ▶ Create a conflict for local officials between non-tax-dependent budgetary resources and ratepayer affordability



4.15 Exercise: deriving revenue requirements

	Revenue requirements formula	Amount
1	r_a (RB) = Net operating income (overall return as authorized)	\$19,104,823
2	O&M = Utility operation & maintenance expense	\$17,479,046
3	D = Depreciation and amortization expense	\$6,919,991
4	T = Taxes (total)	\$3,773,496
5	RR = Total revenue requirements (total operating revenues)	?
	Income statement data	
6	Total operating revenues from sales (RR)	\$47,277,356
7	Total utility operating expenses (lines 2 thru 4)	(\$28,172,533)
8	Net operating income (overall return)	?
	Balance sheet data	
9	Rate base	\$211,690,748
10	Overall return on investment (ROR%)	?
11	Net operating income (overall return)	\$19,104,823
12	Interest on debt service	(\$5,508,840)
13	Net income available to shareholders	?
14	Shareholder equity capital	\$127,014,672
15	Shareholder return (ROE%)	?

4.16 Deriving revenue requirements

23-Revenue requirements and returns (hypothetical)

Line no.	Item	Item	Private: RBROR*		Public: DSCR (1.25)*		Coop: TIER (2.0)*	
			\$	%	\$	%	\$	%
1		RATEMAKING: Revenues = Net Income + Expenses	\$	%	\$	%	\$	%
2	r(RB)	Net Operating Income (NOI) = Overall Return (\$)	19,104,823	40%	13,221,216	34%	11,017,680	29%
3								
4	O&M	Utility Operation & Maintenance Expense	17,479,046	37%	17,479,046	45%	17,479,046	45%
5	D	Depreciation and Amortization Expense	6,919,991	15%	6,919,991	18%	6,919,991	18%
6	T	Taxes Other than Income	1,118,933	2%				
7		Federal and State Income Taxes	2,588,478	5%				
8		Deferred Income Taxes	105,332	0%				
9		Total Tax Credits	(39,247)	0%				
10		Payment in Lieu of Taxes (PILT)	0	0%	895,146	2%	447,573	1%
11	RR	>Total Revenue Requirements	47,277,356	100%	38,515,399	100%	35,864,290	100%
12								
13	NOI	Net Operating Income (after taxes)	19,104,823		13,221,216		11,017,680	
14	RB	Rate Base	211,690,748					
15	r	>Overall Return for Debt and Equity (%)	9.025%					
16								
17	NOI	Net Operating Income (after taxes or PILT)	19,104,823		13,221,216		11,017,680	
18	Int	Total Interest Expense (INT)	5,508,840		8,814,144		5,508,840	
19	P	Principal Payments			1,762,829		1,101,768	
20	DS	>Total Debt Service			10,576,973		6,610,608	
21								
22	DSCR	>Net Operating Income (after taxes) = 1.25 * (DS)			13,221,216			
23	TIER	>Net Operating Income (after taxes) = 2.0 * (INT)					11,017,680	
24		<Net Operating Income (after taxes) less expenses			2,644,243		4,407,072	
25								
26		FINANCIAL SUMMARY						
27		Total Operating Revenues from Sales	47,277,356		38,515,399		35,864,290	
28		Total Operating Expenses (including taxes or PILT)	(28,172,533)		(25,294,183)		(24,846,610)	
29		>Net Operating Income	19,104,823		13,221,216		11,017,680	
30		Interest or Debt Service	(5,508,840)		(10,576,973)		(6,610,608)	
31		>Net Income**	13,595,983					
32		>Retained in Fund Balance for Coverage (Reserves)			2,644,243		4,407,072	
33		Available to System to Spend or Transfer			0		0	
34								
35		Available to Shareholders or System						
36	ROES	Net Income Available = (NOI - Interest)	13,595,983					
37	Equity	Shareholder Equity Capital	127,014,672					
38	ROE%	>Shareholder Return (%)	10.70%					

4.16 Income deficiency and revenue conversion

- Rate cases typically address an income deficiency resulting in earnings attrition
- Revenue conversion, net-to-gross, or gross-up factors (multipliers)
 - ▶ Converts an *income deficiency* into a *revenue deficiency*
 - ▶ Ensure coverage of total revenue requirements by ratepayers following accounting adjustments upward for a revenue deficiency or downward for a revenue excess in order to ensure that utilities have a reasonable opportunity to earn a fair return
- Used in ratemaking to account for (neutralize) dynamic effects on cost of service
 - ▶ Income-based federal and taxes
 - ▶ Revenue-sensitive fees or expenses
 - ▶ Uncollectible revenues from customers
- Basic revenue conversion factors
 - ▶ Conversion factor = $1 / (1 - \text{percentage rate})$
 - ▶ Conversion factor = $(\text{revenue need}) / (\text{revenue net of taxes \& fees})$
 - ▶ Can be calculated for compound and interactive effects
- Example calculations – all are hypothetical
 - ▶ 0.5% effective rate: $1 / (1 - .005) = 1.0050$ conversion factor
 - ▶ 5.0% effective rate: $1 / (1 - .050) = 1.0526$ conversion factor
 - ▶ 20.0% effective rate: $1 / (1 - .200) = 1.2500$ conversion factor

4.16 Illustration of income and revenue adjustments (NRCAM, 2003)

Example Computation of Revenue Deficiency

	Company Adjusted	Staff Adjusted
Rate Base	\$792,534,826	\$775,266,347
Recommended Return on Rate Base	9.79%	9.49%
Calculated Allowed Return	\$77,589,159	\$73,572,776
Net Operating Income	\$57,006,682	\$59,995,491
Income Deficiency	\$20,582,477	\$13,577,286
Net to Gross Tax Multiplier	1.61	1.61
Revenue Deficiency	\$33,137,789	\$21,859,430
Deficiency as Percent of Retail Revenue	15.3%	9.94%

4.16 Revenue conversion calculator

24-Revenue Conversion Factor

Line no.	Item	Rate	Before gross up: income deficiency	After gross up: revenue deficiency
1	Deficiency or Excess		\$100.00	\$145.96
2				
3	Applied to Gross Revenue			
4	Uncollectible expense	0.50%	\$0.50	\$0.73
5	Regulatory fee	0.15%	\$0.15	\$0.22
6	Gross receipts tax or franchise fee	3.00%	\$3.00	\$4.38
7	Net income for tax purposes		\$96.35	\$140.63
8				
9	Applied to Net Revenue			
10	State income taxes (PA rate)	9.90%	\$9.63	\$14.05
11	Income before federal income taxes		\$86.72	\$126.58
12				
13	Federal income taxes	21.00%	\$18.21	\$26.58
14	Income net of taxes and fees		\$68.51	\$100.00
15				
16	Shortfall (or excess) in revenue	31.49%	\$31.49	
17				
18	Other expenses and fees		\$3.65	\$5.33
19	Combined income tax rate on net income	28.89%	\$27.84	\$40.63
20	Total expenses, fees, and taxes		\$31.49	\$45.96
21				
22	Revenue conversion factor $(1/(1-r))$	1.4596		
23	Revenue conversion factor (need/net)	1.4596		

4.16 Exercise: simple revenue conversion

	Receipts tax (example)	Calculation
1	Income deficiency	\$100
2	Receipts tax rate: 3%	.03
3	Conversion factor	$1 / (1 - .03) = 1.0309$
4	Revenue deficiency	$\$100.00 * 1.0309 = \103.09
5	Utility receipts payment	$\$103.09 * 3\% = \3.09
6	Net revenues to utility	$\$103.09 - \$3.09 = \$100.00$
	Uncollectible rate (exercise)	Calculation
7	Income deficiency	\$100
8	Uncollectible rate: 0.5%	.005
9	Conversion factor	?
10	Revenue deficiency	?
11	Uncollectible shortfall	?
12	Net revenues to utility	?

4.16 Revenue conversion: consolidated income taxes ⓘ

- Grossing up for the combined effects of taxes on earnings
 - ▶ Taxes complicate the calculation of revenue requirements
 - ▶ More rate revenues mean more income taxes that ratepayers pay
 - ▶ Formula is based on deductibility of state taxes for federal tax purposes

Assumptions		
1	State income tax rate (SIT): 6% (.06) = 1.0638 conversion factor	
2	Federal income tax rate (FIT): 21% (.21) = 1.2658 conversion factor	
3	Consolidated tax rate accounts for deductibility of SIT	
4	$SIT + (FIT * (1 - SIT))$	
5	$.06 + (.21 * (1 - .06)) = .2574$ or 25.74%	
		Calculation
7	Income deficiency	\$100
9	Conversion factor	$1 / (1 - .2574) = 1.3466$
10	Revenue deficiency	$\$100.00 * 1.3466 = \134.66
11	Consolidated income taxes	$\$134.66 * 25.74\% = \34.66
12	Net revenues to utility	$\$134.66 - \$34.66 = \$100.00$

4.16 Revenue deficiency: private (RBROR)

25-Revenue deficiency: private (RBROR)

Line no.	Description	2018 End-of-Year Actual	Change in Expense Only	Change in Rate Base Only	Change in Expense and Rate Base
1	RESULTS BEFORE ADJUSTMENT				
2					
3	Total Income Decency (Excess)	0	2,302,961	2,302,961	2,302,961
4					
5	Total Utility Operating Revenues	47,277,356	47,277,356	47,277,356	47,277,356
6	Total Utility Expenditures	28,172,533	30,475,494	28,172,533	29,324,014
7	Net Operating Income	19,104,823	16,801,862	19,104,823	17,953,343
8					
9	Hypothetical Rate Base	211,690,748	211,690,748	248,936,424	230,313,586
10	Net Operating Income	19,104,823	16,801,862	19,104,823	17,953,343
11	Return on Rate Base (based on actual)	9.02%	7.94%	7.67%	7.80%
12					
13	Operating Income Deficiency (Excess)				
14	Due to operating expenses	0	2,302,961		1,151,481
15	Due to ratebase investment (earnings)	0		2,302,961	1,151,481
16	Total Income Decency (Excess)	0	2,302,961	2,302,961	2,302,961
17					
18	Revenue Conversion Factor	1.4596	1.4596	1.4596	1.4596
19					
20	Revenue Deficiency (Excess)	0	3,361,375	3,361,375	3,361,375
21					
22	RESULTS AFTER ADJUSTMENT				
23					
24	Total Utility Operating Revenues (adjusted)		50,638,731	50,638,731	50,638,731
25	Total Utility Expenditures (adjusted)		31,533,908	28,172,533	29,853,221
26	Net Operating Income (adjusted)		19,104,823	22,466,198	20,785,511
27					
28	Hypothetical and Adjusted Rate Base		211,690,748	248,936,424	230,313,586
29	Net Operating Income		19,104,823	22,466,198	20,785,511
30	Return on Rate Base (based on actual)		9.02%	9.02%	9.02%
31					
32	Operating Income Deficiency (Excess)				
33	Due to operating expenses		0		0
34	Due to ratebase investment (earnings)			0	0
35	Total Income Decency (Excess)		0	0	0

4.16 Revenue deficiency: nonprivate (DSCR and TIER)

26-Revenue deficiency: non-private (DSCR)

Line No	Description	Public: DSCR (1.25)	Coop: TIER (2.0)
1	Annual Debt Service*	10,576,973	
2	Debt Service Coverage Ratio (DSCR)	1.25	
3	Net Operating Income Requirement	13,221,216	
4			
5	Interest Expense		5,508,840
6	TIER requirement set by lenders		2.00
7	Minimum Net Operating Income Requirement		11,017,680
8			
9	Net Operating Income before Adjustment	10,918,255	8,714,719
10	DSCR without increase	1.03	
11	TIER without increase		1.58
12			
13	Operating Income Deficiency (Excess)	2,302,961	2,302,961
14			
15	Revenue Conversion Factor (based on PILT)	1.0204	1.0101
16			
17	Revenue Deficiency (Excess)	2,349,960	2,326,221
18			
19	Net Operating Income After Taxes (NOI)	13,221,216	11,017,680
20	Change in Operating Income	2,349,960	2,326,221
21	Change in Operating Expenses	46,999	23,260
22	Adjusted Net Operating Income	13,221,216	11,017,680
23	DSCR after adjustment to income	1.25	
24	TIER after adjustment to income		2.00

4.16 Formulas for various adjustments* ⓘ

- Revenue or expense adjustments
 - ▶ Revenue or expense adjustment * (1-combined tax rate) * revenue conversion factor)
- Rate base adjustments
 - ▶ (Rate base adj. * rate of return * gross revenue converter) –
 - ▶ ((rate base adj * weighted debt cost * combined tax rate) * revenue conversion factor)
- Adjustments impacting both rate base and expenses
 - ▶ Rate base adj. * rate of return * gross revenue converter) –
 - ▶ ((rate base adj. * weighted debt cost * combined tax rate) +
 - ▶ (revenue or expense adjustment * (1-combined tax rate) * revenue conversion factor)
- Adjustments to income taxes
 - ▶ Tax adjustment * revenue conversion factor
- Interest synchronization
 - ▶ Adjusted rate base * weighted cost of debt = interest deduction
 - ▶ Interest deduction * consolidated tax rate = reduction to income tax expense for interest

* Simplified without the cash working capital impact calculated

4.17 Ratemaking scenarios

1. A utility capital structure is heavily tilted toward debt (highly leveraged) or equity (equity rich), which the commission discovers during the course of a rate case.
2. A utility has a debt coverage ratio of less than 1.0 because of short-term loans becoming due and files to increase rates to cover the needed cash flow.
3. A utility claims that it is entitled to a higher return on equity due to revenue risk associated with seasonal fluctuations in sales.
4. A utility owner loans personal funds to the utility at the cost equity. Prevailing interest rates are substantially lower.
5. A utility consistently fails to achieve authorized returns and seeks various means of cost-recovery and revenue-assurance mechanisms to lower risk.
6. A utility wins approval for multiple capital and operating cost surcharges but argues that these have no effect on risk or the cost of capital.

Appendix: links to financial trend data

- <https://sec.report/Ticker/YORW>
- <https://www.macrotrends.net/>
- <https://walleinvestor.com/>
- <https://www.macroaxis.com/>
- <https://charts.equityclock.com>
- <https://finance.yahoo.com/>
- <https://www.marketwatch.com/>
- <http://pages.stern.nyu.edu/~adamodar/>
- <https://www.salary.com/>
- <https://www.eei.org/issues-and-policy/finance-and-tax#financialreview>