

Ann E. Bulkley

PRINCIPAL

Boston

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With more than 25 years of experience in the energy industry, Ms. Bulkley specializes in regulatory economics for the electric and natural gas sectors, including rate of return, cost of equity, and capital structure issues.

Ms. Bulkley has extensive state and federal regulatory experience, and she has provided expert testimony on the cost of capital in nearly 100 regulatory proceedings before 32 state regulatory commissions and the Federal Energy Regulatory Commission (FERC).

In addition to her regulatory experience, Ms. Bulkley has provided valuation and appraisal services for a variety of purposes, including the sale or acquisition of utility assets, regulated ratemaking, ad valorem tax disputes, and other litigation purposes. In addition, she has experience in the areas of contract and business unit valuation, strategic alliances, market restructuring, and regulatory and litigation support.

Ms. Bulkley is a Certified General Appraiser licensed in the Commonwealth of Massachusetts and the State of New Hampshire.

Prior to joining Brattle, Ms. Bulkley was a Senior Vice President at an economic consultancy, and also held senior positions at several consulting firms.

AREAS OF EXPERTISE

- Regulatory Economics, Finance & Rates
- Regulatory Investigations & Enforcement
- Tax Controversy & Transfer Pricing
- Electricity Litigation & Regulatory Disputes
- M&A Litigation

EDUCATION

- **Boston University**
MA in Economics
- **Simmons College**
BA in Economics and Finance

PROFESSIONAL EXPERIENCE

- **The Brattle Group (2022–Present)**
Principal
- **Concentric Energy Advisors, Inc. (2002–2021)**
Senior Vice President
Vice President
Assistant Vice President
Project Manager
- **Navigant Consulting, Inc. (1997–2002)**
Project Manager
- **Reed Consulting Group (1995-1997)**
Consultant- Project Manager
- **Cahners Publishing Company (1995)**
Economist

SELECTED CONSULTING EXPERIENCE & EXPERT TESTIMONY

REGULATORY ANALYSIS AND RATEMAKING

Have provided a range of advisory services relating to regulatory policy analysis and many aspects of utility ratemaking, with specific services including:

- Cost of capital and return on equity testimony, cost of service and rate design analysis and testimony, development of ratemaking strategies
- Development of merchant function exit strategies
- Analysis and program development to address residual energy supply and/or provider of last resort obligations
- Stranded costs assessment and recovery



Performance-based ratemaking analysis and design

- Many aspects of traditional utility ratemaking (e.g., rate design, rate base valuation)

COST OF CAPITAL

Have provided expert testimony on the cost of capital and capital structure in nearly 100 regulatory proceedings before state and federal regulatory commissions in the United States.

RATEMAKING

Have assisted several clients with analysis to support investor-owned and municipal utility clients in the preparation of rate cases. Sample engagements include:

- Assisted several investor-owned and municipal clients on cost allocation and rate design issues including the development of expert testimony supporting recommended rate alternatives.
- Worked with Canadian regulatory staff to establish filing requirements for a rate review of a newly regulated electric utility. Along with analyzing and evaluating rate application, attended hearings and conducted investigation of rate application for regulatory staff and prepared, supported, and defended recommendations for revenue requirements and rates for the company. Additionally, developed rates for gas utility for transportation program and ancillary services.

VALUATION

Have provided valuation services to utility clients, unregulated generators, and private equity clients for a variety of purposes, including ratemaking, fair value, ad valorem tax, litigation and damages, and acquisition. Appraisal practices are consistent with the national standards established by the Uniform Standards of Professional Appraisal Practice.

Representative projects/clients have included:

- Prepared appraisals of electric utility transmission and distribution assets for ad valorem tax purposes.
- Prepared appraisals of several hydroelectric generating facilities for ad valorem tax purposes.
- Conducted appraisals of fossil fuel generating facilities for ad valorem tax purposes.
- Conducted appraisals of generating assets for the purposes of unwinding sale-leaseback agreements.
- For a confidential utility client, prepared valuation of fossil and nuclear generation assets for financing purposes for regulated utility client.
- Prepared a valuation of a portfolio of generation assets for a large energy utility to be used for strategic planning purposes. Valuation approach included an income approach, a real options analysis, and a risk analysis.



- Assisted clients in the restructuring of NUG contracts through the valuation of the underlying assets. Performed analysis to determine the option value of a plant in a competitively priced electricity market following the settlement of the NUG contract.
- Prepared market valuations of several purchase power contracts for large electric utilities in the sale of purchase power contracts. Assignment included an assessment of the regional power market, analysis of the underlying purchase power contracts, and a traditional discounted cash flow valuation approach, as well as a risk analysis. Analyzed bids from potential acquirers using income and risk analysis approached. Prepared an assessment of the credit issues and value at risk for the selling utility.
- Prepared appraisal of a portfolio of generating facilities for a large electric utility to be used for financing purposes.
- Prepared fair value rate base analyses for Northern Indiana Public Service Company for several electric rate proceedings. Valuation approaches used in this project included income, cost, and comparable sales approaches.
- Prepared an appraisal of a fleet of fossil generating assets for a large electric utility to establish the value of assets transferred from utility property.
- Conducted due diligence on an electric transmission and distribution system as part of a buy-side due diligence team.
- Provided analytical support for and prepared appraisal reports of generation assets to be used in ad valorem tax disputes.
- Provided analytical support and prepared testimony regarding the valuation of electric distribution system assets in five communities in a condemnation proceeding.
- Prepared feasibility reports analyzing the expected net benefits resulting from municipal ownership of investor-owned utility operations.
- Prepared independent analyses of proposal for the proposed government condemnation of the investor-owned utilities in Maine and the formation of a public power district.
- Valued purchase power agreements in the transfer of assets to a deregulated electric market.

STRATEGIC AND FINANCIAL ADVISORY SERVICES

Have assisted several clients across North America with analytically-based strategic planning, due diligence, and financial advisory services.

Representative projects include:

- Preparation of feasibility studies for bond issuances for municipal and district steam clients.
- Assisted in the development of a generation strategy for an electric utility. Analyzed various NERC regions to identify potential market entry points. Evaluated potential competitors and alliance



partners. Assisted in the development of gas and electric price forecasts. Developed a framework for the implementation of a risk management program.

- Assisted clients in identifying potential joint venture opportunities and alliance partners. Contacted interviewed and evaluated potential alliance candidates based on company-established criteria for several LDCs and marketing companies. Worked with several LDCs and unregulated marketing companies to establish alliances to enter into the retail energy market. Prepared testimony in support of several merger cases and participated in the regulatory process to obtain approval for these mergers.
- Assisted clients in several buy-side due diligence efforts, providing regulatory insight and developing valuation recommendations for acquisitions of both electric and gas properties.

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Arizona Corporation Commission				
Tucson Electric Power Company	6/22	Tucson Electric Power Company	Docket No. G-01933A-22-0107	Return on Equity
Southwest Gas Corporation	12/21	Southwest Gas Corporation	Docket No. G-01551A-21-0368	Return on Equity
Arizona Public Service Company	10/19	Arizona Public Service Company	Docket No. E-01345A-19-0236	Return on Equity
Tucson Electric Power Company	04/19	Tucson Electric Power Company	Docket No. E-01933A-19-0028	Return on Equity
Tucson Electric Power Company	11/15	Tucson Electric Power Company	Docket No. E-01933A-15-0322	Return on Equity
UNS Electric	05/15	UNS Electric	Docket No. E-04204A-15-0142	Return on Equity
UNS Electric	12/12	UNS Electric	Docket No. E-04204A-12-0504	Return on Equity
Arkansas Public Service Commission				
Oklahoma Gas and Electric Co	10/21	Oklahoma Gas and Electric Co	Docket No. D-18-046-FR	Return on Equity
Arkansas Oklahoma Gas Corporation	10/13	Arkansas Oklahoma Gas Corporation	Docket No. 13-078-U	Return on Equity
California Public Utilities Commission				

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Pacificorp, d/b/a Pacific Power	5/22	Pacificorp, d/b/a Pacific Power		Return on Equity
San Jose Water Company	05/21	San Jose Water Company	A2105004	Return on Equity
Colorado Public Utilities Commission				
Public Service Company of Colorado	07/21	Public Service Company of Colorado	21AL-0317E	Return on Equity
Public Service Company of Colorado	02/20	Public Service Company of Colorado	20AL-0049G	Return on Equity
Public Service Company of Colorado	05/19	Public Service Company of Colorado	19AL-0268E	Return on Equity
Public Service Company of Colorado	01/19	Public Service Company of Colorado	19AL-0063ST	Return on Equity
Atmos Energy Corporation	05/15	Atmos Energy Corporation	Docket No. 15AL-0299G	Return on Equity
Atmos Energy Corporation	04/14	Atmos Energy Corporation	Docket No. 14AL-0300G	Return on Equity
Atmos Energy Corporation	05/13	Atmos Energy Corporation	Docket No. 13AL-0496G	Return on Equity
Connecticut Public Utilities Regulatory Authority				
United Illuminating	05/21	United Illuminating	Docket No. 17-12-03RE11	Return on Equity
Connecticut Water Company	01/21	Connecticut Water Company	Docket No. 20-12-30	Return on Equity
Connecticut Natural Gas Corporation	06/18	Connecticut Natural Gas Corporation	Docket No. 18-05-16	Return on Equity
Yankee Gas Services Co. d/b/a Eversource Energy	06/18	Yankee Gas Services Co. d/b/a Eversource Energy	Docket No. 18-05-10	Return on Equity
The Southern Connecticut Gas Company	06/17	The Southern Connecticut Gas Company	Docket No. 17-05-42	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
The United Illuminating Company	07/16	The United Illuminating Company	Docket No. 16-06-04	Return on Equity
Federal Energy Regulatory Commission				
Northern Natural Gas Company	07/22	Northern Natural Gas Company	Docket No. RP22-___	Return on Equity
Transwestern Pipeline Company, LLC	07/22	Transwestern Pipeline Company, LLC	Docket No. RP22-___	Return on Equity
Florida Gas Transmission	02/21	Florida Gas Transmission	Docket No. RP21-441	Return on Equity
TransCanyon	01/21	TransCanyon	Docket No. ER21-1065	Return on Equity
Duke Energy	12/20	Duke Energy	Docket No. EL21-9-000	Return on Equity
Wisconsin Electric Power Company	08/20	Wisconsin Electric Power Company	Docket No. EL20-57-000	Return on Equity
Panhandle Eastern Pipe Line Company, LP	10/19	Panhandle Eastern Pipe Line Company, LP	Docket Nos. RP19-78-000 RP19-78-001	Return on Equity
Panhandle Eastern Pipe Line Company, LP	08/19	Panhandle Eastern Pipe Line Company, LP	Docket Nos. RP19-1523	Return on Equity
Sea Robin Pipeline Company LLC	11/18	Sea Robin Pipeline Company LLC	Docket# RP19-352-000	Return on Equity
Tallgrass Interstate Gas Transmission	10/15	Tallgrass Interstate Gas Transmission	RP16-137	Return on Equity
Idaho Public Utilities Commission				
PacifiCorp d/b/a Rocky Mountain Power	05/21	PacifiCorp d/b/a Rocky Mountain Power	Case No. PAC-E-21-07	Return on Equity
Illinois Commerce Commission				
Illinois American Water	02/22	Illinois American Water	Docket No. 22-0210	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
North Shore Gas Company	02/21	North Shore Gas Company	No. 20-0810	Return on Equity
Indiana Utility Regulatory Commission				
Indiana Michigan Power Co.	07/21	Indiana Michigan Power Co.	IURC Cause No. 45576	Return on Equity
Indiana Gas Company Inc.	12/20	Indiana Gas Company Inc.	IURC Cause No. 45468	Return on Equity
Southern Indiana Gas and Electric Company	10/20	Southern Indiana Gas and Electric Company	IURC Cause No. 45447	Return on Equity
Indiana and Michigan American Water Company	09/18	Indiana and Michigan American Water Company	IURC Cause No. 45142	Return on Equity
Indianapolis Power and Light Company	12/17	Indianapolis Power and Light Company	Cause No. 45029	Fair Value
Northern Indiana Public Service Company	09/17	Northern Indiana Public Service Company	Cause No. 44988	Fair Value
Indianapolis Power and Light Company	12/16	Indianapolis Power and Light Company	Cause No.44893	Fair Value
Northern Indiana Public Service Company	10/15	Northern Indiana Public Service Company	Cause No. 44688	Fair Value
Indianapolis Power and Light Company	09/15	Indianapolis Power and Light Company	Cause No. 44576 Cause No. 44602	Fair Value
Kokomo Gas and Fuel Company	09/10	Kokomo Gas and Fuel Company	Cause No. 43942	Fair Value
Northern Indiana Fuel and Light Company, Inc.	09/10	Northern Indiana Fuel and Light Company, Inc.	Cause No. 43943	Fair Value
Iowa Department of Commerce Utilities Board				

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
MidAmerican Energy Company	01/22	MidAmerican Energy Company	Docket No. RPU-2022-0001	Return on Equity
Iowa-American Water Company	08/20	Iowa-American Water Company	Docket No. RPU-2020-0001	Return on Equity
Kansas Corporation Commission				
Atmos Energy Corporation	08/15	Atmos Energy Corporation	Docket No. 16-ATMG-079-RTS	Return on Equity
Kentucky Public Service Commission				
Kentucky-American Water Company	11/18	Kentucky-American Water Company	Docket No. 2018-00358	Return on Equity
Maine Public Utilities Commission				
Central Maine Power	08/22	Central Maine Power	Docket No. 2022-00152	Return on Equity
Central Maine Power	10/18	Central Maine Power	Docket No. 2018-194	Return on Equity
Maryland Public Service Commission				
Maryland American Water Company	06/18	Maryland American Water Company	Case No. 9487	Return on Equity
Massachusetts Appellate Tax Board				
Hopkinton LNG Corporation	03/20	Hopkinton LNG Corporation	Docket No.	Valuation of LNG Facility
FirstLight Hydro Generating Company	06/17	FirstLight Hydro Generating Company	Docket No. F-325471 Docket No. F-325472 Docket No. F-325473 Docket No. F-325474	Valuation of Electric Generation Assets
Massachusetts Department of Public Utilities				
National Grid USA	11/20	Boston Gas Company	DPU 20-120	Return on Equity
Berkshire Gas Company	05/18	Berkshire Gas Company	DPU 18-40	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Unitil Corporation	01/04	Fitchburg Gas and Electric	DTE 03-52	Integrated Resource Plan; Gas Demand Forecast
Michigan Public Service Commission				
Michigan Gas Utilities Corporation	03/21	Michigan Gas Utilities Corporation	Case No. U-20718	Return on Equity
Wisconsin Electric Power Company	12/11	Wisconsin Electric Power Company	Case No. U-16830	Return on Equity
Michigan Tax Tribunal				
New Covert Generating Co., LLC.	03/18	The Township of New Covert Michigan	MTT Docket No. 000248TT and 16-001888-TT	Valuation of Electric Generation Assets
Covert Township	07/14	New Covert Generating Co., LLC.	Docket No. 399578	Valuation of Electric Generation Assets
Minnesota Public Utilities Commission				
CenterPoint Energy Resources	11/21	CenterPoint Energy Resources	D-G-008/GR-21-435	Return on Equity
Allete, Inc. d/b/a Minnesota Power	11/21	Allete, Inc. d/b/a Minnesota Power	D-E-015/GR-21-630	Return on Equity
Otter Tail Power Company	11/20	Otter Tail Power Company	E017/GR-20-719	Return on Equity
Allete, Inc. d/b/a Minnesota Power	11/19	Allete, Inc. d/b/a Minnesota Power	E015/GR-19-442	Return on Equity
CenterPoint Energy Resources Corporation d/b/a CenterPoint Energy Minnesota Gas	10/19	CenterPoint Energy Resources Corporation d/b/a CenterPoint Energy Minnesota Gas	G-008/GR-19-524	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Great Plains Natural Gas Co.	09/19	Great Plains Natural Gas Co.	Docket No. G004/GR-19-511	Return on Equity
Minnesota Energy Resources Corporation	10/17	Minnesota Energy Resources Corporation	Docket No. G011/GR-17-563	Return on Equity
Missouri Public Service Commission				
Missouri American Water Company	07/22	Missouri American Water Company	Case No. WR-2022-0303 Case No. SR-2022-0304	Return on Equity
Evergy Missouri West	1/22	Evergy Missouri West	File No. ER-2022-0130	Return on Equity
Evergy Missouri Metro	1/22	Evergy Missouri Metro	File No. ER-2022-0129	Return on Equity
Ameren Missouri	03/21	Ameren Missouri	Docket No. ER-2021-0240 Docket No. GR-2021-0241	Return on Equity
Missouri American Water Company	06/20	Missouri American Water Company	Case No. WR-2020-0344 Case No. SR-2020-0345	Return on Equity
Missouri American Water Company	06/17	Missouri American Water Company	Case No. WR-17-0285 Case No. SR-17-0286	Return on Equity
Montana Public Service Commission				
Montana-Dakota Utilities Co.	06/20	Montana-Dakota Utilities Co.	D2020.06.076	Return on Equity
Montana-Dakota Utilities Co.	09/18	Montana-Dakota Utilities Co.	D2018.9.60	Return on Equity
New Hampshire - Board of Tax and Land Appeals				

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Public Service Company of New Hampshire d/b/a Eversource Energy	11/19 12/19	Public Service Company of New Hampshire d/b/a Eversource Energy	Master Docket No. 28873-14-15-16-17PT	Valuation of Utility Property and Generating Assets
New Hampshire Public Utilities Commission				
Public Service Company of New Hampshire	05/19	Public Service Company of New Hampshire	DE-19-057	Return on Equity
New Hampshire-Merrimack County Superior Court				
Northern New England Telephone Operations, LLC d/b/a FairPoint Communications, NNE	04/18	Northern New England Telephone Operations, LLC d/b/a FairPoint Communications, NNE	220-2012-CV-1100	Valuation of Utility Property
New Hampshire-Rockingham Superior Court				
Eversource Energy	05/18	Public Service Commission of New Hampshire	218-2016-CV-00899 218-2017-CV-00917	Valuation of Utility Property
New Jersey Board of Public Utilities				
New Jersey American Water Company, Inc.	01/22	New Jersey American Water Company, Inc.	WR22010019	Return on Equity
Public Service Electric and Gas Company	10/20	Public Service Electric and Gas Company	EO18101115	Return on Equity
New Jersey American Water Company, Inc.	12/19	New Jersey American Water Company, Inc.	WR19121516	Return on Equity
Public Service Electric and Gas Company	04/19	Public Service Electric and Gas Company	EO18060629 GO18060630	Return on Equity
Public Service Electric and Gas Company	02/18	Public Service Electric and Gas Company	GR17070776	Return on Equity
Public Service Electric and Gas Company	01/18	Public Service Electric and Gas Company	ER18010029 GR18010030	Return on Equity
New Mexico Public Regulation Commission				

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Southwestern Public Service Company	07/19	Southwestern Public Service Company	19-00170-UT	Return on Equity
Southwestern Public Service Company	10/17	Southwestern Public Service Company	Case No. 17-00255-UT	Return on Equity
Southwestern Public Service Company	12/16	Southwestern Public Service Company	Case No. 16-00269-UT	Return on Equity
Southwestern Public Service Company	10/15	Southwestern Public Service Company	Case No. 15-00296-UT	Return on Equity
Southwestern Public Service Company	06/15	Southwestern Public Service Company	Case No. 15-00139-UT	Return on Equity
New York State Department of Public Service				
New York State Electric and Gas Company Rochester Gas and Electric	05/22	New York State Electric and Gas Company Rochester Gas and Electric	22-E-0317 22-G-0318 22-E-0319 22-G-0320	Return on Equity
Corning Natural Gas Corporation	07/21	Corning Natural Gas Corporation	Case No. 21-G-0394	Return on Equity
Central Hudson Gas and Electric Corporation	08/20	Central Hudson Gas and Electric Corporation	Electric 20-E-0428 Gas 20-G-0429	Return on Equity
Niagara Mohawk Power Corporation	07/20	National Grid USA	Case No. 20-E-0380 20-G-0381	Return on Equity
Corning Natural Gas Corporation	02/20	Corning Natural Gas Corporation	Case No. 20-G-0101	Return on Equity
New York State Electric and Gas Company Rochester Gas and Electric	05/19	New York State Electric and Gas Company Rochester Gas and Electric	19-E-0378 19-G-0379 19-E-0380 19-G-0381	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Brooklyn Union Gas Company d/b/a National Grid NY KeySpan Gas East Corporation d/b/a National Grid	04/19	Brooklyn Union Gas Company d/b/a National Grid NY KeySpan Gas East Corporation d/b/a National Grid	19-G-0309 19-G-0310	Return on Equity
Central Hudson Gas and Electric Corporation	07/17	Central Hudson Gas and Electric Corporation	Electric 17-E-0459 Gas 17-G-0460	Return on Equity
Niagara Mohawk Power Corporation	04/17	National Grid USA	Case No. 17-E-0238 17-G-0239	Return on Equity
Corning Natural Gas Corporation	06/16	Corning Natural Gas Corporation	Case No. 16-G-0369	Return on Equity
National Fuel Gas Company	04/16	National Fuel Gas Company	Case No. 16-G-0257	Return on Equity
KeySpan Energy Delivery	01/16	KeySpan Energy Delivery	Case No. 15-G-0058 Case No. 15-G-0059	Return on Equity
New York State Electric and Gas Company Rochester Gas and Electric	05/15	New York State Electric and Gas Company Rochester Gas and Electric	Case No. 15-E-0283 Case No. 15-G-0284 Case No. 15-E-0285 Case No. 15-G-0286	Return on Equity
North Dakota Public Service Commission				
Montana-Dakota Utilities Co.	05/22	Montana-Dakota Utilities Co.	C-PU-22-194	Return on Equity
Montana-Dakota Utilities Co.	08/20	Montana-Dakota Utilities Co.	C-PU-20-379	Return on Equity
Northern States Power Company	12/12	Northern States Power Company	C-PU-12-813	Return on Equity
Northern States Power Company	12/10	Northern States Power Company	C-PU-10-657	Return on Equity
Oklahoma Corporation Commission				
Oklahoma Gas & Electric	12/21	Oklahoma Gas & Electric	Cause No. PUD 202100164	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Arkansas Oklahoma Gas Corporation	01/13	Arkansas Oklahoma Gas Corporation	Cause No. PUD 201200236	Return on Equity
Oregon Public Service Commission				
PacifiCorp d/b/a Pacific Power & Light	03/22	PacifiCorp d/b/a Pacific Power & Light	Docket No. UE-399	Return on Equity
PacifiCorp d/b/a Pacific Power & Light	02/20	PacifiCorp d/b/a Pacific Power & Light	Docket No. UE-374	Return on Equity
Pennsylvania Public Utility Commission				
American Water Works Company Inc.	04/22	Pennsylvania-American Water Company	Docket No. R-2020-3031672 (water) Docket No. R-2020-3031673 (wastewater)	Return on Equity
American Water Works Company Inc.	04/20	Pennsylvania-American Water Company	Docket No. R-2020-3019369 (water) Docket No. R-2020-3019371 (wastewater)	Return on Equity
American Water Works Company Inc.	04/17	Pennsylvania-American Water Company	Docket No. R-2017-2595853	Return on Equity
South Dakota Public Utilities Commission				
MidAmerican Energy Company	05/22	MidAmerican Energy Company	D-NG22-005	Return on Equity
Northern States Power Company	06/14	Northern States Power Company	Docket No. EL14-058	Return on Equity
Texas Public Utility Commission				
Entergy Texas, Inc.	07/22	Entergy Texas, Inc.	D-53719	Return on Equity
Southwestern Public Service Commission	08/19	Southwestern Public Service Commission	Docket No. D-49831	Return on Equity
Southwestern Public Service Company	01/14	Southwestern Public Service Company	Docket No. 42004	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Utah Public Service Commission				
PacifiCorp d/b/a Rocky Mountain Power	05/20	PacifiCorp d/b/a Rocky Mountain Power	Docket No. 20-035-04	Return on Equity
Virginia State Corporation Commission				
Virginia American Water Company, Inc.	11/21	Virginia American Water Company, Inc.	Docket No. PUR-2021-00255	Return on Equity
Virginia American Water Company, Inc.	11/18	Virginia American Water Company, Inc.	Docket No. PUR-2018-00175	Return on Equity
Washington Utilities Transportation Commission				
Cascade Natural Gas Corporation	06/20	Cascade Natural Gas Corporation	Docket No. UG-200568	Return on Equity
PacifiCorp d/b/a Pacific Power & Light	12/19	PacifiCorp d/b/a Pacific Power & Light	Docket No. UE-191024	Return on Equity
Cascade Natural Gas Corporation	04/19	Cascade Natural Gas Corporation	Docket No. UG-190210	Return on Equity
West Virginia Public Service Commission				
West Virginia American Water Company	04/21	West Virginia American Water Company	Case No. 21-02369-W-42T	Return on Equity
West Virginia American Water Company	04/18	West Virginia American Water Company	Case No. 18-0573-W-42T Case No. 18-0576-S-42T	Return on Equity
Wisconsin Public Service Commission				
Wisconsin Electric Power Company and Wisconsin Gas LLC	04/22	Wisconsin Electric Power Company and Wisconsin Gas LLC	Docket No. 05-UR-110	Return on Equity
Wisconsin Public Service Corp.	04/22	Wisconsin Public Service Corp.	6690-UR-127	Return on Equity
Alliant Energy		Alliant Energy		Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Wisconsin Electric Power Company and Wisconsin Gas LLC	03/19	Wisconsin Electric Power Company and Wisconsin Gas LLC	Docket No. 05-UR-109	Return on Equity
Wisconsin Public Service Corp.	03/19	Wisconsin Public Service Corp.	6690-UR-126	Return on Equity
Wyoming Public Service Commission				
PacifiCorp d/b/a Rocky Mountain Power	03/20	PacifiCorp d/b/a Rocky Mountain Power	Docket No. 20000-578-ER-20	Return on Equity
Montana-Dakota Utilities Co.	05/19	Montana-Dakota Utilities Co.	30013-351-GR-19	Return on Equity

CERTIFICATIONS/ACCREDITATIONS

Certified General Appraiser, licensed in the Commonwealth of Massachusetts and the State of New Hampshire

Christopher Wall

SENIOR ASSOCIATE

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Chris.Wall@brattle.com

With more than 10 years of experience as a financial and economic consultant in the energy industry, Mr. Wall specializes in regulatory economics for the electric, natural gas, and water utility sectors.

Mr. Wall has expertise in matters related to rate of return, cost of equity, capital structure, cost of service, and rate design. He has prepared expert testimony related to return on equity and capital structure in over 50 regulatory proceedings for electric, natural gas, and water utility clients across the US.

Mr. Wall has also applied his economics, financial modeling, advanced statistics, and econometrics competencies to prepare rate design, rate consolidation, marginal cost, cost of service, valuation, and demand forecast studies for electric and natural gas utilities. These studies have been submitted in utility regulatory proceedings throughout North America.

Mr. Wall has provided expert testimony before regulatory commissions in Arkansas, Massachusetts, and New York on issues that include cost of capital, natural gas demand forecasting, and statistical concepts for return on equity and cost of service.

Prior to joining Brattle, Mr. Wall was an Assistant Vice President at an economic consulting firm.

AREAS OF EXPERTISE

- Regulatory Economics, Finance & Rates

EDUCATION

- **Northeastern University**
MA in Economics
- **Saint Peter's College**
BA in Economics and Mathematics (summa cum laude)

PROFESSIONAL EXPERIENCE

- **The Brattle Group (2022–Present)**
Senior Associate

- **Concentric Energy Advisors, Inc. (2010–2021)**
 - Assistant Vice President (2021)
 - Senior Project Manager (2019–2020)
 - Project Manager (2017–2018)
 - Senior Consultant (2015–2016)
 - Consultant (2013–2014)
 - Assistant Consultant (2011–2012)
 - Associate (2010)
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EXPERT TESTIMONY

- **Return on Equity** | New York Department of Public Service
On behalf of the Corning Natural Gas Corporation, provided testimony related to return on equity in Case No. 21-G-0394 (July 2021) and Case No. 20-G-0101 (February 2020).
 - **Integrated Resource Plan** | Massachusetts Department of Public Utilities
On behalf of Berkshire Gas Company, provided testimony regarding the development of the natural gas demand forecast for an integrated resource plan in DPU 20-139 (2020), DPU 18-107 (2018), DPU 16-103 (2016), and DPU 14-98 (2014).
 - **Return on Equity and Class Cost of Service** | Arkansas Public Service Commission
On behalf of the Arkansas Oklahoma Gas Corporation, provided rebuttal testimony on statistical concepts for return on equity and class cost of service in Docket No. 13-078-U (2014).
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SELECTED CONSULTING EXPERIENCE

COST OF CAPITAL

- Provided expert testimony on the cost of capital for a Northeast natural gas utility.
- Prepared expert testimony and exhibits for return on equity, capital structure, and cost of debt analysis for numerous electric, gas, and water utility clients across the US. This included preparing direct testimony, responding to data requests, drafting rebuttal testimony in response to intervening witnesses, assisting with hearing preparation, and drafting and reviewing post-hearing briefs.

DEMAND FORECASTING & SUPPLY PLANNING

- Filed expert testimony regarding the development of the natural gas demand forecast for a Northeast gas utility.
- Contributed to and worked on demand forecasting projects for multiple Northeast gas utilities:

- Assisted in the development of natural gas price and effective degree day forecasts.
- Developed natural gas demand forecasts by customer class using SPSS.
 - ▶ Developed models for number of customers and use per customer.
 - ▶ Performed checks for model stability, heteroscedasticity, and autocorrelation by performing the Chow, Breusch-Pagan, and Autocorrelation Function/Partial Autocorrelation Function tests.
- Contributed in the development of the forecasting and supply planning report and supported data requests.

RATEMAKING

- Evaluated rate design restructuring and its impacts on customer bills for Northeast gas and electric utilities.
- Developed marginal cost studies and prepared testimony for Northeast electric and gas utilities.
- Designed rates and prepared testimony for a Northeast electric and gas utility.
- Prepared a cost of service study and designed rates for a Mid-Atlantic municipal gas utility.
- Prepared cost of service studies and designed rates for Midwest electric and gas utilities.
- Evaluated the impact of different rate alternatives and solar generation compensation approaches on solar customers in each rate class for a Midwest municipal electric utility.
- Contributed to the development of a benchmarking study to compare a Canadian natural gas utility's performance with its peers.
- Assisted in the development of a Total Factor Productivity Analysis for a Canadian natural gas utility as part of an Incentive Ratemaking report filed with the Ontario Energy Board.

VALUATION

- Provided analytical support for and prepared appraisal reports of generation assets to be used in ad valorem tax disputes.
- Provided analytical support and prepared expert testimony regarding the fair value of the distribution system assets of a Midwest natural gas utility and the fair value of the transmission and distribution system assets of a different Midwest electric utility.

SUMMARY OF ROE ANALYSES RESULTS

<i>Constant Growth DCF - Earnings Growth</i>			
	Minimum Growth Rate	Average Growth Rate	Maximum Growth Rate
30-Day Avg. Stock Price	8.09%	9.32%	10.33%
90-Day Avg. Stock Price	8.23%	9.46%	10.48%
180-Day Avg. Stock Price	8.14%	9.37%	10.38%
Average	8.15%	9.38%	10.40%
<i>Constant Growth DCF - Earnings & Retention Growth</i>			
30-Day Avg. Stock Price	7.39%	9.09%	10.33%
90-Day Avg. Stock Price	7.53%	9.23%	10.48%
180-Day Avg. Stock Price	7.44%	9.13%	10.38%
Average	7.45%	9.15%	10.40%
<i>CAPM, ECAPM, and Bond Yield Risk Premium</i>			
	Current 30-Day Avg 30-Year Treasury Yield	Near-Term Projected 30-Year Treasury Yield	Longer-Term Projected 30-Year Treasury Yield
CAPM:			
Current <i>Value Line</i> Beta	11.41%	11.42%	11.43%
Current Bloomberg Beta	10.83%	10.85%	10.87%
Long-term Avg. <i>Value Line</i> Beta	10.41%	10.44%	10.46%
ECAPM:			
Current <i>Value Line</i> Beta	11.68%	11.69%	11.70%
Current Bloomberg Beta	11.25%	11.26%	11.28%
Long-term Avg. <i>Value Line</i> Beta	10.93%	10.95%	10.97%
Bond Yield Risk Premium:	10.12%	10.17%	10.21%

PROXY GROUP SCREENING DATA AND RESULTS - FINAL PROXY GROUP

	[1]	[2]	[3]	[4]	[5]	[6]	
Company	Ticker	Dividends	S&P Credit Rating Between BBB- and AAA	Covered by More Than 1 Analyst	Positive Growth Rates from at least two sources (Value Line, Yahoo! First Call, and Zacks)	% Regulated Electric Operating Income \geq 70%	Announced Merger
ALLETE, Inc.	ALE	Yes	BBB	Yes	Yes	93.08%	No
Alliant Energy Corporation	LNT	Yes	A-	Yes	Yes	88.08%	No
Ameren Corporation	AEE	Yes	BBB+	Yes	Yes	85.03%	No
American Electric Power Company, Inc.	AEP	Yes	A-	Yes	Yes	95.43%	No
Avista Corporation	AVA	Yes	BBB	Yes	Yes	76.10%	No
Duke Energy Corporation	DUK	Yes	BBB+	Yes	Yes	90.32%	No
Edison International	EIX	Yes	BBB	Yes	Yes	100.25%	No
Entergy Corporation	ETR	Yes	BBB+	Yes	Yes	99.41%	No
Eversource Energy	ES	Yes	A-	Yes	Yes	80.09%	No
Evergy, Inc.	EVRG	Yes	A-	Yes	Yes	100.00%	No
IDACORP, Inc.	IDA	Yes	BBB	Yes	Yes	99.84%	No
NextEra Energy, Inc.	NEE	Yes	A-	Yes	Yes	85.07%	No
NorthWestern Corporation	NWE	Yes	BBB	Yes	Yes	84.01%	No
OGE Energy Corporation	OGE	Yes	BBB+	Yes	Yes	100.00%	No
Otter Tail Corporation	OTTR	Yes	BBB	Yes	Yes	62.74%	No
Portland General Electric Company	POR	Yes	BBB+	Yes	Yes	100.00%	No
Xcel Energy Inc.	XEL	Yes	A-	Yes	Yes	86.47%	No

Notes:

[1]Source: Bloomberg Professional

[2]Source: Bloomberg Professional

[3]Source: Yahoo! Finance and Zacks

[4]Source: Yahoo! Finance, Value Line Investment Survey, and Zacks

[5]Source: SNL Financial (pulled from FERC Form 1) 2019-2021

[6] to [7] Source: Form 10-Ks for 2019, 2020 & 2021

[8]SNL Financial News Releases

30-DAY CONSTANT GROWTH DCF

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Company		Annualized Dividend	Stock Price	Dividend Yield	Expected Dividend Yield	Value Line Projected EPS Growth Rate	Yahoo! Finance Projected EPS Growth Rate	Zacks Projected EPS Growth Rate	Average Projected EPS Growth Rate	Cost of Equity: Minimum Growth Rate	Cost of Equity: Mean Growth Rate	Cost of Equity: Maximum Growth Rate
ALLETE, Inc.	ALE	\$2.60	\$64.09	4.06%	4.22%	6.00%	8.70%	9.60%	8.10%	10.18%	12.32%	13.85%
Alliant Energy Corporation	LNT	\$1.81	\$54.38	3.33%	3.42%	6.00%	5.55%	5.80%	5.78%	8.97%	9.21%	9.43%
Ameren Corporation	AEE	\$2.36	\$88.15	2.68%	2.77%	6.50%	6.64%	6.90%	6.68%	9.26%	9.45%	9.67%
American Electric Power Company	AEP	\$3.32	\$94.56	3.51%	3.62%	6.50%	6.15%	6.10%	6.25%	9.72%	9.87%	10.13%
Avista Corporation	AVA	\$1.76	\$42.48	4.14%	4.24%	3.50%	5.20%	5.20%	4.63%	7.72%	8.87%	9.45%
Duke Energy Corporation	DUK	\$4.02	\$102.85	3.91%	4.01%	5.00%	5.65%	5.50%	5.38%	9.01%	9.40%	9.67%
Edison International	EIX	\$2.95	\$66.39	4.44%	4.55%	6.49%	4.40%	3.00%	4.63%	7.51%	9.18%	11.08%
Entergy Corporation	ETR	\$4.28	\$109.55	3.91%	4.01%	4.00%	6.19%	6.00%	5.40%	7.98%	9.41%	10.22%
Eversource Energy	ES	\$2.55	\$83.08	3.07%	3.17%	6.50%	6.42%	6.50%	6.47%	9.59%	9.64%	9.67%
Evergy, Inc.	EVRG	\$2.45	\$62.50	3.92%	4.02%	7.50%	2.43%	5.30%	5.08%	6.40%	9.10%	11.57%
IDACORP, Inc.	IDA	\$3.16	\$106.55	2.97%	3.02%	4.50%	3.40%	3.40%	3.77%	6.42%	6.79%	7.53%
NextEra Energy, Inc.	NEE	\$1.70	\$82.50	2.06%	2.16%	10.50%	10.21%	9.00%	9.90%	11.15%	12.07%	12.67%
NorthWestern Corporation	NWE	\$2.52	\$57.74	4.36%	4.43%	3.50%	4.50%	1.70%	3.23%	6.10%	7.67%	8.96%
OGE Energy Corporation	OGE	\$1.66	\$39.21	4.22%	4.32%	6.50%	1.90%	5.00%	4.47%	6.17%	8.79%	10.86%
Otter Tail Corporation	OTTR	\$1.65	\$60.44	2.73%	2.82%	4.50%	9.00%	n/a	6.75%	7.29%	9.57%	11.85%
Portland General Electric Company	POR	\$1.81	\$48.17	3.76%	3.83%	5.00%	1.39%	5.30%	3.90%	5.17%	7.73%	9.16%
Xcel Energy Inc.	XEL	\$1.95	\$69.89	2.79%	2.88%	6.00%	7.01%	6.50%	6.50%	8.87%	9.38%	9.90%
Mean										8.09%	9.32%	10.33%
Median										7.98%	9.38%	9.90%

Notes:

[1] Bloomberg Professional as of January 31 2023

[2] Bloomberg Professional 30-day average as of January 31 2023

[3] Equals [1]/[2]

[4] Equals [3] x (1 + 0.5 x [8])

[5] Value Line. Projected EPS growth rate for EIX based on estimated 2022 EPS in order to exclude anomalous results in 2021 due to wildfire and landslide events per Value Line.

[6] Yahoo! Finance

[7] Zacks

[8] Equals average of [5], [6], [7]

[9] Equals [3] x (1 + 0.5 x (min([5], [6], [7]))) + (min([5], [6], [7]))

[10] Equals [4] + [8]

[11] Equals [3] x (1 + 0.5 x (max([5], [6], [7]))) + (max([5], [6], [7]))

90-DAY CONSTANT GROWTH DCF

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Company		Annualized Dividend	Stock Price	Dividend Yield	Expected Dividend Yield	Value Line Projected EPS Growth Rate	Yahoo! Finance Projected EPS Growth Rate	Zacks Projected EPS Growth Rate	Average Projected EPS Growth Rate	Cost of Equity: Minimum Growth Rate	Cost of Equity: Mean Growth Rate	Cost of Equity: Maximum Growth Rate
ALLETE, Inc.	ALE	\$2.60	\$59.65	4.36%	4.54%	6.00%	8.70%	9.60%	8.10%	10.49%	12.64%	14.17%
Alliant Energy Corporation	LNT	\$1.81	\$53.40	3.39%	3.49%	6.00%	5.55%	5.80%	5.78%	9.03%	9.27%	9.49%
Ameren Corporation	AEE	\$2.36	\$84.71	2.79%	2.88%	6.50%	6.64%	6.90%	6.68%	9.38%	9.56%	9.78%
American Electric Power Company	AEP	\$3.32	\$91.64	3.62%	3.74%	6.50%	6.15%	6.10%	6.25%	9.83%	9.99%	10.24%
Avista Corporation	AVA	\$1.76	\$40.23	4.37%	4.48%	3.50%	5.20%	5.20%	4.63%	7.95%	9.11%	9.69%
Duke Energy Corporation	DUK	\$4.02	\$97.43	4.13%	4.24%	5.00%	5.65%	5.50%	5.38%	9.23%	9.62%	9.89%
Edison International	EIX	\$2.95	\$62.17	4.75%	4.86%	6.49%	4.40%	3.00%	4.63%	7.82%	9.49%	11.39%
Entergy Corporation	ETR	\$4.28	\$108.60	3.94%	4.05%	4.00%	6.19%	6.00%	5.40%	8.02%	9.44%	10.25%
Eversource Energy	ES	\$2.55	\$79.99	3.19%	3.29%	6.50%	6.42%	6.50%	6.47%	9.71%	9.76%	9.79%
Evergy, Inc.	EVRG	\$2.45	\$60.52	4.05%	4.15%	7.50%	2.43%	5.30%	5.08%	6.53%	9.23%	11.70%
IDACORP, Inc.	IDA	\$3.16	\$103.99	3.04%	3.10%	4.50%	3.40%	3.40%	3.77%	6.49%	6.86%	7.61%
NextEra Energy, Inc.	NEE	\$1.70	\$80.86	2.10%	2.21%	10.50%	10.21%	9.00%	9.90%	11.20%	12.11%	12.71%
NorthWestern Corporation	NWE	\$2.52	\$54.56	4.62%	4.69%	3.50%	4.50%	1.70%	3.23%	6.36%	7.93%	9.22%
OGE Energy Corporation	OGE	\$1.66	\$37.88	4.37%	4.47%	6.50%	1.90%	5.00%	4.47%	6.31%	8.94%	11.01%
Otter Tail Corporation	OTTR	\$1.65	\$60.40	2.73%	2.82%	4.50%	9.00%	n/a	6.75%	7.29%	9.57%	11.85%
Portland General Electric Company	POR	\$1.81	\$46.44	3.90%	3.97%	5.00%	1.39%	5.30%	3.90%	5.31%	7.87%	9.30%
Xcel Energy Inc.	XEL	\$1.95	\$67.09	2.91%	3.00%	6.00%	7.01%	6.50%	6.50%	8.99%	9.50%	10.02%
Mean										8.23%	9.46%	10.48%
Median										8.02%	9.49%	10.02%

Notes:

[1] Bloomberg Professional as of January 31 2023

[2] Bloomberg Professional 90-day average as of January 31 2023

[3] Equals [1]/[2]

[4] Equals [3] x (1 + 0.5 x [8])

[5] Value Line. Projected EPS growth rate for EIX based on estimated 2022 EPS in order to exclude anomalous results in 2021 due to wildfire and landslide events per Value Line.

[6] Yahoo! Finance

[7] Zacks

[8] Equals average of [5], [6], [7]

[9] Equals [3] x (1 + 0.5 x (min([5], [6], [7])) + (min([5], [6], [7])))

[10] Equals [4] + [8]

[11] Equals [3] x (1 + 0.5 x (max([5], [6], [7])) + (max([5], [6], [7])))

180-DAY CONSTANT GROWTH DCF

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Company		Annualized Dividend	Stock Price	Dividend Yield	Expected Dividend Yield	Value Line Projected EPS Growth Rate	Yahoo! Finance Projected EPS Growth Rate	Zacks Projected EPS Growth Rate	Average Projected EPS Growth Rate	Cost of Equity: Minimum Growth Rate	Cost of Equity: Mean Growth Rate	Cost of Equity: Maximum Growth Rate
ALLETE, Inc.	ALE	\$2.60	\$59.39	4.38%	4.56%	6.00%	8.70%	9.60%	8.10%	10.51%	12.66%	14.19%
Alliant Energy Corporation	LNT	\$1.81	\$56.17	3.22%	3.32%	6.00%	5.55%	5.80%	5.78%	8.86%	9.10%	9.32%
Ameren Corporation	AEE	\$2.36	\$87.43	2.70%	2.79%	6.50%	6.64%	6.90%	6.68%	9.29%	9.47%	9.69%
American Electric Power Company	AEP	\$3.32	\$94.51	3.51%	3.62%	6.50%	6.15%	6.10%	6.25%	9.72%	9.87%	10.13%
Avista Corporation	AVA	\$1.76	\$40.84	4.31%	4.41%	3.50%	5.20%	5.20%	4.63%	7.88%	9.04%	9.62%
Duke Energy Corporation	DUK	\$4.02	\$101.88	3.95%	4.05%	5.00%	5.65%	5.50%	5.38%	9.04%	9.44%	9.71%
Edison International	EIX	\$2.95	\$63.34	4.66%	4.77%	6.49%	4.40%	3.00%	4.63%	7.73%	9.40%	11.30%
Entergy Corporation	ETR	\$4.28	\$111.02	3.86%	3.96%	4.00%	6.19%	6.00%	5.40%	7.93%	9.36%	10.16%
Eversource Energy	ES	\$2.55	\$83.45	3.06%	3.15%	6.50%	6.42%	6.50%	6.47%	9.57%	9.63%	9.65%
Evergy, Inc.	EVRG	\$2.45	\$63.35	3.87%	3.97%	7.50%	2.43%	5.30%	5.08%	6.34%	9.04%	11.51%
IDACORP, Inc.	IDA	\$3.16	\$105.36	3.00%	3.06%	4.50%	3.40%	3.40%	3.77%	6.45%	6.82%	7.57%
NextEra Energy, Inc.	NEE	\$1.70	\$80.77	2.10%	2.21%	10.50%	10.21%	9.00%	9.90%	11.20%	12.11%	12.72%
NorthWestern Corporation	NWE	\$2.52	\$55.02	4.58%	4.65%	3.50%	4.50%	1.70%	3.23%	6.32%	7.89%	9.18%
OGE Energy Corporation	OGE	\$1.66	\$38.41	4.31%	4.41%	6.50%	1.90%	5.00%	4.47%	6.25%	8.88%	10.95%
Otter Tail Corporation	OTTR	\$1.65	\$64.85	2.54%	2.63%	4.50%	9.00%	n/a	6.75%	7.10%	9.38%	11.66%
Portland General Electric Company	POR	\$1.81	\$47.85	3.78%	3.86%	5.00%	1.39%	5.30%	3.90%	5.20%	7.75%	9.18%
Xcel Energy Inc.	XEL	\$1.95	\$69.39	2.81%	2.90%	6.00%	7.01%	6.50%	6.50%	8.89%	9.40%	9.92%
Mean										8.14%	9.37%	10.38%
Median										7.93%	9.38%	9.92%

Notes:

[1] Bloomberg Professional as of January 31 2023

[2] Bloomberg Professional 180-day average as of January 31 2023

[3] Equals [1]/[2]

[4] Equals [3] x (1 + 0.5 x [8])

[5] Value Line. Projected EPS growth rate for EIX based on estimated 2022 EPS in order to exclude anomalous results in 2021 due to wildfire and landslide events per Value Line.

[6] Yahoo! Finance

[7] Zacks

[8] Equals average of [5], [6], [7]

[9] Equals [3] x (1 + 0.5 x (min([5], [6], [7])) + (min([5], [6], [7])))

[10] Equals [4] + [8]

[11] Equals [3] x (1 + 0.5 x (max([5], [6], [7])) + (max([5], [6], [7])))

RETENTION GROWTH

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]
Company	Ticker	All Dividends to Net Profit Projection Year 1	All Dividends to Net Profit Projection Year 2	All Dividends to Net Profit Projection Years 3-5	Average Retention Ratio	Return on Common Equity Projection Year 1	Return on Common Equity Projection Year 2	Return on Common Equity Projection Years 3-5	Average Return on Common Equity	b x r	Common Shares Outstanding Year 0	Common Shares Outstanding Years 3-5	Common Shares Outstanding Growth Rate	Price Projection Years 3-5 High	Price Projection Years 3-5 Low	Price Projection Years 3-5 Mid	Projected Book Value per Share Years 3-5	Market-to-Book Ratio	s	v	s x v	br + sv
ALLETE, Inc.	ALE	69.00%	68.00%	63.00%	33%	7.50%	8.00%	9.00%	8.17%	2.72%	53.20	61.00	2.77%	\$ 95.00	\$ 70.00	\$ 82.50	\$ 54.00	1.53	4.24%	34.55%	1.46%	4.19%
Alliant Energy Corporation	LNT	61.00%	61.00%	61.00%	39%	11.00%	11.50%	11.50%	11.33%	4.42%	250.47	253.00	0.20%	\$ 70.00	\$ 55.00	\$ 62.50	\$ 30.25	2.07	0.42%	51.60%	0.21%	4.63%
Ameren Corporation	AEE	58.00%	58.00%	60.00%	41%	10.00%	10.00%	10.00%	10.00%	4.13%	257.70	280.00	1.67%	\$ 100.00	\$ 80.00	\$ 90.00	\$ 51.25	1.76	2.94%	43.06%	1.27%	5.40%
American Electric Power Company, Inc	AEP	63.00%	63.00%	62.00%	37%	11.00%	10.50%	11.00%	10.83%	4.04%	504.21	545.00	1.57%	\$ 120.00	\$ 100.00	\$ 110.00	\$ 59.00	1.86	2.92%	46.36%	1.36%	5.40%
Avista Corporation	AVA	93.00%	78.00%	72.00%	19%	6.50%	7.50%	8.00%	7.33%	1.39%	71.50	83.00	3.03%	\$ 65.00	\$ 50.00	\$ 57.50	\$ 34.95	1.65	4.98%	39.22%	1.95%	3.35%
Duke Energy Corporation	DUK	76.00%	73.00%	68.00%	28%	8.50%	9.00%	9.00%	8.83%	2.44%	769.00	770.00	0.03%	\$ 130.00	\$ 95.00	\$ 112.50	\$ 70.00	1.61	0.04%	37.78%	0.02%	2.46%
Edison International	EIX	61.00%	61.00%	56.00%	41%	13.00%	12.50%	13.00%	12.83%	5.22%	380.38	390.00	0.50%	\$ 120.00	\$ 80.00	\$ 100.00	\$ 47.45	2.11	1.06%	52.55%	0.55%	5.77%
Entergy Corporation	ETR	62.00%	64.00%	60.00%	38%	9.50%	10.50%	11.50%	10.50%	3.99%	202.65	214.00	1.10%	\$ 160.00	\$ 115.00	\$ 137.50	\$ 74.00	1.86	2.04%	46.18%	0.94%	4.93%
Eversource Energy	ES	62.00%	62.00%	62.00%	38%	9.00%	9.50%	10.00%	9.50%	3.61%	344.40	365.00	1.17%	\$ 115.00	\$ 95.00	\$ 105.00	\$ 53.75	1.95	2.28%	48.81%	1.11%	4.72%
Energy, Inc.	EVRG	64.00%	65.00%	63.00%	36%	8.50%	9.00%	10.00%	9.17%	3.30%	229.30	230.00	0.06%	\$ 95.00	\$ 70.00	\$ 82.50	\$ 47.50	1.74	0.11%	42.42%	0.04%	3.34%
IDACORP, Inc.	IDA	60.00%	63.00%	66.00%	37%	9.50%	9.00%	9.50%	9.33%	3.45%	50.52	52.00	0.58%	\$ 130.00	\$ 105.00	\$ 117.50	\$ 67.30	1.75	1.01%	42.72%	0.43%	3.89%
NextEra Energy, Inc.	NEE	58.00%	59.00%	61.00%	41%	15.00%	13.50%	15.00%	14.50%	5.90%	1963.00	2025.00	0.62%	\$ 105.00	\$ 85.00	\$ 95.00	\$ 27.25	3.49	2.17%	71.32%	1.55%	7.45%
NorthWestern Corporation	NWE	75.00%	72.00%	67.00%	29%	7.50%	7.50%	8.00%	7.67%	2.20%	54.06	62.00	2.78%	\$ 75.00	\$ 55.00	\$ 65.00	\$ 50.00	1.30	3.61%	23.08%	0.83%	3.03%
OG&E Energy Corporation	OGE	73.00%	81.00%	57.00%	30%	12.00%	12.00%	13.00%	12.33%	3.66%	200.10	200.20	0.01%	\$ 55.00	\$ 40.00	\$ 47.50	\$ 26.00	1.83	0.02%	45.26%	0.01%	3.67%
Otter Tail Corporation	OTTR	31.00%	44.00%	57.00%	56%	19.50%	13.50%	11.50%	14.83%	8.31%	41.55	42.50	0.45%	\$ 75.00	\$ 55.00	\$ 65.00	\$ 34.25	1.90	0.86%	47.31%	0.41%	8.71%
Portland General Electric Company	POR	64.00%	64.00%	64.00%	36%	9.00%	8.50%	9.50%	9.00%	3.24%	89.41	100.00	2.26%	\$ 75.00	\$ 55.00	\$ 65.00	\$ 37.00	1.76	3.98%	43.08%	1.71%	4.95%
Xcel Energy Inc.	XEL	62.00%	62.00%	62.00%	38%	10.50%	10.50%	11.00%	10.67%	4.05%	544.03	561.00	0.62%	\$ 90.00	\$ 75.00	\$ 82.50	\$ 37.00	2.23	1.37%	55.15%	0.76%	4.81%
Mean																						4.75%

Notes:

- [1] - [3] Value Line
- [4] Equals 1 - Average ([1], [2], [3])
- [5] - [7] Value Line
- [8] Equals Average ([5], [6], [7])
- [9] Equals [4] x [8]
- [10] - [11] Value Line
- [12] Equals ([11] / [10]) ^ 0.2 - 1
- [13] - [14] Value Line
- [15] Equals Average ([13], [14])
- [16] Value Line
- [17] Equals [15] / [16]
- [18] Equals [12] x [17]
- [19] Equals 1 - (1 / [17])
- [20] Equals [18] x [19]
- [21] Equals [9] + [20]

30-DAY CONSTANT GROWTH DCF

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Company		Annualized Dividend	Stock Price	Dividend Yield	Expected Dividend Yield	Value Line Projected EPS Growth Rate	Yahoo! Finance Projected EPS Growth Rate	Zacks Projected EPS Growth Rate	Projected Retention Growth Rate	Average Projected Growth Rate	Cost of Equity: Minimum Growth Rate	Cost of Equity: Mean Growth Rate	Cost of Equity: Maximum Growth Rate
ALLETE, Inc.	ALE	\$2.60	\$64.09	4.06%	4.20%	6.00%	8.70%	9.60%	4.19%	7.12%	8.33%	11.32%	13.85%
Alliant Energy Corporation	LNT	\$1.81	\$54.38	3.33%	3.42%	6.00%	5.55%	5.80%	4.63%	5.50%	8.04%	8.92%	9.43%
Ameren Corporation	AEE	\$2.36	\$88.15	2.68%	2.76%	6.50%	6.64%	6.90%	5.40%	6.36%	8.15%	9.12%	9.67%
American Electric Power Company	AEP	\$3.32	\$94.56	3.51%	3.62%	6.50%	6.15%	6.10%	5.40%	6.04%	9.01%	9.65%	10.13%
Avista Corporation	AVA	\$1.76	\$42.48	4.14%	4.23%	3.50%	5.20%	5.20%	3.35%	4.31%	7.56%	8.54%	9.45%
Duke Energy Corporation	DUK	\$4.02	\$102.85	3.91%	4.00%	5.00%	5.65%	5.50%	2.46%	4.65%	6.42%	8.65%	9.67%
Edison International	EIX	\$2.95	\$66.39	4.44%	4.55%	6.49%	4.40%	3.00%	5.77%	4.92%	7.51%	9.47%	11.08%
Energy Corporation	ETR	\$4.28	\$109.55	3.91%	4.01%	4.00%	6.19%	6.00%	4.93%	5.28%	7.98%	9.29%	10.22%
Eversource Energy	ES	\$2.55	\$83.08	3.07%	3.16%	6.50%	6.42%	6.50%	4.72%	6.04%	7.87%	9.20%	9.67%
Evergy, Inc.	EVRG	\$2.45	\$62.50	3.92%	4.01%	7.50%	2.43%	5.30%	3.34%	4.64%	6.40%	8.65%	11.57%
IDACORP, Inc.	IDA	\$3.16	\$106.55	2.97%	3.02%	4.50%	3.40%	3.40%	3.89%	3.80%	6.42%	6.82%	7.53%
NextEra Energy, Inc.	NEE	\$1.70	\$82.50	2.06%	2.16%	10.50%	10.21%	9.00%	7.45%	9.29%	9.59%	11.45%	12.67%
NorthWestern Corporation	NWE	\$2.52	\$57.74	4.36%	4.43%	3.50%	4.50%	1.70%	3.03%	3.18%	6.10%	7.62%	8.96%
OGE Energy Corporation	OGE	\$1.66	\$39.21	4.22%	4.32%	6.50%	1.90%	5.00%	3.67%	4.27%	6.17%	8.58%	10.86%
Otter Tail Corporation	OTTR	\$1.65	\$60.44	2.73%	2.83%	4.50%	9.00%	n/a	8.71%	7.40%	7.29%	10.24%	11.85%
Portland General Electric Company	POR	\$1.81	\$48.17	3.76%	3.84%	5.00%	1.39%	5.30%	4.95%	4.16%	5.17%	8.00%	9.16%
Xcel Energy Inc.	XEL	\$1.95	\$69.89	2.79%	2.87%	6.00%	7.01%	6.50%	4.81%	6.08%	7.67%	8.96%	9.90%
Mean											7.39%	9.09%	10.33%
Median											7.56%	8.96%	9.90%

Notes:

[1] Bloomberg Professional as of January 31 2023

[2] Bloomberg Professional 30-day average as of January 31 2023

[3] Equals [1]/[2]

[4] Equals [3] x (1 + 0.5 x [8])

[5] Value Line. Projected EPS growth rate for EIX based on estimated 2022 EPS in order to exclude anomalous results in 2021 due to wildfire and landslide events per Value Line.

[6] Yahoo! Finance

[7] Zacks

[8] Attachment AEB/CMW-5

[9] Equals average of [5], [6], [7], [8]

[10] Equals [3] x (1 + 0.5 x (min([5], [6], [7], [8])) + (min([5], [6], [7], [8])))

[11] Equals [4] + [9]

[12] Equals [3] x (1 + 0.5 x (max([5], [6], [7], [8])) + (max([5], [6], [7], [8])))

90-DAY CONSTANT GROWTH DCF

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Company		Annualized Dividend	Stock Price	Dividend Yield	Expected Dividend Yield	Projected EPS Growth Rate	Yahoo! Finance Projected EPS Growth Rate	Zacks Projected EPS Growth Rate	Retention Growth Rate	Average Projected Growth Rate	Equity: Minimum Growth Rate	Equity: Mean Growth Rate	Equity: Maximum Growth Rate
ALLETE, Inc.	ALE	\$2.60	\$59.65	4.36%	4.51%	6.00%	8.70%	9.60%	4.19%	7.12%	8.64%	11.64%	14.17%
Alliant Energy Corporation	LNT	\$1.81	\$53.40	3.39%	3.48%	6.00%	5.55%	5.80%	4.63%	5.50%	8.10%	8.98%	9.49%
Ameren Corporation	AEE	\$2.36	\$84.71	2.79%	2.87%	6.50%	6.64%	6.90%	5.40%	6.36%	8.26%	9.23%	9.78%
American Electric Power Company	AEP	\$3.32	\$91.64	3.62%	3.73%	6.50%	6.15%	6.10%	5.40%	6.04%	9.12%	9.77%	10.24%
Avista Corporation	AVA	\$1.76	\$40.23	4.37%	4.47%	3.50%	5.20%	5.20%	3.35%	4.31%	7.79%	8.78%	9.69%
Duke Energy Corporation	DUK	\$4.02	\$97.43	4.13%	4.22%	5.00%	5.65%	5.50%	2.46%	4.65%	6.64%	8.87%	9.89%
Edison International	EIX	\$2.95	\$62.17	4.75%	4.86%	6.49%	4.40%	3.00%	5.77%	4.92%	7.82%	9.78%	11.39%
Entergy Corporation	ETR	\$4.28	\$108.60	3.94%	4.05%	4.00%	6.19%	6.00%	4.93%	5.28%	8.02%	9.33%	10.25%
Eversource Energy	ES	\$2.55	\$79.99	3.19%	3.28%	6.50%	6.42%	6.50%	4.72%	6.04%	7.99%	9.32%	9.79%
Energy, Inc.	EVRG	\$2.45	\$60.52	4.05%	4.14%	7.50%	2.43%	5.30%	3.34%	4.64%	6.53%	8.79%	11.70%
IDACORP, Inc.	IDA	\$3.16	\$103.99	3.04%	3.10%	4.50%	3.40%	3.40%	3.89%	3.80%	6.49%	6.89%	7.61%
NextEra Energy, Inc.	NEE	\$1.70	\$80.86	2.10%	2.20%	10.50%	10.21%	9.00%	7.45%	9.29%	9.63%	11.49%	12.71%
NorthWestern Corporation	NWE	\$2.52	\$54.56	4.62%	4.69%	3.50%	4.50%	1.70%	3.03%	3.18%	6.36%	7.87%	9.22%
OGE Energy Corporation	OGE	\$1.66	\$37.88	4.37%	4.47%	6.50%	1.90%	5.00%	3.67%	4.27%	6.31%	8.73%	11.01%
Otter Tail Corporation	OTTR	\$1.65	\$60.40	2.73%	2.83%	4.50%	9.00%	n/a	8.71%	7.40%	7.29%	10.24%	11.85%
Portland General Electric Company	POR	\$1.81	\$46.44	3.90%	3.98%	5.00%	1.39%	5.30%	4.95%	4.16%	5.31%	8.14%	9.30%
Xcel Energy Inc.	XEL	\$1.95	\$67.09	2.91%	2.99%	6.00%	7.01%	6.50%	4.81%	6.08%	7.79%	9.08%	10.02%
Mean											7.53%	9.23%	10.48%
Median											7.79%	9.08%	10.02%

Notes:

[1] Bloomberg Professional as of January 31 2023

[2] Bloomberg Professional 90-day average as of January 31 2023

[3] Equals [1]/[2]

[4] Equals [3] x (1 + 0.5 x [8])

[5] Value Line. Projected EPS growth rate for EIX based on estimated 2022 EPS in order to exclude anomalous results in 2021 due to wildfire and landslide events per Value Line.

[6] Yahoo! Finance

[7] Zacks

[8] Attachment AEB/CMW-5

[9] Equals average of [5], [6], [7], [8]

[10] Equals [3] x (1 + 0.5 x (min([5], [6], [7], [8])) + (min([5], [6], [7], [8])))

[11] Equals [4] + [9]

[12] Equals [3] x (1 + 0.5 x (max([5], [6], [7], [8])) + (max([5], [6], [7], [8])))

180-DAY CONSTANT GROWTH DCF

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Company		Annualized Dividend	Stock Price	Dividend Yield	Expected Dividend Yield	Projected EPS Growth Rate	Yahoo! Finance Projected EPS Growth Rate	Zacks Projected EPS Growth Rate	Retention Growth Rate	Average Projected Growth Rate	Equity: Minimum Growth Rate	Equity: Mean Growth Rate	Equity: Maximum Growth Rate
ALLETE, Inc.	ALE	\$2.60	\$59.39	4.38%	4.53%	6.00%	8.70%	9.60%	4.19%	7.12%	8.66%	11.66%	14.19%
Alliant Energy Corporation	LNT	\$1.81	\$56.17	3.22%	3.31%	6.00%	5.55%	5.80%	4.63%	5.50%	7.93%	8.81%	9.32%
Ameren Corporation	AEE	\$2.36	\$87.43	2.70%	2.78%	6.50%	6.64%	6.90%	5.40%	6.36%	8.17%	9.14%	9.69%
American Electric Power Company	AEP	\$3.32	\$94.51	3.51%	3.62%	6.50%	6.15%	6.10%	5.40%	6.04%	9.01%	9.66%	10.13%
Avista Corporation	AVA	\$1.76	\$40.84	4.31%	4.40%	3.50%	5.20%	5.20%	3.35%	4.31%	7.73%	8.71%	9.62%
Duke Energy Corporation	DUK	\$4.02	\$101.88	3.95%	4.04%	5.00%	5.65%	5.50%	2.46%	4.65%	6.45%	8.69%	9.71%
Edison International	EIX	\$2.95	\$63.34	4.66%	4.77%	6.49%	4.40%	3.00%	5.77%	4.92%	7.73%	9.69%	11.30%
Entergy Corporation	ETR	\$4.28	\$111.02	3.86%	3.96%	4.00%	6.19%	6.00%	4.93%	5.28%	7.93%	9.24%	10.16%
Eversource Energy	ES	\$2.55	\$83.45	3.06%	3.15%	6.50%	6.42%	6.50%	4.72%	6.04%	7.85%	9.18%	9.65%
Evergy, Inc.	EVRG	\$2.45	\$63.35	3.87%	3.96%	7.50%	2.43%	5.30%	3.34%	4.64%	6.34%	8.60%	11.51%
IDACORP, Inc.	IDA	\$3.16	\$105.36	3.00%	3.06%	4.50%	3.40%	3.40%	3.89%	3.80%	6.45%	6.85%	7.57%
NextEra Energy, Inc.	NEE	\$1.70	\$80.77	2.10%	2.20%	10.50%	10.21%	9.00%	7.45%	9.29%	9.63%	11.49%	12.72%
NorthWestern Corporation	NWE	\$2.52	\$55.02	4.58%	4.65%	3.50%	4.50%	1.70%	3.03%	3.18%	6.32%	7.84%	9.18%
OGE Energy Corporation	OGE	\$1.66	\$38.41	4.31%	4.40%	6.50%	1.90%	5.00%	3.67%	4.27%	6.25%	8.67%	10.95%
Otter Tail Corporation	OTTR	\$1.65	\$64.85	2.54%	2.64%	4.50%	9.00%	n/a	8.71%	7.40%	7.10%	10.04%	11.66%
Portland General Electric Company	POR	\$1.81	\$47.85	3.78%	3.86%	5.00%	1.39%	5.30%	4.95%	4.16%	5.20%	8.02%	9.18%
Xcel Energy Inc.	XEL	\$1.95	\$69.39	2.81%	2.90%	6.00%	7.01%	6.50%	4.81%	6.08%	7.69%	8.98%	9.92%
Mean											7.44%	9.13%	10.38%
Median											7.73%	8.98%	9.92%

Notes:

[1] Bloomberg Professional as of January 31 2023

[2] Bloomberg Professional 180-day average as of January 31 2023

[3] Equals [1]/[2]

[4] Equals [3] x (1 + 0.5 x [8])

[5] Value Line. Projected EPS growth rate for EIX based on estimated 2022 EPS in order to exclude anomalous results in 2021 due to wildfire and landslide events per Value Line.

[6] Yahoo! Finance

[7] Zacks

[8] Attachment AEB/CMW-5

[9] Equals average of [5], [6], [7], [8]

[10] Equals [3] x (1 + 0.5 x (min([5], [6], [7], [8])) + (min([5], [6], [7], [8])))

[11] Equals [4] + [9]

[12] Equals [3] x (1 + 0.5 x (max([5], [6], [7], [8])) + (max([5], [6], [7], [8])))

**CAPITAL ASSET PRICING MODEL
CURRENT RISK FREE RATE AND VALUE LINE BETA**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Current 30-day average of 30-year Treasury bond yield	Beta (β)	Market Return (R_m)	Market Risk Premium ($R_m - R_f$)	CAPM ROE (K)	ECAPM ROE (K)
ALLETE, Inc.	ALE	3.71%	0.90	12.50%	8.79%	11.62%	11.84%
Alliant Energy Corporation	LNT	3.71%	0.85	12.50%	8.79%	11.18%	11.51%
Ameren Corporation	AEE	3.71%	0.85	12.50%	8.79%	11.18%	11.51%
American Electric Power Company, Inc.	AEP	3.71%	0.75	12.50%	8.79%	10.30%	10.85%
Avista Corporation	AVA	3.71%	0.90	12.50%	8.79%	11.62%	11.84%
Duke Energy Corporation	DUK	3.71%	0.85	12.50%	8.79%	11.18%	11.51%
Edison International	EIX	3.71%	0.95	12.50%	8.79%	12.06%	12.17%
Entergy Corporation	ETR	3.71%	0.95	12.50%	8.79%	12.06%	12.17%
Eversource Energy	ES	3.71%	0.90	12.50%	8.79%	11.62%	11.84%
Evergy, Inc.	EVRG	3.71%	0.90	12.50%	8.79%	11.62%	11.84%
IDACORP, Inc.	IDA	3.71%	0.80	12.50%	8.79%	10.74%	11.18%
NextEra Energy, Inc.	NEE	3.71%	0.90	12.50%	8.79%	11.62%	11.84%
NorthWestern Corporation	NWE	3.71%	0.90	12.50%	8.79%	11.62%	11.84%
OGE Energy Corporation	OGE	3.71%	1.00	12.50%	8.79%	12.50%	12.50%
Otter Tail Corporation	OTTR	3.71%	0.85	12.50%	8.79%	11.18%	11.51%
Portland General Electric Company	POR	3.71%	0.85	12.50%	8.79%	11.18%	11.51%
Xcel Energy Inc.	XEL	3.71%	0.80	12.50%	8.79%	10.74%	11.18%
Mean						11.41%	11.68%
Median						11.62%	11.84%

Notes:

[1] Bloomberg Professional 30-day average as of January 31, 2023

[2] Value Line

[3] Attachment AEB/CMW-8

[4] Equals [3]-[1]

[5] Equals [1] + [2] x [4]

[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL
NEAR TERM PROJECTED RISK-FREE RATE AND VALUE LINE BETA

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Near-term projected 30-year U.S. Treasury bond yield (Q2 2023 - Q2 2024)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm - Rf)	CAPM ROE (K)	ECAPM ROE (K)
ALLETE, Inc.	ALE	3.82%	0.90	12.50%	8.68%	11.63%	11.85%
Alliant Energy Corporation	LNT	3.82%	0.85	12.50%	8.68%	11.19%	11.52%
Ameren Corporation	AEE	3.82%	0.85	12.50%	8.68%	11.19%	11.52%
American Electric Power Company, Inc.	AEP	3.82%	0.75	12.50%	8.68%	10.33%	10.87%
Avista Corporation	AVA	3.82%	0.90	12.50%	8.68%	11.63%	11.85%
Duke Energy Corporation	DUK	3.82%	0.85	12.50%	8.68%	11.19%	11.52%
Edison International	EIX	3.82%	0.95	12.50%	8.68%	12.06%	12.17%
Entergy Corporation	ETR	3.82%	0.95	12.50%	8.68%	12.06%	12.17%
Eversource Energy	ES	3.82%	0.90	12.50%	8.68%	11.63%	11.85%
Evergy, Inc.	EVRG	3.82%	0.90	12.50%	8.68%	11.63%	11.85%
IDACORP, Inc.	IDA	3.82%	0.80	12.50%	8.68%	10.76%	11.19%
NextEra Energy, Inc.	NEE	3.82%	0.90	12.50%	8.68%	11.63%	11.85%
NorthWestern Corporation	NWE	3.82%	0.90	12.50%	8.68%	11.63%	11.85%
OGE Energy Corporation	OGE	3.82%	1.00	12.50%	8.68%	12.50%	12.50%
Otter Tail Corporation	OTTR	3.82%	0.85	12.50%	8.68%	11.19%	11.52%
Portland General Electric Company	POR	3.82%	0.85	12.50%	8.68%	11.19%	11.52%
Xcel Energy Inc.	XEL	3.82%	0.80	12.50%	8.68%	10.76%	11.19%
Mean						11.42%	11.69%
Median						11.63%	11.85%

Notes:

[1] *Blue Chip Financial Forecasts*, Vol. 42, No. 2, February 1, 2023, at 2

[2] Value Line

[3] Attachment AEB/CMW-8

[4] Equals [3]-[1]

[5] Equals [1] + [2] x [4]

[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL
LONG-TERM PROJECTED RISK-FREE RATE AND VALUE LINE BETA

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

Company	Ticker	[1]	[2]	[3]	[4]	[5]	[6]
		Projected 30-year U.S. Treasury bond yield (2024 - 2028)	Beta (β)	Market Return (R_m)	Market Risk Premium ($R_m - R_f$)	CAPM ROE (K)	ECAPM ROE (K)
ALLETE, Inc.	ALE	3.90%	0.90	12.50%	8.60%	11.64%	11.85%
Alliant Energy Corporation	LNT	3.90%	0.85	12.50%	8.60%	11.21%	11.53%
Ameren Corporation	AEE	3.90%	0.85	12.50%	8.60%	11.21%	11.53%
American Electric Power Company, Inc.	AEP	3.90%	0.75	12.50%	8.60%	10.35%	10.88%
Avista Corporation	AVA	3.90%	0.90	12.50%	8.60%	11.64%	11.85%
Duke Energy Corporation	DUK	3.90%	0.85	12.50%	8.60%	11.21%	11.53%
Edison International	EIX	3.90%	0.95	12.50%	8.60%	12.07%	12.17%
Entergy Corporation	ETR	3.90%	0.95	12.50%	8.60%	12.07%	12.17%
Eversource Energy	ES	3.90%	0.90	12.50%	8.60%	11.64%	11.85%
Evergy, Inc.	EVRG	3.90%	0.90	12.50%	8.60%	11.64%	11.85%
IDACORP, Inc.	IDA	3.90%	0.80	12.50%	8.60%	10.78%	11.21%
NextEra Energy, Inc.	NEE	3.90%	0.90	12.50%	8.60%	11.64%	11.85%
NorthWestern Corporation	NWE	3.90%	0.90	12.50%	8.60%	11.64%	11.85%
OGE Energy Corporation	OGE	3.90%	1.00	12.50%	8.60%	12.50%	12.50%
Otter Tail Corporation	OTTR	3.90%	0.85	12.50%	8.60%	11.21%	11.53%
Portland General Electric Company	POR	3.90%	0.85	12.50%	8.60%	11.21%	11.53%
Xcel Energy Inc.	XEL	3.90%	0.80	12.50%	8.60%	10.78%	11.21%
Mean						11.43%	11.70%
Median						11.64%	11.85%

Notes:

[1] Blue Chip Financial Forecasts, Vol. 41, No. 12, December 2, 2022, at 14

[2] Value Line

[3] Attachment AEB/CMW-8

[4] Equals [3]-[1]

[5] Equals [1] + [2] x [4]

[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

**CAPITAL ASSET PRICING MODEL
CURRENT RISK FREE RATE AND BLOOMBERG BETA**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Current 30-day average of 30-year Treasury bond yield	Beta (β)	Market Return (R_m)	Market Risk Premium ($R_m - R_f$)	CAPM ROE (K)	ECAPM ROE (K)
ALLETE, Inc.	ALE	3.71%	0.83	12.50%	8.79%	11.01%	11.38%
Alliant Energy Corporation	LNT	3.71%	0.80	12.50%	8.79%	10.71%	11.16%
Ameren Corporation	AEE	3.71%	0.76	12.50%	8.79%	10.37%	10.90%
American Electric Power Company, Inc.	AEP	3.71%	0.77	12.50%	8.79%	10.48%	10.98%
Avista Corporation	AVA	3.71%	0.76	12.50%	8.79%	10.36%	10.89%
Duke Energy Corporation	DUK	3.71%	0.73	12.50%	8.79%	10.08%	10.69%
Edison International	EIX	3.71%	0.85	12.50%	8.79%	11.19%	11.52%
Entergy Corporation	ETR	3.71%	0.86	12.50%	8.79%	11.25%	11.56%
Eversource Energy	ES	3.71%	0.81	12.50%	8.79%	10.79%	11.21%
Evergy, Inc.	EVRG	3.71%	0.79	12.50%	8.79%	10.63%	11.10%
IDACORP, Inc.	IDA	3.71%	0.81	12.50%	8.79%	10.80%	11.22%
NextEra Energy, Inc.	NEE	3.71%	0.82	12.50%	8.79%	10.94%	11.33%
NorthWestern Corporation	NWE	3.71%	0.86	12.50%	8.79%	11.30%	11.60%
OGE Energy Corporation	OGE	3.71%	0.93	12.50%	8.79%	11.87%	12.03%
Otter Tail Corporation	OTTR	3.71%	0.88	12.50%	8.79%	11.46%	11.72%
Portland General Electric Company	POR	3.71%	0.79	12.50%	8.79%	10.62%	11.09%
Xcel Energy Inc.	XEL	3.71%	0.75	12.50%	8.79%	10.28%	10.84%
Mean						10.83%	11.25%
Median						10.79%	11.21%

Notes:

[1] Bloomberg Professional 30-day average as of January 31, 2023

[2] Bloomberg Professional

[3] Attachment AEB/CMW-8

[4] Equals [3]-[1]

[5] Equals [1] + [2] x [4]

[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL
NEAR TERM PROJECTED RISK-FREE RATE AND BLOOMBERG BETA

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

Company	Ticker	[1]	[2]	[3]	[4]	[5]	[6]
		Near-term projected 30-year U.S. Treasury bond yield (Q2 2023 - Q2)	Beta (β)	Market Return (R_m)	Market Risk Premium ($R_m - R_f$)	CAPM ROE (K)	ECAPM ROE (K)
ALLETE, Inc.	ALE	3.82%	0.83	12.50%	8.68%	11.03%	11.40%
Alliant Energy Corporation	LNT	3.82%	0.80	12.50%	8.68%	10.73%	11.17%
Ameren Corporation	AEE	3.82%	0.76	12.50%	8.68%	10.40%	10.92%
American Electric Power Company, Inc.	AEP	3.82%	0.77	12.50%	8.68%	10.50%	11.00%
Avista Corporation	AVA	3.82%	0.76	12.50%	8.68%	10.38%	10.91%
Duke Energy Corporation	DUK	3.82%	0.73	12.50%	8.68%	10.11%	10.71%
Edison International	EIX	3.82%	0.85	12.50%	8.68%	11.21%	11.53%
Entergy Corporation	ETR	3.82%	0.86	12.50%	8.68%	11.26%	11.57%
Eversource Energy	ES	3.82%	0.81	12.50%	8.68%	10.81%	11.23%
Evergy, Inc.	EVRG	3.82%	0.79	12.50%	8.68%	10.65%	11.11%
IDACORP, Inc.	IDA	3.82%	0.81	12.50%	8.68%	10.82%	11.24%
NextEra Energy, Inc.	NEE	3.82%	0.82	12.50%	8.68%	10.96%	11.34%
NorthWestern Corporation	NWE	3.82%	0.86	12.50%	8.68%	11.31%	11.61%
OGE Energy Corporation	OGE	3.82%	0.93	12.50%	8.68%	11.88%	12.03%
Otter Tail Corporation	OTTR	3.82%	0.88	12.50%	8.68%	11.48%	11.73%
Portland General Electric Company	POR	3.82%	0.79	12.50%	8.68%	10.64%	11.11%
Xcel Energy Inc.	XEL	3.82%	0.75	12.50%	8.68%	10.31%	10.86%
Mean						10.85%	11.26%
Median						10.81%	11.23%

Notes:

[1] Blue Chip Financial Forecasts, Vol. 42, No. 2, February 1, 2023, at 2

[2] Bloomberg Professional

[3] Attachment AEB/CMW-8

[4] Equals [3]-[1]

[5] Equals [1] + [2] x [4]

[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL
LONG-TERM PROJECTED RISK-FREE RATE AND BLOOMBERG BETA

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

Company	Ticker	[1]	[2]	[3]	[4]	[5]	[6]
		Projected 30-year U.S. Treasury bond yield (2024 - 2028)	Beta (β)	Market Return (R_m)	Market Risk Premium ($R_m - R_f$)	CAPM ROE (K)	ECAPM ROE (K)
ALLETE, Inc.	ALE	3.90%	0.83	12.50%	8.60%	11.05%	11.41%
Alliant Energy Corporation	LNT	3.90%	0.80	12.50%	8.60%	10.75%	11.19%
Ameren Corporation	AEE	3.90%	0.76	12.50%	8.60%	10.42%	10.94%
American Electric Power Company, Inc.	AEP	3.90%	0.77	12.50%	8.60%	10.52%	11.01%
Avista Corporation	AVA	3.90%	0.76	12.50%	8.60%	10.40%	10.93%
Duke Energy Corporation	DUK	3.90%	0.73	12.50%	8.60%	10.13%	10.73%
Edison International	EIX	3.90%	0.85	12.50%	8.60%	11.22%	11.54%
Entergy Corporation	ETR	3.90%	0.86	12.50%	8.60%	11.27%	11.58%
Eversource Energy	ES	3.90%	0.81	12.50%	8.60%	10.82%	11.24%
Evergy, Inc.	EVRG	3.90%	0.79	12.50%	8.60%	10.67%	11.13%
IDACORP, Inc.	IDA	3.90%	0.81	12.50%	8.60%	10.84%	11.25%
NextEra Energy, Inc.	NEE	3.90%	0.82	12.50%	8.60%	10.97%	11.35%
NorthWestern Corporation	NWE	3.90%	0.86	12.50%	8.60%	11.32%	11.62%
OGE Energy Corporation	OGE	3.90%	0.93	12.50%	8.60%	11.89%	12.04%
Otter Tail Corporation	OTTR	3.90%	0.88	12.50%	8.60%	11.48%	11.74%
Portland General Electric Company	POR	3.90%	0.79	12.50%	8.60%	10.66%	11.12%
Xcel Energy Inc.	XEL	3.90%	0.75	12.50%	8.60%	10.33%	10.87%
Mean						10.87%	11.28%
Median						10.82%	11.24%

Notes:

[1] Blue Chip Financial Forecasts, Vol. 41, No. 12, December 2, 2022, at 14

[2] Bloomberg Professional

[3] Attachment AEB/CMW-8

[4] Equals [3]-[1]

[5] Equals [1] + [2] x [4]

[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

**CAPITAL ASSET PRICING MODEL
CURRENT RISK FREE RATE AND LONG-TERM VALUE LINE BETA**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

Company	Ticker	[1]	[2]	[3]	[4]	[5]	[6]
		Current 30-day average of 30-year Treasury bond yield	Beta (β)	Market Return (R_m)	Market Risk Premium ($R_m - R_f$)	CAPM ROE (K)	ECAPM ROE (K)
ALLETE, Inc.	ALE	3.71%	0.79	12.50%	8.79%	10.61%	11.08%
Alliant Energy Corporation	LNT	3.71%	0.75	12.50%	8.79%	10.30%	10.85%
Ameren Corporation	AEE	3.71%	0.73	12.50%	8.79%	10.08%	10.68%
American Electric Power Company, Inc.	AEP	3.71%	0.68	12.50%	8.79%	9.64%	10.35%
Avista Corporation	AVA	3.71%	0.79	12.50%	8.79%	10.61%	11.08%
Duke Energy Corporation	DUK	3.71%	0.67	12.50%	8.79%	9.55%	10.29%
Edison International	EIX	3.71%	0.75	12.50%	8.79%	10.30%	10.85%
Entergy Corporation	ETR	3.71%	0.75	12.50%	8.79%	10.26%	10.82%
Eversource Energy	ES	3.71%	0.74	12.50%	8.79%	10.24%	10.81%
Evergy, Inc.	EVRG	3.71%	0.95	12.50%	8.79%	12.06%	12.17%
IDACORP, Inc.	IDA	3.71%	0.73	12.50%	8.79%	10.12%	10.72%
NextEra Energy, Inc.	NEE	3.71%	0.73	12.50%	8.79%	10.12%	10.72%
NorthWestern Corporation	NWE	3.71%	0.75	12.50%	8.79%	10.26%	10.82%
OGE Energy Corporation	OGE	3.71%	0.93	12.50%	8.79%	11.88%	12.03%
Otter Tail Corporation	OTTR	3.71%	0.85	12.50%	8.79%	11.18%	11.51%
Portland General Electric Company	POR	3.71%	0.75	12.50%	8.79%	10.30%	10.85%
Xcel Energy Inc.	XEL	3.71%	0.66	12.50%	8.79%	9.46%	10.22%
Mean						10.41%	10.93%
Median						10.26%	10.82%

Notes:

[1] Bloomberg Professional 30-day average as of January 31, 2023

[2] Attachment AEB/CMW-7

[3] Attachment AEB/CMW-8

[4] Equals [3]-[1]

[5] Equals [1] + [2] x [4]

[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL
NEAR-TERM PROJECTED RISK FREE RATE AND LONG-TERM VALUE LINE BETA

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

Company	Ticker	[1]	[2]	[3]	[4]	[5]	[6]
		Near-term projected 30-year U.S. Treasury bond yield (Q2 2023 - Q2)	Beta (β)	Market Return (R_m)	Market Risk Premium ($R_m - R_f$)	CAPM ROE (K)	ECAPM ROE (K)
ALLETE, Inc.	ALE	3.82%	0.79	12.50%	8.68%	10.63%	11.10%
Alliant Energy Corporation	LNT	3.82%	0.75	12.50%	8.68%	10.33%	10.87%
Ameren Corporation	AEE	3.82%	0.73	12.50%	8.68%	10.11%	10.71%
American Electric Power Company, Inc.	AEP	3.82%	0.68	12.50%	8.68%	9.68%	10.38%
Avista Corporation	AVA	3.82%	0.79	12.50%	8.68%	10.63%	11.10%
Duke Energy Corporation	DUK	3.82%	0.67	12.50%	8.68%	9.59%	10.32%
Edison International	EIX	3.82%	0.75	12.50%	8.68%	10.33%	10.87%
Entergy Corporation	ETR	3.82%	0.75	12.50%	8.68%	10.28%	10.84%
Eversource Energy	ES	3.82%	0.74	12.50%	8.68%	10.27%	10.83%
Evergy, Inc.	EVRG	3.82%	0.95	12.50%	8.68%	12.06%	12.17%
IDACORP, Inc.	IDA	3.82%	0.73	12.50%	8.68%	10.15%	10.74%
NextEra Energy, Inc.	NEE	3.82%	0.73	12.50%	8.68%	10.15%	10.74%
NorthWestern Corporation	NWE	3.82%	0.75	12.50%	8.68%	10.28%	10.84%
OGE Energy Corporation	OGE	3.82%	0.93	12.50%	8.68%	11.89%	12.04%
Otter Tail Corporation	OTTR	3.82%	0.85	12.50%	8.68%	11.19%	11.52%
Portland General Electric Company	POR	3.82%	0.75	12.50%	8.68%	10.33%	10.87%
Xcel Energy Inc.	XEL	3.82%	0.66	12.50%	8.68%	9.50%	10.25%
Mean						10.44%	10.95%
Median						10.28%	10.84%

Notes:

[1] Blue Chip Financial Forecasts, Vol. 42, No. 2, February 1, 2023, at 2

[2] Attachment AEB/CMW-7

[3] Attachment AEB/CMW-8

[4] Equals [3]-[1]

[5] Equals [1] + [2] x [4]

[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL
LONG-TERM PROJECTED RISK FREE RATE AND LONG-TERM VALUE LINE BETA

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

Company	Ticker	[1]	[2]	[3]	[4]	[5]	[6]
		Projected 30-year U.S. Treasury bond yield (2024 - 2028)	Beta (β)	Market Return (R_m)	Market Risk Premium ($R_m - R_f$)	CAPM ROE (K)	ECAPM ROE (K)
ALLETE, Inc.	ALE	3.90%	0.79	12.50%	8.60%	10.65%	11.11%
Alliant Energy Corporation	LNT	3.90%	0.75	12.50%	8.60%	10.35%	10.88%
Ameren Corporation	AEE	3.90%	0.73	12.50%	8.60%	10.13%	10.72%
American Electric Power Company, Inc.	AEP	3.90%	0.68	12.50%	8.60%	9.70%	10.40%
Avista Corporation	AVA	3.90%	0.79	12.50%	8.60%	10.65%	11.11%
Duke Energy Corporation	DUK	3.90%	0.67	12.50%	8.60%	9.62%	10.34%
Edison International	EIX	3.90%	0.75	12.50%	8.60%	10.35%	10.88%
Entergy Corporation	ETR	3.90%	0.75	12.50%	8.60%	10.30%	10.85%
Eversource Energy	ES	3.90%	0.74	12.50%	8.60%	10.29%	10.84%
Evergy, Inc.	EVRG	3.90%	0.95	12.50%	8.60%	12.07%	12.17%
IDACORP, Inc.	IDA	3.90%	0.73	12.50%	8.60%	10.18%	10.76%
NextEra Energy, Inc.	NEE	3.90%	0.73	12.50%	8.60%	10.18%	10.76%
NorthWestern Corporation	NWE	3.90%	0.75	12.50%	8.60%	10.30%	10.85%
OGE Energy Corporation	OGE	3.90%	0.93	12.50%	8.60%	11.89%	12.04%
Otter Tail Corporation	OTTR	3.90%	0.85	12.50%	8.60%	11.21%	11.53%
Portland General Electric Company	POR	3.90%	0.75	12.50%	8.60%	10.35%	10.88%
Xcel Energy Inc.	XEL	3.90%	0.66	12.50%	8.60%	9.53%	10.27%
Mean						10.46%	10.97%
Median						10.30%	10.85%

Notes:

[1] Blue Chip Financial Forecasts, Vol. 41, No. 12, December 2, 2022, at 14

[2] Attachment AEB/CMW-7

[3] Attachment AEB/CMW-8

[4] Equals [3]-[1]

[5] Equals [1] + [2] x [4]

[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

HISTORICAL VALUE LINE BETA

Company	Ticker	[1] 12/31/2013	[2] 12/31/2014	[3] 12/31/2015	[4] 12/31/2016	[5] 12/31/2017	[6] 12/31/2018	[7] 12/31/2019	[8] 12/31/2020	[9] 12/31/2021	[10] 12/31/2022	[11] Average
ALLETE, Inc.	ALE	0.75	0.80	0.80	0.75	0.80	0.65	0.65	0.85	0.90	0.90	0.79
Alliant Energy Corporation	LNT	0.75	0.8	0.8	0.70	0.70	0.60	0.60	0.85	0.85	0.85	0.75
Ameren Corporation	AEE	0.8	0.75	0.75	0.65	0.70	0.55	0.55	0.85	0.80	0.85	0.73
American Electric Power Company, Inc.	AEP	0.7	0.7	0.7	0.65	0.65	0.55	0.55	0.75	0.75	0.75	0.68
Avista Corporation	AVA	0.75	0.8	0.8	0.70	0.75	0.65	0.60	0.95	0.95	0.90	0.79
Duke Energy Corporation	DUK	0.65	0.6	0.65	0.60	0.60	0.50	0.50	0.85	0.85	0.85	0.67
Edison International	EIX	0.8	0.75	0.7	0.65	0.65	0.55	0.55	0.95	0.95	0.95	0.75
Energy Corporation	ETR	0.7	0.7	0.7	0.65	0.65	0.60	0.60	0.95	0.95	0.95	0.75
Eversource Energy	ES			0.75	0.70	0.65	0.60	0.55	0.90	0.90	0.90	0.74
Evergy, Inc.	EVRG						NMF	NMF	1.00	0.95	0.90	0.95
IDACORP, Inc.	IDA	0.75	0.8	0.8	0.75	0.70	0.55	0.55	0.80	0.80	0.80	0.73
NextEra Energy, Inc.	NEE	0.7	0.7	0.75	0.65	0.65	0.55	0.55	0.90	0.90	0.95	0.73
NorthWestern Corporation	NWE	0.7	0.7	0.7	0.70	0.70	0.55	0.60	0.95	0.95	0.90	0.75
OGE Energy Corporation	OGE	0.85	0.9	0.95	0.90	0.95	0.85	0.75	1.10	1.05	1.00	0.93
Otter Tail Corporation	OTTR	0.95	0.9	0.85	0.85	0.90	0.75	0.70	0.85	0.90	0.85	0.85
Portland General Electric Company	POR	0.75	0.8	0.8	0.70	0.70	0.60	0.55	0.85	0.90	0.85	0.75
Xcel Energy Inc.	XEL	0.65	0.65	0.65	0.60	0.60	0.50	0.50	0.80	0.80	0.80	0.66
Mean		0.75	0.76	0.76	0.70	0.71	0.60	0.58	0.89	0.89	0.88	0.76

Notes:

[1] Value Line, dated December 26, 2013.

[2] Value Line, dated December 31, 2014.

[3] Value Line, dated December 30, 2015.

[4] Value Line, dated December 29, 2016.

[5] Value Line, dated December 28, 2017.

[6] Value Line, dated December 27, 2018.

[7] Value Line, dated December 26, 2019.

[8] Value Line, dated December 30, 2020.

[9] Value Line, dated December 29, 2021.

[10] Value Line, dated December 30, 2022.

[11] Average ([1] - [10])

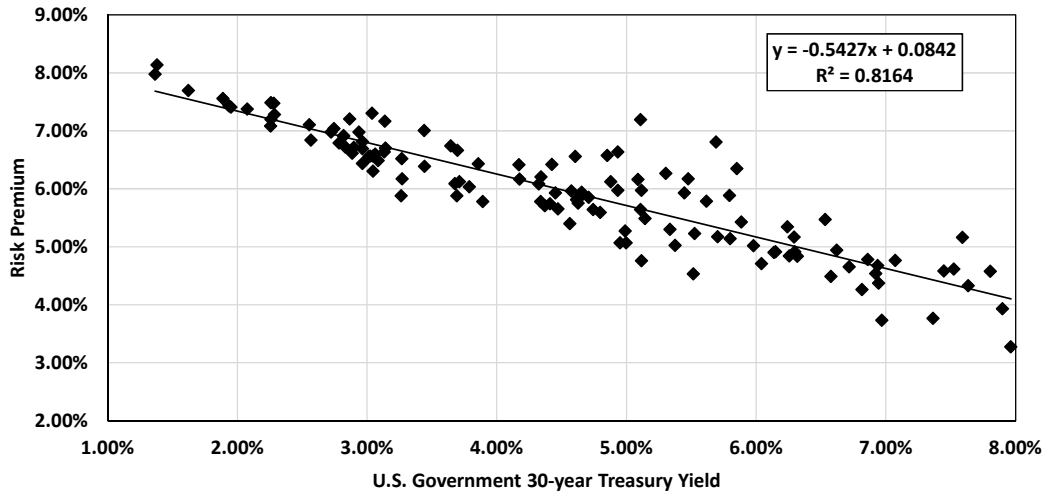
MARKET RISK PREMIUM DERIVED FROM S&P 500 INDEX

[1] Estimate of the S&P 500 Dividend Yield	1.75%
[2] Estimate of the S&P 500 Growth Rate	10.65%
[3] S&P 500 Estimated Required Market Return	12.50%

		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Name	Ticker	Shares Outst'g	Price	Market Capitalization	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Value Line Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
Pentair PLC	PNR	164.50	55.38	9,109.90	0.03%	1.59%	0.00%	12.00%	0.00%
GE HealthCare Technologies Inc	GEHC	453.93	69.52	31,556.94					
Vertex Pharmaceuticals Inc	VRTX	256.69	323.10	82,936.86	0.29%			12.50%	0.04%
Amcor PLC	AMCR	1,489.02	12.06	17,957.58	0.06%	4.06%	0.00%	14.50%	0.01%
Meta Platforms Inc	META	2,255.32	148.97	335,975.17	1.19%			11.00%	0.13%
T-Mobile US Inc	TMUS	1,244.15	149.31	185,764.63	0.66%			16.50%	0.11%
United Rentals Inc	URI	69.36	440.95	30,584.29	0.11%	1.34%	0.00%	18.00%	0.02%
Honeywell International Inc	HON	672.32	208.48	140,165.69	0.50%	1.98%	0.01%	12.00%	0.06%
Alexandria Real Estate Equities Inc	ARE	173.09	160.74	27,822.00	0.10%	3.01%	0.00%	10.00%	0.01%
Delta Air Lines Inc	DAL	641.19	39.10	25,070.45					
Seagate Technology Holdings PLC	STX	206.48	67.78	13,995.49	0.05%	4.13%	0.00%	11.50%	0.01%
United Airlines Holdings Inc	UAL	326.73	48.96	15,996.65					
News Corp	NWS	193.28	20.44	3,950.56		0.98%			
Centene Corp	CNC	566.26	76.24	43,171.66	0.15%			10.00%	0.02%
Martin Marietta Materials Inc	MLM	62.09	359.64	22,330.41	0.08%	0.73%	0.00%	4.50%	0.00%
Teradyne Inc	TER	155.76	101.70	15,840.39	0.06%	0.43%	0.00%	11.50%	0.01%
PayPal Holdings Inc	PYPL	1,140.03	81.49	92,900.88	0.33%			12.00%	0.04%
Tesla Inc	TSLA	3,164.10	173.22	548,085.92				51.50%	
Arch Capital Group Ltd	ACGL	369.87	64.35	23,801.33	0.08%			19.50%	0.02%
DISH Network Corp	DISH	292.27	14.39	4,205.78				-1.50%	
Dow Inc	DOW	703.76	59.35	41,768.10	0.15%	4.72%	0.01%	15.00%	0.02%
Everest Re Group Ltd	RE	39.17	349.69	13,695.61	0.05%	1.89%	0.00%	9.50%	0.00%
Teledyne Technologies Inc	TDY	46.87	424.26	19,885.49	0.07%			11.50%	0.01%
News Corp	NWSA	382.35	20.26	7,746.43		0.99%			
Exelon Corp	EXC	991.76	42.19	41,842.23		3.20%			
Global Payments Inc	GNP	270.40	112.72	30,479.60	0.11%	0.89%	0.00%	17.00%	0.02%
Crown Castle Inc	CCI	433.00	148.11	64,131.63	0.23%	4.23%	0.01%	12.00%	0.03%
Aptiv PLC	APTIV	270.95	113.09	30,641.74				26.00%	
Advance Auto Parts Inc	AAP	59.25	152.28	9,023.20	0.03%	3.94%	0.00%	12.00%	0.00%
Align Technology Inc	ALGN	78.11	269.73	21,069.15	0.07%			17.00%	0.01%
Illumina Inc	ILMN	157.30	214.20	33,693.66	0.12%			6.50%	0.01%
Targa Resources Corp	TRGP	226.38	75.02	16,982.65		1.87%			
LKQ Corp	LKQ	267.18	58.96	15,752.64	0.06%	1.87%	0.00%	13.00%	0.01%
Zoetis Inc	ZTS	466.07	165.49	77,130.26	0.27%	0.91%	0.00%	11.00%	0.03%
Equinix Inc	EQIX	92.54	738.13	68,305.07	0.24%	1.68%	0.00%	15.00%	0.04%
Digital Realty Trust Inc	DLR	287.52	114.62	32,955.77		4.26%		-3.50%	
Las Vegas Sands Corp	LVS	764.17	59.00	45,085.79					
Molina Healthcare Inc	MOH	58.40	311.83	18,210.87	0.06%			11.00%	0.01%

Notes:

- [1] Equals sum of Col. [9]
- [2] Equals sum of Col. [11]
- [3] Equals ((1) x (1 + (0.5 x [2]))) + [2]
- [4] Source: Bloomberg Professional as of January 31, 202:
- [5] Source: Bloomberg Professional as of January 31, 202:
- [6] Equals [4] x [5]
- [7] Equals weight in S&P 500 based on market capitalization [6] if Growth Rate >0% and <=20%
- [8] Source: Bloomberg Professional as of January 31, 202:
- [9] Equals [7] x [8]
- [10] Source: Value Line, as of January 31, 202:
- [11] Equals [7] x [10]



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.903448
R Square	0.816218
Adjusted R Square	0.814724
Standard Error	0.004275
Observations	125.000000

ANOVA

	df	SS	MS	F	Significance F
Regression	1.000000	0.009983	0.009983	546.270060	0.000000
Residual	123.000000	0.002248	0.000018		
Total	124.000000	0.012231			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0.0842	0.0011	75.0021	0.0000	0.0820	0.0865	0.0820	0.0865
U.S. Govt. 30-year Treasury	(0.5427)	0.0232	(23.3724)	0.0000	(0.5886)	(0.4967)	(0.5886)	(0.4967)

	[7] 30-Year Treasury Bond Yield	[8] Risk Premium	[9] ROE
Current 30-day average of 30-year U.S. Treasury bond yield [4]	3.71%	6.41%	10.12%
Blue Chip Near-Term Projected Forecast (Q2/2023 - Q2/2024) [5]	3.82%	6.35%	10.17%
Blue Chip Long-Term Projected Forecast (2024-2028) [6]	3.90%	6.31%	10.21%
AVERAGE			10.17%

Notes:

- [1] Regulatory Research Associates, rate cases through January 31, 2023
- [2] S&P Capital IQ Pro, quarterly bond yields are the average of each trading day in the quarter
- [3] Equals Column [1] – Column [2]
- [4] S&P Capital IQ Pro, 30-day average as of January 31, 2023
- [5] Blue Chip Financial Forecasts, Vol. 42, No. 2, February 1, 2023, at 2
- [6] Blue Chip Financial Forecasts, Vol. 41, No. 12, December 2, 2022, at 14
- [7] See notes [4], [5] and [6]
- [8] Equals $0.084312 + (-0.543602 \times \text{Column [7]})$
- [9] Equals Column [7] + Column [8]

BOND YIELD PLUS RISK PREMIUM

	[1]	[2]	[3]
	Average		
Quarter	Authorized Electric ROE	U.S. Govt. 30- year Treasury	Risk Premium
1992.1	12.38%	7.81%	4.58%
1992.2	11.83%	7.90%	3.93%
1992.3	12.03%	7.45%	4.59%
1992.4	12.14%	7.52%	4.62%
1993.1	11.84%	7.07%	4.76%
1993.2	11.64%	6.86%	4.78%
1993.3	11.15%	6.32%	4.84%
1993.4	11.04%	6.14%	4.91%
1994.1	11.07%	6.58%	4.49%
1994.2	11.13%	7.36%	3.77%
1994.3	12.75%	7.59%	5.16%
1994.4	11.24%	7.96%	3.28%
1995.1	11.96%	7.63%	4.33%
1995.2	11.32%	6.94%	4.37%
1995.3	11.37%	6.72%	4.65%
1995.4	11.58%	6.24%	5.35%
1996.1	11.46%	6.29%	5.17%
1996.2	11.46%	6.92%	4.54%
1996.3	10.70%	6.97%	3.73%
1996.4	11.56%	6.62%	4.94%
1997.1	11.08%	6.82%	4.26%
1997.2	11.62%	6.94%	4.68%
1997.3	12.00%	6.53%	5.47%
1997.4	11.06%	6.15%	4.91%
1998.1	11.31%	5.88%	5.43%
1998.2	12.20%	5.85%	6.35%
1998.3	11.65%	5.48%	6.17%
1998.4	12.30%	5.11%	7.19%
1999.1	10.40%	5.37%	5.03%
1999.2	10.94%	5.80%	5.14%
1999.3	10.75%	6.04%	4.71%
1999.4	11.10%	6.26%	4.84%
2000.1	11.21%	6.30%	4.92%
2000.2	11.00%	5.98%	5.02%
2000.3	11.68%	5.79%	5.89%
2000.4	12.50%	5.69%	6.81%
2001.1	11.38%	5.45%	5.93%
2001.2	10.88%	5.70%	5.17%
2001.3	10.76%	5.53%	5.23%
2001.4	11.57%	5.30%	6.27%
2002.1	10.05%	5.52%	4.53%
2002.2	11.41%	5.62%	5.79%
2002.3	11.25%	5.09%	6.16%
2002.4	11.57%	4.93%	6.63%
2003.1	11.43%	4.85%	6.57%
2003.2	11.16%	4.60%	6.56%
2003.3	9.88%	5.11%	4.76%
2003.4	11.09%	5.11%	5.98%
2004.1	11.00%	4.88%	6.12%
2004.2	10.64%	5.34%	5.30%
2004.3	10.75%	5.11%	5.64%
2004.4	10.91%	4.93%	5.98%
2005.1	10.56%	4.71%	5.85%
2005.2	10.13%	4.47%	5.65%
2005.3	10.85%	4.42%	6.42%
2005.4	10.59%	4.65%	5.94%
2006.1	10.38%	4.63%	5.75%

BOND YIELD PLUS RISK PREMIUM

	[1]	[2]	[3]
	Average		
Quarter	Authorized Electric ROE	U.S. Govt. 30- year Treasury	Risk Premium
2006.2	10.63%	5.14%	5.49%
2006.3	10.06%	5.00%	5.07%
2006.4	10.39%	4.74%	5.64%
2007.1	10.39%	4.80%	5.59%
2007.2	10.27%	4.99%	5.28%
2007.3	10.02%	4.95%	5.07%
2007.4	10.43%	4.61%	5.81%
2008.1	10.15%	4.41%	5.74%
2008.2	10.54%	4.57%	5.96%
2008.3	10.38%	4.45%	5.93%
2008.4	10.39%	3.64%	6.74%
2009.1	10.45%	3.44%	7.01%
2009.2	10.58%	4.17%	6.41%
2009.3	10.41%	4.32%	6.09%
2009.4	10.54%	4.34%	6.20%
2010.1	10.45%	4.62%	5.82%
2010.2	10.08%	4.37%	5.71%
2010.3	10.29%	3.86%	6.43%
2010.4	10.34%	4.17%	6.17%
2011.1	9.96%	4.56%	5.40%
2011.2	10.12%	4.34%	5.78%
2011.3	10.36%	3.70%	6.66%
2011.4	10.34%	3.04%	7.31%
2012.1	10.30%	3.14%	7.17%
2012.2	9.92%	2.94%	6.98%
2012.3	9.78%	2.74%	7.04%
2012.4	10.07%	2.86%	7.21%
2013.1	9.77%	3.13%	6.64%
2013.2	9.84%	3.14%	6.70%
2013.3	9.83%	3.71%	6.12%
2013.4	9.82%	3.79%	6.04%
2014.1	9.57%	3.69%	5.88%
2014.2	9.83%	3.44%	6.39%
2014.3	9.79%	3.27%	6.52%
2014.4	9.78%	2.96%	6.81%
2015.1	9.66%	2.55%	7.11%
2015.2	9.50%	2.88%	6.61%
2015.3	9.40%	2.96%	6.44%
2015.4	9.65%	2.96%	6.69%
2016.1	9.70%	2.72%	6.98%
2016.2	9.41%	2.57%	6.84%
2016.3	9.76%	2.28%	7.48%
2016.4	9.55%	2.83%	6.72%
2017.1	9.61%	3.05%	6.57%
2017.2	9.61%	2.90%	6.71%
2017.3	9.73%	2.82%	6.91%
2017.4	9.74%	2.82%	6.92%
2018.1	9.59%	3.02%	6.57%
2018.2	9.57%	3.09%	6.49%
2018.3	9.66%	3.06%	6.60%
2018.4	9.44%	3.27%	6.17%
2019.1	9.57%	3.01%	6.55%
2019.2	9.58%	2.78%	6.79%
2019.3	9.57%	2.29%	7.28%
2019.4	9.74%	2.26%	7.49%
2020.1	9.45%	1.89%	7.56%
2020.2	9.52%	1.38%	8.14%

BOND YIELD PLUS RISK PREMIUM

	[1]	[2]	[3]
	Average		
Quarter	Authorized Electric ROE	U.S. Govt. 30- year Treasury	Risk Premium
2020.3	9.34%	1.37%	7.98%
2020.4	9.32%	1.62%	7.69%
2021.1	9.45%	2.07%	7.38%
2021.2	9.46%	2.26%	7.20%
2021.3	9.37%	1.93%	7.43%
2021.4	9.36%	1.95%	7.41%
2022.1	9.34%	2.25%	7.08%
2022.2	9.35%	3.05%	6.30%
2022.3	9.14%	3.26%	5.88%
2022.4	9.67%	3.89%	5.78%
2023.1	9.77%	3.68%	6.09%
AVERAGE	10.51%	4.56%	5.95%
MEDIAN	10.39%	4.61%	5.98%

2023-2027 CAPITAL EXPENDITURES AS A PERCENTAGE OF 2022 NET PLANT
(\$ Millions)

		[1]	[2]	[3]	[4]	[5]	[6]	[7]
		2022	2023	2024	2025	2026	2027	2023-2027 Cap. Ex. / 2021 Net Plant
ALLETE, Inc.	ALE							
	Capital Spending per Share		\$ 5.95	\$ 6.60	\$ 7.25	\$ 7.25	\$ 7.25	
	Common Shares Outstanding		58	60	61	61	61	
	Capital Expenditures	\$ 345.10	\$ 392.70	\$ 442.25	\$ 442.25	\$ 442.25	\$ 442.25	39.59%
	Net Plant	\$ 5,215						
Alliant Energy Corporation	LNT							
	Capital Spending per Share		\$ 5.90	\$ 6.08	\$ 6.25	\$ 6.25	\$ 6.25	
	Common Shares Outstanding		252	252	253	253	253	
	Capital Expenditures	\$ 1,483.85	\$ 1,532.42	\$ 1,581.25	\$ 1,581.25	\$ 1,581.25	\$ 1,581.25	48.42%
	Net Plant	\$ 16,025						
Ameren Corporation	AEE							
	Capital Spending per Share		\$ 12.55	\$ 12.78	\$ 13.00	\$ 13.00	\$ 13.00	
	Common Shares Outstanding		267	274	280	280	280	
	Capital Expenditures	\$ 3,350.85	\$ 3,493.96	\$ 3,640.00	\$ 3,640.00	\$ 3,640.00	\$ 3,640.00	56.89%
	Net Plant	\$ 31,225						
American Electric Power Company, Inc.	AEP							
	Capital Spending per Share		\$ 14.15	\$ 14.08	\$ 14.00	\$ 14.00	\$ 14.00	
	Common Shares Outstanding		523	534	545	545	545	
	Capital Expenditures	\$ 7,400.45	\$ 7,516.05	\$ 7,630.00	\$ 7,630.00	\$ 7,630.00	\$ 7,630.00	53.51%
	Net Plant	\$ 70,650						
Avista Corporation	AVA							
	Capital Spending per Share		\$ 6.40	\$ 6.20	\$ 6.00	\$ 6.00	\$ 6.00	
	Common Shares Outstanding		77	80	83	83	83	
	Capital Expenditures	\$ 492.80	\$ 496.00	\$ 498.00	\$ 498.00	\$ 498.00	\$ 498.00	45.56%
	Net Plant	\$ 5,450						
Duke Energy Corporation	DUK							
	Capital Spending per Share		\$ 16.75	\$ 16.75	\$ 16.75	\$ 16.75	\$ 16.75	
	Common Shares Outstanding		770	770	770	770	770	
	Capital Expenditures	\$ 12,897.50	\$ 12,897.50	\$ 12,897.50	\$ 12,897.50	\$ 12,897.50	\$ 12,897.50	54.78%
	Net Plant	\$ 117,725						
Edison International	EIX							
	Capital Spending per Share		\$ 15.10	\$ 15.80	\$ 16.50	\$ 16.50	\$ 16.50	
	Common Shares Outstanding		382	386	390	390	390	
	Capital Expenditures	\$ 5,768.20	\$ 6,098.80	\$ 6,435.00	\$ 6,435.00	\$ 6,435.00	\$ 6,435.00	58.05%
	Net Plant	\$ 53,700						
Entergy Corporation	ETR							
	Capital Spending per Share		\$ 19.00	\$ 19.38	\$ 19.75	\$ 19.75	\$ 19.75	
	Common Shares Outstanding		209	212	214	214	214	
	Capital Expenditures	\$ 3,971.00	\$ 4,097.81	\$ 4,226.50	\$ 4,226.50	\$ 4,226.50	\$ 4,226.50	47.42%
	Net Plant	\$ 43,750						
Eversource Energy	ES							
	Capital Spending per Share		10.5	\$ 10.00	9.5	9.5	9.5	
	Common Shares Outstanding		351	358	365	365	365	
	Capital Expenditures	\$ 3,685.50	\$ 3,580.00	\$ 3,467.50	\$ 3,467.50	\$ 3,467.50	\$ 3,467.50	49.04%
	Net Plant	\$ 36,025						
Evergy, Inc.	EVRG							
	Capital Spending per Share		\$ 9.20	\$ 9.35	\$ 9.50	\$ 9.50	\$ 9.50	
	Common Shares Outstanding		230	230	230	230	230	
	Capital Expenditures	\$ 2,116.00	\$ 2,150.50	\$ 2,185.00	\$ 2,185.00	\$ 2,185.00	\$ 2,185.00	48.97%
	Net Plant	\$ 22,100						
IDACORP, Inc.	IDA							
	Capital Spending per Share		\$ 14.20	\$ 12.15	\$ 10.10	\$ 10.10	\$ 10.10	
	Common Shares Outstanding		51	52	52	52	52	
	Capital Expenditures	\$ 724.20	\$ 625.73	\$ 525.20	\$ 525.20	\$ 525.20	\$ 525.20	55.72%

2023-2027 CAPITAL EXPENDITURES AS A PERCENTAGE OF 2022 NET PLANT
(\$ Millions)

		[1]	[2]	[3]	[4]	[5]	[6]	[7]
		2022	2023	2024	2025	2026	2027	2023-2027 Cap. Ex. / 2021 Net Plant
NextEra Energy, Inc.	NEE	\$ 5,250						
	Capital Spending per Share		\$ 8.40	\$ 9.20	\$ 10.00	\$ 10.00	\$ 10.00	
	Common Shares Outstanding		2025	2025	2025	2025	2025	
	Capital Expenditures		\$17,010.00	\$18,630.00	\$20,250.00	\$20,250.00	\$20,250.00	86.90%
	Net Plant	\$110,925						
NorthWestern Corporation	NWE							
	Capital Spending per Share		\$ 9.10	\$ 7.80	\$ 6.50	\$ 6.50	\$ 6.50	
	Common Shares Outstanding		62	62	62	62	62	
	Capital Expenditures		\$ 564.20	\$ 483.60	\$ 403.00	\$ 403.00	\$ 403.00	40.09%
	Net Plant	\$ 5,630						
OGE Energy Corporation	OGE							
	Capital Spending per Share		\$ 4.75	\$ 4.75	\$ 4.75	\$ 4.75	\$ 4.75	
	Common Shares Outstanding		200	200	200	200	200	
	Capital Expenditures		\$ 950.95	\$ 950.95	\$ 950.95	\$ 950.95	\$ 950.95	45.96%
	Net Plant	\$ 10,345						
Otter Tail Corporation	OTTR							
	Capital Spending per Share		\$ 5.90	\$ 6.08	\$ 6.25	\$ 6.25	\$ 6.25	
	Common Shares Outstanding		42	42	43	43	43	
	Capital Expenditures		\$ 247.21	\$ 256.37	\$ 265.63	\$ 265.63	\$ 265.63	58.84%
	Net Plant	\$ 2,210						
Portland General Electric Company	POR							
	Capital Spending per Share		\$ 8.25	\$ 8.38	\$ 8.50	\$ 8.50	\$ 8.50	
	Common Shares Outstanding		94.5	97	100.0	100.0	100.0	
	Capital Expenditures		\$ 779.63	\$ 814.47	\$ 850.00	\$ 850.00	\$ 850.00	49.78%
	Net Plant	\$ 8,325						
Xcel Energy Inc.	XEL							
	Capital Spending per Share		\$ 9.00	\$ 9.00	\$ 9.00	\$ 9.00	\$ 9.00	
	Common Shares Outstanding		550	556	561	561	561	
	Capital Expenditures		\$ 4,950.00	\$ 4,999.50	\$ 5,049.00	\$ 5,049.00	\$ 5,049.00	52.04%
	Net Plant	\$ 48,225						
Liberty Utilities (Granite State Electric) Corp.	LUGSE							
	Capital Expenditures [8]		\$ 18.42	\$ 29.71	\$ 21.30	\$ 42.69	\$ 17.46	53.50%
	Net Plant [9]	\$ 242.21						

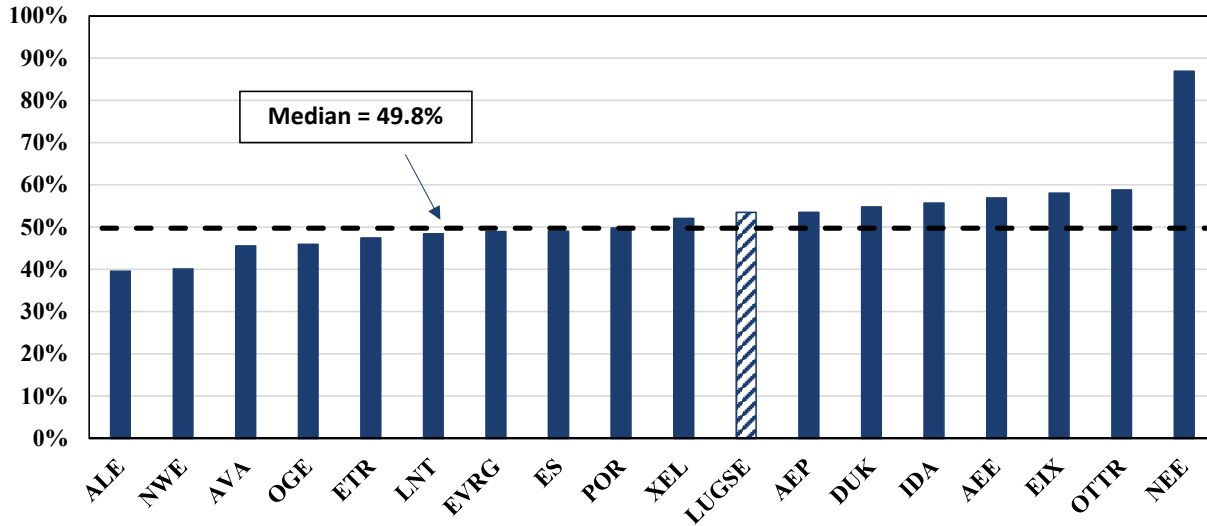
Notes:

[1] - [6] Value Line, dated January 20, 2023, December 9, 2022, and November 11, 2022

[7] Equals (Column [2] + [3] + [4] + [5] + [6]) / Column [1]

[8] Provided by the Company

[9] Provided by the Company



Projected CAPEX/2022 Net Plant

Company	Ticker	Projected CAPEX / 2022 Net Plant
1 ALLETE, Inc.	ALE	40%
2 NorthWestern Corporation	NWE	40%
3 Avista Corporation	AVA	46%
4 OGE Energy Corporation	OGE	46%
5 Entergy Corporation	ETR	47%
6 Alliant Energy Corporation	LNT	48%
7 Evergy, Inc.	EVRG	49%
8 Eversource Energy	ES	49%
9 Portland General Electric Company	POR	50%
10 Xcel Energy Inc.	XEL	52%
11 Liberty Utilities (Granite State Electric) Corp.	LUGSE	53%
12 American Electric Power Company, Inc.	AEP	54%
13 Duke Energy Corporation	DUK	55%
14 IDACORP, Inc.	IDA	56%
15 Ameren Corporation	AEE	57%
16 Edison International	EIX	58%
17 Otter Tail Corporation	OTTR	59%
18 NextEra Energy, Inc.	NEE	87%
Proxy Group Median		49.8%
Liberty Utilities (Granite State Electric) Corp. as % of Median		1.07

Notes:

Attachment AEB/CMW-11, p. 1 col. [7]

**COMPARISON OF LIBERTY GRANITE STATE AND PROXY GROUP COMPANIES
RRA JURISDICTIONAL RANKINGS**

	Operation State	[1]	[2]
		RRA	
		Rank	Numeric Rank
ALLETE, Inc.	Minnesota	Average / 2	5
Alliant Energy Corporation	Iowa	Above Average / 3	3
	Wisconsin	Above Average / 3	3
Ameren Corporation	Illinois	Average / 2	5
	Missouri	Average / 3	6
American Electric Power Company, Inc.	Arkansas	Average / 1	4
	Indiana	Average / 1	4
	Kentucky	Average / 2	5
	Louisiana (PSC)	Average / 2	5
	Michigan	Above Average / 3	3
	Ohio	Average / 3	6
	Oklahoma	Average / 2	5
	Tennessee	Above Average / 3	3
	Texas (PUC)	Average / 3	6
	Virginia	Average / 1	4
	West Virginia	Below Average / 2	8
Avista Corporation	Alaska	Below Average / 1	7
	Idaho	Average / 2	5
	Oregon	Average / 2	5
	Washington	Average / 3	6
Duke Energy	Florida	Above Average / 2	2
	Indiana	Average / 1	4
	Kentucky	Average / 2	5
	North Carolina	Above Average / 3	3
	Ohio	Average / 3	6
	South Carolina	Average / 3	6
	Tennessee	Above Average / 3	3
Edison International	California	Average / 1	4
Entergy	Arkansas	Average / 1	4
	Louisiana (NOCC)	Average / 3	6
	Louisiana (PSC)	Average / 2	5
	Mississippi	Above Average / 3	3
	Texas (PUC)	Average / 3	6
Eversource Energy	Connecticut	Below Average / 1	7
	Massachusetts	Average / 2	5
	New Hampshire	Average / 2	5
Evergy, Inc.	Kansas	Below Average / 1	7
	Missouri	Average / 3	6
IDACORP, Inc.	Idaho	Average / 2	5
	Oregon	Average / 2	5
NextEra Energy, Inc.	Florida	Above Average / 2	2
	Texas (PUC)	Average / 3	6
NorthWestern Corporation	Montana	Below Average / 1	7
	Nebraska	Average / 1	4
	South Dakota	Average / 2	5
OGE Energy Corporation	Arkansas	Average / 1	4
	Oklahoma	Average / 2	5
Otter Tail Corporation	Minnesota	Average / 2	5
	North Dakota	Average / 1	4
	South Dakota	Average / 2	5
Portland General Electric Company	Oregon	Average / 2	5
Xcel Energy Inc.	Colorado	Average / 1	4
	Minnesota	Average / 2	5
	North Dakota	Average / 1	4
	New Mexico	Below Average / 2	8
	South Dakota	Average / 2	5
	Texas (PUC)	Average / 3	6
	Wisconsin	Above Average / 3	3
Proxy Group Average		Average / 2	4.86
Liberty Utilities (Granite State Electric) Corp.	New Hampshire	Average / 2	5

Notes

[1] State Regulatory Evaluations, Regulatory Research Associates, December 28 2022.

[2] AA/1= 1, AA/2= 2, AA/3= 3, A/1= 4, A/2= 5, A/3=6, BA/1= 7, BA/2= 8, BA/3= 9

SIZE PREMIUM CALCULATION

Proxy Group Market Capitalization and Market-to-Book Ratio

Company	Ticker	[1]	[2]
		Market Capitalization (\$ billions)	Market-to-Book Ratio
ALLETE, Inc.	ALE	\$ 3.66	1.37
Alliant Energy Corporation	LNT	\$ 13.76	2.20
Ameren Corporation	AEE	\$ 22.79	2.23
American Electric Power Company, Inc.	AEP	\$ 48.59	2.00
Avista Corporation	AVA	\$ 3.14	1.40
Duke Energy Corporation	DUK	\$ 79.20	1.64
Edison International	EIX	\$ 25.43	1.90
Entergy Corporation	ETR	\$ 22.29	1.84
Eversource Energy	ES	\$ 28.95	1.89
Evergy, Inc.	EVRG	\$ 14.35	1.49
IDACORP, Inc.	IDA	\$ 5.39	1.94
NextEra Energy, Inc.	NEE	\$ 163.94	4.24
NorthWestern Corporation	NWE	\$ 3.34	1.31
OGE Energy Corporation	OGE	\$ 7.89	1.78
Otter Tail Corporation	OTTR	\$ 2.52	2.13
Portland General Electric Company	POR	\$ 4.31	1.56
Xcel Energy Inc.	XEL	\$ 38.31	2.34
Median		\$ 14.35	1.89

Liberty Granite State

Rate Year 1 Rate Base (2023/2024) (\$millions)	[3]	\$ 195.93
Company-Projected Common Equity Ratio	[4]	55.00%
Implied Common Equity (\$millions)	[5]	\$ 107.76
Implied Market Capitalization (\$millions)	[6]	\$ 203.54
Market Capitalization of Proxy Group (median) (\$millions)	[7]	\$ 14,345.18
In % of Proxy Group Market Capitalization (median)	[8]	1.42%

Kroll Cost of Capital Navigator -- Size Premium

		[9]	[10]
		Market Capitalization of Largest Company (\$ millions)	Size Premium
Breakdown of Deciles 1-10			
1-Largest		\$ 2,203,381.29	-0.26%
2		\$ 31,316.51	0.45%
3		\$ 12,323.85	0.57%
4		\$ 5,916.02	0.58%
5		\$ 3,769.88	0.93%
6		\$ 2,365.08	1.16%
7		\$ 1,389.12	1.37%
8		\$ 782.38	1.18%
9		\$ 373.88	2.15%
10-Smallest		\$ 218.23	4.83%
Liberty Implied Market Capitalization	[6]	\$ 203.54	4.83%
Proxy Group Market Capitalization (median)	[7]	\$ 14,345.18	0.45%
Size Premium	[11]		4.38%

Notes:

[1]-[2] S&P Capital IQ Pro, equals 30-day average as of January 31, 2023

[3] Data provided by the Company

[4] Data provided by the Company

[5] Equals [3] x [4]

[6] Equals [5] x median market-to-book ratio of proxy group

[7] Equals median market capitalization of proxy group x 1000

[8] Equals [6] / [7]

[9]-[10] Kroll Cost of Capital Navigator - Size Premium: Annual Data as of 12/31/2022

[11] Size Premium of Liberty less Size Premium of Proxy Group

FLOTATION COST ADJUSTMENT

Company	Date [i]	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
		Shares Issued (000)	Offering Price	Under-writing Discount [ii]	Offering Expense (\$000)	Net Proceeds Per Share	Total Flotation Costs (\$000)	Gross Equity Issue Before Costs (\$000)	Net Proceeds (\$000) [iii]	Flotation Cost Percentage
Algonquin Power & Utilities Corporation	11/8/2021	44,080	\$ 18.15	\$ 0.73	\$ 1,400	\$ 17.39	\$ 33,402	\$ 800,052	\$ 766,650	4.17%
Algonquin Power & Utilities Corporation	10/10/2019	23,000	\$ 13.50	\$ 0.53	\$ 400	\$ 12.96	\$ 12,510	\$ 310,500	\$ 297,991	4.03%
							\$ 45,912	\$ 1,110,552	\$ 1,064,640	4.13%

[i] Offering Completion Date

[ii] Underwriting discount is calculated as the market price minus the offering price when not explicitly given in the prospectus.

[iii] Algonquin Power & Utilities Corporation 2021 and 2019 SEC Form 10-K.

The flotation cost adjustment is derived by dividing the dividend yield by 1 - F (where F = flotation costs expressed in percentage terms), or by 0.9587, and adding that result to the constant growth rate to determine the cost of equity. Using the formulas shown previously in my testimony, the Constant Growth DCF calculation is modified as follows to accommodate an adjustment for flotation costs:

$$k = \frac{D \times (1 + 0.5g)}{P \times (1 - F)} + g$$

Company	Ticker	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	
		Annualized Dividend	Stock Price	Dividend Yield	Expected Dividend Yield	Expected Dividend Yield Adjusted for Flotation Costs	Value Line Earnings Growth	Yahoo! Finance Earnings Growth	Zacks Earnings Growth	Average Earnings Growth	Cost of Equity: Mean Growth Rate	Equity Adjusted for Flotation Costs	
ALLETE, Inc.	ALE	\$2.60	\$64.09	4.06%	4.22%	4.40%	6.00%	8.70%	9.60%	8.10%	12.32%	12.50%	
Alliant Energy Corporation	LNT	\$1.81	\$54.38	3.33%	3.42%	3.57%	6.00%	5.55%	5.80%	5.78%	9.21%	9.36%	
Ameren Corporation	AEE	\$2.36	\$88.15	2.68%	2.77%	2.89%	6.50%	6.64%	6.90%	6.68%	9.45%	9.57%	
American Electric Power Company, Inc.	AEP	\$3.32	\$94.56	3.51%	3.62%	3.78%	6.50%	6.15%	6.10%	6.25%	9.87%	10.03%	
Avista Corporation	AVA	\$1.76	\$42.48	4.14%	4.24%	4.42%	3.50%	5.20%	5.20%	4.63%	8.87%	9.06%	
Duke Energy Corporation	DUK	\$4.02	\$102.85	3.91%	4.01%	4.19%	5.00%	5.65%	5.50%	5.38%	9.40%	9.57%	
Edison International	EIX	\$2.95	\$66.39	4.44%	4.55%	4.74%	6.49%	4.40%	3.00%	4.63%	9.18%	9.37%	
Energy Corporation	ETR	\$4.28	\$109.55	3.91%	4.01%	4.19%	4.00%	6.19%	6.00%	5.40%	9.41%	9.58%	
Eversource Energy	ES	\$2.55	\$83.08	3.07%	3.17%	3.31%	6.50%	6.42%	6.50%	6.47%	9.64%	9.78%	
Evergy, Inc.	EVRG	\$2.45	\$62.50	3.92%	4.02%	4.19%	7.50%	2.43%	5.30%	5.08%	9.10%	9.27%	
IDACORP, Inc.	IDA	\$3.16	\$106.55	2.97%	3.02%	3.15%	4.50%	3.40%	3.40%	3.77%	6.79%	6.92%	
NextEra Energy, Inc.	NEE	\$1.70	\$82.50	2.06%	2.16%	2.26%	10.50%	10.21%	9.00%	9.90%	12.07%	12.16%	
NorthWestern Corporation	NWE	\$2.52	\$57.74	4.36%	4.43%	4.63%	3.50%	4.50%	1.70%	3.23%	7.67%	7.86%	
OGE Energy Corporation	OGE	\$1.66	\$39.21	4.22%	4.32%	4.51%	6.50%	1.90%	5.00%	4.47%	8.79%	8.97%	
Otter Tail Corporation	OTTR	\$1.65	\$60.44	2.73%	2.82%	2.94%	4.50%	9.00%	n/a	6.75%	9.57%	9.69%	
Portland General Electric Company	POR	\$1.81	\$48.17	3.76%	3.83%	4.00%	5.00%	1.39%	5.30%	3.90%	7.73%	7.89%	
Xcel Energy Inc.	XEL	\$1.95	\$69.89	2.79%	2.88%	3.00%	6.00%	7.01%	6.50%	6.50%	9.38%	9.51%	
Mean											9.32%	9.48%	
Median											9.38%	9.51%	
Flotation Cost Adjustment (Mean)												0.16%	[21]
Flotation Cost Adjustment (Median)												0.12%	[22]

Notes:

[1]-[4] Algonquin Power & Utilities Corp. 2021 SEC Form 10-K, at 11; Algonquin Power & Utilities Corp. 2019 SEC Form 10-K, at 7.

[5] Equals [8]/[1]

[6] Equals [4] + ([1] x [3])

[7] Equals [1] x [2]

[8] Equals [7] - [6]

[9] Equals [6] / [7]

[10] Bloomberg Professional

[11] Bloomberg Professional, equals 30-day average as of January 31, 2023

[12] Equals [10] / [11]

[13] Equals [12] x (1 + 0.5 x [18])

[14] Equals [13] / (1 - Flotation Cost)

[15] Value Line

[16] Yahoo! Finance

[17] Zacks Investment Research

[18] Equals Average of [15], [16], [17]

[19] Equals [13] + [18]

[20] Equals [14] + [18]

[21] Equals [20] (Mean) - [19] (Mean)

[22] Equals [20] (Median) - [19] (Median)

CAPITAL STRUCTURE ANALYSIS

Proxy Group Company	Ticker	Most Recent 8 Quarters (Q4/2020 - Q3/2022)				Total Capitalization
		Common Equity Ratio	Long-Term Debt Ratio	Preferred Equity Ratio	Short-term Debt Ratio	
ALLETE, Inc.	ALE	57.22%	42.69%	0.00%	0.10%	100.00%
Alliant Energy Corporation	LNT	51.34%	46.60%	0.79%	1.26%	100.00%
Ameren Corporation	AEE	52.39%	45.62%	0.62%	1.37%	100.00%
American Electric Power Company,	AEP	47.40%	51.00%	0.00%	1.60%	100.00%
Avista Corporation	AVA	48.10%	47.51%	0.00%	4.39%	100.00%
Duke Energy Corporation	DUK	52.33%	46.07%	0.00%	1.59%	100.00%
Edison International	EIX	41.38%	48.41%	4.55%	5.65%	100.00%
Entergy Corporation	ETR	46.19%	53.71%	0.10%	0.00%	100.00%
Evergy, Inc.	EVRG	57.96%	37.67%	0.00%	4.37%	100.00%
Eversource Energy	ES	53.09%	44.56%	0.72%	1.63%	100.00%
IDACORP, Inc.	IDA	54.07%	45.65%	0.28%	0.00%	100.00%
NextEra Energy, Inc.	NEE	60.17%	38.36%	0.00%	1.48%	100.00%
NorthWestern Corporation	NWE	47.68%	52.04%	0.00%	0.28%	100.00%
OGE Energy Corporation	OGE	53.03%	45.19%	0.00%	1.78%	100.00%
Otter Tail Corporation	OTTR	52.85%	44.56%	0.00%	2.59%	100.00%
Portland General Electric Company	POR	45.35%	53.38%	0.00%	1.27%	100.00%
Xcel Energy Inc.	XEL	53.84%	45.48%	0.00%	0.68%	100.00%
	Average	51.43%	46.38%	0.42%	1.77%	
	Median	52.39%	45.65%	0.00%	1.48%	
	Maximum	60.17%	53.71%	4.55%	5.65%	
	Minimum	41.38%	37.67%	0.00%	0.00%	

Notes:

[1] Ratios are weighted by actual common capital, preferred capital, long-term debt and short-term debt of the operating subsidiary.

[2] Electric and Natural Gas operating subsidiaries with data listed as N/A from S&P Capital IQ have been excluded from the analysis.