

**STATE OF ILLINOIS
ILLINOIS COMMERCE COMMISSION**

Illinois Commerce Commission)	
On Its Own Motion)	
)	
vs.)	
)	
Commonwealth Edison Company)	
)	
Order Requiring Commonwealth Edison)	ICC Docket No. 22-0486
Company to File an Initial Multi-Year)	ICC Docket No. 23-0055 (cons.)
Integrated Grid Plan and Initiating Proceeding)	
to Determine Whether the Plan is Reasonable)	
and Complies with the Public Utilities Act)	
)	
Commonwealth Edison Company)	
)	
Verified Petition for Approval of a Multi-)	
Year Rate Plan under Section 16-108.18 of)	
the Public Utilities Act)	

DIRECT TESTIMONY OF

EDWARD C. BODMER

I. QUALIFICATIONS AND SUMMARY OF TESTIMONY

Q. What is your name and on whose behalf are you testifying?

A. My name is Edward C. Bodmer. I am testifying on behalf of the Illinois Public Interest Research Group (“PIRG” or “Illinois PIRG”).

Q. Who is your employer?

A. I am self-employed.

Q. What is the purpose of your testimony?

A. My purpose is to provide factual evidence regarding the measurement of Commonwealth Edison Company’s (“ComEd” or the “Company”) cost of equity capital. I also present information related to the Company’s proposed capital structure.

Q. Summarize some of your professional experiences that qualify you to provide factual information to the Illinois Commerce Commission (“ICC” or “Commission”) regarding ComEd’s cost of equity capital and ComEd’s capital structure.

A. I have provided testimony on financial issues before the ICC and other commissions since the early 1980’s when I testified about ComEd’s request for an interim rate increase as an ICC staff member. Since then, I have testified regarding cost of capital on many occasions. In the 1980’s, I was a vice president at First National Bank of Chicago (now part of Chase) and since 1989 I have done a whole lot of independent consulting and teaching. I have taught professional development classes around the world since the mid 1990’s on finance and energy subjects that include the cost of capital. I recently completed an assignment for the National Electric Power Regulatory Authority (“NEPRA”) for the country of Pakistan. I received a bachelor’s degree from the University of Illinois (highest honors, bronze tablet) and an MBA degree with a specialization in Econometrics from the University of Chicago (high honors). I have attached a CV as an exhibit (PIRG Exhibit 1.1).

30

31 **Q. Given your experience outside of the insulated world of utility regulation, what is**
32 **your reaction to ComEd's rate of return proposal?**

33 A. In this testimony I sharply criticize ComEd's cost of capital report and prove that the
34 company's cost of capital is far below the 10.5% plus recommendation (the plus is for the increase
35 in the return for subsequent years). I also explain that ComEd's capital structure should have
36 higher leverage than the recommendation made by the Company. To some in the highly insulated
37 world of regulation with handsomely paid consultants working for utility companies and threats of
38 reprisals from financial institutions who have vested interests, my ultimate cost of equity ideas
39 may seem extreme. Perhaps by discussing how cost of capital can be measured, the Commission
40 and the hearing examiners could think I am out to harm investors. To the contrary, if I suggested
41 to people I work with that an extremely safe distribution utility company should have a capital
42 structure of 50% debt (as ComEd does); if I asserted that cost of equity capital for a regulated
43 utility in the U.S. is above 10% (as ComEd does); if I suggested that the long-term dividend
44 growth of a very mature industry will be 5.8% forever (as ComEd does); if I asserted that the
45 equity market risk premium is anywhere near 9% (as ComEd does); or if I prepared a cost of
46 capital analysis where every company in the sample has a market to book ratio of above 1.0 and
47 claimed that their returns approximated the cost of capital (as ComEd implicitly does), I would and
48 should be laughed at as being in some kind of parallel universe.

49

50 **Q. Provide an overview of your testimony.**

51 A. I have structured the testimony in a similar manner to ComEd's witnesses by first
52 providing an overview. In evaluating ComEd's cost of equity, my main objective is to present
53 facts and concepts underneath cost of capital measurement so that decision makers (the
54 Commission) can form principled and logical opinions. As s the custom for expert witnesses to
55 write a final recommendation at the outset of testimony, I suggest a return on equity of 6.5%.
56 Before you gasp and think this is crazy, you should understand that if you use the cost of equity
57 numbers that ComEd applied in its asset impairment valuation studies and adjust for current
58 interest rates, the cost of equity capital has an average value of 7.19%. If you focus on the factual
59 information in my testimony, you will see that the number is very reasonable and can be supported
60 by all sorts of analysis.

61 In **Section II**, I begin by proving the basic and key notion that when the market to book
62 ratio is 1.0 and the earnings growth rate as well as the return is constant, the earned return on

63 equity is equal to the cost of equity. I emphasize that I am not using the market to book ratio to
64 directly estimate the cost of capital (I have done this in the past and I recognize that it has not been
65 accepted by the Commission). I instead present data for earned returns and market to book ratios
66 for companies in ComEd's sample. Some of the companies are earning returns on equity of around
67 ComEd's 10.5% recommendation. These companies typically have market to book ratios above
68 2.0. All of the companies in ComEd's sample, even those earning a lot less than 10.5%, have
69 market to book ratios above 1.0.

70 **In Section III**, I move to information related to measurement of the cost of equity capital
71 by working through the three inputs that must be applied in the well-known capital asset pricing
72 model ("CAPM"). I show that the three CAPM inputs – the risk-free rate, the beta, and the equity
73 market risk premium used by Mr. Graves -- ComEd's consultant – are not logical. The first of the
74 three inputs I work through is the equity market risk premium ("EMRP"). I explain why ComEd's
75 assumption about this important but unobservable statistic is implausible as it creates an untenable
76 relationship between investors and non-investors in the economy. I also show that the EMRP that
77 ComEd assumes of 8.7% is not consistent with what other people use in applying the CAPM. The
78 second of the three inputs I address is the beta statistic that measures the risk of a particular
79 company. I discuss issues with ComEd's comparative sample, and most importantly the
80 adjustment that makes low risk companies seem to have a higher cost of capital. The CAPM
81 information demonstrates it is unreasonable to conclude that very safe utility companies are just
82 about as risky as average stocks. The final of the three CAPM inputs is the risk-free rate. In
83 Section III, I explain how use of a 30-year treasury bond to represent the risk-free rate is not
84 correct because the true amount investors earn is subject to a lot of inflation risk (risks that utility
85 company investors do not incur because they can come to the Commission and beg for rate
86 increases when inflation comes around).

87 **Section IV** presents my information related to estimation of the cost of capital through
88 application of the discounted cash flow ("DCF"). As with the CAPM, by critiquing the DCF model
89 inputs I am not implying that the basic DCF idea of deriving the cost of capital from assumptions
90 about how valuation analysts assess prospective cash flow is wrong. I explain that the DCF model
91 depends on three things. These include the short-term growth rate, the long-term growth rate and
92 the assumed valuation model. Mr. Graves' approach is founded on the presumption that utility
93 company earnings growth (adjusted for inflation) can be much higher than population growth for
94 an indefinite period. I show that ComEd's own impairment studies, which ComEd prepares each

95 year, establish the value ComEd's assets use a lower long-term growth assumption. I demonstrate
96 that an alternative model to pure dividend growth can provide a better simulation of how investors
97 make valuations.

98 **Section V** addresses capital structure issues and demonstrates that the debt to capital ratio
99 of many other utility companies is 60% or more. I also work through some credit ratios for
100 ComEd compared to other utility companies.

101
102 **COST OF CAPITAL DEFINITION AND HOPE AND BLUEFIELD**
103 **STANDARDS**

104
105 **Q. What is the general idea of this initial section of your testimony?**

106 A. In this section I do not make an estimate of the cost of equity capital but instead I use an
107 approach to demonstrate what the cost of capital is not, and I also present a lot of background
108 financial data for the comparable sample used by Mr. Graves and companies that ComEd used in
109 its impairment study. I try to focus on a few simple and clear concepts which demonstrate that
110 ComEd's recommendation is too high.

111
112 **Q. Can you list some ideas that are relatively simple and should be understood by**
113 **everybody who will have something to do with rate of return analysis and decision making?**

114 A. There are five fundamental facts that are not very complex and should be the centerpiece of
115 cost of capital analysis. To understand these ideas, you do not need an MBA degree or
116 background in economics or statistics. They are derived from simple logic mixed with a bit of
117 philosophy.

118
119 1. When the ratio of the value of shares from the current stock price relative to the
120 amount of money that has been invested by investors in aggregate (called the market to book ratio
121 or the price to book ratio) is equal to 1.0, the return on equity is equal to the cost of capital
122 assuming constant growth and returns. If the market to book ratio is above 1.0, a company is
123 earning more than its cost of capital. If the market to book ratio is below 1.0, the company is
124 earning less than its cost of capital. This test can be the starting point of cost of capital analysis.
125 Comparing return on equity and cost of equity using the market to book ratio is not some fancy
126 thesis about what has happened to the regulatory process. Unlike previous cases where I have
127 submitted testimony, I do not suggest in any way that the market to book ratio should be used to
128 compute the cost of capital. In the past I have advocated for a regression approach where the
129 relation between the cost of capital and the market to book ratio produces coefficients that can be

130 used to estimate the cost of capital. In this testimony I do not use the market to book ratio to
131 measure the cost of capital.

132
133 2. Measuring the cost of capital with the Capital Asset Pricing Model (“CAPM”) boils down
134 to estimating three parameters. One of them is the number for minimum required return on stocks
135 versus risk free debt (called the EMRP). If the expected minimum return by investors in economy
136 as a whole includes the assumption that the money of investors as a group will grow a lot faster
137 than wages in the overall economy, the implied re-distribution of income to investors and away
138 from everybody else is not tenable over the long run and the number cannot represent a logical
139 expectation. While the real growth in the U.S. economy has been and is expected to be somewhat
140 less than 2%, ComEd makes the assumption that investors money will grow at 8.7% in real terms.
141 A much more reasonable thing to do when estimating the EMRP is to apply what other people
142 assume of about 4-5%.

143
144 3. The second item you need for the CAPM is the beta statistic to measure adjust the cost of
145 capital for the risk of a particular company. ComEd’s witness Graves selects a sample of
146 companies that own generation and have other risks that ComEd does not have and instead of
147 concentrating on distribution companies that really do have risks similar to ComEd (like, for
148 example, ConEd, the distribution company serving New York City). Mr. Graves ultimately
149 concludes that ComEd, a very low risk, has a beta of .87, which is very close to the risk of an
150 average company on the stock market. When the sample is adjusted to focus on companies that
151 are really like ComEd such as the companies ComEd uses in its own impairment studies (not only
152 ConEd), and when the adjustments made to distort the beta are removed, a beta of less than .5
153 results. One of the key points of this analysis is that you must not make the assumption that the
154 risk of utility companies increases over time.

155
156 4. It is easy to say that ComEd shares are a lot riskier than investing in a long-term
157 government bond that is generally mis-labeled as risk-free, item number three of the CAPM. But
158 when you put your money into a bond with a fixed interest rate you are in fact taking a lot of
159 inflation risk. If you earn 2% on a bond and the inflation rate turns out to be 5%, you have lost
160 money in real purchasing power terms (if you want to buy a car in a couple of years, the money
161 you receive on your bond will be less than the inflation in the car cost). On the other hand,
162 companies like ComEd can take away some of this inflation risk. All of this means that the last
163 input into the cost of capital formula for the risk-free rate should be adjusted to account for
164 inflation risk that is present in long-term government bonds.

165
166 5. The discounted cash flow model (“DCF”), another way to estimate the cost of equity
167 capital involves making an assumption about how investors predict cash flow (over an indefinite
168 period) and then backing into the discount rate which is the cost of capital that produces current
169 stock prices. This sounds complicated, but it means that if you know how investors think about
170 the future expected cash flow and you also know the stock price, you then implicitly also know the
171 cost of capital. ComEd used a version of the discounted cash flow model with dividends to
172 represent cash flow and made the assumption that investors are predicting the near-term growth
173 rate over the next five years (5.76% to 7.28%) will last indefinitely. This may not seem to be a big
174 assumption, but if the growth rate on top of inflation exceeds the growth in population, it implies
175 that companies would have to continually increase rates. If you go out long enough, the
176 assumption means that people would have no expenditures for anything other than for electricity

177 distribution. I have demonstrated an alternative discounted cash flow analysis with a long-term
178 growth rate around the expected rate of inflation which is the typical way investors project cash
179 flow, and which is consistent with ComEd's own impairment studies.
180

181 **Q. Before describing the various ways that ComEd's cost of capital estimates can be**
182 **evaluated, introduce the general problem with measuring cost of equity capital.**

183 A. In this answer I define the cost of capital and explain how estimation of the cost of capital
184 is consistent with the United States Supreme Court's Hope and Bluefield decisions.

185 The meaning of cost of capital is not as straightforward as one may think. The cost of
186 capital is not simply the rate of return that is desired by an investor. Rather, the more technical
187 definition is the minimum return that is acceptable to an investor to compensate for taking risk in
188 an investment. The key word here is minimum. It is not the expected return; it is not the return
189 that other people get on investments, it is the lowest return that is acceptable and available for new
190 investors given the risk of the expected cash flow. By granting a return equal to the cost of capital
191 the Commission is maintaining financial integrity and assuring access to new capital.

192 When explaining the cost of capital to my students, I ask them to think of a bidding
193 context. In this example I pretend that there is a highly competitive bid for a solar project where
194 the bidders offer a price to the company that wants to buy power.¹ If you are a bidder, you want to
195 achieve some desired return, but you also want to win the bid and to do this you must offer a low
196 price. Your manager wants a pretty high return, and if you use this in your bid, he or she will be
197 disappointed because you will not win. If you are to have any chance of winning the bid, you
198 negotiate with your manager to push down the acceptable return until you arrive at the minimum
199 acceptable return. This minimum acceptable return approximates the cost of capital.

200

201 **Q. Contrast the terms ROE and cost of equity capital.**

202 A. When I first read Mr. Graves' testimony I thought he seemed to be reluctant to write down
203 the word cost of equity. Instead, he used the term "return on equity estimation." Return on equity
204 is an accounting measure that divides net income received (from the income statement) by the
205 average balance of common equity invested (on the balance sheet). It can be computed easily
206 from historical financial statements – there is nothing about ROE estimation in the calculation.
207 You can find the return on equity easily on the ICC Form 21 or the FERC Form 1. When Mr.
208 Graves wrote in his direct testimony that "Because the ComEd ROE is not directly observable, it

¹ In the hypothetical bid, there are not provisions that give one company an advantage over another company (and there is no collusion).

209 must be estimated based on both quantitative and qualitative information.”² I assume that he
210 meant to say cost of capital or the allowed return in this proceeding.

211 Estimation of the future return on equity is something a valuation analyst may do when he
212 is making an estimate of future cash flow and trying to guess what the Commission may grant.
213 For example, an analyst may make an assumption about energy sales being very high leading to a
214 high earned ROE. This return on equity forecast may be higher or lower than the cost of equity
215 capital.

216
217 **Q. Mr. Graves discusses the Hope and Bluefield cases. Do you agree with his**
218 **interpretation of these cases?**

219 A. Yes. Mr. Graves correctly acknowledges that these are widely accepted standards. Mr.
220 Graves writes that The United States Supreme Court’s Hope and Bluefield decisions that
221 established accepted and applied standards for determining a fair and reasonable rate of return. He
222 states that four parts include:

- 223 1. Consistency of the allowed return with the returns available to investors from other
224 businesses having similar risk
225 2. Adequacy of the return to provide access to capital
226 3. Adequacy of the return to support credit quality to support the utility’s obligations to serve
227 4. The requirement that the end result will lead to just and reasonable rates for customers.
228

229 **Q. Beginning with the first Hope and Bluefield item relating to returns available to**
230 **investors for business having similar risk, explain why your analysis and definition of the**
231 **cost of capital is consistent with this idea.**

232 A. This standard can be interpreted to mean setting the utility rates that allow investors to earn
233 a return equal to their cost of equity capital. The key word in the phrase is the word available and it
234 is essential not to confuse the cost of capital with the rate of return earned on equity. I have
235 presented a lot of data on the market to book section below and I include the return earned on
236 equity for comparable companies in Mr. Graves’ sample as well as some of the companies used in
237 the impairment reports. It has been suggested to me that the earned return on equity should be
238 used to meet the Hope and Bluefield standard. It was even suggested that I do not present data in a
239 transparent way for comparative companies and show the returns on equity. The notion that actual

² ComEd Exhibit 14.0 at line 726.
Illinois PIRG Exhibit 1.0

240 returns reflect the returns available to investors having similar risk is completely incorrect both
241 from a conceptual standpoint and in terms of meeting the Hope and Bluefield standard.

242 To see why it is cost of equity and not return on equity that meets the “returns available to
243 investors criteria”, take examples from companies that are completely different from utility
244 companies like Apple, Microsoft and Google which have created some of the richest people in the
245 world. If you begin at the time these companies were start-ups and see where they are now, you
246 will see that the companies have earned very high returns on equity. For example, say that Apple’s
247 return on equity has been around 35% to 40%. This earned return on equity does not mean if you
248 buy shares of Apple today that are available for you to buy today, your minimum required return
249 for making an investment and accepting future risks associated with movements in the Apple share
250 price and realization of Apple dividends is 40%. From the perspective of what is available today
251 your minimum return would probably be a lot less than 40%. Just like you would not expect to
252 earn a minimum return of 40% if you invested in a company with similar risk like Samsung. The
253 term Mr. Graves’ correctly uses “available to investors” means investors making an investment
254 today and not the return that Steve Jobs earned when he initially invested his money. Steve Jobs
255 may have made a return on equity of 100% and later investors may have earned the overall return
256 on equity of 40%. But these returns are clearly not available anymore. Returns available to
257 investors who are buying Apple shares in competitive capital markets (the word “competitive” has
258 been used by the Commission) is the cost of capital – that is how the stock price in a competitive
259 capital market is determined.³

260 Now let’s move back to discussing utility companies rather than Apple. To illustrate how
261 the term available returns applies, you could look at the picture of data for Alliant in the market to
262 book section below. Alliant is earning equity returns of above 10% and is a company in the
263 comparative sample that both Mr. Graves and the impairment study used. Because of the high
264 return on equity earned by Alliant, the company has a high stock price relative to the amount that
265 investors put into the company (this is the market to book ratio, which is above 2.0). If you are
266 considering returns available to investors today as correctly stated by Mr. Graves, the return that is
267 actually available to a new investor is not the earned ROE of 10%. Instead, it reflects this higher
268 stock price and because the stock price is higher, the return that you have available to you as a new
269 investor will be much lower than the earned return on equity of 10%. This is available return is
270 what we are searching for when we apply the CAPM and DCF models. Buying and selling shares

³ The return on equity for Apple reflects all of the other equity raised by Apple after the initial start-up investment.

271 in the competitive stock market means that the return available in the Hope and Bluefield criteria is
272 the cost of capital. If another company were earning 3% return on equity instead of 10%, because
273 the company had a similar risk, investors would push the stock price down until that company
274 produces a similar return.

275
276 **Q. Is the notion that Hope and Bluefield imply using the cost of equity capital as a basis**
277 **to set the rate of return a controversial item in this case?**

278 A. Thankfully, no. For as long as I have been working on regulatory proceedings (and that is a
279 long time), the cost of equity has been the basis for setting returns. For example, Commission
280 orders have a lot of discussion about the CAPM and the DCF assumptions that I explain below.
281 This means that we cannot look at other companies and see what the actual returns on equity are to
282 estimate the cost of equity capital. Surveying actual accounting returns is not part of my cost of
283 capital estimation and it is not part of the estimation made by Mr. Graves in any of his four
284 methods.

285 While ComEd seems to be reluctant to mention the word cost of equity capital, the
286 company does agree that the cost of equity should be the basis for setting the return on equity. This
287 is confirmed by ComEd's response to a data request. In this data request, ComEd was asked to
288 provide a description of whether the witness believes his estimates are consistent with the cost of
289 equity capital (as opposed to "ROE estimation"). ComEd responded that:

290
291 "Yes, Mr. Graves' ROE estimates ... [are] consistent with the cost of equity capital that
292 investors would require to purchase new equity capital raised by ComEd."
293

294 In the discussion below I show that granting a return equal to the cost of capital by
295 definition allows the company to raise new capital for investment (this is also consistent with the
296 Hope and Bluefield standards). At this point I note rule number one that the earned return on
297 equity for other companies does not tell you anything about the cost of equity.

298
299 **Q. Can the cost of capital be directly observed?**

300 A. No. The most basic problem with estimation of the cost of capital or returns available to
301 investors is that nobody can observe the number. The cost of equity capital is not reported
302 anywhere like the price of eggs in a grocery store or the interest rate on a 10-year treasury bond
303 that can be plucked from the internet. You cannot track cost of equity capital changes in the same
304 way that you can see changes in stock prices, interest rates, gold prices, exchange rates, earnings

305 for a company and other things. You certainly cannot look at the return on equity for other
306 companies and suggest that this is anyway an estimate of the cost of capital. This means measuring
307 the cost of equity is different from measuring just about anything in this proceeding including the
308 cost of debt.

309 Given that when it comes to the cost of equity you cannot read the number in the Wall
310 Street Journal or you cannot get the number from some kind of contract or published market price,
311 most of the time you have to try and compute the number representing returns available to
312 investors in an indirect way. You can do one of two things to derive this minimum return needed
313 to make an investment given the risk of an investment. One way is to back into the number (this is
314 the DCF method). Here the return available to investors comes from what you believe is an
315 estimate made by investment analysts of the cash flow of a company. The second way is to use the
316 capital asset pricing model which is a theoretical way to directly measure the minimum required
317 return from statistical estimates of risk. Both of the methods require estimation of variables that
318 are subjective. These subjective variables include the market risk premium; the beta; the expected
319 growth rate; the expected return, and the expected market risk premium.

320

321 **Q. Continue with the second Hope and Bluefield item relating to adequacy of the return**
322 **to provide access to capital. Explain why your analysis and definition of the cost of capital is**
323 **consistent with this idea.**

324 A. This standard can again be interpreted to mean setting the utility rates that allow investors
325 to earn their cost of equity capital. In this case, instead of talking about an investor who is putting
326 into buying shares consistent with the word “available” you can think about a company making an
327 investment in new equipment because the company requires new capital to make an investment.
328 Again, start with the case of Apple. If Apple wants to invest in a new factory in China (the
329 factories are in fact owned by Foxconn), it must be able to earn a return on the new factory
330 commensurate with the risk of new factory. If Apple invests in a factory that earns a return lower
331 than the cost of capital associated with that factory – the minimum return that can be earned on
332 investments or other factories with similar risk, then its stock price will in theory go down. This
333 required rate of return on Apple’s new factory again does not have anything to do with Apple’s
334 ROE of 40%.

335 Moving to the regulated world, if the return on equity granted by the Commission is below
336 the cost of capital, the company will not want to spend capital to make new investments because
337 the stock price for making raising new capital will mean make existing shareholders worse off. If

338 the granted return is above the cost of capital, then existing shareholders will receive a windfall
339 and the high return is not necessary to attract capital per the Hope and Bluefield standard. I explain
340 this further in the discussion of an equitable balance between consumers and investors.

341
342 **Q. Move to the third Hope and Bluefield standard referred to by Mr. Graves relating to**
343 **adequacy of the return to support credit quality to support the utility's obligations to serve.**
344 **Explain how your analysis can be evaluated in this context.**

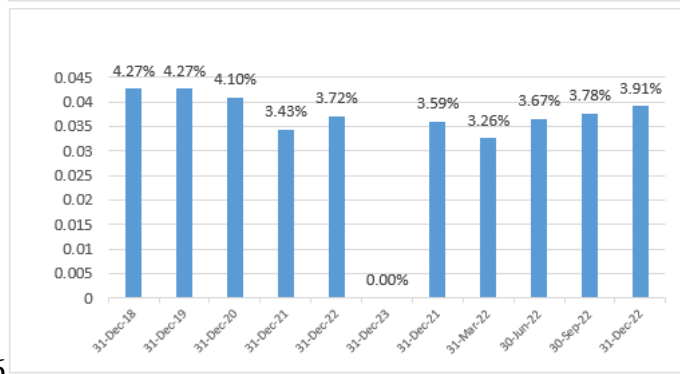
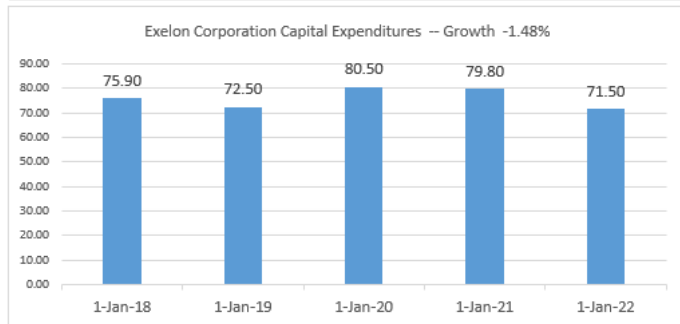
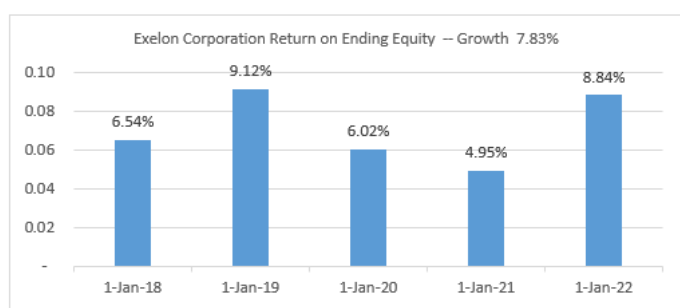
345 A. This criterion is the only part of the Hope and Bluefield standards that does not directly
346 lead to the notion that the return on equity should be set to the cost of equity capital (the returns
347 available to investors facing similar risk). Rather than discussing the economic or finance theory of
348 maintaining credit quality to supporting the obligations to serve, I begin with a case where the
349 issue of credit quality was front and center. After working through this case, I demonstrate that
350 nothing like this is an issue currently nor would it be if ComEd were allowed to earn its cost of
351 capital which is objectively below 6.5%.

352 The case was one of the first cases that I worked on at the Commission in 1979 and 1980.
353 ComEd was in the midst of a massive capital spending program for six new nuclear plants. Three-
354 mile island happened along with the Jane Fonda movie "The China Syndrome". Interest rates hit
355 levels of near or above 20%. ComEd's credit rating fell from AAA to BBB. The company asked
356 for an interim rate increase to assure access to capital markets. Here, the credit quality standard
357 was central.

358 ComEd currently has a very strong bond rating and very good credit metrics. If a return
359 below the formula rate return is granted and if the debt to capital ratio for setting rates is higher
360 than the current ComEd debt to capital ratio, ComEd's very strong credit ratings could suffer. If
361 the Commission interprets the third standard to mean that ComEd's "A" credit rating from S&P
362 must be maintained, the Commission will probably have to increase rates to a level that is above
363 the cost of capital and not meet the other Hope and Bluefield standards. But if the Commission
364 focuses on the obligation to serve as stated by Mr. Graves, where the maintenance of a particular
365 credit rating is not mentioned, then raising new debt capital at reasonable rates (why you want
366 credit quality) will be possible with returns that are set to the cost of capital.

367 To demonstrate that raising debt is possible even if earned returns are low, I include a
368 screenshot of some Exelon financial statistics below. The method I use to acquire data and to
369 present the data for Exelon and other companies is explained in PIRG Exhibit 1.4. Workpapers
370 with the excel file along with equations and macros will be available with this testimony. The

371 picture below for Exelon covers the period before Exelon split-up with Constellation. I include a
 372 lot of graphs like this in my testimony in an effort to provide transparent information (that
 373 sometimes may even conflict with my concepts). The picture first shows the return on equity
 374 earned by Exelon and then the capital expenditures for Exelon in millions of dollars.
 375



Exelon Corporation	1 Year	5 Year
Expected Growth in EPS	5.50%	6.30%
Past Growth in EPS		-3.39%
Year Ago Earnings Mktwatch	2.26	
Forward P/E Ratio (Yahoo)	18.25	
P/E Ratio (Marketwatch)	19.92	
Trailing P/E (Marketwatch)	20.70	
Price to Book (Yahoo)	1.73	
Price to Book (Maretwatch)	1.74	
Capital Expenditures		
ROIC Reported (Marketwatch)	3.12%	
ROE TTM (Yahoo)	6.90%	
ROE (Marketwatch)	6.95%	
ROE - Forward EPS	9.35%	
ROE - Second Yr EPS	9.50%	
Yahoo Beta (5Y monthly)	0.59	
MarketWatch Beta	Beta 0.85	
Current Year	2.37	
Next Year	2.50	
Book Value per Share (Yahoo)	24.89	
Next Year Book Value	25.82	
Second Year Book Value	26.80	
Average Interest Rate		
Shares	994,300	

Note the EBITDA is Divided by 4

376
 377
 378 This snapshot shows that Exelon was able to raise capital to finance its capital expenditures
 379 and it incurred reasonable interest rates despite earning returns on equity of 6.02% and 4.95%. In
 380 this situation even though the return was relatively low, the Hope and Bluefield standard of
 381 maintaining credit quality to assure access to capital markets was met. The Commission could
 382 have a very strict standard such as achieving an AA bond rating, but this would be very unfair to
 383 ratepayers and unnecessary from the standpoint of raising capital.
 384

385 **Q. Discuss the fourth Hope and Bluefield standard referred to by Mr. Graves relating to**
386 **the fact that the end result should lead to just and reasonable rates for customers. Explain**
387 **how the cost of capital test should be used.**

388 This criterion again leads you straight back to the cost of equity standard. If the rate of
389 return is equal to the cost of capital investments in new capital are appropriately compensated. If
390 the return is higher, then the cost of capital, investors simply get extra money that is not consistent
391 with available other investments, and it leads to windfall returns that are not necessary or
392 appropriate. I sometimes call this a gift. There is something that is just as important as the gifts to
393 investor that happens when an agency like the ICC grants returns above the cost of capital.
394 Granting high returns distorts incentives to make capital expenditures. The notion that when
395 returns are set above the cost of capital in a cost-plus scheme there will be negative economic
396 efficiency problems is an old idea and it is pretty obvious. This idea suggests that the Hope and
397 Bluefield criterion of just and reasonable rates is not met if returns are not set to the cost of capital.

398 If whenever you make an investment, the market value of that investment goes up because
399 it earns more than the cost of capital, you will want to make a lot of investments. Non-regulated
400 companies have to go through an investment committee and justify the investment based on all
401 kinds of return simulations and risk analysis. A utility company earning more than its cost of
402 capital just has to stick the investment like AMI, EV investments, DER investments and reliability
403 investments into the rate base. It is natural that they will want to over-invest to increase the market
404 value of the company.

405 When I was part of the ICC staff this idea of over-investing when companies earned more
406 than the cost of capital was called “gold plating” and we would discuss the Averch Johnson effect
407 during Staff outings. I used to believe that the Averch Johnson effect was an academic concept
408 and that the management of utility companies who were struggling to finance nuclear plants would
409 not find frivolous programs with questionable benefits to invest in. But when you read how
410 ComEd seems to want to invest in so many different programs and when you see that the CEO of
411 ComEd thinks he does not have to justify AMI investments (ComEd did not provide the
412 cost/benefit study) the concept is clearly demonstrated.

413 If companies were earning returns lower than the cost of capital as evidenced by market to
414 book ratios, the opposite of the Averch Johnson effect occurs. In this case utilities will be
415 reluctant to make investments because when growth in investment occurs, the market value
416 declines. If returns are set below the cost of capital, there are also negative economic effects.
417 Losses result in unfair transfers from investors to consumers and can influence the investment

418 policies of companies – this is the whole idea of providing a return that enables a company to
419 acquire capital.

420 To illustrate The importance of setting the return equal to the cost of capital from an
421 economic incentive perspective, consider the case of a distribution company deciding on whether
422 or not to invest in a substation to reduce distribution losses. Like Goldie Locks and the Three
423 Bears, the Commission must find the rate or return that is just right. This is the level where the
424 rate of return equals the cost of capital.

425

426 **Q. Does reading the investor relations presentations of Exelon and other companies**
427 **demonstrate the distorted incentives from allowing companies to earn more than their cost of**
428 **capital thereby violating the Hope and Bluefield standards?**

429 A. In my opinion, yes. I have reviewed investor relations reports for different utility
430 companies. The companies essentially copy and paste the same kind of good environmental
431 stewardship, discussion of ESG and needs for reliability, they claim justifies increases in rate
432 base. After that, the presentations move to discussion of the return on equity requests (implicitly
433 acknowledging that they are earning more than the cost of capital). Then there are some
434 statements about asking for very conservative capital structures. For example, the order of the
435 titles of the slides in Exelon’s presentation are the following (the comments in the parenthesis are
436 mine):

437

438 Best-in-Class Operations	(Bragging) Safely Powering
439 Reliability and Resilience	(Make Capital Expenditure)
440 Advancing Clean Energy Choices	(Greenwashing and Excuse to Invest)
441 Exelon is an Industry Leader in ESG	(The best at everything)
442 Path to Clean: Reaching a Net-Zero Footprint	(Greenwashing and Excuse to Invest)
443 Customer Needs and Industry Trends Continue to Support	(Excuse to Invest)
444 Investment Growth	(Rate Base Growth to Increase Value)
445 Exelon’s Annual Earned Operating ROEs	(Earning more than cost of capital)

446

447 Other companies may have a different slide order, but they are all doing more for the
448 environment than other companies, they all have the most reliable system, and most of all they all
449 need to increase rate base. You can read about the economic equations when you look up the
450 Averch Johnson effect, but the investor relations reports combined with the market to book ratios

451 are a really convincing proof of gold plating and distorted incentives. The issue of greenwashing is
452 particularly irritating in the case of ComEd. You go through the torture of reading each of the
453 witnesses including the CEO and the COO and Susan Tireney tell you about the wonderful things
454 ComEd is doing for the environment. And in the back of your head, you think about the
455 remarkably anti-conservation, regressive and bad rate design ComEd has from the perspective of
456 the environment (Mr. Graves even has an exhibit that had a check mark for SFV rates.) Claiming
457 you are doing things for the environment when you just really want to increase rate base that earns
458 a return above the cost of capital - this must really be the very definition of greenwashing.

459

460 **Q Introduce cost of capital data that ComEd included in its own impairment reports.**

461 A. ComEd makes impairment analyses and computes the cost of equity capital using the
462 CAPM each year. ComEd provided five of its impairment studies (from 2018 to 2022) in response
463 to a data request.⁴ There are some big differences between the way ComEd computes its cost of
464 equity capital for its own impairment studies and the way ComEd computes its capital in this
465 proceeding. Throughout this testimony I will refer to some places where ComEd's own
466 impairment studies used different comparative companies, different growth rates, different betas,
467 different measures of the EMRP and different measures of the risk-free rate from Mr. Graves'
468 testimony. I have summarized ComEd's cost of capital estimates from the impairment study
469 computed by Duff and Phelps later in the testimony. For example, in the 2019 impairment study,
470 Duff and Phelps computed a cost of equity of 5.8%. If nothing else, I hope this 5.8% number casts
471 doubt on ComEd statement about not earning its cost of capital during the formula rate period.

472

473

474

SECTION II:

475

DISPROVING COMED'S COST OF EQUITY ESTIMATES BY

476

REVIEWING COST OF CAPITAL MARKET TO BOOK RATIOS AND

477

EVALUATING COMPANIES THAT HAVE A MARKET TO BOOK RATIO

478

OF ABOVE 1.0

479

⁴ In documenting responses to data requests, I use abbreviations. For example, for the response to a data request from the Attorney General I use AG. Response to question 1 would be AG-1. For responses to City of Chicago data requests I use "C". ComEd provided the impairment studies in response to the data request C-1.24.

480

481 **Q. Given difficulties in finding the cost of capital, can you disprove cost of capital**
482 **estimates made from the DCF method and the CAPM method.**

483 A. Yes. ComEd's suggestion that the cost of equity capital is 10.5% can be tested from an
484 analysis of the price of a stock relative to the investment made by the company in assets that are
485 behind the stock. The statistic that divides stock price by something called the book value per
486 share is sometimes called the price to book ratio and sometimes called the market to book ratio. If
487 ComEd is correct and the cost of equity is 10.5%, then utility companies with similar risk that are
488 earning a return on equity of around 10.5% should have a market to book ratio of approximately
489 1.0. Market to book analysis is the most objective thing you can do in assessing whether a
490 company is earning more or less than its cost of capital.

491 The market to book ratio analysis I present here does not result in a definitive cost of equity
492 capital number that you can use as a recommendation. Instead, it provides background for the cost
493 of capital models. In a previous case I made a regression analysis of the market to book ratios and
494 the market to book ratio. Then I set the market to book ratio to 1.0 in the equation and derived an
495 estimate of the cost of capital. I am not doing this kind of analysis in this section. My objective
496 here is to be transparent with financial data and show an overview which gives context to the cost
497 of capital models where I do demonstrate how a definitive cost of equity number can be derived.

498

499 **Q. Can you provide a little historic background about the market to book ratio?**

500 A. Yes. As background, in the late 1970's and early 1980's when inflation was high and
501 companies were in the mist of building nuclear plants, many utility companies had market to book
502 ratios that were below 1.0. In reading cost of capital testimony at that time, the refrain and
503 complaints that investors were having their money confiscated was a central theme. Those
504 involved in the rate-setting process were told many times that investor capital was being
505 confiscated because of the market to book ratios below 1.0. As interest rates have come down and
506 nuclear plant expenditures have stopped, market to book ratios have increased and are now at high
507 levels.

508

509 **Q. Continuing with your explanation of the notion that when the market to book ratio is**
510 **equal to 1.0, please explain how the return on equity is equal to the cost of capital using the**
511 **example of a bond.**

512 A. I use a couple of different ways to prove that when the market to book ratio is equal to 1.0.
513 But first, some definitions. When evaluating the market to book ratio, you must first ascertain the
514 book value of the company you are evaluating. The book value of a company is the amount of
515 money investors (in aggregate) have taken out of their pockets and put into a company to make
516 capital investments. Note that this does not include investors who are buying and selling stock
517 from or to other investors. As a group, investors can put money into a company either by raising
518 new capital (this is called paid in capital on the balance sheet) or they can indirectly put money
519 into the company by not taking all of the income out as dividends (this is retained earnings on the
520 balance sheet). In simple terms, the amount of investment that investors as a group have put into a
521 company is the equity capital on the balance sheet. The amount of the investment can be divided
522 by the number of shares on the balance sheet to derive the book value per share.

523 This investment that is made by investors as a group can be compared to the value of that
524 investment in the stock market or the stock price per share. When thinking about the market to
525 book ratio in simple terms, you can think of investors taking money out of their pocket and then
526 seeing how much that money is worth now. Please note that I am not in any way suggesting that if
527 an investor leaves his money in a company, that money should not grow. The money that is left in
528 a company and that is not taken out as dividends should grow at the cost of capital (again, for
529 investors as a group; not investors who have bought and sold stock from other investors).

530
531 **Q. Can you demonstrate that a market to book ratio of 1.0 when the return equals the**
532 **cost of capital using financial formulas?**

533 A. Yes. Establishing a formula for the market to book ratio is not controversial if you assume
534 that returns, growth and cost of capital are constant (this is why you could argue that a regression
535 analysis can be difficult to implement and why I do not use the market to book ratio analysis to
536 derive the cost of capital in this case). I have presented proof of some fundamental valuation
537 formulas in PIRG Exhibit 1.2 along with a simple example of the market to book ratio using a
538 bond example. In PIRG Exhibit 1.2 I start with the formula that the value of a share of stock is the
539 present value of dividends (the same formula that Mr. Graves used), and the present value of
540 dividends can be expressed as $\text{dividends next year} / (\text{cost of equity} - \text{forever growth})$. A second
541 formula is that the growth rate is the return on equity multiplied by one minus the dividend payout
542 ratio. After a bit of algebra and some substitutions it can be shown that the market to book ratio is
543 equal to:

544

545 Market to Book = (ROE-growth)/(cost of equity – growth)

546
547 If you imagine that the ROE and the cost of equity are the same numbers in this formula,
548 then the top of the equation is the same as the bottom of the equation and the market to book ratio
549 is 1.0 no matter what the growth rate is. For example, pretend the ROE is 6% and the cost of
550 equity is 6%. The growth could be anything less than 6%. When you plug in the 6% for the top
551 and the bottom, the market to book ratio will still be 1.0.

552
553 **Q. Can a simple financial model be used to demonstrate that the cost of capital equals**
554 **the return on equity when the market to book ratio is 1.0?**

555 A. Yes. In the second part of PIRG Exhibit 1.2, I use a simple financial model to prove the
556 notion that a market to book ratio of 1.0 implies the return on equity is equal to the cost of equity.
557 You first put in inputs for the ROE, the growth rate and the cost of equity. You then compute the
558 dividend payout ratio that will allow the company to realize the projected growth. Next you set up
559 an equity investment balance where the equity is the starting amount plus the net income (ROE x
560 equity balance) less the dividends (payout ratio x net income). Finally, the value of the investment
561 is the present value of the dividends. This present value is the same as the initial investment only
562 when the return on equity is equal to the cost of equity.

563 The model documented in PIRG Exhibit 1.2 does not only demonstrate that when the
564 return on equity equals the cost of equity that the market to book ratio is 1.0, but also how different
565 levels of growth in earnings affect the market to book ratio. The table below, which is taken from
566 the exhibit, demonstrates that a market to book ratio of above 2.0 is consistent with a return on
567 equity of 10.5% when the cost of equity is 6.5%.

568

	ROE =COE 10.5%	ROE =COE 6.5%	ROE 10.5%; COE 6.5% Growth	Prior Case; Growth 5%/2%
Market to Book	1.00	1.00	2.33	1.99

569
570

571 **Q. Turning to actual market to book ratios for utility companies that are similar to**
572 **ComEd, what company is most comparable to ComEd?**

573 A. I think it is ConEd of New York, a company that ComEd witness Graves did not include in
574 his sample. ConEd, unlike most of the companies in ComEd's sample, does not own generation
575 assets. In PIRG Exhibit 1.3, I demonstrate why ConEd is the best company to use despite being
576 excluded from Mr. Graves' comparative sample.

577 Continuing with use of ConEd as an example to question Mr. Graves' sample, I note that
578 ConEd was included as a comparative company in ComEd's own impairment study that derives
579 the value of its assets. In the screenshot below I compare the companies that Duff and Phelps used
580 in its impairment study with the companies that Mr. Graves used. This comparison illustrates how
581 Duff & Phelps used ConEd and there are only four companies that overlap between ComEd's own
582 impairment analysis, and the set of companies that Mr. Graves used to argue for increasing rates.
583 Later on, in working through the data, it will be clear that the comparison sample ComEd uses in
584 its impairment study is much more representative of ComEd risks than the sample used by Mr.
585 Graves.

586

Combined List	Impairment	Witness	
	Study	Graves	Both
ALLETE Inc ALE	FALSE	TRUE	FALSE
Alliant Energy Corporation LNT	TRUE	TRUE	TRUE
Ameren Corporation AEE	TRUE	TRUE	TRUE
American Electric Power Company Inc AEP	FALSE	TRUE	FALSE
Avista Corporation AVA	FALSE	TRUE	FALSE
CenterPoint	TRUE	FALSE	FALSE
ConEd ED	TRUE	FALSE	FALSE
Duke Energy Corporation DUK	FALSE	TRUE	FALSE
Edison International EIX	FALSE	TRUE	FALSE
Entergy Corporation ETR	FALSE	TRUE	FALSE
Eversource Energy ES	TRUE	TRUE	TRUE
Evergy Inc EVRG	FALSE	TRUE	FALSE
IDACORP Inc IDA	FALSE	TRUE	FALSE
NextEra Energy Inc NEE	FALSE	TRUE	FALSE
NorthWestern Corporation NWE	FALSE	TRUE	FALSE
OGE Energy Corporation OGE	FALSE	TRUE	FALSE
Otter Tail Corporation OTTR n/a	FALSE	TRUE	FALSE
Portland General Electric Company POR	FALSE	TRUE	FALSE
PPL Corporation	TRUE	FALSE	FALSE
Southern Company	TRUE	FALSE	FALSE
WEC	TRUE	FALSE	FALSE
Xcel Energy Inc XEL	TRUE	TRUE	TRUE

588

589

590 When I teach corporate finance and talk about samples, I emphasize to my students that it
591 is important to look at the underlying data and understand why financial metrics are different for
592 different companies rather than playing with samples to achieve a result or using a lot of
593 companies that may be different in terms of growth prospects, return levels, risk, and age of assets.
594 In the case of ComEd, its sample included NextEra, the company with more non-regulated
595 renewable energy investments than any other company in the U.S. as well as Edison International,
596 the company in California that formerly owned vast projects around the world and is now subject
597 to enormous liabilities from forest fires.

598

599 **Q. Describe how you have made pictures of actual data for returns and the market to**
600 **book ratio starting with ConEd.**

601 A. I have used a database that gathers actual data for the financial statements of utility
602 companies and the stock prices for utility companies to present results of market to book ratios and
603 returns. PIRG Exhibit 1.4 describes the way I have done this and the sources of the data. The
604 spreadsheets with the data and the techniques to retrieve the data are available to all parties as part
605 of my workpapers. I have tried to make the presentation of the data easy to see and interpret. I
606 begin with ConEd as this single company provides more information about ComEd’s risk and cost
607 of capital than any other company. A picture of the return on equity, the market to book ratio and
608 some other statistics for ConEd is shown below.

609

610



611

612

613 The screenshot shows that ConEd is earning returns below ComEd’s 10.5% request and
614 still has market to book ratios above 1.0. On the screenshot above for ConEd and for other
615 comparative companies I show the historic annual market to book ratios for the past five years on
616 the graph with blue bars as well as the current market to book ratio published by
617 finance.yahoo.com and MarketWatch at the right of the graphs. The current levels of the market to
618 book ratio and the return on equity reported by finance.yahoo.com and MarketWatch are shown on
619 the right-hand side of the screenshot next to the graph. You can see that the current statistics for

620 the market to book ratio of 1.66 and 1.64 for ConEd are even higher than the levels shown on the
621 graph. I also compute the return on equity using return forecasts in the pictures. These returns of
622 around 8% to 8.5% are consistent with the high market to book ratios.

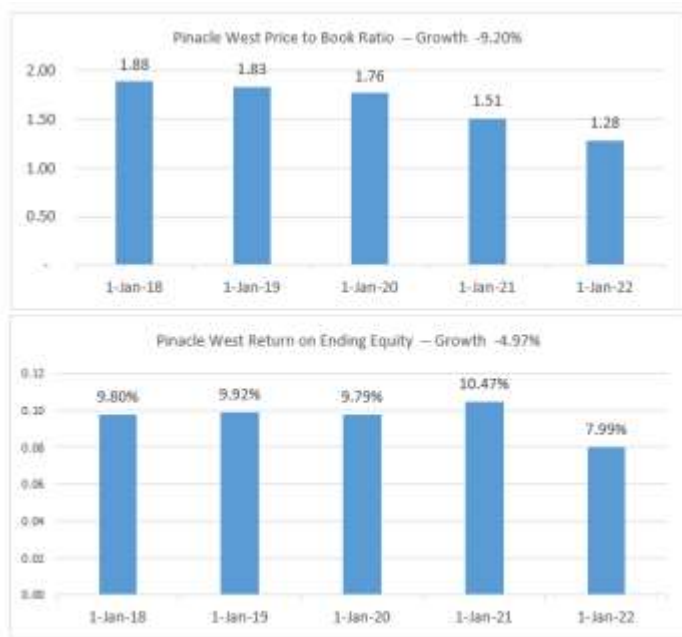
623 In the pictures for the comparative samples (one of which in my sample in ConEd) I also
624 present the beta and growth statistics that are published by finance.yahoo.com and MarketWatch.
625 I show this data as a way to introduce issues that are addressed in the CAPM and DCF sections.
626 The beta statistics and in particular the Yahoo beta are used in the CAPM, and the expected growth
627 rate is used in the DCF section. The assessment of whether the growth is reasonable can in part be
628 evaluated by comparing the historic growth with the forecast growth. For ConEd the beta statistics
629 of .35 and .49 are lower than the numbers used by ComEd's witness Graves for which the overall
630 average is .87. The five-year forecast of earnings growth for ConEd -- 6.12% -- is higher than the
631 historic earnings growth of 1.26%.

632 In the next questions and answers I will present more pictures like the above ConEd
633 screenshot for other utility companies. I have included some of the companies in a separate
634 exhibit – PIRG Exhibit 1.3. If you quickly scan the screenshots, a good picture of the cost of
635 capital relative to the earned return jumps out at you. I suggest that it is more helpful to
636 understand what is happening with respect to earnings and cost of capital in particular situations
637 than to put all of the companies into a bundle and come up with some kind of average levels.

638
639 **Q. What are the return and market to book statistics for the companies that ComEd's**
640 **witness Graves excluded from his sample.**

641 A. The next two screenshots present the data for Pinnacle West and for Hawaiian Electric. Mr.
642 Graves excluded these two companies from its comparative sample which have low forecasted
643 earnings growth as shown in the screenshots below. ComEd witness Graves discusses Pinnacle
644 West as having a very negative return decision and quotes negative statements by Value Line. I
645 have criticized Value Line as having a strong interest in favoring investors rather than consumers.
646 This does not mean that I do not rely on Value Line data. The forecasts made by Value Line rather
647 than the commentary and the beta statistics can be useful for investors. In the screenshot below
648 note that even with a granted return below 8%, the market to book ratio for Pinnacle West is still
649 far above 1.0. Note also that the beta of .43 published by yahoo.finance.com is again far below the
650 beta of .87 that Mr. Graves applies to his overall sample. Unlike many of the other companies, the
651 projected growth in earnings for Pinnacle West is below the very high past growth.

652



Pinnacle West	1 Year	5 Year
Expected Growth in EPS	16.50%	7.05%
Past Growth in EPS		19.19%
Year Ago Earnings Mktwatch	4.30	
Forward P/E Ratio (Yahoo)	19.80	
P/E Ratio (Marketwatch)	18.84	
Trailing P/E (Marketwatch)	18.85	
Price to Book (Yahoo)	1.50	
Price to Book (Marketwatch)	1.42	
Return on Ending Equity		
ROIC Reported (Marketwatch)	3.46%	
ROE TTM (Yahoo)	8.22%	
ROE (Marketwatch)	8.09%	
ROE - Forward EPS	7.57%	
ROE - Second Yr EPS	8.71%	
Yahoo Beta (5Y monthly)	0.43	
MarketWatch Beta	Beta 0.70	

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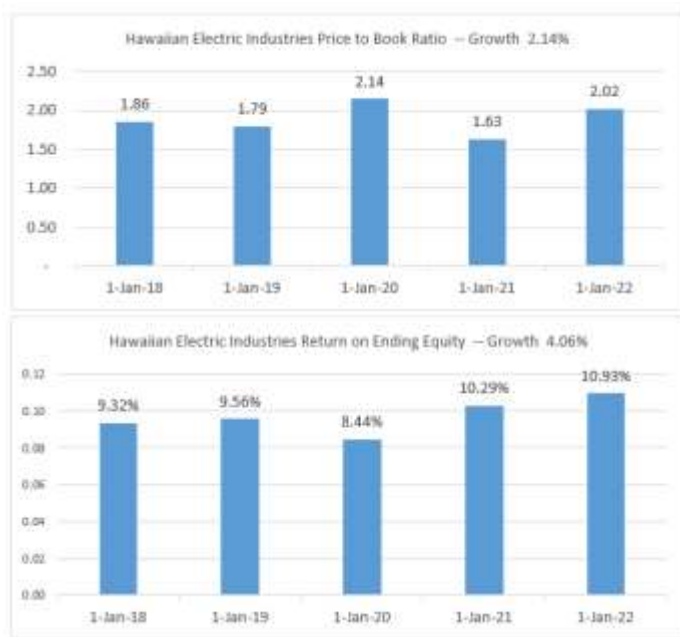
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663

The third company for which I present a picture with financial data is Hawaiian Electric, another company singled out by ComEd’s witness as not being appropriate for comparison. This company owns generation assets like many of the other companies in ComEd’s sample. It has earned a return on equity in the neighborhood of ComEd’s recommended request of 10.5%. With earnings of about 10.5%, it has a market to book ratio of above 2.0. This result is very similar to the simple model that is presented in PIRG Exhibit 1.2. Hawaiian Electric has an expected growth rate of only 1.3% which combined with a dividend yield of 3.9% implies a DCF cost of capital of about 5.2%. Finally, the company has a beta estimated by yahoo.finance.com of .4 which is below the beta that ComEd used in the CAPM.



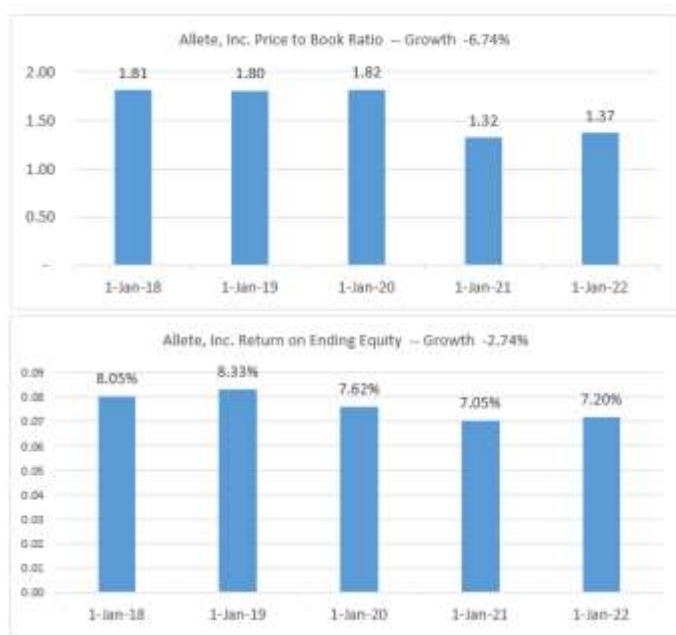
Hawaiian Electric Industries	1 Year	5 Year
Expected Growth in EPS	6.20%	1.30%
Past Growth in EPS		5.94%
Year Ago Earnings Mktwatch	2.21	
Forward P/E Ratio (Yahoo)	17.15	
P/E Ratio (Marketwatch)	17.76	
Trailing P/E (Marketwatch)	17.79	
Price to Book (Yahoo)	1.95	
Price to Book (Marketwatch)	2.08	
Return on Ending Equity		
ROIC Reported (Marketwatch)	4.64%	
ROE TTM (Yahoo)	10.35%	
ROE (Marketwatch)	10.43%	
ROE - Forward EPS	11.05%	
ROE - Second Yr EPS	11.27%	
Yahoo Beta (5Y monthly)	0.41	
MarketWatch Beta	Beta 0.60	

664
665

666 **Q. Continue with illustrations of the market to book ratio and the return on equity for**
667 **some of the companies ComEd used in its sample.**

668 A. I have retrieved data for each of the companies in the ComEd sample and in the impairment
669 study sample. ConEd is just one company in the comparative sample. In making the DCF and beta
670 analysis I used both ComEd's sample and the impairment study sample. I have also looked at the
671 investor relations presentations for each of the companies to understand if they are really
672 comparable. Skimming through the investor relations reports demonstrated that many of the
673 companies are not at all comparable to ComEd beginning with the first on the list, Allele. The
674 picture of Allele below shows that companies earning returns on equity of around 7.5% are still
675 earning more than their cost of capital. When you review Allele's investor presentation, you see
676 the holding company owns Minnesota Power and Light Company, an integrated utility company
677 that owns a lot of generation assets. It also owns companies named New Energy Equity, Allele
678 Clean Energy, and BNI (a lignite mine), all of which the company calls non-regulated operations.
679 Unlike ConEd, Allele is not very comparable to ComEd. It is not surprising that this company has
680 a higher beta than pure distribution companies such as ConEd of New York, the company that I
681 use as an example, which is only involved in retail distribution of energy. Its forecasted growth in
682 earnings is greater than the negative historic growth.

683



Allite, Inc.	1 Year	5 Year
Expected Growth in EPS	8.80%	8.70%
Past Growth in EPS		-0.74%
Year Ago Earnings Mktwatch	3.70	
Forward P/E Ratio (Yahoo)	17.36	
P/E Ratio (Marketwatch)	19.71	
Trailing P/E (Marketwatch)	19.30	
Price to Book (Yahoo)	1.39	
Price to Book (Marketwatch)	1.37	
Return on Ending Equity		
ROIC Reported (Marketwatch)	4.43%	
ROE TTM (Yahoo)	4.18%	
ROE (Marketwatch)	7.42%	
ROE - Forward EPS	7.86%	
ROE - Second Yr EPS	8.37%	
Yahoo Beta (5Y monthly)	0.71	
MarketWatch Beta	Beta 0.79	

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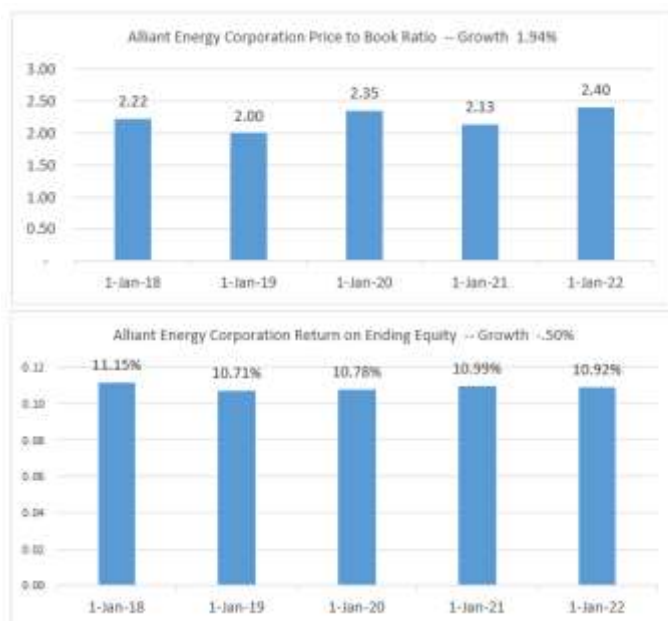
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The second company, Alliant, owns Wisconsin Power and Light and Iowa Power and Light. The company owns a lot of coal fired generation and is making investments in renewable energy. After discussing ESG and Clean energy, Alliant presents its rate base growth as most of the other companies do. The picture of Alliant below in the screenshot demonstrates that when the earned return on equity is at the high end of what ComEd is requesting, the market to book ratio exceeds 2.0. This company that is investing heavily in renewable energy generation but has less non-regulated activities and has a yahoo beta of .52, well below the beta of Allite. This company also has expected growth below past growth.



Alliant Energy Corporation	1 Year	5 Year
Expected Growth in EPS	11.10%	5.55%
Past Growth in EPS		7.36%
Year Ago Earnings Mktwatch	2.80	
Forward P/E Ratio (Yahoo)	18.98	
P/E Ratio (Marketwatch)	20.13	
Trailing P/E (Marketwatch)	20.16	
Price to Book (Yahoo)	2.21	
Price to Book (Marketwatch)	2.21	
Return on Ending Equity		
ROIC Reported (Marketwatch)	5.11%	
ROE TTM (Yahoo)	11.19%	
ROE (Marketwatch)	11.19%	
ROE - Forward EPS	11.32%	
ROE - Second Yr EPS	12.04%	
Yahoo Beta (5Y monthly)	0.52	
MarketWatch Beta	Beta 0.59	

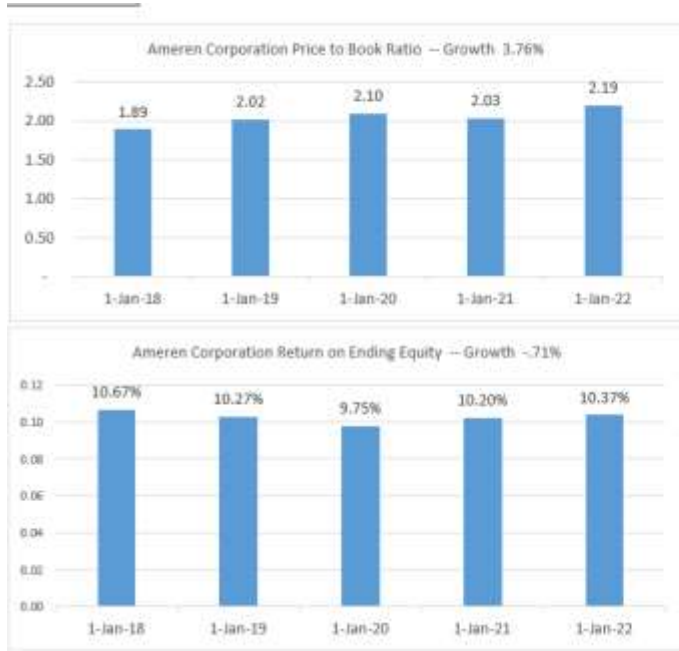
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696

697 The next company in alphabetical order that is included in ComEd's sample is Ameren.
 698 Ameren, as we know, is a regulated distribution company in Illinois. But its subsidiary in
 699 Missouri does own generation and the company is in the process of making big investments in
 700 renewable energy so that it can retire its coal fired generation (hence leading to a big increase in
 701 rate base over the near term). Ameren is earning returns on equity near ComEd's recommended
 702 return on equity and it has a market to book ratio of more than 2.0. This market to book ratio is
 703 consistent with the numbers from the model in PIRG Exhibit 1.3. Note that Ameren's beta as
 704 measured by Yahoo is .43 even though it has coal fired generation and is embarking on a big
 705 program of replacement. Unlike most of the other companies, the historic very high growth in
 706 earnings is below the expected growth rate of almost 10%.

707

708



Ameren Corporation	1 Year	5 Year
Expected Growth in EPS	7.30%	6.90%
Past Growth in EPS		9.09%
Year Ago Earnings Mktwatch	4.08	
Forward P/E Ratio (Yahoo)	20.70	
P/E Ratio (Marketwatch)	21.81	
Trailing P/E (Marketwatch)	21.76	
Price to Book (Yahoo)	2.25	
Price to Book (Marketwatch)	2.22	
Return on Ending Equity	=	
ROIC Reported (Marketwatch)	4.62%	
ROE TTM (Yahoo)	10.54%	
ROE (Marketwatch)	10.63%	
ROE - Forward EPS	10.63%	
ROE - Second Yr EPS	10.90%	
Yahoo Beta (5Y monthly)	0.43	
MarketWatch Beta	Beta 0.66	

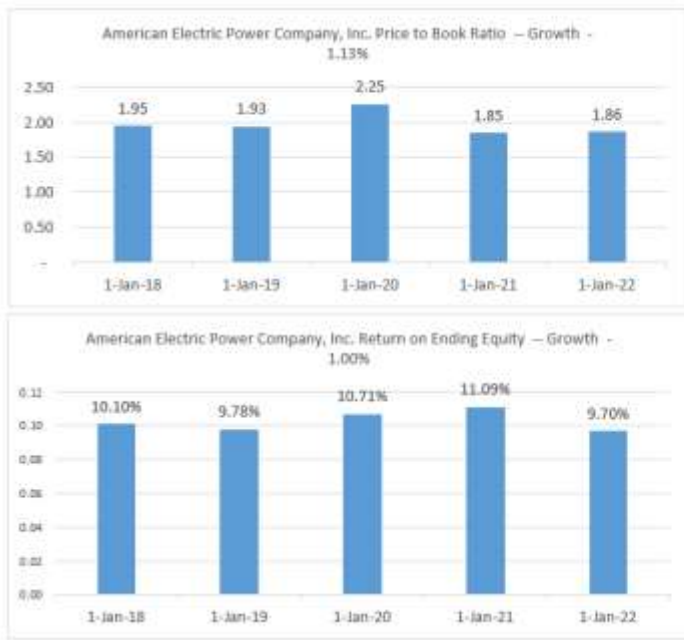
709

710

711 **Q. Continuing with the companies that start with the letter A in ComEd’s sample,**
 712 **discuss the case of American Electric Power and Avista Corporation.**

713 A. American Electric Power (AEP) is one of the largest generators of electricity, owning or
 714 operating about 25,000 megawatts of generating capacity. It sells much of this generation on a
 715 merchant basis in Ohio and the rest of the Midwest. Even though AEP is a very different company
 716 than ComEd, its return on equity and beta are consistent with high market to book ratios. The
 717 company has a yahoo.finance.com beta of .44 and its current market to book ratio is above 2.0.

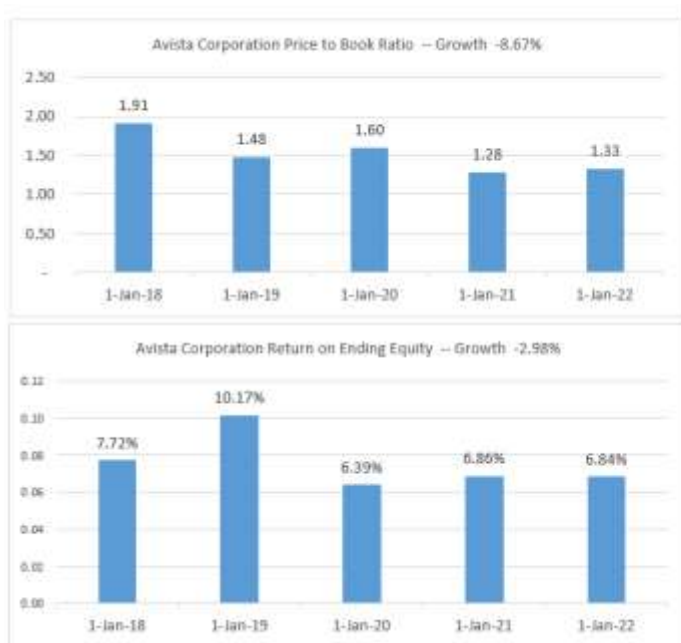
718



American Electric Power Company,	1 Year	5 Year
Expected Growth in EPS	6.60%	5.65%
Past Growth in EPS		6.32%
Year Ago Earnings Mktwatch	5.02	
Forward P/E Ratio (Yahoo)	17.92	
P/E Ratio (Marketwatch)	21.18	
Trailing P/E (Marketwatch)	21.13	
Price to Book (Yahoo)	2.04	
Price to Book (Maretwatch)	2.04	
Return on Ending Equity		
ROIC Reported (Marketwatch)	4.10%	
ROE TTM (Yahoo)	9.85%	
ROE (Marketwatch)	9.96%	
ROE - Forward EPS	11.14%	
ROE - Second Yr EPS	11.40%	
Yahoo Beta (5Y monthly)	0.44	
MarketWatch Beta	Beta 0.54	

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727

The final company in ComEd’s sample with the letter A is Avista. This company has assets in Alaska as well as Washington State, Idaho and Oregon. Avista has a lot of hydro generation which is sold into Western merchant markets. It is an interesting case because it has earned a recent return fairly near 6.5%, and it still has a market to book ratio of above 1.0. The case shows that the Hope and Bluefield criteria can be met with lower returns as this company has maintained access to capital.



Avista Corporation	1 Year	5 Year
Expected Growth in EPS	6.10%	6.30%
Past Growth in EPS		1.16%
Year Ago Earnings Mktwatch	1.89	
Forward P/E Ratio (Yahoo)	18.48	
P/E Ratio (Marketwatch)	21.26	
Trailing P/E (Marketwatch)	20.74	
Price to Book (Yahoo)	1.42	
Price to Book (Maretwatch)	1.42	
Return on Ending Equity		
ROIC Reported (Marketwatch)	3.45%	
ROE TTM (Yahoo)	6.91%	
ROE (Marketwatch)	6.91%	
ROE - Forward EPS	7.36%	
ROE - Second Yr EPS	7.69%	
Yahoo Beta (5Y monthly)	0.49	
MarketWatch Beta	Beta 0.66	

728
729

730 **Q. Do you illustrate the market to book ratios, betas, and growth rates for the rest of the**
731 **data for companies in ComEd's sample.**

732 A. Yes, but I have included the discussion in a separate exhibit, PIRG Exhibit 1.3. In this
733 exhibit, you will see that most of the companies are arguably riskier than ComEd and, more
734 importantly, they all have market to book ratios above 1.0.

735

736

737 **SECTION III: THE CAPITAL ASSET PRICING MODEL AND DIRECT**
738 **ESTIMATES OF THE COST OF CAPITAL**

739

740 **Q. Turning to ComEd's application of the CAPM, comment on items in the analysis that**
741 **can be disproved in an analogous manner to the way the market to book ratio of 1.0**
742 **disproves the 10.5% recommendation.**

743 A. The nice thing about the market to book analysis is that there is not a lot of economic
744 theory, statistics or manipulation of samples from different companies. All you have to understand
745 is that when the market to book ratio is above 1.0, it is very likely that the earned return of the
746 company is more than the cost of capital. But there is also not a direct measurement of the cost of
747 equity capital. To measure the cost of capital, MBA students now all learn about the CAPM. As
748 the ComEd witness writes, the cost of equity in the CAPM can be written as:

749

$$750 \text{ Cost of Equity} = R_f + \text{Beta} \times \text{EMRP}$$

751

752 One nice thing about this formula is that it only has three things you need in order to
753 compute the cost of capital. Rather than simply focusing on the final number, I hope by reading
754 this testimony you will think about the three inputs that go into the formula. I suggest that these
755 three inputs do not require some kind of advanced statistical or financial background, but that they
756 can be evaluated with relatively simple logic. You will see that it is a lot better to evaluate the
757 logic underneath these three numbers than to throw darts at different recommendations from
758 alternative experts.

759 Let's start with the three inputs that ComEd uses. ComEd witness Graves comes up with
760 two numbers for the cost of equity using the CAPM. He presents these numbers on a table just
761 after line 1017 of his testimony. The two numbers are 11.62% and 10.39%. To find the beta and

762 the risk-free rate underneath these numbers you need to go to his exhibit where you can see the
763 three numbers that drive everything in the CAPM. ComEd's three CAPM numbers are:

764

765
$$\text{Cost of Equity} = \text{Risk Free Rate (Rf)} + \text{Beta} \times \text{EMRP}$$

766
$$10.39\% = 4.06\% + .727 \times 8.7\%$$

767
$$11.62\% = 4.06\% + .869 \times 8.7\%$$

768

769 To evaluate ComEd's recommendation we need to evaluate these three numbers. I begin
770 with the last number – the equity market risk premium (EMRP) of 8.7% and then later I work
771 backwards to the betas of .727 and .869 and finally back to the risk-free rate of 4.06%.

772

773 **Q. What were the results of the CAPM that was applied by ComEd in ComEd's**
774 **impairment studies?**

775 A. ComEd's three CAPM inputs from its own cost of capital analysis made in the impairment
776 studies that the company supplied in response to a data request are shown in the table below.

777 While I do not agree with the details of these cost of capital estimates, I think this information
778 could be useful to the Commission. The three CAPM inputs are very different than Mr. Graves's
779 estimates. Note that the lowest cost of equity estimate from the impairment study does not occur
780 in the year that the estimated risk-free rate was the lowest (2020), but when the beta and the EMRP
781 estimate were lowest – the EMRP was 5.5% (compared to Mr. Graves' number of 8.7%) and the
782 beta was .51 (compared to Mr. Graves' number of .87). If you are asking why things like beta and
783 EMRP should change a lot over time you are correct. In theory they should not change a lot.

784

Cost of Equity in ComEd's Own Impairment Study

	Cost of Equity (1)	Risk Free Rate (2)	EMRP (3)	Implied Risk Premium (4)	Implied Beta (5)
				(1-2)	(4/3)
2018 Study	6.50%	3.50%	5.00%	3.00%	0.60
2019 Study	5.80%	3.00%	5.50%	2.80%	0.51
2020 Study	6.60%	2.50%	6.00%	4.10%	0.68
2021 Study	7.20%	2.50%	5.50%	4.70%	0.85
2022 Study	8.50%	4.40%	6.00%	4.10%	0.68

785

786

787

CAPM Input Number 1:

788

789 **Disproving ComEd's 8.7% EMRP Estimate - Growth Rates, Returns and the Fundamental**
 790 **Problems with Assuming Investors Share in Economic Growth is Always Faster than Other**
 791 **People**

792

793 **Q. What is EMRP and why is it such an important part of the CAPM?**

794 A. The EMRP represents the premium that investors need in order to invest in stocks that can
 795 move up and down a lot versus short-term treasury bonds that have a fixed interest rate. This
 796 number is important because whenever anyone uses the CAPM they have to estimate this EMRP.
 797 There is nothing unique to ComEd or to utility companies when measuring EMRP; everybody who
 798 uses the CAPM theoretically applies the same number. In practice not everybody uses the same
 799 EMRP as this number is not something like a stock price that can be verified in the Wall Street
 800 Journal or found on the internet. But these days, it is very easy to find what people all over the
 801 world use. And, the number is less than the 8.7% used by ComEd.

802 When thinking about the EMRP you should understand what it represents. It is the
 803 minimum real growth rate in the wealth desired by equity investors for taking risks that the overall
 804 earnings in the economy rather than investing in a risk-free asset. The growth rate in equity
 805 investment will go up and down period by period relative to a fixed stream of income that will not
 806 vary. This risk of overall stocks may seem like a big risk to take, but growth in the economy over
 807 the long term does not vary that much and this number reflects that fundamental statistical fact that

808 when you have a big portfolio, your risks quickly start looking like the overall risks in the
809 economy.

810

811 **Q. What is the effect of different EMRP estimates on the cost of equity?**

812 A. The formulas below illustrate the effect of changing the EMRP in ComEd's CAPM
813 estimate to more typical numbers that are used by others. I will show that typical EMRP used in
814 the CAPM these days is 4% or less while a high-end estimate could be 5.2%. Please note that if
815 you are looking to plop out overall cost of equity numbers, the numbers below have nothing to do
816 with a recommendation because they only focus on the EMRP. I am just illustrating the effect of
817 different EMRP estimates in isolation (and, of course, I am hoping that you think about the
818 underlying logic of the numbers).

819

820
$$\text{Cost of Equity} = \text{Risk Free Rate (Rf)} + \text{Beta} \times \text{EMRP}$$

821

822 ComEd Low Estimate 10.39% = 4.06% + .727 x 8.7%

823 ComEd High Estimate 11.62% = 4.06% + .869 x 8.7%

824

825 Typical EMRP Used – ComEd Low 6.98% = 4.06% + .727 x 4.0%

826 Typical EMRP Used – ComEd High 7.53% = 4.06% + .869 x 4.0%

827

828 High End EMRP – ComEd Low 7.84% = 4.06% + .727 x 5.2%

829 High End EMRP – ComEd High 8.58% = 4.06% + .869 x 5.2%

830

831 **Q. Elaborate on the point that the EMRP does not include inflation and that it is a real
832 and not a nominal number?**

833 A. You could try to relate the EMRP to the kind of returns you may hope for on a stock
834 portfolio, but you must be careful. You want your stock portfolio to cover inflation, but the EMRP
835 does not include inflation because inflation is included elsewhere in the CAPM. The reason for this
836 is that the risk-free rate already includes inflation and if you included inflation in the EMRP you
837 would be double counting. To see how this works, you can separate the CAPM formula into items
838 that are affected by inflation and items that are not affected by inflation. When regular interest
839 rates are used for the risk-free rate as ComEd does, interest rates include the expected rate of
840 inflation. People who live in countries with high inflation know very well that when they borrow

841 money or when they lend money the interest rate on debt must compensate for inflation over the
842 lending period. For example, if you are putting money away to buy a car in a year, and the
843 inflation rate is 20%, the interest rate on the loan should be at least 20% so that the increase in the
844 cost of the car is covered. This means that interest rate including a risk-free rate and inflation can
845 be written as:

$$R_f = \text{Real Interest Rate} + \text{Expected Inflation}$$

846
847
848
849 In making cost of capital estimates, expected inflation should be included although ComEd's
850 witness Rachel Isabel (ComEd Exhibit 13.0, Line 65) who tries to relate interest rates to the duration
851 of distribution assets is wrong. Expected inflation should cover a time period that is until the next
852 time a definitive rate of return is set. This means that setting fixed interest rates for 30 years does
853 not make sense. If inflation is included in one component of the CAPM – the risk-free rate -- it
854 cannot be included anywhere else, otherwise you will be double counting. This all means that the
855 CAPM could also be written as:

$$\text{Nominal Cost of Equity} = \text{Real } R_f + \text{Expected Inflation} + \text{Beta} \times \text{Real EMRP}$$

856
857
858
859 In the above equation, the word nominal means that inflation is included and the word real means
860 that the inflation rate is not part of the calculation. The implication of this is that when we discuss
861 the EMRP we must compare growth rates and returns implicit in the EMRP to other real rates.

862
863 **Q. What is the starting point to evaluate the EMRP?**

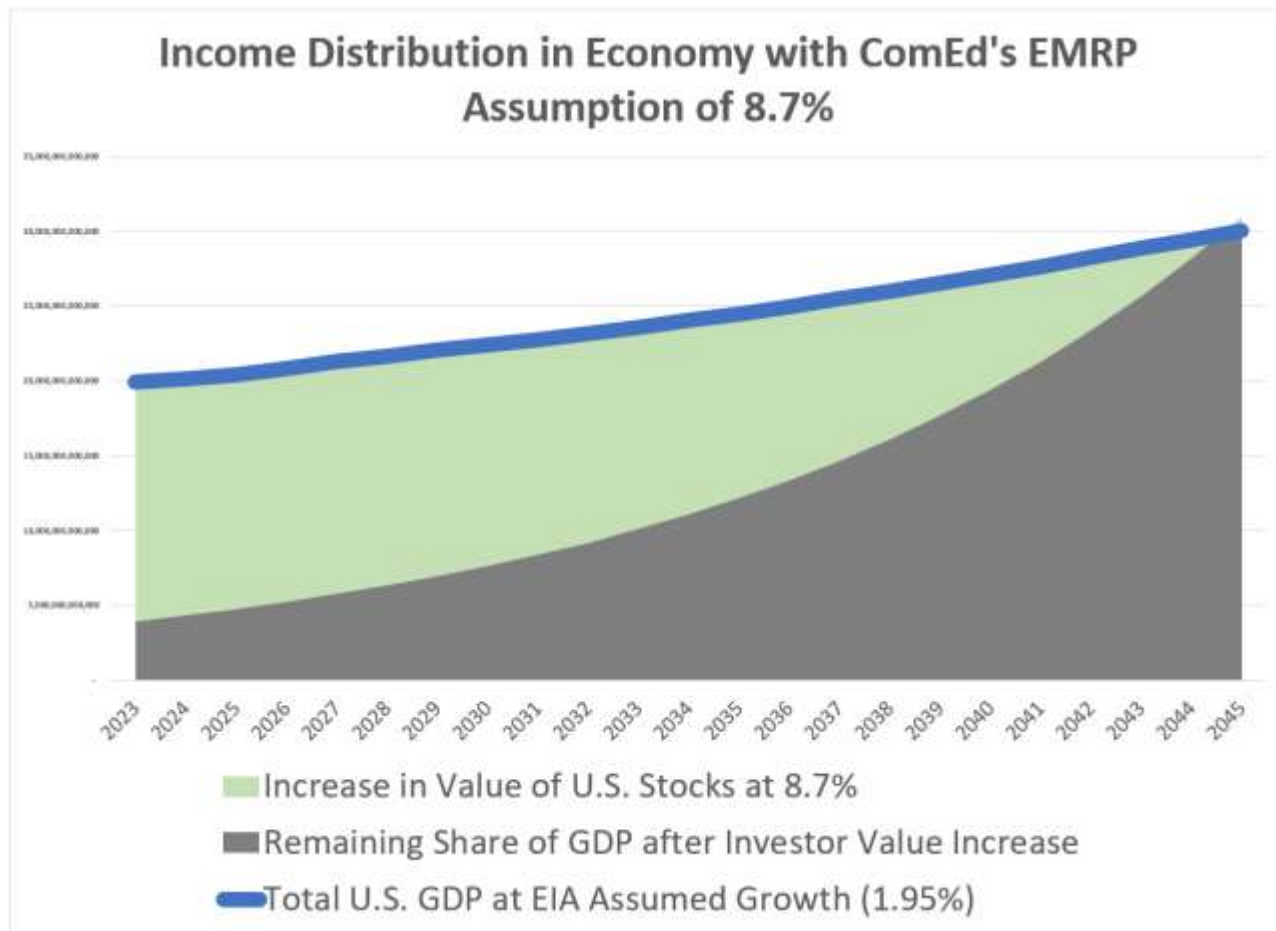
864 A. The most basic concept is that the EMRP is a number that applies across the whole
865 economy and the EMRP, like any measure of return, is a growth rate in your money. Now think
866 about the overall economy. When discussing economic issues people often talk about growth rates
867 and, more precisely, real economic growth without inflation. Like other numbers representing
868 income, the GDP can be separated according to who receives money. For a company you can think
869 of revenues being separated between employee salaries and stockholder income. Similarly, for the
870 entire economy, investor returns received from companies represent one component of the GDP,
871 employee salaries represent another and there are other items like government expenditures.

872 If you can imagine a graph of the overall economy represented by the GDP. Then you can
873 make the area under the graph to represent money going to investors and money going to

874 everybody else. If the EMRP is greater than the real growth in the economy, the investor share
875 will go up faster than the line for the total economy. Investors will get richer and everybody else
876 will be poorer. When you start assuming that investors will experience higher growth than the
877 overall economy indefinitely, by assuming higher EMRP than the real growth in the economy, you
878 get into dangerous territory.

879 To demonstrate the danger in assuming the rates applied by ComEd, I have made a simple
880 simulation of the U.S. economy where investor money grows at 8.7% and the overall economy in
881 real terms grows at rates forecast by the U.S. Energy Information Agency (“EIA”) in their
882 macroeconomic forecast which is about 1.9%. I have included details of this analysis in PIRG
883 Exhibit 1.5 including the sources of the numbers. In the exhibit, I use the market value of stock
884 investments in the economy and assume that they grow at the 8.7% rate that ComEd assumed
885 EMRP – this is what the assumption does. Next, I find the real GDP of the U.S. economy and
886 assume that it will grow at the EIA assumed rates. When you subtract the amount of income
887 earned from the investor growth rate from the overall GDP you get the amount that is left over for
888 everybody else. This produces the absurd result shown in the graph below where there is nothing
889 left for anybody else in 2045.

890



891

892

893

894 I hope you can see from this simple analysis that evaluating concepts like the EMRP does
 895 not require some kind of highly mathematical prowess but rather a little bit of simple logical
 896 thinking. This is why I have structured my testimony by working through data and not putting all
 897 of the emphasis on discussion of a final number and pretending that the Commission will just look
 898 at my number and accept it.

899

900 **Q. Is the future estimation of the real growth in GDP aa disputed issue between you and**
 901 **ComEd?**

902 A. No, this is something Mr. Graves and I agree on. In the graph above, I used a real GDP
 903 growth rate of about 1.9%. ComEd responded to a data request and seemed to not disagree with
 904 the real GDP rates that I used in the above graph. ComEd stated:

905

906 Mr. Graves has no independent analysis or opinions on the long-term real growth rate of
 907 the U.S. economy, and none of the methods of cost of capital estimation Mr. Graves uses

908 rely upon this long-term growth rate. However, Mr. Graves observes that the October 2022
909 publication of Blue-Chip Economic Indicators forecasts a long-term real GDP growth rate
910 of 1.9% ... which is consistent with the Federal Reserve’s projection from the March 22,
911 2023, FOMC meeting (1.8%).⁵
912

913 **Q. Is this idea to evaluate the growth in the overall economy as a basis for thinking about**
914 **the EMRP a new theory that you have come up with?**

915 A. Not at all. As the EMRP is a number that everybody uses, I find that it is better to spend
916 time evaluating what other people use than to try and compute the number yourself. As such I have
917 included reference to a book that you can easily download from the internet in PIRG Exhibit 1.5.
918 This book is titled “Rethinking Equity Risk Premium” and includes articles by people who have
919 spent a lot of time studying the EMRP. It is surprisingly easy to review and one of the articles
920 included the following statement⁶:

921
922 The key insight, which draws on earlier work by a number of authors, was that aggregate
923 corporate profits cannot grow indefinitely much faster—or much slower—than GDP. (And
924 as Herbert Stein was fond of reminding us, any economic trend that cannot continue
925 forever will not.) If profits grow faster than GDP, they eventually take over the economy,
926 leaving nothing for labor, government, natural resource owners, or other claimants. If
927 profits grow more slowly than GDP, they eventually disappear, and businesses will have no
928 profit motive to continue operating. Thus, in the very long run, the ratio of profits to GDP
929 is roughly constant.
930

931 Using the logic above you could make a powerful case that the EMRP should be around 2-
932 3% and some people use EMRP numbers like this. But others use an EMRP number somewhat
933 above this amount as I explain in the next question.

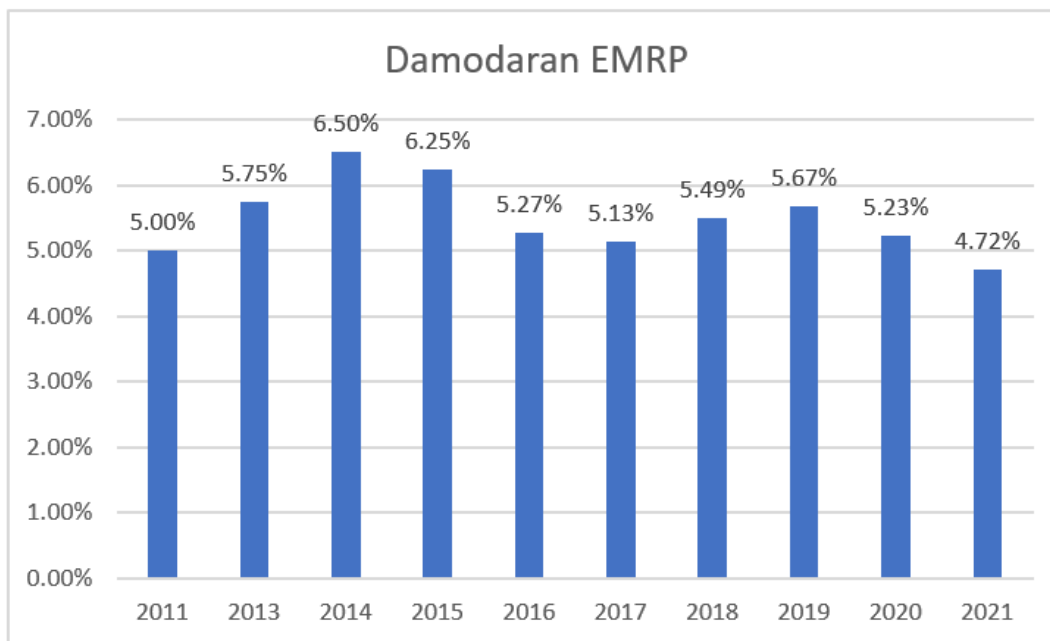
934
935 **Q. Have people who work in finance changed their estimates of the EMRP that is not far**
936 **more than the growth rate of the overall economy?**

937 A. Yes. One of the sources people use is the material published by Aswath Damodaran from
938 NYC on his website (I think the book “Rethinking the Equity Risk Premium” that I discuss in
939 PIRG Exhibit 1.5 is much better). Whilst I disagree with the way Damodaran ignores basic
940 concepts and about how he does not consider capital gains from changes in the interest rates when
941 making historic analysis I do acknowledge that many people use his EMRP numbers.

⁵ ComEd Response to C-1.40

⁶ Page 53 of Rethinking the Equity Risk Premium referring to Grinold and Kroner (2002).

942 The screenshot below shows Damodaran derived an EMRP of 4.72% in 2021 and recently
943 he has pushed it up to 5.13%.⁷ For reasons I discussed in the last question, I think this is very
944 high, but this number should be available to the Commission as it can represent what people really
945 use.
946



947
948
949 In his recent analysis, Damodaran does something good. He does not put his number at the
950 top so you can easily take it. Instead, he shows a table with alternative estimates that I have
951 clipped below.
952

⁷ Equity Risk Premiums (ERP): Determinants, Estimation, and Implications – The 2022 Edition Updated: March 23, 2022, Aswath Damodaran, Stern School of Business, adamodar@stern.nyu.edu.

Table 25: Equity Risk Premium (ERP) for the United States – January 2022

Approach Used	ERP	Additional information
Survey: CFOs	4.42%	Campbell and Harvey survey of CFOs (2018); Average estimate. Median was 3.63%.
Survey: Global Fund Managers	4.60%	Merrill Lynch (January 2014) survey of global managers
Historical - US	5.13%	Geometric average - Stocks minus T.Bonds: 1928-2018
Historical – Multiple Equity Markets	3.20%	Average premium across 20 markets from 1900-2017: Dimson, Marsh and Staunton (2018)
Current Implied premium	4.24%	From S&P 500 – January 1, 2022
Average Implied premium (1960-2021)	4.21%	Average of implied equity risk premium
Average Implied premium (2012-2021)	5.35%	Average of implied equity risk premium
Default spread based premium	3.62%	Baa Default Spread on 1/1/22 * Median value of (ERP/ Default Spread)

953

954

955 **Q. Elaborate on the EMRP from the survey of financial managers.**

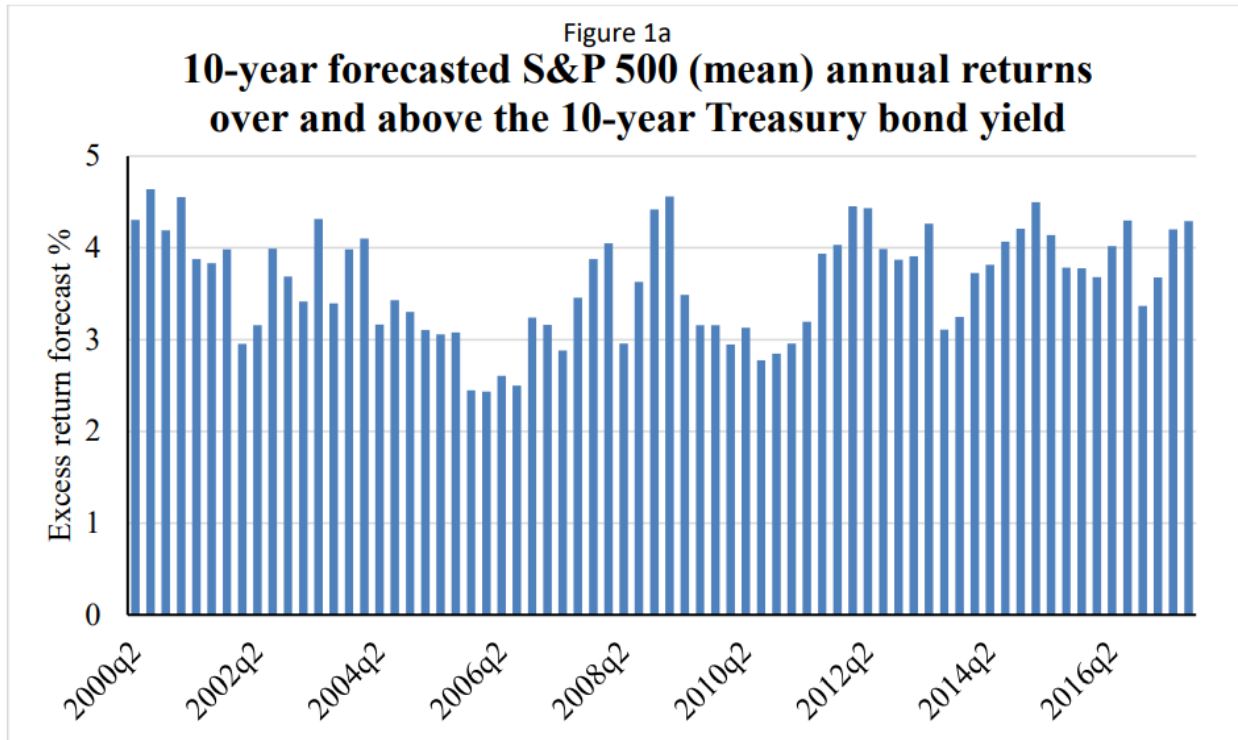
956 A. In writing up the EMRP, Damodaran refers to a survey of what other people use for the
 957 EMRP. As I have emphasized, the Commission can look at what other’s use rather than spending
 958 a lot of time understanding an independent study. Damodaran includes the following statement
 959 about the surveys:

960

961 Professors from Duke University, Graham and Harvey have been conducting annual
 962 surveys of Chief Financial Officers (CFOs) or companies for roughly the last decade with
 963 the intent of estimating what these CFOs think is a reasonable equity risk premium (for the
 964 next 10 years over the ten-year bond rate). In their December 2018 survey, they report an
 965 average equity risk premium of 4.42% across survey respondents, up from the average
 966 premium of 3.37% a year earlier. The median premium in the December 2017 survey was
 967 3.63%, close to the prior year’s value of 3.55%.

968

969 The most important thing for the Commission to do is to scan this picture and notice that
 970 8.7% is way off the scale of the graph. The study of Graham and Harvey included the graph
 971 below.



973

974

975

976 **Q. Do you find ComEd’s effort to independently compute the EMRP commendable?**

977 A. I do not. ComEd’s number is not consistent with what most others use. In Exhibit 1.5 I
 978 discuss the details of what I think is wrong with ComEd’s study.

979

980 **Q. Comment on the EMRP and ComEd’s formula rates**

981 A. When I heard that ComEd is earning 5.8% above the Treasury bond rate in its formula
 982 rates, I immediately thought about the EMRP and beta. With a beta of 1.0, which is an absurd
 983 number for any utility company (see the next section), this implies an EMRP of 5.8%. The 5.8% is
 984 far too high and allows ComEd to earn a return higher than its cost of capital. With a much more
 985 reasonable beta of .5, the implied EMRP doubles, implying a sky high EMRP of 11.6% (5.8% =
 986 11.6% x .5). The fact that ComEd earned more than its cost of capital during the formula rate
 987 period is confirmed by ComEd’s own cost of capital calculations in its impairment studies.

988

989

CAPM Input Number 2:

990

**Ways that Beta Can be Distorted and How You Can Evaluate Betas Using Basic Logic to
Decide Which Beta is Appropriate**

Q., Please discuss the general issue of the second number in the CAPM -- beta and risk.

A. In the CAPM model, the only measure of the risk of a company is the beta statistic. The supposition that all of the risk of a company can be dumped into a single statistic that is computed from a regression of the periodic returns for one company relative to the periodic returns of the overall market is certainly a controversial idea. For the sake of brevity, I am leaving out a discussion of theoretical issues concerning beta, although I do include some discussion about the theory in PIRG Exhibit 1.6 in the context of the beta .76/.33 adjustment I discuss below. The problem with beta for the Commission is more practical and analogous to the issues with the EMRP. There are different ways of getting the beta in practice and the Commission has the difficult job of figuring out which beta is reasonable.

As with the EMRP, I will provide some guidance as to how one can sift through different estimates and make a logical conclusion without just picking a number. I demonstrate that the beta statistic can be very different by taking numbers from alternative sources; by adjusting the statistical numbers, by using weekly instead of monthly data, and by selecting alternative companies in a sample.

Q. What is the effect of applying alternative beta statistics in evaluating the cost of capital?

A. ComEd's witness Graves uses two alternative estimates of the beta statistic, one number that he takes from Bloomberg of .869 and another number that represents the long-term beta and which is .727. I demonstrate in subsequent answers that a much lower beta numbers should be used. To introduce the beta discussion, the table below illustrates the effect of different beta estimates on the cost of equity capital.

$$\text{Cost of Equity} = \text{Risk Free Rate (Rf)} + \text{Beta} \times \text{EMRP}$$

ComEd Low Estimate	10.39%	=	4.06%	+ .727	x	8.7%
ComEd High Estimate	11.62%	=	4.06%	+ .869	x	8.7%
ConEd Beta	7.10%	=	4.06%	+ .350	x	8.7%
ComEd Adjusted Sample	8.50%	=	4.06%	+ .510	x	8.7%

1024
1025 To understand the effect of ComEd's assumptions, consider that the beta of Microsoft is
1026 .91. This means that if you invested in ComEd – a company with no market risk, no obsolescence
1027 risk, no overcapacity risk, no competition risk, your risk would be just about the same as for
1028 Microsoft, a company that faces all of these risks. This beta result would imply that the minimum
1029 rate return that you need to invest in Microsoft is about the same as the minimum rate of return
1030 that you need to invest in ComEd.

1031

1032 **Q. Is ComEd a boring company?**

1033 A. Yes, the company is very low risk and boring company. Growth is slow and stable, if costs
1034 go up, the company can make a submission to the Commission to recover the cost. If sales growth
1035 is greater than expense and rate base growth, the company can make extra profits without changing
1036 rates. There is no electricity merchant price risk. There is no risk associated with obsolescence of
1037 coal plants. There is no direct commodity price risk. There is no risk from market surplus
1038 capacity. S&P states the following about ComEd's risk in the report attached by a ComEd witness
1039 to her testimony:

1040

1041 "ComEd's business risk ... [is] low risk ... from regulated T&D utility operations that
1042 provide an essential service in Chicago and Northern Illinois. Given material barriers to
1043 entry, ComEd and the regulated utility industry as a whole are effectively insulated from
1044 competitive market challenges."⁸
1045

1046 **Q. Is there one single beta that is reported for ComEd that you can pull from the**
1047 **internet?**

1048 A. Unfortunately, not. As with other elements of estimating cost of capital, you cannot pick
1049 up the Wall Street Journal and read off a single number for beta that is universally accepted. This
1050 means that in order to make an informed decision about the cost of capital that depends on the beta
1051 statistic, the hearing examiner, the Commissioner, and others should understand why you can
1052 come up with different numbers for beta. I will demonstrate that you can get a different beta
1053 statistic depending on the three items below and, more importantly, there is a right way and a
1054 wrong way to find the correct beta in the context of this proceeding.

1055

1056 1. Different comparative company samples are used in computing beta.

⁸ This is from ComEd Exhibit 6.01.

- 1057 2. Different stock price time periods are used (e.g., weekly or monthly stock prices)
1058 3. Arbitrary adjustments can be made to push betas towards 1.0.

1059
1060 **Q. Discuss ComEd witness Graves' sample of companies and how the beta is affected by**
1061 **the selection of a sample?**

1062 A. The beta statistic cannot be computed for ComEd because the company is owned by
1063 Exelon and Exelon used to own generating assets that are subject to different risks with merchant
1064 power markets. As the beta is computed from historic data, the Exelon beta includes the effects of
1065 merchant power risk when Exelon owned generating assets. These risks associated with
1066 generation are very different than risks for distribution operations alone, and I agree with ComEd's
1067 witness Graves that the beta must come from a company other than Exelon. But what one should
1068 not do is trust a supposedly comparative sample where details of the comparable companies are
1069 not clearly listed and understood.

1070 Before the 1990's most utility companies had similar risk and all of their assets were
1071 subject to rate of return regulation. But after some parts of the country deregulated generation, the
1072 risks faced by companies changed dramatically. PG&E and Southern California Edison declared
1073 bankruptcy after the California power market crisis; the nuclear generation assets of Texas Utilities
1074 has been among the largest default in the world; NextEra, the company that owns Florida Power
1075 and Light became the electricity company with the highest market capital in the world because of
1076 its investment in renewable energy; companies like Duke Energy have invested in all kinds of
1077 competitive generating assets. These days finding a true comparative company that is as low risk
1078 as ComEd is not an easy task. It is certainly not appropriate to compare a company with merchant
1079 risks to a company that owns regulated distribution assets. NextEra, Duke Energy, Edison
1080 International (formerly Southern California Edison) are in ComEd Witness Graves's sample. The
1081 sample used by Duff & Phelps in computing the impairment study is much more appropriate than
1082 the sample used by Mr. Graves.

1083
1084 **Q. How does ComEd's beta for its sample of companies compare to betas that are**
1085 **computed in different ways?**

1086 A. The table below shows beta calculations from different sources. I have included the details
1087 of my sources and my own calculations in PIRG Exhibit 1.6. This table illustrates that ComEd
1088 uses betas that are higher than the beta you get by going to public sources such as
1089 yahoo.finance.com or by computing the beta by yourself. I explain in PIRG Exhibit 1.6 that

1090 computing beta is really easy in a spreadsheet and the betas that ComEd's witness has computed
 1091 are much higher than the betas you get when you make the calculations by yourself. I demonstrate
 1092 in the next few questions that the best beta statistic is the beta computed by yahoo.finance.com for
 1093 five years or sixty months. The screenshot illustrates that weekly betas are somewhat higher than
 1094 the monthly beta when computed for the same time periods. If the statistical properties of stock
 1095 returns were the same, I show in Exhibit 1.6 that this difference should not be present.
 1096

	ComEd Current Beta	ComEd Long- term Beta	Yahoo Reported Beta	Computed Beta - 2018- 2023	Computed Weekly Beta - 2018-2023
ALLETE Inc ALE	0.88	0.84	0.71	0.74	0.85
Alliant Energy Corporation LNT	0.85	0.78	0.52	0.56	0.55
Ameren Corporation AEE	0.81	0.77	0.43	0.46	0.48
American Electric Power Company Inc AEP	0.81	0.77	0.44	0.46	0.57
Avista Corporation AVA	0.79	0.75	0.49	0.51	0.54
Duke Energy Corporation DUK	0.79	0.73	0.41	0.42	0.49
Edison International EIX	0.93	0.74	0.79	0.84	0.87
Entergy Corporation ETR	0.92	0.74	0.63	0.65	0.84
Eversource Energy ES	0.85	0.73	0.47	0.50	0.50
Evergy Inc EVRG	0.87	0.73	0.47	0.51	0.55
IDACORP Inc IDA	0.82	0.72	0.59	0.62	0.58
NextEra Energy Inc NEE	1.02	0.73	0.44	0.47	0.55
NorthWestern Corporation NWE	0.93	0.71	0.44	0.49	0.65
OGE Energy Corporation OGE	0.98	0.71	0.69	0.74	0.87
Otter Tail Corporation OTTR	0.89	0.70	0.50	0.52	0.59
Portland General Electric Company POR	0.83	0.64	0.58	0.63	0.62
Xcel Energy Inc XEL	0.81	0.58	0.42	0.46	0.42
Mean	0.87	0.73	0.53	0.56	0.62
Median	0.85	0.73	0.49	0.51	0.57

1097
 1098
 1099 **Q. Is it necessary to have a big sample of companies when evaluating ComEd's beta so**
 1100 **you can gauge how much investors need to accept ComEd's risk?**
 1101 A. Absolutely not. It is difficult to make arbitrary rules when selecting companies with
 1102 different betas that can bias the sample. To illustrate problems in ComEd's sample, take two
 1103 companies that have relatively high betas as measured by finance.yahoo.com. These two
 1104 companies are OGE which has a yahoo. Finance beta of .69 and Edison International which has a
 1105 beta of .79. Further, as a statistical measure, the yahoo beta looks backwards five years. These
 1106 two companies are OGE Energy Company that owns Oklahoma Gas and Electric but used to also

1107 own a big non-regulated company and Edison International, which is not very international
1108 anymore and which owns Southern California Gas and Electric. Over the beta calculation period,
1109 both companies have had huge write-offs as illustrated in the screenshot below. OGE's write-off
1110 was in 2020 and Edison International's write-off was in 2018. The events that caused these large
1111 write-offs were in the beta calculation period and clearly affected the investor risk and the
1112 companies should not be included in the sample for evaluation of a very low-risk distribution
1113 company. These companies are extreme examples of problems with ComEd's study. Other less
1114 extreme examples are related to companies with generating assets and with non-regulated assets.

1115

1116 **Q. Why are the betas used by ComEd's witness higher than the betas that come from**
1117 **other sources?**

1118 A. There are a few reasons and unfortunately understanding why the betas are different and
1119 which data is correct can get technical. I explain the differences and technical details in detail in
1120 PIRG Exhibit 1.6. The differences that I discuss include:

1121

- 1122 1. Bloomberg uses two years of data while Yahoo uses more traditional five-year data. In
1123 PIRG Exhibit 1.6 I use Monte Carlo simulation and historic beta statistics to show that does
1124 not make much difference in theory or practice.
- 1125 2. Bloomberg uses weekly data while Yahoo uses monthly data. I demonstrate in PIRG
1126 Exhibit 1.6 that it is somewhat more appropriate to use monthly data because of statistical
1127 issues, but this does not make much of a difference.
- 1128 3. The Bloomberg beta option used by witness Graves includes an adjustment that pushes
1129 betas toward 1.0 and increases the cost of capital. This is a more important issue than the
1130 above two subjects above. I discuss the issue in general terms below and in more technical
1131 terms in PIRG Exhibit 1.6.

1132

1133 **Q. Describe the adjustment that Bloomberg makes to beta which is not made by Yahoo.**

1134 A. The adjustment puts lower weight on the beta directly computed from the stock prices that
1135 were in basis for the original CAPM development and portfolio theory. ComEd described this
1136 adjustment in response to a data request, where the company stated the following:⁹

1137

⁹ ComEd response to C-1.57(d).

1138 Bloomberg applies the Blume adjustment to the raw betas, computed as:

1139 $\beta = 2/3 \times (\text{raw}) + 1/3 \times (1)$.

1140

1141 For the sake of discussion, I refer to the adjustment as the .67/.33 adjustment. To illustrate
1142 how this adjustment works, take the yahoo beta for Eversource in the table above which is about
1143 .5. The adjusted beta is $.67 \times .5 + .33$ or .665. Note that the Bloomberg beta of .85 for Eversource
1144 shown in the above screenshot is even higher than this. All the .67/.33 adjustment referred to in
1145 ComEd's data request does is to push the beta toward 1.0. Unfortunately, the adjustment cannot
1146 be ignored by the Commission because it increases the cost of capital and prices paid to ComEd by
1147 ratepayers. In PIRG Exhibit 1.6 I discuss technical details of why you could make this adjustment
1148 and why the .67/.33 adjustment is completely inappropriate for stable utility companies.

1149

1150 **Q. What are reasons why the Commission could agree with the arbitrary .67/.33**
1151 **adjustment to beta?**

1152 A. It is unfortunate that the Commission must make assessments as to which beta to use – e.g.,
1153 Bloomberg with the .67/.33 adjustment or Yahoo without the adjustment. Whoever at the
1154 Commission makes this decision, which ultimately has a big impact on rates, should hopefully
1155 understand what the rationale for the arbitrary .67/.33 adjustment could be. Luckily, you do not
1156 have to get too technical. The primary issue that the Commission has to address involves whether
1157 the risk of stable distribution companies with little risk (as measured by beta) changes over time
1158 (other more minor issues are discussed in PIRG Exhibit 1.6).

1159 If the Commission believes that utility companies become riskier over time, then it could
1160 accept something like the Bloomberg beta. This idea that companies gradually converge to the
1161 risk of the overall market is typically given as the reason for making the arbitrary adjustment. If,
1162 on the other hand, you believe that the risk of ComEd and other utility companies is pretty stable
1163 over time like I do, then you choose the Yahoo beta. In PIRG Exhibit 1.6 I have studied the betas
1164 of utility companies and demonstrate that they are indeed stable. This analysis conforms to the
1165 logical conclusion that ComEd is not gradually evolving into a riskier company like Tesla or
1166 United Airlines. My data demonstrates that if the Commission is going to use beta, it should use
1167 the yahoo beta or, better yet, the beta that is directly computed from stock prices.

1168

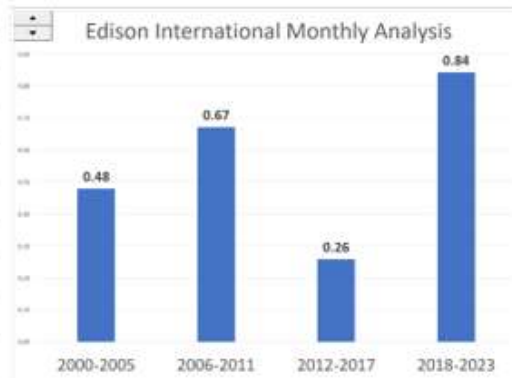
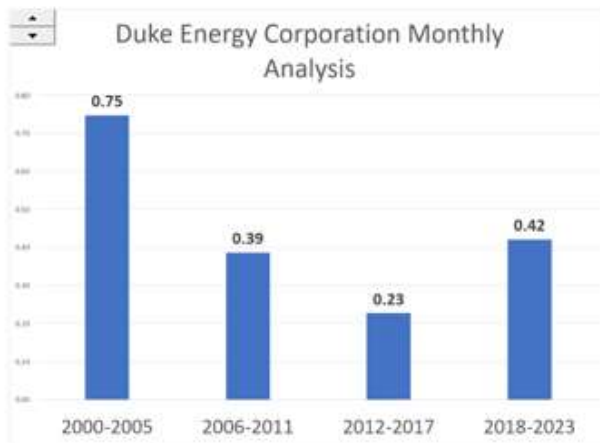
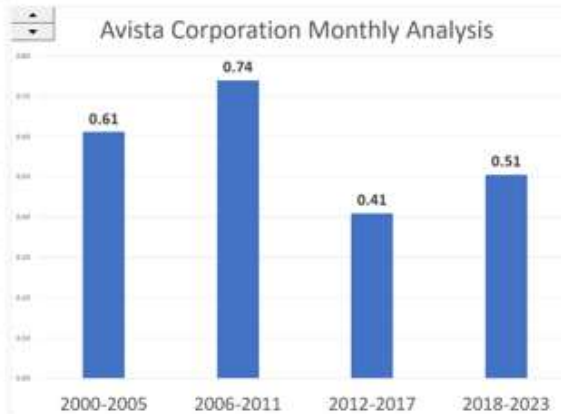
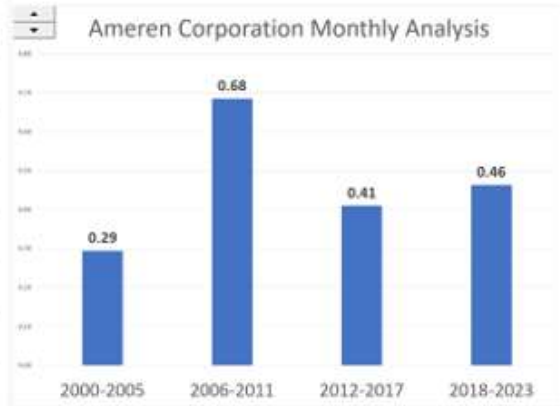
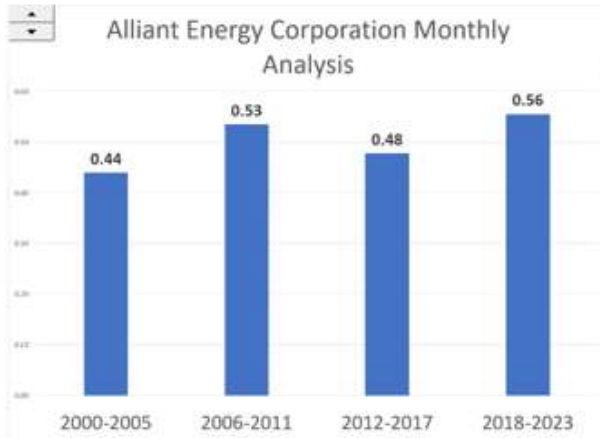
1169 **Q. What are the implications of the arbitrary .67/.33 beta adjustment in the context of**
1170 **witness Graves' ECAPM?**

1171 A. The adjustment that Bloomberg makes to the raw beta is the same adjustment that ComEd
1172 makes when it applies the ECAPM (this is documented in witness Graves' testimony at line 992).
1173 Mr. Graves' adjustment takes a beta that is directly computed from Bloomberg beta and multiplies
1174 it by .75. ComEd adds the number .25 to the product. So, ComEd's ECAPM further applies a
1175 .75/.25 adjustment to a beta that already has the .67/.33 adjustment which pushes betas towards 1.0.

1176 To illustrate, continue with the Eversource example which is .5 using the Yahoo beta. As
1177 shown above the adjusted beta would be $.67 \times .5 + .33$ or .665. But Mr. Graves then adjusts the
1178 already adjusted beta. If we use the Eversource example, this means you would first adjust the
1179 beta from .5 to .665. Then you would make another adjustment on the .665 yielding $.665 \times .75 +$
1180 $.25$ or .748. Making a double adjustment to beta is not explained in the ComEd testimony could be
1181 an oversight.

1182 In PIRG Exhibit 1.6 I also discuss a second rationale for using the .67/.33 adjustment that
1183 Mr. Graves mentions. In response to a data requests, Mr. Graves provided famous articles debating
1184 whether "beta is dead" as justification for the .75/.25 adjustment. Mr. Graves does not interpret
1185 these articles correctly. The articles do not mention the .67/.33 or .75/.25 adjustments. Instead, the
1186 articles imply that the CAPM should not be used if the beta does not correctly explain differences
1187 in risk. In PIRG Exhibit 1.6 I explain how the possibility of betas not correctly measuring risk and
1188 return does not justify the arbitrary .67/.33 adjustment.

1189 I have made a study of whether betas gradually become 1.0 for the companies in Mr.
1190 Graves' sample. This study, again in Exhibit 1.6 demonstrates that there is no tendency for the
1191 betas of companies to increase to 1.10 which could possibly justify the .67/.33 or the .75/.25
1192 adjustments. An excerpt from this analysis is shown below. All you have to do is look at the trends
1193 in beta. If anything, you can see movement towards .5. You can scan many more of these graphs in
1194 the Exhibit (the exception is Edison International which had the big write-off as explained above).
1195



1196
1197
1198

1199 **Q. Using a more appropriate sample and the Yahoo beta, what is an alternative beta?**
 1200 A. The table below shows betas for a more appropriate sample using the different calculation
 1201 methods. Using the simple logic that risks of utility companies should not increase or decrease
 1202 over time and sensible comparative companies, the Commission should use a beta between .35
 1203 and .5.

	ComEd Current Beta	ComEd Long- term Beta	Yahoo Beta	Yahoo with .67/.33 Adjustment
Alliant Energy Corporation LNT	0.85	0.78	0.52	0.68
Ameren Corporation AEE	0.81	0.77	0.43	0.62
Eversource Energy ES	0.85	0.73	0.47	0.64
Xcel Energy Inc XEL	0.81	0.58	0.42	0.61
ConEd			0.35	0.56
FirstEnergy			0.43	0.62
Southern Company			0.48	0.65
WEC			0.38	0.58
Average	0.83	0.72	0.44	0.62
Median	0.83	0.75	0.43	0.62

1205

CAPM Input Number 3:

Understanding Inflation Risk an Application of the Risk-Free Rate

1210 **Q. Unlike the EMRP and the beta is it easy to find the risk-free rate and put a number in**
 1211 **the CAPM?**

1212 A. The question of what interest rate to use as the risk-free rate in the CAPM is not as
 1213 straightforward as one may think. This is because of the risk associated with forecasting inflation
 1214 that is inherent when investing in treasury bonds which are typically used to represent the risk-free
 1215 rate. To introduce issues with the risk-free rate, I begin by showing the effect of different risk-free
 1216 rates on the cost of equity estimate that comes out of the CAPM.

1217

$$\text{Cost of Equity} = \text{Risk Free Rate (Rf)} + \text{Beta} \times \text{EMRP}$$

1218

1219

1220	ComEd Low Estimate	10.39%	=	4.06%	+ .727	x	8.7%
1221	ComEd High Estimate	11.62%	=	4.06%	+ .869	x	8.7%
1222	Recent 30-year Treasury	10.09%	=	3.77%	+ .727	x	8.7%
1223	Recent 5-year Treasury	9.98%	=	3.66%	+ .727	x	8.7%
1224	TIPS Plus Inflation	9.77%	=	3.45%	+ .727	x	8.7%

1225

1226 **Q. Discuss the risk-free rate in the context of inflation risk.**

1227 A. As I introduced in the EMRP section, the treasury bond yield is the only element in the
 1228 traditional CAPM analysis that includes an implicit forecast of inflation. In theory, the period of
 1229 inflation implicit in the cost of capital should correspond to the length of time ComEd rates will be
 1230 in place (and not some kind of asset duration). In this regard, ComEd uses the 30-year treasury
 1231 bond to represent the risk-free rate which I do not think is appropriate. The implicit inflation
 1232 forecast and, more importantly, the risk associated with the implicit inflation forecast in a 30-year
 1233 treasury bond is much longer than the period that rates will be in place from this proceeding (i.e.,
 1234 between this proceeding and the next time ComEd comes to the Commission for a rate decrease or
 1235 a rate increase).

1236 In a data request, Mr. Graves was asked about the risk associated with inflation when you
 1237 hold a treasury bond. The question was: “Does the witness agree that treasuries are risk free if
 1238 held to maturity in real purchasing power.” Mr. Graves responded:

1239

1240 “Mr. Graves does not agree. If inflation changes during the maturity of a Treasury bond,
 1241 its real purchasing power will change as well, even though the nominal recovery is fixed.”
 1242

1243 I completely agree Mr. Graves. When an investor buys a 30-year bond, the return is in fact
 1244 not at all risk free in real purchasing power terms even if the investor holds the bond to maturity.
 1245 If the inflation rate turns out to be higher than the rate implied when the bond is purchased, the
 1246 investor loses real purchasing power to buy things. This means that the long-term bond yield does
 1247 not represent a risk free asset, and using a long-term bond yield overstates ComEd’s cost of
 1248 capital. Furthermore, the longer the bond maturity (i.e., 30 years) the more the inflation risk
 1249 because you have to guess what inflation will be for 30-years. You can even look at the volatility
 1250 of returns on long-term government bonds versus short-term bonds to see that calling 30-year
 1251 treasury bonds risk free is not correct.

1252

1253 **Q. Can you think of a circumstance where it is appropriate to use a 30-year Treasury**
1254 **Bond for the risk-free rate?**

1255 A. Yes, to illustrate why use of a 30-year bond yield is wrong for ComEd in this proceeding,
1256 think about a situation where it could be appropriate to use a long-term bond yield. This situation
1257 is completely different than the current rate proceeding for ComEd. Assume someone is setting
1258 prices for a purchased power contract associated with a single asset such as a solar project where
1259 pricing in the contract has a tenor of 30-years or more.¹⁰ In this case, if the pricing in the
1260 purchased power contract is fixed in nominal terms, the investor wants to lock in inflation over a
1261 very long period. Here you could make a reasonable argument that the 30-year Treasury rate
1262 should be used because the project developer is taking inflation risk for a long period. Such a
1263 situation is of course not the case with ComEd because prices do respond to changes in the
1264 inflation rate every time there is a rate case. The company has the option to ask for rate increases
1265 when the inflation rate changes as it has done with this rate case and it does not have to lock in a
1266 long-term inflation rate.

1267
1268 **Q. Did Mr. Graves implicitly (not explicitly) acknowledge that ComEd stock has lower**
1269 **risk (and by implication lower cost of capital) than government bonds?**

1270 A. Yes. Mr. Graves quoted a man for Summit Financial in his direct testimony who stated the
1271 following:

1272
1273 “The 10-year is repricing everything. I’ve got something that’s even safer and yields even
1274 more ... comparing Treasuries and utility stocks.”
1275

1276 This comment from Summit Financial implies that utility stocks are lower risk by virtue of the
1277 phrase that they are “even safer.” I agree with the implication of the quote. If you invest in a
1278 utility bond, your dividends will generally increase with inflation because of the option for utility
1279 companies to ask for compensatory rate increases. This option to hedge inflation risk is not
1280 possible for treasury bonds that have a fixed nominal rate.

1281 Again, if you earn 2% on a bond and the inflation rate turns out to be 5%, you have lost
1282 money in real purchasing power terms (if you want to buy a car in a couple of years, the money
1283 you receive on your bond will be less than the inflation in the car cost). But companies like

¹⁰ The contract that has a duration of 30-years (if the contract collects money over 30 years, the duration will be a lot less than 30-years).

1284 ComEd can take away this risk as illustrated by this rate case that recovers inflated costs. All of
1285 this means that the last input into the cost of capital formula for the risk-free rate should be
1286 adjusted to account for inflation risk that is present in long-term government bonds.
1287

1288 **Q. Is it possible to take inflation risk out of the risk free rate using the TIPS rates plus**
1289 **expected inflation?**

1290 A. Yes, it is possible, but you must then directly estimate inflation. Treasury Inflation
1291 Protected Securities (“TIPS”) are debt issued U.S. government whose principal value is adjusted
1292 periodically when the inflation rate changes. As shown in the graph below, the 10-year TIPS
1293 interest rate is 1.36% and the 5-year TIPS rate is 1.29%. This means that if an investor buys a
1294 TIPS, he or she is assured of the fixed rate of 1.29% or 1.36% and then the inflation rate is added
1295 to this number. Here, this investor does not take inflation risk because if the inflation rate increases,
1296 his or her purchasing power is maintained. When you look at this graph, remember that this rate
1297 excludes inflation and the inflation rate could be added to the yield to come up with a nominal risk
1298 free rate to use in the CAPM. This means investors do not have to fix the rate of inflation and take
1299 inflation risk.

1300



1301

1302

1303

1304 **Q. Using the EIA forecast of Inflation and a five-year TIPS, what is the resulting risk**
1305 **free rate?**

1306 A. When using TIPS debt as the risk free rate you need an inflation forecast. I have applied
1307 inflation rates projected by the EIA (I included the EIA spreadsheet in my workpapers). Over the
1308 period 2024 to 2027, the expected inflation is 2.16% when using the GDP implicit price deflator (if
1309 you go to the grocery store you may not believe this number). Adding the inflation rate to the
1310 TIPS rate yields a nominal risk free rate of 1.29% + 2.16% or 3.45%. I have included my sources
1311 for the interest rate data and some graphs in PIRG Exhibit 1.9.

1312

1313 **Q. As you are (finally) getting to the end of the CAPM discussion, summarize the CAPM**
1314 **estimates made in the impairment studies.**

1315

1316 A. I have put together the CAPM studies that were made by ComEd in the impairment studies
1317 over the past five years in the table below. In the left hand column I include the cost of equity
1318 used in the study. In the right hand column I recompute the cost of equity in the impairment study
1319 by changing only the risk free rate. This means that the EMRP and the beta from the original
1320 impairment study are used for the different estimates. I think it is important that the Commission
1321 can see ComEd's own numbers. The average of the numbers using the current risk free rate is
1322 7.51%. If you apply the TIPS plus inflation rate method for the risk free rate, the numbers in
1323 column 6 are reduced by 3.77% - 3.45% or .32%. This implies an average cost of equity of 7.19%.

1324

Cost of Equity in ComEd's Own Impairment Study with Current Risk Free Rate

	Cost of Equity	Risk Free Rate	EMRP	Implied Risk Premium	Implied Beta	Current 10-year Yield	Cost of Equity with Current Yield
	(1)	(2)	(3)	(4)	(5)	(6)	(6)
				(1-2)	(4/3)		
2018 Study	6.50%	3.50%	5.00%	3.00%	0.60	3.77%	6.77%
2019 Study	5.80%	3.00%	5.50%	2.80%	0.51	3.77%	6.57%
2020 Study	6.60%	2.50%	6.00%	4.10%	0.68	3.77%	7.87%
2021 Study	7.20%	2.50%	5.50%	4.70%	0.85	3.77%	8.47%
2022 Study	8.50%	4.40%	6.00%	4.10%	0.68	3.77%	7.87%

1325

1326 Another reason I present these cost of equity numbers from the impairment studies is to
1327 illustrate some of the biases and conceptual mistakes that are often made in estimating the cost of
1328 capital. Duff & Phelps, the firm completing the study, changed the source of its beta estimate and
1329 then, within two years, the beta went from .51 to .85. This implies that risk has increased by 67%
1330 in two years. Similar questions can be asked about the EMRP. There are arguments that the
1331 expected premium required to take risk may change. But the way this expected risk premium
1332 bounces around for items like measuring the risk of a company is not plausible.

1333

1334 **Q. What is the result of your application for the CAPM?**

1335 A. I would like to say that you, the reader, can now look at the three CAPM inputs and then
1336 pick your own number. I think that you will come up with a low number for the cost of equity. I
1337 emphasize that anybody in the process can think a bit about the three underlying numbers and
1338 make independent conclusions so there is thought behind the conclusions. I have applied
1339 reasonable numbers and a very high range for the three CAPM numbers below. I am reluctant to
1340 even show this range as it is so much more important to understand where the numbers come from.

1341

1342		Cost of Equity	=	Risk Free Rate (Rf)	+	Beta	x	EMRP
1343	Reasonable Case:	5.21%	=	3.60%	+	.40	x	4.0%
1344	Very High Case:	6.40%	=	3.80%	+	.50	x	5.2%

1345

1346

1347 **SECTION IV: IN APPLYING THE DCF METHOD REAL GROWTH**
1348 **RATES ABOVE POPULATION GROWTH IN THE LONG-TERM DO NOT**
1349 **MAKE SENSE**

1350

1351 **Q. Describe how the DCF method can be used to back into the cost of capital?**

1352 A. Using the DCF model involves two parts. First you make an assumption about how
1353 investors predict cash flow over an indefinite period. Then you back into the discount rate (which
1354 is the cost of capital) that produces current stock prices. The key to the DCF is the first part,
1355 namely your assumption about how you think investors predict cash flow. More specifically, as
1356 corporations last indefinitely for purposes of this analysis, you must input how you think investors
1357 assess the future growth in cash flow over an indefinite period.

1358 To think about how the DCF works, pretend you have your own ideas about how a
1359 company will grow and what kind of return it will earn in the future. Further, you are convinced
1360 that your ideas are correct. But everybody else who values the company and who directly or
1361 indirectly drives the price of the shares has what you think is an irrational opinion about both
1362 future returns and growth. In implementing the DCF model to compute the cost of capital, your
1363 very rational ideas about growth and return do not matter. To derive the cost of capital you need
1364 instead to mimic how people who drive the price of the stock make their valuations. The analyst
1365 assumptions (which may be irrational in your opinion) create cash flow -- the CF part of DCF. To
1366 compute the value of the shares, the cash flow must be discounted -- the D part of DCF. The
1367 discount rate (the cost of capital) applied to the cash flow drives the valuation and the stock price.
1368 You can think of this in terms of a very simple equation in two steps:

1369

1370 Step 1: Value of shares = Analyst Cash Flow (CF)/Discount Rate (D)

1371 Step 2: Back out D: $D = \text{Analyst Cash Flow (CF)}/\text{Value of Shares}$

1372

1373

1374 **Q. Mr. Graves suggests in response to a data request that the DCF can only be computed**
1375 **using a dividend growth model. Do you agree?**

1376 A. Respectfully, no. One can argue about what cash flow model (the CF part) is most
1377 appropriate to use in estimating how share prices are derived (ComEd uses the simple dividend
1378 growth model to estimate cash flow). One can then argue about what the growth and return drivers
1379 should be in the model to mimic how valuation analysts determine cash flow over an indefinite
1380 period (ComEd agrees that cash flow is forecast over an indefinite period). But ComEd provided
1381 the following answer to a data request that I have copied below¹¹. This demonstrates that Mr.
1382 Graves believes only a dividend model can be used in applying the DCF:

1383

1384 **Question:** Provide an explanation of the typical process for computing company value
1385 from a DCF model (e.g., present value of free cash flow to establish enterprise value
1386 subtraction of net debt to establish equity value).

1387

1388 **Answer:** ComEd objects to this request as vague and ambiguous. Subject to and without
1389 waiving any of its objections, ComEd responds as follows:

1390

¹¹ ComEd response to C-1.49(b).

1391 This request seems to confound two (2) possible meanings for the acronym DCF. As used
1392 in Graves Dir., ComEd Ex. 14.0, Mr. Graves is referring to estimating the cost of equity
1393 from dividend yields and growth rates, which already requires the value of the company to
1394 be known (as the denominator of the dividend yield). The second possible usage would be
1395 “discounted cash flow” as in projecting future annual cash flows and then discounting
1396 those back to determine an enterprise value or equity value. This type of analysis is not
1397 relevant to this proceeding. More generally, Mr. Graves has not conducted and is not
1398 aware of any study that has determined the “typical” process for computing company value
1399 from a DCF model. The methodology described parenthetically in the question is one of
1400 many ways that the DCF model can be used to estimate a company’s value, but typically
1401 multiple methods of valuation are applied.
1402

1403 Mr. Graves is gauging how analysts project dividend growth, which is equity cash flow
1404 when he computes his DCF numbers. He discounts the expected future dividends (the CF) at a
1405 discount rate (the D) that establishes stock value. That’s what the dividend discount model has
1406 always done. If dividend discounting is the way everybody computes cash flow to value shares,
1407 fine. In the data request response, Mr. Graves also does acknowledge that you could compute
1408 discounted cash flow in a different way to establish value. But he suggests that any other method
1409 of valuation other than the simple dividend growth model is “not relevant.” I disagree and I
1410 suggest it incorrect to say that anything other than a very simple estimate of dividend growth
1411 forever (computed from earnings estimates) is relevant when backing into the discount rate from
1412 expected cash flow.
1413

1414 **Q. Is there a question as to whether analyst forecasts of five-year growth are unbiased?**

1415 A. There is. The question of whether analyst forecasts of earnings such as those from Value
1416 Line and Yahoo are upwardly biased has is a controversial issue in finance. When looking at the
1417 pictures of market to book ratio and ROE in Section II, I presented the historic growth compared to
1418 the projected growth. For most (but certainly not all) of the comparative companies, the projected
1419 growth is more than the historic growth (see PIRG Exhibit 1.4). A study written by Steven A.
1420 Sharpe from the Federal Reserve suggests there is an upward bias. Mr. Sharpe states:
1421

1422 “One finding is that long-term forecasts are not only upward biased, like forecasts on more
1423 specific, shorter-term horizons, but they also appear to be “extreme”; that is to say, the
1424 higher a growth forecast is, the more upward biased it tends to be.”¹²
1425

¹² How Does the Market Interpret Analysts’ Long-term Growth Forecasts? Steven A. Sharpe, Division of Research and Statistics, Federal Reserve Board, page 17.

1426 If the growth rates are upwardly biased, then the DCF cost of equity capital estimates computed by
1427 Mr. Graves are also upwardly biased. Because of other problems with the way Mr. Graves
1428 computed the DCF, I leave this issue about potential bias in five-year growth alone. But I do note
1429 that if you accept that analysts have a tendency to over-estimate growth, cost of capita numbers
1430 computed from the DCF model are overstated.

1431

1432 **Q. Even if the growth rate is constant, are there other ways to apply the DCF model?**

1433 A. Yes. You can evaluate what drives dividends – growth and return – and derive many
1434 different formulas for the cost of capital using models of cash flow. I show how to establish these
1435 formulas in PIRG Exhibit 1.2 although it is not that important to see how the formulas are derived.
1436 All of the formulas depend on a constant growth rate assumption and would be rarely used in real
1437 world valuations because growth rate is not constant. When analysts make their forecasts, the long-
1438 term growth would not be used as the long-term growth number. The formulas begin with the
1439 extremely simple dividend discount model applied by Mr. Graves and then add the fact that
1440 dividends are related to growth and return. In these formulas k represents the cost of equity; D
1441 represents dividends; P/E represents the price to earnings ratio and g represents the forever growth
1442 rate that is always the same:

1443

$$1444 \quad k = D_1/\text{Value} + g$$

1445

$$1446 \quad k = (1-g/\text{ROE})/\text{Forward } P/E + g$$

1447

$$1448 \quad k = \text{EPS}_1 \times (1-g/\text{ROE})/\text{Value} + g$$

1449

$$1450 \quad k = (\text{ROE}-g) \times \text{Price to Book} + g$$

1451

1452 The first formula -- the one used by ComEd -- is the simplest and implicitly assumes that
1453 earnings growth is the same as dividend growth. The second and third equations include a difficult
1454 assumption relating to what happens if the implicit ROE in the EPS is different from the ROE in
1455 the other part of the equation. The fourth equation allows you to evaluate the k , but it is not useful
1456 if the growth rate changes and if the ROE changes. What the formulas do show is that when
1457 simulating how analysts derive value, you need to be very careful with the growth rate and also
1458 you should include some kind of ROE estimate in the process that you are assuming that financial
1459 analysts used to compute their valuation. To be clear, the above formulas not very useful in
1460 practice because of the constant growth rate assumption.

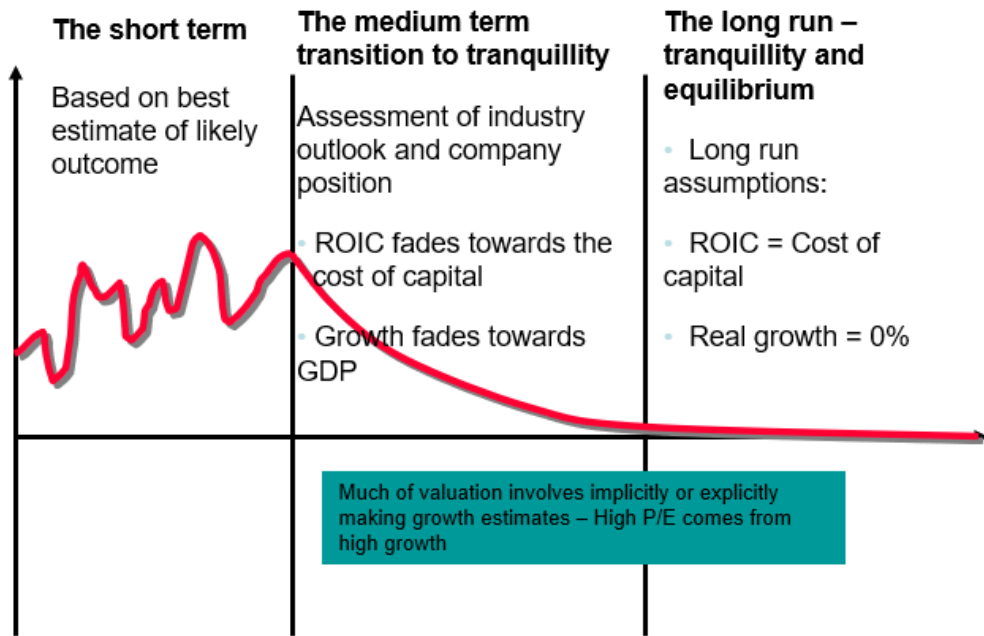
1461

1462 **Q. Do analyst forecasts for cash flow generally include a terminal growth rate that is**
1463 **different from a five-year short-term growth rate?**

1464

1465 A. Yes. The graph below illustrates the typical process for making cash flow forecasts that
1466 drive estimates of the cost of capital in any cash flow (CF in DCF) model. Note how the long-run
1467 assumptions generally assume that the long-term growth rate is only the rate of inflation, and they
1468 also generally assume that the rate of return stabilizes. In my analysis below I demonstrate how the
1469 long-term growth rate and the rate of return can be adjusted.

1470



Reference: Level and persistence of growth rates

1471

1472

1473

1474 **Q. What are the results of ComEd’s application of the DCF methodology?**

1475 A. ComEd used a version of the discounted cash flow model with dividends to represent cash
1476 flow and made the assumption that the near-term growth rate over the next five years will last
1477 indefinitely. Mr. Graves also made a ½ year assumption for increasing the dividend yield and the
1478 cost of equity. The DCF was presented with different stock price dates and with the average and
1479 the median. For the sake of discussion, I use the recent price presented in ComEd’s analysis and

1480 the average and high-end computed cost of equity presented by Mr. Graves. I show the cost of
 1481 equity with and without the ½ year assumption (my calculations are documented in PIRG Exhibit
 1482 1.7).

1483

	Cost of Equity With ½ Adj	Cost of Equity Without Adj	Div. Yield	5-yr Growth	6-yr + Growth
1484 Average	9.66%	9.31%	3.55%	5.76%	5.76%
1485 High	11.31%	10.83%	3.55%	7.28%	7.28%

1486

1487

1488

1489

1490 When you look at the details of the cost of equity for the different companies rather than
 1491 using the average, you can see a large range. One company (Edison International) has a 21.06%
 1492 cost of equity in the high case and another company (Portland General) had a 5.37% cost of equity
 1493 in the low case. I also note that ComEd used the Value Line earnings growth rate and not the
 1494 Value Line dividend growth rate even though the DCF model ComEd uses is measuring future
 1495 growth in dividends. Using the Value Line growth rate produces a lower growth rate and a lower
 1496 cost of equity number than the Value Line earnings growth number.

1497

1498 **Q. Are the ComEd DCF cost of equity estimates reasonable?**

1499 A. No. As with application of the CAPM, the DCF analysis demonstrates assumptions made
 1500 by ComEd do not pass muster of some basic logic and it is not consistent with the way analysts
 1501 evaluate long-term growth. I may be sounding like a broken record, but utility companies whose
 1502 volume sales hopefully will not grow more than population growth (maybe we can restrain our
 1503 energy use to avoid further destruction of the planet) cannot grow from sources other than
 1504 continued real price increases. Rather than getting into too much philosophy about what analysts
 1505 believe growth will be, I just use the long-term growth rate ComEd itself used in its impairment
 1506 studies. The 2022 impairment report stated that:

1507

1508 Long-term Growth Rate

1509 The growth rate used in the terminal year of the discounted cash flow analysis represents
 1510 long-term inflation expectations based on forward-looking macroeconomic indicators (e.g.,
 1511 CPI, GDP deflator, PPI, etc.) published proximate to the valuation date. ComEd used a
 1512 2.0% long-term growth rate (which is conservative compared to D&P’s current 2020
 1513 estimate of 1.2% to 2.6% and average 10-year inflation rate in the LRP of 2.0%). The 2%
 1514 long-term growth rate represents flat real cash flow growth with expectations of increasing
 1515 rate base as a result of replacing plant at higher costs due to inflation. As ComEd continues

1516 to invest in additional rate base, we expect to continue to receive higher revenues in the
1517 future.

1518
1519 The manner in which ComEd used long-term growth is illustrated in the table below:

1520 t

<u>Summary Data</u>			
(\$ in millions)			
Date of current analysis		11/1/20	
Date of most recent Step 1 analysis		11/1/16	
Fair value of equity as of prior Step 1 analysis	\$	14,263	
Margin of passing at most recent Step 1 analysis	\$	5,710	
		<u>2020</u>	<u>2016</u>
ComEd's carrying amount of equity as of November 1	\$	11,237	\$ 8,553
Discount rate as of November 1 ⁽¹⁾		4.50%	5.00%
Long-term growth rate as of November 1 ⁽¹⁾		2.00%	2.00%
EBITDA multiple as of November 1- Year 1 ⁽¹⁾		12.0x	10.0x
EBITDA multiple as of November 1- Year 2 ⁽¹⁾		11.0x	9.5x
⁽¹⁾ - Refer to prior step 1 analysis for sensitivities for these factors none of which indicated a failure of step 1 analysis.			

1521
1522

1523 Mr. Grave's analysis is not the same ad growth made by ComEd itself in its asset valuation.
1524 His approach is founded on the assumption that utility company earnings (adjusted for inflation)
1525 can be much higher than population growth for an indefinite period. Over the long-term, if the
1526 growth rate on top of inflation exceeds the growth in population, it implies that companies would
1527 be able to take more and more out of the pockets of ratepayers. If you go out long enough, the
1528 assumption means that people would have no expenditures for anything other than for electricity
1529 distribution.

1530 In addition to the long-term growth assumption, alternative comparable samples can be
1531 used as alternatives to ComEd's sample. For example, the companies with high estimated cost of
1532 capital in ComEd's sample include NextEra, Edison International, and Allete, three companies
1533 which have very different characteristics to ComEd.

1534

1535 **Q. Have you computed the DCF model using analyst expected cash flow from dividends**
1536 **with correction of the long-term growth rate and a more appropriate sample?**

1537 A. Yes. The table below shows the effects of using a 2% terminal growth rate in the dividend
1538 discount model which is a reasonable number to reflect assumptions that analysts make for their
1539 cash flow forecasts. In making the calculations that simulate analyst valuations I have evaluated
1540 the cost of capital that comes out of the DCF model with and without a ½ year adjustment. As
1541 with other issues that get a bit more technical, I have included the details of how I evaluated these

1542 numbers in a separate exhibit – PIRG Exhibit 1.7. The table below illustrates the effect of
 1543 different growth rates on the estimated cost of capital. The abbreviation “VL Div” means the
 1544 Value Line estimated dividends and the title “Impairment Cos” means that the sample of
 1545 companies including ConEd that was used in the impairment study are applied.

1546

1547		Cost of Equity	Cost of Equity	Div. Yield	5-yr Grwth	6-yr + Grwth
1548		With ½ Adj	Without Adj			
1549						
1550	ComEd Sample	6.62%	6.47%	3.72%	5.85%	2.00%
1551	ComEd VL Div	6.57%	6.43%	3.72%	5.50%	2.00%
1552	Impairment Cos	5.75%	5.65%	3.28%	3.85%	2.00%

1553

1554 **Q. Have you computed ComEd’s cost of equity using a more appropriate DCF model**
 1555 **that includes the value driver for return as well as growth?**

1556 A. Yes. I have computed the cost of capital using long-term growth and an alternative cash
 1557 flow model that accounts for the rate of return. This idea behind using the rate of return is a central
 1558 theme of the McKinsey book referenced by Mr. Graves. In adjusting the DCF model to include a
 1559 return factor, I assume historic earned returns will continue and I then compute the implied
 1560 dividend payout consistent with the growth rate. The alternative DCF model is described in detail
 1561 in PIRG Exhibit 1.2.

1562

1563 **Q. What are the results of the more appropriate DCF model that includes the value**
 1564 **driver for return as well as growth?**

1565 A. The DCF model I have used simulates a more realistic analysis because it is model is more
 1566 consistent with the financial models that valuation analysts use these days to project cash flow for
 1567 utility companies. This model is fully documented in Exhibit 1.7 and the excel file is included as
 1568 one of my workpapers. To introduce how the model that I call a the more appropriate model
 1569 works, you can think about valuations made in a typical Value Line investment report. At the top
 1570 left of the report, Value Line shows a target stock price in approximately five years from a case
 1571 with low case and high case assumptions. This target stock price comes from a valuation model
 1572 that has a lot more assumptions than just dividend growth and it demonstrates that the analyst
 1573 forecasted cash flow includes an implicit or explicit ROE projection. The Value Line projections
 1574 result in forecasts of earnings per share and book value per share along with a lot of other items.

1575 I am not suggesting the more appropriate model I create is the same as the Value Line projections.
1576 Rather, I emphasize that real world projections of cash flow from analysts depend on a lot more
1577 than a simple growth rate in dividends. In the past, I as well as other witnesses have used
1578 variations on the pure dividend growth model such as projecting dividends from the ROE
1579 multiplied by one minus the payout ratio. The approach that I am suggesting can be considered a
1580 variant of alternative bases for computing dividend growth. One can question the assumptions that
1581 I used in the model, or you can question the approach that I used to derive dividends, or you can
1582 disagree with the terminal value method I used. But something that is not correct is to claim that
1583 the only model to use in simulating investor expectations of cash flow is the simple dividend
1584 growth model. The very simple dividend growth model just does not reflect how cash flow
1585 forecasts are made these days.

1586 In Exhibit 1.7 I walk through the model in detail and explain the mechanics of the results. I
1587 have used the comparative companies in the impairment sample (except for PPL which was
1588 difficult because of the very low earnings base and the very high projected growth). The resulting
1589 estimates of the cost of capital which are documented in detail are shown in the screenshot below.
1590 The ½ year adjustment increases the cost of capital and is explained in Exhibit 1.7. Note that in
1591 the screenshot below, which summarizes the cost of equity capital for different companies, the
1592 variation from one company to another is not very high. Across the range of different capped
1593 ROE's (explained again in Exhibit 1.7) and the different terminal growth rates, the cost of capital
1594 is reasonably consistent for different companies and does not have the extreme variation that was
1595 in Mr. Graves' testimony. The cost of capital ranges from 5.78% to 6.60%. This DCF range is
1596 dramatically below ComEd's estimate of 10.5%.
1597

Terminal ROE Cqp	9.50%	9.50%	9.50%	10.00%	10.00%	10.00%	10.50%	10.50%	10.50%
Terminal Growth	1.50%	2.00%	2.50%	1.50%	2.00%	2.50%	1.50%	2.00%	2.50%
	Cost of Equity with 1/2 year	Cost of Equity with 1/2 year	Cost of Equity with 1/2 year	Cost of Equity with 1/2 year	Cost of Equity with 1/2 year	Cost of Equity with 1/2 year	Cost of Equity with 1/2 year	Cost of Equity with 1/2 year	Cost of Equity with 1/2 year
Alliant	5.87%	6.06%	6.25%	6.09%	6.28%	6.48%	6.31%	6.50%	6.70%
Ameren	5.81%	6.00%	6.20%	6.03%	6.23%	6.43%	6.25%	6.45%	6.65%
Eversource	6.61%	6.76%	6.91%	6.87%	7.02%	7.18%	7.12%	7.28%	7.43%
Xcel	5.62%	5.83%	6.04%	5.84%	6.04%	6.25%	6.05%	6.25%	6.47%
ConEd	6.33%	6.47%	6.62%	6.33%	6.47%	6.62%	6.33%	6.47%	6.62%
Southern	5.55%	5.76%	5.97%	5.76%	5.97%	6.18%	5.97%	6.18%	6.39%
WEC	5.10%	5.34%	5.58%	5.30%	5.53%	5.77%	5.48%	5.72%	5.96%
CenterPoint	5.75%	5.94%	6.14%	5.96%	6.16%	6.36%	6.18%	6.37%	6.57%
FirstEnergy	5.78%	5.97%	6.17%	6.00%	6.19%	6.39%	6.21%	6.40%	6.60%
Average	5.82%	6.02%	6.21%	6.02%	6.21%	6.41%	6.21%	6.40%	6.60%
Median	5.78%	5.97%	6.17%	6.00%	6.19%	6.39%	6.21%	6.40%	6.60%

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Results of the more appropriate cash flow model to use as a part of the DCF analysis models can be summarized in a table with different growth rates and different ROE caps. The first screenshot below shows the results in terms of average cost of capital estimation across the companies with the 1/2 year assumption of receipt of cash flow (the 1/2 year assumption increases the cost of capital). The second screenshot shows the results for the case with median instead of average cost of capital across companies. To be clear, the growth label below is long-term growth. The five-year growth estimates are from yahoo.

Cost of Equity from More Reasonable DCF Model

		Average Long-term ROE Cap		
		9.50%	10.00%	10.50%
Growth	1.50%	5.82%	6.02%	6.21%
	2.00%	6.02%	6.21%	6.40%
	2.50%	6.21%	6.41%	6.60%

1609
1610
1611

Cost of Equity from More Reasonable DCF Model

Median

Long-term ROE Cap

9.50% 10.00% 10.50%

	1.50%	5.78%	5.97%	6.17%
Growth	2.00%	6.00%	6.19%	6.39%
	2.50%	6.21%	6.40%	6.60%

1612

1613

1614

1615

SECTION VI: CAPITAL STRUCTURE AND SUMMARY OF

1616

REASONABLE COST OF EQUITY ESTIMATES

1617

1618 **Q. How have you approached your capital structure review of ComEd?**

1619 A. I regularly evaluate debt sizing and debt structuring issues for large project financing, and I
1620 have thought about what a reasonable capital structure would be for ComEd. I have reviewed
1621 ComEd's capital structure by examining the Value Line projection of Exelon's debt to capital ratio
1622 which is expected to reach high levels. Next, I reviewed the debt to capital ratio for other utility
1623 companies to evaluate whether all of the companies really do have a very conservative 50% debt to
1624 capital ratio. When evaluating debt to capital ratios for other companies I focus on companies in
1625 ComEd's sample that have a debt to capital ratio of more than 60%. The third part of my
1626 evaluation was review of ComEd's credit ratios compared to other companies and in particular the
1627 amount of debt relative to cash flow.

1628

1629 **Q. What are realistic effects of applying a different capital structure for ComEd?**

1630 A. A greater proportion of debt in the capital lowers the revenue requirement. This is due to
1631 (1) the interest deduction for taxes; (2) the fact that computation of the allowed return will not
1632 change when the capital structure changes and (3) the lower interest rate than the allowed return on
1633 equity (it is not reasonable to make capital structure adjustments to the cost of equity in this case).

1634

1635

1636 **Q. Is it possible that Exelon's debt to capital will increase after rates are set?**

1637 A. Yes. Some project that Exelon's debt to capital ratio to increase from levels around 50% in
1638 2021 all the way up to well above 60% in 2025-2027.

1639

1640 **Q. Do the exact numbers of increasing debt to capital matter relative to the strategy of**
1641 **getting rates established and then increasing debt to capital ratios once the rates are in**
1642 **place?**

1643 A. No, the exact numbers by year are much less important than the increasing trend in the debt
1644 to capital ratio. With the rates set, Exelon can increase its debt to capital ratio and increase the
1645 earned return on equity. The scenario demonstrates the danger of applying a very conservative
1646 capital structure in this ComEd proceeding and thereby giving more gifts to ComEd investors (who
1647 are Exelon and the people who own Exelon shares).

1648

1649 **Q. What are debt to capital ratios in ComEd's sample and for other companies?**

1650 A. I have used the tool that is described in PIRG Exhibit 1.4 to extract the debt to capital ratios
1651 for different utility companies including companies in Mr. Graves' sample and companies used in
1652 the impairment study. The debt to capital ratios are summarized in the table below where I sorted
1653 the data from the highest debt ratio (reported by yahoo) to the lowest. If you scan the companies
1654 you can see that there are many companies that have debt to capital of above or near 60%. I have
1655 included the bond ratings in the table below. Note that companies with a debt to capital ratio of
1656 60% or above have investment grade bond ratings (BBB- or better).

1657

	Debt to EBITDA	Debt to Equity	Debt to Capital
Entergy Corporation BBB+ Baa2	7.07	2.03	67.04%
Edison International BBB Baa3	6.04	1.89	65.38%
CMS Energy Corporation BBB+ Baa2	6.10	1.89	65.38%
Southern Company BBB+ Baa2	6.08	1.72	63.25%
American Electric Power A- Baa2	6.07	1.68	62.74%
Exelon Corporation BBB+ Baa2	5.82	1.63	61.99%
Xcel Energy Inc. A- Baa1	5.24	1.57	61.02%
Hawaiian Electric Industries, Inc. BBB-	5.39	1.53	60.47%
Wisconsin Energy Corporation A- Baa	6.32	1.49	59.86%
Public Service Enterprise Group BBB+	4.52	1.49	59.85%
Eversource Energy A- Baa1	6.01	1.48	59.60%
Duke Energy Corporation BBB+ Baa2	6.62	1.47	59.51%
Pinnacle West Capital Corporation BB	7.16	1.44	59.03%
Ameren Corporation BBB+ -	5.12	1.42	58.66%
Alliant Energy Corporation A- -	5.54	1.41	58.56%
NextEra Energy, Inc. A- -	4.67	1.32	56.93%
Evergy, Inc. A- Baa2	5.31	1.28	56.16%
Avangrid, Inc. BBB+ -	6.59	1.26	55.80%
Consolidated Edison, Inc. A- Baa2	5.23	1.17	53.89%
OGE Energy Corporation BBB+ -	4.13	1.04	50.94%
NorthWestern Corporation BBB Baa2	5.74	0.99	49.68%
Entergy Corporation BBB+ Baa2	5.12	0.78	43.81%
ALLETE, Inc. BBB -	5.14	0.58	36.60%

1658

1659

1660 **Q. When rating agencies like S&P derive the bond rating for a company like ComEd, do**
1661 **they focus on the debt to capital ratio?**

1662 A. No. In deriving a credit rating like A (the rating of ComEd according to its investor analyst
1663 presentation), the three rating agencies (S&P, Fitch and Moody's) are trying to predict the chance
1664 the that a company will not be able to pay off all of the amount it owes to banks and other lenders.
1665 A bond rating of A is a very high bond rating – for context, the U.S. government is only one notch
1666 above this rating. The chance of not being able to pay lenders depends on the cash flow you have
1667 compared to the amount of your obligations to lenders. This is no different from how a bank looks
1668 at your loan application when you try to get a mortgage on a condominium. To measure the
1669 chance of not being able to pay off a loan, the debt to capital ratio is much less important to a
1670 rating agency than the ratio of how much debt you have compared to how much cash flow you
1671 have to pay off the loan (in the case of a housing loan the amount of debt compared to your
1672 income).

1673 In measuring cash flow relative to debt, you can start with the simplest measure of cash
1674 flow called EBITDA. This is just revenues minus cash expenses. You can compare the EBTDA
1675 cash flow to the debt through dividing the debt by the EBITDA. If you divide the debt by the cash
1676 flow and the number is something like 6.0, then you have a very rough measure of how many
1677 years of cash flow it takes to pay off the debt.

1678 When teaching classes I typically ask students how they could explain the debt to capital
1679 ratio to their mother (assuming their mother is not an investment banker). I want them to use the
1680 years of EBITDA (assuming EBITDA is computed on an annual basis). If it takes 25 years of
1681 EBITDA to pay off assets that have a lifetime of 10 years, there is a big problem.

1682

1683 **Q. But don't the rating agencies use fancier ratios than the EBITDA?**

1684 A. They do use other ratios than debt to EBITDA, but the ratios are all very similar and highly
1685 correlated. EBITDA is a measure of cash flow before taxes, before interest. A company must
1686 make capital expenditures to maintain and replace the existing equipment as well as pay taxes and
1687 interest. So, when you look at rating reports you will see different ratios that may be intimidating.
1688 But the real ultimate source of cash flow is EBITDA and most of the ratios you see are a variant of
1689 the debt to EBITDA ratio. For example, the ratio of FFO to debt essentially takes away interest
1690 payments and taxes from the EBITDA (S&P calls this FFO) and instead of using the ratio Debt to
1691 FFO, they compute FFO divided by debt. When you tell your mother about this and see how long
1692 it takes to pay back debt if there are taxes and future capital expenditures, you will see that it takes
1693 a longer time to pay off your debt if you have to pay taxes and interest (maybe 10 years instead of
1694 6 years), but the ratios are intimately related meaning that if you compute one of the ratios like
1695 debt to EBITDA, the other ratios will have very similar trends and distributions.

1696

1697 **Q. How does the debt to EBITDA ratio of ComEd compare to the debt to EBITDA ratio
1698 of other utility companies?**

1699 A. To compare ComEd with other companies I have included two screenshots below. The first
1700 screenshot shows the debt to EBITDA ratio of 4.5 used by S&P (this is before granting a higher
1701 return in this proceeding). The second screenshot is a graph that demonstrates that ComEd's ratio
1702 of 4.5 is lower, which means it is better from a credit quality perspective. Remember that debt to
1703 EBITDA is asking your mother how long it takes to pay off your debts and a lower number means
1704 you can pay the debt more quickly. The graph shows that ComEd has a very strong credit position

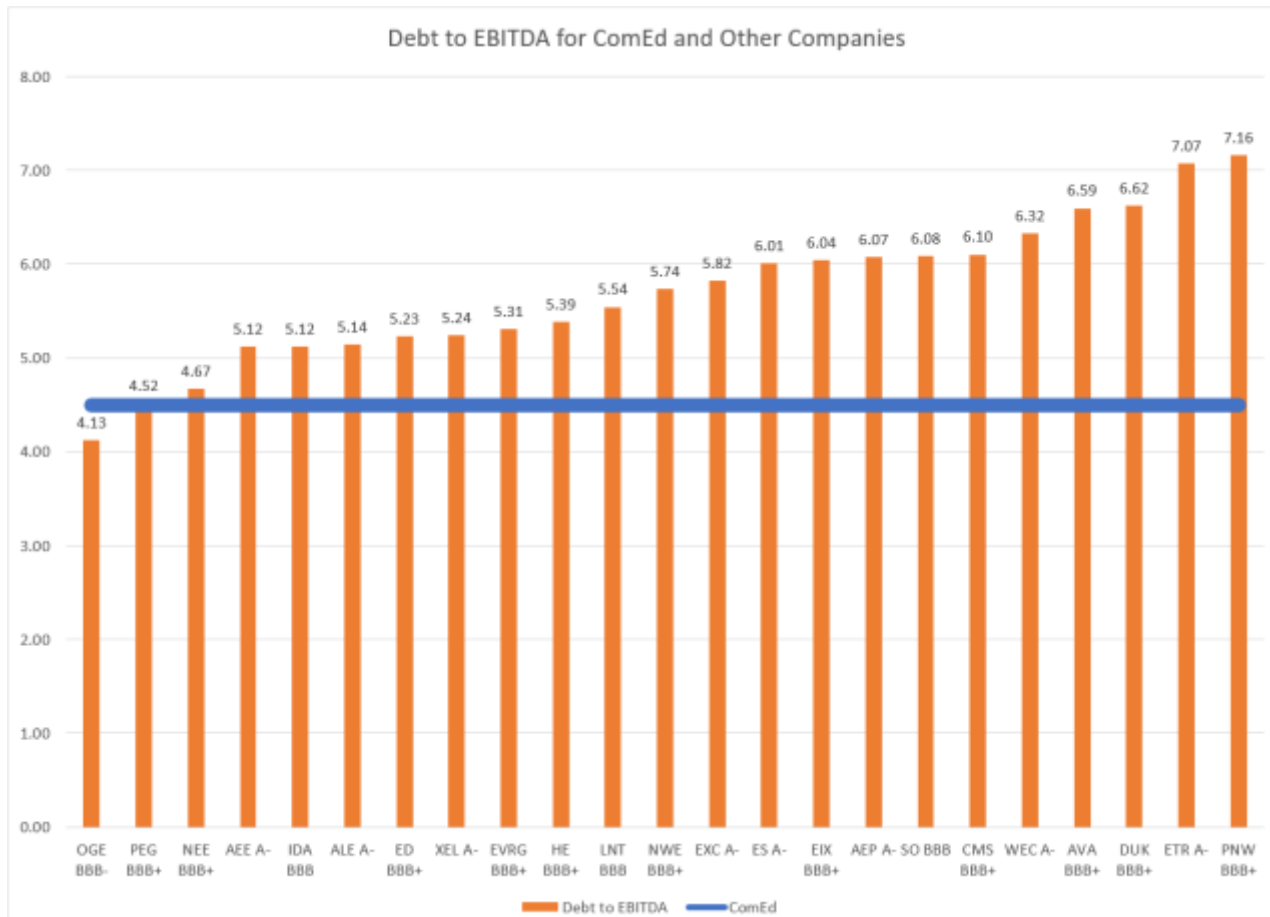
1705 that should alleviate fears about the sky falling if a more heavily weighted debt to capital ratio
 1706 and/or a lower return on equity are applied.
 1707

Commonwealth Edison Co.--Key Metrics*

MIL. \$	2021a	2022f	2023f	2024f
FFO to Debt (%)	19.2	17-19	17-19	16-18
Debt to EBITDA (x)	4.5	4.5-5.0	4.5-5.0	4.5-5.0
FFO cash interest coverage (x)	6.6	6.0-6.5	6.0-6.5	5.5-6.0

*All figures adjusted by S&P Global Ratings, a--Actual, e--Estimate, f--Forecast.

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Q. When considering credit quality, is it good enough to just compute the ratio and then to make a comparison across different industries?

1714 A. No. The rating agencies like S&P must make judgments as to how stable the EBITDA is
 1715 and then assess the appropriate ratio for different ratings and default probabilities. In the
 1716 discussion of how many years of cash flow it takes to pay off debt, if the EBITDA is volatile and it
 1717 suddenly crashes after a couple of years, a ratio of something like 6 years could suddenly become
 1718 something like 100 years. That's why the rating agencies must consider both the stability of
 1719 EBITDA and financial ratios like the amount of debt relative to EBITDA. The rating agencies
 1720 may have fancy names for how they consider the stability of EBITDA, but their techniques
 1721 ultimately require a lot of judgement. S&P calls this judgment as to the volatility of EBITDA, the
 1722 business risk.

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1724 **Q. What is the debt to EBITDA and the business risk of ComEd according to S&P?**

1725 A. S&P's judgement about the business risk of ComEd has implications not only for the debt
 1726 to capital ratio that is reasonable, but also for the beta analysis. The picture below shows that
 1727 ComEd is considered a very low risk company and with the only exception being the
 1728 management– note the “Excellent” business score in the table below .

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Rating Component Scores

Foreign currency issuer credit rating	BBB+/Positive/A-2
Local currency issuer credit rating	BBB+/Positive/A-2
Business risk	Excellent
Country risk	Very Low
Industry risk	Very Low
Competitive position	Strong
Financial risk	Significant
Cash flow/leverage	Significant
Anchor	a-
Diversification/portfolio effect	Neutral (no impact)
Capital structure	Neutral (no impact)
Financial policy	Neutral (no impact)
Liquidity	Adequate (no impact)
Management and governance	Fair (-1 notch)
Comparable rating analysis	Neutral (no impact)
Stand-alone credit profile	bbb+

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1734 **Q. Won't the debt to EBITDA ratio be affected by a lower return on equity driven by**
1735 **more appropriate estimates of the cost of capital?**
1736 A. Yes, it will.
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1738 **Q. Does this conclude your testimony?**
1739 A. Yes.