Docket No.:   A.25-03-010 et seq.
ALJ: Jonathan Lakey
Exhibit No.:   SC/PCF-08
Witness: Mark E. Ellis

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Application of Pacific Gas and Electric Company for Authority to Establish Its Authorized Cost of Capital for Utility Operations for 2026.	Application 25-03-010 (Filed March 20, 2025)
And Related Matters.	Application 25-03-011 (Filed March 20, 2025) Application 25-03-012 (Filed March 20, 2025) Application 25-03-013 (Filed March 20, 2025)

REBUTTAL TESTIMONY OF MARK E. ELLIS

ON BEHALF OF SIERRA CLUB AND THE PROTECT OUR COMMUNITIES
FOUNDATION

AUGUST 20, 2025

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I. INTRODUCTION

Q. Please state your name and professional affiliation.

A. My name is Mark E. Ellis. I am an economic and financial consultant and Senior Fellow for Utilities at the American Economic Liberties Project ("AELP"). My business address is 8595 Nottingham Place, La Jolla, CA 92037.

Q. On whose behalf are you testifying?

A. I am testifying on behalf of the Protect Our Communities Foundation ("PCF") and the Sierra Club ("SC").

Q. Do you certify under penalty of perjury that, to the best of your knowledge, the testimony you will give in this proceeding is true and correct?

A. Yes.

Q. Have you reviewed the direct testimony submitted in this proceeding?

A. Yes.

Q: What is your opinion of the direct opening testimony?

A. I have several high-level observations and critiques of the other non-Utility parties' ("Parties") direct testimonies.[1]

Q. Please summarize your testimony.

A. My rebuttal testimony focuses on two key issues:

- Nearly all the other Parties' cost of equity ("COE") estimates for the Utilities are *substantially higher* than the consensus return expectation for the more-risky market as a whole among dozens of the world's largest and most sophisticated investors. The Commission should not give any weight to the analysis of witnesses testifying in this proceeding that deviate so sharply from that of these highly-regarded and well-resourced institutions with demonstrated market experience and experience.

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[1] EDF-01 (McCann); EPUC/IS/TURN-01 (Gorman); PAO-01 (Woolridge); SBUA-01 (Reno); UCAN-01 (Bandyk); WTF-01 (Rothschild).

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1   • Unrealistic and unsupportable long-term growth assumptions constitute the key factor

2   inflating Parties' COE estimates.

3   I also discuss a handful of common issues across multiple Parties' testimony, as well as

4   several concerns specific to Energy Producers and Users Coalition ("EPUC")/Indicated

5   Shippers ("IS")/The Utility Reform Network's ("TURN's"), Environmental Defense Fund's

6   ("EDF's"), and Wild Tree Foundation's ("WTF's") testimony.

7

8   **II.   PARTIES' COE ESTIMATES FAR EXCEED THE CONSENSUS AMONG THE**
9   **   LARGEST, MOST SOPHISTICATED MARKET PARTICIPANTS.**

10   **Q. How do the Parties' COE estimates compare to the consensus view among finance**

11   **   professionals of the cost of equity?**

12   A. As described in my direct testimony, utility regulatory proceedings are not the only context

13   in which analysts estimate the cost of equity. In fact, the cost of equity is one of the most

14   commonly applied and thoroughly researched topics in all of finance. Dozens of reputable,

15   well-known investment management firms routinely publish forward-looking estimates of

16   the cost of capital for a variety of asset classes, in what are known as their capital market

17   assumptions ("CMA") reports.[2] CMAs are a particularly useful benchmark for utility COE

18   estimates because they are numerous (published by dozens of firms), frequently updated (at

19   least annually; sometimes quarterly), independent, freely available to the public, and the

20   product of organizations with both substantial research capabilities and extensive, ongoing

21   practical expertise in financial markets. These firms are also professionally incentivized to

22   produce accurate, unbiased estimates.[3] The largest, most active market participants are the

23   best source for estimates of the cost of capital, which, by definition, equals investors' market-

24   based expectations.[4]

25   Unsurprisingly, the consensus among these firms for the long-term cost of equity for the

26   market as a whole averages approximately 6%, with differences arising from each firm's

27   views on (1) the degree to which current market valuations (relative to other financial and

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[2]   SC/PCF-01 (Ellis), p. 15-18.
[3]   *See, e.g.*, Fajasy, Why Analyst Estimates Are Often Useless (Mar. 20, 2025), *available at*
      https://stablebread.com/why-analyst-estimates-useless/ [last accessed July 30, 2025].
[4]   SC/PCF-03, pdf p. 5 (page 13 of the book) ("The cost of capital is the minimum rate of return necessary to
      attract capital to an investment.").

1   economic indicators[5]) differ from investors' long-term expectations; and (2) the pace at

2   which valuations will approach investors' long-term expectations.

3   All of the Utilities' and most of the Parties' COE estimates for the Utilities – which are

4   lower-risk than the market as a whole and therefore should have a correspondingly lower cost

5   of equity – fall well *above* the range of consensus among these institutions for the cost of

6   equity of the market as a whole.

7

8   **Q. Are CMAs analogous to the market-based cost of equity that is the objective in utility**

9   **regulatory proceedings?**

10   A. Yes. CMAs reflect each firm's expected returns based on current market prices. The

11   equivalence between "expected return" and "cost of capital" is one of the bedrock principles

12   of finance. They are two sides of the same coin: expected return reflects the view of the

13   *providers of funds* – the return they expect to receive; cost of capital reflects the view of the

14   *firm using the funds* – the return they must provide investors in exchange for the use of their

15   funds.

16   The cost of capital to the firm is the expected return to the investor in a competitive, well-

17   functioning market, where investors have numerous choices among financial assets they can

18   purchase. This is because the firm must offer exactly the return investors require to induce

19   them to supply funds – no more, no less. If the firm offered less than the required return,

20   investors wouldn't invest. If the firm offered more than the required return, other investors

21   would bid up the price of the firm's securities until the expected return matched the required

22   return. As summarized in the popular introductory finance textbook, Brealey and Myers's

23   *Principles and Corporate Finance*:

24   The cost of capital is the minimum acceptable rate of return on capital
25   investment. It is an opportunity cost of capital, because it equals the expected
26   rate of return on investment opportunities open to investors in financial
27   markets.[6]

28   None of the Parties or Utilities disputes the foundational financial principle that expected

29   return and cost of capital are equivalent.

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5   *E.g.*, price-to-earnings ratios.
6   Richard A. Brealey et al., Principles of Corporate Finance (10th ed. 2011), p. 709.

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1

2 **Q. Why do you think the Utilities' and most of the Parties' estimates are so much higher**

3   **than market consensus?**

4 A. None of the Utilities or Parties acknowledge, much less provide any justification for, the

5   wide disparity between their COE estimates and the market consensus. CMAs are well-

6   known among finance professionals and are readily available, so the omission of any mention

7   of their existence, much less explanation of the expert's widely divergent view, demonstrates

8   that the Utilities' and Parties' high COEs involve faulty methodologies or facially

9   implausible assumptions. Neither the Utilities nor the Parties provide any evidence to suggest

10   that any of them have some unique insight into the market that has eluded *every single one* of

11   these institutions, including well-known firms like BlackRock, J.P. Morgan, Morningstar,

12   and Vanguard.

13   The Utilities' and the Parties' witnesses do not provide any rationale for the Commission

14   to determine that their COE results are reasonable given that they far exceed independent

15   benchmarks and conflict with the world's foremost experts on this topic.

16

17 **Q. Can you think of any reason that the Utilities and Parties continue to provide estimates**

18   **so far above the consensus of sophisticated financial market participants?**

19 A. As I have already testified, the Utilities have powerful incentives to maximize returns on

20   equity ("ROEs") for the benefit of shareholders and executives. [7] I know at least some of the

21   consumer side experts are aware of the discrepancy between their recommendations and the

22   consensus among the most sophisticated and active market participants, but they feel

23   prohibited from providing what they know is a more accurate estimate. I have spoken with

24   financial leaders within utility regulatory commissions and consumer advocacy organizations

25   who admit they know their ROE estimates are too high. They explain their continued

26   provision of flawed estimates as "just the way it's always been done." As a result, billions of

27   dollars of unearned gains are unjustly transferred from consumers to utility shareholders.

28

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[7]   SC-PCF-01 (Ellis), p. 22-24.

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1   III.   UNREALISTIC LONG-TERM GROWTH ASSUMPTIONS ARE THE MOST
2   SIGNIFICANT FACTOR INFLATING PARTIES' COE ESTIMATES.

3   A.   Long-Term Growth Is the Most Critical Assumption in Both the DCF and
4   CAPM.

5   **Q. What are the key drivers of Parties' inflated ROE recommendations?**

6   A. Economically implausible long-term dividend growth assumptions are the key driver of

7   Parties' inflated ROE recommendations. With two exceptions, all Parties rely solely on one

8   or more versions of the discounted cash flow model ("DCF") and capital asset pricing model

9   ("CAPM")[8] – both legitimate COE models widely used throughout finance – although the

10   details of their methodologies and assumptions vary. Of these details, the most important – in

11   terms of its influence on their ultimate COE estimates – are the long-term dividend growth

12   assumptions, both explicit and implied, in their utility proxy group DCF analyses and CAPM

13   market risk premium ("MRP") market return forecasts.

14

15   **Q. How does long-term growth influence the result of the DCF?**

16   A. As explained in my direct testimony, the DCF is a model of future expected dividends into

17   perpetuity.[9] The long-term growth rate is used to forecast the DCF's perpetuity dividend

18   stream. In the most basic version of the DCF, the constant-growth DCF ("CG DCF"), COE is

19   equal to the dividend yield plus the long-term dividend growth rate.

20   Other versions of the DCF, such as the multi-stage DCF ("MS DCF") incorporate one or

21   more near-term growth rates, in addition to the long-term rate.[10] Mathematically, the MS

22   DCF can be expressed in the same form as the CG DCF – dividend yield plus a composite

23   perpetuity growth rate equal to a weighted average of the near- and long-term growth rates,

24   as in Utility Consumers' Action Network's ("UCAN's") two-step DCF.[11] Under a wide

25   range of reasonable assumptions, the long-term growth rate accounts for approximately 80%

26   of the MS DCF's CG DCF-equivalent blended growth rate.[12]

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[8]   EPUC/IS/TURN uses the risk premium analysis, as well as the DCF and CAPM; EDF uses only a version of the
      DCF.
[9]   SC/PCF-01 (Ellis), p. 40.
[10] SC/PCF-01 (Ellis), p. 50-52.
[11] UCAN-01 (Bandyk), p. 18-20.
[12] A CG DCF-equivalent single perpetuity growth rate can be calculated by subtracting the dividend yield from
      the MS DCF COE. The CG DCF-equivalent growth rate can, in turn, be expressed as the weighted average of

1

Q. How does long-term growth influence the result of the CAPM?

3 A. The CAPM is also based on a forecast of future dividends, but for the market as a whole

4   (e.g., the S&P 500 Index) instead of the individual utilities directly modeled in the DCF. I

5   explained in my opening testimony that the CAPM is a model of risk relative to the market.[13]

6   One of the CAPM's three input assumptions – the MRP – is intended to reflect the expected

7   future dividends for the entire market. Just as the long-term growth rate assumption strongly

8   influences the ultimate DCF COE estimates for individual utilities, so too, the long-term

9   growth rate assumption for the market as a whole will strongly influence the ultimate CAPM

10   COE estimates for individual utilities.

11

Q. Why is the long-term growth rate more critical than the other assumptions in the DCF and CAPM?

14 A. Most other model inputs – the DCF's dividend yield and near-term growth rate and the

15   CAPM's risk-free rate – are based on observable third-party data, so there is less opportunity

16   for manipulation.[14] Even in the case of the CAPM's beta, substantial differences in

17   assumptions should have relatively modest effects on results – if the MRP estimate (which is

18   based on the forward-looking market return forecast) is reasonable. In contrast, long-term

19   growth is an assumption that analysts commonly posit without any substantive evidentiary or

20   economic support.

21   For example, when they are not erroneously extrapolating analysts' earnings-per-share

22   ("EPS") growth forecasts into perpetuity,[15] cost of capital experts often implausibly assume

23   long-term growth equal to forecast gross domestic product ("GDP"), without explanation.

---

the near- and long-term growth rates. Under a wide range of reasonable assumptions for both utilities and the market as a whole, the weight of the long-term rate in the single blended rate is approximately 80%. UCAN's two-step DCF assigns only a 20% weight to the long-term growth rate. UCAN does not provide any such analysis in support of its 20% weight on the long-term growth rate.

[13]   SC/PCF-01 (Ellis), p. 40, 66.

[14]   Although, as explained in my testimony, that does not prevent the Utilities from manipulating what should be straightforward assumptions – e.g., excessively long trailing price histories, adjusted betas using weekly returns – and, unfortunately, many of the Parties from using the same upwardly biased methods.

[15]   Utility- and even some consumer-side cost of capital analysts (e.g., EPUC/IS/TURN, SBUA) often implement the CG DCF by extrapolating analysts' near-term growth rates into perpetuity. There is no basis for doing so: per the analysts' own guidance, their growth forecasts are valid for, at most, six years. *See* SC/PCF-01 (Ellis), p. 43-45.

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1	Their assumption is incorrect. Basic mathematical, economic, and financial principles bound
2	the range of reasonable long-term per-share earnings and dividend growth, and it is –
3	*necessarily* – below GDP.
4	

5   **B.   For the Market as a Whole, Per-Share Dividend Growth Is Capped at Per-**
6   **Capita GDP.**

7   **Q. How do you know EPS can't grow as fast as GDP?**

8   A. As explained in my testimony, we know from simple mathematical logic that aggregate

9   corporate earnings growth can't exceed GDP because, if it did, eventually corporate profits

10   would overtake the entire U.S. economy – an obviously implausible result because a part

11   (profits are a component of GDP) can't be greater than the whole.

12   We also know, from basic financial and economic logic, that per-share earnings and

13   dividend growth must be *less* than GDP growth. Over time, the total earnings of all

14   companies tends to grow in line with the overall economy. But that does not mean investors

15   see their EPS grow at the same rate. GDP measures the full churn of business activity; both

16   investment and earnings (on past investment) contribute to GDP at the time they occur. But

17   the economy is dynamic: companies are constantly being created and failing. When a

18   business fails and an asset is written down, the earnings disappear, but there is no

19   corresponding capital loss recorded in GDP. New investment replaces the lost earnings, such

20   that aggregate profits keep pace with GDP, but that requires new equity issuance. The owners

21   of equity in failed businesses permanently lose some of the earnings that once contributed to

22   the economy; on a per-share basis, their earnings cannot keep pace with aggregate GDP.

23   Business failure and creation therefore create a persistent "failure wedge" between GDP

24   growth and earnings-per-share and dividend-per-share ("DPS") growth.

25   In practice, that wedge tends to be about the same size as population growth. New equity

26   issuance and the earnings they generate are allocated across the population as new potential

27   investors are born and eventually enter the market. As a result, EPS and DPS tend to track

28   GDP *per capita*, not total GDP. Essentially, over time, aggregate earnings and dividends–

29   which track GDP – must be spread over more investors as population increases.

30

C.   Utility EPS and DPS Growth Track Inflation.

2 **Q. In your testimony, you said that utilities' long-term growth is lower than per-capita**

3 **GDP and tracks inflation. Can you explain why that's the case?**

4 A. Utilities' EPS and DPS growth tracks inflation, not per-capita GDP.

5   Utility returns are regulated and stable, and they rarely fail. As a result, as a sector, they

6 do not need to constantly replace lost earnings through new equity. Instead, they behave

7 more like fixed-income investments: they generate reliable profits, so they can afford, and

8 are expected by investors, to pay out most of them as dividends. Because most earnings are

9 paid out, there is limited reinvestment, so organic per-share growth is low.

10   When utilities do need to grow, they commonly issue new equity. Utilities issue more

11 equity, relative to their market capitalization, than every other industry sector except real

12 estate (which, for tax reasons, distribute substantially all their income).[16] Over time, the

13 combination of high payout ratios, limited reinvestment, and continuous equity issuance

14 leads to per-share earnings and dividends growing only with inflation, not per-capita GDP. It

15 is not a mathematical inevitability, like the broader market's failure wedge between GDP and

16 EPS, but rather a long-standing investor equilibrium: steady income now in exchange for

17 limited growth, roughly equivalent to inflation protection, later.

18   Figure 1 compares the growth rates for GDP, the market as a whole, and the utility sector,

19 all adjusted for inflation, for the nearly 100 years from 1927 through 2024.[17] The white bars

20 are aggregates – total GDP, market capitalization, book value, and dividends; gray bars are

21 normalized: per capita for GDP; per share for price, book value, and dividends. Several

22 patterns are clear. As anticipated, aggregate investment, as reflected in book value, in both

23 the market as a whole and utilities tracks aggregate GDP, at around 3%. But the per-share

24 income generated from that investment has grown at very different rates: per-capita for the

25 market, inflation (0% in real terms) for utilities.

---

[16]   Yardeni Research, S&P 500 Shares Outstanding (sectors), Figure 27, *available at* https://yardeni.com/charts/sp-500-shares-outstanding-sectors/ [last accessed Aug. 8, 2025].

[17]   M. Ellis analysis of French Data Library ("FDL") data (Eugene F. Fama and Kenneth R. French, "Data Library," *available at* https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html); Federal Reserve Economic Data ("FRED") data (Federal Reserve Bank of St. Louis, *available at* https://fred.stlouisfed.org/); Bureau of Labor Statistics ("BLS") https://www.bls.gov/cpi/data.htm); measuringworth.com data [all last accessed Aug. 6, 2025].

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1

Figure 1. Long-term historical inflation-adjusted growth rates, 1927-2024
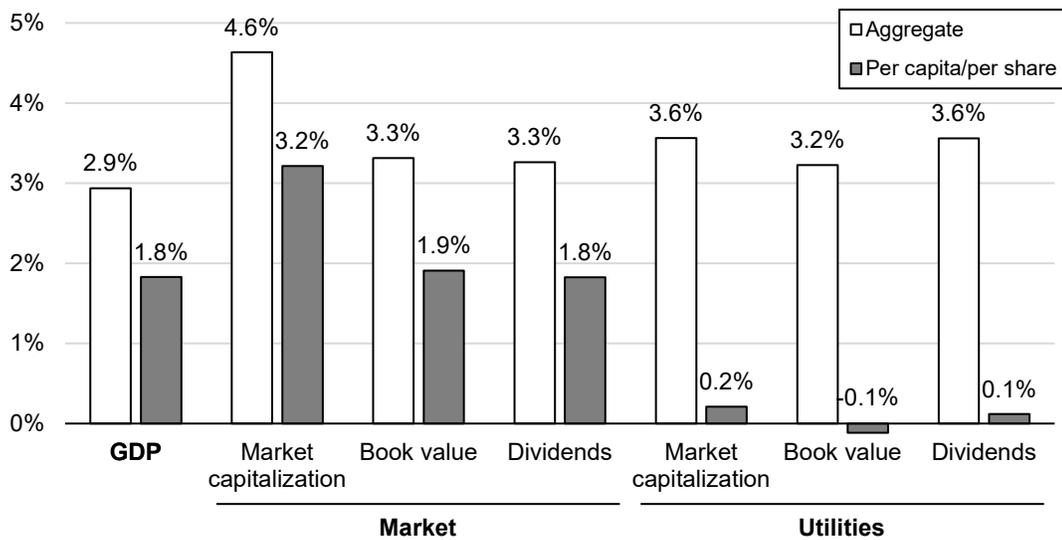
2

3   **D.   The Market's and Utility Sector's Long-Term Historical Growth Rates**
4   **Provide Benchmarks to Assess the Reasonableness of DCF Long-Term**
5   **Growth Rate Assumptions.**

6   **Q. Why are these findings about the market's and utility sector's long-term growth rates**
7   **important for the Commission to understand?**

8   A. The fact that large-scale economic and demographic factors determine long-term dividend

9   growth – per-capita GDP for the market, inflation for utilities – is important because these

10   benchmarks provide an easy test for the reasonableness of the assumptions used in the DCF

11   model, whether estimating COE for utility proxy group members or for the market as a

12   whole. With a few exceptions, both Parties' and Utilities' DCF models are based on explicit

13   long-term growth assumptions that are implausible when compared to these economically

14   robust benchmarks.

15   Regardless of how the DCF long-term growth rate is derived – whether from analyst

16   estimates, GDP, specific relationships between accounting and financial metric (as in the

17   sustainable growth DCF that will be discussed next), or any other approach – it must pass

18   two reasonableness tests. The first test doesn't even require looking at the growth rate itself;

19   simply compare the result to market consensus. When the world's most sophisticated

20   investors think the expected return for the market as a whole is approximately 6%, a DCF

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1   that produces 9% (or higher) for the market, or 8% (or higher) for a lower-risk utility, lacks

2   credibility unless its proponent offers a compelling explanation for the discrepancy.

3   The second test is to compare the long-term growth rate to forecast GDP per capita (for

4   the market) or expected inflation (for utility proxy group members); they should not differ by

5   more than 0.5% or so. The long-term growth rate is into perpetuity – forever. The best

6   available benchmark for perpetuity is almost always the entirety of the historical record.[18]

7

8   **E.   The Sustainable-Growth DCF Does Not Provide Reasonable COE Estimates.**

9 **Q. Please describe the sustainable-growth DCF model.**

10 A. The sustainable-growth DCF ("SG DCF") is a version of the CG DCF in which the

11   perpetuity growth rate is based on utility accounting and financial metrics – specifically

12   ROE, earnings retention, share issuance, and valuation (P/B) – instead of the more common

13   analyst EPS or DPS growth forecasts.

14   The SG DCF replicates the basic cash flow and growth drivers of a utility:

15
$$P = \frac{Br(1-b)}{k-br-sv},$$

16   where P is current stock price, B is current book value, r is ROE, b is the earnings retention

17   ratio, k is the cost of equity, s is the share issuance rate, and v is the accretion ratio, the share

18   of new equity raised that accrues to existing shareholders, equal to $1 - \frac{B}{P}$.[19]

19   The SG DCF valuation formula can be rewritten to express k, COE, as:

20
$$k = \frac{B}{P}r(1-b) + br + s\left(1 - \frac{B}{P}\right).$$

---

[18]   The exception is when there has been a one-off change in the historical record, such as the increase in stock market valuations (e.g., price-earnings ratios) that occurred over the 20th century. The market's repricing of equity market risk boosted realized returns in a manner that is unlikely to be repeated because doing so would require the equity risk premium to turn negative.

[19]   *See, e.g.*, Myron J. Gordon, The Cost of Capital to a Public Utility (1974), p. 30-33. When a utility issues new shares, it's selling part of the company to raise money. The ownership stake existing shareholders give up depends on how highly the company is valued. If the stock price is high compared to the company's book value, it can raise more money while giving up less ownership, which is good for existing shareholders. Because utilities are allowed to earn a return higher than their market-based cost of capital on any new equity they raise, the new capital ends up generating more profit than it costs. So even though existing shareholders now own a slightly smaller slice of the company, that slice is worth more because their share of total earnings is now larger than it was before the new equity issuance. The fraction by which existing owners' share of earnings rises is equal to $1 - \frac{B}{P}$; it reflects how much of the company's market value is "extra" above the book value that the contributors of new equity have acquired. The higher the stock price relative to book, the less of the company needs to be sold to bring in each dollar of new capital, and the bigger the gain for existing shareholders.

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1	The term $\frac{B}{P}r(1-b)$, meaning ROE x book value x the share of earnings that are distributed
2	(not retained) / price, is the dividend yield. Consequently, the SG DCF formula for COE is
3	sometimes expressed as:

$$k = \frac{D}{P} + br + s\left(1 - \frac{B}{P}\right),$$

5	where D is the current dividend. The Parties who use the SG DCF in this proceeding –
6	including EPUC/TURN/IS, SBUA, and WTF[20] – use this version.
7	Comparing the SG DCF to the basic constant-growth DCF:

$$k = \frac{D}{P} + g,$$

9	where g is the perpetuity growth rate, we see that the SG DCF's perpetuity growth rate can
10	be expressed in terms of a handful of utility accounting and financial metrics – retention rate,
11	ROE, share issuance, and valuation:

$$g = br + s\left(1 - \frac{B}{P}\right).$$

13	This expression of the long-term growth rate in terms of the SG DCF's utility accounting
14	and financial assumptions makes clear that the SG DCF is a version of CG DCF.
15	

16 **Q. Is the SG DCF widely used to estimate the cost of equity?**

17 A. No. Use of the SG DCF to estimate the cost of equity is utility-specific. The SG DCF is not

18   used to estimate COE for other types of companies because the SG DCF unrealistically

19   assumes that ROE, earnings retention, share issuance, and stock price-to-book ratio ("P/B")

20   all will remain constant into perpetuity. The SG DCF's various input parameters cannot be

21   forecast accurately into perpetuity, as will be demonstrated below.

22

23 **Q. If the SG DCF is not used elsewhere to estimate COE, why is it used in utility**

24   **regulatory proceedings?**

25 A. The SG DCF is superficially appealing because it captures the regulated utility financial

26   model's key interactions between ROE, earnings retention and payout, equity issuance,

---

[20]   As discussed below, EDF does not explain its COE calculation methodology. From a source cited in its testimony, it appears EDF also uses the SG DCF, although a simplified version that excludes the issuance and accretion terms.

1   valuation (P/B), and growth. But the SG DCF's structural accuracy is the source of its key

2   shortcoming.

3

4   **Q. What is the SG DCF's key shortcoming?**

5   A. The SG DCF's key shortcoming arises from the fact that its growth rate assumption, $br +$

6    $s\left(1 - \frac{B}{P}\right)$, is a *perpetuity* growth rate and therefore must pass the two reasonableness tests

7   described above. The Parties' average SG DCF perpetuity growth rates are all in the range of

8   4% to 6%, well above expected long-term inflation of approximately 2%.[21] Adding the

9   current dividend yield of approximately 3.7% produces COE estimates approaching 8% to

10   10% – far above market consensus.

11   The Parties' SG DCF results are not unique to the recent utility accounting and financial

12   metrics used in the Parties' SG DCF models.[22] Back-testing the SG DCF using comparable

13   input assumptions from prior years yields similarly unrealistic perpetuity growth rates. Figure

14   2 shows the SG DCF perpetuity growth rate, $br + s\left(1 - \frac{B}{P}\right)$, calculated using trailing-5-year

15   averages for ROE, retention, issuance, and accretion. The resulting perpetuity growth rate is

16   consistently greater than 6%, far above expected inflation. Clearly, the market does not

17   expect all four of the constituent input assumptions of the SG DCF – ROE, retention,

18   issuance, and accretion – to remain at their recent levels into perpetuity. The fundamental

19   premise of the SG DCF – that the current levels of its input assumptions will be sustained

20   into perpetuity – simply has no basis.

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[21]   EPUC/IS/TURN-01 (Gorman), p. 75, 137, 209, 264: 5.53 % (PG&E), 5.20% (SCE), 5.26% (SDG&E), 6.46%
       (SCG); SBUA-01 (Reno), Exhibit MLR-1, Schedules MLR-6c and MLR-6f: 5.12% and 5.15% (PG&E); WTF-
       01 (Rothschild), Exhibit ALR-3, p. 1: 4.51% and 4.61% (PG&E, SCE, SDG&E); Exhibit ALR-8, p. 1: 4.91%
       and 5.10% (SCG).

[22]   EPUC/IS/TURN and SBUA use Value Line 5-year forecasts to estimate the parameters of their SG DCF
       models. The SG DCF input parameters estimated from Value Line forecasts are roughly consistent with the
       trailing-5-year averages.

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1 **Figure 2. SG DCF perpetuity growth rate for the S&P 1500 Utilities Index[23]**
2 December 2010 – July 2025
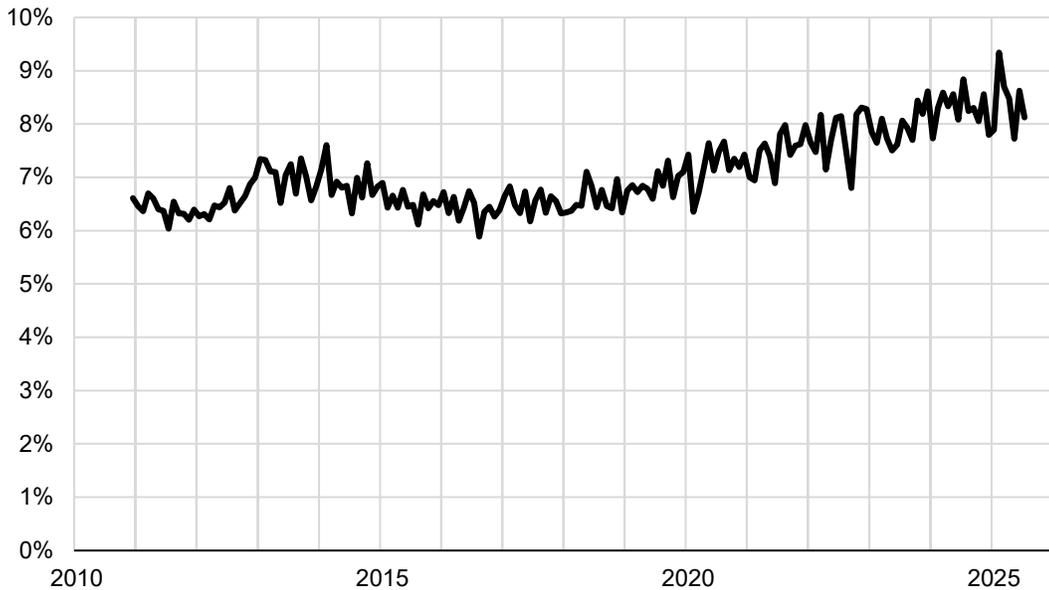
3

4   Use of the SG DCF in utility regulatory proceedings is an example of model blindness,

5 the tendency to mistake a model for reality. For example, EPUC/IS/TURN compares each of

6 its four SG DCF perpetuity growth rates, ranging from 5.20% to 6.46%, to its own multi-

7 stage DCF "maximum long-term sustainable growth rate" of 4.10% to demonstrate the

8 latter's reasonableness[24] – in the process failing to recognize that each of EPUC/TURN/IS's

9 SG DCF growth rates is substantially higher than 4.10% and therefore not reasonable. Users

10 of the SG DCF and utility commissions need to critically examine whether the SG DCF

11 accurately reflects the real-world system it claims to represent, check whether its

12 assumptions are valid, and test whether its results are consistent with other reliable

13 information.

14

15 **Q. Do you have other concerns with the SG DCF?**

16 A. Yes. I have several other concerns with the SG DCF, beyond the challenge of estimating a

17   perpetuity growth rate from limited historical or forecast data.

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23   M. Ellis analysis of S&P Global Market Intelligence (S&P GMI) data [last accessed Aug. 16, 2025].
24   EPUC/IS/TURN-01 (Gorman), p. 75, 137, 209, 264.

Exhibit SC/PCF-08: Rebuttal Testimony of Mark E. Ellis

1   A related concern is ensuring consistency among the various assumptions: the assumed

2   ROE, earnings reinvestment ratio, and share issuance rate must all reflect the same time

3   period into the future. Parties' assumptions are not internally consistent.

4   For example, EPUC/IS/TURN and SBUA each implicitly assume two different ROEs

5   and retention ratios in their SG DCFs. In addition to being the primary determinant of the SG

6   DCF's perpetuity growth rate, the earnings retention ratio also sets the assumed dividend

7   yield, equal to $\frac{B}{P}r(1-b)$. EPUC/IS/TURN and SBUA use the current dividend yield[25] –

8   which is based on the *current* ROE and retention ratio – but base their growth rates on

9   *forecast* ROE, retention ratio, and share issuance rate.[26] WTF likewise uses the current

10   dividend yield yet bases its growth rate on a mix of historical and forecast data.[27]

11   Figure 3 compares the current dividend yield to the SG DCF dividend yield implied by

12   the trailing-five-year average B/P, ROE, and retention rate for the S&P 1500 Utilities Index.

13   The dividend yields calculated under the two methodologies are uncorrelated, and the current

14   yield has exceeded the SG DCF-implied yield for the last ten years. Using the current

15   dividend yield in the SG DCF is inconsistent with the model's other, forward-looking

16   assumptions. EPUC/TURN/IS, SBUA, and WTF all make this error in their SG DCF

17   analyses.[28]

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[25]   Most recent quarterly dividend annualized by multiplying by 4 divided by the recent trailing-average stock
       price.

[26]   *See, e.g.,* EPUC/IS/TURN-01 (Gorman), Exhibit MPG-7, p. 1; SBUA-01 (Reno), p. 47-48.

[27]   For example, WTF's forecast retention rate is the ratio of the book dividend yield (most recent dividend divided
       by current book value) to WTF's forecast ROE. WTF-01 (Rothschild), Exhibit ALR-3, p. 1.

[28]   *See, e.g.*, EPUC/IS/TURN-01 (Gorman), Exhibit MPG-7, p. 1; SBUA-01 (Reno), Exhibit MLR-1, Schedule
       MLR-6c; WTF-01 (Rothschild), Exhibit ALR-3, p. 1.

Exhibit SC/PCF-08: Rebuttal Testimony of Mark E. Ellis

1 **Figure 3. Current vs. SG DCF trailing-5-year dividend yield for the S&P 1500 Utilities**
2 **Index**[29]
3 December 2010 – July 2025
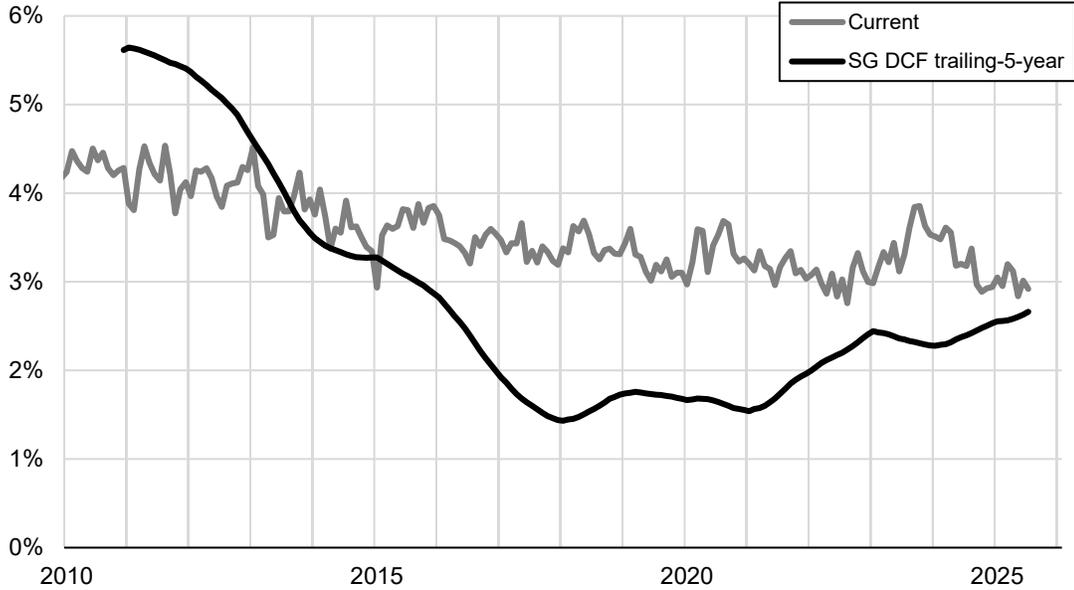
4

5   An additional concern with the SG DCF is upward bias in the analyst forecasts that

6   EPUC/IS/TURN and SBUA use to estimate their future ROEs and growth rates – a well-

7   known and thoroughly researched and documented phenomenon. Figure 4 compares the S&P

8   1500 Utilities Index's actual ROE, calculated as the last twelve months' ("LTM") EPS

9   divided by book value at the start of those twelve months, to the next twelve months'

10   ("NTM") forecast ROE, based on analyst EPS estimates and current book value. Analysts'

11   estimated ROEs consistently higher, by 1.4% on average.

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[29]   M. Ellis analysis of S&P GMI [last accessed Aug. 16, 2025].

Exhibit SC/PCF-08: Rebuttal Testimony of Mark E. Ellis

1 **Figure 4. Forecast vs. actual ROE for the S&P 1500 Utilities Index**[30]
2 January 2005 – July 2025
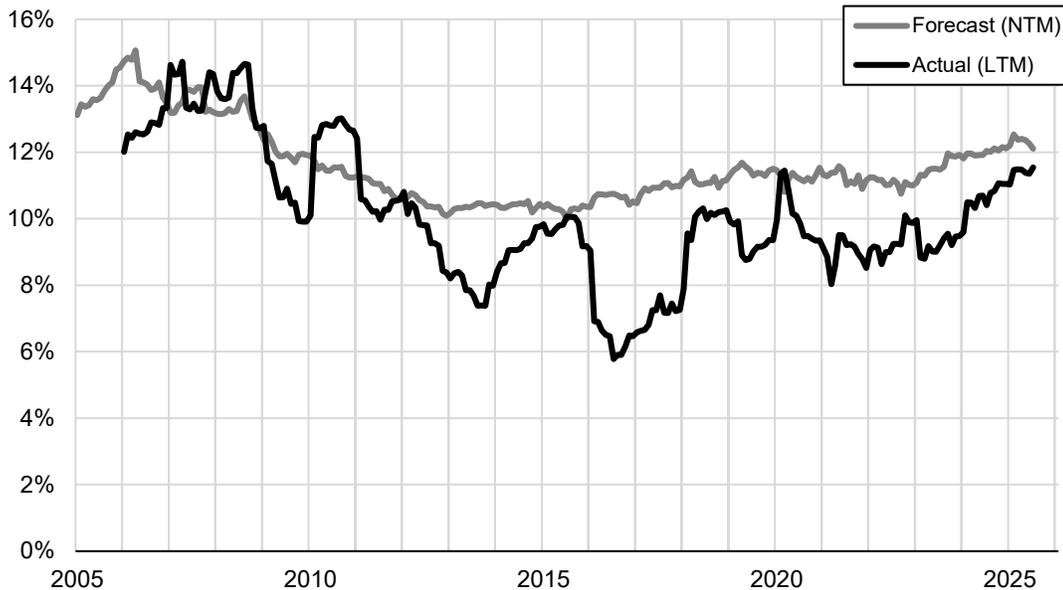
3

4   A final concern with the SG DCF is that the data are all based on utility holding

5 companies, not the operating affiliates for which the Commission is trying to estimate

6 COE.[31] Even though proxy group members are typically selected to reflect, as closely as

7 possible, "pure-play" utilities, their capital structures almost always differ from those of the

8 underlying operating companies. Holding companies typically have more debt in their overall

9 capital structure than their utility operating companies. In principle, SG DCF results could be

10 adjusted for differences in capital structure, like the approach described in my direct

11 testimony. None of the Parties makes such an adjustment, though.

12   Stepping back, it is important to recognize that the accounting metrics used in the SG

13 DCF – ROE, earnings retention, and share issuance – are all the product of human decisions.

14 They are discretionary, not grounded in any fundamental economic or financial principle or

15 theory. The data upon which these assumptions are typically based – analyst near-term

16 forecasts or 1-, 5-, 10-, or even 20-year trailing histories – provide little guidance on how

17 these metrics might evolve into perpetuity.

18

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[30]   M. Ellis analysis of S&P GMI [last accessed Aug. 16, 2025].
[31]   EDF-01 (McCann), p. 34; EPUC/IS/TURN-01 (Gorman), p. 66-67, 129-130, 202-203, 257; SBUA-01 (Reno), Exhibit MLR-1, Schedule MLR-4; WTF-01 (Rothschild), p. 42-43.

Exhibit SC/PCF-08: Rebuttal Testimony of Mark E. Ellis

1   **Q.** **What is your recommendation to the Commission and the Parties regarding the SG**

2   **DCF?**

3   A. Given the practical infeasibility of implementing the SG DCF with input assumptions that

4   can reasonably be expected to remain valid forever, I recommend the Commission disregard

5   all SG DCF results in this proceeding and exclude it altogether from future utility COE

6   analyses.

7

8   **Q.** **What about exceptions, like DCF models that do not have explicit long-term forecasts?**

9   A. The only DCF model used by Parties that does not include an explicit long-term growth rate

10   is WTF's non-constant-growth DCF ("NCG DCF").[32] WTF's NCG DCF results are higher

11   than the results of WTF's other DCF models, which themselves are based on unrealistically

12   high long-term growth rates – indicating that the NCG DCF's implied long-term growth rates

13   are even more unrealistically inflated.[33]

14

15   F.   **Third-Party MRPs Must Be Scrutinized to Ensure Their Validity for Utility**

16   **COE Estimation.**

17   **Q.** **Some witnesses use independent MRPs for their CAPM analyses that imply a higher**

18   **expected market return than both your own estimate and your CMA survey average.**

19   **How do you explain the discrepancies between your and the CMAs' market return**

20   **forecasts and the witnesses' independent market return forecasts?**

21   A. The objective in setting the rate of return in utility regulatory proceedings is to estimate the

22   current, long-term, forward-looking, market-based cost of equity. Independent MRPs should

23   therefore also reflect the current, long-term, forward-looking,[34] market-based cost of equity.

24   Several of the independent MRPs used by the Utilities and Parties fail to meet one or more of

25   these criteria and must be either adjusted (if possible) or given no weight. Moreover, these

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[32]   WTF-01 (Rothschild), p. 52-54; Exhibit ALR-3, p. 3; Exhibit ALR-8, p. 3-4.

[33]   WTF-01 (Rothschild), Exhibit ALR-3, p. 1-3.

[34]   As explained in my direct testimony, the MRP must be forward-looking and not based on the historical average. This is because historical market returns benefited from a number of one-off factors that economists broadly agree are unlikely to be repeated in the future. One such factor is "multiple expansion": a market-wide compression of the equity risk premium. Assuming multiple expansion will continue indefinitely would require the equity risk premium to turn negative in the future, in defiance of basic financial logic.

Exhibit SC/PCF-08: Rebuttal Testimony of Mark E. Ellis

1   specific MRPs are just individual estimates and should be given no more weight than any of

2   the dozens of other estimates compiled in my CMA survey.[35]

3   For example, CalAdvocates bases its MRP in part on a survey of various third-party

4   estimates, but the constituent estimates are not screened or adjusted to reflect the four criteria

5   listed above.[36] As cited in my testimony, the appropriate basis for long-term COE estimation

6   is the current geometric average return,[37] but CalAdvocates' survey is based on a mix of

7   *historical* averages, both *arithmetic* and geometric.[38] The survey therefore is not current,

8   forward-looking, and or long-term and therefore is not valid for estimating utility COE.

9   Another independent estimate used by several witnesses, from Kroll,[39] is a single-year

10   arithmetic average so must be adjusted to a long-term geometric average before use[40] – an

11   adjustment none of the witnesses make. Even then, it should be considered with equal weight

12   to the dozens of other independent forecasts that might be used.[41]

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[35] An exception might be surveys of third-party estimates, such as those compiled by CalAdvocates and Horizon Actuarial Services (https://www.horizonactuarial.com/survey-of-capital-market-assumptions). Nonetheless, the individual responses in these surveys must likewise be scrutinized to ensure they meet the same four criteria: current, long-term, forward-looking, and market-based.

[36] PAO-01 (Woolridge), p. 63-71.

[37] SC/PCF-01 (Ellis), p. 77, fn. 167. The arithmetic average return is the simple mean of periodic returns, while the geometric average return accounts for compounding over time. For example, suppose an investment gains 50% in year 1 and loses 50% in year 2, such that at end of year 2, the ending value is 1.5 x 0.5 = 0.75 of the starting value, i.e., the cumulative return is negative. The arithmetic average is $(50\% – 50\%)/2 = 0\%$, which clearly misrepresents the fact that the investment lost value. The geometric average is $[(1 + 50\%) \times (1 – 50\%)]^{0.5} – 1 = -13.4\%$. The arithmetic average overstates the true growth rate when returns vary, because it ignores compounding effects. This is known as "volatility drag." For the market as a whole, historical volatility drag is approximately 1.7%, i.e., the historical arithmetic average is about 1.7% higher than the historical geometric average. A more detailed explanation of the difference between arithmetic and geometric returns and why geometric returns must be used for long-term COE estimation is contained in my direct testimony in the 2023 Cost of Capital proceeding (A.22-04-008 et seq., PCF-09 (Ellis), p. 84-88).

[38] PAO-01 (Woolridge), Exhibit JRW-6, p. 5.

[39] *E.g.*, SCE-03 (Villadsen), p. x; PAO-01 (Woolridge), p. 71; UCAN-01 (Bandyk), p. 14.

[40] *See, e.g.*, Duff & Phelps, Client Alert: Duff & Phelps Increases U.S. Equity Risk Premium Recommendation to 5.5%, Effective January 31, 2016 (Mar. 2016), p. 41, *available at* https://edge.sitecorecloud.io/krollllc17bf0-kroll6fee-proda464-0e9b/media/Assets/PDFs/Publications/Valuation/COC/us-erp-recommendation-increase-2016.pdf. Kroll acquired Duff and Phelps's cost of capital service.

[41] Another MRP used by several witnesses (e.g., CalAdvocates, UCAN), comes from NYU finance professor Aswath Damodaran. He assumes long-term DPS growth equal to the yield on the 10-year Treasury. He provides no theoretical or empirical support for this assumption, and the current value is significantly higher than forecast long-term pre-capita GDP growth. Although the method is clearly flawed, it should not be disregarded. Rather, it should be considered as just one of several dozen long-term, forward-looking forecasts in a comprehensive survey. *See* Damodaran, Equity Risk Premiums (ERP): Determinants, Estimation, and Implications – The 2025 Edition, March 2025, p. 96, *available at* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5168609.

Exhibit SC/PCF-08: Rebuttal Testimony of Mark E. Ellis

| | | | | | | | |

1   Of the three parameters in the CAPM – risk-free rate, expected market return, beta[42] – the

2   expected market return is the most critical due its potentially outsize influence on the

3   ultimate result and *perceived* subjectivity and wide range of reasonable values. This

4   perception is incorrect, though. Once we account for our four criteria – current, long-term,

5   forward-looking, market-based – the range of reasonable values is much narrower, as my

6   CMA survey demonstrates.

7   To illustrate the strength of consensus among the most sophisticated and active market

8   participants about the future long-term market return, Figure 5 summarizes a mini-update of

9   my CMA survey that uses only forecasts as of April 25, 2025, or later and also includes their

10   long-term Treasury return forecasts. The average of their market and long-term Treasury

11   return forecasts, 5.25% and 4.33%, are both approximately 0.6% lower than my 5.81% and

12   4.89% estimates. Consequently, their 0.91% average MRP is nearly identical to my 0.88%

13   estimate. The consistency of the market's largest and most sophisticated investors' most

14   recent forecasts with my own further supports the validity of my approach and results.

15   **Figure 5. Recent investment firm market and long-term Treasury return forecasts[43]**
16   Percent, nominal geometric

| | | | | Return | | |
| | | | | | Long-term | |
Firm	As of	Horizon (years)	Scenario	Market	Treasury	MRP
BlackRock	4/25/2025	30	Base	7.67	3.72	3.95
		30	Alternative	4.79	3.05	1.75
Invesco	5/30/2025	10		5.10	4.80	0.30
Morningstar	6/30/2025	10		2.90	4.80	-1.90
Nuveen	6/30/2025	10		6.33	4.63	1.70
Research Affiliates	6/30/2025	10	Valuation dependent	3.32	4.72	-1.40
		10	Yield & growth	6.52	4.80	1.72
State Street	6/30/2025	10+		5.17	4.06	1.10
Vanguard	6/30/2025	30		5.40	4.40	1.00
Average				**5.25**	**4.33**	**0.91**

17

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[42]   In addition to all four Utilities, several Parties use adjusted betas in their CAPM models (PAO-01 (Woolridge), p. 62; EPUC/IS/TURN-01 (Gorman), p. 94-95; SBUA-01 (Reno), p. 55). As explained in my testimony (SC/PCF-01 (Ellis), p. 70-71), adjusted betas are not valid for utilities. These Parties' and the Utilities' use of adjusted beta invalidates their CAPM analyses.

[43]   SC/PCF-09, BlackRock Investment Institute, Capital Market Assumptions (May 2025), *available at* https://www.blackrock.com/institutions/en-us/insights/charts/capital-market-assumptions; SC/PCF-10, Paul Jackson, Quarterly Global Asset Allocation Outlook (Jul. 2, 2025), *available at*

Exhibit SC/PCF-08: Rebuttal Testimony of Mark E. Ellis

1

2   IV.   **TESTIMONY-SPECIFIC CONCERNS.**

3   A.   **EPUC/IS/TURN Uses the Risk Premium Analysis, a Conceptually Invalid**
4   **Method That Other Commissions Have Rejected.**

5   **Q. Do any Parties' witnesses use ROE-based models, like the risk premium or expected**

6   **earnings analyses that do not estimate investors' market-based return expectations?**

7   A. Only one witness uses a financial model that does not actually estimate the cost of capital:

8   EPUC/IS/TURN's testimony includes the risk premium analysis ("RPA"). As discussed in

9   my testimony, ROE-based models like the RPA do not even purport to estimate a market-

10   based COE and therefore are of no use in utility regulatory proceedings.[44] The witness for

11   EPUC/IS/TURN provides no rationale or justification for using a model that is not based on

12   investor's market-based expectations and that has been known for decades to be conceptually

13   invalid.

14   Reliance on any ROE-based model constitutes a severe deficiency in the professional

15   competence and diligence required of expert witnesses, as well as of the parties who rely on

16   their testimony, in cost of capital proceedings. The stakes in California cost of capital directly

17   proceedings are enormous – tens of billions of dollars – and directly impact the well-being of

18   tens of millions of Californians. It is reasonable to expect consultants submitting cost of

19   capital testimony to have the basic financial and regulatory awareness to know that the RPA

20   "defies general financial logic"[45] – those are table stakes.

21   The now well-known invalidity and conceptual circularity of ROE-based models are not

22   new insights, nor unique to regulation. When Kahn wrote about the problem of excessive

23   ROEs in 1970, he was not introducing a new theory; he was simply stating the most

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https://www.invesco.com/ch/en/insights/quarterly-global-asset-allocation-portfolio-outlook.html; SC/PCF-11,
Morningstar, Morningstar Markets Observer: Q3 2025, *available at*
https://www.morningstar.com/business/insights/research/markets-observer; SC/PCF-12, Nuveen, Capital
Market Assumptions, *available at*
https://documents.nuveen.com/Documents/Nuveen/Default.aspx?uniqueid=383ec787-32b9-40cf-adae-
04db99f75bdf; Asset Allocation Interactive, *available at* https://interactive.researchaffiliates.com/asset-
allocation; SC/PCF-13, State Street Investment Management, Long-Term Asset Class Forecasts: Q3 2025 (Jul.
25 2025), *available at* https://www.ssga.com/us/en/institutional/insights/long-term-asset-class-forecasts-q3-
2025; SC/PCF-14, Vanguard, Vanguard Capital Markets Model® Forecasts (Jul. 23 2025), *available at*
https://corporate.vanguard.com/content/corporatesite/us/en/corp/vemo/vemo-return-forecasts.html.

44   SC/PCF-01 (Ellis), p. 34-39.
45   *Ass'n of Bus. Advocating Tariff Equity v. Midcontinent Indep. Sys. Operator, Inc.*, Opinion No. 569 (Nov. 21,
     2019)

1 foundational principle of finance – discounted present value – in the language of utility
2 regulation:

> 3 The source of the discrepancy between market and book value has been that
> 4 commissions have been allowing *r*'s in excess of *k*; if instead they had set *r*
> 5 equal to *k*, or proceeded at some point to do so, both the discrepancy between
> 6 market and book value and the inconsistency would have disappeared, or
> 7 would never have arisen.
> 8 …
> 9 The cost of capital, which is what a utility company must match if it is to
> 10 attract funds, is what investors could obtain by buying the *securities* of other
> 11 companies in the open market – not what the companies themselves earn on a
> 12 dollar of additional investment.
> 13 …
> 14 If the cost of capital is lower, any attempt of a regulatory commission,
> 15 persuaded by the comparable earnings argument, to permit investors the
> 16 higher returns would only be self-defeating. Investors would respond to the
> 17 higher earnings per share by bidding up the prices of the securities to the point
> 18 at which the new purchases would earn only the old cost of capital on their
> 19 investments. The only beneficiaries would be those who happened to own the
> 20 stock at the time the policy change was announced or anticipated. There is no
> 21 way of giving new purchasers of stock more than the cost of capital, except by
> 22 changing the rules after they have made their purchases.[46]

23 Continuing to use ROE-based models (sometimes referred to as "comparable earnings"
24 approaches[47]) because they have been used for a long time,[48] or because a consultant is
25 simply unaware of their conceptual invalidity falls far short of the professional standards of
26 competence and diligence expected in cost of capital proceedings, especially in light of the
27 stakes involved.

28

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[46] Alfred E. Kahn, The Economics of Regulation, The MIT Press (The MIT Press: 1970). p. 50, 52, 52 fn. 79 (emphasis in original).

[47] David C. Parcell, The Cost of Capital – A Practitioner's Guide, Society of Utility and Regulatory Financial Analysts ("SURFA") (SURFA: 2020), p. 117-125.

[48] SURFA defends its continued teaching of the comparable earnings method to students in its utility ROR training program on the grounds that it was accepted practice in the 1960s – logic on par with a medical school reviving cigarette prescriptions because it was common practice in the same era. SURFA's argument isn't just flawed; it advertises the bankruptcy of its case. *See* The Economic Populist, Utility Finance Insiders Are Upset About Our Utility Finance Paper (Apr. 2025), *available at* https://economicpopulist.substack.com/p/utility-finance-insiders-are-upset.

Exhibit SC/PCF-08: Rebuttal Testimony of Mark E. Ellis

1		**B.** **The Commission Should Disregard EDF's Recommendations Due Its Lack of**
2		**Transparency.**

3   **Q.**   **What is your assessment of EDF's testimony?**

4   A.   EDF does not provide any substantive explanation for how it calculates its recommended

5   ROEs, beyond a vague description of its process:

> 6   Based on the analyses presented by other researchers indicating a current
> 7   premium on utilities' ROEs of approximately 1% to 5%, an expressed interest
> 8   by the Commission to have market and authorized book values converge, and
> 9   my finding of a significant premium that appears to incentivize
> 10   overinvestment by the utilities, Table EDF-7 presents EDF's proposed ROE
> 11   for each utility. The proposals are based on two calculations of the market
> 12   value premium of either the most recent as of July 2025 or the 12-month
> 13   average. These ROEs include a 10% adder to account for ongoing financial
> 14   transaction and management costs.[49]

15   Although EDF earlier explains that it calculates a "premium created by authorized ROE over

16   the market valuation of that ROE,"[50] nowhere does it explain how that premium is

17   calculated.

18   I find EDF's recommendations concerning for several reasons. Most critical is that EDF

19   provides no explanation of its methodology and how it arrives at its recommendations. Why

20   should the Commission, Utilities, or any Party give its recommendations any consideration at

21   all if it provides no explanation for how it arrived at them, the models used, and the sources

22   for its assumptions? Even though EDF's recommended ROEs are the closest to my own –

23   although far above market consensus and much too high – I cannot endorse them due to this

24   lack of transparency.[51]

25   A minor concern is EDF's "10% adder to account for ongoing financial transaction and

26   management costs." Again, EDF provides no explanation for the motivation for this

27   adjustment, the specific costs it is intended to cover, or how it arrived at 10%.

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[49]   EDF-01 (McCann), p. 36-37.
[50]   EDF-01 (McCann), p. 34.
[51]   Based on the source cited in EDF's testimony, I believe EDF uses a sustainable growth DCF similar to SBUA's and WTF's. EDF-01 (McCann), p. 36. The cited source, Steve Kihm et al., *You Get What You Pay For: Moving Toward Value in Utility Compensation – Part One – Revenue and Profit* (Jun. 2015), p. 7, describes a "residual income model" that is mathematically equivalent to the sustainable growth model, except it does not include the share issuance (*sv*) contribution to growth.

Exhibit SC/PCF-08: Rebuttal Testimony of Mark E. Ellis

1   A final concern is the results themselves. EDF provides two sets of estimates, one based

2   on EDF's most recent monthly estimate of each Utility's ROE premium, the other on the

3   trailing twelve-month average.[52] The differences in these two sets of estimates are wide,

4   ranging from 1.0 to 1.4% depending on the Utility – equivalent to 14% to 28% of his

5   recommended ROEs. EDF provides no guidance on how to interpret these results, namely,

6   which EDF believes is more representative of the current, forward-looking, long-term,

7   market-based COE, or what factors should the Commission consider in deciding between

8   them.

9

10   **C.   WTF Erroneously Complexifies Its DCF and CAPM, Invalidating Its**
11   **Results.**

12   **Q. Do you have any observations about WTF's analysis?**

13   A. Yes. WTF introduces several proprietary methods in both its DCF and CAPM analyses.

14   Many of these methods and their underlying assumptions are conceptually flawed or lack

15   empirical support.

16   With respect to its DCF, WTF's proprietary NCG DCF version incorporates an

17   assumption – that the P/B will remain unchanged while the expected growth rate changes[53] –

18   that contradicts basic financial principles.

19   With respect to its implementation of the CAPM, WTF's option-derived betas and market

20   return forecast are all based on options that expire within 6 months.[54] Despite WTF's

21   arguments to the contrary, they are only valid for estimating a short-term cost of equity. In

22   addition, WTF's claim that using a long-term Treasury yield as the risk-free rate in the

23   CAPM is not valid because the long-term Treasury is not zero-beta is incorrect. The long-

24   term Treasury does, in fact, have zero beta.

25

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[52]   EDF-01 (McCann), p. 37.
[53]   WTF-01 (Rothschild), p. 52-53.
[54]   WTF-01 (Rothschild), p. 66, Exhibit ALR-3, p. 2.

Exhibit SC/PCF-08: Rebuttal Testimony of Mark E. Ellis

1   **1.   The assumptions implicit in WTF's non-constant-growth DCF are**
2   **internally contradictory, rendering the model economically invalid.**

3   Q. **WTF introduces a novel "non-constant-growth DCF" model. What is your assessment**

4   **of this analysis?**

5   A. WTF's NCG DCF is a variation on the MS DCF described in my testimony,[55] although it has

6   only two stages, near- and long-term (into perpetuity). The near-term dividend forecast is

7   based on Value Line estimates from 2025 to 2029. Long-term dividend growth is not

8   explicitly modeled. Instead, WTF's NCG DCF assumes a 2029 price at which each proxy

9   group member's stock is effectively sold. The cost of equity is the discount rate at which the

10   present value of the forecast dividends and stock price sale equals the current stock price.[56]

11

12 Q. **Is WTF's approach of assuming the sale of the stock at the end of the near-term growth**

13   **phase conceptually valid?**

14 A. Yes. Mathematically, all multi-stage DCF models are equivalent to WTF's purchase-

15   dividends-sale approach. But WTF's NCG DCF imposes a constraint on the future stock

16   price that violates basic financial principles, invalidating its results.

17

18 Q. **What constraint does WTF's NCG DCF impose on the future stock price, and how does**

19   **it violate basic financial principles?**

20 A. WTF's NCG DCF assumes the future stock price has the same P/B as the current stock price.

21   The price-to-book ratio generally stays constant only if the dividend growth rate does not

22   change.[57] As the model's name clearly states, though, the growth rate in WTF's non-constant

23   growth DCF is not constant. Consequently, the price-to-book ratio should not be constant –

24   but WTF assumes it is.

25

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[55] SC/PCF-01 (Ellis), p. 50-56.
[56] WTF-01 (Rothschild), p. 52-53.
[57] For example, in WTF's constant growth DCF, P/B = (ROE – growth)/(COE – growth). Given a constant ROE, which WTF assumes, P/B will vary with the growth rate. *See* WTF-01 (Rothschild), p. 45-52. While it is possible for P/B to remain constant as the growth rate changes, that would require ROE to vary exactly according to the formula: ROE = P/B x (COE – growth) + growth. WTF provides no explanation for why ROE should or might vary so as to exactly offset the effect on P/B of a change in growth rate, and there is no reason to expect it to do so.

Exhibit SC/PCF-08: Rebuttal Testimony of Mark E. Ellis

1   **Q. How does WTF justify its constant-P/B assumption?**

2   A. WTF explains its constant-P/B assumption as follows:

3   Q. WHY DID YOU USE BOOK VALUE GROWTH TO PROVIDE THE
4   ESTIMATE OF THE FUTURE STOCK PRICE?
5
6   A. For any given earned return on book equity, earnings are directly
7   proportional to the book value. Furthermore, book value growth is the net
8   result after the company produces earnings, pays a dividend and also, perhaps,
9   either sells new common stock at market price or repurchases its own
10   common stock at market price.[58]

11   WTF's explanation for its constant-P/B assumption fails to address the financial

12   contradiction between a non-constant growth rate and a constant P/B. Earnings may be

13   directly proportional to book value, but this does not imply that the stock price is

14   proportional to book value. It is well-known that differences in expected growth are the key

15   determinant of differences in the price-to-earnings ratio ("P/E") across companies within a

16   sector.[59] If earnings grow with book value, but P/E changes due to a change in expected

17   growth over time – which the model, by definition, assumes – then P/B must also change

18   over time. WTF's constant-P/B assumption violates this basic financial principle.

19

20   **Q. Is there more direct evidence that WTF's NCG DCF produces unreasonable results and**
21   **is therefore not valid?**

22   A. One way to demonstrate the invalidity of WTF's NCG DCF is to look at the long-term

23   growth rate implied by its constant-P/B constraint. At the end of the first stage, in 2029, the

24   stock price can be represented by a simple CG DCF:

25
$$P_{2029} = \frac{D_{2029}\left(1 + g_{perpetuity}\right)}{k - g_{perpetuity}},$$

26   where P_{2029} and D_{2029} are the stock price (based on Value Line's forecast book value and

27   WTF's constant-P/B constraint) and dividend (based on Value Line's forecast) at the end of

28   the near-term growth phase; $g_{perpetuity}$ is the dividend growth rate from the end of the near-

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[58]   WTF-01 (Rothschild), p. 53.
[59]   *See, e.g.*, Jason Fernando, Price-to-Earnings (P/E) Ratio: Definition, Formula, and Examples (Aug. 2025),
     available at https://www.investopedia.com/terms/p/price-earningsratio.asp [last accessed Aug. 15, 2025]: "In
     general, a high P/E suggests that investors expect higher earnings growth than those with a lower P/E."

1   term stage into perpetuity; and k is the cost of equity. This formula can be rearranged to

2   express the perpetuity growth rate as:

3
$$g_{perpetuity} = \frac{k - \frac{D_{2029}}{P_{2029}}}{1 + \frac{D_{2029}}{P_{2029}}}.$$

4   In general, the perpetuity growth rates should be relatively similar, in principle close to

5   expected long-term inflation, currently approximately 2%, as explained above. The

6   perpetuity growth rates implied by WTF's NCG DCF, though, are substantially higher than

7   long-term expected inflation and vary widely – averaging 4.73% for WTF's electric utility

8   proxy group, with a range of 2.02% to 10.19%.[60] Such systematically unrealistic perpetuity

9   growth rates directly reveal the conceptual invalidity of WTF's NCG DCF.[61]

10

11   **2.   WTF's option-implied betas and market return forecast are not valid**
12   **for estimating a long-term COE.**

13   **Q. What is your assessment of WTF's option-based approach?**

14   A. WTF introduces a novel methodology to estimate forward-looking betas and an expected

15   market return, both based on the probability distribution of expected market returns implied

16   by the prices of stock options.[62]

17   WTF's methodology requires specialized data and software that WTF does not provide,

18   nor to which the other Parties and Utilities have access. Given the practical impossibility of

19   conducting any meaningful review, WTF's proprietary beta analysis should be viewed with

20   skepticism. As a matter of principle, the Commission, Parties, and Utilities should not be

21   expected to rely on a "black box" analysis provided by any Party or Utility.

22   Notably, WTF does not provide the option-implied betas for the individual companies

23   within its two proxy groups, only the proxy-group averages. I suspect the results vary

24   substantially from one company to the next, and from one day to the next. The limited data

25   WTF does provide suggests as much. The range and standard deviation of WTF's electric

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[60]   M. Ellis analysis of WTF-01 (Rothschild), Exhibit ALR-3, p. 3.
[61]   Beyond the conceptual flaw of WTF's NCG DCF, WTF's use of 12-month trailing average prices across both of CG and NCG DCF models is also erroneous, introducing upward bias, as explained in SC/PCF-01 (Ellis), p. 47-49.
[62]   WTF-01 (Rothschild), p. 58.

1   proxy group option-implied betas are more than 4 times those of WTF's calculated 5-year

2   historical betas.[63] A methodology that produces such inconsistent results, across companies

3   and across short time intervals, is not suitable for estimating a long-term COE.

4   WTF's methodology is not conceptually valid for estimating a long-term COE. While the

5   concept of using option prices, which are inherently forward-looking, has merit, WTF's

6   implementation is not valid because the options used by WTF to estimate the expected

7   market return have an expiration date only 5 years in the future, and those used to estimate

8   beta have expiration dates only 6 months out. Consequently, WTF's CAPM results are only

9   valid for the 6 months after their calculation – the minimum duration of validity of any of its

10 constituent assumptions – making them entirely inappropriate for long-term utility COE

11 estimation.

12

13 **Q. Do you find WTF's arguments in support of its option-implied betas compelling?**

14 A. WTF makes several arguments to justify its use of option-implied betas based on data valid

15   only 6 months into the future, but they are unpersuasive.

16   WTF justifies the validity of relying on options valid only 6 months into the future to

17 estimate a long-term utility COE with an appeal to possibility, quoting the research paper

18 from which its methodology is drawn:

19   The methodology … "allows for the computation of a complete term structure
20   of beta for each company so long as the options data are available," so there is
21   nothing inherent in the methodology that limits it to a certain time horizon.[64]

22 It might be *conceptually possible* to estimate longer-term betas from option prices, *if the*

23 *appropriate data were available*, but WTF does not, in fact, compute a complete term

24 structure precisely because the option price data are *not* available. WTF's methodology

25 *would* be valid if they had the appropriate data, but that data is not available, and this

26 argument does not support the use of WTF's methodology with *in*appropriate data.[65]

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[63] WTF-01 (Rothschild), Exhibit ALR-4, p. 3.
[64] WTF-01 (Rothschild), p. 67, citing Peter Christoffersen et al., Forward-Looking Betas (Apr. 25, 2008), p. 24, *available at* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=891467.
[65] The fallacy of WTF's argument is so well-known among analysts that it has its own acronym: GIGO, for "garbage in, garbage out."

Exhibit SC/PCF-08: Rebuttal Testimony of Mark E. Ellis

1   WTF also cites the same research paper's finding that 6-month option-based betas had

2   better predictive validity over the next 6 to 24 months than trailing betas for the 30

3   companies in the Dow Jones Index.[66] This is a faulty generalization, for two reasons. First,

4   predictive validity even as far as 2 years into the future is not relevant for long-term (multi-

5   decade) COE estimate. In addition, as explained in my direct testimony, utility betas don't

6   behave like the typical stock beta; they exhibit mean-reversion – the tendency to trend back

7   to their long-term average of 0.5-0.6 over time.[67] Option-implied betas' purported superior

8   short-term predictive validity may therefore imply worse long-term predictive validity.

9   Another of WTF's arguments undermines its case, rather than supporting it:

10   Simply because some may argue that it may be preferable to use longer time
11   horizons in place of or in addition to a 6-month horizon, it does not mean that
12   a 6-month 2 option-implied beta is of no relevance or cannot be used. That
13   would be tantamount to saying you cannot use a 1-year Value Line Earnings
14   Per Share estimate [beyond one year].[68]

15 WTF's analogy is a transparent non sequitur. One-year forward EPS estimates are valid only

16 for one year. A moment's reflection reveals this argument's incoherence. If Value Line

17 reports one-year-forward EPS estimate – i.e., for 2026 – that estimate is obviously valid only

18 for 2026 – not 2027, 2028, or any other future year.

19   WTF continues:

20   In fact, for purposes of option-implied betas, it would be difficult to say if a
21   time horizon of 1 year, for instance, is necessarily always better than a time
22   horizon of 6 months.[69]

23 This is another transparent logical fallacy – an argument from ignorance. While it cannot be

24 ruled out that a 6-month forward beta has, for some reason, better predictive validity than a

25 1-year forward beta, without evidence there is no reason to think it should or would be, and

26 WTF provides none. In fact, WTF's own testimony demonstrates the opposite. As Chart 5

27 shows, long-term volatilities are markedly less variable than short-term volatilities, so a 1-

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66   WTF-01 (Rothschild), p. 138.
67   SC/PCF-01 (Ellis), p. 70-75.
68   WTF-01 (Rothschild), p. 68.
69   WTF-01 (Rothschild), p. 68.

Exhibit SC/PCF-08: Rebuttal Testimony of Mark E. Ellis

1   year volatility provides a far more reliable representation of long-term expectations than a 6-

2   month measure.[70] Based on WTF's own evidence, we *can* say that, in calculating an option-

3   implied beta, "a time horizon of 1 year … is necessarily always better than a time horizon of

4   6 months."

5   WTF's grab bag of specious arguments – appeal to possibility, faulty generalization, non

6   sequitur, argument from ignorance – aren't just flawed; taken together, they betray the

7   vacuity its case.

8

9   **3.   Contrary to WTF's assertion, the long-term Treasury has a beta of**
10   **zero and is therefore valid for use in the CAPM.**

11   **Q. WTF claims the beta of the long-term Treasury is not zero and therefore should not be**

12   **used in the CAPM. Is this correct?**

13   A. WTF claims it is inappropriate to use a long-term risk-free rate in the CAPM because the

14   beta of long-term Treasurys is not zero, in violation of a key assumption of the CAPM. WTF

15   does not provide any original analysis or citation to independent research in support of this

16   claim.[71] I'd like to provide two clarifications about WTF's assertion.

17   First, the term "risk-free" to describe the zero-beta asset in the CAPM can be

18   misinterpreted. Risk is a relative concept. For example, a 1-month Treasury bill ("T-bill")

19   might, on its face, seem risk-free for an investor holding it the entire month until expiration.

20   Repeatedly reinvesting in the 1-month T-bill might, therefore, be considered a risk-free

21   investment strategy.

22   But T-bills are not necessarily a risk-free asset. The perception of risk – both prospective

23   and realized – is relative. In recent years, T-bill returns were substantially lower than

24   inflation. For example, if an investor, spooked by losses during the 2007-08 financial crisis,

25   decided to put all their money in the "risk-free" 1-month T-bill for the next 13½ years, they

26   would have lost 25% of their purchasing power in inflation-adjusted terms.[72] The "risk-free"

27   T-bill turned out to be anything but.

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[70] WTF-01 (Rothschild), p. 36.
[71] WTF-01 (Rothschild), p. 130.
[72] M. Ellis analysis of FRED and BLS data [last accessed August 8, 2025].

Exhibit SC/PCF-08: Rebuttal Testimony of Mark E. Ellis

1   The CAPM implicitly recognizes that risk is relative. As WTF correctly notes, for use in

2   the CAPM, the "risk-free" asset need only have zero beta – zero risk *relative to the market*.[73]

3   Contrary to WTF's claim, though, the returns on long-term Treasurys are, in fact, zero-beta.

4   Figure 6 is a cross-plot of the historical monthly total returns of the 30-year Treasury against

5   those of the market (interest or dividend income plus capital gain), from March 1977 through

6   June 2025 – the 30-year Treasury's entire available trailing history. The 30-year Treasury's

7   beta – the slope of the regression line – of 0.04 is not statistically significantly different from

8   0.0, as indicated by a t-statistic of 1.19.[74]

9   **Figure 6. 30-year Treasury historical beta[75]**
10   March 1977 – June 2025
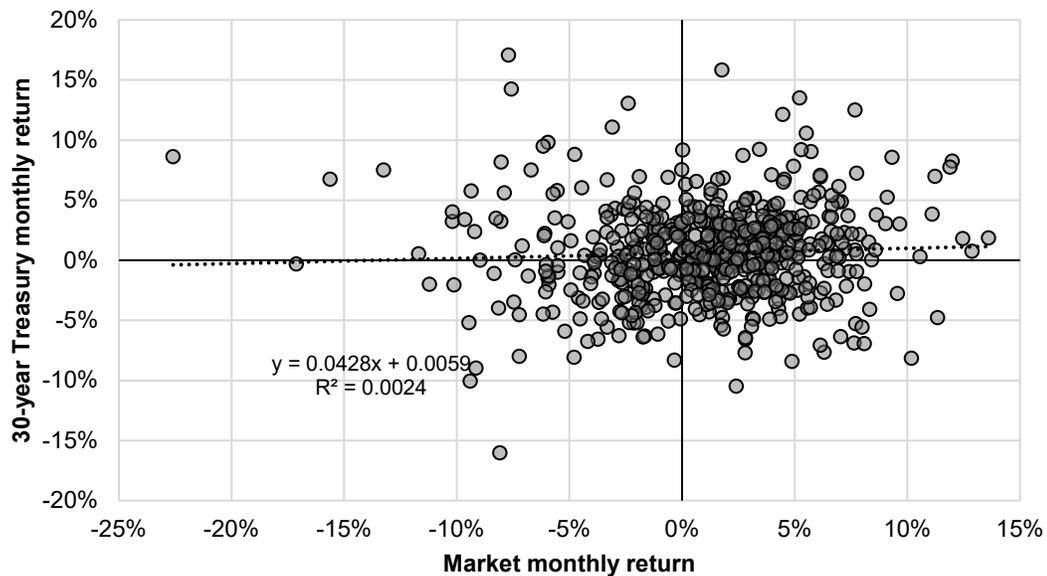
11

12

13 **Q. Does this conclude your testimony?**

14 A. Yes.

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[73]   WTF-01 (Rothschild), p. 130.
[74]   *See* SC/PCF-01 (Ellis), p. 83, fn. 187.
[75]   M. Ellis analysis of FDL and FRED data [last accessed August 8, 2025].

Exhibit SC/PCF-08: Rebuttal Testimony of Mark E. Ellis