STATE OF IOWA

BEFORE THE IOWA UTILITIES BOARD

IN RE: **INTERSTATE POWER AND LIGHT COMPANY**	**DOCKET NO. RPU-2021-____**

DIRECT TESTIMONY

OF

DR. BENTE VILLADSEN, BRATTLE GROUP

NOVEMBER 2, 2021

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I. INTRODUCTION AND PURPOSE

Q1. Please state your name, occupation and business address for the record.

A1. My name is Bente Villadsen and I am a Principal of The Brattle Group, whose business address is One Beacon Street, Suite 2600, Boston, Massachusetts, 02108.

Q2. Briefly describe your educational and professional qualifications.

A2. I have more than 20 years of experience working with regulated utilities on cost of capital and related matters. My practice focuses on cost of capital, regulatory finance, and accounting issues. I am the co-author of the text, "Risk and Return for Regulated Industries"[1] and a frequent speaker on regulatory finance at conferences and webinars. I have testified or filed expert reports on cost of capital in Alaska, Arizona, California, Hawaii, Illinois, Michigan, New Mexico, New York, Ohio, Oregon, and Washington, as well as before the Bonneville Power Administration, Federal Energy Regulatory Commission (FERC), the Surface Transportation Board, the Alberta Utilities Commission, Barbados Fair Trading Commission, and the Ontario Energy Board. I have provided white papers on cost of capital to the British Columbia Utilities Commission, the Canadian Transportation Agency, Mexico's Comisión Reguladora de Energía as well as to European and Australian regulators on cost of capital. I have also testified in Utah courts on cost of capital issues. I have testified or filed testimony on regulatory accounting issues before the FERC, the Regulatory Commission of Alaska, the Michigan Public Service Commission, the Texas Public Utility

[1] Bente Villadsen, Michael J. Vilbert, Dan Harris, A. Lawrence Kolbe, "Risk and Return for Regulated Industries," Academic Press, 2017.

Commission as well as in international and U.S. arbitrations and regularly provide advice to utilities on regulatory matters as well as risk management.

I hold a Ph.D. from Yale University and a BS/MS from University of Aarhus, Denmark. Prior to joining The Brattle Group, I was a business school faculty member at Washington University in St. Louis, University of Michigan, and University of Iowa. Appendix A contains more information on my professional qualifications as well as a list of my prior testimonies and publications.

Q3. What is the purpose of your testimony in this proceeding?

A3. Interstate Power and Light Company (IPL or the Company) has asked me to estimate the cost of equity that the Iowa Utilities Board (Board) should allow IPL an opportunity to earn on the equity-financed portion of its rate base associated with the 400 MW solar generation and 75 MW battery storage facility (collectively, the Projects) that the Company plans to add to its generation fleet. I understand that IPL is seeking approval from the Board for advanced ratemaking principles pursuant to Iowa Code section 476.53. The Board's statutory authority to order advance ratemaking principles is grounded in Iowa's policy of "attract[ing] the development of electric power generating and transmission facilities within the state in sufficient quantity to ensure reliable electric service to Iowa consumers and provide economic benefits to the state." Iowa Code § 476.53(1). I also understand that under this regulatory provision, the allowed return on equity (ROE) would be set for the period covering the full economic life of the asset, estimated to be approximately 30 years for the solar

generation and 20 years for the battery storage facility. I also consider the relative risk of the Company compared to the peer group and the impact of its proposed capital structure.

Finally, my understanding is that this Project is highly beneficial to the State economy in terms of job creation and economic development, to Iowa customers in the form of low-cost renewable energy, and to the Company in terms of diversifying its generation portfolio. Project benefits are however accompanied by substantial risks to IPL. These risks are described later in my testimony.

Q4. Have you prepared any exhibits to accompany and support your testimony?

A4. Yes. I have attached the following IPL Villadsen Direct Exhibit(s) to my testimony:

- Exhibit 1: Technical Appendix;
- Exhibit 2: Return on Equity Analysis;
    - Schedule A: Table of Contents;
    - Schedule B: Classification of Companies by Assets;
    - Schedule C: Market Value of the Electric Sample;
    - Schedule D: Capital Structure Summary of the Electric Sample;
    - Schedule E: Estimated Growth Rates of the Electric Sample;
    - Schedule F: DCF Cost of Equity of the Electric Sample;
    - Schedule G: Overall After-Tax DCF Cost of Capital of the Electric Sample;

- Schedule H: DCF Cost of Equity at Alliant Energy's Proposed Capital Structure;
- Schedule I: Risk-Free Rates;
- Schedule J: Risk Positioning Cost of Equity of the Electric Sample;
- Schedule K: Overall After-Tax Risk Positioning Cost of Capital of the Electric Sample;
- Schedule L: Risk Positioning Cost of Equity at Alliant Energy's Proposed Capital Structure;
- Schedule M: Hamada Adjustment to Obtain Unlevered Asset Beta;
- Schedule N: Electric Sample Average Asset Beta Relevered at Alliant Energy's Proposed Capital Structure;
- Schedule O: Risk-Positioning Cost of Equity using Hamada-Adjusted Betas;
- Schedule P: Risk Premiums Determined by Relationship Between Authorized ROEs and Long-term Treasury Bond Rates; and
- Schedule Q: FERC-based Market Risk Premium Summary.

II. SUMMARY OF CONCLUSIONS

Q5. Do you have any preliminary comments regarding the appropriate ROE?

A5. The current determination of IPL's allowed ROE for the Projects takes place during continued uncertain economic and financial conditions due to the still ongoing impacts of the COVID-19 pandemic, which has led to unprecedentedly low U.S. Treasury bond yields as the Federal Reserve continues to hold the short-term interest rates at a near-zero percentage point. While capital market

conditions have stabilized in the recent months, the economy continues to be buttressed by continued monetary policy of low interest rates and an increasing risk of inflation that may persist longer than previously expected. The allowed nominal ROE set in this proceeding is expected to remain in effect through the economic life of the Project, imposing inflation (and other) risks on IPL that can reduce the real earned ROE in a rising inflationary environment. Additionally, the regulated Electric Utility sample of integrated electric utilities does not fully capture the risks associated with long-term nature of the generation asset for which the appropriate ROE needs to be determined in this proceeding. I therefore consider additional risks the Projects' face.

Q6. Please summarize your recommendation for IPL's ROE.

A6. I recommend that IPL be allowed to earn a return on equity of 11.40 percent on the regulated rate base for the Projects at the Company's 51 percent common equity. The 11.40 percent ROE recommendation is reasonable when evaluating the prevailing cost of equity for integrated electric utilities and the Projects' specific risks as well as the physical nature of the asset.

The recommendation is based on my implementation of standard cost of capital estimation models including two versions each of the Discounted Cash Flow (DCF) model and the Capital Asset Pricing Model (CAPM), as well as an Implied Risk Premium analysis and an analysis of the business risks of the

Projects.[2,3] Based on my consideration of the results from the various cost of capital estimation models as well as the context of advanced ratemaking provision that fixes the authorized, nominal ROE for the next 30 years, imposing long-term inflationary risks and other policy and operational risks, I believe that a 11.40 percent ROE for the Projects is reasonable and supported by the Electric Utility Sample's cost of equity and the Board's prior findings. I note that my recommended 11.40 percent is supported by the Electric Sample even before making adjustments for expected inflation.

Q7. How is the remainder of your testimony organized?

A7. Section III formally defines the cost of capital and explains the techniques for estimating it in the context of utility rate regulation. Section IV discusses conditions and trends in capital markets and their impact on the cost of capital. Section V explains my analyses and presents the results. Section VI discusses business risks of IPL's Projects relevant to my recommended allowed ROE. Finally, Section VII concludes with a summary of my recommendations.

III. COST OF CAPITAL PRINCIPLES AND APPROACH

A. RISK AND THE COST OF CAPITAL

Q8. How is the "Cost of Capital" defined?

A8. The cost of capital is defined as the expected rate of return in capital markets on alternative investments of equivalent risk. Put differently, it is the rate of return

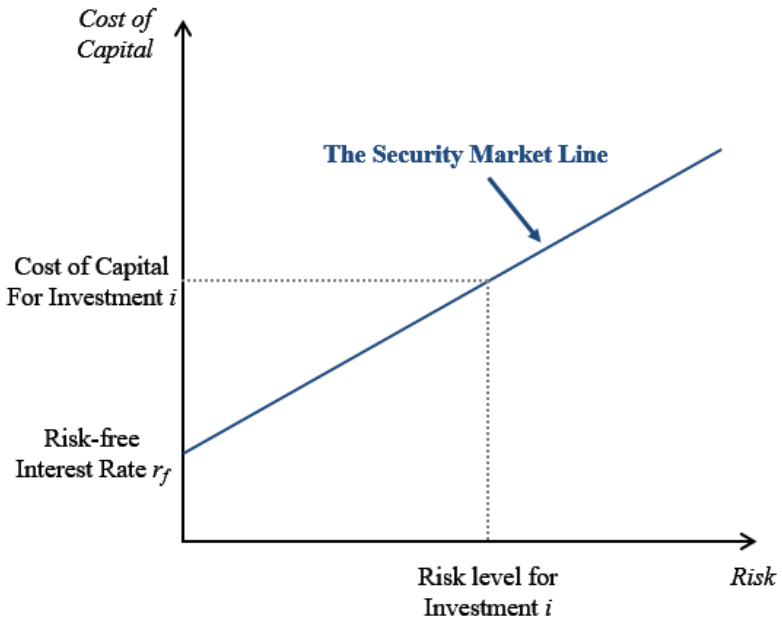
[2] Importantly, it is the risks of the asset and not that of the owner that determines the appropriate cost of capital. See, for example, Brealey, Myers, and Allan, "Principles of Corporate Finance," 10th edition, 2011, p. 214.

[3] The Board has previously used the same models and recently stated that "[i]n determining an ROE for a utility, the Board has relied on the DCF model, the CAPM, and the risk premium model." See, for example, Iowa Utilities Board, "Final Decision and Order in Re. Iowa-American Water Company, Docket Nos. RPU-2020-0001, TF-2020-0250," issued June 28, 2021, p. 24.

investors require based on the risk-return alternatives available in competitive capital markets. The cost of capital is a type of opportunity cost: it represents the rate of return that investors could expect to earn elsewhere without bearing more risk. "Expected" is used in the statistical sense: the mean of the distribution of possible outcomes. The terms "expect" and "expected," as in the definition of the cost of capital itself, refer to the probability-weighted average over all possible outcomes.

The definition of the cost of capital recognizes a tradeoff between risk and return that can be represented by the "security market risk-return line" or "Security Market Line" for short. This line is depicted in Figure 1 below. The higher the risk, the higher the cost of capital required.

Figure 1
The Security Market Line



Q9. What factors contribute to systematic risk for an equity investment?

A9. When estimating the cost of equity for a given asset or business venture, two categories of risk are important. The first is business risk, which is the degree to which the cash flows generated by the business (and its assets) vary in response to moves in the broader market. In context of the CAPM, business risk can be quantified in terms of an "assets beta" or "unlevered beta." For a company with an assets beta of 1, the value of its enterprise will increase (decrease) by 1 percent for a 1 percent increase (decline) in the market index.

The second category of risk relevant for an equity investment depends on how the business enterprise is financed and is called financial risk. Section III.B below explains how financial risk affects the systematic risk of equity.

Q10. What are the guiding standards that define a just and reasonable allowed rate of return on rate-regulated utility investments?

A10. The seminal guidance on this topic was provided by the U.S. Supreme Court in the *Hope* and *Bluefield* cases,[4] which found that:

- The return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks;[5]
- The return should be reasonably sufficient to assure confidence in the financial soundness of the utility; and

[4] *Bluefield Water Works & Improvement Co. v. Public Service Com'n of West Virginia*, 262 U.S. 679 (1923) ("*Bluefield*"), and *Federal Power Com'n v. Hope Natural Gas Co*., 320 U.S. 591 (1944) ("*Hope*").

[5] *Hope*, 320 U.S. at 603.

- The return should be adequate, under efficient and economical management for the utility to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties.[6]

Q11. How does the standard for just and reasonable rate of return relate to the cost of capital?

A11. The first component of the *Hope* and *Bluefield* standard, as articulated above, is directly aligned with the financial concept of the opportunity cost of capital.[7] The cost of capital is the rate of return investors can expect to earn in capital markets on alternative investments of equivalent risk.[8]

By investing in a regulated utility asset, investors are tying up some capital in that investment, thereby foregoing alternative investment opportunities. Hence, the investors are incurring an "opportunity cost" equal to the returns available on those alternative investments. The allowed return on equity needs to be at least as high as the expected return offered by alternative investments of equivalent risk or investors will choose these alternatives instead. Otherwise the utility's ability to raise capital and fund its operations will be negatively impacted. This is a fundamental concept in cost of capital proceedings for regulated utilities such

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6 *Bluefield*, 262 U.S. at 680.

7 A formal link between the opportunity cost of capital as defined by financial economics and the proper expected rate of return for utilities was developed by Stewart C. Myers, "Application of Finance Theory to Public Utility Rate Cases*," Bell Journal of Economics & Management Science* 3:58-97 (1972).

8 The opportunity cost of capital is also referred to as simply the "cost of capital," and can be equivalently described in terms of the "required return" needed to attract investment in a particular security or other asset (i.e., the level of expected return at which investors will find that asset at least as attractive as an alternative investment).

as IPL. The Board has recognized the importance of providing a ROE that meets investors' required return.[9]

Q12. Please summarize how you considered risk when estimating the cost of capital.

A12. To evaluate comparable business risk, I looked to a proxy group of regulated electric utilities. The electric utilities I consider have a high proportion of regulated assets and revenue with the majority having more than 80 percent of assets subject to regulation. Additionally, they all have a network of assets that are used to serve end customers and they are capital intensive (meaning that each dollar in revenue requires substantial investment in fixed assets). Because this proceeding seeks to establish the appropriate risk-commensurate allowed ROE for IPL's Projects, my recommendation focuses on results from a proxy group of electric utilities, which I refer to the "Electric Sample". Further, (as explained in Financial Risk and the Cost of Equity section below) I analyzed and adjusted for differences in financial risk due to different levels of financial leverage among the proxy companies and between the capital structures of the proxy companies and the regulatory capital structure that will be applied to IPL for ratemaking purposes.

B. Financial Risk and the Cost of Equity

Q13. How does capital structure affect the cost of equity?

A13. Debtholders in a company have a fixed claim on the assets of the company and are paid prior to the company's owners (equity holders) who hold the inherently

[9] *See*, for example, Final Decision and Order in Docket Nos. RPU-2020-0001 and TF-2020-0250, June 28, 2021, p. 21.

variable residual claim on the company's operating cash flows. Because equity holders only receive the profit that is left over after the fixed debt payments are made, higher degrees of debt in the capital structure amplify the variability in the expected rate of return earned by equity-holders. This phenomenon of debt resulting in financial leverage for equity holders means that, all else equal, a greater proportion of debt in the capital structure increases risk for equity holders, causing them to require a higher rate of return on their equity investment, even for an equivalent level of underlying business risk.

Q14. How do differences in financial leverage affect the estimation of the cost of equity?

A14. The CAPM and DCF models rely on market data to estimate the cost of equity for the proxy companies, so the results reflect the value of the capital that investors hold during the estimation period (market values).

The authorized ROE is applied to the regulatory equity portion of IPL's investment in the Projects. Because the cost of equity is measured using a group of proxy companies, it may well be the case that these companies finance their operations with a different debt and equity proportion than the proportion the Board allows in IPL's rate base. Specifically, the CAPM and DCF models measure the cost of equity using market data and consequently are measures of the cost of equity using the proportion of debt and equity that is inherent in that data. Therefore, I consider the impact of any difference between the financial risk inherent in those cost of equity estimates and the capital structure used to determine IPL's required return on equity.

Differences in financial risk due to the different degree of financial leverage in IPL's regulatory capital structure compared to the capital structures of the proxy companies mean that the equity betas measured for the proxy companies must be adjusted before they can be applied in determining IPL's CAPM return on equity. Similarly, the cost of equity measured by applying the DCF models to the proxy companies' market data requires adjustment if it is to serve as an estimate of the appropriate allowed ROE for IPL's Projects at the regulatory capital structure the Board approves.

Importantly, taking differences in financial leverage into account does not change the value of the rate base. Rather, it acknowledges the fact that a higher degree of financial leverage in the regulatory capital structure imposes a higher degree of financial risk for an equity investment in IPL's Projects rate base than is experienced by equity investors in the market-traded stock of the less leveraged proxy companies.

Q15. How specifically do you consider financial risk in your analysis of the cost of equity using market data for the proxy group companies?

A15. The impact of financial risk is taken into account in an analysis of cost of equity using market-based models such as the DCF and CAPM in several manners.[10] One way is to determine the after-tax weighted-average cost of capital (WACC) for the proxy group using the equity and debt percentages as the weight assigned to the cost of equity and debt. Financial theory holds that for a given level of

[10] The impact of financial leverage on the risk premium model needs to be considered separately as it uses regulatory data rather than market data, meaning that differences in regulatory capital structures are the figures that are relevant for this model.

business risk, the WACC is constant over a broad set of capital structures, i.e., the WACC is the same at, for example, 55 percent and 45 percent equity, as the cost of equity increases as the percentage of equity decreases. I estimate the WACC for each utility in the proxy group based on that utility's capital structure. I then evaluate the average WACC across the proxy group. Once the weighted cost of capital is determined for the proxy group, I can determine the cost of equity that is required at IPL's regulatory capital structure. This approach assumes that the after-tax WACC is constant for a range that spans the capital structures used to estimate the cost of equity and the regulatory capital structure.

A second approach was developed by Professor Hamada,[11] who estimated the cost of equity using the CAPM and made comparisons between companies with different capital structure using beta. Specifically, under the Hamada approach, I use the estimated beta to calculate what beta would be associated with a 100 percent equity financed firm to obtain a so-called all-equity or assets beta and then re-lever the beta to determine the beta associated with the regulatory capital structure. This requires an estimate of the systematic risk associated with debt (*i.e.*, the debt beta), which is usually quite small. In Exhibit 1, I set forth additional technical details regarding the methods that can be used to account for financial risk when estimating the cost of capital.

[11] Distinguished professor emeritus of finance and former dean of the University of Chicago's Booth School of Business. Professor Hamada is credited for developing a method to determine the cost of equity for a company with a different capital structure than that of the comparable companies. His research allows us to compare the cost of equity for companies that have different amounts of equity on an apples to apples basis.

Q16. Can you provide a numerical illustration of how the cost of equity changes, all else being equal, when the degree of leverage changes?

A16. Yes. I constructed a simple example below, where only the leverage of a company varies. I assumed the return on equity is 11.40 percent at a 51 percent equity capital structure and determine the return on equity that would result in the same overall return if the percentage of equity in the capital structure were reduced to 45 percent.

Figure 2
Illustration of Impact of Financial Risk on ROE

		Company A (51% Equity)	Company B (45% Equity)
Rate Base	[a]	$1,000	$1,000
Equity	[b]	$510	$450
Debt	[c]	$490	$550
Total Cost of Capital (7.7%)	[d] = [a]×7.77%	$77.74	$77.74
Cost of Debt (4%)	[e] = [c]×4%	$19.60	$22.00
Equity Return	[f] = [d] - [e]	$58.14	$55.74
Rate of Return on Equity (ROE)	[g] = [f] / [b]	11.40%	12.39%

Figure 2, above, illustrates how financial risk[12] affects returns and the ROE. The overall return remains the same for Company A and B at $77.74. However, Company B with the lower equity share and higher financial leverage must earn a higher percentage ROE in order to maintain the same overall return. This higher percentage allowed ROE represents the increased risk to equity investors caused by the higher degree of leverage.

[12] Financial risk is risk that a company has due to its capital structure; specifically the higher proportion of debt in a company's capital structure, the larger the financial risk.

The principle illustrated in Figure 2 is an example of the adjustments I performed to account for differences in financial risk when conducting estimates of the cost of equity applicable to IPL. This is important because it implies that if an equity percentage lower than the relied upon 51 percent common equity is allowed, then IPL's cost of equity is higher than what I estimate here.

C. Approach to Estimating the Cost of Equity

Q17. Please describe your approach for determining the cost of equity for IPL.

A17. As stated above, the standard for establishing a fair rate of return on equity requires that a regulated utility be allowed to earn a return equivalent to what an investor could expect to earn on an alternative investment of equivalent risk. Therefore, my approach to estimating the cost of equity for IPL focuses on measuring the expected returns required by investors to invest in companies that face business and financial risks comparable to those faced by IPL. Because certain models require market data, my consideration of comparable companies is restricted to those that have publicly traded stock. To this end, I have selected a proxy group that consists of companies providing primarily regulated electric distribution and integrated services (similar to IPL). I also consider the directional impact of the Projects being new construction, long-lived assets with a fixed return on equity throughout the life of the assets. I view this in the light of forecasted inflation, interest rate developments, and plausible normalization of markets. I derive the ROE estimates from the representative cost of equity according to standard financial models, including two versions of the DCF and the CAPM and ECAPM models. I also consider a risk premium model. These

three models have previously been used by the Board for ROE determination purposes.[13]

I also perform analyses of historical allowed ROEs for electric utilities in relation to prevailing risk-free interest rates at the time the ROE was authorized, and use the implied allowed risk-premium relationship to estimate a utility cost of equity consistent with current economic conditions. The results of this implied risk premium analysis (sometimes referred to herein as the "Risk Premium" model) are an additional consideration that supports my recommendation and serves as a check on the reasonableness of my market-based results.

Q18. Has the Board previously recognized the importance of relying on multiple models and especially of those you employ?

A18. Yes. In a recent decision regarding Iowa-American Water, the Board stated

> *[i]n determining an ROE for a utility, the Board has relied on the DCF model, the CAPM, and the risk premium model.*[14]

Thus, it is clear that the Board previously has relied on multiple financial models and the same models as I used in this testimony.

Q19. Is the Board's use of these models similar to the approach of other utility regulators?

A19. Yes. Many regulators rely on these models and notably FERC, which regulates electric transmission operations, recently issued an order proposing to rely explicitly on multiple models in its determination of just and reasonable ROEs for

[13] *See*, Iowa Utilities Board, "Final Decision and Order in Re. Iowa-American Water Company, Docket Nos. RPU-2020-0001, TF-2020-0250," issued June 28, 2021, p. 24.

[14] Iowa Utilities Board, "Final Decision and Order in Re. Iowa-American Water Company, Docket Nos. RPU-2020-0001, TF-2020-0250," issued June 28, 2021, p. 24.

transmission owners.[15] In FERC's most recent (Order 569-A), the FERC relies on versions of the DCF and CAPM as well as the implied Risk Premium method. These recent FERC ROE Orders represents a substantial change of FERC's historical practice of relying on only a single model—the DCF—to set allowed ROEs. FERC explicitly recognizes that different models offer complementary views of investor requirements and market expectations and that it is necessary to evaluate and consider all such evidence as FERC found "that ROE determinations should consider multiple models, both to capture the variety of models used by investors and to mitigate model risk."[16]

FERC's assessment and reasoning in this regard is very much in line with the principles that guide my own decision to inform my analysis based on the results of multiple complementary analyses.

IV. CAPITAL MARKET CONDITIONS AND THE COST OF CAPITAL

Q20. What do you cover in this section?

A20. In this section, I address recent changes in capital market conditions, the increased volatility in equity and debt markets, how these factors affect the cost of equity and its estimation. Specifically, I address (i) the inherent risks in setting a ROE for the life of a project, (ii) interest rate developments; (iii) investors' perceptions of the market risk premium, (iv) inflation expectations.

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[15] *See* Coakley v. Bangor Hydro-Electric Co., 165 FERC ¶ 61,030 (October 2018)("Coakley Order") wherein FERC switched from relying on the DCF to relying on four cost of equity estimation methodologies (DCF, CAPM, Implied Risk Premium, and Expected Earnings). See also FERC Order 569-A, Docket No. EL14-12-004, May 21, 2020 and FERC Order 569-B, Docket No. EL14-12-004, November 19, 2020, which confirmed Order 569-A.

[16] FERC Order 569-A, p. 25.

Q21. Please provide a summary of the data and developments discussed below.

A21. First, I summarize the risks associated with setting an authorized ROE for the life of the Projects. Second, I focus the discussion on the expected developments in interest rates, which directly impact the cost of equity as estimated by two standard models (the CAPM and risk premium model). Interest rates also may impact indirectly the DCF method as investors' expectations concerning interest rates may impact stock prices and growth. Third, I discuss investor expectations as to the market risk premium, *i.e.*, the return over and above the risk-free rate that investors require to hold equity. This measure again affects the inputs to the financial models and the interpretation of the results. Fourth, I discuss growth and inflation expectations, which directly affect the DCF model, as well the other models through the expected interest rate developments.

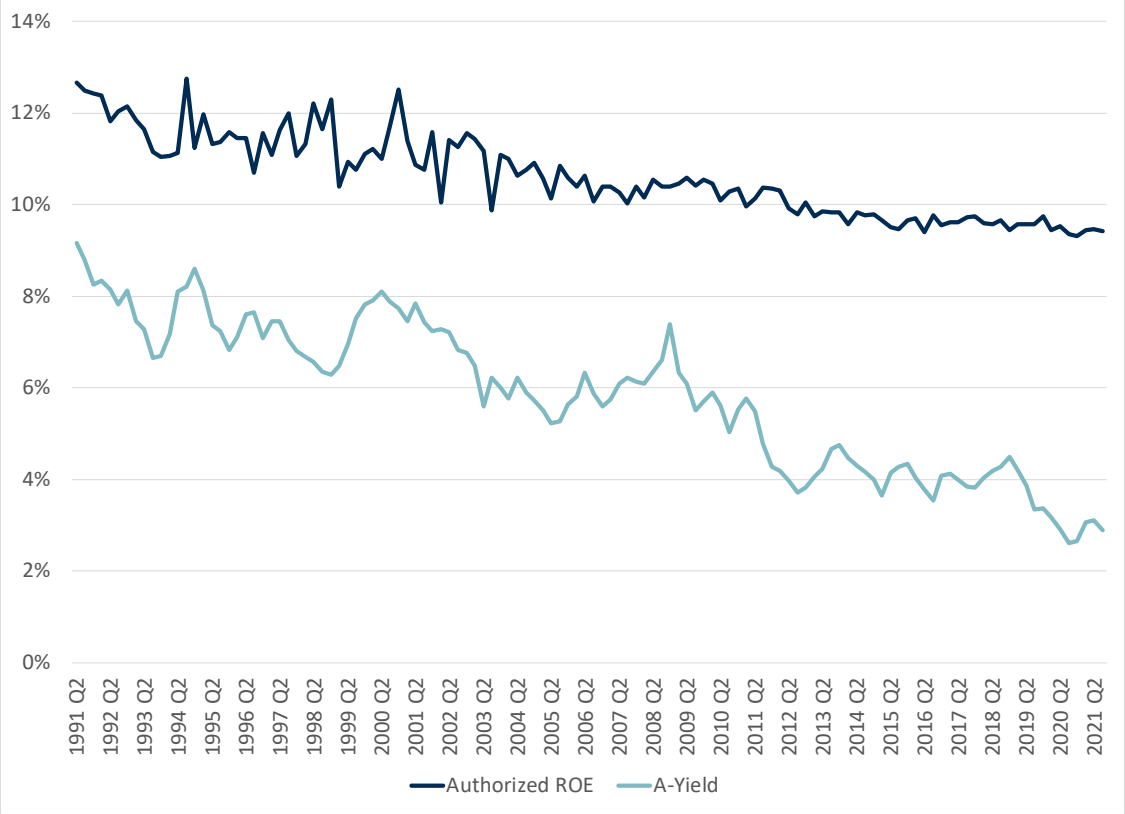
Q22. Are there risks associated with a fixed rate of return over the life of a project?

A22. Yes. There are no guarantees that the cost of capital will remain at the current level over the life of the Projects. This is especially true at the current time, where both the cost of debt as measured by utility bond yields and the average authorized ROE are low by historical standards. Additionally, the correlation between allowed ROEs and inflation is historically almost 70%, so an increase in inflation,[17] which recently is likely to substantially affect the required return on equity as well as the ROE allowed by regulatory commissions. As a simple illustration, Figure 3 below shows the development in the average allowed ROE

[17] Calculated as a simple correlation of the authorized ROEs and the CPI inflation as provided by the Bureau of Labor Statistics using the period from 1991 to Q2, 2021.

from 1990 and the yield on A rated utility bonds from 1990 through today.[18] The chart shows that the A-rated utility bond yield and the authorized ROE have declined over time, but the premium that equity commands over the A-rated utility bond yield has increased, *i.e.,* the relationship is not constant.

Figure 3: Average Allowed ROE and A Utility Bond Yield: 1991 – Q3, 2021



Q23. Why do you discuss capital market conditions in a testimony aimed at determining IPL's ROE?

A23. Capital market conditions are important to cost of equity estimation methodologies and can affect the inputs to the cost of equity models. Inputs to

[18] I use data from Q2, 1991 to today as that is the longest period for which I have both authorized ROE and A-rated utility bond yield data.

the DCF models are affected by the economy in general as economic growth will affect growth rates and utility stock prices. Consequently, the capital market developments affect the growth rates, dividend yield, and the assessment of estimates' reasonableness.

Furthermore, the risk-free rate is an input to the risk premium model and CAPM, so that recent and expected developments in government bond yields are important to assess the validity of any measure of the risk-free rate. This is particularly important in this proceeding as the allowed ROE is expected to remain in place over the entire life of the Project. Although currently interest rate in capital markets are low, there is no certainty that it will remain at current levels over the long life of the Projects. As financial analysts as well as government agencies expect interest rates (and the cost of capital) to increase,[19] a fixed rate of return for IPL's Projects will under-compensate investors for the Projects' risks over their economic life and result in under-recovery of risk-commensurate returns for the Company. Therefore, a measure of expected risk-free rate over this period is needed to estimate the ROE for IPL's Projects using CAPM and the risk premium model. Similarly, the Market Risk Premium (MRP) is an input to the CAPM, so factors that affect the MRP (e.g., volatility and changes in investors' risk perceptions) are vital for accurate determination of the ROE.

[19] Blue Chip Economic Indicator's forecasted interest rates are depicted in Figure 4. Other sources for interest rate forecasts include: Energy Information Administration, "2021 Energy Outlook, Table 20: Macroeconomic Indicators;" Consensus Forecast, July 2021 and Congressional Budget Office, "The 2021 Long-Term Budget Outlook," March 2021. These are the agencies forecast year to date.

A. Interest Rates

Q24. How do interest rates affect the cost of equity?

A24. The current interest rate environment affects the cost of equity estimation in several ways. Most directly, the CAPM takes as one of its inputs a measure of the risk-free rate (see Figure 1). The estimated cost of equity using the CAPM decreases (increases) by one percentage point when the risk-free rate decreases (increases) by one percentage point. Therefore, to the extent that prevailing government yields are depressed due to economic uncertainties related to COVID-19 or the monetary policy responses, using current yields as the risk-free rate will depress the CAPM estimate below what is representative of the forward-looking cost of equity, which will be in effect during the 30-year regulatory period. Therefore, the allowed fair return on equity for the Projects should reflect the future interest rate environment.

Q25. What are the relevant developments regarding interest rates?

A25. Current interest rates on 10-year U.S. Government bonds remain low at 1.68 percent[20], despite significant improvement since the historic low levels in 2020, due to flight-to-quality behaviors by investors as well as the Federal Reserve's expansion of its quantitative easing programs. Interest rates on 10-year U.S. Government bonds were at 1.86 percent at the end of 2019.[21] As large parts of the economy began to shut down in response to the pandemic, investors fled riskier assets for safer assets. This demand for U.S. government bonds caused bond yields to decrease rapidly. On March 9, 2020, the entire U.S. yield curve

[20] Federal Reserve, FRED, as of October 21, 2021.
[21] Bloomberg accessed October 23, 2020 and Federal Reserve, FRED assessed December 3, 2020.

fell below 100 bps for the first time in history and the 10-year U.S. government bond yield hit a record low of 0.339 percent.[22] Since then, long-term government bond yields have increased somewhat—10 year U.S. Government bonds as of January 26, 2021 was 1.05 percent.[23] Later that month, the Federal Reserve lowered the federal funds target rate to the 0 to 0.25 percent range, and announced "unlimited" quantitative easing to support the financial markets.[24] Since then, the U.S. government bond yields have risen but still remain near historic lows and below end of 2019 levels. The current 10-year U.S. Government bond yields are at 1.68 percent.[25] Following its September 2021 meeting the Fed stated that "the Committee judges that a moderation in the pace of asset purchases may soon be warranted,"[26] so a moderation in the monetary policy can be expected but the timing remains unclear.

Looking forward, professional forecasters as well as government agencies expect treasury bonds to increase. The forecasts by Blue Chip Economic Indicators (BCEI) is depicted in Figure 4 below. BCEI October 2021 edition forecasts that the yield on 10-year treasury bonds will increase. Specifically, BCEI projects the 10-year government bond yield will be 2.1, 2.3, and 2.5 percent in 2022, 2023 and 2024, respectively (Figure 4), and 3.0 percent in 2028-2032 – the furthest out BCEI provides a forecast.[27] I believe that the

[22] Sunny Oh, "Treasury yield curve sinks below 1% after oil and coronavirus worries rout stocks," *Market Watch*, March 9, 2020, accessed March 31, 2020, https://www.marketwatch.com/story/30-year-treasury-yield-tumbles-below-1-after-oil-and-coronavirus-worries-rout-stocks-2020-03-09

[23] Federal Reserve Bank of St. Louis, January 26, 2021; https://fred.stlouisfed.org/series/DFII10.

[24] U.S. Federal Reserve, "Federal Reserve Announces Extensive New Measures to Support the Economy," Press Release, March 23, 2020.

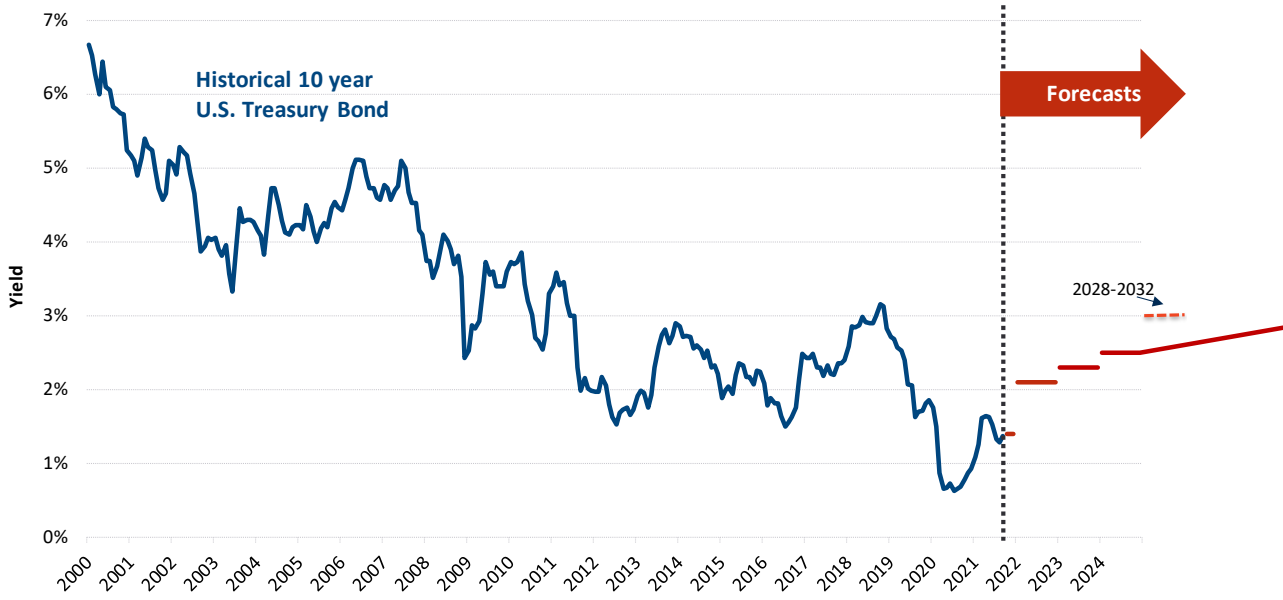
[25] Federal Reserve, FRED, as of October 21, 2021.

[26] Federal Reserve Board, Press Release, September 22, 2021.

[27] Wolters Kluwer Blue Chip Economic Indicators and PwC Analysis, October 2021, p. 14.

expectations for 2028-2032 is most relevant among available forecasts for this proceeding as the ROE will be in effect from 2023 through 2054. The Energy Information Administration similarly expects the 10-year government bond yield to be about 2.8 percent by 2030 and about 3 percent by 2050.[28] Because the risk-free rates is an input to several cost of equity estimation models, the relationship between current and forecasted risk-free rates is an important consideration.

Figure 4: Historical and Projected Ten-Year Treasury Bond Yields[29]



Source: Historical data from Bloomberg. Forecasts from Blue Chip Economic Indicators March 2021 and June 2021 issue.

Therefore, current expectations from BCEI and the Energy Information Administration is that the 10-year Treasury bond yield will be 3.0 percent (or

[28] Energy Information Administration, "2021 Energy Outlook, Table 20: Macroeconomic Indicators."
[29] Id.

equivalently, the 20-year Treasury bond yield will be 3.5 percent) during most years of the Projects' operations.

B. Risk Premiums

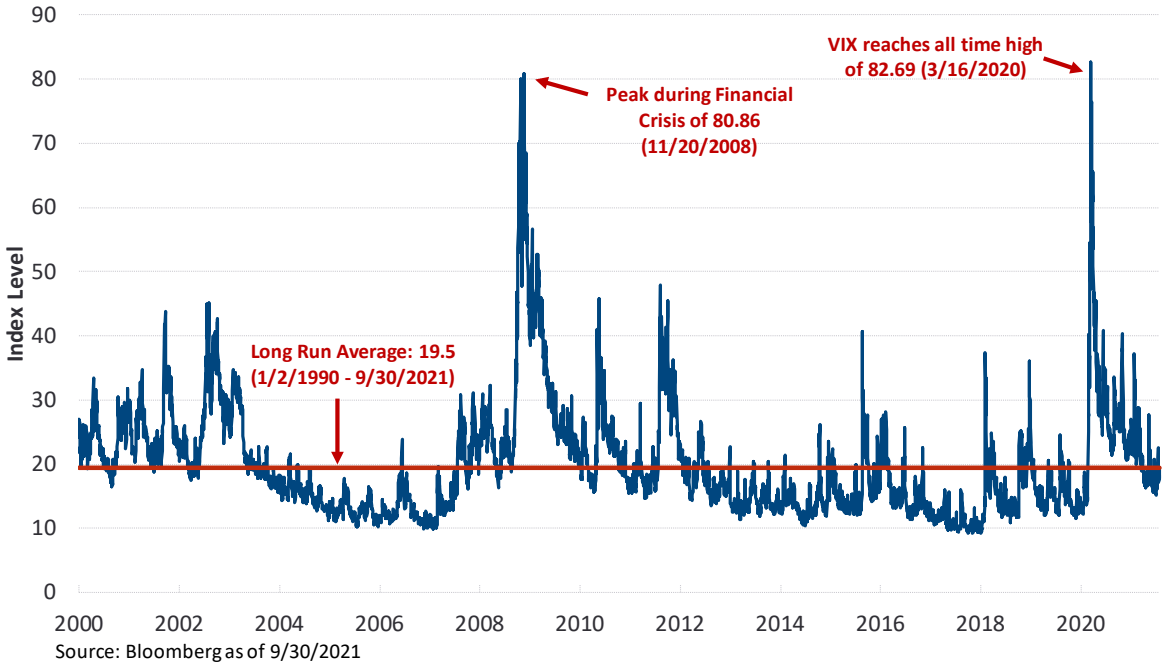
Q26. What is the current evidence regarding market volatility?

A26. During the early months of COVID-19, financial markets became extremely volatile as shown in near-term common volatility measures, such as the VIX, which is frequently referred to as the market's fear index.[30] The VIX reached an all-time high of 82.69 on March 16, 2020, which was higher than the peak of 80.86 during the Financial Crisis. However, the VIX has slowly retreated from recent highs to between 15.01 and 23.25 during the 30 day period ending October 22, 2021.[31]

[30] See, for example, VIX Volatility Index: How To Use The Fear Index To Confirm Stock Market Bottoms | Investor's Business Daily (investors.com) or What Is the VIX Index, aka Wall Street's 'Fear Gauge'? | GOBankingRates for discussions on how VIX measures market sentiment.

[31] Bloomberg, as of July 30, 2021 and CBOE as of January 27, 2021 https://www.google.com/search?q=VIX+cboe&sourceid=ie7&rls=com.microsoft:en-US:IE-Address&ie=&oe=#spf=1611799158418

Figure 5: VIX: 2000 through Q3, 2021

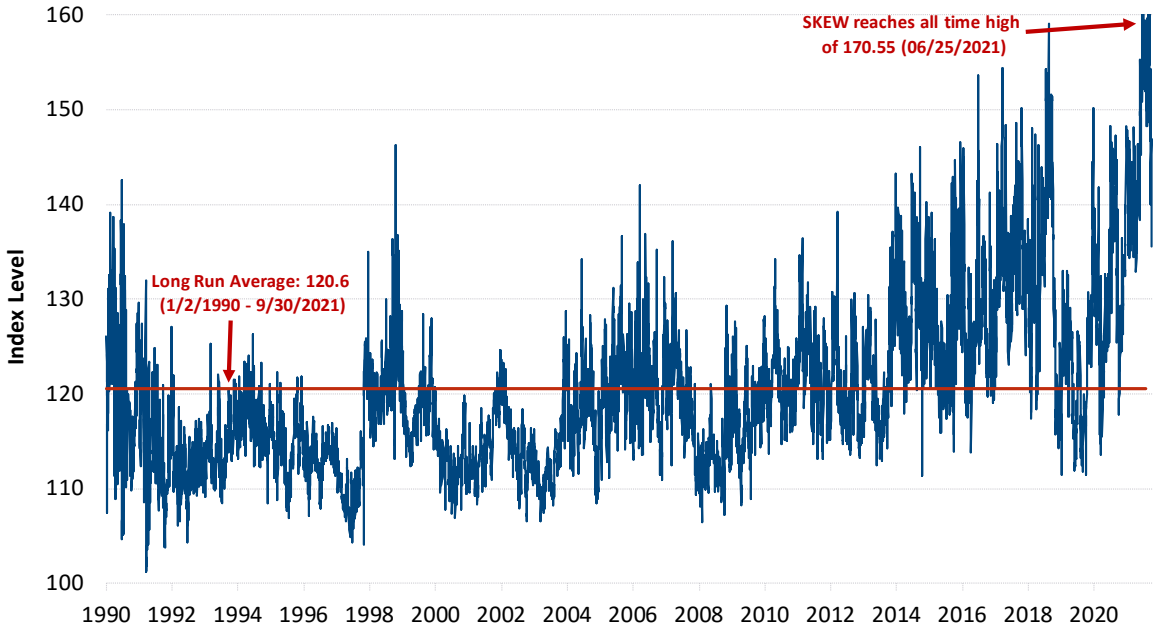


Source: Bloomberg as of 9/30/2021

Similarly, the SKEW index, which measures the market's willingness to pay for protection against negative "black swan" stock market events (i.e., sudden substantial downturns),[32] shows that investors are cautious. A SKEW value of 100 indicates outlier returns are unlikely, but as the SKEW increases, the probability of outlier returns becomes more significant. Figure 6 below shows the development in the SKEW since 1990 and that the index has recently increased following a period of declining SKEW. The recent spike in the SKEW shows that investors continue to pay for protection against downside risks.

[32] For example, http://www.cboe.com/products/vix-index-volatility/volatility-indicators/skew.

Figure 6: SKEW



Source: Bloomberg as of 9/30/2021

As both the VIX and SKEW measures are forward-looking, the variability in VIX and SKEW shows that investors expect volatility to continue (for at least a year) but are cautiously optimistic about investing in equity. The SKEW index spiked over 148.3 on June 30, 2020 and reached its historical high on June 25, 2021 at 170.55—well above the long-term average of 120. As of October 26, the SKEW was 141.[33] Such circumstances lead investors to require a higher premium to invest in assets or financial instruments that are not risk-free.

Q27. What is the Market Risk Premium?

A27. In general, a risk premium is the amount of "excess" return—above the risk-free rate of return—that investors require to compensate them for taking on risk. As

[33] CBOE as of October 26, 2021. Cboe Global Indices: SKEW Index Dashboard

illustrated in Figure 1 the riskier the investment, the larger the risk premium investors will require.

The MRP is the risk premium associated with investing in the market as a whole. Since the so-called "market portfolio" embodies the maximum possible degree of diversification for investors,[34] the MRP is a highly relevant benchmark indicating the level of risk compensation demanded by capital market participants. It is also a direct input necessary to estimating the cost of equity using the CAPM and other risk-positioning models.

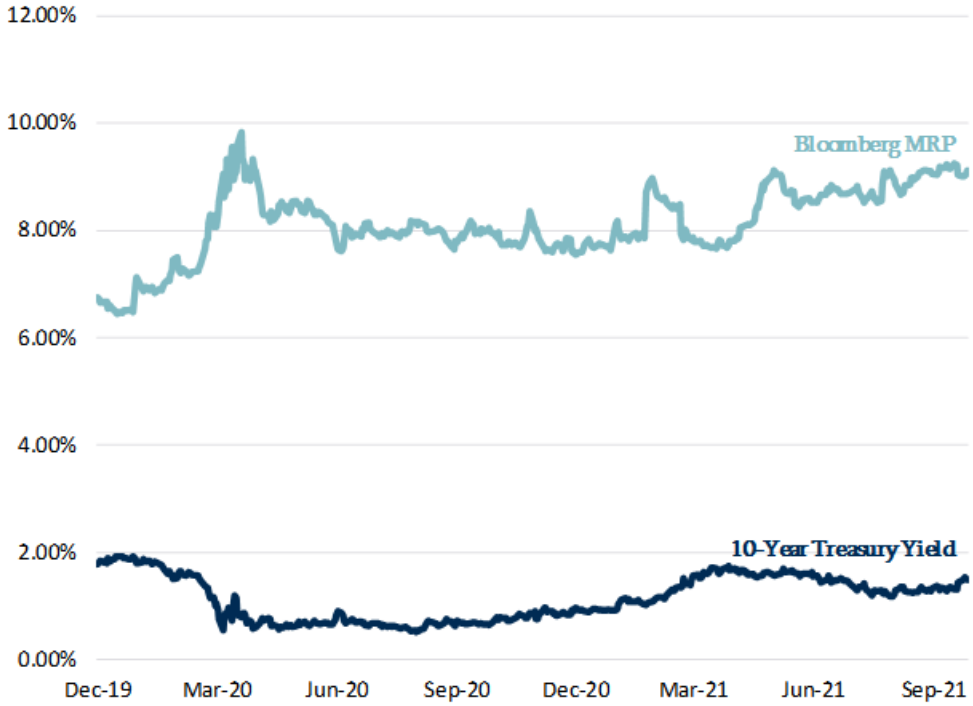
Q28. Please explain the current evidence related to the MRP.

A28. The heightened volatility in the market has increased the premium that investors require to hold risky assets, especially when measured utilizing forward-looking methodologies that estimate expected market returns with reference to current dividend yields. Bloomberg's forward-looking estimate of the MRP for the U.S. increased to as high as 9.84 percent in March 2020 and remained high at 8.62 percent as of September 30, 2021.[35] Current forward market risk premium investors require to hold risky assets remains substantially elevated compared to premiums required during pre-pandemic years since capital markets' slow recovery following the financial crisis. Academic research has shown that market disruptions lead to a prolonged MRP impact as discussed below.

[34] In finance theory, the "market portfolio" describes a value-weighted combination of all risky investment assets (e.g., stocks, bonds, real estate) that can be purchased in markets. In practice, academics and financial analysts nearly always use a broad-based stock market index, such as the S&P 500, to represent the overall market.

[35] Bloomberg, as of October, 2021. Measured over a 20-year U.S. Treasury bond.

Figure 7: Bloomberg's Daily Market Risk Premium and Risk Free Rate (Nov. 2019 – September 2021).



Q29. Are higher risk premiums relevant given that treasuries are near historic lows?

A29. Yes—this is highly relevant for cost of equity estimation as current risk-free rates are extremely low. As shown above in Figure 7, authorized equity premium and the MRP has increased as the risk-free rate declined. Further, as shown in both academic and industry analyses, the allowed risk premium over the risk-free rate is inversely related to the risk-free rate. For example, Villadsen et al. (2017) found that the allowed risk premium increases by approximately 0.44 percent for each 1 percent decline in the risk-free rate for the period 1990 to 2015.[36] Morin finds that the risk premium increases by 0.52 percent for each 1 percent decline in the

[36] Bente Villadsen, Michael J. Vilbert, Dan Harris, and A. Lawrence Kolbe, "*Risk and Return for Regulated Industries*," Academic Press, 2017, pp. 118-119.

risk-free rate.[37] As shown in Figure 7 above, this phenomenon is also documented in the forward-looking market risk premium calculated by Bloomberg. According to Bloomberg, the MRP is currently 8.62 percent over the 20-year Treasury bond,[38] which is higher than the historical average MRP of about 7.25 percent. It is also an increase over the forward-looking MRPs measured at the end of 2019 (pre-COVID) of 6.48 percent and the average for 2019 at 7.15 pecent.[39]

Q30. Is there evidence that the MRP will remain elevated going forward?

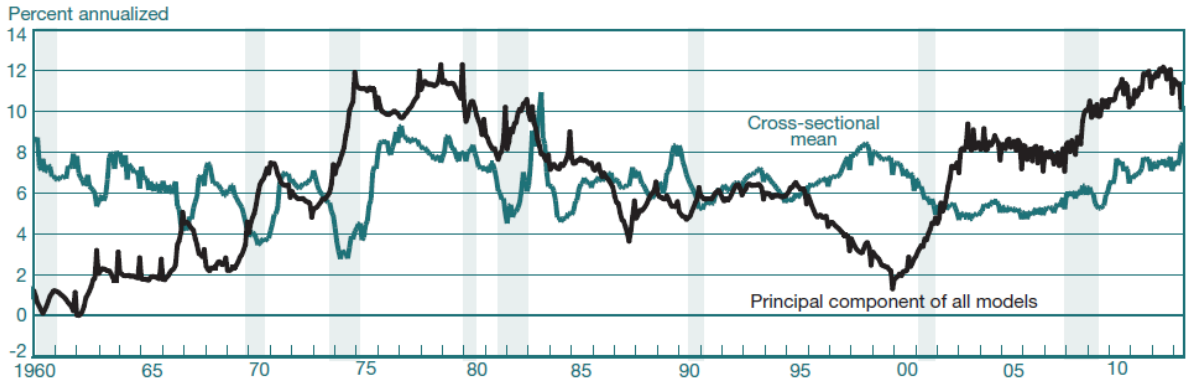
A30. Yes. In 2015, Duarte and Rose of the Federal Reserve of New York performed a study that aggregated the results of many models of the required MRP in the United States and tracked them over time.[40] This analysis found a very high MRP after the financial crisis, relative to time periods prior the crisis.

The authors estimated the MRP that resulted from a range of models each year from 1960 through the time of their study. The authors then reported the average as well as the first principal component of the results.[41] The authors found that the models used to determine the risk premium were converging to provide comparable estimates and that the average annual estimate of the MRP had reached an all-time high in 2012-2013. (Figure 8 below is a copy of the

[37] Roger A. Morin, "*New Regulatory Finance*," Public Utilities Reports, Inc., 2006, pp. 123-125.
[38] Bloomberg, as of June 30, 2021. The 8.62% MRP is relative to the contemporaneous yield over a 20-Yr treasury bond. Relative to the contemporaneous yield over a 10-Yr treasury bond, the Bloomberg reported MRP is 9.12%.
[39] *Id*.
[40] Fernando Durate and Carlo Rosa, "The Equity Risk Premium: A Review of Models," *Federal Reserve Bank of New York*, December 2015 ("Duarte and Rosa, 2015") https://www.newyorkfed.org/research/staff_reports/sr714.html.
[41] Duarte and Rosa emphasize the "first principal component" of the 20 models. This means that the authors used statistics to compute the weighted average combination of the models that captures the variability among the 20 models over time.

summary chart from Duarte and Rosa's 2015 paper). These directional trends identified by Duarte and Rosa are reasonably consistent with those observed from Bloomberg and they further support the proposition that the elevation of the MRP over its historical pre-crisis levels was a persistent feature of capital markets in the time following the financial crisis. Specifically, the financial crisis saw high volatility and a flight to quality – similar to conditions seen in 2020 in response to the COVID-19 pandemic. Therefore, it is reasonable to expect that the current MRP will remain elevated compared to historical levels, especially given the uncertainty related to the extent of economic and financial impacts from COVID-19 and the historically low interest rates.

Figure 8: Duarte and Rosa's Chart 3
One-Year Ahead MRP and Cross-Sectional Mean of Models



Q31. Please summarize how the economic developments discussed above have affected the return on equity and debt that investors require.

A31. Utilities rely on investors in capital markets to provide funding to support their capital expenditure programs and efficient business operations. Investors consider the risk-return tradeoff in choosing how to allocate their capital among different investment opportunities. It is therefore important to consider how

investors view the current economic conditions, including the plausible developments in the risk-free rate and the growth in the U.S. GDP.

These investors have been affected by the recent market volatility, so there are reasons to believe that their risk aversion remains elevated relative to pre-COVID-19 levels. As IPL is expected to be compensated as a utility on the equity component of its investment in the Projects, the same factors would affect IPL's equity.

C. Inflation Expectations and Impact

Q32. Why is inflation relevant to the return on the Projects?

A32. The return on equity that is being determined now is expected to be in effect for 30 years for the solar generating facilities as part of the Projects, so IPL will be exposed to economic developments including inflation over the next 30 years. Because the allowed return on equity is a nominal return, it includes today's inflation, but going forward the inflation could readily change. Historically, inflation has impacted not only product prices but also the cost of capital as shown in above.

Q33. What are recent indicators of the growth and inflation for the US economy?

A33. Recent surveys by economists, such as the BCEI survey, indicate that U.S. real GDP will increase by 5.7 percent in 2021 and 4.1 percent in 2022 for a nominal GDP of 9.7 percent and 7.3 percent respectively.[42]

[42] Wolters Kluwer Blue Chip Economic Indicators, October 2021, p. 2-3. The forecasted real growth has remained stable in recent months, but inflation expectations are up, so the nominal GDP growth has increased.

In August 2020, the U.S. Federal Reserve announced a policy change whereby they would target inflation of 2 percent on average, noting that the Federal Reserve would hold overnight borrowing interest rates lower for longer.[43] The Federal Reserve has remained cautious about the pace and extent of the ongoing recovery. In the April 2021 Federal Open Market Committee (FOMC) Press Conference, Federal Reserve Chair Powell noted that economic indicators have improved recently but reiterated that "economic recovery remains uneven and far from complete."[44] In the July 2021 meeting of the FOMC, the FOMC concluded.[45]

> *The sectors most adversely affected by the pandemic have shown improvement but have not fully recovered. Inflation has risen, largely reflecting transitory factors.*

and

> *The path of the economy continues to depend on the course of the virus.*

Mr. Powell's April speech noted that the Federal Reserve has continued to keep interest rates near zero (0 to 0.25 percent) and that it would maintain its sizable asset purchases,[46] adding that these market support measures are necessary to ensure that the monetary policy continues to deliver "powerful support to the

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[43] U.S. Federal Reserve, "Federal Open Market Committee announces approval of updates to its Statement on Longer-Run Goals and Monetary Policy Strategy," August 27, 2020, accessed March 2, 2021, https://www.federalreserve.gov/newsevents/pressreleases/monetary20200827a.htm.

[44] Board of Governors of the Federal Reserve System, "Transcript of Chair Powell's Press Conference," April 28, 2021, https://www.federalreserve.gov/mediacenter/files/FOMCpresconf20210428.pdf.

[45] Federal Reserve Press Release, July 28, 2021.

[46] Ibid. The July 2021 meeting of the FOCM maintained this target. Source: Federal Reserve Press Release, July 28, 2021.

economy until the recovery is complete."[47] Projections from the FOMC continue to indicate that policy rates will remain at current levels through at least 2023.[48] These policy rates will likely continue to exert downward pressure on interest rates over the near to medium term.

At the same time, the Federal Government has engaged in substantial fiscal stimulus. For example, since January 2021, several government assistance programs were passed to stimulate the U.S. economy. In early March, the Government passed a $1.9 trillion American Rescue Plan, which provided direct economic impact payments and extended unemployment benefits.[49] More recently, the U.S. Senate passed a $1.2 trillion infrastructure bill, which, if enacted, will fund infrastructure (including energy) and other items.[50] Other programs, such as the Paycheck Protection Program, continued to disburse aid to businesses. This infusion of cash into the economy has created and will continue to create concerns about inflation, albeit the Federal Reserve expects the inflation to be transitory.[51]

Following these initiatives, the Consumer Price Index, a common measure of inflation, increased by 5.4 percent from October 2020 through

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47 *Ibid.*

48 U.S. Federal Reserve, "March 17, 2021: FOMC Projections materials, accessible version," March 17, 2021, https://www.federalreserve.gov/monetarypolicy/fomcprojtabl20210317.htm. See also, Federal Reserve Press Release, July 28, 2021.

49 Alan Fram, "Congress Oks $1.9T virus relief bill in win for Biden, Dems," *Associated Press*, March 11, 2021, accessed October 5, 2021, https://apnews.com/article/joe-biden-bills-legislation-coronavirus-pandemic-7eb383e58c8fcf50f6f586b6d5cfc523.

50 See, for example, https://www.kirkland.com/publications/blog-post/2021/08/bipartisan-infrastructure-bill

A larger reconciliation bill at up to $3.5 trillion is still under consideration.

51 Federal Reserve Press Release, July 28, 2021.

September 2021, which is the largest 12-month increase since September 2008.[52] At the same time, BCEI estimate an annual inflation of 3.2 percent for 2022. Similarly, preliminary data shows the consumer price index increased 5.4 percent over the last 12 months when July is included.[53] These figures have caused Larry Summers,[54] to warn that "inflation is here" and that a soft landing of the inflation is unprecedented.[55] More recently Lawrence Summers has warned that

> *I don't think we're anywhere close to the kind of Carter-era double-digit inflation, but I do think we're in very serious danger of repeating almost all the mistakes of the 1960s and early 1970s*[56]

At the same time the Federal Reserve Board in its July meeting stated that "the Committee will aim to achieve inflation moderately above 2 percent for some time so that inflation averages 2 percent over time …"[57] but more recently acknowledged that inflation is higher than expected although Chairman Powell argues that the upward pressure will abate over time.[58] Thus, there is some disagreement as to the magnitude and persistence of the price increases currently experienced.

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52 U.S. Bureau of Labor Statistics, "Consumer Price Index – September 2021," October 13, 2021.

53 BCEI, October 2021, p. 3.

54 Larry Summers is an economist and a former Secretary of the Treasury (Clinton), Chair of the National Economic Council (Obama), Chief Economist at the World Bank, and President of Harvard

55 WBUR, "Former Treasury Secretary On Consumer Prices, Inflation, U.S. Role in Global Pandemic Efforts," August 11, 2021, https://www.wbur.org/hereandnow/2021/08/11/larry-summers-inflation-prices

56 Bloomberg Economics, "Summers Sees Dangerous Policy Parallels With High-Inflation Era," September 10, 2021; Summers Sees Dangerous Policy Parallels With High-Inflation Era - Bloomberg

57 Federal Reserve Press Release, July 28, 2021.

58 NPR, "The Fed Says Inflation Is Hotter Than Expected – But It Should Cool Next Year," September 22, 2021; The Fed Says Inflation Is Hotter Than Expected But It Should Cool : NPR

However, rising inflation has introduced new uncertainties to the financial markets and points to an increase in the return required by investors to hold risky assets. With the risk of inflation increasing, there is an increased risk that the authorized as well as any currently calculated ROE will be downward biased over the upcoming period.

Finally, although substantial progress has been made on distributing the COVID-19 vaccine, the length and extent of the economic impacts from the COVID-19 pandemic are unknown and the impacts are expected to persist for some time even as expanded vaccination reduces the risk of spread of COVID-19 and social distancing measures in the US are reduced. In addition, substantial risk remains due to the emergence of the Delta variant, which, as the Federal Reserve pointed out means that "[t]he path of the economy continues to depend on the course of the virus."[59]

V. ESTIMATING THE COST OF EQUITY

A. PROXY GROUP SELECTION

Q34. How do you identify proxy companies of comparable business risk to IPL?

A34. IPL is engaged in the regulated electric generation and distribution business, although in this proceeding, the ROE I estimate is for the Projects (400 MW solar and 75 MW battery storage) that IPL seeks to construct in 2023 (50 MW) and 2024 (425 MW). IPL plans to operate the 50 MW of solar generation between 2023 and 2053 (or longer, as circumstances may allow), 350 MW of solar generation between 2024 and 2054 (or longer, as circumstances may allow), and

[59] *Ibid.*

the 75 MW of battery energy storage between 2024 and 2044 (or longer, as circumstances may allow). The business risk associated with these endeavors depends on many factors, including the specific characteristics of the service territory and regulatory environment in which the provider of these services operates. Consequently, it is not possible to identify publicly traded proxy companies that replicate every aspect of the Projects' risk profile. However, selecting companies with business operations concentrated in regulated industries or having similar lines of business and/or business environments is an appropriate starting point for selecting one or more proxy groups of comparable risk to IPL. As a second step, I must evaluate the Projects or jurisdiction-specific risks so that the Company's ROE is placed appropriately relative to the sample companies.

To this end, I have selected a sample of electric utilities. I report results for the electric utilities and refer to this sample as the "Electric Sample". The proxy companies in the Electric Sample are similar to IPL and the Projects in that they are rate regulated by state utility commissions, provide customers a product through a network of assets, and rely on substantial capital to provide service; *i.e.*, they are capital intensive as is IPL and the Projects. Additionally, all regulated utilities are subject to conservation initiatives, many have recently faced moratoriums on shut-offs,[60] and consumption patterns have changed

[60] Lillian Federico, "Bans on utility shut-offs during COVID-19 pandemic challenge regulators," *S&P Market Intelligence*, August 28, 2020, https://www.spglobal.com/marketintelligence/en/news-insights/blog/bans-on-utility-shut-offs-during-covid19-pandemic-challenge-regulators.

toward residential use during the COVID-19 pandemic.[61] However, the companies in the Electric Sample differ from the IPL in that they are established utilities while the Projects proposed by IPL are yet to be constructed. Additionally, the Projects will consist of solar generation and batteries, while the Electric Sample is a group of utilities that own distribution, transmission, and various types of generation. Thus, the companies' risk characteristics may differ from IPL's risks in acquiring and constructing the Projects.

It is important that a proxy group used to assess the cost of equity for the Projects (absent of any unique jurisdictional or Company characteristics) is regulated, because regulation tends to place substantial requirements and also protections on the companies. I also believe the physical characteristics of the industry – capital intensive, serving different customer groups (residential, commercial, industrial) – is a characteristic of the Projects and of the selected electric utilities. Capital intensity affects the operating risks through the split between fixed and variable costs. Customer composition likewise affects the demand risk; for example, many electric utilities face declining per-customer demand due to conservation and regulation (legislation or voluntary commitments) although the declining per customer demand may change with electric vehicles or other electrification becoming more common.[62]

[61] Darren Sweeney, "Warm weather, residential power sales help utilities offset demand declines," *S&P Market Intelligence*, August 4, 2020, https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/warm-weather-residential-power-sales-help-utilities-offset-demand-declines-59727866

[62] The Energy Information Administration forecast electric growth of less than one percent annually through 2050. Source: - Electricity - Electricity demand grows at a modest rate throughout the projection period - U.S. Energy Information Administration (EIA).

Q35. Please summarize how you selected the members of the Electric Sample.

A35. To identify companies suitable for inclusion in the samples, I started with the universe of publicly traded companies in the electric utility industry as identified by *Value Line Investment Analyzer* (*Value Line)*. Next, I reviewed business descriptions and financial reports of these companies and eliminated companies that had less than 50 percent of their assets dedicated to regulated utility activities in their industry.[63]

With this group of companies, I applied further screening criteria to eliminate companies that have had recent significant events that could affect the market data necessary to perform cost of capital estimation. Specifically, I identified companies that have cut their dividends or engaged in substantial merger and acquisition (M&A) activities over the relevant estimation window.[64] I eliminated companies with dividend cuts because the announcement of a dividend cut may produce disturbances in the stock prices and growth rate expectations in addition to potentially being a signal of financial distress. I eliminated companies with significant M&A activities because such events typically affect a company's stock price in ways that are not representative of how investors perceive its business and financial risk characteristics. For example, a utility's stock price will commonly jump upon the announcement of an acquisition to match the acquirer's bid.

[63] For electric utilities, I rely on Edison Electric Institute (EEI), 2020 Financial Review. This report gives industry financial information as well as a percentage of regulated assets for each of the companies.
[64] As described in Sections V, the CAPM requires five years of historical data, while the DCF relies on current market data.

Further, I require companies to have an investment grade credit rating[65] and more than $300 million in market capitalization for liquidity purposes.[66] A final, and fundamental, requirement is that the proxy companies have the necessary data available for estimation.

Q36. What are the characteristics of the Electric Sample?

A36. The electric proxy group is comprised of electric utilities whose primary source of revenue and majority of assets are subject to regulation and have power distribution and power generation. My final proxy group comprises of 26 electric utilities, listed in Figure 9 below.

The figures below report the proxy companies' annual revenue for the most recent four quarters as of Q4 2020 and also reports the market capitalization, credit rating, beta and growth rate. The annual revenue as well as the market cap was obtained from Bloomberg. The credit rating is reported by Bloomberg.[67] The growth rate estimate is a weighted average between forecast estimates from Thomson Reuters and *Value Line*. Betas were obtained from *Value Line.*

[65] In some cases, a proxy company does not have a credit rating from any of the major rating agencies. However, if they were to be rated, they would receive an investment grade rating. In these instances, I assign the company the average credit rating of the rest of the proxy group.
[66] No companies were eliminated for this reason.
[67] In cases where a company does not have an S&P rating from Bloomberg, Moody's rating was obtained from Moody's, annual reports, or Bloomberg.

Figure 9
Electric Sample

Company	Annual Revenue (2020) ($MM)	Regulated Assets	Market Cap. (Q3 2021) ($MM)	Value Line Beta	S&P Credit Rating	Long-Term Growth Estimate
	[1]	[2]	[3]	[4]	[5]	[6]
ALLETE	$1,331	MR	$3,182	0.90	BBB	6.6%
Amer. Elec. Power	$15,545	R	$42,077	0.75	A-	6.1%
Ameren Corp.	$5,838	R	$21,541	0.85	BBB+	7.2%
Avista Corp.	$1,390	R	$2,773	0.95	BBB	6.3%
Black Hills	$1,865	R	$4,116	1.00	BBB+	4.9%
CMS Energy Corp.	$6,997	R	$17,788	0.80	BBB+	6.1%
CenterPoint Energy	$8,085	R	$14,888	1.15	BBB+	5.6%
Dominion Energy	$13,467	R	$60,347	0.85	BBB+	6.0%
Duke Energy	$23,443	R	$76,655	0.90	BBB+	5.6%
Edison Int'l	$12,747	R	$21,910	1.00	BBB	4.9%
Entergy Corp.	$10,859	R	$21,464	0.95	BBB+	4.2%
Evergy Inc.	$5,179	R	$14,690	0.95	A-	5.0%
Exelon Corp.	$33,837	MR	$48,431	0.95	BBB+	4.4%
Hawaiian Elec.	$2,656	MR	$4,504	0.85	BBB-	3.5%
IDACORP Inc.	$1,352	R	$5,249	0.85	BBB	3.9%
MGE Energy	$566	R	$2,762	0.75	AA-	5.4%
NextEra Energy	$16,418	MR	$160,181	0.95	A-	9.6%
NorthWestern Corp.	$1,311	R	$3,092	0.95	BBB	3.6%
OGE Energy	$3,271	R	$6,780	1.05	BBB+	4.5%
Otter Tail Corp.	$1,060	R	$2,323	0.90	BBB	3.1%
Pinnacle West Capital	$3,438	R	$8,261	0.95	A-	3.2%
Public Serv. Enterprise	$9,039	MR	$31,055	0.95	BBB+	3.8%
Sempra Energy	$11,912	R	$41,227	1.00	BBB+	5.7%
Southern Co.	$21,423	R	$67,844	0.95	A-	6.9%
WEC Energy Group	$7,977	R	$28,674	0.80	A-	6.6%
Xcel Energy Inc.	$12,624	R	$34,465	0.80	A-	6.2%
Alliant Energy	$3,352	R	$14,451	0.85	A-	5.8%
Electric Sample	$8,777	R	$28,175	0.91	BBB+	5.4%
Regulated (R) Electric Sample	$7,664	R	$23,403	0.90	BBB+	5.3%

Sources and Notes:
[1]: Bloomberg as of September 30, 2021.
[2]: Key R - Regulated (80% or more of assets regulated).
MR - Mostly Regulated (less than 80% of assets regulated).
[3]: See Schedule 3 Panels A through I.
[4]: See Schedule 10
[5]: Bloomberg as of September 30, 2021.
[6]: See Schedule 5.

Q37. How do the electric proxy companies compare to IPL in terms of financial metrics?

A37. IPL's regulated electric operations generated an annual revenue of $1,695 million in 2020,[68] which is smaller than the average of the electric proxy group or the 80% or more Regulated group. The Projects are only a small fraction of that. IPL's long-term unsecured issuer credit rating is Baa1 from Moody's, which is equal to the average credit rating of the electric proxy companies. The Projects do not have a separate credit rating but will be backed by the credit of IPL. Lastly, as noted above, the Projects will be regulated as is IPL and all the companies in the Electric Sample. Lastly, I note that there is not much difference between the Mostly Regulated and Regulated electric utilities in terms of revenue, market capitalization, systematic risk (beta), credit rating or forecasted growth.

Q38. What regulatory capital structure did you use for evaluating the ROE the Projects?

A38. I use a capital structure including 51 percent common equity and 2 percent preferred equity and 47 percent debt in my recommendation of the appropriate ROE for the Projects.

B. THE CAPM BASED COST OF EQUITY ESTIMATES

Q39. Please briefly explain the CAPM.

A39. CAPM assumes the collective investment decisions of investors in capital markets will result in equilibrium prices for all risky assets such that the returns investors expect to receive on their investments are commensurate with the risk

[68] Interstate Electric Power Company. 2020 Annual Report, p. 12.

of those assets relative to the market as a whole. The CAPM posits a risk-return relationship known as the Security Market Line (see Figure 1 in Section III), in which the required expected return on an asset (above the risk-free return) is proportional to that asset's relative risk as measured by that asset's beta.

More precisely, the CAPM states that the cost of capital for an investment, S (*e.g.*, a particular common stock), is determined by the risk-free rate plus the stock's systematic risk (as measured by beta) multiplied by the market risk premium. Mathematically, the relationship is given by the following equation:

$$\boldsymbol{r_s = r_f + \beta_s \times MRP} \quad (1)$$

- $\boldsymbol{r_S}$ is the cost of capital for investment S;
- $\boldsymbol{r_f}$ is the risk-free interest rate;
- $\boldsymbol{\beta_S}$ is the beta risk measure for the investment S; and
- $\boldsymbol{MRP}$ is the market equity risk premium.

The CAPM is a "risk-positioning model," which operates on the principle that investors price risky securities to offer a higher expected rate of return than safe securities. It says that an investment, whose returns do not vary relative to market returns, should receive the risk-free interest rate (that is the return on a zero-risk security, the y-axis intercept in Figure 1), whereas investments of the same risk as the overall market (*i.e.*, those that by definition have average systematic market risk) are priced so as to expect to return the risk-free rate plus the MRP. Further, it says that the risk premium of a security over the risk-free rate equals the product of the beta of that security and the MRP.

1. Inputs to the CAPM

Q40. What inputs does your implementation of the CAPM require?

A40. As demonstrated by equation (1), estimating the cost of equity for a given company requires a measure of the risk-free rate of interest and the MRP as well as a measure of the stock's beta. There are several choices and sources of data that inform the selection of these inputs. I discuss these issues below. (Additional technical detail, along with a discussion of the finance theory underlying the CAPM is provided in Exhibit 1.)

Q41. What value did you use for the risk-free rate of interest?

A41. I use the yield on a 20-year U.S. Treasury bond as the risk-free asset for purposes of my analysis.[69] As explained previously, I rely on a forecast of what 10-year Treasury bond yields will be in 2028-32, which is the farthest available forecast for yields on government bonds within the next 30-year economic life of the planned Projects. Based on this forecast, I use 3.00 percent as the long-term risk-free rate of interest.[70] I adjust this value upward by 50 basis points (bps), which is my estimate of the representative historical maturity premium for the 20-year over the ten-year Government Bond. This produces a risk-free rate of 3.50 percent for 2028-32.[71] As noted earlier this forecast for the risk-free rate is also consistent with the long-term forecast from the Energy Information Administration.

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69 I use the 20-year Treasury bond yield because the historical MRP as measured by Duff & Phelps is over an approximately 20-year Treasury bond. Using a Treasury bond of a different maturity would require an adjustment to the MRP to match the maturity of the relied upon Treasury bond.

70 Blue Chip Economic Indicators, October 2021. This is the most recent forecast that goes out more than one year.

71 I make no adjustments to the risk-free rate for the elevation in the spread between utility bond yields and yields on treasury bonds.

As for the MRP, I consider two scenarios, where in Scenario 1, I rely on the historical average MRP as calculated by Duff & Phelps and in Scenario 2, I use the *forecasted* MRP as calculated by Bloomberg.

Q42. What value did you use for the MRP?

A42. Like the cost of capital itself, the MRP is a forward-looking concept. It is by definition the premium above the risk-free interest rate that investors can expect to earn by investing in a value-weighted portfolio of all risky investments in the market. The premium is not directly observable. Rather, it must be inferred or forecasted based on known market information. One commonly used method for estimating the MRP is to measure the historical average premium of market returns over the income returns on government bonds for a long historical period.[72] The average market risk premium from 1926 to the present (March 2021) is 7.25 percent.[73] I use this value of the MRP along with a risk-free rate of 3.50 percent in Scenario 1 of my CAPM.

In Scenario 2, I use a forward-looking MRP of 8.62 percent[74], which is Bloomberg's September 30, 2021 forecasted MRP in combination with the same 3.50 percent risk-free rate. I note that this is a conservative estimate as the

[72] The longest period for which Duff & Phelps reports data is 1926 to current. Based on financial textbooks such as Ross, Westerfield and Jaffe, "*Corporate Finance*," 10'th Edition, 2013, pp. 324-327, I use the longest period for which reliable estimates are available – in this case 1926 to 2020.

[73] Duff & Phelps, *Ibbotson SBBI 2021 Valuation Yearbook* 10-21.

[74] Bloomberg forecasts an MRP of 9.12% relative to a 10 year treasury bond yield. Since I use a 20 year treasury bond risk-free rate, I adjust the Bloomberg MRP down by 50 bps, which is my estimate of maturity premium for a 20 year treasury bond over the 10 year bond yield.

FERC-relied upon methodology to determine the MRP currently results in an MRP of 9.96 to 12.12 percent.[75]

The fact that recent forward-looking estimates of the MRP exceeded the historical average level is consistent with the broader body of evidence that risk premiums have remained elevated relative to their pre-financial crisis levels (see Section IV above). I also note that investors may require a higher or lower risk premium, reflecting the investment alternatives and aggregate level of risk aversion at any given time. As explained in Section IV above, there is evidence that investors' level of risk aversion is elevated relative to the time before the COVID-19 pandemic and may remain elevated for some time, even after the pandemic.

Therefore, I believe the 7.25 percent long-term historical average MRP value I rely on is a low-end estimate of what the market risk premium will be during the period at issue in this proceeding. I similarly believe that the 8.62 percent I rely on for my Scenario 2 is also conservative at this time as the FERC approach would result in a substantially higher MRP.

Q43. Please summarize the parameters of the scenarios and variations you considered in your CAPM and ECAPM analyses.

A43. The parameters are shown in Figure 10 below. Specifically, I use the forecasted 20-year U.S. Treasury rate for 2028-32 of 3.50 percent. I pair this with the long-term average historic MRP of 7.25 percent as estimated by Duff & Phelps. In

[75] Estimated as of September 30, 2021, consistent with FERC methodology for MRP calculation and over a risk-free rate of 2.1%. For consistency, I report the calculated MRPs of 10.36 and 12.52 percent after the deduction of 40 bps as the FERC methodology would use a risk-free rate of 2.1 percent; *see* IPL Villadsen Direct Exhibit 2.

Scenario 2, I pair it with Bloomberg's end of February forecast for forward-looking MRP of 8.62 percent.

Figure 10: CAPM and ECAPM Scenarios

	Scenario 1	Scenario 2
Risk-Free Interest Rate	3.50%	3.50%
Market Risk Premium	7.25%	8.62%

Q44. What betas did you use for the companies in your proxy groups?

A44. I used *Value Line* betas, which are estimated using the most recent five years of weekly historical returns data.[76] The *Value Line* levered equity betas are reported in Figure 9 above. Importantly, these betas—which are measured (by *Value Line*) using the market stock return data of the proxy companies—reflect the level of financial risk inherent in the proxy companies' market value leverage ratios over the estimation period. Because IPL's regulatory capital structure includes a higher proportion of debt financing than does the market data on the proxy companies used to estimate the ROE,[77] the financial risk associated with an equity investment in IPL's rate base is correspondingly greater than the financial risk borne by investors in the proxy companies' publicly traded stock. Importantly, the DCF model and the CAPM-based models use market data to estimate the ROE, so that it is the market value capital structure that is the relevant comparison across companies. As the risk premium model's ROE

[76] See Value Line Glossary, accessible at http://www.valueline.com/Glossary/Glossary.aspx

[77] IPL's regulatory debt ratio of 47% is above the average five-year average market value debt ratio measured for the Electric Sample. The average market value debt percentage of the Electric Sample is 40.6% (5-year average).

estimates are based on book value capital structures, the relevant comparison is across book value capital structures for that model.

Consequently, standard textbook techniques are applied to unlever the *Value Line* betas reported in **Error! Reference source not found.** above and relever the resulting asset betas at IPL's regulatory capital structure. See Exhibit 1 for details.[78]

2. The Empirical CAPM

Q45. What other equity risk premium model do you use?

A45. Empirical research has long shown that the CAPM tends to overstate the actual sensitivity of the cost of capital to beta: low-beta stocks tend to have higher risk premiums than predicted by the CAPM and high-beta stocks tend to have lower risk premiums than predicted.[79] A number of variations on the original CAPM theory have been proposed to explain this finding, but the observation itself can also be used to estimate the cost of capital directly by using beta to measure relative risk by making a direct empirical adjustment to the CAPM.

The second variation on the CAPM that I employ makes use of these empirical findings. It estimates the cost of capital with the equation,

$$\boldsymbol{r_S = r_f + \alpha + \beta_S \times (MRP - \alpha)} \qquad (2)$$

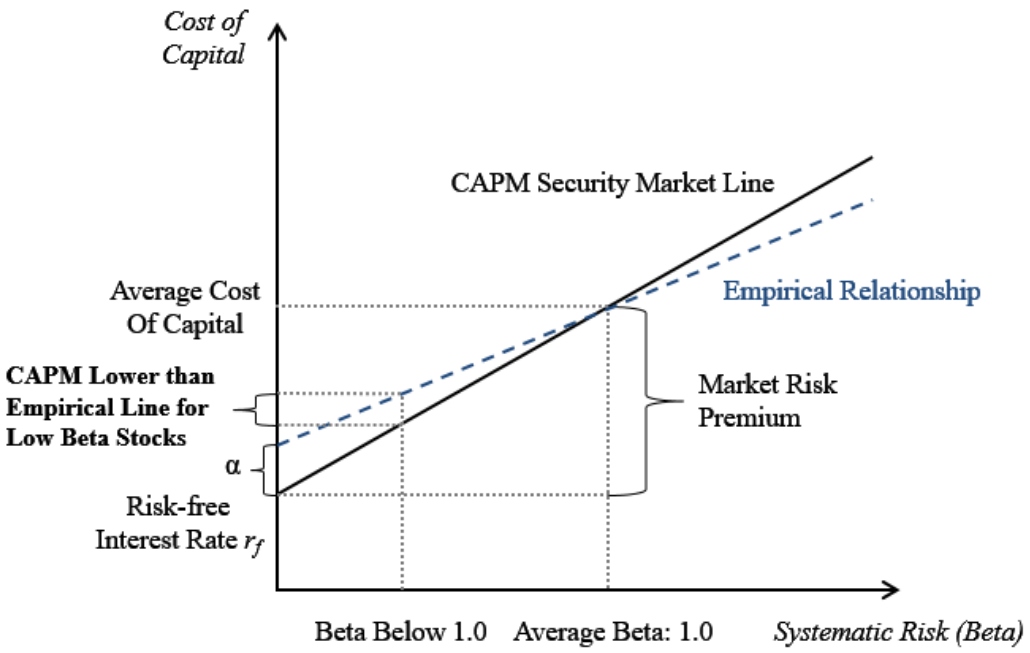
[78] The Technical Appendix (Exhibit 1) to this testimony provides a detailed description of the standard textbook formulas used to implement the "Hamada" technique for unlevering measured equity betas based on the proxy companies' capital structures to calculate "asset betas" that measure the proxy companies' business risk independent of the financial risk impact of differing capital structures. The proxy group average asset betas are then relevered at the target capital structure (*i.e.*, IPL's regulatory capital structure), with the precise relevered beta depending on the specific version of the unlevering/relevering formula employed.

[79] *See* Figure B-2 in Exhibit 1 for references to relevant academic articles. I also note that Value Line betas rely on five years of weekly data, so today's estimates reflect data from 2016 to today, which may not reflect the period for which the rate being determined is in place.

where α is the "alpha" adjustment of the risk-return line, a constant, and the other symbols are defined as for the CAPM (see equation (2) above).

I label this model the Empirical Capital Asset Pricing Model, or "ECAPM." The alpha adjustment has the effect of increasing the intercept, but reducing the slope of the Security Market Line in Figure 1, which results in a Security Market Line that more closely matches the results of empirical tests. This adjustment is portrayed in Figure 11 below. In other words, the ECAPM produces more accurate predictions of eventual realized risk premiums than does the CAPM.

Figure 11
The Empirical Security Market Line



Q46. Why do you use the ECAPM?

A46. Academic research finds that the CAPM has not generally performed well as an empirical model. One of its short-comings is directly addressed by the ECAPM, which recognizes the consistent empirical observation that the CAPM underestimates the cost of capital for low beta stocks. In other words, the ECAPM is based on recognizing that the actual observed risk-return line is flatter and has a higher intercept than that predicted by the CAPM. The alpha parameter (α) in the ECAPM adjusts for this fact, which has been established by repeated empirical tests of the CAPM. In summary, these studies estimate alpha parameters that range between 1 percent[80] and 7.32 percent.[81] I apply an alpha parameter of 1.5 percent in my application of the ECAPM.[82] Exhibit 1 Section II.C provides further discussion of the empirical findings that have tested the CAPM and also provides documentation for the magnitude of the adjustment, α.

3. Results from the CAPM Based Models

Q47. Please summarize the results of the CAPM-based models.

A47. The results of CAPM and ECAPM estimation for the three proxy groups are presented in Figure 12 below. The ranges of results for each model (CAPM and ECAPM) reflect the application of different specific versions of the textbook formulas used to account for the impact of different financial leverage on financial risk.

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80 Black, Fischer. Beta and Return. *The Journal of Portfolio Management* 20 (Fall): 8-18.

81 Fama, Eugene F. and Kenneth R. French. 1992. The Cross-Section of Expected Stock Returns. *Journal of Finance* 47 (June): 427-465.

82 The 1.5 percent is near the bottom of the range determined in the academic literature and therefore conservative.

Figure 12
CAPM / ECAPM Model Results

Estimated Return on Equity	Scenario 1 [1]	Scenario 2 [2]
Electric Sample		
Financial Risk Adjusted Method		
CAPM	11.2%	12.7%
ECAPM (α = 1.5%)	11.4%	12.8%
Hamada Adjustment Without Taxes		
CAPM	10.9%	12.3%
ECAPM (α = 1.5%)	10.8%	12.2%
Hamada Adjustment With Taxes		
CAPM	10.7%	12.1%
ECAPM (α = 1.5%)	10.7%	12.1%

Sources and Notes:
[1]: Long-Term Risk Free Rate of 3.50%, Long-Term Market Risk Premium of 7.25%.
[2]: Long-Term Risk Free Rate of 3.50%, Long-Term Market Risk Premium of 8.62%.

Q48. How do you interpret the results of your CAPM and ECAPM Analyses?

A48. The results in Figure 12 above range from 10.7 to 12.8 percent. However, I focus more heavily on Scenario 2 results, given the higher risks for IPL over a very long project life of the Projects, to arrive at my recommendation.[83] Further, I focus on the Hamada approaches so that the Scenario 2 results reasonably range from 12.1 to 12.3 percent for CAPM-based estimates.

Q49. Can you describe the DCF model's approach to estimating the cost of equity?

A49. The DCF model attempts to estimate the cost of capital for a given company directly, rather than based on its risk relative to the market as the CAPM does.

[83] I note that the average of the CAPM, Hamada with tax results is 11.4 percent.

The DCF method assumes that the market price of a stock is equal to the present value of the dividends that its owners expect to receive. The method also assumes that this present value can be calculated by the standard formula for the present value of a cash flow—literally a stream of expected "cash flows" discounted at a risk-appropriate discount rate. When the cash flows are dividends, that discount rate is the cost of equity capital:

$$\boldsymbol{P_0} = \frac{\boldsymbol{D_1}}{\boldsymbol{1+r}} + \frac{\boldsymbol{D_2}}{\boldsymbol{(1+r)^2}} + \frac{\boldsymbol{D_3}}{\boldsymbol{(1+r)^3}} + \cdots + \frac{\boldsymbol{D_T}}{\boldsymbol{(1+r)^T}} \quad (3)$$

Where,

$\boldsymbol{P_0}$ is the current market price of the stock;

$\boldsymbol{D_t}$ is the dividend cash flow expected at the end of period $\boldsymbol{t}$;

$\boldsymbol{T}$ is the last period in which a dividend cash flow is to be received; and

$\boldsymbol{r}$ is the cost of equity capital.

Importantly, this formula implies that if the current market price and the pattern of expected dividends are known, it is possible to "solve for" the discount rate r that makes the equation true. In this sense, a DCF analysis can be used to estimate the cost of equity capital implied by the market price of a stock and market expectations for its future dividends.

Many DCF applications assume that the growth rate lasts into perpetuity, so the formula can be rearranged algebraically to directly estimate the cost of capital. Specifically, the implied DCF cost of equity can then be calculated using the well-known "DCF formula" for the cost of capital:

$$r = \frac{D_1}{P_0} + g = \frac{D_0}{P_0} \times (1 + g) + g \quad (4)$$

where D_0 is the current dividend, which investors expect to increase at rate g by the end of the next period, and over all subsequent periods into perpetuity.

Equation (4) says that if equation (3) holds, the cost of capital equals the expected dividend yield plus the (perpetual) expected future growth rate of dividends. I refer to this as the single-stage DCF model; it is also known as the Gordon Growth model, in honor of its originator, Professor Myron J. Gordon.

Q50. Are there other versions of the DCF model?

A50. Yes. There are many alternative versions, notably (i) multi-stage models, (ii) models that use cash flow rather than dividends, or versions that combine aspects of (i) and (ii).[84] One such alternative expands the Gordon Growth model to three stages. In the multistage model, earnings and dividends can grow at different rates, but must grow at the same rate in the final, constant growth rate period. [85]

In my implementation of the multi-stage DCF, I assume that companies grow their dividend for five years at the forecasted company-specific rate of earnings growth, with that growth then tapering over the next five years toward the growth rate of the overall economy (*i.e.*, the long-term GDP growth rate forecasted to be in effect ten years or more into the future). I note that the multi-stage DCF model likely understates the cost of equity as it is plausible the payout

[84] The Surface Transportation Board uses a cash flow based model with three stages. See, for example, Surface Transportation Board Decision, "STB Ex Parte No. 664 (Sub-No. 1)," Decided January 23, 2009 and most recently re-affirmed in "STB Ex Parte No. 664 (Sub-No. 4)," issued June 23, 2020.

[85] See Exhibit 1, Section I for further discussion of the various versions of the DCF model, as well as the details of the specific versions I implement in this proceeding.

ratio changes and a company reaches steady-state growth. The model ignores that possibility.

4. DCF Inputs and Results

Q51. What growth rate information do you use?

A51. The first step in my DCF analysis (either constant growth or multi-stage formulations) is to examine a sample of investment analysts' forecasted earnings growth rates for companies in my proxy group. For the single-stage DCF and for the first stage of the multi-stage DCF, I use investment analyst forecasts of company-specific growth rates sourced from *Value Line* and Thomson Reuters *IBES*.

For the long-term growth rate for the final, constant-growth stage of the multistage DCF estimates, I use the long-term U.S. GDP growth forecast of 4.1 percent from Blue Chip Economic Indicators.[86] Thus, the long-run (or terminal) growth rate in the multi-stage model is nominal GDP growth.

Q52. What are the pros and cons of the input data?

A52. Both the Gordon Growth and single-stage DCF models require forecast growth rates that reflect investor expectations about the pattern of dividend growth for the companies over a sufficiently long horizon, but estimates are typically only available for three - five years. In the multi-stage version, I taper these growth rates toward a stable growth rate corresponding to a forecast of long-term GDP growth for all companies.

[86] See Blue Chip Economic Indicators, October 2021, p. 14.

One issue with the data is that it includes solely dividend payments as cash distributions to shareholders, while some companies also use share repurchases to distribute cash to shareholders. To the extent that companies in the Electric Sample use share repurchases, the DCF model using dividend yields will underestimate the cost of equity for these companies. While there are companies in the Electric Sample that have engaged in share buybacks in the past, the magnitude is currently not large.

A second issue is that the flight to quality has resulted in higher than usual stock prices for electric utilities and hence lower than usual dividend yields. As a result, the dividend yield may be downward biased. The multi-stage DCF model additionally requires a measure of the long-term GDP growth.

Q53. Please summarize the DCF-based cost of equity estimates for the proxy groups.

A53. The results of the DCF based estimation for the proxy groups are displayed below in Figure 13.

Figure 13
DCF Model Results

	Simple	Multi-stage
	[1]	[2]
Electric Sample	9.4%	8.2%

Q54. How do you interpret the results of your DCF analyses?

A54. The results in Figure 13 above exhibit a range from 8.2 to 9.4 percent. However, because the forecasted long-term GDP growth is low and likely caused by a very high near-term growth the simple DCF merits more weight than the multi-stage

DCF. This is confirmed by the fact that all CAPM results are above the simple DCF results. Consequently, I conservatively consider 9.4 percent to be reasonably representative for the DCF model[87] for the Electric Sample, although it is still substantially outside the range of reasonable estimates from CAPM/ECAPM models.

C. Risk Premium Model Estimates

Q55. Did you estimate the cost of equity that results from an analysis of risk premiums implied by allowed ROEs in past utility rate cases?

A55. Yes. In this type of analysis, sometimes called the "risk premium model," the cost of equity capital for utilities is estimated based on the historical relationship between allowed ROEs in utility rate cases and the risk-free rate of interest at the time the ROEs were granted. These estimates add a "risk premium" implied by this relationship to the relevant (prevailing or forecast) risk-free interest rate:

$$Cost\ of\ Equity = r_f + Risk\ Premium \qquad (5)$$

Q56. What are the merits of this approach?

A56. First, it estimates the cost of equity from regulated entities as opposed to holding companies, so that the relied-upon figure is directly applicable to a rate base. Second, the allowed returns are readily observable to market participants, who will use this as one data input in making investment decisions, so that the information is at the very least a good check on whether the return is comparable to that of other investments. Third, I analyze the spread between the allowed ROE at a given time and the then-prevailing interest rate to ensure that I properly

[87] The low end is the midpoint of the single-stage and multistage results, while the high end is the single-stage result. The reported figures were rounded to the nearest ¼ percent.

consider the interest rate regime at the time the ROE was awarded. This implementation ensures that I can compare allowed ROE granted at different times and under different interest rate regimes.

Q57. How did you use rate case data to estimate the risk premiums for your analysis?

A57. The rate case data from 1990 through Q3 2021[88] is derived from Regulatory Research Associates.[89] Using this data, I compared (statistically) the average allowed rate of return on equity granted by U.S. state regulatory agencies in electric utility rate cases to the average 20-year Treasury bond yield that prevailed in each quarter.[90] I calculated the allowed utility "risk premium" in each quarter as the difference between allowed returns and the Treasury bond yield, since this represents the compensation for risk allowed by regulators. Then I used the statistical technique of ordinary least squares ("OLS") regression to estimate the parameters of the linear equation:

$$Risk\ Premium = A_0 + A_1 \times (Treausury\ Bond\ Yield) \quad (6)$$

I derived my estimates of A_0 and A_1 using standard statistical methods (OLS regression) and found that the regression has a high degree of explanatory power in a statistical sense. I report my results for the respective classifications of rate cases below in Figure 14.[91] I note that the results displayed in Figure 14 below shows that the risk premium model fits the data well as the R-squared is

[88] Technically, I use data for the period January 1990 through September 2021.
[89] SNL Financial as of October 2021.
[90] I rely on the 20-year government bond to be consistent with the analysis using the CAPM to avoid confusion about the risk-free rate. While it is important to use a long-term risk-free rate to match the long-lived nature of the assets, the exact maturity is a matter of choice.
[91] IPL Villadsen Direct Exhibit 2 contains my risk premium analysis.

above 85 percent for both utilities. The R-squared is a measure of how well the data fits the model and these R-squared indicate solid results.

Figure 14
Implied Risk Premium Model Results

	R Squared	Estimate of Intercept (A0)	Estimate of Slope (A1)	Implied Cost of Equity Range
	[1]	[2]	[3]	[4]
Electric Utility	86.3%	8.5%	-55.2%	10.1%

Sources and Notes:
[1]-[3]: Estimated Using S&P Market Intelligence, as of September 30, 2021
[4]: Risk-free rate of 3.5%

The negative slope coefficient reflects the empirical fact that regulators grant smaller risk premiums when risk-free interest rates (as measured by Treasury bond yields) are higher. This is consistent with past observations that the premium investors require to hold equity over government bonds increases as government bond yields decline. In the regression described above the risk premium declined by less than the increase in Treasury bond yields. Therefore, the allowed ROE on average declined by less than 100 bps when the government bond yield declined by 100 bps.

Based on this analysis, the implied risk premium estimate is 10.1 percent, which I consider somewhat downward biased for a 30-year project in that it relies on authorized returns from, for example, the COVID-19 period, which may not be representative.

VI. THE PROJECTS AND IPL SPECIFIC CIRCUMSTANCES

Q58. Can you please summarize your assessment of IPL Projects' relevant business risk?

A58. IPL seeks to acquire 400 MW solar generation and 75 MW battery storage facility. IPL expects to acquire the solar and battery storage projects from at least two different developers. In addition, using tax equity required a change in MISO's interconnection tariff to complete IPL's acquisition of one of the Projects that IPL will be acquiring. My understanding is that this project may be the first time the new MISO interconnection tariff is utilized. Further, this transaction is expected to involve one or more tax equity partners, which increases risk for IPL. Specifically, tax equity investment will be viewed as debt on IPL's balance sheet by investors, effectively decreasing the proportion of equity in IPL's capital structure. IPL is taking on the risks of tax equity financing in order to benefit its customers. Using a tax equity partnership, IPL can deliver the benefits of the Federal Investment Tax Credit to its customers, which reduces IPL's share of the capital cost of the Projects compared to traditional utility ownership. In addition, use of a tax equity partnership is relatively new among regulated electric utilities, with only a handful of electric utilities to date using this form of financing.

Further, given that commodity prices are both uncertain and elevated due to significant supply constraints in the market place, establishing a cost cap ratemaking principle for the Projects results in elevated risk for the Company with regard to the Projects. More importantly, the Electric Sample of integrated electric utilities does not capture the unique risks of the Project for which the

appropriate ROE needs to be determined in this proceeding. The Electric Sample comprises integrated electric utilities that have significant distribution and transmission assets, both of which are considered much less risky than generation assets like the Projects at issue in this proceeding. As a reference, consider that PJM Interconnection L.L.C, in its most recent review of the Variable Resource Requirement curve used to clear PJM-administered RPM Auctions, estimated that for its Cost of New Entry (CONE) parameters, the appropriate ROE for a new merchant generator that would operate in PJM in 2022 and participate in PJM's energy and forward capacity market, is 13.0 percent.[92] Similarly, MISO's most recent Annual CONE filing, dated October 2, 2020[93], incorporated a 13.4 percent ROE at 55 percent equity composition to determine the Local Resource Zone CONE costs for attracting new generation development to meet zonal capacity needs. While IPL's proposed Projects are not merchant generation, there are certain long-term risks that are similar, if not identical, to those faced by merchant generators. Thus, the CONE parameters of both MISO and PJM serve to provide a valid reference to the model estimated ROE for the Projects.

Additionally, IPL is seeking approval from the Board under the Advanced Ratemaking provision. Under this regulatory provision, the allowed ROE would be set for the period covering the full economic life of the asset, estimated to be approximately 30 years for solar and 20 years for battery energy storage. This

[92] PJM Interconnection, L.L.C., Docket No. ER19-105-000, Periodic Review of Variable Resource Requirement Curve Shape and Key Parameters

[93] Filing of the Midcontinent Independent System Operator, Inc. Regarding Local Resource Zone CONE Calculation Docket No. ER21-26-000

means that the return on equity that is being determined now is expected to be in effect for 30 years. Consequently, over the next 30 years, IPL will be exposed to economic developments including inflation, among other risks, such as operational and policy risks. Because the allowed return on equity is a nominal return, it includes today's inflation, but going forward the inflation could readily change.

As discussed previously, recent surveys by BCEI economists, indicate that U.S. real GDP will increase by 5.7 percent in 2021 and 4.1 percent in 2022 for a nominal GDP of 9.7 percent and 7.3 percent respectively.[94] The Bureau of Labor Statistics recently estimated the annualized Consumer Price Index (CPI) for October 2020 through September 2021 is at 5.4 percent,[95] which is the largest increase since August 2008.

All of this points to significant uncertainty regarding inflation expectations over the long term. The Project will be exposed to inflation risk in its allowed ROE over the long-term.

Such risks have clearly been recognized in prior advanced rate making dockets, where the Board has authorized a return 125 to 165 basis points higher than that awarded integrated electric utilities at the same time.[96] Thus, clearly,

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94 Wolters Kluwer Blue Chip Economic Indicators, October 2021, p. 2-3

95 Bureau of Labor Statistics, "Economic News Release," July 13, 2021.

96 See, for example, Order Approving Settlement With Modifications in Docket No. RPU-2014-0002, issued January 20, 2015, pp. 11-12. In this matter the authorized ROE was 11.5%. The average allowed ROE for integrated electric utilities in 2014-2015 was 9.85%, so the authorized ROE for this matter was 165 basis points higher. Similarly, in Final Order and Decision in Docket No. RPU-2017-0002, issued April 17, 2018 pp. 52-53, the Board authorized a ROE of 11% for IPL's New Wind II Project. At the same time (2017-2018), the average allowed ROE for integrated electric utilities was 9.75%, so the authorized ROE for the New Wind II Project was 125 basis points higher than the average allowed ROE.

the Board has in past decisions acknowledged that fixing the ROE for a renewable project for the life of the project merits a higher ROE than that awarded an integrated electric utility.

VII. COST OF CAPITAL RECOMMENDATION

Q59. Please summarize your conclusions regarding IPL' risk and the necessary return.

A59. I find that IPL's Projects to be of higher than average risk relative to the Electric Sample companies as acknowledged in the Board's past advanced ratemaking decisions for renewables. The fact that rates will be in effect 20 for the battery storage and 30 years for solar, and IPL's exposure to substantial inflation risk, as well as other risks such as potential regulatory lag, electric industry changes and changing economic factors. Therefore, the Projects merit an allowed ROE well above the average of the estimates for the Electric Sample.

Q60. What do you recommend for IPL' cost of equity in this proceeding?

A60. I recommend an ROE of 11.40 percent on 51 percent common equity and 2 percent preferred equity.

I base my recommendation on the following observations. The risk profile of the Projects is well above that of the average integrated electric utility for reasons discussed above. Consequently, I find the Board's past approach of awarding an authorized ROE that is well above the calculated ROE appropriate. In this case, the average of my CAPM / ECAPM results is 11.7 percent while the Scenario 2 reasonably range from 12.1 to 12.3 percent. The DCF is 9.4 percent, and the risk premium model results in a ROE of 10.1 percent. Taking the average

of the three models (CAPM/ECAPM, DCF and Risk Premium) and conservatively adding 100 basis points, I obtain a ROE of 11.4 percent. I further note that the maturity premium of a 30-year Treasury Bond over a 3-year Treasury Bond average 1.53 percent over the past 30 years, while the maturity premium of a 20-year Treasury Bond over a 3-year Treasury Bond average 1.46 percent over the past 30 years (and 1.69 percent over the past 20 years). Therefore, a premium of upward 150 basis points over today's cost of equity would be reasonable. Thus, the request for an authorized ROE of 11.4 percent is well within the range (11.4 to 11.9 percent).[97] If I were to rely only on the CAPM and DCF models as the Board did in its decision in RPU-2020-0001, the average for the CAPM and DCF is 10.25 percent. Adding 125 to 165 basis points to that figure results in a ROE of 11.50 to 11.90 percent.[98] Additionally, the ROE allowed in recent CONE studies are indicative of the return on equity for new entries and generation. Such ROE are 270 to 300 basis points above my average for the Electric Sample, so even if I adjust for only half of the incremental ROE granted in CONE studies, I find a recommended ROE above 11.40 percent.[99] Thus, the request for a ROE of 11.40 percent is supported by the several approaches and may even be conservative.

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97 This uses the more reasonable result from the single-stage DCF (the average of the DCF, CAPM and risk premium is 10.4%, so adding 125 – 165 bps results in a ROE of 11.65 to 12.05 percent). If I were to include the multi-stage model, the average of the CAPM/ECAPM, DCF/Multi-Stage DCF, and Risk Premium is 10.2%, so the addition of 125 to 165 basis points results in a ROE of 11.45 to 11.85 percent. The requested 11.4 percent is below that range.

98 This uses the single-stage DCF. If I were to include the multi-stage model, the average of the CAPM/ECAPM and DCF/Multi-Stage DCF is 10.25%, so the addition of 125 -165 basis points results in a ROE of 11.5 percent to 11.9 percent.

99 Using the PJM CONE ROE of 13.0% and taking an average of the 13% and my estimated average of 10.4% results in a ROE of 11.7%.

Q61. Does this conclude your direct testimony?

A61. Yes, it does.

STATE OF IOWA

BEFORE THE IOWA UTILITIES BOARD

IN RE: **INTERSTATE POWER AND LIGHT COMPANY**	**DOCKET NO. RPU-2021-____**

AFFIDAVIT OF
DR. BENTE VILLADSEN

STATE OF FLORIDA)
) ss.
COUNTY OF PASCO)

I, Dr. Bente Villadsen, being first duly sworn on oath, depose and state that I am the same Dr. Bente Villadsen identified in the Direct Testimony; that I have caused the Direct Testimony, including any Exhibits, including exhibits, to be prepared and am familiar with the contents thereof; and that the Direct Testimony, including exhibits, are true and correct to the best of my knowledge and belief as of the date of this Affidavit.

/s/ Dr. Bente Villadsen_____
Dr. Bente Villadsen

Subscribed and sworn to before me,
a Notary Public in and for said County
and State, this 30TH day of October, 2021.

/s/ Anthony Coleprete
Anthony Coleprete
My commission expires on May 16, 2025