CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
ELECTRIC CASE TESTIMONIES
VOLUME 2

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CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
DIRECT TESTIMONY OF
YUKARI SAEGUSA

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CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
DIRECT TESTIMONY OF
YUKARI SAEGUSA

Q. Please state your name and business address.

A. My name is Yukari Saegusa. I am Vice President and Treasurer of Consolidated Edison Company of New York, Inc. (“Con Edison” of the “Company”). My business address is 4 Irving Place, New York, New York.

Q. Briefly describe your educational background.

A. I graduated from the University of Pennsylvania, Wharton School in 1989 and received a B.S. degree in Economics. I received an MBA from the MIT Sloan School of Management in 1995.

Q. Please summarize your professional background.

A. I joined Con Edison in March 2013. Prior to joining Con Edison, from 2004 to 2013 I was employed by Barclays as a Managing Director in Debt Capital Markets covering the United States utility and energy sectors. I was employed from 1995 to 2004 by Citigroup, also in Debt Capital Markets covering the United States utility sector. In my roles at Barclays and Citigroup, I was broadly responsible for advising utility clients on the design and execution of debt capital-raising and liability management strategies.

Q. Have you previously sponsored testimony before the New York State Public Service Commission ("Commission")?

A. Yes. I submitted testimony on behalf of Orange and Rockland Utilities, Inc. in Cases 14-E-0493, 14-G-0494, 18-E-0067 and 18-G-0068.

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

A. My direct testimony discusses (1) the current financial market environment, (2) the Company's historic and projected capital structure and cost of capital, and (3) the Company's financial challenges and the need to maintain access to financial markets at reasonable cost.

I. CURRENT FINANCIAL MARKET ENVIRONMENT

Q. Please describe the current state of the financial markets.

A. The U.S. is currently in its ninth year of economic expansion. U.S gross domestic product grew at an annual rate of 3.4% in the third quarter of 2018, the second fastest in the last three years. The unemployment rate has dropped from a high of 10.0% in October of 2009 to 3.9% in December 2018. Despite the recent market pullback in late 2018, the U.S. equity market is trading near all time highs and valuations remain above historical averages. The S&P 500 stock index, a proxy

for the U.S. equity market, is trading at approximately 15.1x forward twelve month earnings compared with a 10-year average of 14.6x based on data compiled by Factset as of December 14, 2018 (see Exhibit__(YS-1)). Valuations in the utilities sector are also above the historical long-term averages. The S&P 500 Utilities Index traded at 18.2x forward twelve month earnings compared with a 10-year average of 15.2x as of December 14, 2018. Utility stocks, often viewed by investors as bond surrogates, are trading at a premium to historical valuation measures as investor search for yield in the current interest rate environment.

On the fixed income side, the U.S. fixed income market is now in its third decade of a bull market run. Investors have been willing to invest money at record low yields as they look to put funds to work in an artificially low interest rate environment. The yield on Moody’s Baa Corporate Bond Index recently stood at 5.14% (December 14, 2018) compared to a long-term average of 7.38% since January 2, 1986. Record low yields have been driven in large part by unprecedented actions taken by the U.S. Federal Reserve and central banks around the world in response to the 2008 financial crisis. The Federal

Reserve and other central banks have injected a substantial amount of liquidity into their respective economies through multiple rounds of quantitative easing. Quantitative easing is the practice of using money, newly created by the central banks, to buy mortgage-backed and government securities. The practice increases liquidity by injecting money supply into the economy and suppressing interest rates by driving the prices of the mortgage-backed and government securities up and yields on those securities down.

Q. Has the Federal Reserve taken action to scale back the unprecedented actions it took after the 2008 financial crisis?

A. Yes. Starting in January 2014, the Federal Reserve gradually began to reduce the amount of its bond purchases, ending these purchases completely in October 2014, and signaled an end to its ultra-loose monetary policy. In the December 2015 meeting of the Federal Open Markets Committee(“FOMC”), the Federal Reserve raised the Federal Funds rate by 25 basis points (“bps”) further signaling the end of an easing cycle and the beginning of a hiking cycle. Subsequent to the December 2015 Federal funds rate increase, the FOMC has hiked rates by 25 bps

eight times (at the December 2016, March 2017, June 2017, December 2017, March 2018, June 2018, September 2018 and December 2018 meetings). The Federal Funds rate target range currently stands at 2.25%-2.50%. The Federal Funds rate is the overnight interest rate at which a depository institution lends funds maintained at the Federal Reserve to another depository institution. The Federal Funds rate is generally only applicable to the most creditworthy institutions when they borrow and lend overnight funds to each other. The Federal Funds rate is one of the most influential interest rates in the U.S. economy, because it affects monetary and financial conditions, which in turn have a bearing on key aspects of the broad economy including employment, growth and inflation.

Q. Has the Federal Reserve provided any guidance on the Federal Funds rate beyond 2018?

A. Yes. The Federal Reserve publishes a forecast of the Federal Funds rate for 2019, 2020, 2021 and longer run. The projections are based on the individual assessments of the Federal Reserve Board members and Federal Reserve Bank presidents. In the lastest forecast (December 2018), the median of the FOMC participants' assessments

of appropriate monetary policy puts the Federal Funds rate at 2.9%, 3.1% and 3.1% for 2019, 2020 and 2021, respectively. The forecast implies a 52.5 bps increase in the Federal Funds rate in 2019 from year end 2018 levels or approximately two 25 bps rate hikes. The Federal Reserve has signaled a willingness to continue to raise the Federal Funds rate despite signs of slowing global economic expansion, tightening of financial conditions and increased financial market volatility.

Q. Has the Federal Reserve announced any additional policy changes with respect to its bond buying program that will likely put upward pressure on interest rates?

A. In September 2017, the Federal Reserve announced that it has embarked on an effort to reduce its $4.5 trillion balance sheet. At its September 2017 meeting, the FOMC stated:

> The Committee intends to gradually reduce the Federal Reserve's holdings of Treasury securities and agency securities--agency debt and agency mortgage-backed securities (MBS)--by decreasing the reinvestment of the principal payments it receives from securities holdings.

The Federal Reserve began reducing its balance sheet in October 2017. As of October 2018, the Federal Reserve had reduced its balance sheet by $288 billion to $4.2 trillion (see Exhibit__(YS-2)). At the December 2018 FOMC meeting, Jerome Powell, the Chair of the Federal Reserve, signaled that the reduction of the Federal Reserve's balance sheet would continue by saying:

> I think that the runoff of the balance sheet has been smooth and has served its purpose. And I don't see us changing that.

Q. What are the challenges faced by the Company in today's financial markets?

A. Taking the aforementioned factors into account, one of the main challenges faced by the Company is its ability to earn a fair rate of return. A confluence of factors including Staff of the Department of Public Service's ("Staff") approach to setting cost rates for debt and equity, a rising and volatile interest rate environment, and elevated utility equity market valuations expose the Company to the risk that it will not be able to earn its cost of capital.

Q. Please describe the shortcomings with Staff's approach to setting cost rates for debt in the current financial

market environment.

A. Staff's approach to setting cost rates for debt based on current interest rates ignores the risks of rising rates as the Federal Reserve continues to hike interest rates and reduce its balance sheet. As an example, the 10-year Treasury yield is up 17.3% and the 30-year Treasury yield is up 11.8% year to date through December 14, 2018. In addition to the upward trajectory of interest rates, rates have also exhibited volatility. At their highest levels, 10-year Treasury yields had increased 31.2% and 30-year Treasury yields had increased 22.8% year to date. We expect interest rate volatility to continue. Short-term interest rates may rise both earlier and more quickly in anticipation of further actions by the Federal Reserve given the fact that the markets are forward-looking. As evidence of this, the mere hint of the Federal Reserve's decision to start tapering its monetary easing policy in May 2013 sent ten-year Treasury bill rates higher by 46 bps for the month. A 46 bps move in one month (or an increase of 25% on a relative basis) has few precedents since 1990. To put this into perspective, on an absolute basis, this movement ranked in the top 95th percentile of changes in monthly ten-year Treasury

bill rates since 1990 (see Exhibit___(YS-3)), which was prepared under my supervision and direction). And on a relative basis, a 25% move ranked in the top 99.5 percentile of changes in monthly ten-year Treasury bill rates since 1990. Sustained high volatility will likely lead investors to require a higher rate of return to compensate them for the additional risks that they will have to bear given this increased volatility. Therefore, Staff should rely on forecasted rates to set cost rates for debt.

Q. Please describe the shortcomings with Staff's approach to setting cost rates for equity in the current financial market environment.

A. The current low interest rate environment has pushed utility equity market valuations above historical levels. These conditions are exacerbating the flaws of Staff's reliance on a formulaic approach to determining a fair return on equity. Staff's discounted cash flow ("DCF") model, in particular, is producing results that are well below historical levels. Company witness Villadsen further discusses the weaknesses in Staff's formulaic approach. She also provides an example of how the Federal Energy Regulatory Commission has responded to

concerns about the reliability of the DCF methodology in the current low interest rate environment.

Q. What additional challenges are faced by the Company in the current environment?

A. Volatility in the financial markets has been and will continue to be one of the Company's most significant challenges as the Company continually needs to access the capital markets. Geopolitical events have the potential to further increase volatility in the capital markets. World events like those from the past few years(*e.g.*, trade tensions between the United States and China, BREXIT, the potential of a global economic slowdown, and the ongoing shutdown of the Federal government) can produce shocks that could affect the Company's ability to access capital markets efficiently.

II. CAPITALIZATION AND COST OF CAPITAL

Q. What capital structure do you believe should be used in the context of these rate case proceedings?

A. A capital structure with a 50.00% equity ratio, 1.11% customer deposits ratio and a 48.89% debt ratio should be used.

Q. Please describe why this proposed capital structure is appropriate.

A. The proposed capital structure with a 50.00% equity ratio (as compared with the 48.00% equity ratio in the Company's current electric and gas rate plans) is appropriate and necessary to address the Company's weaker cash flow profile. The Company's weaker cash flow profile is a direct result of the successive low return on equity and equity ratios in its recent rate plans. The weak cash flow profile has been exacerbated further by the passage of the Tax Cut and Jobs Act of 2017 ("TCJA"). The two provisions of the TCJA that most negatively impact the Company's ability to generate cash flows have been the reduction of the maximum corporate tax rate from 35% to 21% and the curtailment of bonus depreciation. These two developments will reduce the amount of future cash flow contribution from deferred taxes. In addition, as discussed in the direct testimony of the Company's Income Tax Panel, the reduction of the corporate tax rate means that the Company will need to return a portion of the difference between taxes that have been collected from customers at the 35% tax rate and the new 21% tax rate.

Q. How did the rating agencies respond to the passage of TCJA?

A. On January 19, 2018, Moody's lowered the rating outlooks of 24 regulated utilities and utility holding companies from "stable" to "negative." The rating outlooks for CEI, Con Edison and Orange and Rockland were lowered from "stable" to "negative".

Q. What reasons did Moody's provide to support the rating outlook changes?

A. In the report, included as Exhibit__(YS-4), Moody's wrote:

> The change in outlook to negative from stable for the 24 companies affected in this rating action primarily reflects the incremental cash flow shortfall caused by tax reform on projected financial metrics that were already weak, or were expected to become weak, given the existing rating for those companies. The negative outlook also considers the uncertainty over the timing of any regulatory actions or other changes to corporate finance policies made to offset the financial impact.

Q. What are the implications of a negative outlook?

A. A Moody's rating outlook is an opinion regarding the likely rating direction of a company over the medium term. A negative outlook indicates a higher likelihood of a negative ratings change.

Q. What factors did Moody's state it would consider in deciding whether a ratings downgrade would be warranted?

A. Moody's stated that it would continue to monitor the financial impact of the TCJA on each company over the next 12 to 18 months. Moody's stated a focus on:

> …regulatory approach to rate treatment and any changes to corporate finance strategies. This will include balance sheet changes dues to the reclassification of excess deferred tax liabilities as a regulatory liability and the magnitude of any amounts to be refunded to customers.

Q. Did Moody's provide their views on potential regulatory offsets to the negative cash flow impact of the TCJA?

A. Yes. Moody's was of the view that potential regulatory offsets could include accelerated cost recovery of certain regulatory assets or future investment; changes to the equity layer or allowed ROEs in rates, and other actions.

Q. Did Moody's provide any comments supporting their change in outlook for the Company specifically?

A. In a report published January 31, 2018, Moody's commented that (see Exhibit__(YS-5)):

> CECONY's negative outlook is driven by the negative impact from Federal tax reform, signed into law in December 2017. The resulting deterioration in cash flow, due to the early termination of bonus depreciation among other cash negative provisions, will pressure already weaker financial metrics compared to peers.

but

> CECONY's outlook could return to stable if the company is able to mitigate the negative cash flow impact from tax reform through regulatory developments to offset cash flow leakage with some other cash generative measures.

Q. Has there been any changes made by Moody's to the Company's ratings since their January 31, 2018 report lowering the Company's rating outlook?

A. Yes. On October 30, 2018, Moody's downgraded the Company's senior unsecured rating from "A2" to "A3" and the commercial paper rating from "P-1" to "P-2". Moody's

cited the Company's weak financial profile as the cause of the downgrade. Moody's commented that the Company's credit challenges are:

- Stagnant cash flow generation expected due to tax reform;
- High capex requirements and high dividend payout drive higher debt levels;
- State's move toward more renewable energy creates new operating demands; and
- Moderate carbon transition risk as a T&D utility with no generation ownership.

Moody's expects the Company's ratio of cash flow from operations before changes in working capital ("CFO pre-WC") to debt to fall to 16%-17% from over 20% historically and warned that the two main factors that could lead to an additional downgrade are (1) CFO pre-WC to debt declining consistently below 17% and (2) a less predictable regulatory environment or reduced cost recovery provisions.

Q. Are the credit challenges of stagnant cash flows and higher capital requirements cited by Moody's unique to the Company?

A. No. In a November 8, 2018 regulated utility sector report titled, "2019 outlook negative amid growing debt and stagnant cash flow" (see Exhibit__(YS-6)), Moody's maintained the utility sector outlook at "negative" citing:

> …increasing debt to fund capital spending and dividends, as well as stalled cash flow growth as utilities continue to sort out the implementation of tax reform with state regulators.

Q. Did this Moody's report provide an update on how various regulatory jurisdictions around the country have responded to the deteriorating credit profile of the sector?

A. Yes. Moody's highlighted the divergence in how various regulatory jurisdictions have responded to declining credit profiles. In summary, Moody's highlighted the contrast between regulatory jurisdictions that have been proactive in addressing the risks from deteriorating credit quality as compared with other jurisdictions that have offered little to no support. Moody's writes:

> Some regulatory decisions in 2018 will allow for incremental cash flow generation, such as increased equity capitalization allowed in Alabama, Georgia

and Texas, while several others have allowed utilities to offset liabilities due to required customer rebates against assets to be collected in the future. These regulatory decisions should lend some stability to utility cash flows and the financial metrics of affected companies.

but

On the other hand, some regulatory decisions offer no new cash flow offsets, or not enough to support utility financial metrics at historical levels. For example, a more straightforward application of the new tax law has resulted in the nullification of entire rate increases for Consolidated Edison Company of New York (A3 stable) and Oklahoma Gas & Electric Company (OG&E A3 negative)...

Q. Can any conclusions be drawn from how supportiveness of regulatory jurisdictions impact the creditworthiness of regulated utilities in the current environment?

A. Moody’s has shown that the supportiveness of the regulator has a direct and meaningful impact on a regulated utility’s creditworthiness. Going back to Moody’s January action of changing the rating outlooks to “negative” from “stable” for 24 regulated utilities and

utility holding companies, six of those companies have had their rating outlooks changed back to “stable,” while five companies have had their ratings downgraded as of November 2018. Of the six companies that have had their rating outlooks change back to “stable,” four are in states that Moody’s has deemed to have implemented policies that provide cash flow support to lessen the negative impact of the TCJA. Conversely, four of the five companies that have been downgraded since Moody’s January outlook action are in states that Moody’s has deemed to have offered little to no offset to the negative cash flow impacts of the TCJA.

Q. Did Moody’s highlight any specific credit positive policies that provide incremental cash flow as an offset to the cash lost due to the TCJA?

A. Yes. In a June 18, 2018 report (see Exhibit__(YS-7)), Moody’s highlighted Georgia and Alabama as two jurisdictions that have increased the authorized equity ratios. Georgia approved a tax reform settlement agreement allowing Georgia Power Company to increase its authorized retail equity ratio from approximately 51% to as high as 55%. The Alabama Public Service Commission approved Alabama Power Company’s request to increase

gradually its equity ratio to 55% by 2025. Moody's commented that (see Exhibit__(YS-8)):

> Georgia Power's settlement agreement and the increased authorized equity ratio also signal the continued credit supportive regulatory environment in Georgia and the constructive relationship the utility has with the Georgia Public Service Commission.

Moody's commented on Alabama's settlement (see Exhibit__(YS-9)):

> On 1 May 2018, in response to changes to US tax legislation, the Alabama Public Service Commission approved modifications to the Rate Stabilization and Equalization (plan) and made other commitments designed to support the credit quality of Alabama Power. As part of the Rate RSE modifications in May 2018, the APSC also approved an increase in Alabama Power's equity ratio to 55% by 2025, a credit positive.

Q. Besides Moody's November 8, 2018 utility sector report, has there been any other independent analysis that has evaluated the supportiveness of regulatory jurisdictions around the country?

A. Yes. On November 29, 2018, UBS' utility equity analyst published a sector report (see, Exhibit__(YS-10)) titled "North America Power & Utilities: Roll On". In this report, UBS ranks the various North American regulatory jurisdications based on five criteria: (1) whether commissioners are appointed or elected; (2) allowed return spread history; (3) mechanisms that reduce regulatory lag; (4) rates and customer levels compared to region; (5) tendency to settle versus litigate rate cases; and (6) a subjective investor friendliness factor.

Q. How did New York rank in UBS' evaluation?

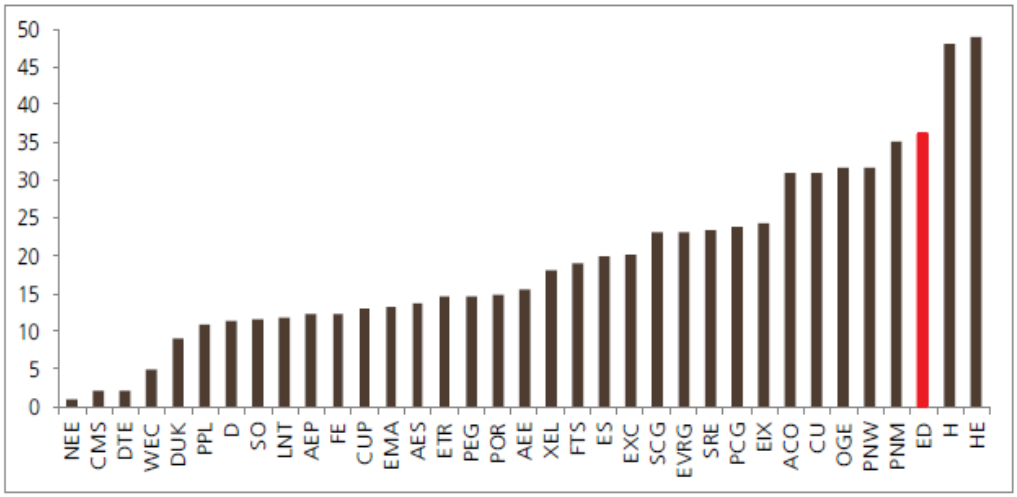
A. New York's regulatory jurisdiction ranked in the 4th tier, with the 1st tier being the most favorable and 5th tier being the least favorable. This represented a downgrade for New York from when UBS last published their rankings in February 2018. As noted in the chart below, New York was ranked in the 3rd tier before this downgrade. New York has been surpassed by states such as Connecticut and Delaware as those states have implemented supportive regulatory mechanisms, including the reduction of regulatory lag.

TIER 1	TIER 2	TIER 3	TIER 4	TIER 5
		Nova Scotia		
		North Dakota		
FERC		Iowa		
		Kentucky		
		Washington		
		Tennessee		
		Texas		
		Missouri		
		Massachusetts		
		South Carolina		
	Pennsylvania	Wyoming	Prince Edward Island	
	Illinois	Kansas	Nevada	
	Arkansas	Rhode Island	New Hampshire	
	Ohio	California	New York	
Florida	Louisiana	Alberta	Oklahoma	New Mexico
Michigan	Georgia	Newfoundland & Labrador	Alaska	Maine
Utah	Idaho	Delaware	West Virginia	Maryland
Wisconsin	British Columbia	Minnesota	South Dakota	Montana
Alabama	Indiana	Connecticut	Nebraska	Hawaii
Colorado	Virginia	New Jersey	Mississippi	Vermont
North Carolina	Oregon	Arizona	Ontario	District of Columbia

Source: UBS

Q. Did UBS rank Con Edison against its regulated utility peers?

A. Yes. As noted in the chart below, UBS ranked Con Edison 33rd out of the 35 companies evaluated by UBS based on UBS' proprietary ranking of regulatory jurisdictions. In addition, UBS applied a negative 5 percent discount to the Company's equity valuation to account for the New York regulatory environment.



Source: UBS

Q. What is the significance of the recent downgrades of both the Company and New York regulatory jurisdiction by both fixed income and equity analysts?

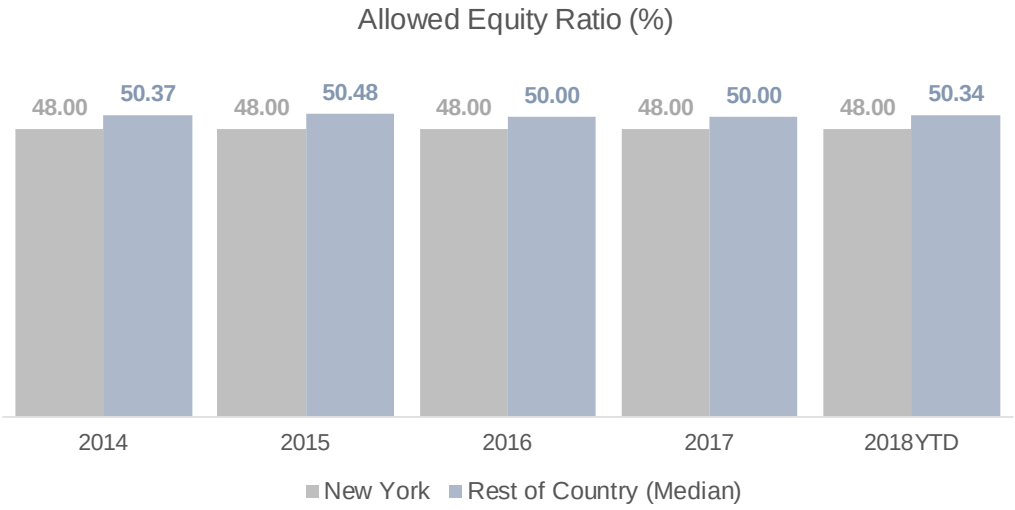
A. The recent downgrades are an independent confirmation of the deterioration of the New York regulatory environment relative to the rest of the country. A less supportive regulatory environment imposes additional costs for both customers and shareholders. The downgrade of the Company by Moody's has already increased the rates at which the Company can borrow debt. The Company's commercial paper rates have increased by approximately 3-5 bps and the credit spreads at which the Company borrows longer debt have widened by approximately 3-5 bps since the recent Moody's downgrade of the Company's credit rating. In

addition, any discount applied by investors to the Company's equity valuation to account for the less supportive regulatory environment in New York will increase the Company's cost of equity.

The Company will be required to access both the debt and equity markets in the coming years due to weaker cash flows resulting from the TCJA paired with sustained capital spending in order to maintain the Company's infrastructure. The ability to access the capital markets in an efficient and cost effective manner will benefit customers and shareholders.

Q. Why is a capital structure with a 50.00% equity ratio reasonable?

A. An equity ratio of 50.00% would bring New York up to the national average. The chart below shows the median equity ratio for the rest of the country over the last five years, as compared with a median equity ratio of 48.00% in New York.



Source: SNL Financial

In addition, as previously noted, some jurisdictions are further increasing equity ratios to offset the negative cash flow impact of the TCJA. A slightly higher equity ratio will also provide the capital markets with a clear signal that New York will act proactively to preserve the credit strength of its utilities.

Q. How would a 50.00% equity ratio potentially impact the Company's credit profile?

A. As discussed above, a 50.00% equity ratio would be an important signal of the credit supportiveness of the New York regulatory jurisdiction to the credit rating agencies. The rating agencies' assessment of regulatory framework is an important component of their rating

methodology. For example, Moody's applies a 25% weighting to regulatory framework in its rating methodology. In addition, a higher equity ratio will result in stronger credit metrics for the Company. As an example, Moody's is most focused on the Company's CFO pre-WC to total debt ratio. In Moody's most recent write-up on its downgrade of Con Edison (Exhibit__(YS-11)), the agency listed "CFO pre-WC to debt declining consistently below 17%" as one factor that could lead to an additional downgrade of the Company's credit rating. In the same report Moody's calculated the Company's most recent CFO pre-WC to debt ratio (as of September 30, 2018) at 16.4%, which is below Moody's threshold for an additional downgrade. The chart below estimates the potential improvement to the Company's CFO pre-WC to debt ratio (as of September 30, 2018) based on Moody's methodology, assuming a 50.00% equity ratio instead of 48.00%.

	Last 12 Months Ending 9/30/18	Adjustment for 50% Equity Ratio	LTM 2018 with 50% Equity Ratio
CECONY Electric Ratebase	$19,588		$19,588
CECONY Gas Ratebase	5,342		5,342
Total Electric & Gas Ratebase	$24,930		$24,930
Allowed Return on Equity	9.00%		9.00%
Allowed Equity Ratio	48.00%	50.00%	50.00%
Moody's Credit Ratio			
Cash Flows from Operations (pre-working capital)	$2,711	$45	$2,756
Total Debt	16,554	(499)	16,055
CFO pre-WC / Debt	**16.4%**		**17.2%**

Increasing the Company current 48.00% equity ratio by 2.00% to 50.00% is estimated to improve the Company's CFO pre-WC to debt ratio by approximately 80 bps and put the ratio above Moody's downgrade threshold. Given the Company's already weak credit metrics, an 80 bps improvement can mean the difference between the Company maintaining its current rating as compared to a further downgrade.

Q. Has the Company prepared a required rate of return exhibit?

A. Yes. The document entitled "CONSOLIDATED EDISON COMPANY OF NEW YORK –– RATE OF RETURN REQUIRED FOR THE RATE YEAR –– THIRTEEN MONTH AVERAGE ENDING DECEMBER 31, 2020," is set forth as Exhibit__(AP-5), Schedule 2.

Q. Please describe any projected changes in Con Edison's long-term debt and how such changes have been incorporated into the required rate of return for the Rate Year (*i.e.*, January 1, 2020 through December 31, 2020).

A. The Company has issued and expects to issue the following debentures:

- During the linking period (*i.e.*, October 1, 2018 through December 31, 2019): $1,100 million of Debentures, Series D 2018, 4.600% to be issued November 2018, due November 2048, $600 million of Debentures, Series A 2019, 5.000% to be issued March 2019, due March 2049 and $600 million of Debentures, Series B 2019, 5.000% to be issued September 2019, due September 2049.
- During the Rate Year: $750 million of Debentures, Series A 2020, 5.450% to be issued March 2020, due March 2050 and $650 million of Debentures, Series B 2020, 5.450% to be issued September 2020, due September 2050.

Q. Please describe how you developed the cost of long-term debt.

A. Exhibit__(AP-5), Schedules 5 and 6, present the detailed calculation of the cost of the long-term debt at September 30, 2018 and for the thirteen-month average ending December 31, 2020, respectively. These schedules detail each issue of long-term debt outstanding and calculate an effective annual cost for each issue, taking into consideration the original net proceeds to the Company and annual interest costs. The sum of the effective annual cost for all issues is divided by the gross amount of debt outstanding to derive the weighted average cost of long-term debt.

Q. Did you provide the interest rate forecasts used as a basis for the cost of debt in this exhibit?

A. Yes.

Q. What method have you used to develop the interest rate forecasts?

A. The Company has used forecasts of Treasury bond rates from the publication *Blue Chip Financial Forecasts*, plus a spread to Treasury bond rates based on indicative quotes from financial institutions. The *Blue Chip Financial Forecasts* consist of the consensus forecast of approximately 45 economists. This approach provides more reasonable forecast results than simply using the most

current Treasury bond rates. At the update stage of this proceeding, the Company will revise Exhibit__ (AP-5), Schedule 6, to reflect the most recent data available, as well as any new or refinanced debt that the Company may have issued by that time.

Q. Do you believe that current Treasury rates provide the best estimate of future long-term interest rates?

A. No. The position of Staff in recent base rate proceeedings that current rates are the best estimate of future long-term interest rates relies on a single academic paper that the Company believes is not relevant.

Q. Can you explain the flaw in Staff's position?

A. Yes. In the direct testimony of the Staff Capital Stucture Panel (pp. 55-56) submitted in recent Orange and Rockland Utilities, Inc. electric and gas base rate cases (*i.e.*, Case 18-E-0067 & 18-G-0068), Staff states that:

> …relatively short-term movements in long-term interest rates are difficult to forecast. Such forecasts are not only poor predictors of the magnitude of the expected change in interest rates, they are not even reliable with respect to the direction of the change. Instead, the best estimate of future long-term interest rates is no-change; in

other words, the current rates of these debt instruments.

Q. Does Staff offer any evidence to support their position?

A. Yes. Staff references a study titled, “On Forecasting Long-Term Interest Rates: Is the Success of the No-Change Prediction Surprising?”, by Dr. James E. Pesando in the Journal of Finance, September 1980. This study relies upon research entitled *Econometric Models and Current Interest Rates: How Well do They Predict Future Rates,* from J. Walter Elliott and Jerome R. Baier published in 1979. The Company believes that both papers are not relevant to the discussion of forecasted interest rates in this rate case. Pesando and Elliot/Baier argue that short-term movements in long-term interest rates are not “forecastable.” Their analyses determined that current long-term interest rates (*i.e.*, a no-change prediction) outperformed “unconditional predictions” in forecasting long-term interest rates one month forward. But Pesando cautioned that when a longer forecasting timeframe was used, the outperformance of the no-change prediction no longer held. When Pesando looked over a one-year forward period, the results were very different. In his research, Pesando notes the following when comparing the

results from the one-month study to the one-year study:

> These figures highlight the fact that it is short-run movements in long-term rates which are not likely to be "forecastable" under the joint hypothesis of market efficiency and a time-invariant term premium.

The Company is setting the cost of debt rates anywhere from three months to three years forward and therefore this timeframe is not consistent with the Pesando and Elliot/Baier research.

Q. What is a better method than using current rates to forecast rates?

A. A forward looking measure of rates is a better forecasting method. Examples of forward looking measures are the forward rate curve or a consensus of economists' estimates contained in the *Blue Chip Financial Forecasts*. The forward rate is the rate you can lock in today to borrow in the future and can be interpreted as the market's consensus forecast of interest rates. A consensus forecast of Treasury rates, such as that produced by Blue Chip Financial, provides a more reasonable estimate rather than simply relying on current rates. Adopting a forward looking measure is essential

in the current rising interest rate environment.

Q. Do you have a recommendation for the treatment of the Company's variable rate debt?

A. Yes. I recommend the continuation of the true-up of interest costs for the Company's variable rate debt, that the Commission authorized in the Company's last electric and gas base rate cases (Cases 16-E-0060 and 16-G-0061).

Q. What would be included in the true-up?

A. The true-up would include the difference between the rates actually prevailing during the Rate Year and the interest costs set for the variable rate debt in this case. The true-up would also be applied to credit support costs such as letters of credit associated with such debt. In addition, existing long-term debt has associated unamortized issuance costs (representing underwriting fees and other costs from the time of issuance) which should also be included in the true-up. Furthermore, if the Company decides to refinance any variable rate debt, the actual cost of the replacement debt issues (including issuance costs and any credit support) and the new interest rate would be trued-up as well.

Q. What stand-alone capital structure for the Company results from the calculations that you described?

A. Exhibit__ (AP-5), Schedule 2, shows the forecasted capital structure for the thirteen months ending December 31, 2020 of 50.34% long-term debt, 1.14% of customer deposits, and 48.53% common stock equity. The Company has no preferred stock outstanding.

Q. Does Exhibit__ (AP-5) also show the forecasted capital structure, based on a thirteen-month average, for the twelve months ending December 31, 2021 and December 31, 2022, respectively?

A. Yes. Schedules 3 and 4 of Exhibit__ (AP-5) show the capital structure for those periods. These schedules show that the debt ratio would decrease slightly to 50.29% of the Company’s capital structure in 2021 and then increase slightly to 50.33% in 2022. These schedules also show that the customer deposit ratio would decrease modestly to 1.08% in 2021 and 1.04% in 2022. The equity ratio would increase to 48.63% and remain unchanged at 48.63% for the twelve-month periods ending December 2021 and 2022, respectively.

Q. What return on equity is the Company proposing be used for purposes of developing a revenue requirement in these filings?

A. For the reasons discussed in the direct testimony of the Company's Accounting Panel, the Company proposes a 9.75% return on equity ("ROE") be used. The Company is proposing a ROE that is slightly lower than what Company witness Villadsen is recommending in order to minimize the controversial issues in this proceeding and facilitate reaching a multi-year rate plan through settlement.

Q. What overall rate of return is the Company proposing in these proceedings?

A. Using the Company's proposed capital structure, cost of long-term debt and return on equity, the overall rate of return is 7.29% as shown on Exhibit__ (AP-5), Schedule 2.

III. CAPITAL NEEDS AND INVESTOR CONCERNS

Q. Please describe the financial challenges facing the Company during the Rate Year and beyond.

A. The Company faces the following interrelated financial challenges: (A) the capital intensive nature of its business, (B) flat to declining demand growth for electricity, (C) its unusually weak cash flows, (D) the restrictions that regulation places on its ability to respond to unfavorable developments in its environment,

and (E) its dependence on the market to fund its capital needs.

Q. Please discuss the capital intensive nature of the Company's business.

A. The Company's business requires significant capital investment every year, its assets are long-lived and the underlying technology, facilities and customer base are mature.

Capital intensity is high for utilities. According to a June 2, 2011, IHS Cambridge Energy Research Associates presentation titled *Post Fukushima: If not nuclear, what energy mix?*, the electric utility industry is the most capital intensive industry as measured by the ratio of total assets to total revenues. As shown on Exhibit___ (YS-12), which was prepared under my supervision and direction, the Company's capital intensity can be demonstrated by the fact that its ratio of net fixed assets per dollar of revenues is 3.2, as compared with 0.9 for the average S&P 500 company and 0.2 for the median company. Capital intensity amplifies risk for investors because capital intensive businesses have to recover much larger fixed costs (interest and depreciation) before achieving a return on their

investment. The Company's assets also have extraordinarily long lives. Long-lived assets, in the context of rate regulation, present two financial challenges for the Company that are also risks for potential investors in the Company's debt issuances and equity shares. First, their investment horizons for capital recovery must be much longer. For debt investors, utility debt has much longer average maturities than other companies. Equity investors must also wait longer for repayment on their investment. Second, there is a regulatory risk in long-lived assets because United States rate regulation limits returns to a fraction of historic tangible book value rather than replacement or current market value. The Company's depreciation recoveries, which reflect historic tangible net book values, are small relative to its current capital costs, returning only 40% of its capital expenditures in the form of depreciation for the twelve months ended December 31, 2017.

Due to the long depreciation lives established in rates, this dynamic is likely to continue for many years. As shown on Exhibit___ (YS-13), which was prepared under my supervision and direction, by way of comparison, the

average S&P 500 company recovered 152% of its capital expenditures through depreciation and amortization. This would have placed Con Edison near the bottom 10% of companies in the S&P 500 that had meaningful recovery rates. CEI (which had a 36% capital expenditure recovery rate) had the six-lowest recovery rate among the 27 utilities in the S&P 500 with reported results as shown on Exhibit___ (YS-14), which was prepared under my supervision and direction. This would have placed Con Edison in the bottom half among the 27 utilities in the S&P 500 with reported results. The average recovery rate for the utility companies in the S&P 500 was 48%.

The Company’s large installed base of mature equipment requires a continuous investment in replacement assets. In other industries, a much larger portion of investment can be dedicated to new business (generating offsetting revenues) or new technology (lowering costs).

Mature assets raise operating costs and increase operating risks, particularly in an environment that requires the highest level of reliability and imposes regulatory penalties for failing to achieve it. The technology of the business is also mature, affording little opportunity to significantly reduce invested

capital in the business through technological innovation. The need for continuous investment to maintain and improve the system with slight opportunities for demand growth and limited depreciation cash flow means that the Company must seek rate increases and raise new capital frequently to maintain its operations. Replacement capital needs alone substantially exceed the cash generated through depreciation recoveries for the Company.

Q. Please describe how flat to declining demand growth for electricity presents a financial challenge.

A. The Company's total retail electric sales volume has decreased by an average annual rate of 0.64% over the last five years (2013-2017). Flat to declining demand growth for electricity, coupled with the capital intensive nature of the business, puts upward pressure on the unit cost of electricity as the recovery of capital is spread over a smaller base.

Q. Please describe how the Company's weak cash flows present a financial challenge.

A. Because the Company will continue to be challenged by its weak operating cash flows and lack of positive free cash flows, Con Edison will continue to be more dependent on

external funding.

Q. Have you prepared an exhibit to show this?

A. Yes, please refer to Exhibit___ (YS-15), which was prepared under my supervision and direction.

Q. Have any of credit rating agencies commented on the Company's weak cash flows?

A. Yes. In addition to Moody's commentary discussed above, S&P commented on the Company's weak cash flows in a October 19, 2018 report (see Exhibit__ (YS-16)):

> …we expect FFO ["funds from operations"] to debt to average about 16% through 2020, down from about 19% in 2017. The company's weaker financial measures primarily reflect its elevated capital spending program, and the effects of U.S. tax reform.

Fitch, in a October 24, 2018 report (Exhibit__ (YS-17)), also mentioned the Company's FFO leverage metrics provide little headroom at current rating levels.

Q. Please describe how restrictions on the Company's business imposed by the Commission present a financial challenge.

A. The Company is subject to various regulatory restrictions that limit its ability to react to unfavorable circumstances. For example, the Company must provide

service as requested, even if doing so entails significant investment upon unfavorable terms. It also is limited in its ability to reach beyond its franchise area to serve attractive new customers. The Company's assets are immovable; unlike those of most companies they cannot be used in a different location or business, their usefulness and profitability are tied to providing utility service in its New York service territory. Unlike non-utility companies, Con Edison has a limited ability to retain the advantages of its efforts to improve its efficiency and thus lower its costs of doing business for the benefit of its equity investors. The Commission routinely requires earnings sharing mechanisms, which serve to limit earnings opportunities, as a component of base rate case settlements. Moreover, any additional efficiencies achieved by management are fully allocated to customers each time rates are reset, given the capital recovery and cash flow parameters of historic cost-of-service rate making.

Q. Please describe how the fact that the Company must continually raise capital increases risk for existing and prospective investors.

A. As mentioned earlier in my direct testimony, the Company

must approach the markets for additional new debt capital on a frequent and recurring basis. Con Edison is forecasted to raise $1,200 million in 2019, $1,400 million in 2020, $1,790 million in 2021 and $1,200 million in 2022. The Company will need the assurances of positive cash flows and favorable regulatory support to continue to market this debt at reasonable rates. Each time Con Edison markets its debt securities, investors will assess the risks they would bear if they invested in the Company in light of the challenges identified above. Their assessment of these risks is, and will be, priced into the cost of debt each time the Company seeks new capital in the years ahead. To the extent that analysis of risk leads the market to reduce stock prices or raise interest rates, the existing investors are disadvantaged and other potential investors are made more wary. Through this cycle of investors assessing and pricing risks that the Company faces, customers are negatively impacted through increases in the cost of financing the Company’s capital investment needs. To raise this capital at a reasonable cost, the Company must remain an attractive investment to both debt and equity investors. To remain attractive to these

investors, Con Edison must receive fair and reasonable treatment from its regulators.

Q. How much and what type of debt does the Company have outstanding?

A. As of September 30, 2018 Con Edison had $13,662 million of long-term debt. The Company also had letters of credit outstanding in an amount of $178 million. Letters of credit represent an additional capital need which must be met, requiring the Company to compete for scarce funds in a highly regulated bank market.

Q. Who owns the Company's debt?

A. Investment managers, insurance companies, pension plans, hedge funds, banks, trust companies and individuals.

Q. How do bond investors evaluate Con Edison?

A. For most investors, the credit ratings assigned by the nationally recognized statistical rating organizations (*i.e.*, Moody's, S&P and Fitch) are the threshold basis for evaluating individual corporate credits such as those offered by the Company.

Q. What are the current ratings on Company debt?

A. The long-term, senior unsecured debt ratings are A3, A-, and A- by Moody's, S&P, and Fitch, respectively. The short-term debt is rated P-2, A-2, and F2, respectively.

All ratings have a stable outlook.

Q. Are bond ratings the correct indicator of the risks to shareholders?

A. No. The priority of bondholders' claim on the Company means that shareholders are subject to a higher level of risk. Shareholders, unlike bondholders, only have a residual claim to the resources and income of the Company, and thus face risks even in well-rated companies. If returns are inadequate, the bondholder may suffer a loss from a credit downgrade. The stockholder will suffer the loss directly through a drop in the share price and/or through a lower dividend.

Q. Why do companies such as Con Edison need to maintain a particularly strong financial condition?

A. Capital intensive companies with a duty to serve have to borrow in spite of the state of the market and need continuous access to capital. In addition, utilities may have to access the capital market in response to a natural catastrophe (*e.g.*, Superstorm Sandy). When utilities are forced to pay high rates, these rates will remain with the companies and their customers for as long as 30 years. On the short-end of the maturity spectrum, access to commercial paper and bank borrowing markets is

key to allowing the Company to pay for energy that must be delivered, no matter the price. Only A-1/P-1 borrowers can maintain that status in all markets, a status that has become more tenuous for Con Edison due to its current A-2/P-2 (S&P's/ Moody's) rating for commercial paper. At the height of the financial crisis of 2008-2009, non-A-1/P-1 borrowers, if they had access to commercial paper market, paid significantly higher rates.

The seizing up of the commercial paper market at that time was relieved only by the Federal government's extraordinary decision to provide an effective backstop for the highest-rated (A-1/P-1) commercial paper issuers, a solution that may not always be available, and may not extend to lower quality issuers such as Con Edison.

If the Company were to lose access to the commercial paper market, borrowing costs would increase as the Company would have to rely more upon long-term debt, which is more expensive. In addition, the Company could be forced to issue debt with less attractive terms because it lacked the flexibility to wait for better market conditions. The recent past has demonstrated the importance of maintaining a strong credit rating and

investor confidence in our credit.

Q. Please explain why maintaining its current debt ratings is important for Con Edison.

A. The Company has a significant continuing construction program that must be funded in large part by debt financing. Access to credit markets will be restrictive for lower quality creditors. In addition, a part of the Company's financing program is comprised of short-term borrowing through its commercial paper program. Such borrowing is highly sensitive to credit quality and credit market conditions.

Q. Who owns the Company?

A. Con Edison has one shareholder, Consolidated Edison, Inc. ("CEI"). CEI, in turn, is owned by approximately 43,000 registered shareholders. Registered shareholders are the individuals or businesses whose names are listed on the shareholder register of CEI.

Q. What are the characteristics of the registered shareholders?

A. CEI's registered shareholders consist of individuals and institutional investors. Institutional investors often own shares for the benefit of others. These investors purchase CEI shares for the benefit of their investors

who, in turn, may be pension funds or other individual investors. Since pension funds exist for the benefit of the individual participants in their plans, it makes sense to think of the ultimate beneficiaries of share ownership in CEI, and derivatively in the Company, of being millions of individuals who may own shares directly, invest in U.S. stock mutual funds, or receive or expect benefits from pension plans or life insurance policies.

Q. What do the people who own CEI shares, either directly or indirectly, provide to the Company?

A. They provide the capital that the Company needs above and beyond what debt investors provide. Their capital allows the Company to provide safe, reliable energy utility service to the Company’s customers. Without these shareholders, the Company’s customers would have to pay currently for all of the costs of the services they receive. For example, without these shareholders, customers would have to pay for a new substation as it is constructed rather thanover the subsequent decades during which they benefit from its operation.

Q. What do these equity investors expect in return?

A. They expect compensation either in the form of a periodic dividend payment or an increase in the value of the business, or both.

Q. How do equity investors in regulated utilities set their expectations for compensation?

A. The return expectations of equity investors in rate-regulated energy utilities are grounded in "the regulatory compact." The regulatory compact's essence is that equity investors forgo the monopoly earnings they would otherwise enjoy in return for the institutionalization of their monopoly in a defined geographic area and a fair and equitable return on the capital they have invested.

Q. What standards exist to help equity investors and regulators determine whether a rate-regulated utility offers a fair and equitable return?

A. The general standards for a fair and equitable return for investors in utility shares are well-established in the United States. The underlying requirement for fair treatment for equity investors has been recognized for years. As discussed in the direct testimony of Company witness Villadsen, it dates back to the *Hope* and *Bluefield* cases. The

United States Supreme Court in those cases established that in determining the fairness or reasonableness of a utility's allowed ROE, one needed to look at the consistency of a utility's allowed ROE with the returns on equity investments in other businesses having similar or comparable risks.

Q. How would a potential equity investor evaluate the return limitations on New York utilities as to their magnitude, timing and probability?

A. There are four significant factors in an equity investor's assessment of New York utility regulation: (1) headline rate of return on equity, (2) the likelihood of earning that return, (3) the symmetry of potential earned equity returns, and (4) the restrictions the regulator places on the scope of the business. To make this assessment, a potential equity investor will start with the basic parameters of the Commission's rate orders.

Q. How do the Commission's rate orders influence investors' evaluation of the first identified return consideration?

A. The first factor, the headline rate of return on equity, is important for an equity investor because it provides the most visible indication in the rate order of the

regulator's willingness to balance the needs of investors and customers.

Q. How have the Commission's authorized returns compared to those in other jurisdictions?

A. As we demonstrate in this case and have demonstrated in previous rate cases, the rates of allowed return granted in New York are well below those in other states. I have provided a comparison of allowed returns in New York as compared with other states (based on data from Regulatory Research Associates ("RRA")) to demonstrate the consistency of this practice (Exhibit___ (YS-18), which was prepared under my supervision and direction).

In past cases, Staff has argued that each of the rate cases in the RRA database is unique and, therefore, no meaningful conclusion can be drawn. While I would agree that each rate case is unique, it is equally obvious that the differences in the authorizations cannot always be such that New York companies should consistently be among the lowest returns in the country.

Q. Staff has pointed to the various regulatory recovery mechanisms authorized by the Commission as a justification for the low authorized ROEs granted to New York State utilities. Do you agree with Staff's

position?

A. No, I do not. The regulatory recovery mechanisms that New York State provides are not distinctive among the U.S. regulatory jurisdictions. As set forth in Exhibit___ (YS-19), which was prepared under my supervision and direction, many of the mechanisms put in place by the Commission are currently in use in other jurisdictions. Accordingly, the Company does not believe that these mechanisms compensate for the low ROEs consistently granted by the Commission.

Q. Can investors readily measure the degree to which a regulatory regime fairly rewards shareholders?

A. In New York, yes. The Commission has a clear and long-standing policy of setting returns relative to the historic tangible book value of the investors' shares. Information about returns on share book values for publicly-traded United States companies is readily available to investors from public sources as a basis for comparison.

Q. How does Con Edison compare to this universe of alternative investments?

A. Con Edison does not fare well in the comparison. When looking at the five-year historical average return on

book equity, the Company had a return that would have placed it near the bottom fifth of S&P companies with meaningful available data. The median return on equity for the S&P 500 index was 15.8%. The comparable return on book equity for Con Edison was 9.2%.

Q. Have you prepared an exhibit to show this?

A. Yes, please refer to Exhibit___ (YS-20), which was prepared under my supervision and direction.

Q. Are companies typically valued by investors at their book value?

A. No, they are valued by investors based on their future business prospects. Exhibit___ (YS-21), which was prepared under my supervision and direction, shows the five-year average market to book ratios for those S&P companies with positive book equity. CEI's market to book ratio is in the bottom 12% of this universe for this important measure of investor perceptions and expectations, even after the financial crisis which severely affected the financial sector and other industries.

Q. How would an investor assess the second factor: the likelihood of a utility actually earning the headline equity return?

A. The investor would analyze the adjustments made to actual costs that are allowed to be recovered, imputed productivity that may or may not be achieved, and any other revenue or expense adjustments. To the extent that such adjustments are made to real costs, the headline rate of return is unlikely to be achieved.

Q. How would an investor assess the third factor: the symmetry of potential returns?

A. There is ample opportunity through a system where potential negative revenue adjustments are far larger than potential positive incentives, as well one-way true-ups of costs--burdens which have been imposed in New York rate decisions--to realize significantly lower returns than the headline authorized return. All of these aspects of New York rate orders produce asymmetry in expected returns, which a rational potential equity investor would judge as ultimately reducing his or her expected return. Little evidence exists that these burdens are common in other jurisdictions in the country, where the peers that are the basis for the Commission's DCF and CAPM results operate.

Q. How would an investor assess the fourth factor: the restrictions the regulator places on the scope of the business?

A. The adverse impact of the last factor is less quantifiable because it consists of opportunities foreclosed to the Company and thus to the investor. Restrictions on investments in generation in New York, and the punitive indirect restrictions on affiliate company capitalization, reduce the value of the Company to its owners, but in ways that are difficult to quantify explicity.

Q. Have the shortcomings in the treatment of the Company been reflected in equity analysts' views of the CEI?

A. Yes. As of January 14, 2019, CEI ranked as 499th of the 505 companies in the S&P 500 in terms of analyst buy/sell rankings (see Exhibit___ (YS-22), which was prepared under my superivision and direction).

IV. CONCLUSION

Q. Please summarize your testimony regarding the financial challenges facing the Company.

A. My testimony concerns the financial challenges and the need to maintain access to financial markets at

reasonable cost. Both equity and debt investors perceive that the New York regulatory environment is a difficult one in which to operate. Such a perception, if it continues, will make the financing of needed expenditures more expensive in normal times and less certain in times of financial crises.

To avoid such an outcome, and to re-establish debt and equity investors' trust in the fairness of New York regulation, a fair and equitable rate of return, competitive with those available elsewhere in the market, and a reasonable chance to actually earn that return, are needed. And to achieve such, the Commission should grant the rate of return and capital structure requested by the Company.

Q. Does that conclude your direct testimony?

A. Yes, it does.

BEFORE THE
STATE OF NEW YORK PUBLIC SERVICE COMMISSION

CASE 19-E-[xxxx]	)	Proceeding on Motion of the Commission as
	)	to the Rates, Charges, Rules and Regulations
	)	of Consolidated Edison Company of New
	)	York, Inc. for Electric Service.
	)	
CASE 19-G-[xxxx]	)	
	)	Proceeding on Motion of the Commission as
	)	to the Rates, Charges, Rules and Regulations
	)	of Consolidated Edison Company of New
	)	York, Inc. for Gas Service.

DIRECT TESTIMONY OF BENTE VILLADSEN

January 25, 2019

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DIRECT TESTIMONY OF BENTE VILLADSEN

I. INTRODUCTION AND PURPOSE

Q1. Please state your name, occupation and business address.

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. Please summarize your professional qualifications.

A2. I have 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 have testified or filed expert reports on cost of capital in Alaska, Arizona, California, Illinois, New Mexico, Oregon, and Washington, as well as before the Bonneville Power Administration, the Surface Transportation Board, the Alberta Utilities 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 as well as to European and Australian regulators on cost of capital. I have testified or filed testimony on regulatory accounting issues before the Federal Energy Regulatory Commission ("FERC"), the Regulatory Commission of Alaska, the Michigan Public Service Commission, the Texas Public Utility 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. Exhibit__(BV-1) contains more information on my professional qualifications as well as a list of my prior testimonies.

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

A3. I have been asked by Consolidated Edison Company of New York, Inc. ("Con Edison" or the "Company") to estimate the cost of equity that the State of New York Public Service Commission ("NY PSC" or the "Commission") should allow the Company an opportunity to earn on the equity financed portion of its regulated (gas and electric) utility rate base. Specifically, I perform cost of equity analysis and provide return on equity ("ROE") estimates derived from market data for a proxy group of regulated electric utility companies, and provide additional estimates based on an analysis of allowed utility risk premiums. I also evaluate the business risk characteristics of Con Edison and consider the Company's requested regulatory capital structure to be applied for ratemaking purposes.

II. SUMMARY OF CONCLUSIONS

Q4. Please summarize your findings and recommendation.

A4. I recommend that Con Edison be allowed to earn a 10.00 percent rate of return on the equity portion of its regulated rate base. This recommendation is based on my implementations of standard cost of capital estimation models including two versions each of the Discounted Cash Flow ("DCF") model and Capital Asset Pricing Model ("CAPM"), as well as an implied risk premium analysis, along with an analysis of Con Edison's risks. Figure 1 and Figure 2 below summarize the model results and the corresponding reasonable ranges that are presented and discussed in Section V below. Based on my consideration of the model results in the context of Con Edison's specific business risk characteristics and financial circumstances and of current capital market conditions, I believe it is appropriate to place Con Edison's allowed return at 10.00

percent, which is in the upper half of the overall 9.25 - 10.25 percent range of reasonable cost of equity estimates suggested by my analysis.

Figure 1
Summary of Results

Model		Estimate
CAPM	[a]	8.9% - 9.3%
ECAPM (α = 1.5%)	[b]	9.4% - 10.0%
Single-Stage DCF	[c]	10.4%
Multi-Stage DCF	[d]	8.8%
Implied Risk Premium	[e]	9.8% - 10.4%

Notes:
Estimates as of 11/30/2018.
[a], [b]: Long-term risk free rate of 4.1%, Long-term market risk premium of 7.07%.
[d]: Long-run nominal GDP growth estimate of 4.1%.
[e]: Estimated using rate case data from SNL and treasury data from Bloomberg.

Figure 2
Summary of Reasonable Ranges of Estimates

Model		Estimate
CAPM/ECAPM	[a]	9.25% - 10%
DCF Models	[b]	9.25% - 10.25%
Implied Risk Premium	[c]	9.75% - 10.5%

Q5. How is the remainder of your testimony organized?

A5. 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. Finally, Section VI discusses Con Edison's business risk characteristics and other company specific circumstances relevant to my recommended allowed ROE for the Company within the reasonable ranges of cost of equity estimates.

III. COST OF CAPITAL PRINCIPLES AND APPROACH

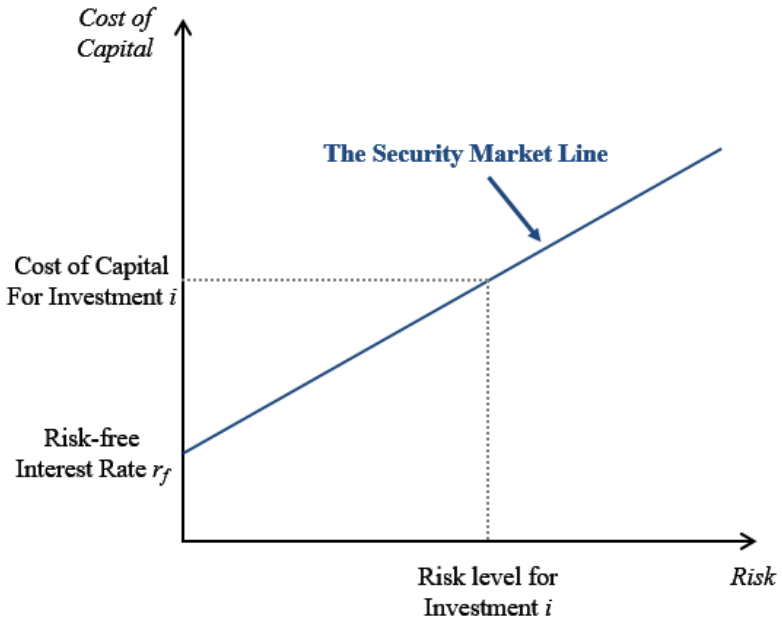
A. RISK AND THE COST OF CAPITAL

Q6. How is the "Cost of Capital" defined?

A6. The cost of capital is defined as the expected rate of return in capital markets on alternative investments of equivalent risk. In other words, it is the rate of return 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 3 below. The higher the risk, the higher the cost of capital required.

Figure 3
The Security Market Line



Q7. What factors contribute to systematic risk for an equity investment?

A7. 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% for a 1% 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.

Q8. What are the guiding standards that define a just and reasonable allowed rate of return on rate-regulated utility investments?

A8. The seminal guidance on this topic was provided by the U.S. Supreme Court in the *Hope* and *Bluefield* cases,[1] which found that:

- The return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks;[2]
- The return should be reasonably sufficient to assure confidence in the financial soundness of the utility; and
- 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.[3]

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[1] 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").

[2] Hope, 320 U.S. at 603.

[3] Bluefield, 262 U.S. at 680.

Q9. How does the standard for just and reasonable rate of return relate to the cost of capital?

A9. 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.[4] The cost of capital is the rate of return investors can expect to earn in capital markets on alternative investments of equivalent risk.[5]

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. If the allowed return on the utility investment is not at least as high as the expected return offered by alternative investments of equivalent risk, investors will choose these alternatives instead, and the utility's ability to raise capital and adequately fund its operations will be adversely impacted or even prevented. This is a fundamental concept in cost of capital proceedings for regulated utilities such as Con Edison.

Q10. Please summarize how you considered risk when estimating the cost of capital.

A10. To evaluate comparable business risk, I looked to a proxy group of regulated electric utilities. Further, (as explained in Section III.B 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 Con Edison for ratemaking purposes. To determine where in the estimated range Con Edison's ROE reasonably falls, I compared the business risk of Con Edison to that of the proxy group companies, and also considered recent capital markets developments.

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

[5] 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).

B. FINANCIAL RISK AND THE COST OF EQUITY

Q11. How does capital structure affect the cost of equity?

A11. Debt holders 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 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.

Q12. How do differences in financial leverage affect the estimation of the cost of equity?

A12. The CAPM and DCF model 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 allowed ROE is applied to Con Edison's rate base, which will be financed with a different portion of debt than the proxy companies. 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 Con Edison's required return on equity.

Differences in financial risk due to the different degree of financial leverage in Con Edison'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 to determining Con Edison'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 Con Edison at its different regulatory capital structure.

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 Con Edison's rate base than is experienced by equity investors in the market-traded stock of the less leveraged proxy companies.

Q13. How specifically do you take financial risk into account in your analysis of the cost of equity using market data for the proxy group companies?

A13. There are several manners in which the impact of financial risk can be taken into account in an analysis of cost of equity using market-based models such as the DCF and CAPM. One way is to determine the after-tax weighted-average cost of capital for the proxy group using the equity and debt percentages as the weight assigned to the cost of equity and debt. If this figure is constant between the estimate obtained for the proxy group and the entity to which it is applied—in this case the capital structure used in the rate of return calculation—then the ROE that is required for the regulated entity can be determined. This approach assumes that the after-tax weighted average cost of capital 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, who estimated the cost of equity using the CAPM and made comparisons between companies with different capital structure using beta. Specifically, in 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___(BV-2) I set forth additional technical details related to methods to account for financial risk when estimating the cost of capital.

Q14. Can you provide a numerical illustration of how the cost of equity changes, all else equal, when the degree of financial leverage changes?

A14. Yes. I constructed a simple example below, where only the financial leverage of a company varies. I assumed the return on equity is 11.00 percent at a 50 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 4
Illustration of Impact of Financial Risk on ROE

		Company A (50% Equity)	Company B (45% Equity)
Rate Base	[a]	$1,000	$1,000
Equity	[b]	$500	$450
Debt	[c]	$500	$550
Total Cost of Capital (8%)	[d] = [a] × 8%	$80.0	$80.0
Cost of Debt (5%)	[e] = [c] × 5%	$25.0	$27.5
Equity Return	[f] = [d] - [e]	$55.0	$52.5
Rate of Return on Equity (ROE)	**[g] = [f] / [b]**	**11.00%**	**11.67%**

Figure 4, above, illustrates how financial risk affects returns and the ROE. The overall return remains the same for Company A and B at $80. But 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 financial leverage.

The principle illustrated in Figure 4 is exemplary of the adjustments I performed to account for differences in financial risk when conducting estimates of the cost of equity applicable to Con Edison.

C. APPROACH TO ESTIMATING THE COST OF EQUITY

Q15. Please describe your approach for determining the cost of equity for Con Edison.

A15. 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 Con Edison focuses on measuring the expected returns required by investors to invest in companies that face business and financial risks comparable to those faced by Con Edison. Because certain of the 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 consisting of publicly traded companies. The proxy group consists of companies providing primarily regulated electricity services.[6] With this proxy group, I derive estimates of the representative cost of equity according to standard financial models including two versions of the CAPM—the traditional version and an empirically-adjusted version—and single- and multi-stage versions of the DCF.

I also perform an analysis of historical allowed ROEs for electric utilities in relation to prevailing risk-free interest rates at the time, 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 informs my recommendation and serves as a check on the reasonableness of my market-based results.

Q16. How do your approach and the models you employ compare to those traditionally employed by the Staff of the New York Department of Public Service ("Staff")?

A16. As exemplified in the Commission's most recent order regarding the Company's ROE[7] and in the testimony of Staff witnesses,[8] the Commission's Generic Finance Methodology is broadly similar to, but also has important differences from, my approach.

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[6] Consistent with past precedent in Con Edison's rate cases, I use a proxy group of electric utilities to calculate the recommend ROE for both Con Edison's electric and gas regulated operations.

[7] Order Approving Electric and Gas Rate Plans (Case 16-E-0060, 16-G-0061, and 16-E-0196), January 25, 2017 ("2017 Order"), p. 28.

[8] Direct Testimony of Staff Finance Panel in Cases 16-E-0060 and 16-G-0061, p. 63.

The market-based DCF and CAPM estimation techniques I rely on align with the Commission's historical reliance on both DCF and CAPM results to inform its allowed ROE determinations. Of note, Staff has consistently implemented a "zero-beta" version of the CAPM,[9] which is conceptually and methodologically aligned with the version of the empirical CAPM (*i.e.*, ECAPM) that I implement.

While Staff and I both derive estimates from the DCF and CAPM, there are differences in how we select inputs to implement the models. For example, Staff's approach to the DCF attempts to infer a "sustainable growth" rate based on Value Line forecasts of return on book equity and retention ratio, whereas I implement both single- and multi-stage DCF models based directly on forecasts (including by Value Line) of growth in earnings available for distribution to investors. As discussed further below, I believe considering the results of both single and multi-stage models is appropriate in light of current market conditions and their impact on dividend yields.

Similarly, for the CAPM, Staff typically relies on current Treasury yields for the risk-free rate, whereas I look at forecasts of the Treasury yield in an attempt to capture investor expectations for the risk-free rate of return during the period rates set in this proceeding will be in effect. While currently prevailing yields are somewhat lower than the forecasted yield I use, the reverse is true of the market risk premium ("MRP") estimates traditionally relied on by Staff, which are significantly higher than the estimate I employ, which (as discussed below) is supported by both historical and forward-looking evidence.

Importantly, as discussed in Section III.B, my CAPM and DCF analyses employ standard finance techniques to adjust explicitly for differences in financial leverage between the proxy group companies and the Company's requested regulatory capital structure. The fact that Staff's typical approach does not take financial risk into account by using the standard adjustment techniques means that Staff's analysis misses an important step in

[9] Id., p. 87; see also Prepared Testimony of Staff Panel in Cases 18-E-0067 & 18-G-0068, p. 92.

estimating the opportunity cost of capital commensurate with an investment of equivalent risk.[10]

Finally, in contrast to Staff's practice, I do not believe it is appropriate to place fixed primary emphasis on one model in deriving a recommended allowed ROE. Whereas the Commission has traditionally placed 2/3 weight on the DCF and 1/3 on the CAPM, I consider the ranges of results produced by the models I employ: two versions of the CAPM, two versions of the DCF, and the implied Risk Premium method. The reason I believe it is important to consider the range is that I prefer to focus on the tendency of the data rather than a weighted average of results for two models – either of which may be affected by idiosyncratic market conditions (model risk) at any given point in time.

Q17. Why do you believe your approach to considering ranges of estimates derived from multiple versions of both the DCF and CAPM, and also relying on an implied Risk Premium analysis, is justified?

A17. There is no one perfect model for estimating the cost of equity, and the various models and estimation approaches I employ each have different strengths and sensitivities. For example, the CAPM relies on an explicit measurement of systematic risk (beta) for which the cost of equity capital must compensate investors, but this parameter must be measured using historical data,[11] and thus changes more slowly in response to changes in industry risk characteristics. Conversely, the DCF models incorporate current market prices and the most recent dividends, enabling them to capture shifts over time. However, this also makes the DCF sensitive to short-term market phenomena that may or may not be representative of the capital market conditions and required investor returns that will prevail during the time Con Edison's electric and gas rates are in effect. In contrast to both the CAPM and DCF models, the implied risk premium analysis focuses directly on

[10] I am not aware of any textbooks that do not discuss methods to account for financial risk.

[11] I note that Value Line applies an empirical adjustment (the Blume adjustment) that converts the beta derived from historical return data into a better indicator of forward-looking systematic risk (i.e., a better predictor of beta going forward).

the relationship of allowed returns for regulated utility companies to observable rates of return (*i.e.*, bond yields) reflective of contemporaneous capital market conditions.

Q18. Have other important utility regulatory bodies acknowledged the importance of relying on multiple models?

A18. Yes. Notably FERC, which regulates electric transmission operations, recently issued an order proposing to rely explicitly on four models in its determination of just and reasonable ROEs for transmission owners.[12] The FERC ROE Order represents a substantial change of FERC's historical practice of relying on only a single model—the DCF—to set allowed ROEs. In it, 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.

Q19. What reasons did FERC give for revising its approach to consider multiple models rather than only the DCF?

A19. In the FERC ROE Order, FERC stated its concern that compared to when it originally adopted the DCF model as its only focus of consideration for determining utility ROEs, "the DCF methodology may no longer singularly reflect how investors make their decisions," since "investors have increasingly used a diverse set of data sources and models to inform their investment decisions."[13] The FERC ROE Order also lays out other "difficulties with sole reliance on the DCF methodology," including that the single model's results appear at times to diverge from its underlying principles and the real world experience of capital market participants, and that the results sometimes move differently from the results of other models on which those market participants may rely to inform their investment decisions.[14] Ultimately, FERC views its proposal to rely on

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[12] See Coakley v. Bangor Hydro-Electric Co., 165 FERC ¶ 61,030 (October 2018) (referred to herein as the "FERC ROE Order"). The ROE estimation methodologies in the FERC ROE Order include versions of the DCF and CAPM, as well as the implied Risk Premium method and an Expected Earnings analysis.

[13] FERC ROE Order, paragraph 40.

[14] *Id*., paragraphs 40-45.

multiple models as a way to avoid this "model risk" and summarizes its rationale as follows.

> In relying on a broader range of record evidence to estimate [New England Transmission Owners'] cost of equity, we ensure that our chosen ROE is based on substantial evidence and bring our methodology into closer alignment with how investors inform their investment decisions.[15]

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.

Q20. Are there any potential concerns about how current capital market conditions may influence the DCF model results that may caution against giving it disproportionate weight in setting Con Edison's ROE?

A20. Yes. To the extent utility stocks are currently acting as a *relatively* less risky investment vehicle for risk-averse investors seeking returns in a time of increased volatility and still-low government bond yields, this may contribute to their price-to-earnings ratios ("PE ratios") being unrepresentatively high—and their dividend yields unrepresentatively low—compared to what investors might expect in a more normal (or normalizing) interest rate environment. If this is the case, implementing the DCF model using current market data may produce results that understate what investors' required returns will be when interest rates move higher as expected in the near future (including during the time period Con Edison's rates set during these proceedings will be in effect).

FERC addressed a similar issue in the FERC ROE Order, expressing its concern about the reliability of DCF model results in the current market environment as follows.

> Under [the premise of the DCF methodology], increases in a company's actual earnings or projected growth in earnings would ordinarily be required to justify an increase in the company's stock price. Moreover, there is no evidence that investments in the utility sector have become less risky during these periods. However, it appears that during the periods at issue in these complaint proceedings, average utility stock prices have increased by more than would be justified by any increase

[15] Id., p. 15.

> in actual utility earnings or projected growth in earnings. From October 1, 2012 through December 1, 2017, the Dow Jones Utility Average increased from about 450 to 762.59, an increase of almost 70 percent. However, utility earnings did not increase by nearly the same amount, as demonstrated in Figure 3 below, which shows the substantial increase in utilities' price to earnings (PE) ratio during the same period. Moreover, average IBES three to five year growth projections appear not to have increased during that period. Thus, there has not been an increase in either current or projected utility earnings that would justify the substantial increase in utility stock prices.[16]

FERC concluded from this discussion that recent investor behavior with respect to utility stocks appears to have diverged from the DCF model's predictions, a factor that informs FERC's decision (discussed in Section III.C) to reconsider its primary reliance on the DCF in favor of giving equal weight to four different and complementary models. Similarly, this concern informs the way I consider the results of the DCF models as well as the CAPM and Risk Premium models in selecting my recommendation.

IV. CAPITAL MARKET CONDITIONS AND THE COST OF CAPITAL

Q21. Why do you discuss capital market conditions in testimony aimed at determining Con Edison's ROE?

A21. This section discusses important market conditions that affect the inputs to the cost of equity models. Because the risk-free rate is an input to the CAPM, recent and expected developments in risk-free government interest rates are important to assess the validity of any measure of the risk-free rate. Similarly, the MRP is an input to the CAPM, so factors that affect the MRP (*e.g.*, volatility and changes in investors risk perception) are vital for an accurate determination of the ROE.

As to DCF model inputs, developments in the economy in general affect growth rates and utility stock prices. Consequently, the capital market developments impact the growth rates, dividend yield, and general assessment of the estimates' reasonableness.

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[16] FERC ROE Order, paragraph 45 (citations omitted).

Finally, the Tax Cuts and Jobs Act of 2017 ("TCJA") affected utilities differently than other companies in that tax reductions generally flow to customers and, consequently, impacts the utility's credit metrics and earnings volatility. As a result, it is necessary that the allowed ROE and appropriate equity capital structure ratio for Con Edison fulfill the requirements set forth by *Hope* and *Bluefield* once the implications of the TCJA are considered.

Q22. Please summarize how your analysis of capital market conditions affects your conclusions?

A22. First, I conclude that interest rates are on an increasing trajectory, with practitioner forecasts and bond yield spread evidence suggesting further increases in long-term government bond yields. This supports my reliance on forecasts of long-term U.S. Treasury yields for the risk-free rate.

Second, because forward-looking estimates of the MRP have recently been at or slightly above the long-term historical average level and market volatility indicators have recently been higher, I conclude my reliance on the historical average U.S. MRP of 7.07% is reasonable and conservative as an input to my CAPM and ECAPM analysis.

Finally, I conclude that because (all else equal) the TCJA results in reduced cash flows and increased volatility of cash flows for Con Edison, it may be appropriate to increase the Company's allowed ROE, its equity capital structure, or both. While I do not make any explicit adjustment for TCJA's impact in my implementation of the models, I do consider it in placing my recommendation within the range of reasonable cost of equity results from the DCF, CAPM, and Risk Premium analyses.

A. INTEREST RATE DEVELOPMENTS

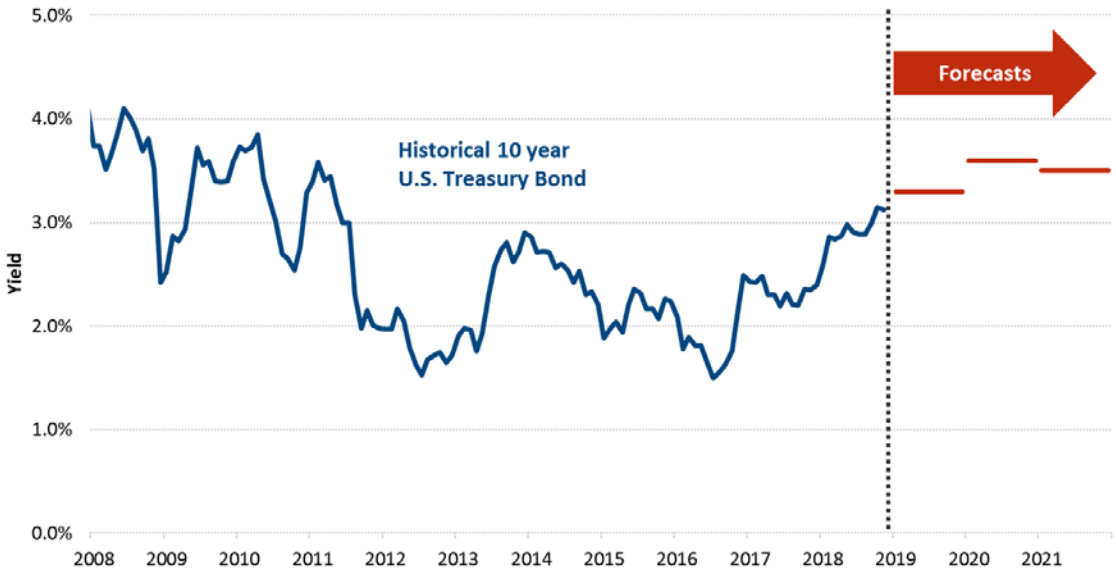
Q23. What are the relevant developments regarding interest rates?

A23. Interest rates, including the long-term government bond yields that are typically used to represent the risk-free rate in the context of regulated utility ratemaking, have remained extremely low in the years since the global financial crisis of 2008. However, yields

have increased substantially over the past year and are forecasted to continue on their upward trajectory in coming years. For example, since hitting an all-time low in July 2016, the yield on ten-year U.S. Treasury bonds has more than doubled to over 3 percent at the time of my analysis.[17]

Furthermore, the consensus forecast from Blue Chip Economic Indicators—which surveys more than 50 institutional market analysts and participants, including major banks, academic finance departments, credit rating agencies, institutional investors, and Fortune 500 companies—is that the yield on ten-year Treasury bonds will increase to 3.6 percent by 2020. Figure 5 below plots these expected increases in the ten-year Treasury bond yield.

Figure 5
Historical and Projected Ten-Year Treasury Bond Yields



Source: Historical data from Bloomberg. Forecasts from Blue Chip Economic Indicators Oct. 2018 issue.

[17] Bloomberg as of 11/30/2018. The November 2018 average ten-year U.S. Treasury yield was 3.12%. On July 5, 2016, the ten-year U.S. treasury yield closed at 1.37%.

Q24. What forces contributed to the sustained period of very low interest rates over the decade following the financial crisis?

A24. The monetary policy actions of the Federal Reserve (the "Fed") in response to the financial crisis were a key driver of the low interest rates. The Fed's Federal Open Market Committee ("FOMC") undertakes market actions to influence interest rates—especially the so-called "federal funds rate"[18]—subject to its statutory mandate to maximize employment and keep inflation under control. In response to the financial crisis, the FOMC drastically reduced its target federal funds rate from 5.25 percent in August 2007 to 0.00 – 0.25 percent starting in December 2008.[19] The Fed's zero interest rate policy remained in effect for the next seven years, ending in December 2015 when the FOMC finally raised its federal funds target to 0.25 - 0.50 percent.[20]

Concurrent with its sustained monetary policy actions related to the short-term federal funds rate, the Fed also implemented several unprecedented policy interventions with the explicit goal of reducing interest rates on long-term borrowing instruments. This "quantitative easing" program of long-term government bonds served to keep Treasury yields at very low levels for an extended period of time. And importantly, even after the FOMC ceased buying securities, it maintained trillions of dollars' worth of Treasuries and government-backed mortgage backed securities on its balance sheet, continuing to reinvest the principal when the assets matured.[21]

Global economic conditions also contributed to the unprecedented low rates on U.S. government debt. For example, at the height of the European sovereign debt crisis in 2011-2012, flight from European bonds and yield-lowering actions by the European

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[18] The federal funds rate is the rate at which large banks lend and borrow funds in the short-term. It is therefore influential in determining market interest rates throughout the economy.

[19] See FOMC Statements issued August 7, 2007 and December 16, 2008 accessed at https://www.federalreserve.gov/monetarypolicy/fomc_historical.htm

[20] See FOMC Statement, December 16, 2015 accessed at https://www.federalreserve.gov/monetarypolicy/fomccalendars htm

[21] As of October 4, 2018, the Fed's long-term Treasury and Agency securities balance was at $4.0 trillion. See Board of Governors of the Federal Reserve System, Credit and Liquidity Programs and the Balance Sheet, accessed at https://www.federalreserve.gov/releases/h41/20181004/.

Central Bank ("ECB") spurred increased demand for U.S. Treasury bonds—thus driving up prices and bringing yields down. This pattern repeated in 2016 in the period leading up to, and especially following, the "Brexit" vote. Indeed, on July 10, 2016, shortly after Great Britain officially voted to leave the European Union, the ten-year U.S. Treasury Yield reached its all-time low of 1.37%.[22]

Q25. What forces have contributed to the current rising trend in interest rates?

A25. As shown in Figure 5, U.S. Treasury bond yields have been on an increasing trend since their low point in mid-2016. This is consistent with the Fed's recognition that the economy has strengthened, employment conditions remain strong, and inflation—while still below its 2.0 percent target—has begun to increase. The FOMC has responded by increasing the target federal funds rate eight times since ending the zero interest rate policy in December 2015, consistently over each subsequent quarterly meeting. After the most recent hike announced at the FOMC's December 19, 2018 meeting, the federal funds target rate stands at 2.25 – 2.50 percent.[23] In addition, the Fed signaled its intention to continue the consistent rate increases going forward.

Importantly, the Fed has also recently enacted "Policy Normalization" procedures, whereby it is gradually decreasing its holdings of long-term bonds by not reinvesting principal from expiring securities. These procedures took effect starting in October 2017 and have continued at an accelerating pace ever since.[24]

In summary, central bank monetary policy action is aligned with and supportive of a continued gradual steady increase in interest rates, including yields on risk-free long-term government bonds. This is consistent with the economic forecasts of continued increases in the risk-free rate continuing through the period at issue in this proceeding.

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[22] Yield from Bloomberg. See also "U.S. 10-Year Treasury Yield Closes at Record Low" (July 5, 2016) The Wall Street Journal, accessed at https://www.wsj.com/articles/government-bond-yields-in-u-s-europe-hit-historic-lows-1467731411.

[23] See FOMC Statement, September 19, 2018, accessed at https://www.federalreserve.gov/newsevents/pressreleases/monetary20181219a.htm

[24] See FOMC Communications related to Policy Normalization, April 16, 2018, accessed at https://www.federalreserve.gov/monetarypolicy/policy-normalization.htm

B. RISK PREMIUMS AND YIELD SPREADS

Q26. What is the Market Risk Premium?

A26. 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 illustrated above in Figure 3, 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,[25] 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.

Q27. Do you have any data on how estimates of the MRP have evolved over the time leading up to and since the 2008 financial crisis?

A27. Yes. Bloomberg publishes a forward-looking estimate of the MRP based on market prices and expected dividends for U.S. stocks.[26] Figure 6 displays the development of Bloomberg's forecasted MRP since 2006.

The Bloomberg MRP increased substantially with the onset of the financial crisis and has remained elevated relative to pre-crisis levels. Though the November 2018 average forward-looking MRP reported by Bloomberg is in line with the long-term historical

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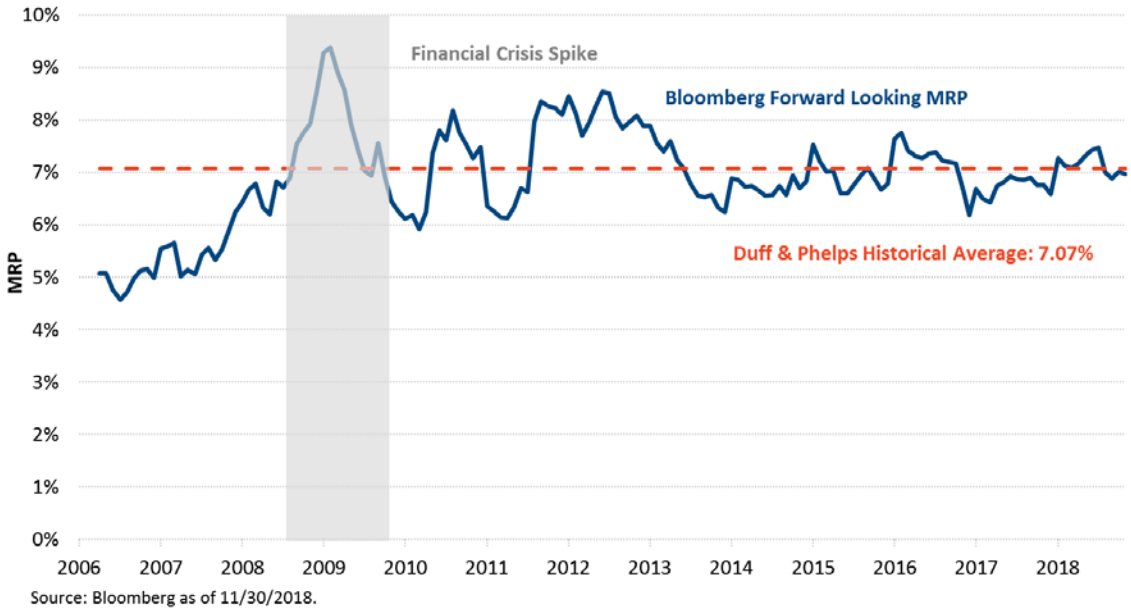
[25] In finance theory, the "market portfolio" describes a value-weighted combination of all risky investment assets (e.g., stocks, bonds, real estate) that can be purchased in markets. In practice, academics and financial analysts nearly always use a broad-based stock market index, such as the S&P 500,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

[26] Bloomberg's calculation of the expected market return is based on an implementation of a multi-stage DCF model (see Section V.D.1 below) applied to all dividend paying stocks in the S&P 500 index; Bloomberg calculates the MRP by subtracting the current ten-year Treasury bond yield from the estimated expected market return, however, it is also possible to calculate the MRP measured relative to a 20-year Treasury bond yield, which is the calculation I perform for ease of comparison to historical average risk premiums calculated by comparing the Ibbotson data on stock market returns in excess income returns on long-term U.S. Treasury yields with an approximate average maturity of 20 years.

average MRP,[27] the average since the 2008 financial crisis was 7.2 percent,[28] indicating the investors have displayed increased risk aversion and demanded higher compensation for taking on risk in the time since the financial crisis.

Figure 6
Bloomberg Forward looking MRP (2006-2018)



Source: Bloomberg as of 11/30/2018.

Q28. Is there any other market evidence concerning risk premiums?

A28. Yes. One observable risk premium is the spread between yields on risk-free Treasury bonds and the yields on corporate bonds of the same maturity. Unlike U.S. government bonds, debt instruments issued by corporate entities come with some probability of default and have some associated level of systematic risk. To compensate for this risk, corporate bonds—including utility bonds—offer higher expected returns (as measured by the market yield) than do government bonds.

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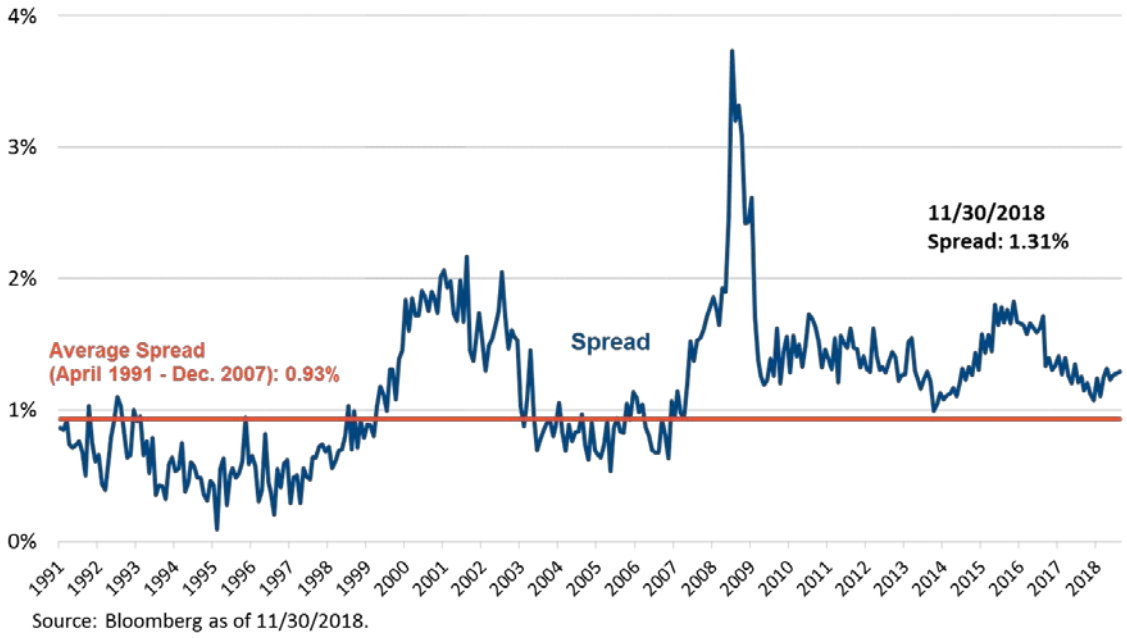
[27] As noted below, the historical average MRP calculated using the long-established Ibbotson stock and bond market data currently published by Duff & Phelps is 7.07 percent.

[28] Average of Bloomberg forecasted MRP (relative to 20-year Treasury Bonds) for the U.S. from January 2009 - November 2018. Bloomberg as of 11/30/2018.

Figure 7 plots the yield spread for A-rated utility bonds compared to Treasury bonds for the longest period of available data. As the figure shows, utility yield spreads spiked dramatically with the onset of the financial crisis and have remained elevated to their pre-crisis average level.

Figure 7
Spread between 20-year A-rated Utility Bond and 20-year Treasury Bond Yields



Source: Bloomberg as of 11/30/2018.

Q29. What are the implications of elevated yield spreads to the cost of equity?

A29. The yield spread is simply one form of risk premium, albeit for assets (corporate bonds) that are relatively lower risk compared to equity securities (*i.e.*, stock). Consequently, one explanation for the elevated yield spread is that investors are requiring a higher premium to take on market risk than they did on average prior to the financial crisis.[29] This would indicate an elevated MRP compared to the historical average.

An alternative explanation for the elevated yield spread is that the yield on Treasury bills remains artificially low due to the lingering after-effects of Fed's unprecedented

[29] See "Explaining the Rate Spread on Corporate Bonds," Edwin J. Elton, Martin J. Gruber, Deepak Agarwal, and Christopher Mann, The Journal of Finance, February 2001, pp. 247-277.

monetary policy. Under this explanation, the yield spread would be expected to return to its historical average level as the risk-free rate returns to more normal levels.

Regardless of which interpretation is correct, the consequence is that if the cost of equity is estimated using the current risk-free rate and a historical average MRP, the estimate will be downward biased. Hence, it is necessary to "normalize" the risk-free rate in CAPM model inputs, which I have done by using a forecast for what government bond yields will be throughout the period at issue in this case.

C. MARKET VOLATILITY

Q30. How does the stock market's volatility relate to the cost of capital?

A30. Academic research has found that investors expect higher risk premiums during more volatile periods,[30] indicating that the MRP may increase when market volatility is high, even when investors' level of risk aversion remains unchanged. This is relevant to estimating the Company's cost of equity because increased volatility suggests higher risk premiums and therefore higher market-required ROE.

A measure of the market's expectations for volatility is the VIX index, which measures the 30-day implied volatility of the S&P 500 index.[31] These indices are also referenced as the "market's fear gauge."[32] While the VIX had recently been trading substantially below its long term historical average of approximately 19.40, it spiked substantially

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[30] See, e.g., K. French, W. Schwert and R. Stambaugh (1987), "Expected Stock Returns and Volatility," Journal of Financial Economics, Vol. 19, p. 3:

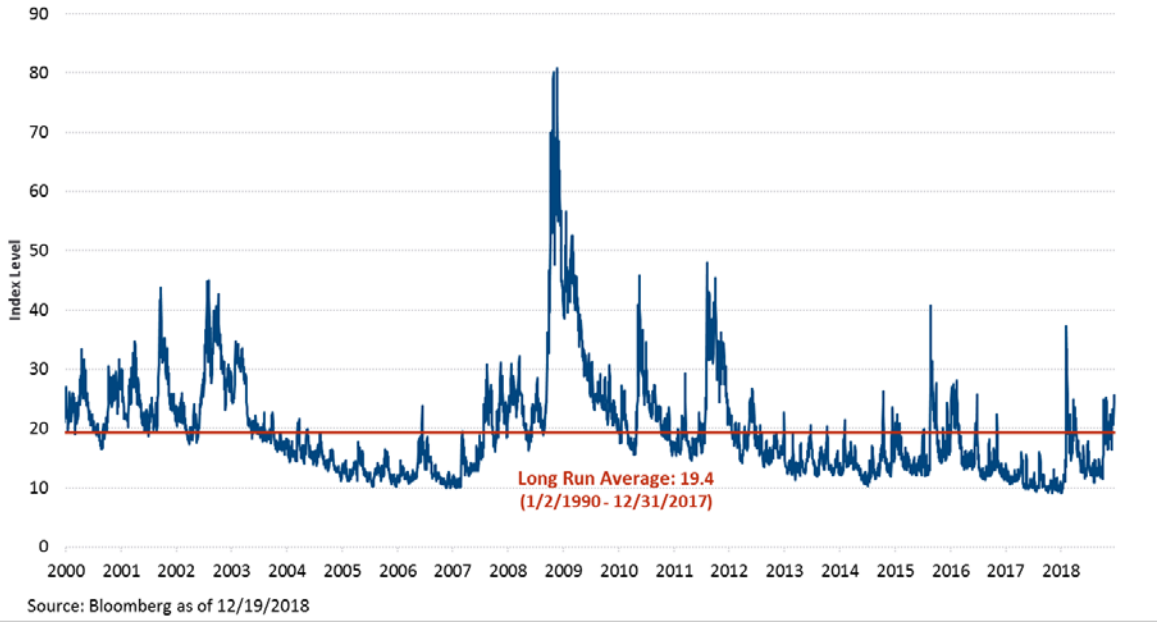
> We find evidence that the expected market risk premium (the expected return on a stock portfolio minus the Treasury bill yield) is positively related to the predictable volatility of stock returns. There is also evidence that unexpected stock returns are negatively related to the unexpected change in the volatility of stock returns. This negative relation provides indirect evidence of a positive relation between expected risk premiums and volatility.

[31] *See, e.g.*, Chicago Board Option Exchange at http://www.cboe.com/micro/VIX/vixintro.aspx

[32] CNBC, "VIX, the Market's Fear Gauge Plunges in Historic One-Week Move," July 5, 2016.

above that level in early October and again in December 2018, each time concurrent with a significant drop in the stock market.[33]

Figure 8
VIX Index



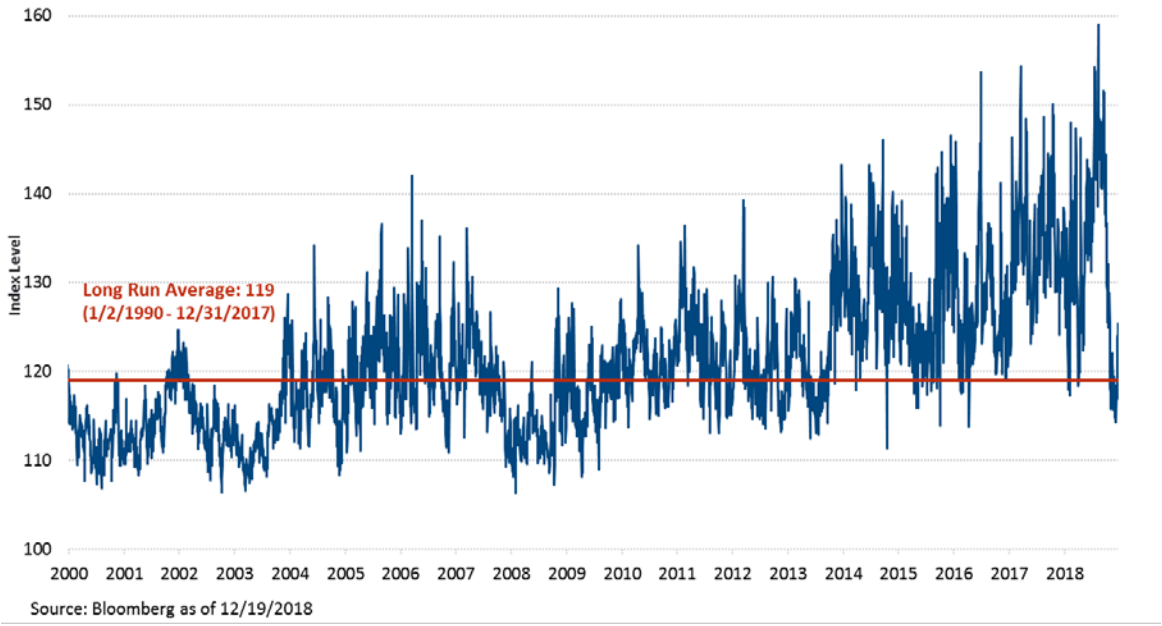
Q31. Do you look at any other indexes regarding market volatility?

A31. Yes. 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), offers a reason to be cautious of interpreting recent low VIX levels as an indicator of improved capital market certainty over the long term. A SKEW value of 100 indicates outlier returns are unlikely, but as the SKEW increases, the probability of outlier returns become more significant. Figure 9 shows that the SKEW currently stands at almost 132, while the index has averaged 119 over the last 15 years. This indicates that investors are willing to pay for protection against downside risk and thus are exhibiting signs of elevated risk aversion concerns of downside tail risk.

[33] As an illustration of the market volatility, the S&P 500 dropped more than 350 points (12%) during the first three weeks of December.

The SKEW has briefly dropped below its long-run average in November and December 2018, but generally has been on an upward trend since at least 2015.

Figure 9
SKEW Index



Q32. Are there reasons why capital markets may exhibit high volatility going forward?

A32. Yes. A few contributing reasons to capital market volatility recently include notably the shut-down of the federal government, which has been going on since December 23, 2018 and where no resolution are in sight. This may impact economic growth and regulatory policy implementation, and will likely contribute to uncertainty among capital market participants.

Additionally, the ongoing exchange of trade tariffs between the United States and China, challenging negotiations occurring in the European Union regarding finalization of the exit of Great Britain, which could lead to a no-deal Brexit, and the new agreement seeking to replace the North American Free Trade Agreement ("NAFTA").

Throughout 2018, the U.S. and China engaged in an exchange of new trade tariffs, as exemplified by China's September 18, 2018 response to a September 17, 2018 U.S.

declaration of tariffs on $200 billion of Chinese exports.[34] As these trade tensions have unfolded and escalated, uncertainty in the markets has increased significantly because investors do not know when or if tariffs will be implemented on products affecting companies in which they hold equity. On any given day, a tariff could be announced, significantly affecting the value of a company or companies. Thus, the current market landscape embodies significant uncertainty.

To further the instability facing U.S. markets resulting from the trade dispute with China, the removal of NAFTA and the implementation of the United States-Mexico-Canada Agreement ("USMCA") has been an ongoing source of insecurity for all investors and those doing business throughout North America. Though the USMCA was formally signed in November 2018, the negotiation process was far from transparent and led to significant concerns of the fallout for investors holding equity in any business needing to trade across the applicable borders. Before the USMCA, which still requires approval from the U.S. Congress, is finally approved and implemented, certain tariffs and trade rules will change, likely leading investors to be unsure of the direction of certain businesses.

D. IMPLICATIONS OF THE TAX CUTS AND JOBS ACT OF 2017 ("TCJA")

Q33. How does implementation of the TCJA affect regulated utilities?

A33. The TCJA reduced the federal corporate marginal tax rate from 35% to 21%. Although the TCJA is likely to be a net positive for investors in unregulated companies, for the Company, the vast majority (if not all) of the benefits will flow to customers. This is because the savings in income taxes will flow through to customers in the form of lower rates. At the same time, the implementation of the TCJA (including its treatment by utility regulators in a ratemaking context) will likely increase the risks facing regulated companies because they will experience (i) a near-term decrease in cash flows and (ii) an increase in the variability of after-tax earnings (and cash flows).

[34] The U.S. announced a 10% tariff on these goods for the remainder of 2018, which will escalate to a 25% tariff afterward. The Chinese retaliation included $60 billion of U.S. goods. See "The Trade War is on: How We Got Here and What's Next, Bloomberg," 9/18/2018.

Q34. How does the lower corporate tax rate under the TCJA affect the expected volatility of cash flows for regulated companies?

A34. For regulated companies, as for unregulated corporate taxpayers, the change in the income tax allowance will result in greater volatility of net income (and cash flow) because the income tax provides a "buffer" against the impact of variations in expected costs and expected revenue on net income. Consider for example the effect on net income of a 10% increase in sales revenue. All else equal, net income would increase by about 6.5% for a 35% income tax rate, (*i.e.* 0.10 times (1 – 0.35)), but would increase by 7.9% for a 21% income tax rate. The change would be similar and symmetrical for a decrease in revenue.

Further, the amplified variability in net income due to the lower corporate tax rate is likely to amplify systematic risk, because variations in revenue are generally related to variations in the broader economy that affect the value of all risky assets, not just tax-paying corporations. Since systematic risk is the type of risk that affects the cost of capital, it is reasonable to expect that the TCJA will, all else equal, contribute to higher required returns for corporate equity holders, including those in regulated utilities.

Importantly, while this increase in variability of income applies to all corporate tax-paying entities, unlike unregulated corporations, regulated utilities do not benefit from after-tax higher profits under the new lower tax rate, because the revenue requirement is adjusted to pass the tax savings on to customers.[35]

Q35. How will the TCJA affect a regulated company's credit metrics?

A35. Credit metrics are negatively affected by regulatory ratemaking treatment of the TCJA, because such treatment causes a near-term reduction in the regulated utilities' cash flow and related cash flow metrics that are closely observed by debt ratings agencies. As discussed further in Section V.B below, the expected refunds of excess deferred taxes and lower tax deferrals associated with new investment due to the lower tax rate and loss

[35] This discussion assumes that the revenue requirement has been adjusted to account for the lower corporate income tax rate.

of bonus depreciation under the TCJA will reduce cash flow. Yet the tax reform has no impact on the amount of assets needed for reliability and to serve customers, a portion of which will be debt-financed. Decreases in key cash flow metrics, such as the cash flow to debt ratios that inform the credit rating agencies credit opinions, have negatively affected the credit profile of many regulated utilities, and will continue to do so.[36] Indeed, as discussed below, Con Edison is among the group of regulated utility companies that have had their credit ratings downgraded by one or more rating agencies due to the effects of the TCJA.

Q36. What are the implications of the reduced cash flows and increased volatility of cash flows in the context of these proceedings?

A36. These effects suggest that it could be appropriate to increase either the allowed ROE or the amount of equity in the capital structure (or possibly both) to help compensate for the increased financial risk imposed on regulated utilities by the TCJA.

While the uncertainty surrounding the passage of the TCJA has been removed, it is unlikely that impacts on the cost of capital will immediately appear in the estimation models. The TCJA has not yet been in place for one complete fiscal year, and the regulatory treatments in various jurisdictions have been in effect for an even shorter period. A longer period of market data may be needed before the cost of capital estimation models can be expected to reflect impacts of the TCJA on investors' required returns.

Notwithstanding that decreases in cash flow metrics and increased volatility of earnings both increase financial risk in ways that may not be reflected in the cost of capital model

[36] See Moody's Investor Service, Global Credit Research, "Moody's changes outlooks on 25 US regulated utilities primarily impacted by tax reform," January 19, 2018; Sector Comment, "Tax reform is credit negative for sector, but impact varies by company," January 24, 2018; Regulated Utilities - U.S., "2019 outlook shifts to negative due to weaker cash flows, continued high leverage," June 18, 2018; and Regulated Utilities - U.S., "2019 outlook negative amid growing debt and stagnant cash flow," November 8, 2018. See also S&P Global Ratings, Rating Direct, "U.S. Tax Reform: For Utilities' Credit Quality, Challenges Abound," January 24, 2018 and Fitch Ratings, Special Report, "Tax Reform Impact on the U.S. Utilities, Power & Gas Sector: Tax Reform Creates Near-Term Credit Pressure for Regulated Utilities and Holding Companies," January 24, 2018.

results, I do not make an explicit upward adjustment to my estimate of the cost of equity or my recommended allowed ROE to account for the impact of the TCJA. However, in Section V.B below, I address the question of how increasing the proportion of equity in Con Edison's regulatory capital structure could help to mitigate some of the TCJA's negative effects on credit quality.

V. ESTIMATING THE COST OF EQUITY

A. PROXY GROUP SELECTION

Q37. How do you identify proxy companies of comparable business risk to Con Edison?

A37. Con Edison is primarily engaged in the regulated distribution of electricity and natural gas. 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 Con Edison's risk profile. However, selecting companies with business operations concentrated in similar lines of business and/or business environments is an appropriate starting point for selecting a proxy group of comparable risk to Con Edison.

To this end I have selected a proxy group composed of companies focused on the provision of electricity to end users, which also includes some companies that—like Con Edison—engage in the regulated distribution of both electricity and natural gas ("Electric Proxy Group").

Q38. Please summarize how you selected the members of the Electric Proxy Group.

A38. To identify companies suitable for inclusion in the Electric Proxy Group, I started with the universe of publicly traded companies in the electricity utility industry as identified by *Value Line Investment Analyzer* (*"Value Line").* Next, I reviewed business

descriptions and financial reports of these companies and eliminated those which had less than 50 percent of their assets dedicated to regulated electric utility activities.[37]

With this group of companies, I applied further screening criteria to eliminate companies which have had recent significant events that could affect the market data necessary to perform cost of capital estimation. Specifically, I identify companies that have cut their dividends or engaged in substantial merger and acquisition ("M&A") activities over the relevant estimation window.[38] I eliminate companies with such dividend cuts because the announcement of a cut may produce disturbances in the stock prices and growth rate expectations in addition to potentially being a signal of financial distress. I generally eliminate 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.

Further, I require companies have an investment grade credit rating[39] and more than $300 million in annual revenues for liquidity purposes. A final, and fundamental, requirement is that the proxy companies have the necessary data available for estimation.

Q39. What are the characteristics of the Electric Proxy Group?

A39. The Electric Proxy Group is comprised of electric utilities whose primary source of revenues and majority of assets are subject to regulation. The final proxy group consists of the 26 electric utilities listed in Figure 10 below. These companies own regulated electric utility subsidiaries and are classified by EEI as either "regulated"—having at

37 I rely on Edison Electric Institute (EEI), Stock Performance – 2017 Q4 Financial Update. This report gives industry financial information as well as a percentage of regulated assets for each of the companies.

38 As described in Sections V.C, the CAPM requires five years of historical data, while the DCF relies on current market data.

39 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 Electric Proxy Group.

least 80% of their assets dedicated to regulated utility operations) or "mostly regulated"—having at least 50% regulated assets.[40] (These EEI categories are designated with an "R" or "M" in the table below). Therefore, the Electric Utility Proxy Group is broadly representative of the regulated electric industry from a business risk perspective.

Figure 10 reports the proxy companies' annual revenues for the most recent four quarters as of Q3, 2018 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 S&P Research Insight. The growth rate estimate is a weighted average between estimates from Thomson Reuters and *Value Line*. Betas were obtained from *Value Line*.

[40] Edison Electric Institute (EEI), Stock Performance – 2017 Q4 Financial Update.

Figure 10
Electric Proxy Group

Company	Annual Revenues (USD million)	Regulated Assets	Market Cap. 2018 Q3 (USD million)	Beta	S&P Credit Rating (2018)	Long Term Growth Est.
	[1]	[2]	[3]	[4]	[5]	[6]
ALLETE	$1,388	M	$3,878	0.65	BBB+	5.7%
Alliant Energy	$3,517	R	$10,181	0.60	A-	6.2%
Amer. Elec. Power	$16,205	R	$35,280	0.55	A-	5.8%
Ameren Corp.	$6,274	R	$15,714	0.55	BBB+	6.8%
CMS Energy Corp.	$6,822	R	$14,027	0.55	BBB+	6.9%
DTE Energy	$13,733	M	$20,096	0.55	BBB+	5.6%
Entergy Corp.	$11,121	R	$14,961	0.60	BBB+	1.7%
MGE Energy	$560	M	$2,260	0.60	AA-	8.3%
OGE Energy	$2,260	R	$7,331	0.85	BBB+	1.1%
Otter Tail Corp.	$902	R	$1,907	0.75	BBB	6.1%
AVANGRID Inc.	$6,346	M	$15,110	0.30	BBB+	9.7%
Consol. Edison	$12,349	R	$24,364	0.40	A-	3.2%
Duke Energy	$24,205	R	$57,441	0.50	A-	4.9%
Eversource Energy	$8,309	R	$19,745	0.60	A+	5.7%
NextEra Energy	$16,360	M	$81,411	0.55	A-	8.3%
PPL Corp.	$7,772	R	$21,335	0.70	A-	3.4%
Public Serv. Enterprise	$9,324	M	$26,428	0.60	BBB+	6.7%
Southern Co.	$23,787	R	$43,762	0.50	A-	2.2%
Unitil Corp.	$434	R	$763	0.55	BBB+	4.0%
Edison Int'l	$12,868	R	$22,051	0.55	BBB+	4.2%
El Paso Electric	$909	R	$2,418	0.65	BBB	4.4%
IDACORP Inc.	$1,364	R	$5,003	0.55	BBB	2.4%
Pinnacle West Capital	$3,695	R	$8,907	0.55	A-	4.5%
PNM Resources	$1,425	R	$3,135	0.65	BBB+	5.7%
Portland General	$1,984	R	$4,113	0.60	BBB+	4.9%
Xcel Energy Inc.	$11,453	R	$24,475	0.50	A-	6.1%
Average	$7,899		$18,696	0.58		5.2%

Sources and Notes:
[1]: Bloomberg as of 9/30/2018.
[2]: Company 10-Ks. See Table No. BV-2.
[3]: See Table No. BV-3 Panels A through Z.
[4]: See Supporting Schedule # 1 to Table No. BV-10.
[5]: S&P Credit Ratings from Research Insight as of 2018 Q3.
[6]: See Table No. BV-5.

Q40. How does the Electric Proxy Group compare to Con Edison in terms of financial metrics?

A40. Con Edison's electric distribution operations generated an annual revenue figure of $7.1 billion in 2017, which is smaller than the average member of the Electric Proxy Group by approximately $0.8 billion. The approximate equity rate base of Con Edison's electric distribution operations is $8.4 billion, less than half the market capitalization of the average member of the Electric Proxy Group.[41] Con Edison's issuer credit rating of A- is above the median credit rating of BBB+ for the Electric Proxy Group.[42]

B. CAPITAL STRUCTURE

Q41. What regulatory capital structure for Con Edison did you employ in your analysis?

A41. As recommended by Con Edison company witness Saegusa, I use a capital structure consisting of 50.00 percent equity, 48.89 percent debt, and 1.11 percent customer deposits. I understand this request reflects a greater equity ratio than the capital structure in Con Edison's most recent approved rate order,[43] and I believe an increase in equity financing of rate base is appropriate at this time for reasons discussed below. I also note that Con Edison's requested 50% equity ratio is in line with regulatory capital structures determined in recent U.S. utility rate cases,[44] but is also substantially lower than the market value equity ratios for the Electric Proxy Group that affect the cost of equity estimates measured for those companies using market data.[45]

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41 This estimate falls between the median ($8 billion) and average ($10.4 billion) book value of equity of the Electric Proxy Group.

42 Con Edison data as reported by S&P Global Market Intelligence, accessed 10/11/2018.

43 2017 Order, p. 28. See also Joint Proposal in Case 16-E-0060, 16-G-0061, and 16-E-0196, Appendix 1, page 6 of 11.

44 The average allowed equity ratio from 2013 to 2018 for Electric cases was 49%. Calculated using data from SNL Financial as of 12/7/2018.

45 Exhibit___(BV-3), Table No. BV-4

Q42. Are there any reasons why it might be appropriate to consider including a higher equity ratio in Con Edison's regulatory capital structure used for ratemaking purposes compared to what has been applied in past rate cases?

A42. Yes. The impact of the TCJA, coupled with Con Edison's significant ongoing capital expenditures, has placed downward pressure on the Company's cash flows and associated credit metrics. As a result, Moody's recently downgraded Con Edison's long term debt issuer rating (from A2 to A3), along with that of its corporate parent CEI (from A3 to Baa1), stating that regulatory treatment of the new tax law would lead to "a series of revenue and cash flow reductions" for Con Edison "that will offset some of the expected general rate increases that the utility would otherwise have."[46] Moody's explained that offsetting rate increases and cash flow reductions will lead Con Edison's "cash flow to remain steady, at the same time that the utility's capital spending – and debt – is expected to increase for infrastructure resiliency, energy efficiency, and other New York policy priorities," resulting in "cash flow to debt ratios around 16-17% through 2020, … down from over 20% in recent years."[47]

Q43. How does regulatory treatment of the TCJA lead to lower cash flows and deteriorating credit metrics for regulated utilities such as Con Edison?

A43. The TCJA can reduce cash flows for regulated companies in several ways. First, when the benefits of decreased tax costs are passed through to utility customers, this manifests in a lower "gross up" for taxes (*i.e.*, the income tax allowance) in the revenue requirement. Reduced revenues in turn lead to decreased pre-tax cash flows and associated credit metrics.[48]

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[46] "Rating Action: Moody's downgrades ConEd to Baa1, CECONY to A3 and O&R to Baa1; outlooks stable," Moody's Investor Service, October 30, 2018.

[47] *Ibid*.

[48] EBIT (earnings before interest and taxes) and EBITDA (earnings before interest, taxes, depreciation and amortization) are common measures of pre-tax cash flow that are considered by credit rating agencies as part of credit metrics such as EBIT and EBITDA interest coverage ratios or the debt-to-EBITDA ratio. As discussed below, cash flow mesures such as Funds from Operations (FFO) and associated credit metrics (such as FFO-to-debt and FFO interst coverage) for regulated utilities are also negatively affected by the TCJA.

Second, on an after-tax basis, the benefit of accelerated tax depreciation is reduced in proportion to tax rate, leading to a reduction in after-tax cash flows. Third, the TCJA eliminated bonus depreciation for utility assets, drastically reducing the amount of tax deductions that can be taken immediately for new capital investment.

Fourth, regulated utilities will be required to amortize back to customers the balances of Excess Deferred Income Taxes ("EDIT") that arise from the reduced corporate tax rate. EDIT relates to Accumulated Deferred Income Tax ("ADIT"), which represents the accumulated effect of timing difference in depreciation for income tax and regulatory purposes. Because tax depreciation deductions are accelerated relative to regulatory depreciation expense included in rates, utilities collect and accumulate positive deferred taxes in the early years of a regulated asset; these balances are drawn down in later years when the tax deductions are reduced below the levels of book depreciation (or entirely exhausted). The assumption is that the ADIT balance will return to zero for any asset at the end of its regulatory life. However, with a reduction in the corporate tax rate, some of the taxes deferred in the early years (at the higher tax rate) will never become due to the IRS in later years (at the new lower rate). This excess ADIT represents a temporary windfall to the utility until it is amortized back to customers via adjustments to the revenue requirement. As the EDIT is amortized, the portion of rate base that must be financed by investors increases, since EDIT (like ADIT) is a source of zero cost financing for the utility. However, despite this partially offsetting increase in required return on rate base, the net effect of returning EDIT to customers is to decrease the utility's cash flows, both before and after taxes, until the EDIT has been exhausted. In addition, because amortizing EDIT increases the proportion of rate base that must be financed with external capital, this may place additional downward pressure on cash flow-to-debt metrics (to the extent the additional capital required is in the form of debt).

Q44. Please illustrate how implementation of the TCJA reduces utility cash flows and credit metrics.

A44. Figure 11 below illustrates the impact of TCJA on incremental after-tax cash flows generated by a new investment in utility rate base. It compares the pre-TCJA status quo

(*i.e.*, a 35% corporate tax rate and 40% year-1 bonus depreciation that was scheduled to be permitted for new utility investment in 2019 under the prior tax code) with the new situation, namely 21% tax rate and only the standard year-1 Modified Accelerated Capital Recovery System ("MACRS") tax depreciation deduction.[49] As shown, the funds from operations ("FFO")[50] measure of cash flow is dramatically lower under the new tax regime compared to what utilities would have forecasted for new rate base investments prior to the TCJA taking effect. In turn, the incremental impact of new capital expenditures on utilities' cash flow to debt ratios is diminished by the new law,[51] contributing to the kind of deterioration in the aggregate levels of these metrics that Moody's discussed in justifying its downgrade of Con Edison's credit rating.

[49] For illustrative purposes, the figure posits a hypothetical $1 million investment in new utility assets with a 30-year economic life for depreciation purposes and qualifying for accelerated tax depreciation according to the 20-year MACRS schedule. The investment in rate base is assumed to be financed with 50.00% debt / 50.00% equity and receive a 10.00% allowed ROE.

[50] For purposes of this example, FFO is defined as the result of adding back depreciation expense and deferred taxes (which are non-cash expenses) to net income. All credit rating agencies consider an after-tax cash flow measure of this type for purposes of calculating cash flow to debt ratios.

[51] Under standard depreciated original cost ratemaking and absent the effects of accelerated tax depreciation, the incremental impact of a given rate base asset to the FFO-to-debt metric is lowest when the asset is new and improves as the asset depreciates; accelerated tax depreciation, and especially bonus depreciation, mitigates or even reverses this trend by providing more cash flow in early years.

Figure 11
TCJA Impact on Year-1 Incremental Cash Flow and Credit Metrics
Illustrated for $1,000 of New Utility Plant Investment
Financed with 50% Equity / 50% Debt

		No TCJA - 35% tax rate with bonus depreciation	TCJA - 21% tax rate without bonus depreciation	Difference
		[1]	[2]	[3] = [2] - [1]
Net Income	[a] = 500 * 10%	$50.0	$50.0	-
Depreciation	[b] = 1,000 / 30	$33.3	$33.3	-
Deferred income Taxes				
Tax Depreciation	[c]	$422.5	$37.5	($385.0)
Book Depreciation	[d] = [b]	$33.3	$33.3	-
Temporary Difference	[e] = [c] - [d]	$389.2	$4.2	($385.0)
Deferred Income Taxes	[f] = [e] * tax rate	$136.2	$0.9	($135.3)
Funds From Operations	[g] = [a] + [b] + [f]	$219.5	$84.2	($135.3)
FFO-to-Debt (%)	[h] = [g] / 500	43.9%	16.8%	-27.1%

Notes:
[1] [c] = 1,000 * 42.25%; Represents year-1 deduction from 20-year MACRS schedule with 40% bonus depreciation.
[2] [c] = 1,000 * 3.75%; Represents year-1 deduction from 20-year MACRS schedule.

I note that while Figure 11 focuses on the impact of TCJA for new investment, the combined effect of differences in on-going tax deferrals and EDIT amortization is to reduce cash flow and cash flow-to-debt metrics associated with many pre-existing rate base assets also. Indeed, Moody's has evaluated all components of the TCJA as a drag on credit quality across the regulated utility industry, estimating that the average reduction in the ratio of cash flow to debt for utilities due to implementing the new tax law is 150-250 bps.[52]

[52] Moody's Investor Service, "Moody's Changes Outlook on 25 US Regulated Utilities Primarily Impacted by Tax Reform," January 19, 2018. The average reflects bonus depreciation and the impact on cash flow and financing of both new and pre-existing assets. See also Moody's Investor Service, Regulated Utilities - U.S., "2019 outlook shifts to negative due to weaker cash flows, continued high leverage," June 18, 2018 and "2019 outlook negative amid growing debt and stagnant cash flow," November 8, 2018.

Q45. Has the Commission recognized that its proposed ratemaking treatment of the TCJA will decrease cash flows and credit quality for Con Edison and other regulated utilities?

A45. Yes. In its August 9, 2018 Order Determining Rate Treatment of Tax Changes, the Commission acknowledged the findings of Staff and the submissions of the utilities with respect to the negative cash flow implications of TCJA described above,[53] and stated that "the prospective cash flow reductions that utilities will experience because of the Tax Act warrant a careful consideration of the methodology for passing back the Tax Act savings to customers."[54] Further, the Commission described credit quality concerns as an important factor for consideration in recent and future rate proceedings.[55]

Q46. Can using a greater percentage of equity in the regulatory capital structure mitigate some of the detrimental impacts of the new tax law on utility credit quality?

A46. Yes, as discussed by Company witness Saegusa, by financing a greater portion of rate base assets with equity, regulated utilities can both improve cash flow (due to earning an after-tax return) and reduce their debt obligations, both of which serve to improve credit metrics and overall credit quality as evaluated by rating agencies. Figure 12 below illustrates this point using a simple example of a utility with aggregate accelerated tax depreciation deductions approximately 1.5 times the composite depreciation expense included in rates.[56] This example demonstrates that, holding all other factors constant, increasing the percentage of equity vs. debt financing included in the regulatory capital structure can lead to meaningful improvements in after-tax cash flow-to-debt metrics.

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53 Case 17-M-0815, Order Determining Rate Treatment of Tax Changes, issued August 9, 2018 ("2018 Tax Order"), pp. 61-62.

54 *Id.*, p. 61.

55 *Id.*, p. 62.

56 Specifically, the example assumes ratemaking depreciation at 3.33% and accelerated tax depreciation deductions at 5.00% of aggregate rate base value.

Figure 12
Effect of Capital Structure on Cash Flow to Debt Credit Metrics
Illustrated per $1,000 of Rate Base

		48% Equity / 52% Debt	50% Equity / 50% Debt	52% Equity / 48% Debt
		[1]	[2]	[3]
Equity Portion of Rate Base	[a]	$480.0	$500.0	$520.0
Debt Portion of Rate Base	[b] = 1,000 - [a]	$520.0	$500.0	$480.0
Net Income	[c] = [a] * 10%	$48.0	$50.0	$52.0
Depreciation	[d] = 1,000 / 30	$33.3	$33.3	$33.3
Deferred income Taxes				
Tax Depreciation	[e] = 1,000 * 5.00%	$50.0	$50.0	$50.0
Book Depreciation	[f] = [d]	$33.3	$33.3	$33.3
Temporary Difference	[g] = [e] - [f]	$16.7	$16.7	$16.7
Deferred Income Taxes	[h] = [g] * 21%	$3.5	$3.5	$3.5
Funds From Operations	[i] = [c] + [d] + [h]	$84.8	$86.8	$88.8
FFO-to-Debt (%)	[j] = [i] / [b]	16.3%	17.4%	18.5%

Q47. Have utilities and regulators recognized that increasing the equity ratio in the regulatory capital structure is a viable and effective mechanism for mitigating the negative credit impacts associated with regulatory implementation of the TCJA?

A47. Yes. The Georgia Public Utilities Commission increased Atlanta Gas Light Co's common equity ratio from 51.00 to 55.00 percent and also increased the equity thickness for Georgia Power.[57] Similarly, the Kentucky Public Service Commission allowed Atmos Kentucky to increase its equity percentage from 52.30 to 58.20 percent,[58] and the Alabama Public Service Commission has approved a plan to allow Alabama Power Company to gradually increase its regulatory equity ratio from 47.00 to 55.00 percent by 2025 or sooner.[59] In addition the New Jersey Board of Public Utilities has authorized PSE&G to increase its regulatory equity ratio to 54.00 percent.[60]

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57 GA PUC, Docket D-40828 and Southern Company, "Investor Presentation," Nov. 7, 2018.

58 KY PSC, Docket C-2018-00281.

59 *See* Moody's Investor Service, Regulated Utilities - U.S., "2019 outlook shifts to negative due to weaker cash flows, continued high leverage," June 18, 2018.

60 *See* BPU Docket Nos. ER18010029 and GR18010030, NJ BPU Decision, pp. 7, 14. PSE&E has been steadily increasing its regulatory equity ratio since 2013, a year in which its year end regulatory equity

At the same time, utilities have been issuing a larger volume of equity than at any time since the financial crisis according to Thompson Reuter's data.[61] According to Moody's, approximately $24 billion in new equity issuances by regulated U.S. utilities were announced in 2018 (though November).[62]

Both utility managers and utility regulators recognize that "deleveraging" through use of more equity financing—especially as accompanied by recognition of this greater reliance on equity financing for ratemaking purposes—is an effective and appropriate option for supporting utility credit ratings in the face of the cash flow reductions and increased investor financing requirements imposed by regulatory implementation of the TCJA.

C. THE CAPM BASED COST OF EQUITY ESTIMATES

Q48. Please briefly explain the CAPM.

A48. In the CAPM 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 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 3 in Section III), in which the required expected return on an asset 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 multiplied by the market risk premium. Mathematically, the relationship is given by the following equation:

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

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ratio was 51%. See BPU Docket Nos. ER18010029 and GR18010030, Direct Testimony of Scott Jennings, 12+0 Update, August 8, 2018, p. 55.

[61] Reuters Business News, "US tax reform reenergizes equity markets for utility companies," June 12, 2018.

[62] Moody's Investor Service, Regulated Utilities - U.S., "2019 outlook negative amid growing debt and stagnant cash flow," November 8, 2018.

- r_S is the cost of capital for investment S;
- r_f is the risk-free interest rate;
- β_S is the beta risk measure for the investment S; and
- MRP is the market equity risk premium.

The CAPM is a "risk-positioning model," which operates on the principle (corroborated by empirical data) 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 3), whereas investments of the same risk 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

Q49. What inputs does your implementation of the CAPM require?

A49. 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 measurement of the stock's beta. There are many methodological 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___(BV-2).)

Q50. What value did you use for the risk-free rate of interest?

A50. I used the yield on a 20-year U.S. Treasury bond as the risk-free asset for purposes of my analysis. Recognizing the fact that the cost of capital set in this proceeding may be in place over the next several years, I rely on a forecast of what Treasury bond yields will be in 2020. Specifically, *Blue Chip Economic Indicators* projects that the yield on a ten-

year Government Bond will be 3.6 percent by 2020.[63] I adjust this value upward by 50 bps, which is my estimate of the representative historical maturity premium for the 20-year over the ten-year Government Bond. This gives me 4.1 percent as an estimate of the risk-free rate.

Q51. What value did you use for the MRP?

A51. 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 over some long historical period. The average market risk premium from 1926 to the present (2017) is 7.07 percent.[64] I use this value of the MRP in my CAPM analyses.

I also note that Bloomberg's forward-looking market-implied MRP is currently estimated at approximately 7.0 percent (when expressed relative to 20-year bond yields) and was above the 7.07 percent long-term historical average value in most months of 2018. 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.)

Therefore, and considering the recent increase in measures of market volatility, I believe the 7.07 percent long-term historical average MRP value I rely on is a reasonable and conservatively low estimate of what the market risk premium will be during the period at issue in this proceeding.

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63 Blue Chip Economic Indicators, October 2018, p. 14.

64 Duff & Phelps, Ibbotson SBBI 2018 Valuation Yearbook 10-21.

Q52. What betas did you use for the companies in the Electric Proxy Group?

A52. I used *Value Line* betas, which are estimated using the most recent five years of weekly historical returns data.[65] The *Value Line* levered equity betas measured for the Electric Proxy Group are reported in Figure 10 and above. Importantly, as explained in Section III.B above, 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 Con Edison's regulatory capital structure includes a substantially higher proportion of debt financing compared to the proxy companies,[66] the financial risk associated with an equity investment in Con Edison's rate base is correspondingly greater than the financial risk borne by investors in the proxy companies' publicly traded stock.[67]

Consequently, when standard textbook techniques are applied to unlever the *Value Line* betas reported in Figure 10 and relever the resulting asset betas at Con Edison's regulatory capital structure, the resulting proxy group averages are 0.68 – 0.70 for the Electric Proxy Group.[68]

2. The Empirical CAPM

Q53. What other equity risk premium model do you use?

A53. 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

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65 See Value Line Glossary, accessible at http://www.valueline.com/Glossary/Glossary.aspx

66 Con Edison's proposed regulatory capital structure debt ratio of 48.89% (with 1.11% customer deposits) is above the maximum of five-year average debt ratios measured for the Electric Proxy Group. The average debt percentage of the Electric Proxy Group is 40%.

67 A further detailed discussion is contained in Exhibit___(BV-2), Section III.

68 See Exhibit___(BV-3), Table Nos. BV-13 – BV-15. The Technical Appendix (Exhibit___(BV-2)) 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., Con Edison's regulatory capital structure), with the precise relevered beta depending on the specific version of the unlevering/relevering formula employed.

predicted by the CAPM and high-beta stocks tend to have lower risk premiums than predicted.[69] 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, 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,

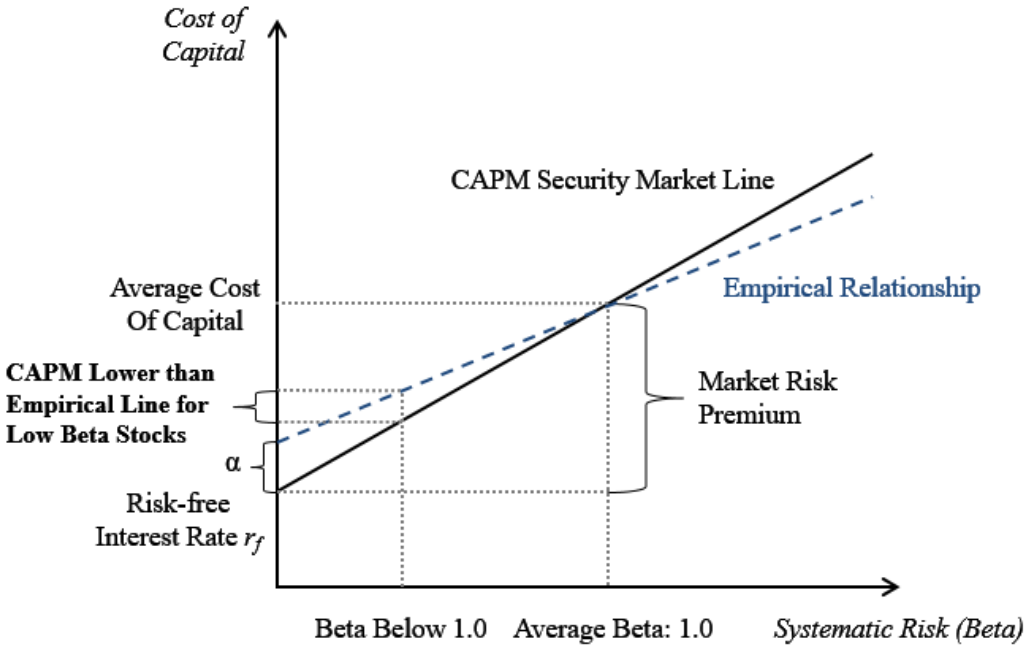
$$\boldsymbol{r_S = r_f + \alpha + \beta_S \times (MRP - \alpha)} \qquad (2)$$

where $\boldsymbol{\alpha}$ 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 3, which results in a Security Market Line that more closely matches the results of empirical tests. This adjustment is portrayed in Figure 13 below. In other words, the ECAPM produces more accurate predictions of eventual realized risk premiums than does the CAPM.

[69] *See* Figure A-2 in Exhibit___(BV-2) for references to relevant academic articles.

Figure 13
The Empirical Security Market Line



Q54. Why do you use the ECAPM?

A54. 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. Exhibit___(BV-2), Section II.C discusses the empirical findings that have tested the CAPM and also provides documentation for the magnitude of the adjustment, α.

Q55. How does your implementation of the ECAPM compare to the "Zero Beta" CAPM that has recently been employed by Staff?

A55. The two models are conceptually linked. In recent base rate proceedings involving Con Edison (as well as CEI's other regulated subsidiary Orange and Rockland Utilities, Inc.), Staff testified that "a considerable body of research has shown that the Traditional CAPM may underestimate required returns when betas are below 1.0."[70] This is the same reason I employ the ECAPM. In addition, while the specific formula employed by Staff differs from Equation 2 above, the mathematical impact of the two adjustments is similar, with Staff's formula adjusting the slope of the risk-return relationship somewhat more (and thus increasing the estimated cost of equity for low beta companies somewhat more) than my ECAPM formula.[71]

3. Results from the CAPM Based Models

Q56. Please summarize the parameters of the scenarios and variations you considered in your CAPM and ECAPM analyses.

A56. The parameters are displayed in Figure 14 below. As discussed above, the risk-free interest rate represents Blue Chip Economic Indicators projection for the ten-year Treasury Yield to prevail in 2020, adjusted to a 20-year horizon. The MRP is the long-term historical arithmetic average of annual realized premiums of U.S. stock market returns over long-term (approximately 20-year maturity) Treasury bond income returns from 1926 to 2017 as reported by Duff and Phelps.

Figure 14
Parameters in Risk Positioning Analyses

Risk-Free Interest Rate	4.10%
Market Risk Premium	7.07%

[70] Direct Testimony of Staff Finance Panel in Cases 16-E-0060 and 16-G-0061, pp. 87-88; Direct Testimony of Staff Finance Panel in Cases 18-E-0067 and 18-G-0068, pp. 92-93.

[71] Staff uses the formula $\boldsymbol{r_S = r_f + 0.25 \times MRP + \beta_S \times (0.75 \times MRP)}$. If this formula were applied with an MRP of approximately 7.0%, it would be equivalent to applying an alpha of $\alpha = 1.75\%$ in my ECAPM formula, rather than the $\alpha = 1.5\%$ I actually use.

Q57. Please summarize the results of the CAPM-based models.

A57. The results of CAPM and ECAPM estimation for the Electric Proxy Group are presented in Figure 15 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.

Figure 15
CAPM Summary: Electric Proxy Group

	CAPM	ECAPM (α = 1.5%)
Overall Cost of Capital	9.3%	10.0%
Hamada Adjustment Method (with taxes)	8.9%	9.4%
Hamada Adjustment Method (without taxes)	9.1%	9.5%

Note: Long-Term Risk Free Rate of 4.10%, Long-Term Market Risk Premium of 7.07%.

Q58. How do you interpret the results of your CAPM and ECAPM Analyses?

A58. In my opinion, the estimates reported above support a reasonable cost of equity range of 9.25 - 10.00 percent based on the Electric Proxy Group.[72] As discussed above, the established academic evidence indicates that the traditional CAPM tends to understate the cost of equity for lower-than-average risk companies such as those in the Electric Proxy Group, I therefore give somewhat greater weight to the ECAPM results to inform my recommendation and consider the lowest estimate from the CAPM to be too low.

D. DCF BASED ESTIMATES

1. Single and Multi-Stage DCF Models

Q59. Can you describe the DCF model's approach to estimating the cost of equity?

A59. 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. The DCF method assumes that the market price of a stock is equal to the present value of the dividends that

[72] I consider the lowest of the CAPM estimates unreasonable and round the results to the nearest 0.25 percent to assess the reasonable range.

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:

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

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:

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

where $\boldsymbol{D_0}$ is the current dividend, which investors expect to increase at rate $\boldsymbol{g}$ 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 of the University of Toronto.

Q60. Are there other versions of the DCF model?

A60. 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).[73] 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. [74]

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).

2. DCF Inputs and Results

Q61. What growth rate information do you use?

A61. 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.

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73 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.

74 See Exhibit___(BV-2), 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.

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 from Blue Chip Economic Indicators.[75] Thus, the long-run (or terminal) growth rate in the multi-stage model is nominal GDP growth.

Q62. What are the pros and cons of the input data?

A62. 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.

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.

Q63. Please summarize the DCF based cost of equity estimates for the Electric Proxy Group.

A63. The results of the DCF based estimation for the Electric Proxy Group are displayed below in Figure 16.

Figure 16
DCF Model Results: Electric Proxy Group

Single-Stage	10.4%
Multi-Stage	8.8%

Q64. How do you interpret the results of your DCF analyses?

A64. As discussed above, the DCF models are currently estimated based on dividend yields that may be expected to increase as interest rates continue to rise in the coming months

[75] See Blue Chip Economic Indicators, October 2018, p. 14.

and years. As a consequence, the multi-stage DCF model's assumption that *current* prices reflect investor's expectations that dividend growth will converge with the rate of GDP growth in the long term may underestimate how that pattern of expected dividends will be valued in the market throughout the period for which the rates decided in this proceeding will be in effect (*i.e.*, 2019 onward).[76] Thus, while I acknowledge that the single-stage DCF model makes the strong assumption that current three-to-five year Earnings Per Share growth expectations will persist into perpetuity, I conclude that a reasonable estimate of the cost of equity falls somewhere between what is estimated by the two versions of the model. In considering the results from the Electric Proxy Group, I believe the DCF model supports a reasonable range of 9.25 to 10.25 percent for Con Edison's cost of equity.

E. RISK PREMIUM MODEL ESTIMATES

Q65. Did you estimate the cost of equity that results from an analysis of risk premiums implied by allowed ROEs in past utility rate cases?

A65. 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:

$$Cost\ of\ Equity = r_f + Risk\ Premium$$

Q66. What are the merits of this approach?

A66. 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 one

[76] Blue Chip's forecasted GDP growth was 4.10% at the time of estimation, while the realized nominal GDP growth for Q2 and Q3, 2018 was 7.60 percent and 4.90 percent, respectively.
Source: https://www.bea.gov/news/glance

data input to 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 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.

Q67. How did you use rate case data to estimate the risk premiums for your analysis?

A67. The rate case data from 1990-2018 is derived from Regulatory Research Associates.[77] Using this data I compared (statistically) the average allowed rate of return on equity granted by U.S. state regulatory agencies in electric utility and electric distribution rate cases to the average 20-year Treasury bond yield that prevailed in each quarter.[78] 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:

$$Risk\ Premium\ =\ A_0\ +\ A_1\ \times\ (Treausury\ Bond\ Yield) \qquad (8)$$

I derived my estimates of A_0 and A_1 using standard statistical methods (OLS regression) and find 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 17.[79]

77 SNL Financial as of December 2018.

78 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.

79 My workpapers for the implied risk premium analysis are contained in Exhibit___(BV-4).

Figure 17
Implied Risk Premium Model Estimates

		R Squared	Estimate of A_0	Estimate of A_1	Implied Cost of Equity
Electric Utility	[a]	0.829	8.48%	-0.542	10.4%
Electric Distribution	[b]	0.877	8.87%	-0.762	9.8%

Sources and notes: [a], [b]: Estimated using SNL Past Rate Case data as of 12/7/2018 and Bloomberg Treasury yield data as of 11/30/2018.

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, I find that the current market conditions are consistent with an ROE of 10.4 percent for the average electric utility and 9.8 percent for the average electric distribution utility.

Q68. What conclusions did you draw from you risk premium analysis?

A68. The results in Figure 17 indicate a range of approximately 9.75 - 10.5 percent as a reasonable allowed ROE for Con Edison based on the risk premium model, which overlaps with the upper half of the estimates from the reasonable range from the DCF and CAPM models. While the risk premium model based on historical allowed returns are not underpinned by fundamental finance principles in the manner of the CAPM or DCF models, I believe that this analysis, when properly designed and executed and placed in the proper context, is a valid and useful approach to estimating utility ROE. Because the risk premium analysis as implemented takes into account the interest rate prevailing during the quarter the decision was issued, it provides a useful benchmark for the cost of equity in any interest environment. Because it relies on the returns for

regulated utilities, I believe this method provides a good way to directly assess whether the ROE is commensurate with that available to alternative investments of similar risk.

VI. CON EDISON SPECIFIC CIRCUMSTANCES AND ROE RECOMMENDATION

A. BUSINESS RISK CHARACTERISTICS

Q69. Are there any differences in the regulatory environment in which the comparable companies and Con Edison operates?

A69. Yes. There are several. First, the state of New York has undertaken a package of energy and utility policy reforms known as New York's Reforming the Energy Vision (REV) programs. The stated goal of these programs is

> promoting more efficient use of energy, deeper penetration of renewable energy resources such as wind and solar, wider deployment of "distributed" energy resources, such as micro grids, roof-top solar and other on-site power supplies, and storage …[80]

From an electric utility perspective, energy efficiency and distributed energy resources reduces the amount of power the utility distributes and most of the comparable companies operate in states without such comprehensive plans.[81] In addition, the New York REV programs reflect a new regulatory environment, so that its ultimate impact on the utilities is unknown and therefore results in higher business risk.

Second, the Company's most recent electric and gas rate orders each included an earnings sharing mechanism, where earnings are shared between customers and the Company above the allowed ROE plus 50 bps. There is no similar sharing mechanism when earnings are below the allowed ROE minus 50 bps.[82] An asymmetric sharing mechanism inherently makes it more difficult for the Companies to earn their allowed ROE on average as illustrated in the example below.

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[80] *See*, http://www3.dps.ny.gov/W/PSCWeb.nsf/All/CC4F2EFA3A23551585257DEA007DCFE2?OpenDocument

[81] New York does have a decoupling mechanism in place. Source: SNL, "Adjustment Clauses: A State-by State Overview," September 28. 2018.

[82] 2017 Order, pp. 26-29.

Figure 18
Example of Asymmetric Risk Associated with Sharing Mechanism

		8% Earned ROE	9% Earned ROE	10% Earned ROE
Rate Base	[a]	$1,000	$1,000	$1,000
Equity (%)	[b]	48%	48%	48%
Allowed Return on Equity	[c] = [a] × [b] × (9%)	$43.20	$43.20	$43.20
Earned Return	[d] = [a] × [b] × Earned ROE	$38.40	$43.20	$48.00
Earned Return - reimbursed to Customers	[e]	$0.00	$0.00	$1.20
Net Earned Return	[f] =[d] - [e]	$38.40	$43.20	$46.80
Deviation from Allowed Return	**[g] = [f] - [c]**	**-$4.80**	**$0.00**	**$3.60**

Notes:
[e]: For earned return on equity from 9.5% - 10%, Con Edison must reimburse customers 50% of value.
Thus, $1.20 = (10% - 9.5%) × [a] × [b] × .5 must be reimbursed to customers if Con Edison were to realize a 10% return on equity.

As is shown in the figure, the negative deviation from under-earning by 1% is *greater* than the positive deviation associated with over-earning by 1%. As a result, on an expected value basis, Con Edison is more likely to under-earn than they are to over-earn and consequently they will be challenged in earning the allowed ROE.[83]

Third, Con Edison's electric operations have the opportunity to earn incentive for Non-Wires Alternatives based on the net benefits of such programs. Based on periodic filings with the Commission, the Company can earn up to 30% (with customers earning 70%) of the net benefits associated with pursuing non-wires alternative projects.[84] As these incentives are granted for replacing wires with alternatives, there is no distinct impact on the cost of capital or the estimation hereof.

Fourth, I understand Con Edison is implementing an aggressive cost mitigation program - the Business Cost Optimization ("BCO") Program - and has reflected projected savings from the BCO Program in its revenue requirements in these cases. I also understand Con

[83] Statistically speaking, the expected value is the average across all possible outcomes weighted by their likelihood. In this simple example, this points to the average of $-4.80 and $3.60 being less than zero, despite the percentage deviation from the allowed return being +/- 1%. A circumstance without asymmetric risk would retain an expected value of zero for the identical percentage deviation in expected return. This example assumes that Con Edison is equally likely to over earn by 1% as Con Edison is to under earn by 1%.

[84] 2017 Order pp. 29-32 and "Order Approving Shareholder Incentives," Case 15-E-0229, pp. 9-13; Joint Proposal in Case 16-E-0060, pp. 29-31.

Edison has not proposed a reconciliation mechanism if the savings actually realized are less than the projected amounts. As a result, Con Edison bears additional business risk associated with not achieving the BCO Program related costs savings that it provides to customers. This business risk increases the difficulty the Company will face earning its allowed ROE going forward.

Q70. How do these regulatory mechanisms compare to those of the comparable companies?

A70. As noted above, REV-like programs are not common. Looking next to adjustment clauses, a study published by Regulatory Research Associates has found that New York State is neither at the top nor at the bottom regarding the use of adjustment mechanisms for new investments.[85] However, New York is among the few states that operate with a multi-year rate plan for both electric and gas utilities.[86] I also note that Con Edison has a decoupling mechanism, as do more than half of the proxy companies, although the specifics of each plan differ.[87] Because a decoupling mechanism is common, any impact on the ROE or the ability to earn the allowed ROE would be included in the proxy group data, so there is no impact on what Con Edison should be allowed. In addition, research has shown that statistically the presence of a decoupling mechanism has no impact on the cost of capital for electric or gas utilities.[88]

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85 Regulatory Research Associates, "Adjustment Clauses: A state-by-state overview," September 28, 2018.

86 Mark A. Lowry, "Multi-year Rate Plans," NRRI, May 9, 2017.

87 Regulatory Research Associates, "Adjustment Clauses: A state-by-state overview," September 28, 2018.

88 *See*, for example, Joe Wharton and Michael J. Vilbert, "Decoupling and the Cost of Capital," The Electricity Journal vol. 28, 2015, pp. 19-28.

B. EQUITY FLOTATION COSTS

Q71. Are there any other Con Edison-specific considerations relevant to the determination of its allowed ROE?

A71. Yes. It is my understanding that the Company (through its parent company CEI) has incurred flotation costs associated with equity issuances that have not been recovered in rates. These costs take the form of underwriting fees and discounts to the offer price. For example, if flotation costs represent approximately 2.5% of the proceeds raised by the issuances, only $97.50 out of every $100 raised in equity issuances would actually be available to finance Con Edison's assets and operations. To the extent these costs were / are not recovered as expenses at the time of the issuances, they should appropriately be recovered via an adjustment to the return on equity going forward.

Q72. How can Con Edison's ROE be adjusted to allow recover of equity issuance costs?

A72. A standard approach to adjusting the allowed ROE to provide recovery of all past equity issuance costs can be implemented via a straightforward adjustment to the single-stage DCF model. In place of the standard single-stage DCF formula (equation 7), the following formula is used.

$$r = \frac{D_1}{P_0(1-f)} + g$$

where f is the percentage of proceeds lost to underwriting fees or other flotation costs. This formula recognizes that if shares trade at (for example) $100, but 2.5% of the proceeds of the initial issuance of those shares was consumed by flotation costs, only $\$100 \times (1 - 0.025) = \$97.5$ represents value invested in cash-flow generating assets. Therefore, it is relative to this "adjusted" price, not the nominal market price, that investors' required return should be measured.

Comparing the flotation cost-adjusted formula to the standard DCF formula for values of the dividend yield, growth rate, and financial leverage that are representative of the Electric Proxy Group (see Figure 19 below), I find that ten bps is an appropriate ROE adjustment to allow recovery of costs amounting to 2.5% of equity issuance proceeds.

Figure 19
Representative Flotation Cost Adjustment Calculation

		Without Adjustment [1]	With Adjustment [2]
Flotation Cost Share of Issuance Proceeds	[a]	n/a	2.5%
Sample Average Dividend Yield	[b]	3.4%	3.5%
Growth Rate Estimate	[c]	5.4%	5.4%
Single Stage DCF Cost of Equity	[d]	8.8%	8.9%
Sample Average Equity Market Value Ratio (%)	[e]	60.9%	60.9%
Sample Average Debt Market Value Ratio (%)	[f]	39.1%	39.1%
Sample Average Cost of Debt Estimate	[g]	4.8%	4.8%
Tax Rate	[h]	26.1%	26.1%
Single Stage DCF Overall Cost of Capital	[i]	6.8%	6.8%
ConEd Regulatory Equity Ratio (%)	[j]	50%	50%
ConEd Regulatory Debt Ratio (%)	[k]	50%	50%
ConEd Cost of Debt Estimate	[l]	4.5%	4.5%
Implied Cost of Equity	**[m]**	**10.2%**	**10.3%**

Sources and Notes:
[a]: Villadsen Direct Testimony.
[b], [c]: Table No. BV-6 - Panel A.
[d] = [b] + [c]
[e]: Table No. BV-4
[f] = 1 - [e]. For simplification, I include preferred equity in debt.
[g]: Table No. BV-7.
[h]: Composite State and Federal Tax Rate.
[i] = ([d] x [e]) + ([g] x [f] x (1 - [h]))
[j], [k]: ConEd Regulatory Capital Structure.
[l]: Representative Cost of Debt for A rated Utilities.
[m] = ([i] - [k] x [l] x (1 - [h])) / [j]

C. COST OF CAPITAL RECOMMENDATION

Q73. What do you recommend for Con Edison's cost of equity in this proceeding?

A73. I recommend that Con Edison be allowed to earn a 10.00 percent rate of return on the equity portion of its regulated rate base. This estimate is situated in the upper half of the reasonable range of 9.25 - 10.25 percent I obtained from the DCF and CAPM estimation. It is also consistent with the range of 9.75 to 10.25 percent that I obtained from the implied risk premium model. The fact that 10.00 percent is within what is observed for

all three models, DCF-based, CAPM-based, and Risk Premium, suggests that it is a central tendency of the data.

In my opinion, placing Con Edison's allowed rate of return in the upper half of the reasonable range of DCF cost of equity estimates, at the high end of the CAPM/ECAPM range, and in a range consistent with the implied Risk Premium model results is reasonable. As noted above, (i) Con Edison faces somewhat elevated uncertainty and business risk related to substantial changes in regulatory policy, and (ii) the TCJA has resulted in greater volatility of equity cash flows and negative credit quality impacts for the Company, which will only be partially offset by a higher equity ratio (*i.e.*, 50 percent).[89] Finally, although the illustrative ten bps flotation costs adjustment derived in Section VI.B above is not explicitly included in my model results or reasonable ranges, I believe my recommendation is sufficient to allow Con Edison to earn compensation for past (and potential future) equity flotation costs as a component of its ROE.

Q74. Does this conclude your direct testimony?

A74. Yes, it does.

[89] The impact of the TCJA on the Company is discussed in greater detail in the Direct Testimony of Yukari Saegusa.

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

ELECTRIC FORECASTING PANEL

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CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

ELECTRIC FORECASTING PANEL

I. INTRODUCTION

Q. Would the members of the Forecasting Panel please state their names and business address?

A. John Catuogno, Hock G. Ng, and Leanne M. Attanasio, 4 Irving Place, New York, New York 10003.

Q. By whom are you employed, in what capacity, and what are your professional backgrounds and qualifications, and current responsibilities?

A. **(Catuogno)** We are employed by Consolidated Edison Company of New York, Inc. ("Con Edison" or the "Company"). I am the Director of Resource Planning & Forecasting in Energy Management. I graduated from Polytechnic University with a Bachelor of Science degree in Mechanical Engineering in 1991 and with a Master of Science degree in Management in 2002. I am a registered Professional Engineer in the State of New York. I am an Adjunct Assistant Professor in the Mechanical Engineering Department of Manhattan College, where I perform graduate lectures on energy.

I joined Con Edison in 1991 and have held various positions of increasing responsibility in the Fossil Power, Nuclear Power Engineering, Steam Operations, and

Energy Management Organizations. Since December 2013, I have been the Director of Energy Management's Resource Planning & Forecasting Department. My responsibilities include oversight of daily peak, annual peak, monthly/annual energy revenue and volume forecasts for the electric, gas, and steam systems; electric resource planning; and technical and analytical support for long range plans, strategies, and industry trends and issues that affect the Company.

(Ng) I am the Section Manager of Electric Forecasting in Energy Management. I graduated from the University of Western Australia with a Bachelor of Economics degree in 1983. I also received a PhD degree in Economics in 1992 from Stanford University. Prior to joining Con Edison, I taught and performed research in economics and econometrics at various universities. In 2005, I began my employment with Con Edison as a Senior Planning Analyst in Corporate Accounting. In April 2018, I was promoted to my current position in Energy Management. My responsibilities include overseeing the development of the electric delivery volume and revenue forecast. I have also co-authored two articles dealing with forecast modeling issues that have been published in the

International Journal of Forecasting, and Systems Analysis Modeling Simulation.

(Attanasio) I am a Senior Planning Analyst in the Electric Forecasting Section in Energy Management. I received a Bachelor's degree in Economics (Honors Program) from Ateneo de Manila University in 1998. I also received a Master of Arts degree in Economics in 2008 and a Doctorate in Economics in 2010, both from Fordham University. I also hold the Chartered Financial Analyst® designation. Prior to joining Con Edison, I taught Economics and Statistics at Fordham and also managed the University's Master of Arts Program in International Political Economy and Development. Other positions I have held in the past involved derivatives trading and macroeconomic forecasting. In 2013, I joined Con Edison in the capacity of Analyst as an experienced economic modeler and forecaster. I have developed econometric time series models and forecasts for Orange and Rockland and Con Edison.

Q. Have you previously testified or submitted testimony in any proceedings before the New York State Public Service Commission?

A. **(Catuogno)** Yes, I have testified in Cases 09-S-0794, 09-S-0029, 07-S-1315, and 13-S-0032.

(Ng) I have testified in previous electric rate cases, including Cases 13-E-0030, 08-E-0539, and 07-E-0523, and submitted written testimony in Cases 16-E-0060, 15-E-0050, and 09-E-0428.

(Attanasio) I have submitted written testimony in Case 18-E-0067.

II. PURPOSE AND SUMMARY OF TESTIMONY

Q. What is the purpose of the Forecasting Panel's testimony?

A. The Panel presents the Company's forecast of electric delivery volumes, revenues, and system sendout for October 1, 2018 through December 31, 2022, and discusses the methodologies used to develop these forecasts.

Q. What is the difference between delivery volume and sendout?

A. Sendout refers to the total amount of electric energy that was sent out by the Company. Delivery volume refers to the amount of electric energy delivered to the customer as recorded at the customer's meter. The latter differs from the former because of line loss in the system.

Q. What is the purpose of the delivery volume and sendout forecasts?

A. The delivery volume forecast is used to determine the revenue forecast. The delivery volume and revenue forecasts are then used by the Company's Rate Engineering department to determine rates per service class. The sendout forecast is used by Company Witness Kimball to develop the electricity supply cost forecast.

Q. What were the actual and normalized delivery volumes for the 12 months ended September 2018?

A. The actual CECONY service territory delivery volume for the 12 months ended September 2018 was 56,943 gigawatt hours ("GWh"). The normalized delivery volume for this period was 55,585 GWh. The normalization procedure is detailed in DPS-1-92.

Q. Would you please summarize, in aggregate form, your delivery volume forecast?

A. The delivery volume forecast for the three months ending December 2018 is 13,078 GWh. The delivery volume forecast for the 12 months ending December 2019 is 54,764 GWh. The delivery volume forecasts are 54,047 GWh for the 12 months ending December 2020 ("Rate Year" or "RY1"), 52,757 GWh for the 12 months ending December

2021 (which we will refer to as “RY2”), and 51,751 GWh for the 12 months ending December 2022 (which we will refer to as “RY3”).

Q. Would you please summarize, in aggregate form, your delivery revenue forecast?

A. The delivery revenue forecasts are $8,111.981 million for the 12 months ending December 2019, $7,913.718 million for RY1, $7,921.790 million for RY2, and $7,878.911 million for RY3.

Q. What is the actual and normalized sendout for the 12 months ended September 2018?

A. The actual franchise area sendout for the 12 months ended September 2018 was 61,085 GWh. The normalized sendout for the same period was 59,551 GWh.

Q. Please summarize your sendout forecasts.

A. The sendout forecast for the three months ended December 2018 is 13,729 GWh. The sendout forecast for the 12 months ending December 2019 is 58,842 GWh. The sendout forecasts are 58,020 GWh for RY1, 56,420 GWh for RY2, and 55,163 GWh for RY3.

Q. Do you have any exhibits that accompany this testimony?

A. Yes, we are presenting nine exhibits, Exhibit ___ (EFP-1) through Exhibit ___ (EFP-9).

Q. Were these nine exhibits prepared under the Panel's direction and supervision?

A. Yes. We will describe each of these exhibits in the course of our testimony.

III. DELIVERY VOLUMES BY SERVICE CLASSIFICATION

Q. What forecasting methodologies are used to project the electric delivery volumes for each service classification ("SC")?

A. The forecasts of delivery volumes for all SCs, except SC 5 (Electric Traction Systems), SC 6 (Public and Private Street Lighting), and SC 13 (Bulk Power – Housing Development) are based on econometric models. The forecasts of delivery volumes for SC 5 and SC 6 are performed on a deterministic basis, meaning we assume that delivery volumes remain at their current levels for these two SCs. The only customer in SC 13 is on Standby Service and the forecast for that customer is included as part of the forecast for Standby Service customers, which we discuss in Section III-I.

Q. Please explain why the Company uses a different methodology for SC 5 and SC 6.

A. SC 5 and SC 6 are small service classifications and their delivery volumes have not changed significantly over time.

Q. Are there any other delivery volume forecasts that are not based on econometric models?

A. Yes. For commercial customers receiving the Company's Business Incentive Rate ("BIR"), the Company forecasts delivery volumes by extending recent trends. For customers under the Recharge New York ("RNY") program, the Company forecasts the delivery volume ("below-the-allocation") that is exempt from the System Benefits Charge ("SBC") and Renewable Portfolio Standard ("RPS") charge on a deterministic basis. For customers under Standby Service programs (65 existing customers and six projected new customers), the Company performs an analysis of each individual customer's recent usage.

A. Econometric Models

Q. For which service classes did the Company use econometric models?

A. The Company used econometric models to forecast electric delivery volumes for SC 1 (Residential), SC 2 (Small Commercial), SC 8 (Master Metered Apartments), SC 9 (Large Commercial), and SC 12 (Multiple Dwelling Space

Heating). The Company's modeling periods, independent variables, and model structure are described below.

B. Modeling Periods

The Company developed the SC 12 econometric model on a monthly basis, using data from October 1993 through September 2018. The Company developed all other econometric models on a quarterly basis, using data from the fourth quarter of 1993 through the third quarter of 2018. Due to data availability issues, SC 12 had to be modeled with monthly data in the past. We continue to use the same model for SC 12 because it had performed well.

C. Independent Variables

The Company employs three types of independent variables – weather, dummy, and economic.

Weather variables, in terms of heating and cooling degree days, are included in all models to account for delivery variations due to differences in weather conditions.

Dummy variables are included in the SC 9 and SC 12 models to account for structural breaks in the data. Each dummy variable can take the value of zero or one, and is used to indicate the presence of sudden shifts in the level of the data. The inclusion of such a variable allows us to

isolate the impact of sudden breaks in the trend of a data series.

Economic variables are included in the various models as follows:

- The SC 2 and SC 9 models, which apply to small and large commercial customers, respectively, include the number of customers in the class, real electric price of the class, which refers to the price of electricity expressed in constant base-year dollars, and private non-manufacturing employment. The private non-manufacturing employment variable has not been seasonally adjusted.
- The SC 1 model, which applies to residential customers, includes the real electric price of the class and real disposable income.
- The SC 8 model includes the real electric price of the class.

D. Model Structure

Each econometric model consists of two parts: a regression model, which correlates the delivery volume with the set of independent variables selected into the

model; and an autoregressive integrated moving average ("ARIMA") model, which is discussed below. The combined model is often referred to as an ARIMAX model in modeling literature, where the letter "X" stands for the set of independent variables included in the model. The ARIMA model can take many different forms, and each model has its own ARIMA structure, statistically determined according to the data pattern of each SC.

Q. What is the purpose of including ARIMA as part of the modeling?

A. In forecast modeling, the model includes only a few key economic variables, such as real electric price, number of customers, income and/or employment. Although other economic variables may have an effect on electric delivery, they cannot be included in the model because they are not quantifiable, or there are no data available on them. The ARIMA mechanism captures the collective effect of these other variables. In addition, ARIMA also smoothes out autocorrelations in the data. Autocorrelation is the situation where the current value of a variable is significantly related to its own values in the recent past. It is frequently present in time

series data. If left unaddressed, the presence of autocorrelation leads to high forecast errors.

Q. Have you prepared an Exhibit showing the models that you have just described?

A. Yes, we have prepared a six-page document entitled "VOLUME FORECASTING MODELS." In the Exhibit, we provide the econometric models used for forecasting delivery volume for SCs 1, 2, 8, 9, and 12, as well as the sendout model.

MARK FOR IDENTIFICATION AS EXHIBIT ___ (EFP-1)

Q. What criteria are used to measure the accuracy of the econometric models?

A. The Company uses generally accepted criteria to measure the accuracy of each model. The Company tests many different model structures for each SC, with variations especially in the structure of the ARIMA part of the model. As was done in Cases 13-E-0030 and 16-E-0060, we use a Durbin-Watson value near two, a low standard error, and a high R^2 as criteria to select the full econometric model in each SC for forecasting.

Q. Have you prepared an Exhibit showing the measures of accuracy you have just described?

A. Yes, we have prepared a one-page document entitled "ELECTRIC FORECASTING MODEL STATISTICS." In this Exhibit, we present measures of model performance for SCs 1, 2, and 9. These three service classifications are featured in the Exhibit because they account for over 90 percent of total Con Edison delivery volumes.

MARK FOR IDENTIFICATION AS EXHIBIT ___ (EFP-2)

Q. Please explain this Exhibit.

A. The Exhibit lists the adjusted R^2, standard error, and Durbin-Watson statistic of the models for SCs 1, 2, and 9. All three statistics satisfy the criteria discussed above, indicating that the models fit the historical data very well.

E. Model Assumptions

Q. You listed the key economic variables used in the forecasting models as private non-manufacturing employment, real electric price, real disposable income, and the number of customers in each SC. Please explain how the data for private non-manufacturing employment are developed.

A. For the historical period, the Company uses the Bureau of Labor Statistics Current Employment Survey ("CES") data for New York City (through September 2018) and

Westchester County (through December 2004). Since the Bureau of Labor Statistics CES discontinued the Westchester County series at the end of 2004, the Company estimated the January 2005 – September 2018 employment figures for Westchester County by applying the most up-to-date year-over-year growth rates (obtained from the economic consulting firm Moody's Analytics, Inc. ("Moody's Analytics" or "Moody's") in September 2018) to the actual CES historical (2004) figures.

Q. How is the forecast for private non-manufacturing employment developed?

A. The private non-manufacturing employment forecast is developed using the forecast from Moody's. The Moody's forecast is also used by the New York Independent System Operator and other New York State utilities. The Moody's forecast is developed for New York State as a whole and for individual regions and counties within the State. The Company developed its forecast for New York City by applying the annual growth rates available in the Moody's database in September 2018 (the most current available at the time the forecast was developed) to the CES actuals. The Company developed its forecast for Westchester County

by applying the annual growth rates available in Moody's database in September 2018 to the CES 2004 actuals.

Q. What is the projection for private non-manufacturing employment?

A. For the Company's service territory, private non-manufacturing employment is projected to increase by 1.7% in 2018, 1.0% in 2019, 0.1% in 2020, -0.1% in 2021, and 0.6% in 2022.

Q. How does the Company develop the forecast for real disposable income?

A. We use the forecast for real disposable income provided by Moody's.

Q. What is Moody's projection for real personal disposable income?

A. For the Company's service territory, Moody's projects that real personal disposable income will increase by 3.3% in 2018, -0.4% in 2019, -0.2% in 2020, 0.7% in 2021, and 2.2% in 2022.

Q. How is the data for real electric price developed?

A. For the historical period, we calculate the nominal electric price for each SC by dividing the total delivery revenue of full service customers in the SC by their delivery volume. We then divide the nominal electric

price by a price deflator to obtain the real electric price.

Q. What assumption does the model use for the real electric price variable in the forecast period?

A. As was done in Cases 13-E-0030 and 16-E-0060, we assume that the real electric price in the forecast period remains at the level it was in during the most recent 12-month period, which in this case is the 12 months ended September 2018.

Q. Are the foregoing projections of employment, real disposable income, and real electric price used as inputs in the forecasting models to generate the Con Edison delivery volume forecasts?

A. Yes.

Q. Please explain how you developed the customer forecasts for the various service classifications.

A. The forecasted number of customers for SCs 1, 2, 8, and 9 are based on quarterly ARIMA models, using data from the fourth quarter of 1993 through the third quarter of 2018. The forecasted number of SC 12 customers is based on a monthly ARIMA model, using data from October 1993 through September 2018.

The forecasted number of customers for SC 5 and SC 6 are done on a deterministic basis.

Q. How does the Company use the customer forecasts?

A. The forecasted number of customers in each service class is used to forecast the number of bills, which, in turn, is used in calculating the competitive delivery revenues, which we will explain later in our testimony.

Q. Have you prepared an exhibit showing the ARIMA models used for forecasting the number of customers?

A. Yes, we have prepared a five-page document entitled "CUSTOMERS FORECASTING MODELS." In the Exhibit, we provide the ARIMA models used to forecast the number of customers for SCs 1, 2, 8, 9 and 12.

MARK FOR IDENTIFICATION AS EXHIBIT ___ (EFP-3)

Q. Based upon the foregoing methodologies, what are the projections for customers for SC 1, SC 2, and SC 9?

A. We project the number of customers for SC 1, SC 2, and SC 9 to grow by the percentages in the table below. These three service classes account for over 99% of the total number of customers.

	2018	2019	2020	2021	2022
SC 1	0.79%	0.63%	0.45%	0.43%	0.48%
SC 2	3.15%	2.82%	2.70%	2.51%	2.38%
SC 9	0.24%	0.25%	0.15%	0.14%	0.18%

Q. Are the foregoing customer projections used as inputs in the forecasting models to generate the Con Edison delivery volume forecasts?

A. For SCs 2 and 9, these customer forecasts are used as inputs in their respective forecasting models. In addition, customer forecasts for all Con Edison service classes are used to project the number of bills to determine competitive charge revenues, as explained later in our testimony.

Q. Have you prepared an exhibit showing the economic assumptions you have described?

A. Yes, we have prepared a one-page document entitled "ECONOMIC ASSUMPTIONS." In this Exhibit, we provide projected values of the economic variables during the forecast period.

MARK FOR IDENTIFICATION AS EXHIBIT ___ (EFP-4)

F. New York Power Authority Volumes

Q. Are there other delivery volumes that are included in the forecast?

A. Yes. We also include New York Power Authority ("NYPA") volumes.

Q. Please describe the methodology for forecasting NYPA volumes.

A. We developed the NYPA volumes using a combination of methodologies – some items were developed on a deterministic basis and others based on econometric models.

For SC 66 (Westchester Street Lighting) and SC 80 (New York City Street Lighting), we forecast delivery volume on a deterministic basis based on recent billing data. We forecast the delivery volume for the new World Trade Center ("WTC") and the development of the Hudson Yards based on data provided by our Energy Services Department. We used econometric models to forecast the power supplied by Kennedy International Airport Cogeneration ("KIAC") to JFK Airport, and to forecast delivery volumes for all other NYPA service classes.

Q. Have you prepared an exhibit showing the models that you have just described?

A. Yes, we have prepared a three-page document entitled "NYPA VOLUME FORECASTING MODELS." In this Exhibit, we provide the econometric models used for forecasting NYPA delivery volume.

MARK FOR IDENTIFICATION AS EXHIBIT ___ (EFP-5)

G. Recharge New York Volumes

Q. Please describe how you develop the RNY delivery volume forecast.

A. We develop the delivery volume forecast for RNY by using historical data for the 12 month period that ended September 2018 of the customers who have accepted a RNY allocation offered by NYPA.

Q. How are the total delivery volumes for the franchise area derived?

A. The total delivery volumes are equal to the sum of Con Edison, NYPA, and RNY volumes.

H. Demand Side Management Programs

Q. Does your forecast of delivery volumes reflect the impact of demand side management ("DSM") programs?

A. Yes. The forecasts are net of the impacts of Con Edison's Energy Efficiency Transition Implementation Plan ("ETIP") programs, Con Edison's Demand Management Program ("DMP") through 2019, and the Company's current Non-Wires

Solutions (“NWS”) portfolio, including the Brooklyn Queens Demand Management Program (“BQDM”) as proposed in the testimony of the CES panel. The forecast also includes projected reductions attributable to other energy reduction programs, such as approved NYSERDA Clean Energy Fund (“CEF”) programs, as well as NYPA’s planned efficiency projects in the Company’s service territory.

Q. What sources are used for energy efficiency program forecasts?

A. The energy efficiency program forecasts are based on the energy efficiency programs described in the Customer Energy Solutions Panel testimony. As noted there, the energy efficiency programs proposed in this rate filing do not reflect the Commission’s December 13, 2018 “Order Adopting Accelerated Energy Efficiency Targets” in Case 18-M-0084 because of timing issues. However,the Company will reflect any change the Customer Energy Solutions panel makes resulting from that order on preliminary update.

Q. What sources are used in other program forecasts?

A. The Company included projected energy savings from its Demand Management Program based on Case 16-E-0060

(expiring 12/19) and its BQDM Program based on Case 14-E-0302.

Q. Is NYSERDA's CEF included in this forecast?

A. Yes, savings related to the NYSERDA CEF are included in this forecast. We based forecasted energy savings on the estimated market development benefits found in the Clean Energy Investment Plan: Budget Accounting and Benefits Chapter submitted by NYSERDA in Matter 16-00681, *In the Matter of the Clean Energy Fund Investment Plan*, and adjusted for expected future energy reductions in the CECONY service territory.

I. Other Volume Adjustments

Q. Are there any other adjustments to the delivery forecast?

A. Yes. The delivery volume forecast for CECONY customers includes the following additional adjustments:

1. Solar generation – to account for the projected reduction in delivery volumes associated with the installation of solar panels by customers who will then generate a portion or all of their energy requirements.
2. Standby service (DG/CHP) - to reflect the projected delivery volumes from customers who plan to convert

a portion, or all, of their existing load to on-site generation and will pay standby rates.

3. Conservation Voltage Optimization - to account for the projected reduction in delivery volumes associated with voltage optimization that is made possible when advanced metering infrastructure ("AMI") is installed.

4. Hudson Yards – to capture the projected delivery volumes from the development of the Hudson Yards, excluding the accounts that are eligible for NYPA rates. This adjustment is based on data provided by Energy Services.

5. Steam air-conditioning conversions – to capture the projected delivery volumes to customers who currently operate steam air-conditioning chillers and plan to convert to electric chillers.

6. Electric Vehicles – to capture the projected delivery volumes to customers who will be operating electric vehicles.

7. Shutdown and Decommissioning of Indian Point Generating Station – to capture the projected delivery volumes to power auxiliary services at the

Indian Point Generating Station after its units are permanently shutdown.

8. Temporary Gas Moratorium in part of Westchester – to capture the delivery volume to customers who might install electric heating systems due to the temporary moratorium on gas service in part of Westchester.

Q. Are you making any adjustments to the NYPA delivery volumes?

A. Yes. We adjusted the NYPA delivery volume forecast to reflect the projected reduction in delivery volumes from NYPA customers who plan to convert all or a portion of their existing load to on-site generation, as well as the projected delivery volumes to the WTC and the Hudson Yards accounts that are supplied by NYPA.

Q. Have you prepared an exhibit showing the adjustments you have made to the delivery volume forecast?

A. Yes, we have prepared a nine-page document entitled "DELIVERY AND SENDOUT ADJUSTMENTS." In this Exhibit, we provide the impacts on delivery volume due to items noted above. The impacts are listed, by service class, for each rate year.

MARK FOR IDENTIFICATION AS EXHIBIT ___ (EFP-6)

Q. For what periods are delivery volumes forecasted?

A. Quarterly. However, the quarterly delivery volumes need to be disaggregated into monthly amounts.

Q. Why do you need to disaggregate the quarterly delivery volumes into monthly forecasts?

A. Monthly delivery volumes are required to calculate revenues.

Q. How are the quarterly delivery volumes disaggregated into monthly delivery volumes?

A. Quarterly delivery volumes are divided into monthly delivery volumes by replicating the patterns of historical weather-normalized monthly delivery volumes. Monthly delivery volumes are also adjusted to reflect the differences in forecasted billing cycle days.

IV. REVENUE FORECAST

Q. Please explain the method of estimating Con Edison’s delivery revenues.

A. The delivery revenue forecast consists of both the non-competitive delivery revenues and the competitive delivery revenues. The non-competitive delivery revenues include revenues from customer charges, and the energy and demand delivery rates while the competitive delivery revenues are comprised of the Merchant Function Charge

("MFC"), Billing and Payment Processing Charge ("BPP"), and Metering Charge Revenues.

A. Non-Competitive Revenues

Q. Please explain the method of forecasting Con Edison's non-competitive transmission and distribution delivery ("T&D") revenues for the forecast periods.

A. The T&D revenues from the forecasted delivery volumes to Con Edison's customers are estimated by month and by service classification. For each of the energy-only classes (SCs 1 and 2), the Company develops a pricing equation by correlating the monthly average T&D revenue of the class to the monthly volume of the class, the number of billing days, and summer/winter rate differentials, if applicable, using data from February 2015 through January 2017. These pricing equations are an update of those used in Case 16-E-0060.

For each of the commercial classes (SCs 5, 8, 9, and 12), where energy and demand charges apply, the Company also develops a demand pricing equation by correlating monthly average T&D revenue of the class to monthly billed demand of the class, the number of billing-days, and summer/winter rate differentials, if applicable, using data from February 2015 through January 2017. The

T&D energy revenues for commercial classes are based upon pricing equations similar to those developed for the energy only classes. The delivery volume, billed demand and revenues of customers receiving BIR under Rider J and RNY customers are excluded from the data used in these commercial pricing equations. These pricing equations are then applied to the delivery and demand forecast of the respective service classes to obtain revenue at rates that went into effect on January 1, 2015. The revenue from the pricing models is then adjusted to reflect the rate changes that went into effect on January 1, 2017, January 1, 2018, and January 1, 2019.

Q. How do you forecast the revenues for customers not included in the pricing equations?

A. The forecast of T&D energy and demand revenues for BIR customers are based on the trend of actual BIR revenues over the 36 months ended December 2017, adjusted to reflect current rates.

The forecast of T&D revenues for the allocated portion of RNY customers are based on historical billing data for the same period used to develop the delivery volume forecast.

The T&D revenues for SC 6 and customers in SCs 8, 9, and 13 that are taking service under standby service were estimated by applying the appropriate tariff rates.

B. Competitive Revenues

Q. Please explain the method of estimating Con Edison's competitive delivery revenues for the forecast periods.

A. The MFC revenues represent the supply and credit and collection related charges. The service class delivery volumes for full service customers only were multiplied by the current MFC rate as determined in Case 16-E-0060.

The BPP revenues are determined by applying the BPP charge per bill to the forecasted number of bills. This charge is at the level set in Case 16-E-0060 and depends on the customer's choice of billing option and choice of service.

The Metering Charge is also on a per bill basis and applies to demand classes only (SCs 5, 8, 9, 12, and Standby Service). We similarly forecast this charge by using the rates set in Case 16-E-0060.

Q. Please explain the development of the forecasts of the number of bills for the various service classifications.

A. We determine the forecasted monthly number of bills by service class by adding the monthly year over year change

in the number of customers to the monthly number of bills for the twelve months ended December 31, 2017 (i.e., the historical period for which detailed billing data is available), as was provided to us by the Electric Rate Panel. For January 2018 through September 2018, this change in the number of customers is based on actual customer counts. For the forecast period, the change in the number of bills is based on the number of customers forecast.

Q. Please explain the projection of billable demand for Con Edison's commercial customers.

A. The billable demand forecast is the ratio of the forecasts for energy volume and the average hours use.

Q. How is the average hours use forecasted?

A. For each SC, the Company performs a detailed analysis of the relationship between historical delivery volumes and billable demand to determine the average number of hours of usage in each month. We then project these historical monthly averages as the forecasted hours use.

C. NYPA Revenues

Q. Please explain the method of estimating NYPA delivery service revenues for the forecast periods.

A. We forecast NYPA delivery service revenues by applying monthly average demand rates to the estimated billable demand. The estimated monthly demand rates are based upon the average actual demand rates for the 12 months ended September 2017, adjusted to reflect the rate changes that went into effect on January 1, 2017, January 1, 2018, and January 1, 2019. For NYPA standby service, the energy only classes, KIAC, WTC, and the Hudson Yards, the delivery revenues are estimated by applying the appropriate tariff rates to our forecast.

Q. Please explain the method of arriving at the estimated NYPA demand.

A. We based the monthly billable demand projections on an analysis of historical growth patterns and a three-year average of the historical ratio of monthly billable demand to the total annual billable demand. Billable demand is not applicable to small general services and non-New York City street lighting that only have an energy charge component.

Q. Please explain the method of arriving at KIAC billable demand.

A. We base the KIAC billable demand forecast on a method that is similar to that used in developing the Con Edison

commercial class demand forecast. We calculate the KIAC billable demand by taking the ratio of the energy volume forecast and the average hours use.

Q. How is the average hours use for KIAC forecasted?

A. We project it by using the relationship between KIAC's historical delivery volumes and billable demand.

Q. Please explain the method of estimating WTC and the Hudson Yards billable demand.

A. We develop the WTC and the Hudson Yards billable demand forecast based on a deterministic method using the estimated load levels provided by Energy Services.

Q. The revenue forecast also includes Market Supply Charge ("MSC") and Monthly Adjustment Clause ("MAC") revenues. Please explain how these components are forecast.

A. Rates for the MSC and MAC charges for each service class are supplied by the Electric Rate Panel. These rates are then multiplied into the delivery volume forecast for the respective service classes to determine, by service class, the MSC and MAC charges.

V. SENDOUT FORECAST

Q. How is the franchise area sendout forecast developed?

A. We use an econometric model to forecast the franchise area sendout on a quarterly basis.

Q. What variables are used in the sendout model?

A. We use weather variables in terms of heating and cooling degree days to account for variations due to differences in weather conditions. Like the delivery volume forecast, the key economic variables included in the sendout model are real electric price, total non-manufacturing employment, real disposable income and the number of customers. As with the private non-manufacturing employment series used in the delivery volume forecasting models, the total non-manufacturing employment series used in the sendout model is not seasonally adjusted.

Q. Please explain how the forecast variables are derived.

A. The bases for the real electric price and real disposable income are the same as for the delivery volume forecast. Total non-manufacturing employment is the sum of private non-manufacturing employment and governmental employment. The governmental employment projection is based on Moody’s Analytics’ forecast of total government employment. Total non-manufacturing employment is projected to increase by 1.5% in 2018, 0.9% in 2019, 0.1% in 2020, -0.3% in 2021, and 0.6% in 2022. The number of

customers is represented by a sales-weighted index of the number of customers in SCs 1, 2, 8, and 9.

Q. Does your forecast of system sendout reflect the impact of DSM programs?

A. Yes. Like the delivery volume forecast, the sendout forecast is net of the impact of the DSM programs.

Q. Are there any other adjustments made to the sendout forecast?

A. Yes. The sendout forecast is also adjusted for projected changes in each of the factors affecting delivery volumes as discussed in Section III above.

Q. How do you determine the sendout forecasts for the different categories of delivery volumes, such as NYPA, RNY and retail access delivery volumes?

A. The NYPA and RNY sendout forecasts are derived from their respective delivery volume forecasts. We apply the historical averages of distribution efficiency factors to the delivery volume forecast to account for the line loss in the system. Forecasts for retail access customers are done using a proportional allocation.

Q. How was the sendout for Con Edison full service customers derived?

A. It is derived by subtracting the sendout forecasts for NYPA, RNY, and retail access customers from the franchise area sendout.

Q. Do you need to disaggregate the quarterly sendout forecasts into monthly forecasts?

A. Yes. Company Witness Kimball requires the monthly full service sendout for forecasting fuel costs.

Q. How are the quarterly sendout forecasts disaggregated into monthly sendouts?

A. Quarterly sendouts are divided into monthly sendouts by reflecting the patterns of historical weather-normalized monthly sendout figures.

VI. FORECAST SUMMARY

Q. I show the Panel a one-page document entitled “ELECTRIC SENDOUT, DELIVERY VOLUMES, AND REVENUES FROM DELIVERY VOLUMES – FORECASTED THREE MONTHS ENDING DECEMBER 31, 2018, AND YEARS ENDING DECEMBER 31, 2019, DECEMBER 31, 2020, DECEMBER 31, 2021, AND DECEMBER 31, 2022” and ask if it was prepared under the Panel’s supervision and direction?

A. Yes, it was.

MARK FOR IDENTIFICATION AS EXHIBIT ___ (EFP-7)

Q. Will you please describe what is shown on this Exhibit?

A. Yes. This Exhibit shows the forecast of electric system sendout, delivery volumes and revenues from delivery volumes for the three months ended December 31, 2018 and the twelve months ending December 31, 2019, December 31, 2020 – RY1, December 31, 2021 – RY2, and December 31, 2022 – RY3. Lines 1 through 4 show sendout categories within the Con Edison franchise area, and the total sendout for each period. Lines 5 through 8 show electric system delivery volumes for the same categories. Lines 9 through 23 show revenues for each of the periods. For RY1, as shown in column 3, lines 24 through 29 show the proposed revenue increases from delivery volumes to Con Edison and NYPA customers, decreased revenues from discounts to low income customers, as well as the associated revenue taxes, and line 30 shows total revenue at the proposed rates.

Q. I show the Panel a document consisting of five pages, entitled “ELECTRIC DELIVERY VOLUMES AND REVENUES FROM DELIVERY VOLUMES BY SERVICE CLASSIFICATION” and ask if this Exhibit was prepared under the Panel’s supervision and direction?

A. Yes, it was.

MARK FOR IDENTIFICATION AS EXHIBIT ___ (EFP-8)

Q. Does this Exhibit set forth the results of the forecasts?

A. Yes. This Exhibit sets forth in greater detail, by service classification, the data that were shown in summary form on Exhibit ___ (EFP-7). Page 1 of this Exhibit shows the forecasted electric delivery volumes and revenues by service classification for the three months ended December 31, 2018. GWh delivery volumes are shown in Column 1, the sum of the monthly billable demand for Con Edison and NYPA in Column 2, non-competitive transmission and distribution delivery revenues at the current rates in Column 3, competitive service revenues at the current rates in Column 4, Reactive Power revenues at the current rates in Column 5, System Benefit Charge/Renewable Portfolio Standard revenues in Column 6, MSC, MAC, and DLM revenues in Column 7, revenue taxes in Column 8, and total revenues at current rates in Column 9. Pages 2 through 5 are similar in format to page 1; page 2 covers the forecast for 12 months ending December 31 2019, page 3 covers the forecast for RY1, page 4 covers the forecast for RY2, and page 5 covers the forecast for RY3. For the rate years, the low income discounts are shown as a separate item on line 9 at the level proposed by the Customer Operations Panel. For

RY1, as shown on page 3, the effect of the proposed changes in revenues, annualized for the Rate Year, are shown in Columns 10 through 13, with the associated increase in revenue taxes shown in Column 14. The proposed change in revenues from the purchase of receivables, as supplied by the Electric Rate Panel, is shown on line 10. Column 15 shows the total revenues at proposed rates. The total proposed revenue increase to Con Edison's customers of $417,925,000, exclusive of Gross Receipts Tax ("GRT"), consists of the non-competitive T&D related delivery revenue increase of $371,503,000, the customer charge increase of $48,014,000, the competitive service revenue decrease of $8,640,000, reactive power revenue increase of $560,000, and a MAC increase of $6,488,000. The proposed rates also result in increases, exclusive of GRT, in NYPA delivery revenue of $52,668,000, and reactive power revenue increase of $339,000. The resultant proposed overall increase for RY1, inclusive of the increase in rates and charges of $14,676,000 for revenue taxes, amounts to $485,415,000.

Q. Should this revenue forecast be used as the basis for setting the target revenues in the revenue decoupling mechanism ("RDM")?

A. Yes, the non-competitive delivery revenue forecast shown in Columns 3, 5, 10, and 12 on Page 3 of Exhibit ___ (EFP-8) should be the basis for setting the target revenue for each relevant service classification.

Q. Is the Company proposing any changes to the RDM?

A. No, we are not proposing any changes to the RDM.

Q. Please explain the current methodology.

A. The current RDM is based on a total class revenue approach. That is, at the end of each rate year, the Company will reconcile, by service class, the actual delivery revenues including reactive power revenue to the allowed delivery revenues, which include reactive power revenue. The Company refunds to customers if the actual delivery revenues are more than the allowed delivery revenues and surcharges customers if the actual delivery revenues are less than the allowed delivery revenues. The RDM is applicable to SCs 1, 2&6, 8, 9&5, 12, and NYPA. BIR, RNY, and Standby Service customers are excluded from the RDM.

Q. Assuming that retail access customers' supply costs were equivalent to the supply cost projected by the Company to its full service customers, and assuming that NYPA customers' supply costs were $0.063360/kWh, as specified in the testimony of the Electric Rate Panel, what is the overall percentage increase corresponding to the total overall revenue increase?

A. The percentage increase for RY1 is approximately 4.2 percent.

Q. Has the Electric Forecasting Panel prepared an exhibit that shows the future average prices of delivery and supply by service class, taking into account both the increase in proposed delivery rates and other expected changes, such as changes in the MSC and MAC?

A. Yes, we have prepared a one-page document entitled "FUTURE AVERAGE DELIVERY AND SUPPLY PRICES BY SERVICE CLASSIFICATION." In this Exhibit, we provide the forecast of the average price of T&D Delivery and Supply for each service classification for the three rate years. The supply charges reflect the effect of projected MSC and MAC charges based on the electric supply cost projections made by Company Witness Kimball. The delivery charges consist of projected non-competitive T&D

charges and projected competitive service charges based on three years of proposed delivery revenue increases as provided to us by the Electric Rate Panel.

MARK FOR IDENTIFICATION AS EXHIBIT ___ (EFP-9)

Q. Does this conclude the Panel’s direct testimony?

A. Yes, it does.