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Hager – Liddle

BEFORE THE PUBLIC UTILITY COMMISSION

OF THE STATE OF OREGON

UE 319

Cost of Capital

PORTLAND GENERAL ELECTRIC COMPANY

Direct Testimony and Exhibits of

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I. Introduction

Q. Please state your names and positions with Portland General Electric Company (PGE).

A. My name is Patrick G. Hager. I am the Manager of Regulatory Affairs at PGE. I am responsible for analyzing PGE's cost of capital.

My name is Chris Liddle. I am the Assistant Treasurer and Manager of Corporate Finance and Investor Relations. I am responsible for managing the company's treasury functions including financing as well as investor relations.

Our qualifications are included at the end of this testimony.

Q. What is the purpose of your testimony?

A. The purpose of our testimony is to recommend PGE's cost of capital and capital structure for the 2018 test year. PGE's requested cost of capital and capital structure are necessary to maintain its current credit profile for access to the debt and equity markets, to fund its significant capital investments planned for 2018, and to provide PGE the opportunity to earn a fair return for equity shareholders while keeping its costs reasonable. As Dr. Villadsen discusses in her testimony (PGE Exhibit 1100), guidance regarding the appropriate authorized cost of capital is provided by the Bluefield[1] and Hope[2] United States Supreme Court decisions as well as ORS 756.040.

Q. What is PGE's requested overall cost of capital for this filing?

A. We request and support a 7.46% cost of capital for the 2018 test year. This cost of capital includes a 9.75% authorized Return on Equity (ROE). Dr. Villadsen has also produced a recommended range for PGE's authorized ROE and 9.75% is below the mid-point of that range. This point estimate is for revenue requirement purposes. Table 1 below shows the

[1] Bluefield Water Works v. Public Service Comm'n - 262 U.S. 679 (1923)
[2] FPC v. Hope Nat. Gas Co. - 320 U.S. 591 (1944)

recommended cost of the two components of PGE's capital, common equity and long-term debt. Table 1 also shows PGE's forecasted 2018 capital structure.

Table 1
PGE's Weighted Cost of Capital
Test Year 2018

Component	Average Outstanding ($000) [1]	Percent of Capital [2]	Component Cost	Weighted Cost
Long-term Debt	$2,661,400	50%	5.170%	2.585%
Common Equity	$2,521,922	50%	9.750%	4.875%
Total	**5,183,322**	**100%**		**7.460%**

[1] "Average Outstanding" reflects PGE's projected average values of long-term debt and common equity for 2018.

[2] "Percent of Capital" reflects PGE's long-term targeted capital structure of 50% debt, 50% equity, and is used to calculate PGE's weighted average cost of capital (Weighted Cost).

Q. How is the remainder of your testimony organized?

A. In the following section, we describe PGE's financial goals and how we manage counterparty risks and liquidity. Section III provides a review of financial and market regulation changes as well as the recent and near future financial market and economic conditions. We discuss PGE's cost of long-term debt, including new and redeemed issuances in Section IV. In Section V, we discuss PGE's capital structure. Section VI provides our qualifications.

II. PGE's Financial Goals

Q. What is PGE's overall financial goal?

A. Our overall goal is to provide adequate capital and liquidity to fund PGE operations at the least cost and least risk to customers. For protection against unforeseen changes in cash flow and to manage daily cash and liquidity needs, we rely on our revolving lines of credit.

Q. Does PGE have additional financial goals?

A. Yes. As part of our overall financial goal, we have additional goals regarding financial performance, counterparty credit risk, and liquidity management, including:

- Solid financial performance:
  - Maintain investment grade credit ratings;
  - Access financial markets at reasonable terms to provide liquidity for operations and capital expenditures;
  - Achieve an actual ROE that is commensurate with the ROE achieved by a group of utilities with similar characteristics, service territory, and business risks;
  - Maintain a capital structure of approximately 50% debt and 50% equity over time;
  - Set retail prices at a level sufficient to recover prudently incurred costs, including an overall return on utility investment, while taking into account the economic conditions of our customers; and
  - Manage counterparty credit risks, wholesale and retail, to protect our customers and PGE.

A. Solid Financial Performance

Q. Why is it important for PGE to maintain an investment grade rating?

A. It is essential for PGE to maintain an investment grade rating in order to secure financing for both debt and equity, at reasonable rates, especially in today's volatile financial environment, and to maintain access to wholesale energy markets. Without an investment grade rating, PGE's access to financing would be more limited, at higher rates, and PGE would have to provide significant additional collateral to its counterparties (and may lose the ability to trade with some counterparties) in the wholesale power market, which would result in higher costs to customers.

Q. How does PGE maintain its investment grade credit rating?

A. Fundamentally, PGE's credit rating is a function of its financial performance, which is driven by PGE's retail prices and its ability to manage costs. The rating agencies, as well as equity investors, expect companies to achieve certain financial performance standards to achieve an investment grade credit rating, as demonstrated in the financial and liquidity ratios that the rating agencies publish. PGE takes various steps to ensure that our financial performance continues to place us within the range of the appropriate financial ratios. We accomplish this through our continuous financial management that includes: closely monitoring our budgets; minimizing our costs to finance operations through the optimal use of revolvers, long-term debt, and equity; closely monitoring our capital structure; and by analyzing our counterparty risks and taking appropriate mitigation measures. Using all of these measures helps us maintain our financial performance levels that are necessary to maintain our investment grade credit ratings.

Q. Financial performance is an important element for the rating agencies. Do they consider other factors?

A. Yes. Other factors that rating agencies consider include regulatory and recovery risk, corporate operations and growth, customer and portfolio diversification, and liquidity and financial measures. We note that in the past, the rating agencies have been concerned with PGE's earnings volatility due to one-time but significant write-offs, the asymmetric deadband on the Power Cost Adjustment Mechanism (PCAM), and Oregon regulation, in general. PGE closely monitors the evolving rating agencies' methodologies and annually visits the major rating agencies for presentations and discussions.

Q. Have PGE's bond ratings changed recently?

A. No. However, PGE did receive two upgrades on its long-term debt from Moody's in the past few years. PGE's long-term debt ratings from Moody's are two notches higher than Standard & Poor's (S&P). These ratings were recently affirmed but PGE continues to take steps to meet S&P's ratings criteria for an upgrade, which would help lower financing costs for customers through lower pricing on revolving lines of credit and new debt.

Q. What does PGE do to ensure an optimal long-term cost of capital?

A. PGE aims to issue long-term debt so that debt maturities closely match investment schedules of our capital projects. We use First Mortgage Bonds (FMBs) as the primary form of debt because it has lower cost than unsecured alternatives. PGE evaluates private placement market rates, bank term loans and delayed draw/forward structures to arrive at the lowest financing costs available to PGE at the time of our financing need.

Q. How does PGE determine the timing of its financing?

A. PGE forecasts its cash needs, which include capital expenditures, debt maturities, dividends and changes in working capital, and attempts to match the timing and amount of its long-term financing proceeds to meet those requirements. In the past, PGE has used a delayed draw for its long-term bonds that allows us to fix the interest rate on the upcoming bond issue, removing interest rate and funding risk**.**

Q. Does PGE's financial performance help PGE to maintain its desired long-term capital structure?

A. Yes. As we stated earlier, our desired long-term capital structure is 50% equity and 50% long-term debt, although it may fluctuate from year to year. We believe that the 50% equity in our capital structure helps us to better withstand difficult situations, such as under-earning due to events outside of our control. To maintain this ratio, we use several techniques and tools as we discussed above. In addition, we require sufficient retail revenues to maintain the required financial ratios and investor expectations for our long-term capital structure. In the future, we look to continue to use equity issuances, stock repurchases, capital expenditure programs, the debt market, and cash from operations to help us maintain our desired capital structure.

B. Manage Customer and Counterparty Credit Risks

Q. Why is it important for PGE to manage customer credit risks?

A. PGE attempts to minimize its exposure to customer defaults. PGE's energy deliveries and revenues are subject to industry and customer-specific risks and uncertainty, including potential shut down of plants, curtailment of operations, or new capacity as a result of changed economic or specific circumstances. In fact, since the onset of the Great Recession in 2008, a number of our large customers have filed for bankruptcy, liquidated businesses, changed ownership or permanently shut down operations, substantially affecting PGE's actual and anticipated energy deliveries. In particular, in 2015, a large paper manufacturer closed, causing a decline in deliveries. In 2016, operational changes in our solar and metals manufacturing customers caused a further decline in deliveries. Large customer-related energy deliveries and revenue risk is asymmetric, in that through our discussions with our large customers, we are often aware of large expansions and increases to loads in advance to plan for adequate service, but the same notice is not necessarily known or given when customer's energy deliveries significantly decline.

Q. How does PGE manage this customer credit risk?

A. PGE performs credit reviews of our customers and in particular our large customers and associated industries, with high-tech being the most relevant example. Our load forecasters work closely with PGE's Key Customer Managers to gain a better understanding of the business forecasts provided by our customers and their potential consequences on PGE retail load. After our review, we then determine the appropriate deposit required of a large customer. This deposit typically is up to one-sixth of the annual bill.

Q. How does PGE manage counterparty risk?

A. PGE manages its counterparty risk in wholesale power transactions using the same methods as for our large customers. We perform credit reviews of our wholesale power customers, both purchasers and sellers, and then determine the appropriate amount of collateral that we will require from a counterparty based on their credit risk profile. We also set a minimum credit rating below which we will not trade with the counterparty.

C. Liquidity Management

Q. What is PGE's strategy for liquidity management and related revolving credit facility sizing?

A. PGE's strategy is fourfold:

- Carry sufficient credit levels to support both operational and power supply needs over a five year forward looking time horizon.
- Achieve designation of adequate or better from rating agencies (based on Moody's and S&P's interpretation of our liquidity).
- Fund short-term debt requirements using commercial paper or revolving credit facility loans as appropriate. Issue letters of credit in lieu of cash collateral if pricing is right.
- Manage market exposure related to maturing lines of credit by replacing lines one year prior to maturity.

Q. Has PGE separately analyzed its revolving lines of credit requirements?

A. Yes. PGE periodically analyzes its revolver requirements separately for power supply and other operational needs, the sum of which yields the total liquidity requirement for PGE's needs. The separation has allowed PGE to ensure that its power and gas procurement efforts have enough liquidity to meet collateral requirements while also maintaining sufficient liquidity for other operations.

Q. When did you last perform such an analysis?

A. We last analyzed our revolving lines of credit requirements in the fall of 2016.

Q. What were the results of your fall 2016 analysis?

A. Based on our 2016 analysis, we determined that PGE's current revolver of $500 million is sufficient to meet our liquidity needs in support of power supply and other operations. We will monitor the need to increase the revolver in 2018 based on the outcome of the Integrated Resource Planning process and subsequent competitive bidding process.

Q. Did you determine if the results of your analyses would affect PGE's ratings by Moody's and/or S&P?

A. Yes. For Moody's criteria, our analysis found that our liquidity profile would be rated "adequate" in 2017 and 2018. For S&P, we would be rated "strong" in 2017 and would be rated "adequate" in 2018 based on their rating criteria. Based on this set of analyses, we determined that our current revolver capacity of $500 million is sufficient at this time.

III. Uncertainty in Regulation, Accounting, and Financial Markets

A. Regulation and Financial Markets

Q. What are PGE's current bond ratings?

A. PGE's current bond ratings for secured (first mortgage) long-term debt are A1 from Moody's and A- from S&P. Ratings for unsecured debt are A3 and BBB. PGE's credit ratings, which were recently affirmed, are provided in PGE Exhibit 1002.

Q. You noted above that rating agencies consider a Commission's regulatory policy when determining a company's rating. Can you provide some additional detail?

A. Yes. Regulatory policy that supports timely recovery of prudent costs is essential to maintaining a stable, investment grade credit rating. Both Moody's and S&P consider regulatory policy a key factor in their determination of a utility's creditworthiness. Moody's places 25% weight on the factor "Regulatory Framework" (with the other three factors and their weights being "Ability to Recover Costs and Earn Returns," 25%, "Diversification," 10% and "Financial Strength and Liquidity," 40%).[3] S&P indicates that "[r]egulation is the most critical aspect that underlies regulated integrated utilities' creditworthiness."[4] Key characteristics in the assessment of regulatory environment for both credit rating firms include the consistency and predictability of Commission decisions, as well as the ability for timely recovery of prudently incurred costs.

Q. Have financial analysts or rating agencies noted any concerns regarding regulatory outcomes as they pertain to PGE?

[3] "Rating Methodology – Regulated Electric and Gas Utilities." Moody's Investor Service- December 23, 2013.
[4] "Key Credit Factors for the Regulated Utilities Industry." Standard & Poor's- November 19, 2013.

A. Yes. Both Moody's and S&P have expressed some concern regarding the recovery of PGE's capital costs for Carty.[5] They expect that the increased costs for Carty will be recovered either through the litigation proceedings occurring between PGE, the Carty construction contractor, and two sureties who provided a performance bond on the project, or through retail rates.

Q. Do financial analysts have additional concerns regarding regulatory outcomes for PGE?

A. Yes. Sell side analysts have noted that the Public Utility Commission of Oregon (OPUC) has historically allowed ROEs that are slightly below the national average, but they also note that recent settlements have included constructive outcomes such as timely rate recognition of investment, forward looking test years, revenue decoupling, and a renewable adjustment clause.[6] In the past, the rating agencies have stated concerns regarding the asymmetric nature and size of the deadbands in the PCAM, and it has been an ongoing concern expressed by financial analysts.

Q. What concerns have financial analysts expressed regarding the PCAM?

A. Most electric utilities tend to have a 'pass through' of their power costs if a PCAM is in place, with no deadbands. PGE's asymmetrical deadband is unique. Thus, it is not unexpected that analysts' concerns surround the wide deadband and the asymmetry of benefits allocation, which could result in "meaningful" impacts on PGE's earnings, increasing volatility. Wells Fargo mentions the following risks for PGE: negative regulatory developments; Request For Proposal outcome uncertainty; and risks related to the

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[5] "Portland General Electric", Credit Opinion, Moody's Investment Service, July 8, 2016
"Portland General Electric", RatingsDirect, S&P Global Ratings, June 23, 2016
[6] "POR Maintained Guidance; IRP Pending - Hold." Gabelli & Company- October 31, 2016.

asymmetrical PCAM (hydro, plant outages, etc.).[7] J.P. Morgan lists PGE fuel and purchased power recovery mechanism as a source of risk: “any combination of a reduction in hydro conditions or an increase in the price of coal or natural gas could adversely impact POR’s near-term earnings.”[8] Key Banc views the PCAM as a source of “earnings variability related to fuel price volatility” and has stated that “[a]ny opportunity to make changes to this mechanism to reduce earnings risk around fuel would be viewed positively.”[9]

Q. How does increased earnings volatility impact PGE’s cost of capital?

A. Financial theory states that, all else equal, increased earnings volatility results in increased uncertainty or risk. This is because investors and creditors require greater compensation for owning an investment with more risk. A firm with greater earnings volatility will have a higher cost of capital than a firm with more stable earnings. If the current PCAM structure results in a higher level of earnings volatility relative to that faced by comparable firms, then investors’ required rate of return for PGE will be higher as well. As a result, investors will demand a higher return to hold PGE’s debt or common stock increasing the cost to finance PGE activities.

B. Update of Financial and Accounting Regulation Changes

Q. How have financial sector regulations changed?

A. Following the financial crisis, policymakers and regulators have sought to impose tougher rules and standards on banks in hopes of preventing future systemic crises. Regulatory efforts have been primarily focused in the following four areas: higher capital requirements (including higher minimum ratios and higher quality capital); new liquidity standards (new ratios and requirement for higher quality liquid assets); assigning higher capital

[7] “POR: CapEx Comes Through On Q3 Update” -Wells Fargo Equity Research- 28 October 2016
[8] “U.S. Utilities & Power Outlook.”-J.P.Morgan-16 December 2016
[9] “Utilities – ALERT: Edison Electric Institute.” –Key Banc Capital Markets- 8 November 2016

requirements and increasing supervision for the largest financial institutions (Systemically Important Banks); complying with money market reforms (causing a significant shift from prime fund to government funds and impacting yields); and adopting national initiatives (Dodd-Frank and Volker rule).

Q. How did commercial banks meet these new requirements?

A. First, the banks began tightening of lending standards during 2012, making it more difficult for firms to access credit, potentially increasing firms' costs to obtain credit. Second, banks were forced to participate in the liquidity scenarios outlined by central banks around the world, encouraging many banks to maintain more reserves on hand than they had historically. One additional result is that U.S. banks have significant excess reserves at the Federal Reserve Bank (Fed),[10] leaving less available for lending.

Q. Have these new requirements affected PGE's ability to access funds?

A. PGE has yet to see a significant impact due to these requirements. In 2015, we saw some financial stress passed through to PGE and other utilities as banks complied with the Basel III regulation (full compliance is required by 2019). However, we have yet to experience the notable increase in borrowing costs we expected to result due to this stress. Banks have chosen to be more particular when lending funds and, therefore, the availability of credit has tightened for certain entities.

Q. What challenges does PGE face in connection to imputed debt?

A. PGE faces significant risks and uncertainties connected with imputed debt from purchased power contracts: S&P "imputes" additional debt to PGE's capital structure based on the payments from long-term power purchase agreements (PPAs). S&P believes that because of

[10] http://research.stlouisfed.org/fred2/series/EXCSRESNS.

these quasi-debt instruments an adjustment must be made to the capital structure to reflect the additional leverage of PPA contracts. Significant increases in the debt ratio are a quantitative trigger for potential ratings downgrades. A ratings downgrade by S&P from PGE's current rating could result in higher interest rates on debt issuances, an inability to attract equity capital at a reasonable price, and additional collateral postings for power supply operations.

Q. What challenges does PGE face in connection with Financial Accounting Standards Board Accounting Standards?

A. Accounting Standards Codification (ASC) 810 Consolidation of Variable Interest Entities (VIE) provides guidance for determining the financial reporting for entities over which control is attained by means other than through voting rights. Under ASC 810, consolidation is based on the power to direct significant activities of the VIE and the obligation to absorb losses that are significant to the VIE. The entity with the power to direct significant activities and the obligation to absorb significant losses becomes the "primary beneficiary" of the VIE and, in turn, is required to consolidate the financial statement of the VIE for financial reporting to the SEC. ASC 810 requires consolidated financial statements to reflect total assets under control and total liabilities for which an entity is responsible.

Under ASC 810, PGE may be required to reflect the total assets, liabilities and non-controlling interests of its PPA counterparties on PGE's balance sheet on an ongoing basis when reporting its financial position on a consolidated basis. Although PGE is not involved in the creation of these entities and has no equity or debt invested, we may be required to consolidate the financial results of PPA counterparties with our own. The counterparty entities are expected to be highly debt-leveraged and consolidating their capital structure will likely distort PGE's authorized capital structure. High debt leverage will impact PGE's creditworthiness, as the increase in PGE's debt-to-equity percentage increases financial risk. To support PGE's creditworthiness and realign its capital structure, an increase to PGE's common equity could be necessary to offset the impact of the additional debt, consolidated under ASC 810.

Q. Has the Financial Accounting Standards Board revised or added Accounting Standards that could impact PGE?

A. Yes. In February 2016, ASC 842 Leases was updated by the Financial Accounting Standards Board. The new standard will require operating leases to be recorded on a company's balance sheet as a right of use asset with a corresponding lease liability. On the income statement, capital lease assets will be amortized and recorded within applicable depreciation and amortization periods, and the minimum lease payments will be split between principal and implied interest, which will be recorded as interest expense. Operating leases will record amortization and interest expense as one straight-line value within operating expense on the income statement. PGE is in the process of quantifying the impacts of the new lease standard and plans to adopt the standard no earlier than its effective date of January 1, 2019. In light of our earlier discussion on imputed debt, PGE continues to have discussions with S&P as well as Moody's regarding their expected treatment of these changes for ratings purposes; however, nothing definitive is available yet.

C. Macroeconomic Uncertainty

Q. One factor that can certainly affect bond ratings is the economy, as earnings are partially driven by economic growth. Can you provide a brief overview of the recent years' market conditions and going forward?

A. Yes. First, we should expect some uncertainty in financial markets due to the change in the U.S. presidential administration and the expected changes in fiscal and monetary policy direction. Second, the U.S. economy has become more integrated into the world economy over time. Thus, developments in other parts of the world can affect the U.S. economy and require additional awareness of these developments. In addition, most developed countries continue to grapple with the challenge of taking appropriate fiscal and monetary policy actions in the aftermath of the financial crisis, with several central banks pursuing *negative* interest rates. Of significant concern is the euro zone. The euro zone grew slightly in the first quarter of 2016, but the growth slowed in the second half of the year. The lack of growth in the euro zone can impact the U.S. economy as the demand for its exports will decline, due to lower income in the euro zone as well as the strengthening dollar. Of particular concern in the euro zone are:

- Britain's 2016 vote to exit the European Union (EU), or 'Brexit'. The separation of Britain from the Common Market will have significant impacts on the financial markets, although no one is quite certain what those impacts will be. For example, London is the center for much of the European financial industry and if Britain departs from the EU, then that financing may migrate to Frankfurt or another EU financial center. Also, trade between Britain and the EU (and between Ireland and Britain) is likely to be disrupted as the EU imposes tariffs or other trade measures until a trade agreement is negotiated. The euro and the pound are both likely to be impacted and the dollar is likely to strengthen as investors seek stability.

- The continuing political development in Greece. Greece elected a government that pledged to cancel the austerity program imposed by outside financial entities in exchange for additional lending to Greece. The current government continues to negotiate with international lenders and to pursue no additional austerity measures. This situation will likely continue in 2017 and beyond and will continue to have an impact on the financial markets.
- The Italian banking crisis. Italy's banks are being weighed down by several hundred billion dollars in bad loans, which they are having difficulty divesting. They are also struggling with basic profitability as Italy's economy is at a standstill and not expected to grow more than 1% in the coming years. Failure of Italy's banks could result in negative financial consequences across Europe with potential effects on global markets.

Another macroeconomic factor that needs to be considered is the expected rise of interest rates. The Fed ended its quantitative easing in 2014 and has raised rates twice within the last 14 months. The most recent increase of a quarter of a percentage point occurred in December 2016, and the Fed has forecasted three quarter-point increases in 2017 with the stated caveat that the impact of new economic policies could alter future decisions.[11]

Q. Do potential risks remain in the U.S. or global economies?

[11] "Fed Raises Rates for First Time in 2016, Anticipates 3 Increases in 2017" The Wall Street Journal, 15 December 2016
http://www.wsj.com/articles/fed-raises-rates-for-first-time-in-2016-anticipates-3-increases-in-2017-1481742086

A. Yes. Rating downgrades or deteriorating credit quality of a country may result in a decline in the value of government bonds held by banks, triggering losses. Where the securities are used as surety for funding or derivatives, banks face calls for additional collateral, draining liquidity from markets.

Banks may be forced to hedge their credit value adjustments - adjustments made to account for the credit risk of counterparties. This hedging is usually done by purchasing default protection on sovereign entities or shorting government bonds. This will exacerbate losses as sovereign entities' bond values fall further.

Market constraints may necessitate use of proxies for sovereign entities, including shorting or buying insurance on equity indices or major stocks. Banks may short sell the currency as a de facto hedge. Proxy hedges transmit the volatility into other asset markets. This creates additional risk as volatility spikes sharply and correlation between major asset classes becomes unstable, especially in a risk-on risk-off trading environment.

IV. Cost of Long-Term Debt

Q. How did you calculate the cost of long-term debt for 2018?

A. PGE Exhibit 1001 presents the amount and the effective cost of PGE's outstanding long-term debt for the test year. This includes existing bond issuances as of January 15, 2016, as well as bond issuances and retirements expected in 2017 and 2018. We included the applicable adjustments to debt as approved in OPUC Order No. 07-015 when calculating the amount of debt outstanding. The full amount and cost for each issuance of debt outstanding at year end is included. We then multiply the amount outstanding by the effective interest rate for each bond issuance. The effective interest rate represents the internal rate of return for each of the cash flows associated with each debt issuance, including all unamortized call premiums and issuance expenses for debt issuances replaced before maturity with less expensive financings. Table 2 below summarizes PGE's cost of long-term debt for test year 2018.

Table 2
PGE's Cost of Long-Term Debt ($000)

	2018 Forecast	UE 294* Order No. 15-356	Difference
Principal Amount	$ 2,661,400	$ 2,344,400	$ 317,000
Annual Interest Cost	$ 137,603	$ 125,443	$ 12,160
Effective Interest Rate	**5.170%**	**5.350%**	**(0.180)%**

** UE 294 figures include amounts from long-term debt issued in January 2016.*

Q. What future debt issuances did you include in your analysis?

A. We expect to issue $450 million in long-term fixed rate debt during 2017, and have included the full amount in our calculation as our current best estimate. At this time, we do not anticipate the need to issue long-term debt in 2018. We will provide an update to our cost of long-term debt in our rebuttal testimony, which will include changes in long-term debt for 2018, if any.

Q. What is the expected term, coupon rate, and issuance cost for the bonds to be issued in 2017?

A. PGE currently expects to issue three 30-year tranches of FMBs in 2017 with an estimated coupon rate of 4.24%. The first tranche is expected to be issued early in the year, and the second two tranches are expected to be issued late in 2017. We will update our cost of debt as actual terms become available.

Q. How were the estimated coupon rates and issuance costs derived by PGE?

A. The rates are based on an indicative new issuance pricing analysis, which includes a current estimated credit spread provided by a subset of PGE's investment banks and a forecast of treasury rates from Global Insight.

Q. Is any long-term PGE debt maturing in 2017 or 2018?

A. Yes. PGE has $150 million of term loans maturing in November 2017. At present, there are no maturities in 2018.

V. Capital Structure

Q. How did you determine the appropriate capital structure for 2018?

A. We evaluated PGE's capital structure using the forecasted income statement and balance sheet for 2018. Additionally, we considered several factors, including PGE's need to maintain its financial strength; flexibility and adequate liquidity; its ability to maintain reliable and economical access to the capital markets; minimizing the cost of capital to customers and shareholders; and the Commission's Order in UE 294 (Order No. 15-356). We also considered PGE's desire to maintain a capital structure consisting of 50% long-term debt and 50% equity.

Q. Does PGE expect to issue common equity in 2018?

A. No. At this time PGE does not anticipate additional equity issuances but we will provide an update if our financing plans change**.**

Q. Are you seeking a different capital structure than that in UE 294?

A. No. In UE 294, Order No. 15-356 adopted a settlement among the parties that reaffirmed PGE's regulated capital structure at 50% equity and 50% debt. PGE's long-term goal continues to be to maintain our capital structure at 50% equity and 50% debt; however, the equity ratio fluctuates around the 50% target level, due to the timing and size of debt and equity issuances.

Q. Why does PGE intend to maintain 50% equity in its capital structure?

A. It is the optimal debt-to-equity ratio for PGE because it offers a balance between the ideal debt-to-equity range and reduces our cost of capital. The equity portion of PGE's capital structure is important because it represents how PGE finances its cash needs. In addition, the equity portion helps offset the leverage and risk that PGE encounters, in part, as it has finished its large capital expenditure program. It is also required to help offset the leverage imputed by the rating agencies due to purchased power. In light of ASC 810 (discussed above), understanding and mitigating the leverage created by imputed debt is also important. Additionally, PGE faces risks in today's banking environment because of its small size, and it must maintain a solid capital structure and financial flexibility to help contain customer costs and retain shareholder value.

Q. Aside from the risks discussed above, what other types of significant risks does PGE encounter today?

A. PGE encounters a variety of risks including:

- Hydro and wind availability and weather changes: Weather creates risk for PGE in several ways, including: lower than average stream flows; lower than average wind flows and/or the timing of it; and volatility in electricity usage because of sudden, unexpected weather changes and severe storms. These risks are not mitigated by our decoupling mechanism and can potentially force PGE to purchase more spot energy, when the markets may be tight. The costs resulting from these purchases could be greater than what is included in customer prices.
- Regional economic weakness: Regional economic weakness can adversely affect PGE's revenues. Weakness in the state of Oregon's economy, can lead to a decline in electricity usage as customers conserve electricity in response. This can negatively impact PGE's revenues, thereby reducing PGE's profits, which negatively affect PGE's retained earnings and returns to investors. Lower retained earnings affect our ability to reinvest in the business. Oregon's economy was especially hard-hit during the recession and financial crisis of 2008, and has only recently recovered.

- Uncertainty regarding financial and business operations contingencies: as noted in our SEC annual 10-K and quarterly 10-Q filings.[12] PGE could be vulnerable to cyber security and physical asset attacks. The electric industry is going through accelerated technological changes, which can make a basic premise of the current business model (economies of scales gained from central generation facilities) obsolete. Our workforce is aging, and PGE is starting to experience difficulties in finding replacements for key positions.
- Uncertain federal and state energy policy: legislative or regulatory efforts to reduce greenhouse gas emissions and water discharges from thermal plants could lead to increased capital and operating costs. Operating changes required from PGE in order to comply with existing and new laws related to fish and wildlife also could materially increase PGE costs.

Q. Do the financial markets agree that these are risks for PGE?

A. Yes. Recent reports from various equity analysts include at least one of the risks listed above. We have included the most recent reports from Wells Fargo and Ladenburg Thalmann in our confidential work papers.

Q. Can PGE mitigate these risks?

A. PGE can manage some of these risks, but not others. For risks that PGE can manage, PGE develops management capabilities and core competencies, as well as establishes strong processes and procedures to mitigate those risks. PGE is proactively implementing programs that will better prepare us for the operational impacts of adverse events. For

[12] http://investors.portlandgeneral.com/sec.cfm
Starting with page 116,Note 18- 2015 SEC Form 10-K
http://files.shareholder.com/downloads/POR/328496689x0xS784977-16-111/784977/filing.pdf
Starting with page 26 Note 7- the most recent 10/28/16 SEC Form 10-Q

example, recovery from catastrophic events remains a key strategic focus of PGE. PGE's office of Business Continuity and Emergency Management has developed formal recovery plans to address disasters and implement emergency management procedures. PGE is also taking measures to address cyber security risks by increasing Information Technology security staff and evaluating process improvements for detection and prevention of cyber-attacks. Another risk category is PGE's fuel supply. PGE is developing backup plans for fueling in the event of extended outages of natural gas pipelines or coal supply. We are looking at gas dispatch modeling and performing cost-benefit analysis of re-establishing the ability of gas plants to run on oil if pipeline interruptions occur. We are also moving forward with storage solutions and have provided a Notice to Proceed to NW Natural to develop its North Mist storage facility in order to provide long-term no-notice underground natural gas storage to serve our Beaver and Port Westward natural gas fired generating plants.[13]

We note however that there are risks that PGE cannot manage including those associated with the government or regulatory framework. For these types of risk, we ensure that we are prepared, aware, and capable of responding to them to the best of our ability and we continue to actively participate in the legislative and regulatory arenas.

Q. Could the risks addressed above alter the cost of capital you request?

A. Yes. If these risks result in financial distress to PGE, the cost of long-term debt and the cost of equity will increase, with a resulting long-term cost impact on customers through increased borrowing costs and possibly a ratings downgrade.

[13] "NW Natural Receives Notice to Proceed on its North Mist Expansion Project" Nasdaq Global New Wire. 3 October 2016 https://globenewswire.com/news-release/2016/10/03/876446/0/en/NW-Natural-Receives-Notice-to-Proceed-on-its-North-Mist-Expansion-Project.html

VI. Qualifications

Q. Mr. Hager, please state your educational background and experience.

A. I received a Bachelor of Science degree in Economics from Santa Clara University in 1975 and a Master of Arts degree in Economics from the University of California at Davis in 1978. In 1995, I passed the examination for the Certified Rate of Return Analyst (CRRA). In 2000, I obtained the Chartered Financial Analyst (CFA) designation.

I have taught several introductory and intermediate classes in economics at the University of California at Davis and at California State University Sacramento. In addition, I taught intermediate finance classes at Portland State University. Between 1996 and 2004, I served on the Board of Directors for the Society of Utility and Regulatory Financial Analysts. Locally, I have been on the Board of Directors for Advantis Credit Union since 2007, serving previously on the Audit Committee.

I have been employed at PGE since 1984, beginning as a business analyst. I have worked in a variety of positions at PGE since 1984, including power supply. My current position is Manager, Regulatory Affairs.

Q. Mr. Liddle, please state your educational background and experience.

A. I received a Bachelor of Science degree in Business Administration with a finance emphasis from the University of Oregon in 2004 and a Master of Business Administration degree from Portland State University in 2009.

I have been employed at PGE since 2005, beginning as an analyst in PGE's Corporate Finance Department. I then worked in PGE's Investor Relations Department. I spent approximately seven years working in PGE's Rates and Regulatory Affairs Department. I then managed PGE's forecasting team including financial and load forecasting, and economic analysis. My current position is Assistant Treasurer and Manager of Corporate Finance & Investor Relations.

Q. Does this conclude your testimony?

A. Yes.

List of Exhibits

PGE Exhibit	Description
1001	Cost of Long-Term Debt
1002	Standard & Poor's and Moody's Investors Service Credit Ratings

Cost of Long-Term Debt

Expected December 31, 2018 - 2018 Test Year

Updated 01.04.2017

	AWO	Type	Description	Issue Date	Maturity Date	Term	Coupon	Gross Proceeds	DD&E Issue Costs	Call Premium & Unamort. DD&E of Refunded Issue	F/N	Net Proceeds	Embedded Cost	Net to Gross Rate	Face Amount Outstanding	Net Outstanding	Face Amount Weight	Weighted Rate
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)		(L)	(M)	(N)	(O)	(P)	(Q)	(R)
												[I - J - K]		[L / I]		[N * O]	[O / Total]	[Q * M]
1	7000000037	Series MTN	9.310% Series	12-Aug-91	11-Aug-21	30	9.310%	$20,000,000	$176,577	$0		$19,823,423	9.399%	99.117%	$20,000,000	$19,823,423	0.751%	0.071%
2	7000000022	Series VI MTN	6.750% Series	4-Aug-03	1-Aug-23	20	6.523%	$50,000,000	$521,342	$1,946,809	*1*	$47,531,849	6.985%	95.064%	$50,000,000	$47,531,849	1.879%	0.131%
3	7000000023	Series VI MTN	6.875% Series	4-Aug-03	1-Aug-33	30	6.648%	$50,000,000	$521,342	$1,946,809	*1*	$47,531,849	7.046%	95.064%	$50,000,000	$47,531,849	1.879%	0.132%
4	7000000024	FMB	6.310% Series	26-May-06	1-May-36	30	6.310%	$175,000,000	$1,270,865	$6,199,472	*3*	$167,529,663	6.640%	95.731%	$175,000,000	$167,529,663	6.575%	0.437%
5	7000000025	FMB	6.260% Series	26-May-06	1-May-31	25	6.260%	$100,000,000	$723,857	$4,132,982	*2*	$95,143,161	6.662%	95.143%	$100,000,000	$95,143,161	3.757%	0.250%
6	7000000433	FMB	5.800% Series	16-May-07	1-Jun-39	32	5.800%	$170,000,000	$1,447,420	$50,969	*3*	$168,501,611	5.861%	99.119%	$170,000,000	$168,501,611	6.388%	0.374%
7	7000000027	FMB	5.810% Series	19-Sep-07	1-Oct-37	30	5.810%	$130,000,000	$1,627,092	$0		$128,372,908	5.899%	98.748%	$130,000,000	$128,372,908	4.885%	0.288%
8	7000000181	FMB	6.100% Series	13-Apr-09	15-Apr-19	10	6.100%	$300,000,000	$2,608,223	$0	*4*	$297,391,777	6.218%	99.131%	$300,000,000	$297,391,777	11.272%	0.701%
9	7000000182	FMB	5.430% Series	3-Nov-09	3-May-40	30.5	5.430%	$150,000,000	$1,034,283	$0		$148,965,717	5.477%	99.310%	$150,000,000	$148,965,717	5.636%	0.309%
10	7000000185	PCB	Clstrp 98A Fixed	11-Mar-10	1-May-33	23	5.000%	$97,800,000	$688,885	$1,521,911	*5*	$95,589,204	5.168%	97.739%	$97,800,000	$95,589,204	3.675%	0.190%
11	7000000036	PCB	Brdmn 98A Fixed	11-Mar-10	1-May-33	23	5.000%	$23,600,000	$166,234	$912,065	*5*	$22,521,701	5.346%	95.431%	$23,600,000	$22,521,701	0.887%	0.047%
12	3000000509	FMB	4.47% Series	27-Jun-13	15-Jun-44	31	4.470%	$150,000,000	$1,121,463	$0		$148,878,537	4.515%	99.252%	$150,000,000	$148,878,537	5.636%	0.254%
13	3000000510	FMB	4.47% Series	29-Aug-13	14-Aug-43	30	4.470%	$75,000,000	$560,731	$0		$74,439,269	4.516%	99.252%	$75,000,000	$74,439,269	2.818%	0.127%
14	3000000576	FMB	4.74% Series	15-Nov-13	15-Nov-42	29	4.740%	$105,000,000	$671,615	$0		$104,328,385	4.781%	99.360%	$105,000,000	$104,328,385	3.945%	0.189%
15	3000000575	FMB	4.84% Series	16-Dec-13	15-Dec-48	35	4.840%	$50,000,000	$319,817	$0		$49,680,183	4.878%	99.360%	$50,000,000	$49,680,183	1.879%	0.092%
16	3000000696	FMB	4.39% Series	15-Aug-14	15-Aug-45	31	4.390%	$100,000,000	$628,548	$0	*6*	$99,371,452	4.427%	99.371%	$100,000,000	$99,371,452	3.757%	0.166%
17	3000000697	FMB	4.44% Series	15-Oct-14	15-Oct-46	32	4.440%	$100,000,000	$628,548	$0	*6*	$99,371,452	4.477%	99.371%	$100,000,000	$99,371,452	3.757%	0.168%
18	3000000698	FMB	3.51% Series	17-Nov-14	15-Nov-24	10	3.510%	$80,000,000	$502,838	$0	*6*	$79,497,162	3.585%	99.371%	$80,000,000	$79,497,162	3.006%	0.108%
19	3000000789	FMB	3.55% Series	15-Jan-15	15-Jan-30	15	3.550%	$75,000,000	$375,000	$0		$74,625,000	3.593%	99.500%	$75,000,000	$74,625,000	2.818%	0.101%
20	3000000831	FMB	3.50% Series	20-May-15	20-May-35	20	3.500%	$70,000,000	$350,000	$2,665,260	*8*	$66,984,740	3.810%	95.692%	$70,000,000	$66,984,740	2.630%	0.100%
21	3000000898	FMB	2.51% Series	6-Jan-16	6-Jan-21	5	2.510%	$140,000,000	$627,125	$8,536,430	*7*	$130,836,445	3.966%	93.455%	$140,000,000	$130,836,445	5.260%	0.209%
22	2017-1	FMB	4.24% Series	1-Mar-17	1-Mar-47	30	4.240%	$125,000,000	$875,000	$0	*9*	$124,125,000	4.282%	99.300%	$125,000,000	$124,125,000	4.697%	0.201%
23	2017-2	FMB	4.24% Series	1-Oct-17	1-Oct-47	30	4.240%	$125,000,000	$875,000	$0	*9*	$124,125,000	4.282%	99.300%	$125,000,000	$124,125,000	4.697%	0.201%
24	2017-3	FMB	4.24% Series	1-Nov-17	1-Nov-47	30	4.240%	$200,000,000	$1,400,000	$0	*9*	$198,600,000	4.282%	99.300%	$200,000,000	$198,600,000	7.515%	0.322%
			Annual expense from loss on reacquired debt							$17,139		($17,139)						
			Totals					$2,661,400,000	$19,721,805	$27,929,846		$2,613,748,349			$2,661,400,000	$2,613,765,488	100.00%	5.169%

Cost of LT Debt (includes annual expense from loss on reacquired debt)	
	5.170%

Losses on Other Reacquired Debt	Issue Date	Mat. Date	Reacquisition Date	Gross Proceeds	Total Gain/Loss to Amortize	2018 Expense
7000000(5.450% Colstrip 98B Fixed PCB due	1-May-03	1-May-33	1-May-09	$21,000,000	$411,622	$17,139
						$17,139

Footnotes

1 $5.8 million in call premia resulting from acquisition of 9.46% and 7.75% issues was allocated evenly among August 2003 issues (see UE 180, PGE Exhibit 1400, page 3).

2 There was a $12 million call premium on the 8.125% redeemed issue. A portion was disallowed in UE 180. The remainder is rolled into the new debt and will be paid over the period of the May 2006 issuances.

3 $5.1 million Trojan 1990B PCBs redeemed early in June 2007. Unamortized loss of $50,969 was added to the 5.80% series $170MM issued in May 2007 used to redeem the PCBs.

4 "DD&E Issue Costs" (column J) was updated to reflect $222,000 discount to par at issuance.

5 PCB issues put-back to PGE in May 2009. PGE re-marketed in March 2010 (due on original maturity date of 05/01/2033).

6 See next tab for Report of Securities

7 2016 Q1 issuance on Lines 21 is updated with 140M issuance of FMB in January 2016.

8 The 6.80% $67M 7-year series maturing Jan. 2016 earlier replaced by a like 7-year pro forma series in 2016 is now updated to New Actual Line 20 data.

Standard & Poor's and Moody's Investors Service Credit Ratings

	S&P	Rating Date	Moody's	Rating Date
Senior Secured Debt	A-	6/23/2016	A1	7/8/2016
Senior Unsecured	BBB	6/23/2016	A3	7/8/2016
Short-term/ Commercial Paper	A-2	6/23/2016	P-2	7/8/2016

"Credit Opinion: Portland General Electric Company" June 23, 2016. Standard & Poor's
"Credit Opinion: Portland General Electric Company" July 8, 2016. Moody's Investors Service