

CASE: UG 389
WITNESSES: MATT MULDOON-MOYA ENRIGHT-CURTIS DLOUHY

**PUBLIC UTILITY COMMISSION
OF
OREGON**

STAFF EXHIBIT 1300

**Staff Testimony in Support
of Partial Settlement Stipulation**

**REDACTED
August 7, 2020**

1 **Q. Please state your name, occupation, and business address.**

2 A1. My name is Matt Muldoon. I am the Economic Analysis Program Manager
3 within the Energy Rates, Finance, and Audit (ERFA) Division of the Public
4 Utility Commission of Oregon (Commission or OPUC).

5 A2. My name is Moya Enright. I am a Senior Utility Analyst in the OPUC ERFA
6 Economic Analysis Program.

7 A3. My name is Curtis Dlouhy. I am a Senior Economist in the OPUC ERFA
8 Economic Analysis Program.

9 **Q. What is your common business address?**

10 A. 201 High Street SE, Suite 100, Salem, OR 97301.

11 **Q. Please describe your educational background and work experience.**

12 A. Our educational background and work experience are set forth in our
13 respective Witness Qualification Statements, provided as Exhibits Staff/1301,
14 Staff/1302, and Staff/1303.

15 **Q. What is the purpose of this testimony?**

16 A. We are responsible for the analysis of three Cost of Capital (CoC) issues in
17 Docket No. UG 389 Avista Corporation (Avista, AVA or Company):

- 18 1. Capital Structure;
19 2. Cost of Long-Term (LT) Debt; and
20 3. Cost of Common Equity, also known as Return on Equity (ROE).

21 Using the above information, Staff calculates an overall Rate of Return
22 (ROR).

23 **Q. What is your summary recommendation?**

1 A. Staff concurs with All Parties¹ in the partial settlement as shown herein in
2 recommending a balanced capital structure of 50.0 percent equity and
3 50.0 percent LT Debt, a point ROE of 9.4 percent, and a 5.07 percent cost of
4 LT Debt, rounded as stipulated. Parties differed on best range of reasonable
5 ROEs, but they converge to recommend said point ROE. When Staff
6 discusses a range of reasonable ROEs hereafter, it only illustrates how Staff's
7 modeling supports the Parties' compromise agreement.

8 In aggregate, the above component values translate to a 7.24 percent
9 ROR, rounded as stipulated.

10 **Q. Did you prepare tables showing Avista's current, Avista's-earlier**
11 **proposed and the Staff calculated CoC?**

12 A. Yes, the following three tables provide that information.

¹ Parties to the Partial Stipulation are Avista, Staff, the Oregon Citizens' Utility Board (CUB), and the Alliance of Western Energy Consumers (AWEC), collectively (Parties).

Table 1

AVA Current OPUC Authorized (UG 366 Order No. 19-331)			AVA
Component	Percent of Total	Stipulated or Implied Cost	Weighted Average
Long Term Debt	50.00%	5.070%	2.535%
Preferred Stock	0.00%	0.000%	0.000%
Common Stock	50.00%	9.40%	4.700%
100.00%			7.24%

Table 2

AVA Requested – UG 389		Direct Testimony		
Component	Percent of Total	Cost	Weighted Average	ROR vs. Current
Long Term Debt	50.00%	5.10%	2.550%	0.265%
Preferred Stock	0.0000%	0.00%	0.000%	
Common Stock	50.00%	9.9%	4.950%	
100.00%			7.50%	

Table 3

Staff Proposed – UG 389		Stipulation		
Component	Percent of Total	Cost	Weighted Average	ROR vs. Current
Long Term Debt	50.0%	5.07%	2.535%	0.000%
Preferred Stock	0.0000%	0.00%	0.000%	
Common Stock	50.0%	9.40%	4.700%	
100.00%			7.24%	

Q. Have you issued data requests (DRs) in this rate case?

A. Yes. Our CoC analysis is informed by Company responses to 70 multipart DRs.

1 **Q. How is your testimony organized?**

2 A. Our testimony is organized as follows:

3	Issue 1, Capital Structure.....	5
4	Issue 2, Cost of Long Term Debt	6
5	Issue 3, Cost of Common Equity.....	12
6	Conclusion	21

7 **Q. Did you prepare exhibits in support of your opening testimony?**

8 A. Yes. Staff prepared the following exhibits:

9	Staff/1304	CONFIDENTIAL	Capital Structure
10	Staff/1305	CONFIDENTIAL	Cost of LT Debt Table & Maturity Profile
11	Staff/1306		ROE Peer Screening
12	Staff/1307		Long-Run Growth Rates
13	Staff/1308		BEA Historic GDP Growth
14	Staff/1309		TIPS Implied Inflation Expectations

15 **Q. Does Staff support the Stipulated Terms on CoC?**

16 A. Yes. The Stipulated Terms mirror Staff's analysis, other than rounding.

17 Therefore, Staff recommends that the Commission adopt the Stipulated

18 Terms on CoC.

ISSUE 1, CAPITAL STRUCTURE

Q. What is the basis for your recommendation for a capital structure of 50.0 percent Common Equity and 50.0 percent LT Debt?

A. Avista requested an authorized capital structure of 50 percent equity and 50 percent long-term debt.² Staff has examined actual and projected information provided by Avista in response to Staff DRs 38 and 134, and observed that a 50 percent equity layer represented the actual capital structure of the Company in recent years.

Further, Staff verified the historic information received by the Company by analyzing both Avista's Annual 10-k SEC filings for financial years 2015 through 2019, and historic data exported by Staff from SNL. Staff's findings are presented in Exhibit Staff/1304.

Staff found that the stipulated 50 percent common equity capital structure reflects the Company's actual capital structure and is consistent with a Commission-preferred balanced capital structure.³

Q. How has the Commission viewed capital structure?

A. The Commission has generally accepted that a capital structure with 50 percent common equity and 50 percent LT Debt balances the lower cost of borrowing against the credit enhancement represented by equity.

Q. Please summarize Staff's recommendation.

² See Avista/100, Vermillion/6 regarding requested capital structure.

³ See as an example Commission discussion of equity structure in the floatation of PGE Stock after the Enron Bankruptcy.

- 1 A. Staff recommends that the Commission find a 50 percent common equity
2 capital structure reasonable. This is both consistent with Commission
3 precedent, and actual and projected values for capital structure.

4 **ISSUE 2, COST OF LONG-TERM (LT) DEBT**

5 **Q. Briefly summarize Staff's recommendation for Avista's Cost of LT Debt.**

- 6 A. Staff recommends a Cost of LT Debt of 5.07 percent, representing the cost of
7 all outstanding and forecasted debt, as of the 2021 test year.

8 In Confidential Exhibit Staff/1305 page 1, Staff has presented a
9 summary table, which displays the LT Debt instruments included in Staff's
10 calculation of LT Debt, along with Staff's calculation thereof. In this exhibit
11 Staff calculated a cost of LT Debt of 5.057, however Staff agrees with the
12 stipulated cost of LT Debt of 5.07, rounded as stipulated.

13 **Q. How has Staff calculated Avista's Cost of LT Debt?**

- 14 A. Staff compiled a comprehensive table of Avista's outstanding and forecasted
15 LT Debt as of the 2021 test year, using independent data sources including
16 Bloomberg, SNL, and the Company's SEC filings.

17 Staff first identified outstanding debt using Bloomberg, and tracked
18 individual debt issuances using their unique CUSIP numbers.⁴ Staff exported
19 the details of each issuance, including issuance and maturity dates, yields,
20 issued and outstanding debt amounts, and credit ratings from the Bloomberg

⁴ A CUSIP number is a nine-character alphanumeric code, which identifies financial securities. The acronym "CUSIP" is derived from the Committee on Uniform Security Identification Procedures, a committee of the American Bankers Association.

1 database. This data was cross-referenced against the Company's latest SEC
2 filing, and the records available through SNL. As a final step, the data
3 included in the table was confirmed by Avista through discovery as being fully
4 accurate.⁵

5 Staff used this information to compile a fully comprehensive table of
6 Avista's LT Debt, to calculate the yield to maturity of each debt issuance, and
7 finally, to calculate the Company's carrying cost of long-term debt.

8 **Q. Avista provided a table of LT Debt in its initial filing. Why not use that?**

9 A. Staff's approach of independently compiling a table of LT Debt is beneficial
10 because it ensures that a clear and impartial record is created. Publicly
11 available information can provide valuable insight and aid with the verification
12 process. For example, the Company's SEC filing includes standardized
13 information, in contrast to a General Rate Case for which no such
14 standardized model exists, and some information may be missed.

15 Staff's thorough research ensures that when the Cost of LT Debt is
16 calculated, it fully encapsulates the Company's debt issuances, permitting
17 Staff and the Commission to place their full confidence in the integrity of the
18 data therein.

19 **Q. Is this table updated to reflect the anticipated composition of Avista's**
20 **LT debt in the 2021 test year?**

⁵ See Exhibit Staff/1305 page 4 for Avista's confidential response to DR 133.

1 A. Yes. Staff has made specific adjustments to Avista's current LT Debt
2 holdings to reflect the Company's anticipated debt structure come 2021.

3 These changes include:

- 4 • Planned debt issuances in 2020 [BEGIN CONFIDENTIAL] [END
5 CONFIDENTIAL] have been incorporated.
- 6 • The current portion of LT Debt has been excluded.⁶
- 7 • All costs related to Pollution Control Revenue Bonds⁷ (PCRB) have been
8 excluded from Staff's table of LT Debt.

9 **Q. How has Staff forecasted interest rates for forecasted debt issuances?**

10 A. Staff has forecasted the usual synthetic forward interest rate for Avista's
11 forecasted debt issuances. This is shown in Exhibit 1305, page 2.

12 Staff began this process by surveying forward US Treasury (UST)
13 interest rates⁸ over a five-week period, and calculating the average
14 forecasted rate during that period. By taking this approach, Staff ensured that
15 volatility within the month did not bias the forecast, as might have happened if
16 the forecasted rate as observed on a single day was used.

17 The second step of this process involved calculating the spread between
18 A-Rated Utility bonds and US Treasuries. The "spread" is the difference in
19 borrowing costs for A-Rated utilities compared with less risky US Treasuries.

⁶ The current portion of LT Debt includes any debt maturing within one year of the test year.

⁷ PCRBs are debt instruments issued by municipalities to finance investment by private entities in pollution control. These instruments allow companies such as Avista to take advantage of the lower interest rates enjoyed by municipalities when raising debt for specific uses.

⁸ Forward US Treasury rates reflect the market's best estimate borrowing costs on a date in the future. As Avista expects to issue debt in [BEGIN CONFIDENTIAL] [END CONFIDENTIAL], Staff focused its analysis on forecasted forward interest rates for these dates.

1 In financial modeling and market or debt securities issuance projections, the
2 UST rates are often called risk free rates. A variable with a subscript RF
3 usually refers to a UST bond or note of applicable tenure.

4 Finally, Staff applied the spread over UST to the forecasted UST interest
5 rate for like maturity, resulting in the forecasted interest rate for Avista's debt
6 issuances in 2020 [BEGIN CONFIDENTIAL] [END
7 CONFIDENTIAL].

8 Staff favors the approach described above because liquidity in the UST
9 market is high. The large number of buyers and sellers of these securities
10 increases the accuracy of the forecast. The addition of the spread adjusts the
11 forecast to reflect borrowing costs typical of other utilities issuing first
12 mortgage bonds with comparable credit ratings to Avista.

13 **Q. How does Staff's calculation of Avista's Cost of LT Debt differ from the**
14 **stipulated cost of LT Debt?**

15 A. Parties differed on the Company's cost of LT Debt, in particular with regard to
16 the forecasted spread between UST to the Company's issuances, due to
17 market volatility surrounding COVID-19. Parties converged on the stipulated
18 cost of LT debt of 5.07 percent, rounded as stipulated.

19 **Q. Did you prepare a debt maturity profile for Avista?**

20 A. Yes. In Exhibit Staff/1305 page 3, Staff has provided a debt maturity profile
21 for the test year, reflecting Staff's proposed Cost of LT Debt table. This
22 profile shows that the Company's forecasted issuances of [BEGIN
23 CONFIDENTIAL] [END CONFIDENTIAL] year debt in 2020 [BEGIN

1 **CONFIDENTIAL** [REDACTED] **[END CONFIDENTIAL]** will avoid maturity
2 concentrations.

3 **Q. Have costs associated with PCRBs been excluded from Staff's**
4 **calculation of LT Debt carrying costs?**

5 A. Yes, all costs related to PCRBs have been excluded from Staff's table of LT
6 Debt. Avista's PCRBs relate to its thermal electric generation in Montana.
7 However, as Avista's General Rate Case relates to its natural gas business in
8 Oregon, it is not appropriate for these costs to be included in Avista's cost of
9 LT Debt. This approach is consistent with the treatment of PCRBs in Avista's
10 previous General Rate Cases.⁹

11 **Q. Does the table reflect discounts or premiums, debt issuance costs, and**
12 **hedging losses and gains?**

13 A. Yes. The table fully encompasses discounts or premiums, debt issuance
14 costs, and debt insurance costs. Staff has tied each individual cost back to
15 the associated issuance, and calculated the net proceeds of each debt
16 issuance. The net proceeds of each debt issuance is used to calculate the
17 Yield to Maturity of that issuance, which feeds into Staff's calculation of LT
18 Debt carrying costs.

19 **[BEGIN CONFIDENTIAL]** [REDACTED]
20 [REDACTED]

⁹ See recent Avista general rate cases, including: OPUC Order No. 14-015 in Docket No. UG 246, Order No. 15-109 in Docket No. UG 284, and Order Nos. 16-076 and 16-109 in Docket No. UG 288.

1

[REDACTED]

2

[REDACTED] [END CONFIDENTIAL].

3

Q. What is Staff's summary recommendation for Avista's Cost of LT Debt?

4

A. Staff recommends a Cost of LT Debt of 5.07 percent. This recommendation

5

is supported by comprehensive analysis by Staff and is therefore a value in

6

which the Commission can place high confidence.

7

ISSUE 3, COST OF COMMON EQUITY

Q. What point ROE within what range of reasonable ROEs does Staff recommend?

A. Staff recommends, as do the other Parties, a point ROE of 9.40 percent, which is at the top of a range of reasonable ROEs of 8.80 to 9.35 percent. Although the ROE of 9.40 represents the upper limit rounded up, considering other factors contributing to ROR, Staff finds this settlement to be reasonable.

Q. What is the primary contributing modeling that supports Staff's recommended 9.40 percent point ROE?

A. Staff's two different three-stage discounted cash flow (DCF) models are the primary foundation for Staff's recommended point ROE.

Q. Did you perform indicator modeling as a general check on this recommendation?

A. No. Had Staff and Parties not settled, Staff would have used Single-Stage DCF Modeling, Capital Asset Pricing Modeling (CAPM), and Risk Premium Modeling (RPM) analysis as general indicators to further test the proposed 9.40 percent ROE.

To keep this testimony in support fairly concise and to minimize the burden of distributing testimony, Staff testimony in support will primarily show how Staff's two primary comprehensive models support the Parties recommended 9.40 percent point ROE for Avista, without exhaustive examples of usual and customary Staff modeling components.

PEER SCREEN

Q. How did you select comparable companies (peers) to estimate Avista's ROE?

A. Staff sought to identify utilities that most closely resemble the regulated Avista Corporation. This objective led Staff to focus on highly regulated local gas distribution companies (LDC) covered by Value Line. Staff excluded diversified utilities from its peer group, for example, companies with exposure to the risky oil and natural gas exploration sectors.

This approach is consistent with the approach taken by Staff in the NW Natural GRC's in early 2020.¹⁰ The selection criteria used by Staff was as follows:

1. Covered by Value Line (VL) as a gas utility;
2. Forecasted by VL to have positive dividend growth;
3. LT Issuer Credit Rating equal to or better than BBB- from S&P, or Baa3 from Moody's;
4. No decline in annual dividend in last four years based on VL;
5. Has heavily regulated natural gas LDC revenue;
6. Has LT Debt under 56 percent in VL Capital Structure; and
7. Has no recent merger and acquisition activity.

Q. How does Staff's peer group selection process compare to the process employed by Avista?

¹⁰ Docket No. UG 388.

1 A. Avista's witness Mr. McKenzie used an approach similar to Staff's in many
2 aspects. Firstly, Mr. McKenzie based his selection on companies followed
3 by Value Line. Further, he considered only utilities with investment-grade
4 credit ratings from Moody's and S&P, which were not involved in significant
5 merger or acquisition activity, had not cut dividend payments during the past
6 six month, and which had not announced a dividend cut since that time.

7 Unsurprisingly, Staff's approach to selecting peer utilities was stricter
8 than the Company's, as it included only highly regulated utilities in its peer
9 group. This resulted in a peer group of four comparable utility companies,
10 compared with Avista's peer group of nine.

11 **Q. Did Staff's peer group for three-stage DCF modeling address peer**
12 **utility capitalization size?**

13 Q. Yes. Most of Staff's peer group is the small to mid-cap market capitalization
14 size, like Avista. The reason for Staff's approach is that the closer the peer
15 group is to Avista's actual regulated gas utility experience, the less outboard
16 adjustment is required to generate modeling that is reasonably predictive for
17 Avista. Consequently, no Staff adjustments for capitalization size were
18 required in Staff's three-stage DCF modeling.

19 **GROWTH RATES**

20 **Q. What long-term growth rates did you use in Staff's two three-stage**
21 **DCF models?**

1 A. Staff used three different long-term growth rates, with different methods
2 employed in developing each. As demonstrated in Exhibit Staff/1307, Staff
3 has included long-run growth forecasts updated as recently as April and
4 May 2020.

5 The first method uses the U.S. Congressional Budget Office's (CBO)
6 4.0 percent nominal 20-year GDP growth rate estimate.

7 Staff's second Composite Growth Rate applies a 50 percent weight to
8 the average annual growth rate resulting from estimates of long-term GDP
9 by the U.S. Energy Information Administration (EIA), the U.S. Social
10 Security Administration, PricewaterhouseCoopers estimate for long-run
11 (10- to 7 30-years from now), and the CBO, with each receiving one-
12 quarter of that 50 percent weight. The remaining 50 percent is the average
13 annual historical real GDP growth rate, established using regression
14 analysis, for the period 1980 through 2017 to which we apply the TIPS
15 inflation forecast discussed above.

16 Staff's third "Near Historical" Stage 3 annual growth rate, shown in
17 Exhibit Staff/1308, is an equally weighted average of the earlier described
18 U.S. Bureau of Economic Analysis (BEA) derived projection which
19 presumes the future will look much like the past.

20 **Q. Did your analysis reflect a synthetic forward curve?**

21 A. Yes, Staff utilized synthetic forward curve using UST Treasury Inflation
22 Protected Securities (TIPS) break-even points. This reflects implied market-
23 based inflationary expectations, which unsurprisingly, as shown in Exhibit

1 Staff/1309, have decreased during Quarter 2 2020 in-line with the effects of
2 COVID-19 on the economy.

3 Inflation expectations are vital to Staff's calculations, as it is assumed
4 for purposes of its three-stage DCF modeling that LDC utility growth is
5 bounded by the growth of the U.S. economy, and more specifically
6 impacted by challenges regarding U.S. population and productivity in the
7 long-run (20-year) modeling period.

8 **Q. How do your methods employed in this case differ from those utilized**
9 **by Staff in recent general rate cases?**

10 A. Staff's methods and modeling are consistent with those used by Staff in
11 recent general rate cases, including Docket Nos. UG 388, UE 390, and
12 UE 374, each of which are general rate cases occurring in 2020.

13 **Q. Does this approach capture a reasonable set of investor expectations,**
14 **similar to Staff's analysis in other recent general rate cases?**

15 A. Yes, Staff modeling captures the expectations of investors who think that: A)
16 the non-partisan CBO is reliable, B) blended federal agency expert analysis
17 also informs the historical track record, and C) one should be optimistic about
18 the economy's long-run growth, provided there are still enough non-retired
19 adult Americans to make it happen 20 years from now.

20 **THREE-STAGE DCF MODEL**

21 **Q. Describe the two three-stage DCF models on which you primarily rely.**

1 A. Staff's first model is a conventional three-stage discounted dividend model,
2 which Staff denotes as a "30-year Three-stage Discounted Dividend Model
3 with Terminal Valuation based on Growing Perpetuity" (referred to as
4 "Model X"). This model captures the thinking of a money manager at a
5 pension fund or insurance company, or other institutional investor, who
6 expects to keep the Company's stock indefinitely and use the dividend cash
7 flow to meet future obligations.

8 Staff's second model is the "30-year Three-stage Discounted Dividend
9 Model with Terminal Valuation Based on P/E Ratio" (referred to as
10 "Model Y"). This model best fits the investor who has a goal they are
11 working towards. In addition to the income stream from dividends, this
12 investor intends to sell the stock as the goal is reached.

13 Both models require, for each proxy company analyzed by Staff, a
14 "current" market price per share of common stock, estimates of dividends
15 per share to be received over the next five years calculated from
16 information provided by Value Line, and a long-term growth rate applicable
17 to dividends 10- to 30-years out.

18 **Q. Please explain what is commonly accepted by industry professionals**
19 **as an appropriate long-term growth rate for use in ROE modeling?**

20 A. Some growth rates labeled "long" are quite deceiving, and may be
21 supported by information looking only at the next ten years or less into the
22 future.

1 Staff has often observed utilities in GRCs proposing to extrapolate
2 short-term rates into long-term, which has the effect of over-inflating their
3 modeled required ROE. This is in spite of Commission precedent, and the
4 well-recognized fact, that thirty years is considered by investors as the
5 primary horizon for financial decision-making. Thirty years is a common
6 length of time for mortgages of plants, equipment, and homes, and a
7 generally accepted period for economists to ascribe to one generation.
8 Just as institutional holders of utility securities match the cash flows from
9 utility dividends to future obligations, such as the payout of life insurance,
10 preparing to meet future pension and post-retirement obligations, and
11 interest service for borrowing; individuals also plan for the education of
12 their children, ownership of their home, and provision for their retirement
13 on this same multi-decade timeframe.

14 Staff always recommends the Commission be particularly vigilant for
15 any substitution of a short-term growth rate for a long-term 20- to 30-year
16 growth rate. Over-extrapolating a snapshot of short-term data undermines
17 confidence in modeling results. For example, Value Line, Blue Chip, and a
18 variety of other financial resources focus most on the next five years. The
19 next five years may be affected by recent events. Over the long run,
20 people and productivity are the key drivers of economic growth.

21 **Q. Describe how you performed your analysis.**

1 A. Using the cohort of proxy companies that met our screens, Staff ran each of
2 Staff's two three-stage DCF models three times, each time using a different
3 long-term growth rate.

4 **Q. Was your analysis consistent with a top supportable finding of**
5 **9.40 percent point ROE?**

6 A. Yes.

7 **IMPACTS OF COVID-19 ON ROE**

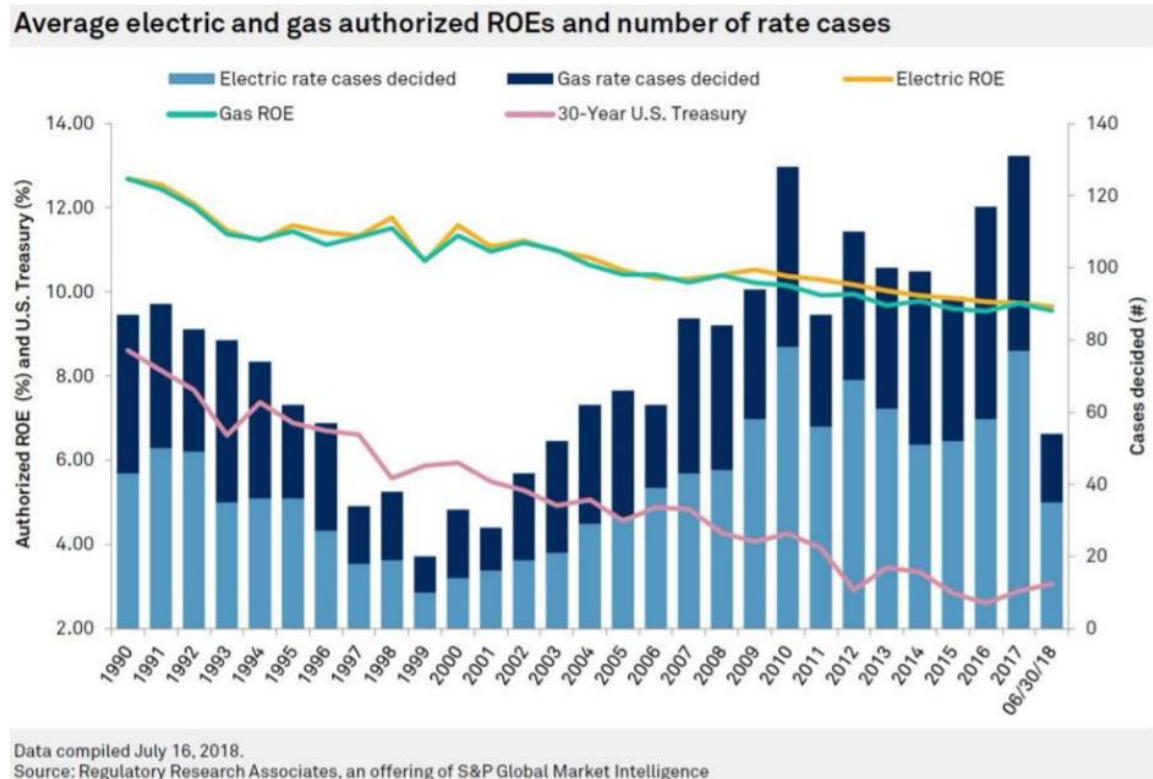
8 **Q. Do you believe your results are robust even given the uncertainty around**
9 **the impact of COVID-19?**

10 A. While Staff believes there is a downward glide path for ROE, as shown in
11 Figure 1 below, that trajectory is not linear, and may pause through the
12 uncertainties surrounding COVID-19 pandemic impacts on the economy. So,
13 while there may be some macro indicators variously pointing upward or
14 downward, all parties agree that the stipulated ROE is reasonable in the near
15 term when rates will take effect.

1

Figure 1

2

Downward Parallel Glide Paths of Utility ROE and 30-Year US Treasuries¹¹

3

Q. Please describe the trend illustrated in Figure 1 above.

4

A. Figure 1 demonstrates that Gas and Electric Utilities have followed a downward glide path for authorized ROE's since 1990, in tandem with the decline of the 30-year US Treasury (UST) rate.

7

Now the COVID-19 Pandemic has driven Federal Reserve near term

8

UST interest rates to near zero, while spreads over UST for A and B rated

9

utility bonds are elevated but falling, Staff expects there to be further

10

downward pressure on authorized ROEs across the country.

¹¹ See "Average U.S. Electric, Gas ROE Authorizations in H1'18 Down from 2017" published on August 2, 2018 by Regulatory Research Associates (RRA), an affiliate of S&P Global Market Intelligence. <https://www.spglobal.com/marketintelligence/en/newsinsights/research/average-u-s-electric-gas-roe-authorizations-in-h1-18-downfrom-2017>.

1 **Q. Does Staff's recommendation account for the most recently available**
2 **data regarding economic growth?**

3 A. Yes. Staff fully refreshed its analysis to reflect available updates to forecasted
4 growth rates. Staff's results continue to support an authorized ROE of 9.4
5 percent.

6 **CONCLUSION**

7 **Q. In summary, what are your recommendations to the Commission on**
8 **Cost of Capital to the Commission in this General Rate Case?**

9 A. Staff recommends a 50 percent Common Equity and 50 percent LT Debt
10 Capital Structure; a 5.07 percent Cost of LT Debt; and a ROE of
11 9.40 percent. In aggregate, this equates to a 7.24 percent overall ROR.
12 Rounding of these recommendations is as stipulated.

13 **Q. Does Staff continue to find that its recommendations hold up after**
14 **refreshing growth rates in July?**

15 A. Yes. Staff's recommendations, which are consistent with the terms of the
16 Partial Stipulation addressing CoC, are still valid, largely because Staff's
17 earlier modeling made no heroic assumptions regarding GDP growth or
18 inflation rates. The Stipulated Terms mirror Staff's analysis, other than
19 rounding. Therefore, Staff recommends that the Commission adopt the
20 Stipulated Terms on CoC

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

22 A. Yes.

CASE: UG 389
WITNESS: MATT MULDOON

**PUBLIC UTILITY COMMISSION
OF
OREGON**

STAFF EXHIBIT 1301

Witness Qualifications Statement

August 7, 2020

WITNESS QUALIFICATION STATEMENT

NAME: Matthew (Matt) J. Muldoon

EMPLOYER: PUBLIC UTILITY COMMISSION OF OREGON

TITLE: Manager, Economic Analysis
Energy – Rates Finance and Audit (ERFA) Division

ADDRESS: 201 High Street SE, Suite 100
Salem, OR 97301

EDUCATION: In 1981, I received a Bachelor of Arts Degree in Political Science from the University of Chicago. In 2007, I received a Masters of Business Administration from Portland State University with a certificate in Finance.

EXPERIENCE: From April of 2008 to the present, I have been employed by the OPUC. My current responsibilities include financial analysis with an emphasis on Cost of Capital (CoC). I have worked on CoC in the following general rate case dockets: AVA UG 186; UG 201, UG 246, UG 284, UG 288, UG 325, UG 366 and current UG 389; NWN UG 221, UG 344, and UG 388; PAC UE 246, UE 263 and current UE 374; PGE UE 262, UE 283, UE 294, UE 319, and UE 335; and CNG UG 287, UG 305, UG 347 and current UG 390.

From 2002 to 2008, I was Executive Director of the Acceleration Transportation Rate Bureau, Inc. where I developed new rate structures for surface transportation and created metrics to insure program success within regulated processes.

I was the Vice President of Operations for Willamette Traffic Bureau, Inc. from 1993 to 2002. There I managed tariff rate compilation and analysis. I also developed new information systems and did sensitivity analysis for rate modeling.

OTHER: I have prepared, and defended formal testimony in contested hearings before the OPUC, ICC, STB, WUTC and ODOT. I have also prepared OPUC Staff testimony in BPA rate cases.

CASE: UG 389
WITNESS: MOYA ENRIGHT

**PUBLIC UTILITY COMMISSION
OF
OREGON**

STAFF EXHIBIT 1302

Witness Qualifications Statement

August 7, 2020

WITNESS QUALIFICATIONS STATEMENT

NAME: Moya Enright

EMPLOYER: Public Utility Commission of Oregon

TITLE: Senior Economist
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ADDRESS: 201 High Street SE. Suite 100
Salem, OR. 97301

EDUCATION: Energy Risk Professional Certification (part-qualified).
Global Association of Risk Professionals.

M.Sc. Political Science, 2015.
University of Amsterdam.

M.Sc. Investment, Treasury and Banking, 2011.
Dublin City University.

B.A. International Business and Languages, 2008.
Dublin City University through a joint curriculum with École Supérieure de Commerce de Montpellier.

EXPERIENCE: I have been employed as a Senior Utility and Energy Analyst at OPUC since January 2019. My current responsibilities include financial analysis, with an emphasis on Cost of Capital (CoC) and power cost forecasting.

I have worked on CoC in the following general rate case dockets: AVA UG 366, NWN UG 388; and pending PAC UE 374, AVA UG 389, and CNG UG 390.

Prior to joining OPUC I was employed as an Energy Trader for Meridian Energy, a hydro and wind energy generator in New Zealand from 2015 to 2019; as a Trading and Operations Analyst at Tynagh Energy, a gas focused independent power producer Ireland from 2011 to 2013; as a Senior Electricity Market Controller at EirGrid, the Irish Transmission System Operator from 2008 to 2011; and in various Accounts Assistant roles from 2004 to 2008, including Audit Intern at KPMG.

CASE: UG 389
WITNESS: CURTIS DLOUHY

**PUBLIC UTILITY COMMISSION
OF
OREGON**

STAFF EXHIBIT 1303

Witness Qualifications Statement

August 7, 2020

WITNESS QUALIFICATION STATEMENT

NAME: Curtis Dlouhy

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TITLE: Senior Economist
Energy Rates, Finance, and Audit Division

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EDUCATION: PhD, Economics
University of Oregon,
Eugene, OR

Master of Science, Economics
University of Oregon,
Eugene, OR

Bachelor of Arts, Economics & Math
Nebraska Wesleyan
University, Lincoln, NE

EXPERIENCE: I have been employed by the Oregon Public Utility Commission (OPUC) since June 2020 in the Energy Rates, Finance, and Audit Division. My responsibilities include providing research, analysis, and recommendations on a range of regulatory issues.

Prior to working for the Commission I was employed by the University of Oregon as a graduate employee where I taught classes in Intermediate Microeconomics, Industrial Organization and Antitrust Economics. My PhD dissertation covered various topics in fossil fuel markets ranging from coal mine closure, electricity choices under carbon taxes and coal transport via railroad.

CASE: UG 389

WITNESSES: MATT MULDOON-MOYA ENRIGHT-CURTIS DLOUHY

**PUBLIC UTILITY COMMISSION
OF
OREGON**

**STAFF EXHIBIT 1304
Capital Structure**

**Exhibits in Furtherance
of Testimony in Support of Partial Stipulation**

August 7, 2020

Staff Exhibit 1304 Part A (Page 1 to 4)

are confidential

and

filed in electronic format.

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
 Washington, D.C. 20549

Form 10-K

(Mark One)

- ☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
FOR THE FISCAL YEAR ENDED December 31, 2015 OR
- ☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
FOR THE TRANSITION PERIOD FROM **TO**
 Commission file number 1-3701

AVISTA CORPORATION

(Exact name of Registrant as specified in its charter)

Washington
 (State or other jurisdiction of
 incorporation or organization)

1411 East Mission Avenue, Spokane, Washington
 (Address of principal executive offices)

91-0462470
 (I.R.S. Employer
 Identification No.)

99202-2600
 (Zip Code)

Registrant's telephone number, including area code: 509-489-0500
 Web site: http://www.avistacorp.com

Securities registered pursuant to Section 12(b) of the Act:

<u>Title of Class</u>	<u>Name of Each Exchange on Which Registered</u>
Common Stock, no par value	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act:

Title of Class
 Preferred Stock, Cumulative, Without Par Value

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. Yes ☐ No ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the Registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days: Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ☒ No ☐

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§ 229.405 of this chapter) is not contained herein, and will not be contained, to the best of Registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer	<input checked="" type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input type="checkbox"/> (Do not check if a smaller reporting company)	Smaller reporting company	<input type="checkbox"/>

AVISTA CORPORATION

the balance of customer fund obligations at Ecova increased cash by \$16.2 million. During 2014, we repurchased \$79.9 million of common stock.

Cash inflows during 2013 were from a \$119.0 million increase in short-term borrowings on Avista Corp.'s committed line of credit, the issuance of \$90.0 million of long-term debt and the issuance of \$4.6 million of common stock. We also cash settled interest rate swap agreements for \$2.9 million related to the pricing of the \$90.0 million of long-term debt. Cash outflows during 2013 were from the maturity of long-term debt of \$50.5 million and a net decrease in borrowings on Ecova's committed line of credit of \$8.0 million (borrowings of \$3.0 million and repayments of \$11.0 million).

Capital Resources

Our consolidated **capital structure**, including the current portion of long-term debt and short-term borrowings, and excluding noncontrolling interests, consisted of the following as of December 31, 2015 and 2014 (dollars in thousands):

	December 31, 2015		December 31, 2014	
	Amount	Percent of total	Amount	Percent of total
Current portion of long-term debt and capital leases	\$ 93,167	2.9%	\$ 6,424	0.2%
Current portion of nonrecourse long-term debt (Spokane Energy)	—	—%	1,431	0.1%
Short-term borrowings	105,000	3.2%	105,000	3.4%
Long-term debt to affiliated trusts	51,547	1.6%	51,547	1.6%
Long-term debt and capital leases	1,480,111	45.4%	1,480,702	47.3%
Total debt	1,729,825	53.1%	1,645,104	52.6%
Total Avista Corporation shareholders' equity	1,528,626	46.9%	1,483,671	47.4%
Total	\$ 3,258,451	100.0%	\$ 3,128,775	100.0%

Our shareholders' equity increased \$45.0 million during 2015 primarily due to net income, partially offset by the repurchase of common stock and dividends.

We need to finance capital expenditures and acquire additional funds for operations from time to time.

The cash requirements needed to service our indebtedness, both short-term and long-term, reduce the amount of cash flow available to fund capital expenditures, purchased power, fuel and natural gas costs, dividends and other requirements.

See "Executive Level Summary" for a detailed discussion of the liquidity and capital resource transactions which occurred during 2015 and our anticipated needs for 2016.

Balances outstanding and interest rates of borrowings (excluding letters of credit) under Avista Corp.'s committed line of credit were as follows as of and for the year ended December 31 (dollars in thousands):

	2015	2014	2013
Balance outstanding at end of year	\$ 105,000	\$ 105,000	\$ 171,000
Letters of credit outstanding at end of year	\$ 44,595	\$ 32,579	\$ 27,434
Maximum balance outstanding during the year	\$ 180,000	\$ 171,000	\$ 171,000
Average balance outstanding during the year	\$ 95,573	\$ 62,088	\$ 27,580
Average interest rate during the year	0.98%	1.01%	1.14%
Average interest rate at end of year	1.18%	0.93%	1.02%

Any default on the line of credit or other financing arrangements of Avista Corp. or any of our "significant subsidiaries," if any, could result in cross-defaults to other agreements of such entity, and/or to the line of credit or other financing arrangements of any other of such entities. Any defaults could also induce vendors and other counterparties to demand collateral. In the event of any such default, it would be difficult for us to obtain financing on reasonable terms to pay creditors or fund operations. We would also likely be prohibited from paying dividends on our common stock. Avista Corp. does not guarantee the indebtedness of any of its subsidiaries. As of December 31, 2015, Avista Corp. and its subsidiaries were in compliance with all of the covenants of their financing agreements, and none of Avista Corp.'s subsidiaries constituted a "significant subsidiary" as defined in Avista Corp.'s committed line of credit.

We are restricted under our Restated Articles of Incorporation, as amended, as to the additional preferred stock we can issue. As of December 31, 2015, we could issue \$1.3 billion of additional preferred stock at an assumed dividend rate of 6.3 percent. We are not planning to issue preferred stock.

AVISTA CORPORATION**NOTE 14. LONG-TERM DEBT AND CAPITAL LEASES**

The following details long-term debt outstanding as of December 31 (dollars in thousands):

Maturity Year	Description	Interest Rate	2015	2014
Avista Corp. Secured Long-Term Debt				
2016	First Mortgage Bonds	0.84%	\$ 90,000	\$ 90,000
2018	First Mortgage Bonds	5.95%	250,000	250,000
2018	Secured Medium-Term Notes	7.39%-7.45%	22,500	22,500
2019	First Mortgage Bonds	5.45%	90,000	90,000
2020	First Mortgage Bonds	3.89%	52,000	52,000
2022	First Mortgage Bonds	5.13%	250,000	250,000
2023	Secured Medium-Term Notes	7.18%-7.54%	13,500	13,500
2028	Secured Medium-Term Notes	6.37%	25,000	25,000
2032	Secured Pollution Control Bonds (1)	(1)	66,700	66,700
2034	Secured Pollution Control Bonds (1)	(1)	17,000	17,000
2035	First Mortgage Bonds	6.25%	150,000	150,000
2037	First Mortgage Bonds	5.70%	150,000	150,000
2040	First Mortgage Bonds	5.55%	35,000	35,000
2041	First Mortgage Bonds	4.45%	85,000	85,000
2044	First Mortgage Bonds	4.11%	60,000	60,000
2045	First Mortgage Bonds (2)	4.37%	100,000	—
2047	First Mortgage Bonds	4.23%	80,000	80,000
Total Avista Corp. secured long-term debt			1,536,700	1,436,700
AEL&P Secured Long-Term Debt				
2044	First Mortgage Bonds	4.54%	75,000	75,000
Total secured long-term debt			1,611,700	1,511,700
AERC Unsecured Long-Term Debt				
2019	Unsecured Term Loan	3.85%	15,000	15,000
Total secured and unsecured long-term debt			1,626,700	1,526,700
Other Long-Term Debt Components				
Capital lease obligations			68,601	74,149
Settled interest rate swaps (3)			(26,515)	(17,541)
Unamortized debt discount			(956)	(1,122)
Unamortized long-term debt issuance costs			(10,852)	(11,360)
Total			1,656,978	1,570,826
Secured Pollution Control Bonds held by Avista Corporation (1)			(83,700)	(83,700)
Current portion of long-term debt and capital leases			(93,167)	(6,424)
Total long-term debt and capital leases			\$ 1,480,111	\$ 1,480,702

- (1) In December 2010, \$66.7 million and \$17.0 million of the City of Forsyth, Montana Pollution Control Revenue Refunding Bonds (Avista Corporation Colstrip Project) due in 2032 and 2034, respectively, which had been held by Avista Corp. since 2008 and 2009, respectively, were refunded by new bond issues (Series 2010A and Series 2010B). The new bonds were not offered to the public and were purchased by Avista Corp. due to market conditions. The Company expects that at a later date, subject to market conditions, these bonds may be remarketed to unaffiliated investors. So long as Avista Corp. is the holder of these bonds, the bonds will not be reflected as an asset or a liability on Avista Corp.'s Consolidated Balance Sheets.

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

Form 10-K

(Mark One)

- ☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
FOR THE FISCAL YEAR ENDED December 31, 2017 OR
- ☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
FOR THE TRANSITION PERIOD FROM **TO**
Commission file number 1-3701

AVISTA CORPORATION

(Exact name of Registrant as specified in its charter)

Washington
(State or other jurisdiction of
incorporation or organization)

91-0462470
(I.R.S. Employer
Identification No.)

1411 East Mission Avenue, Spokane, Washington
(Address of principal executive offices)

99202-2600
(Zip Code)

Registrant's telephone number, including area code: 509-489-0500
Web site: http://www.avistacorp.com

Securities registered pursuant to Section 12(b) of the Act:

Title of Class
Common Stock, no par value

Name of Each Exchange on Which Registered
New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act:

Title of Class
Preferred Stock, Cumulative, Without Par Value

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. Yes ☐ No ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the Registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days: Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ☒ No ☐

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§ 229.405 of this chapter) is not contained herein, and will not be contained, to the best of Registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☐

AVISTA CORPORATION**Consolidated Financing Activities**

Net cash provided by financing activities was \$72.2 million for 2016 compared to net cash provided of \$0.5 million for 2015. In 2016 we had the following significant transactions:

- borrowing of \$70.0 million pursuant to a term loan agreement in August, which was used to repay a portion of the \$90.0 million in first mortgage bonds that matured in August 2016,
- issuance and sale of \$175.0 million of Avista Corp. first mortgage bonds in December 2016, the proceeds of which were used to repay the \$70.0 million term loan, with the remainder being used to pay down a portion of our committed line of credit,
- payment of \$163.2 million for the maturity of long-term debt (including the \$70.0 million term loan),
- increase in cash dividends paid to \$87.2 million (or \$1.37 per share) for 2016 from \$82.4 million (or \$1.32 per share) for 2015,
- \$15.0 million net increase in the balance of our committed line of credit,
- and
- issuance of \$67.0 million of common stock (net of issuance costs).

In 2015 we had the following significant transactions:

- issuance and sale of \$100.0 million of Avista Corp. first mortgage bonds in December 2015,
- payment of \$2.9 million for the maturity of long-term debt,
- cash dividends paid were \$82.4 million (or \$1.32 per share) for 2015,
- issuance of \$1.6 million of common stock (net of issuance costs),
- and
- repurchase of \$2.9 million of our common stock.

Capital Resources

Our consolidated capital structure, including the current portion of long-term debt and short-term borrowings, and excluding noncontrolling interests, consisted of the following as of December 31, 2017 and 2016 (dollars in thousands):

	December 31, 2017		December 31, 2016	
	Amount	Percent of total	Amount	Percent of total
Current portion of long-term debt and capital leases	\$ 277,438	7.6%	\$ 3,287	0.1%
Short-term borrowings	105,398	2.9%	120,000	3.4%
Long-term debt to affiliated trusts	51,547	1.4%	51,547	1.5%
Long-term debt and capital leases	1,491,799	40.8%	1,678,717	47.9%
Total debt	1,926,182	52.7%	1,853,551	52.9%
Total Avista Corporation shareholders' equity	1,729,828	47.3%	1,648,727	47.1%
Total	\$ 3,656,010	100.0%	\$ 3,502,278	100.0%

Our shareholders' equity increased \$81.1 million during 2017 primarily due to net income, the issuance of common stock and stock compensation net of minimum tax withholdings, partially offset by dividends.

We need to finance capital expenditures and acquire additional funds for operations from time to time. The cash requirements needed to service our indebtedness, both short-term and long-term, reduce the amount of cash flow available to fund capital expenditures, purchased power, fuel and natural gas costs, dividends and other requirements.

Committed Lines of Credit

Avista Corp. has a committed line of credit with various financial institutions in the total amount of \$400.0 million that expires in April 2021. As of December 31, 2017, we had \$260.6 million of available liquidity under this line of credit.

The Avista Corp. credit facility contains customary covenants and default provisions, including a covenant which does not permit our ratio of "consolidated total debt" to "consolidated total capitalization" to be greater than 65 percent at any time. As of December 31, 2017, we were in compliance with this covenant with a ratio of 52.7 percent.

AEL&P has a \$25.0 million committed line of credit that expires in November 2019. As of December 31, 2017, there were no borrowings or letters of credit outstanding under this credit facility.

The AEL&P credit facility contains customary covenants and default provisions including a covenant which does not permit the ratio of "consolidated total debt at AEL&P" to "consolidated total capitalization at AEL&P," (including the impact of the

AVISTA CORPORATION**NOTE 14. LONG-TERM DEBT AND CAPITAL LEASES**

The following details long-term debt outstanding as of December 31 (dollars in thousands):

Maturity Year	Description	Interest Rate	2017	2016
Avista Corp. Secured Long-Term Debt				
2018	First Mortgage Bonds	5.95%	250,000	250,000
2018	Secured Medium-Term Notes	7.39%-7.45%	22,500	22,500
2019	First Mortgage Bonds	5.45%	90,000	90,000
2020	First Mortgage Bonds	3.89%	52,000	52,000
2022	First Mortgage Bonds	5.13%	250,000	250,000
2023	Secured Medium-Term Notes	7.18%-7.54%	13,500	13,500
2028	Secured Medium-Term Notes	6.37%	25,000	25,000
2032	Secured Pollution Control Bonds (1)	(1)	66,700	66,700
2034	Secured Pollution Control Bonds (1)	(1)	17,000	17,000
2035	First Mortgage Bonds	6.25%	150,000	150,000
2037	First Mortgage Bonds	5.70%	150,000	150,000
2040	First Mortgage Bonds	5.55%	35,000	35,000
2041	First Mortgage Bonds	4.45%	85,000	85,000
2044	First Mortgage Bonds	4.11%	60,000	60,000
2045	First Mortgage Bonds	4.37%	100,000	100,000
2047	First Mortgage Bonds	4.23%	80,000	80,000
2047	First Mortgage Bonds (2)	3.91%	90,000	—
2051	First Mortgage Bonds	3.54%	175,000	175,000
Total Avista Corp. secured long-term debt			1,711,700	1,621,700
Alaska Electric Light and Power Company Secured Long-Term Debt				
2044	First Mortgage Bonds	4.54%	75,000	75,000
Total secured long-term debt			1,786,700	1,696,700
Alaska Energy and Resources Company Unsecured Long-Term Debt				
2019	Unsecured Term Loan	3.85%	15,000	15,000
Total secured and unsecured long-term debt			1,801,700	1,711,700
Other Long-Term Debt Components				
Capital lease obligations			62,148	65,435
Unamortized debt discount			(626)	(792)
Unamortized long-term debt issuance costs			(10,285)	(10,639)
Total			1,852,937	1,765,704
Secured Pollution Control Bonds held by Avista Corporation (2)			(83,700)	(83,700)
Current portion of long-term debt and capital leases			(277,438)	(3,287)
Total long-term debt and capital leases			\$ 1,491,799	\$ 1,678,717

- (1) In December 2010, \$66.7 million and \$17.0 million of the City of Forsyth, Montana Pollution Control Revenue Refunding Bonds (Avista Corporation Colstrip Project) due in 2032 and 2034, respectively, which had been held by Avista Corp. since 2008 and 2009, respectively, were refunded by new variable rate bond issues (Series 2010A and Series 2010B). The new bonds were not offered to the public and were purchased by Avista Corp. due to market conditions. The Company expects that at a later date, subject to market conditions, these bonds may be remarketed to unaffiliated investors. So long as Avista Corp. is the holder of these bonds, the bonds will not be reflected as an asset or a liability on Avista Corp.'s Consolidated Balance Sheets.

UNITED STATES SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

(Mark One)

Form 10-K

- ☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
FOR THE FISCAL YEAR ENDED December 31, 2019 OR
- ☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

FOR THE TRANSITION PERIOD FROM **TO**
Commission file number **001-03701**

AVISTA CORPORATION

(Exact name of Registrant as specified in its charter)

WA
 (State or other jurisdiction of
 incorporation or organization)

91-0462470
 (I.R.S. Employer
 Identification No.)

1411 East Mission Avenue, Spokane, WA 99202-2600
 (Address of principal executive offices, including zip code)

Registrant's telephone number, including area code: **509-489-0500**
 Web site: <http://www.avistacorp.com>

Securities registered pursuant to Section 12(b) of the Act:

<u>Title of Each Class</u>	<u>Trading Symbol(s)</u>	<u>Name of Each Exchange on Which Registered</u>
Common Stock	AVA	NYSE

Securities registered pursuant to Section 12(g) of the Act:

Title of Class
Preferred Stock, Cumulative, Without Par Value

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. Yes ☐ No ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the Registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days: Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

AVISTA CORPORATION**Capital Resources****Capital Structure**

Our consolidated capital structure, including the current portion of long-term debt and short-term borrowings, and excluding noncontrolling interests, consisted of the following **as of December 31, 2019 and 2018** (dollars in thousands):

	December 31, 2019		December 31, 2018	
	Amount	Percent of total	Amount	Percent of total
Current portion of long-term debt and leases (1)	\$ 58,928	1.4%	\$ 107,645	2.8%
Short-term borrowings	185,800	4.5%	190,000	4.9%
Long-term debt to affiliated trusts	51,547	1.2%	51,547	1.3%
Long-term debt and leases (1)	1,961,083	46.7%	1,755,529	45.3%
Total debt	2,257,358	53.8%	2,104,721	54.3%
Total Avista Corporation shareholders' equity	1,939,284	46.2%	1,773,220	45.7%
Total	\$ 4,196,642	100.0%	\$ 3,877,941	100.0%

(1) Effective, January 1, 2019, we adopted ASC 842 which resulted in the reclassification of the Snettisham lease from long-term debt, to lease liabilities in 2019. The Snettisham lease amount is included here for this calculation. In addition, other operating leases were recorded on the Consolidated Balance Sheet as of January 1, 2019 and are included here for this calculation. See "Note 5 of the Notes to Consolidated Financial Statements" for further discussion and for the amounts recorded in 2019.

Our shareholders' equity increased \$166.1 million during 2019 primarily due to net income and the issuance of common stock, partially offset by dividends.

We need to finance capital expenditures and acquire additional funds for operations from time to time. The cash requirements needed to service our indebtedness, both short-term and long-term, reduce the amount of cash flow available to fund capital expenditures, purchased power, fuel and natural gas costs, dividends and other requirements.

Committed Lines of Credit

Avista Corp. has a committed line of credit with various financial institutions in the total amount of \$400.0 million that expires in April 2021. As of December 31, 2019, there was \$196.2 million of available liquidity under this line of credit. We expect to renew or replace this committed line of credit during 2020.

The Avista Corp. credit facility contains customary covenants and default provisions, including a covenant which does not permit our ratio of "consolidated total debt" to "consolidated total capitalization" to be greater than 65 percent at any time. As of December 31, 2019, we were in compliance with this covenant with a ratio of 53.8 percent.

Balances outstanding and interest rates of borrowings (excluding letters of credit) under Avista Corp.'s committed line of credit were as follows as of and for the year ended December 31 (dollars in thousands):

	2019	2018
Balance outstanding at end of year	\$ 182,300	\$ 190,000
Letters of credit outstanding at end of year	\$ 21,473	\$ 10,503
Maximum balance outstanding during the year	\$ 221,000	\$ 200,000
Average balance outstanding during the year	\$ 148,616	\$ 58,199
Average interest rate during the year	3.05%	2.80%
Average interest rate at end of year	2.64%	3.18%

In November of 2019, AEL&P renewed its \$25.0 million committed line of credit with a new expiration date in November 2024. As of December 31, 2019, there was \$21.5 million of available liquidity under this line of credit.

The AEL&P credit facility contains customary covenants and default provisions including a covenant which does not permit the ratio of "consolidated total debt at AEL&P" to "consolidated total capitalization at AEL&P," (including the impact of the Snettisham obligation) to be greater than 67.5 percent at any time. As of December 31, 2019, AEL&P was in compliance with this covenant with a ratio of 54.6 percent.

As of December 31, 2019, Avista Corp. and its subsidiaries were in compliance with all of the covenants of their financing agreements, and none of Avista Corp.'s subsidiaries constituted a "significant subsidiary" as defined in Avista Corp.'s committed line of credit.

AVISTA CORPORATION**NOTE 15. LONG-TERM DEBT**

The following details long-term debt outstanding as of December 31 (dollars in thousands):

Maturity Year	Description	Interest Rate	2019	2018
Avista Corp. Secured Long-Term Debt				
2019	First Mortgage Bonds	5.45%	—	90,000
2020	First Mortgage Bonds	3.89%	52,000	52,000
2022	First Mortgage Bonds	5.13%	250,000	250,000
2023	Secured Medium-Term Notes	7.18%-7.54%	13,500	13,500
2028	Secured Medium-Term Notes	6.37%	25,000	25,000
2032	Secured Pollution Control Bonds (1)	(1)	66,700	66,700
2034	Secured Pollution Control Bonds (1)	(1)	17,000	17,000
2035	First Mortgage Bonds	6.25%	150,000	150,000
2037	First Mortgage Bonds	5.70%	150,000	150,000
2040	First Mortgage Bonds	5.55%	35,000	35,000
2041	First Mortgage Bonds	4.45%	85,000	85,000
2044	First Mortgage Bonds	4.11%	60,000	60,000
2045	First Mortgage Bonds	4.37%	100,000	100,000
2047	First Mortgage Bonds	4.23%	80,000	80,000
2047	First Mortgage Bonds	3.91%	90,000	90,000
2048	First Mortgage Bonds	4.35%	375,000	375,000
2049	First Mortgage Bonds (2)	3.43%	180,000	—
2051	First Mortgage Bonds	3.54%	175,000	175,000
Total Avista Corp. secured long-term debt			1,904,200	1,814,200
Alaska Electric Light and Power Company Secured Long-Term Debt				
2044	First Mortgage Bonds	4.54%	75,000	75,000
Total secured long-term debt			1,979,200	1,889,200
Alaska Energy and Resources Company Unsecured Long-Term Debt				
2019	Unsecured Term Loan	3.85%	—	15,000
2024	Unsecured Term Loan	3.44%	15,000	—
Total secured and unsecured long-term debt			1,994,200	1,904,200
Other Long-Term Debt Components				
Capital lease obligations (3)			—	57,210
Unamortized debt discount			(788)	(882)
Unamortized long-term debt issuance costs			(13,944)	(13,654)
Total			1,979,468	1,946,874
Secured Pollution Control Bonds held by Avista Corporation (1)			(83,700)	(83,700)
Current portion of long-term debt and capital leases			(52,000)	(107,645)
Total long-term debt and capital leases			\$ 1,843,768	\$ 1,755,529

- (1) In December 2010, \$66.7 million and \$17.0 million of the City of Forsyth, Montana Pollution Control Revenue Refunding Bonds (Avista Corporation Colstrip Project) due in 2032 and 2034, respectively, which had been held by Avista Corp. since 2008 and 2009, respectively, were refunded by new variable rate bond issues (Series 2010A and Series 2010B). The new bonds were not offered to the public and were purchased by Avista Corp. due to market conditions. The Company expects that at a later date, subject to market conditions, these bonds may be remarketed to unaffiliated investors. So long as Avista Corp. is the holder of these bonds, the bonds will not be reflected as an asset or a liability on Avista Corp.'s Consolidated Balance Sheets.

CASE: UG 389
WITNESSES: MATT MULDOON-MOYA ENRIGHT-CURTIS DLOUHY

**PUBLIC UTILITY COMMISSION
OF
OREGON**

**STAFF EXHIBIT 1305
Cost of LT Debt**

**Exhibits in Furtherance
of Testimony in Support of Partial Stipulation**

August 7, 2020

Staff Exhibit 1305

is confidential

and

filed in electronic format.

CASE: UG 389
WITNESSES: MATT MULDOON-MOYA ENRIGHT-CURTIS DLOUHY

**PUBLIC UTILITY COMMISSION
OF
OREGON**

**STAFF EXHIBIT 1306
Peer Screening**

**Exhibits in Furtherance
of Testimony in Support of Partial Stipulation**

August 7, 2020

Staff Exhibit 1306

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filed in electronic format.

1	2	3	4	5	6	18	19	20	21	22	23	24	25	26
Avista Corp AVA UG 389 Proxy Group		Screen: 1 Sensitivities: 2		VL Gas Utilities passing Staff Peer Screen VL Gas Utilities passing Company Screen		80% Mid Cap		Either / Or						
#	Abbreviated Utility	UG 389 Company	UG 366 Staff	VL Corporate Name Gas Utility	Ticker	S&P Local LT Rating ≥ BBB- 3/26/2019	Moody's Local LT Rating ≥ Baa3 3/26/2019	Last 10-K Highly Regulated LDC Revenue	VL 2020 LT Debt < 56% of Capital	VL 2022-2024 LT Debt % of Capital	VL 2020 Common Equity % of Capital	VL Preferred Stock of Capital	VL Div. Growth Rate > 0%	Major M&A in Last 4 Years
1	Atmos	Yes	Yes	Atmos Energy Corporation	ATO	A	A1	R	37.0%	35.0%	63.0%	0.0%	Pass	Pass
2	Chesapeake	Yes	No	Chesapeake Utilities Corporation	CPK	FAIL	B1 FAIL	FAIL	39.0%	35.0%	61.0%	0.0%	Pass	Pass
3	New Jersey	Yes	No	New Jersey Resources Corporation	NJR	FAIL	Aa3	FAIL	42.5%	40.5%	57.5%	0.0%	Pass	FAIL
4	NiSource	Yes	Yes	NiSource Inc.	NI	BBB+	Baa2	FAIL	54.0%	53.0%	45.9%	0.1%	FAIL	Pass
5	Northwest Natural	Yes	No	Northwest Natural Gas Company	NWN	A+	Baa1	R	48.0%	47.5%	52.0%	0.0%	Pass	Pass
6	ONE Gas	Yes	Yes	ONE Gas, Inc.	OGS	A	A2	R	38.0%	38.0%	62.0%	0.0%	Pass	Pass
7	South Jersey	Yes	No	South Jersey Industries, Inc.	SJI	BBB	A3	FAIL	58.5%	58.0%	41.5%	0.0%	Pass	FAIL
8	Southwest Gas	Yes	No	Southwest Gas Holdings, Inc.	SWX	A	A3	R	48.5%	46.0%	51.5%	0.0%	Pass	Pass
9	Spire	Yes	Yes	Spire, Inc. (Formerly: The Laclede Group, Inc.)	SR	A	Baa2	R	42.0%	40.0%	57.4%	0.6%	Pass	Pass
10	UGI	No	No	UGI Corporation (Propane Focus / VL)	UGI	FAIL	Withdrawn	FAIL	50.0%	35.5%	50.0%	0.0%	Pass	Pass
11	WGL	No	No	WGL Holdings, Inc.	WGL	BBB-	Baa1	R	49.0%	42.0%	50.0%	1.0%	Pass	FAIL
TOTAL PEERS		9	4	When Value Line (VL) Beta ratio exceeds 99.9 or earnings are negative, VI shows "NMF" for 'no meaningful figure'										
			80% Mid Cap											

1	2	3	4	27	28
Avista Corp AVA UG 389 Proxy Group		Screen:	1		
		Sensitivities:	2		
		Gas Group		M&A Activity and General Notes re: Last 4 Years	
#	Abbreviated Utility	UG 389 Company	UG 366 Staff		#
1	Atmos	Yes	Yes	Completed Sale Atmos Energy Marketing to CenterPoint Energy Jan. 4, 2017 leaving Atmos Energy 100% Regulated.	1
2	Chesapeake	Yes	No	VL indicates this utility 55% unregulated. SEC Edgar 2018 Form 10-K P2 Operating Segments confirms.	2
3	New Jersey	Yes	No	2017 NJR and SJI Merger Discussion But NO Completion of Merger	3
4	NiSource	Yes	Yes	Major Safety Failure near Boston, MA 2015 2016 div cuts	4
5	Northwest Natural	Yes	No	HoldCo Formation - Purchase of mostly small water utilities to date	5
6	ONE Gas	Yes	Yes	ONE Gas, Inc was created in 2014 as a spinoff of ONEOK's natural gas distribution operations.	6
7	South Jersey	Yes	No	Bought Elizabethtown Gas & Elkton Gas 2018 for \$1.7 B - NJR / SJI Merger	7
8	Southwest Gas	Yes	No	Reorganized under holding company.	8
9	Spire	Yes	Yes	Spire STL 65 mile pipeline boosted cap-x about \$300M	9
10	UGI	No	No	Different Propane Business Model besides N Gas and Electric.	10
11	WGL	No	No	Canada's AltaGas closed purchase of WGL for \$4.6 Billion on Jul. 6, 2018 https://www.altagas.ca/newsroom/news-releases/altagas-ltd-announces-closing-its-acquisition-wgl-holdings-inc	11
TOTAL PEERS		9	4		
		80% Mid Cap			
1	2	3	4	27	28

CASE: UG 389
WITNESSES: MATT MULDOON-MOYA ENRIGHT-CURTIS DLOUHY

**PUBLIC UTILITY COMMISSION
OF
OREGON**

**STAFF EXHIBIT 1307
Long-Run Growth Rates**

**Exhibits in Furtherance
of Testimony in Support of Partial Stipulation**

August 7, 2020

Staff Exhibit 1307

Page 1

is

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Resource	10-Year GDP Projection	20-Year GDP Projection	30-Year GDP Projection	Date Accessed	Last Updated	Page
White House Budget , FY 2021, Table S-9, Economic Assumptions URL https://www.whitehouse.gov/wp-content/uploads/2020/02/budget_fy21.pdf	4.98 (N), 2.98 (Real)	N/A	N/A	6/25/2020	2/10/2020	126
CBO , The Budget and Economic Outlook: 2020-2030, Table 2-1 URL https://www.cbo.gov/system/files/2020-01/56020-CBO-Outlook.pdf	3.7 (N), 1.7 (Real)			6/25/2020	1/28/2020	30
SSA OASDI Trustee Report , Table V.B2, Additional Economic Factors URL https://www.ssa.gov/OACT/TR/2020/tr2020.pdf	2.0 (Real, FY 2030)	1.9 (Real, FY 2040)	2.0 (Real, FY 2050)	6/25/2020	4/22/2020	114
EIA Assumptions to Annual Energy Outlook 2020 , Table 1, Economic growth in gross domestic product URL https://www.eia.gov/outlooks/aeo/assumptions/pdf/macroeconomic.pdf	1.9% (Real)	1.8% Real	1.8% Real	6/25/2020	1/29/2020	1
EIA Annual Energy Outlook 2020, Critical drivers and model updates URL https://www.eia.gov/outlooks/aeo/pdf/AEO2020%20Full%20Report.pdf	N/A	N/A	1.4%, 1.9% , 2.4% (Real, FY 2050)	6/25/2020	1/29/2020	20
BLS , Projections Overview and Highlights, 2018-28 , Figure 5 URL https://www.bls.gov/opub/mlr/2019/article/projections-overview-and-highlights-2018-28.htm	1.8 (Real, FY 2028)	N/A	N/A	6/25/2020	10/1/2019	N/A
PwC , The Long View, Table B2, Breakdown of...average real growth in GPD at MERs (2016-2050) URL https://www.pwc.com/gx/en/world-2050/assets/pwc-the-world-in-2050-full-report-feb-2017.pdf	N/A	N/A	1.8% (Real, FY 2050)	6/25/2020	2/1/2017	69
Fidelity , Secular Outlook for Global Growth: The Next 20 Years, Exhibit 6 URL https://institutional.fidelity.com/app/proxy/content?literatureURL=959546.PDF	N/A	1.7% (Real, FY 2038)	N/A	6/25/2020	5/31/2019	8

Acronyms Used	
BLS	Bureau of Labor Statistics
CBO	Congressional Budget Office
EIA	Energy Information Administration
FY	Fiscal Year
GDP	Gross Domestic Product
MERs	Market Exchange Rates
N	Nominal
N/A	Not Available
OASDI	Old Age Survivors Disability Insurance (Social Security)
PwC	PricewaterhouseCooper
R	Real
SSA	Social Security Administration

FISCAL YEAR 2021

A BUDGET FOR
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FUTURE



BUDGET OF THE U.S. GOVERNMENT

OFFICE OF MANAGEMENT AND BUDGET | [OMB.GOV](https://www.omb.gov)

Table S-9. Economic Assumptions¹

(Calendar years)

	Actual 2018	Projections											
		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross Domestic Product (GDP):													
Nominal level, billions of dollars	20,580	21,437	22,494	23,645	24,849	26,113	27,442	28,822	30,242	31,719	33,269	34,893	36,598
Percent change, nominal GDP, year/year	5.4	4.2	4.9	5.1	5.1	5.1	5.1	5.0	4.9	4.9	4.9	4.9	4.9
Real GDP, percent change, year/year	2.9	2.4	2.8	3.1	3.0	3.0	3.0	3.0	2.9	2.8	2.8	2.8	2.8
Real GDP, percent change, Q4/Q4	2.5	2.5	3.1	3.0	3.0	3.0	3.0	2.9	2.8	2.8	2.8	2.8	2.8
GDP chained price index, percent change, year/year	2.4	1.8	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Consumer Price Index,² percent change, year/year ...	2.4	1.8	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Interest rates, percent:³													
91-day Treasury bills ⁴	1.9	2.1	1.4	1.5	1.5	1.6	1.7	2.0	2.2	2.4	2.5	2.5	2.5
10-year Treasury notes	2.9	2.2	2.0	2.2	2.5	2.7	3.0	3.1	3.1	3.1	3.2	3.2	3.2
Unemployment rate, civilian, percent³	3.9	3.7	3.5	3.6	3.8	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0

Note: A more detailed table of economic assumptions appears in Chapter 2, "Economic Assumptions and Interactions with the Budget," in the *Analytical Perspectives* volume of the Budget.

¹ Based on information available as of mid-November 2019.

² Seasonally adjusted CPI for all urban consumers.

³ Annual average.

⁴ Average rate, secondary market (bank discount basis).



Table 2-1.

CBO's Economic Projections for Calendar Years 2020 to 2030

	Estimated, 2019 ^a	2020	2021	2022	Annual Average	
					2023– 2024	2025– 2030
Percentage Change From Fourth Quarter to Fourth Quarter						
Gross Domestic Product						
Real ^b	2.4	2.2	1.8	1.6	1.6	1.7
Nominal	4.2	4.2	3.9	3.8	3.7	3.7
Inflation						
PCE price index	1.5	2.0	2.1	2.1	2.0	1.9
Core PCE price index ^c	1.7	2.2	2.1	2.0	2.0	1.9
Consumer price index ^d	2.0 ^e	2.5	2.6	2.6	2.4	2.2
Core consumer price index ^c	2.3 ^e	2.8	2.6	2.5	2.4	2.2
GDP price index	1.8	1.9	2.1	2.1	2.1	2.0
Employment Cost Index ^f	3.1	3.6	3.6	3.6	3.4	3.1
Fourth-Quarter Level (Percent)						
Unemployment Rate	3.5 ^e	3.5	3.6	4.0	4.4 ^g	4.4 ^h
Percentage Change From Year to Year						
Gross Domestic Product						
Real ^b	2.3	2.2	1.9	1.7	1.6	1.7
Nominal	4.2	4.2	4.1	3.8	3.7	3.7
Inflation						
PCE price index	1.4	1.9	2.1	2.1	2.0	1.9
Core PCE price index ^c	1.6	2.0	2.2	2.1	2.0	1.9
Consumer price index ^d	1.8 ^e	2.4	2.5	2.6	2.4	2.3
Core consumer price index ^c	2.2 ^e	2.7	2.6	2.5	2.4	2.2
GDP price index	1.8	1.9	2.1	2.1	2.1	2.0
Employment Cost Index ^f	3.0	3.5	3.6	3.6	3.5	3.1
Annual Average						
Unemployment Rate (Percent)	3.7 ^e	3.5	3.5	3.8	4.3	4.5
Payroll Employment (Monthly change, in thousands) ^j	181 ^e	135	59	17	17	51
Interest Rates (Percent)						
Three-month Treasury bills	2.1 ^e	1.6	1.7	1.8	2.1	2.3
Ten-year Treasury notes	2.1 ^e	1.9	2.2	2.6	2.7	3.0
Tax Bases (Percentage of GDP)						
Wages and salaries	43.5	43.7	43.8	43.9	43.9	43.8
Domestic corporate profits ^j	7.2	7.6	7.7	7.7	7.8	7.8

Sources: Congressional Budget Office; Bureau of Economic Analysis; Bureau of Labor Statistics; Federal Reserve.

For economic projections for each year from 2020 to 2030, see Appendix B.

GDP = gross domestic product; PCE = personal consumption expenditures.

a. Values for 2019 do not reflect the values for GDP and related series that the Bureau of Economic Analysis has released since early January 2020.

b. Real values are nominal values that have been adjusted to remove the effects of changes in prices.

c. Excludes prices for food and energy.

d. The consumer price index for all urban consumers.

e. Actual value for 2019.

f. The employment cost index for wages and salaries of workers in private industry.

g. Value for the fourth quarter of 2024.

h. Value for the fourth quarter of 2030.

i. The average monthly change in the number of employees on nonfarm payrolls, calculated by dividing the change from the fourth quarter of one calendar year to the fourth quarter of the next by 12.

j. Adjusted to remove distortions in depreciation allowances caused by tax rules and to exclude the effects of changes in prices on the value of inventories.

THE 2020 ANNUAL REPORT OF THE BOARD OF
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TRUST FUNDS

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THE 2020 ANNUAL REPORT OF THE BOARD OF TRUSTEES OF THE
FEDERAL OLD-AGE AND SURVIVORS INSURANCE AND FEDERAL
DISABILITY INSURANCE TRUST FUNDS



*Assumptions and Methods***Table V.B2.—Additional Economic Factors (Cont.)**

Calendar year	Average annual unemployment rate ^a	Annual percentage change ^b in—			Average annual interest rate	
		Labor force ^c	Total employment ^d	Real GDP ^e	Nominal ^f	Real ^g
Intermediate:						
2020	3.8	1.1	0.9	2.1	2.3	h
2021	4.2	.7	.3	2.3	2.9	-.1
2022	4.6	.8	.3	2.2	3.3	.5
2023	5.0	.8	.4	2.1	3.6	.9
2024	5.0	.6	.6	2.1	4.0	1.2
2025	5.0	.5	.5	2.1	4.2	1.6
2026	5.0	.5	.5	2.1	4.4	1.8
2027	5.0	.5	.5	2.1	4.6	2.0
2028	5.0	.5	.5	2.1	4.6	2.2
2029	5.0	.5	.5	2.1	4.7	2.2
2030	5.0	.4	.4	2.0	4.7	2.3
2035	5.0	.4	.4	2.0	4.7	2.3
2040	5.0	.3	.3	1.9	4.7	2.3
2045	5.0	.4	.4	2.0	4.7	2.3
2050	5.0	.5	.5	2.0	4.7	2.3
2055	5.0	.4	.4	2.0	4.7	2.3
2060	5.0	.4	.4	2.0	4.7	2.3
2065	5.0	.3	.3	1.9	4.7	2.3
2070	5.0	.3	.3	1.9	4.7	2.3
2075	5.0	.4	.4	2.0	4.7	2.3
2080	5.0	.4	.4	2.0	4.7	2.3
2085	5.0	.4	.4	2.0	4.7	2.3
2090	5.0	.4	.4	2.0	4.7	2.3
2095	5.0	.4	.4	1.9	4.7	2.3
Low-cost:						
2020	3.7	1.5	1.5	3.2	3.3	-.7
2021	3.9	1.2	.9	3.6	3.8	.4
2022	4.0	.8	.7	3.1	4.4	.9
2023	4.0	.8	.8	2.8	4.7	1.4
2024	4.0	.8	.7	2.8	5.0	1.7
2025	4.0	.7	.7	2.7	5.3	2.0
2026	4.0	.7	.7	2.7	5.5	2.3
2027	4.0	.6	.6	2.6	5.6	2.5
2028	4.0	.6	.6	2.6	5.8	2.6
2029	4.0	.6	.6	2.6	5.8	2.8
2030	4.0	.5	.5	2.5	5.8	2.8
2035	4.0	.5	.5	2.5	5.8	2.8
2040	4.0	.5	.5	2.5	5.8	2.8
2045	4.0	.7	.6	2.6	5.8	2.8
2050	4.0	.7	.7	2.7	5.8	2.8
2055	4.0	.7	.7	2.7	5.8	2.8
2060	4.0	.6	.6	2.6	5.8	2.8
2065	4.0	.6	.6	2.6	5.8	2.8
2070	4.0	.6	.6	2.6	5.8	2.8
2075	4.0	.7	.7	2.7	5.8	2.8
2080	4.0	.7	.7	2.7	5.8	2.8
2085	4.0	.7	.7	2.7	5.8	2.8
2090	4.0	.7	.7	2.7	5.8	2.8
2095	4.0	.6	.6	2.6	5.8	2.8

January 2020

Macroeconomic Activity Module

Table 1. Economic growth in gross domestic product (GDP), nonfarm employment, and productivity

Assumptions	2019–2020	2021–2030	2031–2040	2041–2050	2019–2050
Real GDP (billion chain-weighted \$2009)					
High Economic Growth	2.4%	2.3%	2.3%	2.5%	2.4%
Reference	1.9%	1.9%	1.8%	1.8%	1.9%
Low Economic Growth	1.4%	1.4%	1.4%	1.3%	1.4%
Nonfarm Employment					
High Economic Growth	1.4%	0.6%	0.7%	0.9%	0.8%
Reference	1.1%	0.4%	0.6%	0.5%	0.5%

U.S. Energy Information Administration | Assumptions to the Annual Energy Outlook 2020: Macroeconomic Activity Module

1

January 2020

Low Economic Growth	0.8%	0.1%	0.4%	0.3%	0.3%
Productivity					
High Economic Growth	1.5%	2.1%	1.8%	1.9%	1.9%
Reference	1.0%	1.8%	1.4%	1.4%	1.5%
Low Economic Growth	0.7%	1.5%	1.0%	1.1%	1.2%

Source: U.S. Energy Information Administration, AEO2020 National Energy Modeling System runs: ref2020.d112119a, lowmacro.d112619a, and highmacro.d112619a.

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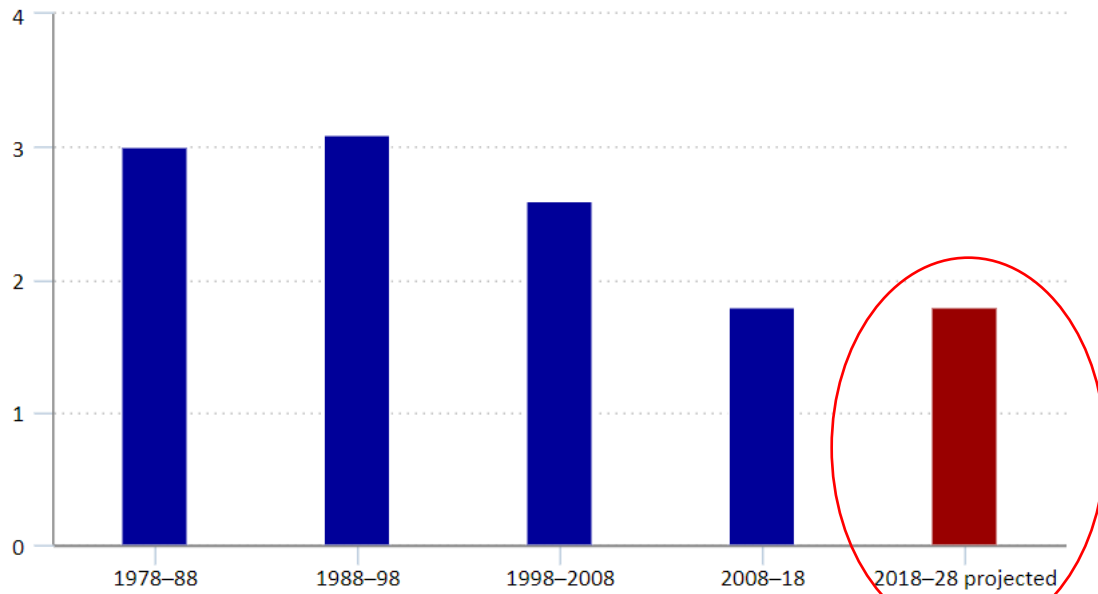
—which also affect important drivers of energy demand growth

- The AEO2020 Reference, High Economic Growth, and Low Economic Growth cases illustrate three possible paths for U.S. economic growth. In the High Economic Growth case, average annual growth in real GDP during the projection period is 2.4% compared with 1.9% in the Reference case. The Low Economic Growth case assumes a lower rate of annual growth in real GDP of 1.4%.
- Differences among the cases reflect different assumptions for growth in the labor force, capital stock, and productivity. These changes affect capital investment decisions, household formation, industrial activity, and amount of travel.
- All three economic growth cases assume smooth economic growth and do not anticipate business cycles or large economic shocks.



Figure 5. Gross domestic product, 10-year CAGR, 1978–2018 and projected 2018–28

Percent (CAGR)



Hover over chart to view data.
Note: CAGR = compound annual growth rate.
Source: U.S. Bureau of Labor Statistics.



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The World in 2050

The Long View

How will the global economic order change by 2050?

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Table B2: Breakdown of components of average real growth in GDP at MERs (2016-2050)

Country	Average Pop Growth p.a %	Average Real Growth per capita p.a %	% of growth due to MER	Average GDP growth p.a. (in USD)
India	0.7%	4.1%	2.8%	7.7%
Vietnam	0.5%	4.5%	2.4%	7.4%
Bangladesh	0.6%	4.1%	2.2%	7.0%
Pakistan	1.4%	2.9%	2.6%	7.0%
Egypt	1.4%	2.6%	2.5%	6.6%
Philippines	1.1%	3.1%	2.1%	6.3%
Nigeria	2.3%	1.9%	2.1%	6.2%
Indonesia	0.6%	3.1%	2.5%	6.2%
South Africa	0.5%	3.2%	2.1%	5.8%
Malaysia	0.8%	2.7%	2.3%	5.8%
Iran	0.4%	2.5%	2.6%	5.5%
Colombia	0.4%	2.9%	2.0%	5.3%
Saudi Arabia	1.1%	1.9%	2.2%	5.1%
Mexico	0.7%	2.5%	1.7%	5.0%
Thailand	-0.3%	2.9%	2.3%	4.9%
Turkey	0.5%	2.4%	1.8%	4.8%
Poland	-0.4%	2.5%	2.5%	4.5%
China	-0.1%	3.1%	1.4%	4.4%
Russia	-0.3%	2.2%	2.3%	4.2%
Argentina	0.7%	2.2%	1.1%	4.1%
Brazil	0.4%	2.2%	1.3%	3.9%
South Korea	0.0%	1.8%	1.0%	2.8%
Spain	-0.1%	1.5%	0.9%	2.3%
Australia	0.9%	1.3%	-0.2%	2.1%
United Kingdom	0.4%	1.5%	0.2%	2.1%
Canada	0.6%	1.2%	0.3%	2.1%
Netherlands	0.1%	1.5%	0.4%	2.0%
France	0.3%	1.3%	0.3%	1.9%
United States	0.5%	1.3%	0.0%	1.8%
Germany	-0.2%	1.5%	0.4%	1.7%
Italy	-0.2%	1.2%	0.5%	1.5%
Japan	-0.5%	1.4%	0.1%	1.1%

Source: PwC analysis

LEADERSHIP SERIES



Secular Outlook for Global Growth: The Next 20 Years

Slower economic growth is expected to result in a lower-than-historical-average interest rate climate and to offer less of a tailwind to equities

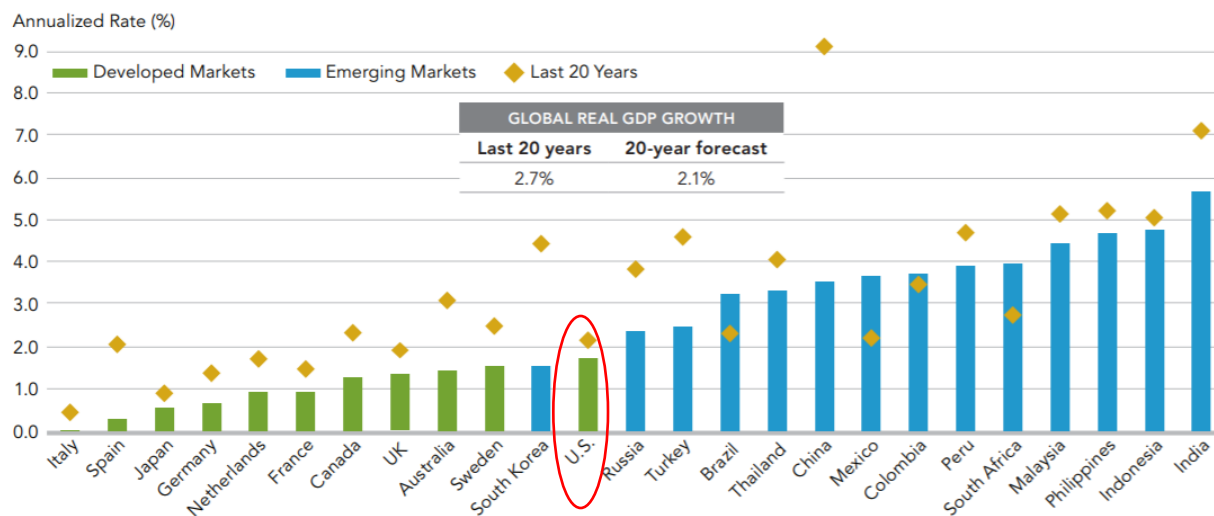
Irina Tytell, PhD | Senior Research Analyst, Asset Allocation Research

Lisa Emsbo-Mattingly | Director of Asset Allocation Research

Dirk Hofschire, CFA | Senior Vice President, Asset Allocation Research

EXHIBIT 6: The world economy will grow more slowly, with the highest growth rates found in developing economies.

Real GDP 20-Year Growth Forecasts vs. History, 2019–2038



CASE: UG 389
WITNESSES: MATT MULDOON-MOYA ENRIGHT-CURTIS DLOUHY

**PUBLIC UTILITY COMMISSION
OF
OREGON**

**STAFF EXHIBIT 1308
BEA Historic GDP Growth**

**Exhibits in Furtherance
of Testimony in Support of Partial Stipulation**

August 7, 2020

Staff Exhibit 1308

is

filed in electronic format.

www.bea.gov/national/xls/gdplev.xlsx

<https://www.bea.gov/national/xls/gdplev.xlsx>

gdplev.xlsx

Bureau of Economic Analysis (BEA)

Staff Accessed
June 25, 2020

Data Recompiled by BEA on May 28, 2020

Annual

Quarterly

<https://www.bea.gov/data/economic-accounts/national>

Long Run Historical GDP Growth Rate

http://www.bea.gov/national/index.htm			(Seasonally adjusted annual rates)				1980 through 2020 Q1		
Yr	GDP in billions of current dollars	GDP in billions of chained 2012 dollars	Quarter	GDP in billions of current dollars	GDP in billions of chained 2012 dollars	Qtr#	Average	2.58%	Real
1929		104.556							
1930		92.16	1947Q1	243.164	2033.061	1	1	8.830198	1980
1931	77.391	950.037	1947Q2	245.968	2027.639	2	2	8.809378	
1932	59.522	827.495	1947Q3	249.585	2023.452	3	3	8.808189	
1933	57.154	817.265	1947Q4	259.745	2055.103	4	4	8.826666	
1934	66.8	905.594	1948Q1	265.742	2086.017	5	5	8.846071	1981
1935	74.241	986.231	1948Q2	272.567	2120.450	6	6	8.838633	
1936	84.83	1113.291	1948Q3	279.196	2132.598	7	7	8.850537	
1937	93.003	1170.344	1948Q4	280.366	2134.981	8	8	8.839582	
1938	87.352	1131.564	1949Q1	275.034	2105.562	9	9	8.823924	1982
1939	93.437	1222.375	1949Q2	271.351	2098.380	10	10	8.828476	
1940	102.899	1330.151	1949Q3	272.889	2120.044	11	11	8.824646	
1941	129.309	1565.778	1949Q4	270.627	2102.251	12	12	8.825045	
1942	165.952	1861.5	1950Q1	280.828	2184.872	13	13	8.838137	1983
1943	203.084	2178.39	1950Q2	290.383	2251.507	14	14	8.860638	
1944	224.447	2351.627	1950Q3	308.153	2338.514	15	15	8.880432	
1945	228.007	2328.626	1950Q4	319.945	2383.291	16	16	8.901080	1984
1946	227.535	2058.375	1951Q1	336.000	2415.660	17	17	8.920439	
1947	249.616	2034.814	1951Q2	344.090	2457.517	18	18	8.937569	
1948	274.468	2118.512	1951Q3	351.385	2508.166	19	19	8.947163	
1949	272.475	2106.559	1951Q4	356.178	2513.690	20	20	8.955339	
1950	299.827	2289.546	1952Q1	359.820	2540.550	21	21	8.964983	1985
1951	346.914	2473.758	1952Q2	361.030	2546.022	22	22	8.973749	
1952	367.341	2574.898	1952Q3	367.701	2564.401	23	23	8.988905	
1953	389.218	2695.614	1952Q4	380.812	2648.621	24	24	8.996310	
1954	390.549	2680.023	1953Q1	387.980	2697.855	25	25	9.005602	1986
1955	425.478	2871.198	1953Q2	391.749	2718.709	26	26	9.010096	
1956	449.353	2932.388	1953Q3	391.171	2703.411	27	27	9.019620	
1957	474.039	2994.132	1953Q4	385.970	2662.482	28	28	9.024977	
1958	481.229	2971.951	1954Q1	385.345	2649.755	29	29	9.032401	1987
1959	521.654	3178.182	1954Q2	386.121	2652.643	30	30	9.043132	
1960	542.382	3259.971	1954Q3	390.996	2682.601	31	31	9.051771	
1961	562.21	3343.546	1954Q4	399.734	2735.091	32	32	9.068795	
1962	603.921	3548.409	1955Q1	413.073	2813.212	33	33	9.073948	1988
1963	637.451	3702.944	1955Q2	421.532	2858.988	34	34	9.087002	
1964	684.46	3916.28	1955Q3	430.221	2897.598	35	35	9.092844	
1965	742.289	4170.75	1955Q4	437.092	2914.993	36	36	9.106081	
1966	813.414	4445.853	1956Q1	439.746	2903.671	37	37	9.116195	1989
1967	859.958	4567.781	1956Q2	446.010	2927.665	38	38	9.123799	
1968	940.651	4792.315	1956Q3	451.191	2925.035	39	39	9.131181	
1969	1017.615	4942.067	1956Q4	460.463	2973.179	40	40	9.133149	
1970	1073.303	4951.262	1957Q1	469.779	2992.219	41	41	9.144018	1990
1971	1164.85	5114.325	1957Q2	472.025	2985.663	42	42	9.147640	
1972	1279.11	5383.282	1957Q3	479.490	3014.919	43	43	9.148305	
1973	1425.376	5687.207	1957Q4	474.864	2983.727	44	44	9.139160	
1974	1545.243	5656.465	1958Q1	467.540	2906.274	45	45	9.134470	1991
1975	1684.904	5644.843	1958Q2	471.978	2925.379	46	46	9.142237	
1976	1873.412	5948.995	1958Q3	485.841	2993.068	47	47	9.147278	
1977	2081.826	6224.086	1958Q4	499.555	3063.085	48	48	9.150756	
1978	2351.599	6568.608	1959Q1	510.330	3121.936	49	49	9.162656	1992
1979	2627.334	6776.58	1959Q2	522.653	3192.380	50	50	9.173441	
1980	2857.307	6759.181	1959Q3	525.034	3194.653	51	51	9.183275	
1981	3207.042	6930.71	1959Q4	528.600	3203.759	52	52	9.193653	
1982	3343.789	6805.758	1960Q1	542.648	3275.757	53	53	9.195326	1993
1983	3634.038	7117.729	1960Q2	541.080	3258.088	54	54	9.201133	
1984	4037.613	7632.812	1960Q3	545.604	3274.029	55	55	9.205895	
1985	4338.979	7951.074	1960Q4	540.197	3232.009	56	56	9.219404	
1986	4579.631	8226.392	1961Q1	545.018	3253.826	57	57	9.229059	1994
1987	4855.215	8510.99	1961Q2	555.545	3309.059	58	58	9.242519	
1988	5236.438	8866.498	1961Q3	567.664	3372.581	59	59	9.248347	
1989	5641.58	9192.134	1961Q4	580.612	3438.721	60	60	9.259737	
1990	5963.144	9365.494	1962Q1	594.013	3500.054	61	61	9.263278	1995
1991	6158.129	9355.355	1962Q2	600.366	3531.683	62	62	9.266257	
1992	6520.327	9684.892	1962Q3	609.027	3575.070	63	63	9.274728	
1993	6858.559	9951.502	1962Q4	612.280	3586.827	64	64	9.281496	
1994	7287.236	10352.432	1963Q1	621.672	3625.981	65	65	9.288957	1996
1995	7639.749	10630.321	1963Q2	629.752	3666.669	66	66	9.305498	
1996	8073.122	11031.35	1963Q3	644.444	3747.278	67	67	9.314428	
1997	8577.552	11521.938	1963Q4	653.938	3771.845	68	68	9.324758	
1998	9062.817	12038.283	1964Q1	669.822	3851.366	69	69	9.331193	1997
1999	9630.663	12610.491	1964Q2	678.674	3893.296	70	70	9.347677	
2000	10252.347	13130.987	1964Q3	692.031	3954.121	71	71	9.360107	
2001	10581.822	13262.079	1964Q4	697.319	3966.335	72	72	9.368659	
2002	10936.418	13493.064	1965Q1	717.790	4062.311	73	73	9.378604	1998
2003	11458.246	13879.129	1965Q2	730.191	4113.629	74	74	9.387820	
2004	12213.73	14406.382	1965Q3	749.323	4205.086	75	75	9.400267	
2005	13036.637	14912.509	1965Q4	771.857	4301.973	76	76	9.416297	
2006	13814.609	15338.257	1966Q1	795.734	4406.693	77	77	9.425717	1999
2007	14451.86	15626.029	1966Q2	804.981	4421.747	78	78	9.433379	
2008	14712.845	15604.687	1966Q3	819.638	4459.195	79	79	9.446391	
2009	14448.932	15208.834	1966Q4	833.302	4495.777	80	80	9.463244	
2010	14992.052	15598.753	1967Q1	844.170	4535.591	81	81	9.468855	2000
2011	15542.582	15840.684	1967Q2	848.983	4538.370	82	82	9.485001	
2012	16197.007	16197.007	1967Q3	865.233	4581.309	83	83	9.486336	
2013	16784.851	16495.369	1967Q4	881.439	4615.853	84	84	9.492545	
2014	17527.258	16912.038	1968Q1	909.387	4709.993	85	85	9.489690	2001
2015	18224.78	17403.843	1968Q2	934.344	4788.688	86	86	9.495518	
2016	18715.04	17688.89	1968Q3	950.825	4825.799	87	87	9.491359	
2017	19519.424	18108.082	1968Q4	968.030	4844.779	88	88	9.494079	
2018	20580.223	18638.164	1969Q1	993.337	4920.605	89	89	9.502786	2002
2019	21427.69	19073.056	1969Q2	1009.020	4935.564	90	90	9.508825	
			1969Q3	1029.956	4968.164	91	91	9.513261	
			1969Q4	1038.147	4943.935	92	92	9.514808	
			1970Q1	1051.200	4936.594	93	93	9.520341	2003
			1970Q2	1067.375	4943.600	94	94	9.528906	
			1970Q3	1086.059	4989.159	95	95	9.545746	
			1970Q4	1088.608	4935.693	96	96	9.557162	
			1971Q1	1135.156	5069.746	97	97	9.562485	2004
			1971Q2	1156.271	5097.179	98	98	9.570077	
			1971Q3	1177.675	5139.128	99	99	9.579486	
			1971Q4	1190.297	5151.245	100	100	9.589453	
			1972Q1	1230.60					

1984Q1	3908.054	7483.371	149	149	9.793966	2017
1984Q2	4009.601	7612.668	150	150	9.799296	2017
1984Q3	4084.250	7686.059	151	151	9.807173	
1984Q4	4148.551	7749.151	152	152	9.815883	
1985Q1	4230.168	7824.247	153	153	9.822183	2018
1985Q2	4294.887	7893.136	154	154	9.830817	
1985Q3	4386.773	8013.674	155	155	9.838027	
1985Q4	4444.094	8073.239	156	156	9.840737	2019
1986Q1	4507.894	8148.603	157	157	9.848360	
1986Q2	4545.340	8185.303	158	158	9.853344	
1986Q3	4607.669	8263.639	159	159	9.858548	2020
1986Q4	4657.627	8308.021	160	160	9.863809	
1987Q1	4722.156	8369.930	161	161	9.850862	
1987Q2	4806.160	8460.233	162			
1987Q3	4884.555	8533.635	163			
1987Q4	5007.994	8680.162	164			
1988Q1	5073.372	8725.006	165			
1988Q2	5190.036	8839.641	166			
1988Q3	5282.835	8891.435	167			
1988Q4	5399.509	9009.913	168			
1989Q1	5511.253	9101.508	169			
1989Q2	5612.463	9170.977	170			
1989Q3	5695.365	9238.923	171			
1989Q4	5747.237	9257.128	172			
1990Q1	5872.701	9358.289	173			
1990Q2	5960.028	9392.251	174			
1990Q3	6015.116	9398.499	175			
1990Q4	6004.733	9312.937	176			
1991Q1	6035.178	9269.367	177			
1991Q2	6126.862	9341.642	178			
1991Q3	6205.937	9388.845	179			
1991Q4	6264.540	9421.565	180			
1992Q1	6363.102	9534.346	181			
1992Q2	6470.763	9637.732	182			
1992Q3	6566.641	9732.979	183			
1992Q4	6680.803	9834.510	184			
1993Q1	6729.459	9850.973	185			
1993Q2	6808.939	9908.347	186			
1993Q3	6882.098	9955.641	187			
1993Q4	7013.738	10091.049	188			
1994Q1	7115.652	10188.954	189			
1994Q2	7246.931	10327.019	190			
1994Q3	7331.075	10387.382	191			
1994Q4	7455.288	10506.372	192			
1995Q1	7522.289	10543.644	193			
1995Q2	7580.997	10575.100	194			
1995Q3	7683.125	10665.060	195			
1995Q4	7772.586	10737.478	196			
1996Q1	7868.468	10817.896	197			
1996Q2	8032.840	10998.322	198			
1996Q3	8131.408	11096.976	199			
1996Q4	8259.771	11212.205	200			
1997Q1	8362.655	11284.587	201			
1997Q2	8518.825	11472.137	202			
1997Q3	8662.823	11615.636	203			
1997Q4	8765.907	11715.393	204			
1998Q1	8866.480	11832.486	205			
1998Q2	8969.699	11942.032	206			
1998Q3	9121.097	12091.614	207			
1998Q4	9293.991	12287.000	208			
1999Q1	9417.264	12403.293	209			
1999Q2	9524.152	12498.694	210			
1999Q3	9681.856	12662.385	211			
1999Q4	9899.378	12877.593	212			
2000Q1	10002.857	12924.179	213			
2000Q2	10247.679	13160.842	214			
2000Q3	10319.825	13178.419	215			
2000Q4	10439.025	13260.506	216			
2001Q1	10472.879	13222.690	217			
2001Q2	10597.822	13299.984	218			
2001Q3	10596.294	13244.784	219			
2001Q4	10660.294	13280.859	220			
2002Q1	10788.952	13397.002	221			
2002Q2	10893.207	13478.152	222			
2002Q3	10992.051	13538.072	223			
2002Q4	11071.463	13559.032	224			
2003Q1	11183.507	13634.253	225			
2003Q2	11312.875	13751.543	226			
2003Q3	11567.326	13985.073	227			
2003Q4	11769.275	14145.645	228			
2004Q1	11920.169	14221.147	229			
2004Q2	12108.987	14329.523	230			
2004Q3	12303.340	14464.984	231			
2004Q4	12522.425	14609.876	232			
2005Q1	12761.337	14771.602	233			
2005Q2	12910.022	14839.782	234			
2005Q3	13142.873	14972.054	235			
2005Q4	13332.316	15066.597	236			
2006Q1	13603.933	15267.026	237			
2006Q2	13749.806	15302.705	238			
2006Q3	13867.469	15326.368	239			
2006Q4	14037.228	15456.928	240			
2007Q1	14208.569	15493.328	241			
2007Q2	14382.363	15582.085	242			
2007Q3	14535.003	15666.738	243			
2007Q4	14681.501	15761.967	244			
2008Q1	14651.039	15671.383	245			
2008Q2	14805.611	15752.308	246			
2008Q3	14835.187	15667.032	247			
2008Q4	14559.543	15328.027	248			
2009Q1	14394.547	15155.940	249			
2009Q2	14352.850	15134.117	250			
2009Q3	14420.312	15189.222	251			
2009Q4	14628.021	15356.058	252			
2010Q1	14721.350	15415.145	253			
2010Q2	14926.098	15557.277	254			
2010Q3	15079.917	15671.967	255			
2010Q4	15240.843	15750.625	256			
2011Q1	15285.828	15712.754	257			
2011Q2	15496.189	15825.096	258			
2011Q3	15591.850	15820.700	259			
2011Q4	15796.460	16004.107	260			
2012Q1	16019.758	16129.418	261			
2012Q2	16152.257	16198.807	262			
2012Q3	16257.151	16220.667	263			
2012Q4	16358.863	16239.138	264			
2013Q1	16569.591	16382.964	265			
2013Q2	16637.926	16403.180	266			
2013Q3	16848.748	16531.685	267			
2013Q4	17083.137	16663.649	268			
2014Q1	17104.555	16616.540	269			
2014Q2	17432.909	16841.475	270			
2014Q3	17721.657	17047.098	271			
2014Q4	17849.912	17143.038	272			
2015Q1	17984.178	17277.580	273			
2015Q2	18219.405	17405.669	274			
2015Q3	18344.713	17463.222	275			
2015Q4	18350.825	17468.902	276			
2016Q1	18424.283	17556.839	277			
2016Q2	18637.253	17639.417	278			
2016Q3	18806.743	17735.074	279			
2016Q4	18991.883	17824.231	280			
2017Q1	19190.431	17925.256	281			
2017Q2	19356.649	18021.048	282			
2017Q3	19611.704	18163.558	283			
2017Q4	19918.910	18322.464	284			
2018Q1	20163.159	18438.254	285			
2018Q2	20510.177	18598.135	286			
2018Q3	20749.752	18732.720	287			
2018Q4	20897.804	18783.548	288			
2019Q1	21098.827	18927.281	289			
2019Q2	21340.267	19021.860	290			
2019Q3	21542.540	19121.112	291			
2019Q4	21729.124	19221.970	292			
2020Q1	21534.907	18974.702	293			

CASE: UG 389
WITNESSES: MATT MULDOON-MOYA ENRIGHT-CURTIS DLOUHY

**PUBLIC UTILITY COMMISSION
OF
OREGON**

**STAFF EXHIBIT 1309
TIPS Implied Inflation Expectations**

**Exhibits in Furtherance
of Testimony in Support of Partial Stipulation**

August 7, 2020

Staff Exhibit 1309

is

filed in electronic format.

2030 through 2050 TIPS-Implied Average Annual Inflation Rate:

1.62%

Yr. End Mo.-Yr.	Years	Individually Implied Price Levels					Implied Forward Curve/Price Level					Implied Price Level	Check
		5-Yr	7-Yr	10-Yr	20-Yr	30-Yr	5-Yr	7-Yr	10-Yr	20-Yr	30-Yr		
Dec-20	0	100.00	100.00	100.00	100.00	100.00	100.00					100.00	
Dec-21	1	100.85	101.05	101.16	101.42	101.47	100.85					100.85	
Dec-22	2	101.70	102.10	102.34	102.87	102.95	101.70					101.70	
Dec-23	3	102.56	103.17	103.53	104.33	104.46	102.56					102.56	
Dec-24	4	103.43	104.25	104.74	105.82	106.00	103.43					103.43	
Dec-25	5	104.31	105.34	105.95	107.32	107.55	104.31					104.31	
Dec-26	6		106.45	107.19	108.85	109.13		105.92				105.92	
Dec-27	7		107.56	108.43	110.40	110.73		107.56				107.56	
Dec-28	8			109.69	111.97	112.35			109.11			109.11	
Dec-29	9			110.97	113.56	114.00			110.67			110.67	
Dec-30	10			112.26	115.18	115.67			112.26			112.26	
Dec-31	11				116.82	117.37				114.15		114.15	114.08
Dec-32	12				118.48	119.09				116.07		116.07	115.93
Dec-33	13				120.17	120.84				118.03		118.03	117.80
Dec-34	14				121.88	122.61				120.02		120.02	119.71
Dec-35	15				123.61	124.41				122.04		122.04	121.65
Dec-36	16				125.37	126.23				124.09		124.09	123.62
Dec-37	17				127.16	128.08				126.18		126.18	125.62
Dec-38	18				128.97	129.96				128.31		128.31	127.65
Dec-39	19				130.80	131.87				130.47		130.47	129.72
Dec-40	20				132.67	133.80				132.67		132.67	131.82
Dec-41	21					135.77					134.73	134.73	133.95
Dec-42	22					137.76					136.82	136.82	136.12
Dec-43	23					139.78					138.94	138.94	138.32
Dec-44	24					141.83					141.10	141.10	140.56
Dec-45	25					143.91					143.29	143.29	142.83
Dec-46	26					146.02					145.52	145.52	145.15
Dec-47	27					148.16					147.78	147.78	147.50
Dec-48	28					150.33					150.08	150.08	149.88
Dec-49	29					152.54					152.41	152.41	152.31
Dec-50	30					154.78					154.78	154.78	154.78

Average Quarterly Values for FRB H15 Data
See FRB H.15 Tab for Data Feed Sources.

Staff TIPS Analysis Quarterly Aggregation

Average Monthly Inflation Indexed Rates by Quarter					
Qtr	TIPS-05m	TIPS-07m	TIPS-10m	TIPS-20m	TIPS-30m
2010-Q1	0.47	0.94	1.43	2.00	2.16
2010-Q2	0.46	0.91	1.36	1.77	1.88
2010-Q3	0.20	0.57	1.06	1.68	1.76
2010-Q4	-0.11	0.28	0.75	1.48	1.65
2011-Q1	0.07	0.67	1.09	1.71	2.00
2011-Q2	-0.29	0.33	0.80	1.49	1.78
2011-Q3	-0.65	-0.22	0.28	0.95	1.25
2011-Q4	-0.75	-0.39	0.05	0.61	0.85
2012-Q1	-1.02	-0.60	-0.17	0.51	0.78
2012-Q2	-1.08	-0.75	-0.35	0.35	0.66
2012-Q3	-1.27	-1.01	-0.63	0.02	0.43
2012-Q4	-1.42	-1.15	-0.76	-0.02	0.36
2013-Q1	-1.40	-0.98	-0.59	0.19	0.56
2013-Q2	-1.04	-0.62	-0.25	0.47	0.80
2013-Q3	-0.32	0.17	0.56	1.16	1.43
2013-Q4	-0.29	0.25	0.57	1.19	1.50
2014-Q1	-0.16	0.37	0.58	1.11	1.39
2014-Q2	-0.25	0.27	0.43	0.88	1.14
2014-Q3	-0.13	0.24	0.32	0.72	0.98
2014-Q4	0.19	0.39	0.45	0.75	0.95
2015-Q1	0.11	0.23	0.27	0.52	0.71
2015-Q2	-0.10	0.22	0.30	0.67	0.91
2015-Q3	0.26	0.48	0.57	0.92	1.14
2015-Q4	0.36	0.51	0.66	1.02	1.24
2016-Q1	0.15	0.32	0.49	0.88	1.11
2016-Q2	-0.24	-0.05	0.19	0.62	0.85
2016-Q3	-0.22	-0.09	0.08	0.44	0.62
2016-Q4	-0.06	0.12	0.33	0.69	0.86
2017-Q1	0.07	0.33	0.44	0.75	0.95
2017-Q2	0.10	0.30	0.44	0.76	0.94
2017-Q3	0.17	0.36	0.45	0.75	0.94
2017-Q4	0.32	0.44	0.50	0.72	0.87
2018-Q1	0.56	0.65	0.68	0.82	0.93
2018-Q2	0.69	0.77	0.79	0.88	0.95
2018-Q3	0.81	0.81	0.81	0.88	0.93
2018-Q4	1.06	1.06	1.06	1.15	1.23
2019-Q1	0.73	0.76	0.79	0.96	1.10
2019-Q2	0.42	0.46	0.51	0.71	0.89
2019-Q3	0.18	0.16	0.15	0.37	0.59
2019-Q4	0.09	0.11	0.15	0.36	0.54
2020-Q1	-0.14	-0.12	-0.06	0.14	0.29
2020-Q2	-0.49	-0.50	-0.48	-0.27	-0.09

Average Monthly Nominal UST Rates by Quarter					
Qtr	UST-05m	UST-07m	UST-10m	UST-20m	UST-30m
2010-Q1	2.42	3.16	3.72	4.49	4.62
2010-Q2	2.25	2.93	3.49	4.20	4.37
2010-Q3	1.55	2.19	2.79	3.60	3.85
2010-Q4	1.49	2.18	2.86	3.84	4.16
2011-Q1	2.12	2.83	3.46	4.32	4.56
2011-Q2	1.86	2.55	3.21	4.07	4.34
2011-Q3	1.15	1.78	2.43	3.34	3.70
2011-Q4	0.95	1.50	2.05	2.75	3.04
2012-Q1	0.90	1.44	2.04	2.80	3.14
2012-Q2	0.79	1.24	1.82	2.55	2.94
2012-Q3	0.67	1.08	1.64	2.37	2.75
2012-Q4	0.69	1.12	1.71	2.46	2.86
2013-Q1	0.83	1.32	1.95	2.75	3.14
2013-Q2	0.92	1.39	2.00	2.78	3.15
2013-Q3	1.51	2.12	2.71	3.44	3.72
2013-Q4	1.44	2.12	2.75	3.50	3.79
2014-Q1	1.60	2.22	2.76	3.42	3.68
2014-Q2	1.66	2.19	2.62	3.18	2.76
2014-Q3	1.70	2.16	2.50	3.01	3.26
2014-Q4	1.60	2.00	2.28	2.69	2.97
2015-Q1	1.45	1.77	1.97	2.32	2.55
2015-Q2	1.52	1.91	2.17	2.62	2.89
2015-Q3	1.55	1.94	2.22	2.65	2.96
2015-Q4	1.59	1.94	2.19	2.60	2.96
2016-Q1	1.37	1.69	1.92	2.32	2.72
2016-Q2	1.24	1.54	1.75	2.15	2.57
2016-Q3	1.13	1.40	1.56	1.91	2.28
2016-Q4	1.61	1.93	2.13	2.52	2.82
2017-Q1	1.94	2.25	2.44	2.78	3.04
2017-Q2	1.81	2.07	2.26	2.64	2.90
2017-Q3	1.82	2.06	2.24	2.58	2.82
2017-Q4	2.07	2.25	2.37	2.62	2.82
2018-Q1	2.54	2.69	2.76	2.91	3.03
2018-Q2	2.77	2.87	2.92	3.00	3.08
2018-Q3	2.81	2.88	2.93	3.00	3.07
2018-Q4	2.88	2.96	3.03	3.17	3.27
2019-Q1	2.47	2.55	2.65	2.85	3.01
2019-Q2	2.12	2.22	2.33	2.58	2.78
2019-Q3	1.63	1.71	1.80	2.08	2.28
2019-Q4	1.62	1.72	1.79	2.10	2.26
2020-Q1	1.16	1.29	1.38	1.71	1.88
2020-Q2	0.36	0.54	0.69	1.15	1.38

Implied Market-based Inflationary Expectations					
Qtr	5-Yr	7-Yr	10-Yr	20-Yr	30-Yr
2010-Q1	1.96	2.22	2.28	2.49	2.47
2010-Q2	1.80	2.03	2.13	2.43	2.49
2010-Q3	1.35	1.63	1.73	1.92	2.09
2010-Q4	1.59	1.90	2.12	2.36	2.51
2011-Q1	2.05	2.16	2.37	2.61	2.56
2011-Q2	2.15	2.22	2.41	2.57	2.56
2011-Q3	1.81	2.00	2.15	2.39	2.45
2011-Q4	1.71	1.89	1.99	2.14	2.19
2012-Q1	1.92	2.04	2.20	2.29	2.36
2012-Q2	1.86	1.99	2.17	2.21	2.28
2012-Q3	1.94	2.09	2.28	2.35	2.31
2012-Q4	2.11	2.27	2.47	2.48	2.50
2013-Q1	2.23	2.31	2.54	2.55	2.58
2013-Q2	1.95	2.01	2.25	2.32	2.34
2013-Q3	1.82	1.95	2.15	2.29	2.29
2013-Q4	1.73	1.86	2.17	2.31	2.29
2014-Q1	1.77	1.85	2.18	2.30	2.29
2014-Q2	1.90	1.92	2.20	2.30	1.62
2014-Q3	1.83	1.92	2.18	2.28	2.29
2014-Q4	1.41	1.61	1.83	1.95	2.02
2015-Q1	1.35	1.54	1.70	1.79	1.85
2015-Q2	1.63	1.69	1.86	1.95	1.97
2015-Q3	1.29	1.47	1.65	1.73	1.82
2015-Q4	1.23	1.43	1.53	1.58	1.72
2016-Q1	1.23	1.37	1.43	1.45	1.61
2016-Q2	1.48	1.58	1.56	1.53	1.72
2016-Q3	1.35	1.49	1.48	1.47	1.66
2016-Q4	1.67	1.80	1.80	1.83	1.96
2017-Q1	1.87	1.92	2.01	2.03	2.10
2017-Q2	1.71	1.78	1.82	1.88	1.96
2017-Q3	1.65	1.70	1.79	1.83	1.88
2017-Q4	1.75	1.81	1.87	1.89	1.95
2018-Q1	1.97	2.04	2.08	2.08	2.11
2018-Q2	2.07	2.11	2.13	2.12	2.14
2018-Q3	2.01	2.07	2.11	2.11	2.13
2018-Q4	1.81	1.90	1.98	2.02	2.03
2019-Q1	1.73	1.79	1.86	1.89	1.91
2019-Q2	1.70	1.76	1.82	1.87	1.88
2019-Q3	1.45	1.55	1.64	1.71	1.69
2019-Q4	1.53	1.61	1.64	1.74	1.72
2020-Q1	1.30	1.41	1.44	1.58	1.59
2020-Q2	0.85	1.05	1.16	1.42	1.47

FRB **H.15** Market Yield on U.S. Treasury (UST) Securities at Constant Maturity, Quoted on an Investment Basis in Percent per Year

Staff Accessed , July 1, 2020 at: <https://www.federalreserve.gov/datadownload/Choose.aspx?rel=H15>

Monthly					
TIPS-05m	5	Year	Inflation Indexed	H.15 ID	RIFLGFCY05_XII_N.M
TIPS-07m	7				RIFLGFCY07_XII_N.M
TIPS-10m	10				RIFLGFCY10_XII_N.M
TIPS-20m	20				RIFLGFCY20_XII_N.M
TIPS-30m	30				RIFLGFCY30_XII_N.M

Month	TIPS-05m	TIPS-07m	TIPS-10m	TIPS-20m	TIPS-30m
2010-01	0.42	0.85	1.37	2.00	TIPS-30
2010-02	0.42	0.90	1.42	2.03	2.16
2010-03	0.56	1.08	1.51	1.98	2.15
2010-04	0.62	1.10	1.50	1.90	2.05
2010-05	0.41	0.86	1.31	1.72	1.83
2010-06	0.34	0.76	1.26	1.69	1.77
2010-07	0.34	0.73	1.24	1.80	1.87
2010-08	0.13	0.51	1.02	1.65	1.76
2010-09	0.13	0.46	0.91	1.58	1.66
2010-10	-0.32	0.02	0.53	1.32	1.44
2010-11	-0.21	0.17	0.67	1.44	1.61
2010-12	0.21	0.65	1.04	1.67	1.89
2011-01	0.06	0.62	1.06	1.70	1.97
2011-02	0.25	0.84	1.24	1.85	2.13
2011-03	-0.09	0.54	0.96	1.58	1.89
2011-04	-0.14	0.49	0.86	1.48	1.79
2011-05	-0.34	0.29	0.78	1.47	1.77
2011-06	-0.38	0.21	0.76	1.53	1.78
2011-07	-0.49	0.09	0.62	1.36	1.62
2011-08	-0.75	-0.36	0.14	0.81	1.10
2011-09	-0.72	-0.39	0.08	0.69	1.02
2011-10	-0.63	-0.28	0.19	0.72	0.99
2011-11	-0.85	-0.46	0.00	0.55	0.78
2011-12	-0.78	-0.44	-0.03	0.56	0.78
2012-01	-0.92	-0.55	-0.11	0.51	0.74
2012-02	-1.11	-0.69	-0.25	0.45	0.72
2012-03	-1.03	-0.57	-0.14	0.56	0.87
2012-04	-1.06	-0.65	-0.21	0.50	0.79
2012-05	-1.12	-0.79	-0.34	0.44	0.68
2012-06	-1.05	-0.82	-0.50	0.10	0.50
2012-07	-1.15	-0.92	-0.60	-0.01	0.39
2012-08	-1.19	-0.94	-0.59	0.06	0.47
2012-09	-1.47	-1.17	-0.71	0.02	0.44
2012-10	-1.47	-1.18	-0.75	-0.01	0.41
2012-11	-1.38	-1.13	-0.77	-0.06	0.35
2012-12	-1.40	-1.13	-0.76	0.00	0.33
2013-01	-1.39	-1.04	-0.61	0.20	0.48
2013-02	-1.39	-0.94	-0.57	0.19	0.57
2013-03	-1.43	-0.97	-0.59	0.19	0.62
2013-04	-1.38	-0.97	-0.65	0.07	0.48
2013-05	-1.14	-0.69	-0.36	0.35	0.72
2013-06	-0.59	-0.21	0.25	0.98	1.21
2013-07	-0.45	0.02	0.46	1.09	1.34
2013-08	-0.33	0.15	0.55	1.16	1.44
2013-09	-0.17	0.34	0.66	1.22	1.50
2013-10	-0.41	0.11	0.43	1.05	1.37
2013-11	-0.38	0.18	0.55	1.20	1.51
2013-12	-0.09	0.47	0.74	1.32	1.61
2014-01	-0.09	0.45	0.63	1.17	1.44
2014-02	-0.26	0.30	0.55	1.12	1.40
2014-03	-0.14	0.37	0.56	1.05	1.33
2014-04	-0.11	0.38	0.54	0.98	1.23
2014-05	-0.34	0.21	0.37	0.82	1.08
2014-06	-0.29	0.23	0.37	0.84	1.11
2014-07	-0.27	0.18	0.28	0.72	0.98
2014-08	-0.21	0.15	0.22	0.64	0.90
2014-09	0.10	0.38	0.46	0.81	1.05
2014-10	0.06	0.32	0.38	0.74	0.96
2014-11	0.14	0.37	0.45	0.77	0.99
2014-12	0.37	0.47	0.51	0.73	0.89
2015-01	0.17	0.24	0.27	0.50	0.66
2015-02	0.11	0.22	0.26	0.52	0.73
2015-03	0.04	0.23	0.28	0.55	0.73
2015-04	-0.26	-0.01	0.08	0.42	0.65
2015-05	-0.10	0.27	0.33	0.70	0.96
2015-06	0.05	0.39	0.50	0.89	1.13
2015-07	0.14	0.42	0.50	0.87	1.11
2015-08	0.31	0.49	0.56	0.87	1.08
2015-09	0.33	0.52	0.65	1.01	1.24
2015-10	0.21	0.39	0.57	0.98	1.22
2015-11	0.40	0.55	0.69	1.03	1.25
2015-12	0.46	0.59	0.73	1.06	1.26
2016-01	0.33	0.49	0.67	1.05	1.26
2016-02	0.14	0.30	0.47	0.85	1.09
2016-03	-0.03	0.16	0.34	0.73	0.99
2016-04	-0.22	-0.03	0.19	0.60	0.86
2016-05	-0.22	-0.04	0.21	0.64	0.86
2016-06	-0.27	-0.07	0.17	0.63	0.82
2016-07	-0.32	-0.16	0.04	0.42	0.61
2016-08	-0.17	-0.06	0.09	0.43	0.62
2016-09	-0.17	-0.05	0.12	0.47	0.64
2016-10	-0.26	-0.10	0.10	0.49	0.69
2016-11	-0.07	0.11	0.32	0.69	0.86
2016-12	0.15	0.36	0.56	0.89	1.04
2017-01	0.03	0.27	0.42	0.74	0.92
2017-02	0.01	0.29	0.40	0.73	0.93
2017-03	0.18	0.42	0.49	0.79	0.99
2017-04	0.08	0.28	0.39	0.72	0.91
2017-05	0.09	0.29	0.47	0.80	0.99
2017-06	0.14	0.32	0.46	0.75	0.93
2017-07	0.23	0.42	0.55	0.84	1.01
2017-08	0.16	0.35	0.43	0.74	0.93
2017-09	0.12	0.31	0.37	0.67	0.87
2017-10	0.25	0.42	0.50	0.77	0.94
2017-11	0.30	0.43	0.50	0.72	0.87
2017-12	0.42	0.48	0.50	0.68	0.80
2018-01	0.45	0.51	0.54	0.69	0.80
2018-02	0.63	0.73	0.76	0.89	0.99
2018-03	0.61	0.71	0.75	0.89	0.99
2018-04	0.65	0.72	0.74	0.85	0.93
2018-05	0.72	0.82	0.84	0.92	0.98
2018-06	0.71	0.76	0.79	0.87	0.93
2018-07	0.74	0.76	0.77	0.84	0.88
2018-08	0.79	0.79	0.79	0.86	0.92
2018-09	0.89	0.88	0.88	0.95	1.00
2018-10	1.01	1.03	1.04	1.14	1.21
2018-11	1.10	1.11	1.11	1.21	1.30
2018-12	1.08	1.04	1.02	1.11	1.19
2019-01	0.91	0.91	0.92	1.07	1.19
2019-02	0.73	0.76	0.80	0.96	1.10
2019-03	0.56	0.60	0.66	0.85	1.02
2019-04	0.49	0.54	0.60	0.79	0.97
2019-05	0.48	0.52	0.57	0.75	0.92
2019-06	0.28	0.32	0.37	0.59	0.79
2019-07	0.25	0.27	0.31	0.54	0.77
2019-08	0.11	0.07	0.04	0.25	0.49
2019-09	0.17	0.13	0.11	0.32	0.51
2019-10	0.12	0.12	0.15	0.36	0.55
2019-11	0.09	0.12	0.17	0.37	0.54
2019-12	0.06	0.09	0.14	0.35	0.52
2020-01	-0.09	-0.04	0.04	0.26	0.43
2020-02	-0.26	-0.20	-0.11	0.12	0.29
2020-03	-0.08	-0.13	-0.12	0.03	0.16
2020-04	-0.37	-0.44	-0.45	-0.28	-0.12
2020-05	-0.43	-0.45	-0.44	-0.26	-0.08
2020-06	-0.67	-0.62	-0.54	-0.28	-0.06

Monthly					
UST-05m	5	Year	H.15 ID	RIFLGFCY05_N.M	
UST-07m	7			RIFLGFCY07_N.M	
UST-10m	10			RIFLGFCY10_N.M	
UST-20m	20			RIFLGFCY20_N.M	
UST-30m	30			RIFLGFCY30_N.M	

Month	UST-05m	UST-07m	UST-10m	UST-20m	UST-30m
2010-01	2.48	3.21	3.73	4.50	4.60
2010-02	2.36	3.12	3.69	4.48	4.62
2010-03	2.43	3.16	3.73	4.49	4.64
2010-04	2.58	3.28	3.85	4.53	4.69
2010-05	2.18	2.86	3.42	4.11	4.29
2010-06	2.00	2.66	3.20	3.95	4.13
2010-07	1.76	2.43	3.01	3.80	3.99
2010-08	1.47	2.10	2.70	3.52	3.80
2010-09	1.41	2.05	2.65	3.47	3.77
2010-10	1.18	1.85	2.54	3.52	3.87
2010-11	1.35	2.02	2.76	3.82	4.19
2010-12	1.93	2.66	3.29	4.17	4.42
2011-01	1.99	2.72	3.39	4.28	4.52
2011-02	2.26	2.96	3.58	4.42	4.65
2011-03	2.11	2.80	3.41	4.27	4.51
2011-04	2.17	2.84	3.46	4.28	4.50
2011-05	1.84	2.51	3.17	4.01	4.29
2011-06	1.58	2.29	3.00	3.91	4.23
2011-07	1.54	2.28	3.00	3.95	4.27
2011-08	1.02	1.63	2.30	3.24	3.65
2011-09	0.90	1.42	1.98	2.83	3.18
2011-10	1.06	1.62	2.15	2.87	3.13
2011-11	0.91	1.45	2.01	2.72	3.02
2011-12	0.89	1.43	1.98	2.67	2.98
2012-01	0.84	1.38	1.97	2.70	3.03
2012-02	0.83	1.37	1.97	2.75	3.11
2012-03	1.02	1.56	2.17	2.94	3.28
2012-04	0.89	1.43	2.05	2.82	3.18
2012-05	0.76	1.21	1.80	2.53	2.93
2012-06	0.71	1.08	1.62	2.31	2.70
2012-07	0.62	0.98	1.53	2.22	2.59
2012-08	0.71	1.14	1.68	2.40	2.77
2012-09	0.67	1.12	1.72	2.49	2.88
2012-10	0.71	1.15	1.75	2.51	2.90
2012-11	0.67	1.08	1.65	2.39	2.80
2012-12	0.70	1.13	1.72	2.47	2.88
2013-01	0.81	1.30	1.91	2.68	3.08
2013-02	0.85	1.35	1.98	2.78	3.17
2013-03	0.82	1.32	1.96	2.78	3.16
2013-04	0.71	1.15	1.76	2.55	2.93
2013-05	0.84	1.31	1.93	2.73	3.11
2013-06	1.20	1.71	2.30	3.07	3.40
2013-07	1.40	1.99	2.58	3.31	3.61
2013-08	1.52	2.15	2.74	3.49	3.76
2013-09	1.60	2.22	2.81	3.53	3.79
2013-10	1.37	1.99	2.62	3.38	3.68
2013-11	1.37	2.07	2.72	3.50	3.80
2013-12	1.58	2.29	2.90	3.63	3.89
2014-01	1.65	2.29	2.86	3.52	3.77
2014-02	1.52	2.15	2.71	3.38	3.66
2014-03	1.64	2.23	2.72	3.35	3.62
2014-04	1.70	2.27	2.71	3.27	3.52
2014-05	1.59	2.12	2.56	3.12	3.39
2014-06	1.68	2.19	2.60	3.15	3.42
2014-07	1.70	2.17	2.54	3.07	3.33
2014-08	1.63	2.08	2.42	2.94	3.20
2014-09	1.77	2.22	2.53	3.01	3.26
2014-10	1.55	1.98	2.30	2.77	3.04
2014-11	1.62	2.03	2.33	2.76	3.04
2014-12	1.64	1.98	2.21	2.55	2.83
2015-01	1.37	1.67	1.88	2.20	2.46
2015-02	1.47	1.79	1.98	2.34	2.57
2015-03	1.52	1.84	2.04	2.41	2.63
2015-04	1.35	1.69	1.94	2.33	2.59
2015-05	1.54	1.93	2.20	2.69	2.96
2015-06	1.68	2.10	2.36	2.85	3.11
2015-07	1.63	2.04	2.32	2.77	3.07
2015-08	1.54	1.91	2.17	2.55	2.86
2015-09	1.49	1.88	2.17	2.62	2.95
2015-10	1.39	1.76	2.07	2.50	2.89
2015-11	1.67	2.02	2.26	2.69	3.03
2015-12	1.70	2.04	2.24	2.61	2.97
2016-01	1.52	1.85	2.09	2.49	2.86
2016-02	1.22	1.53	1.78	2.20	2.62
2016-03	1.38	1.68	1.89	2.28	2.68
2016-04	1.26	1.57	1.81	2.21	2.62
2016-05	1.30	1.60	1.81	2.22	2.63
2016-06	1.17	1.44	1.64	2.02	2.45
2016-07	1.07	1.33	1.50	1.82	2.23
2016-08	1.13	1.40	1.56	1.89	2.26
2016-09	1.18	1.46	1.63	2.02	2.35
2016-10	1.27	1.56	1.76	2.17	2.50
2016-11	1.60	1.93	2.14	2.54	2.86
2016-12	1.96	2.29	2.49	2.84	3.11
2017-01	1.92	2.23	2.43	2.75	3.02
2017-02	1.90	2.22	2.42	2.76	3.03
2017-03	2.01	2.30	2.48	2.83	3.08
2017-04	1.82	2.10	2.30	2.67	2.94
2017-05	1.84	2.11	2.30	2.70	2.96
2017-06	1.77	2.01	2.19	2.54	2.80
2017-07	1.87	2.13	2.32	2.65	2.88
2017-08	1.78	2.03	2.21	2.55	2.80
2017-09	1.80	2.03	2.20	2.53	2.78
2017-10	1.98	2.20	2.36	2.65	2.88
2017-11	2.05	2.23	2.35	2.60	2.80
2017-12	2.18	2.32	2.40	2.60	2.77
2018-01	2.38	2.51	2.58	2.73	2.88
2018-02	2.60	2.78	2.86	3.02	3.13
2018-03	2.63	2.77	2.84	2.97	3.09
2018-04	2.70	2.82	2.87	2.96	3.07
2018-05	2.82	2.93	2.98	3.05	3.13
2018-06	2.78	2.87	2.91	2.98	3.05
2018-07	2.78	2.85	2.89	2.94	3.01
2018-08	2.77	2.84	2.89	2.97	3.04
2018-09	2.89	2.96	3.00	3.08	3.15
2018-10	3.00	3.09	3.15	3.27	3.34
2018-11	2.95	3.04	3.12	3.27	3.36
2018-12	2.68	2.75	2.83	2.98	3.10
2019-01	2.54	2.61	2.71	2.89	3.04
2019-02	2.49	2.57	2.68	2.87	3.02
2019-03	2.37	2.47	2.57	2.80	2.98
2019-04	2.33	2.43	2.53	2.76	2.94
2019-05	2.19	2.29	2.40	2.63	2.82
2019-06	1.83	1.95	2.07	2.36	2.57
2019-07	1.83	1.93	2.06	2.36	2.57
2019-08	1.49	1.55	1.63	1.91	2.12
2019-09	1.57	1.64	1.70	1.97	2.16
2019-10	1.53	1.62	1.71	2.00	2.19
2019-11	1.64	1.74	1.81	2.13	2.28
2019-12	1.68	1.79	1.86	2.16	2.30
2020-01	1.56	1.67	1.76	2.07	2.22
2020-02	1.32	1.42	1.50	1.81	1.97
2020-03	0.59	0.78	0.87	1.26	1.46
2020-04	0.39	0.55	0.66	1.06	1.27
2020-05	0.34	0.53	0.67	1.12	1.38
2020-06	0.34	0.55	0.73	1.27	1.49

CASE: UG 389
WITNESSES: MATT MULDOON-MOYA ENRIGHT-CURTIS DLOUHY

**PUBLIC UTILITY COMMISSION
OF
OREGON**

**STAFF EXHIBIT 1309
TIPS Implied Inflation Expectations**

**Exhibits in Furtherance
of Testimony in Support of Partial Stipulation**

August 7, 2020

Staff Exhibit 1309

is

filed in electronic format.

2030 through 2050 TIPS-Implied Average Annual Inflation Rate:

1.62%

Yr. End Mo.-Yr.	Years	Individually Implied Price Levels					Implied Forward Curve/Price Level					Implied Price Level	Check
		5-Yr	7-Yr	10-Yr	20-Yr	30-Yr	5-Yr	7-Yr	10-Yr	20-Yr	30-Yr		
Dec-20	0	100.00	100.00	100.00	100.00	100.00	100.00					100.00	
Dec-21	1	100.85	101.05	101.16	101.42	101.47	100.85					100.85	
Dec-22	2	101.70	102.10	102.34	102.87	102.95	101.70					101.70	
Dec-23	3	102.56	103.17	103.53	104.33	104.46	102.56					102.56	
Dec-24	4	103.43	104.25	104.74	105.82	106.00	103.43					103.43	
Dec-25	5	104.31	105.34	105.95	107.32	107.55	104.31					104.31	
Dec-26	6		106.45	107.19	108.85	109.13		105.92				105.92	
Dec-27	7		107.56	108.43	110.40	110.73		107.56				107.56	
Dec-28	8			109.69	111.97	112.35			109.11			109.11	
Dec-29	9			110.97	113.56	114.00			110.67			110.67	
Dec-30	10			112.26	115.18	115.67			112.26			112.26	
Dec-31	11				116.82	117.37				114.15		114.15	114.08
Dec-32	12				118.48	119.09				116.07		116.07	115.93
Dec-33	13				120.17	120.84				118.03		118.03	117.80
Dec-34	14				121.88	122.61				120.02		120.02	119.71
Dec-35	15				123.61	124.41				122.04		122.04	121.65
Dec-36	16				125.37	126.23				124.09		124.09	123.62
Dec-37	17				127.16	128.08				126.18		126.18	125.62
Dec-38	18				128.97	129.96				128.31		128.31	127.65
Dec-39	19				130.80	131.87				130.47		130.47	129.72
Dec-40	20				132.67	133.80				132.67		132.67	131.82
Dec-41	21					135.77					134.73	134.73	133.95
Dec-42	22					137.76					136.82	136.82	136.12
Dec-43	23					139.78					138.94	138.94	138.32
Dec-44	24					141.83					141.10	141.10	140.56
Dec-45	25					143.91					143.29	143.29	142.83
Dec-46	26					146.02					145.52	145.52	145.15
Dec-47	27					148.16					147.78	147.78	147.50
Dec-48	28					150.33					150.08	150.08	149.88
Dec-49	29					152.54					152.41	152.41	152.31
Dec-50	30					154.78					154.78	154.78	154.78

Average Quarterly Values for FRB H15 Data
See FRB H.15 Tab for Data Feed Sources.

Staff TIPS Analysis Quarterly Aggregation

Average Monthly Inflation Indexed Rates by Quarter					
Qtr	TIPS-05m	TIPS-07m	TIPS-10m	TIPS-20m	TIPS-30m
2010-Q1	0.47	0.94	1.43	2.00	2.16
2010-Q2	0.46	0.91	1.36	1.77	1.88
2010-Q3	0.20	0.57	1.06	1.68	1.76
2010-Q4	-0.11	0.28	0.75	1.48	1.65
2011-Q1	0.07	0.67	1.09	1.71	2.00
2011-Q2	-0.29	0.33	0.80	1.49	1.78
2011-Q3	-0.65	-0.22	0.28	0.95	1.25
2011-Q4	-0.75	-0.39	0.05	0.61	0.85
2012-Q1	-1.02	-0.60	-0.17	0.51	0.78
2012-Q2	-1.08	-0.75	-0.35	0.35	0.66
2012-Q3	-1.27	-1.01	-0.63	0.02	0.43
2012-Q4	-1.42	-1.15	-0.76	-0.02	0.36
2013-Q1	-1.40	-0.98	-0.59	0.19	0.56
2013-Q2	-1.04	-0.62	-0.25	0.47	0.80
2013-Q3	-0.32	0.17	0.56	1.16	1.43
2013-Q4	-0.29	0.25	0.57	1.19	1.50
2014-Q1	-0.16	0.37	0.58	1.11	1.39
2014-Q2	-0.25	0.27	0.43	0.88	1.14
2014-Q3	-0.13	0.24	0.32	0.72	0.98
2014-Q4	0.19	0.39	0.45	0.75	0.95
2015-Q1	0.11	0.23	0.27	0.52	0.71
2015-Q2	-0.10	0.22	0.30	0.67	0.91
2015-Q3	0.26	0.48	0.57	0.92	1.14
2015-Q4	0.36	0.51	0.66	1.02	1.24
2016-Q1	0.15	0.32	0.49	0.88	1.11
2016-Q2	-0.24	-0.05	0.19	0.62	0.85
2016-Q3	-0.22	-0.09	0.08	0.44	0.62
2016-Q4	-0.06	0.12	0.33	0.69	0.86
2017-Q1	0.07	0.33	0.44	0.75	0.95
2017-Q2	0.10	0.30	0.44	0.76	0.94
2017-Q3	0.17	0.36	0.45	0.75	0.94
2017-Q4	0.32	0.44	0.50	0.72	0.87
2018-Q1	0.56	0.65	0.68	0.82	0.93
2018-Q2	0.69	0.77	0.79	0.88	0.95
2018-Q3	0.81	0.81	0.81	0.88	0.93
2018-Q4	1.06	1.06	1.06	1.15	1.23
2019-Q1	0.73	0.76	0.79	0.96	1.10
2019-Q2	0.42	0.46	0.51	0.71	0.89
2019-Q3	0.18	0.16	0.15	0.37	0.59
2019-Q4	0.09	0.11	0.15	0.36	0.54
2020-Q1	-0.14	-0.12	-0.06	0.14	0.29
2020-Q2	-0.49	-0.50	-0.48	-0.27	-0.09

Average Monthly Nominal UST Rates by Quarter					
Qtr	UST-05m	UST-07m	UST-10m	UST-20m	UST-30m
2010-Q1	2.42	3.16	3.72	4.49	4.62
2010-Q2	2.25	2.93	3.49	4.20	4.37
2010-Q3	1.55	2.19	2.79	3.60	3.85
2010-Q4	1.49	2.18	2.86	3.84	4.16
2011-Q1	2.12	2.83	3.46	4.32	4.56
2011-Q2	1.86	2.55	3.21	4.07	4.34
2011-Q3	1.15	1.78	2.43	3.34	3.70
2011-Q4	0.95	1.50	2.05	2.75	3.04
2012-Q1	0.90	1.44	2.04	2.80	3.14
2012-Q2	0.79	1.24	1.82	2.55	2.94
2012-Q3	0.67	1.08	1.64	2.37	2.75
2012-Q4	0.69	1.12	1.71	2.46	2.86
2013-Q1	0.83	1.32	1.95	2.75	3.14
2013-Q2	0.92	1.39	2.00	2.78	3.15
2013-Q3	1.51	2.12	2.71	3.44	3.72
2013-Q4	1.44	2.12	2.75	3.50	3.79
2014-Q1	1.60	2.22	2.76	3.42	3.68
2014-Q2	1.66	2.19	2.62	3.18	2.76
2014-Q3	1.70	2.16	2.50	3.01	3.26
2014-Q4	1.60	2.00	2.28	2.69	2.97
2015-Q1	1.45	1.77	1.97	2.32	2.55
2015-Q2	1.52	1.91	2.17	2.62	2.89
2015-Q3	1.55	1.94	2.22	2.65	2.96
2015-Q4	1.59	1.94	2.19	2.60	2.96
2016-Q1	1.37	1.69	1.92	2.32	2.72
2016-Q2	1.24	1.54	1.75	2.15	2.57
2016-Q3	1.13	1.40	1.56	1.91	2.28
2016-Q4	1.61	1.93	2.13	2.52	2.82
2017-Q1	1.94	2.25	2.44	2.78	3.04
2017-Q2	1.81	2.07	2.26	2.64	2.90
2017-Q3	1.82	2.06	2.24	2.58	2.82
2017-Q4	2.07	2.25	2.37	2.62	2.82
2018-Q1	2.54	2.69	2.76	2.91	3.03
2018-Q2	2.77	2.87	2.92	3.00	3.08
2018-Q3	2.81	2.88	2.93	3.00	3.07
2018-Q4	2.88	2.96	3.03	3.17	3.27
2019-Q1	2.47	2.55	2.65	2.85	3.01
2019-Q2	2.12	2.22	2.33	2.58	2.78
2019-Q3	1.63	1.71	1.80	2.08	2.28
2019-Q4	1.62	1.72	1.79	2.10	2.26
2020-Q1	1.16	1.29	1.38	1.71	1.88
2020-Q2	0.36	0.54	0.69	1.15	1.38

Implied Market-based Inflationary Expectations					
Qtr	5-Yr	7-Yr	10-Yr	20-Yr	30-Yr
2010-Q1	1.96	2.22	2.28	2.49	2.47
2010-Q2	1.80	2.03	2.13	2.43	2.49
2010-Q3	1.35	1.63	1.73	1.92	2.09
2010-Q4	1.59	1.90	2.12	2.36	2.51
2011-Q1	2.05	2.16	2.37	2.61	2.56
2011-Q2	2.15	2.22	2.41	2.57	2.56
2011-Q3	1.81	2.00	2.15	2.39	2.45
2011-Q4	1.71	1.89	1.99	2.14	2.19
2012-Q1	1.92	2.04	2.20	2.29	2.36
2012-Q2	1.86	1.99	2.17	2.21	2.28
2012-Q3	1.94	2.09	2.28	2.35	2.31
2012-Q4	2.11	2.27	2.47	2.48	2.50
2013-Q1	2.23	2.31	2.54	2.55	2.58
2013-Q2	1.95	2.01	2.25	2.32	2.34
2013-Q3	1.82	1.95	2.15	2.29	2.29
2013-Q4	1.73	1.86	2.17	2.31	2.29
2014-Q1	1.77	1.85	2.18	2.30	2.29
2014-Q2	1.90	1.92	2.20	2.30	1.62
2014-Q3	1.83	1.92	2.18	2.28	2.29
2014-Q4	1.41	1.61	1.83	1.95	2.02
2015-Q1	1.35	1.54	1.70	1.79	1.85
2015-Q2	1.63	1.69	1.86	1.95	1.97
2015-Q3	1.29	1.47	1.65	1.73	1.82
2015-Q4	1.23	1.43	1.53	1.58	1.72
2016-Q1	1.23	1.37	1.43	1.45	1.61
2016-Q2	1.48	1.58	1.56	1.53	1.72
2016-Q3	1.35	1.49	1.48	1.47	1.66
2016-Q4	1.67	1.80	1.80	1.83	1.96
2017-Q1	1.87	1.92	2.01	2.03	2.10
2017-Q2	1.71	1.78	1.82	1.88	1.96
2017-Q3	1.65	1.70	1.79	1.83	1.88
2017-Q4	1.75	1.81	1.87	1.89	1.95
2018-Q1	1.97	2.04	2.08	2.08	2.11
2018-Q2	2.07	2.11	2.13	2.12	2.14
2018-Q3	2.01	2.07	2.11	2.11	2.13
2018-Q4	1.81	1.90	1.98	2.02	2.03
2019-Q1	1.73	1.79	1.86	1.89	1.91
2019-Q2	1.70	1.76	1.82	1.87	1.88
2019-Q3	1.45	1.55	1.64	1.71	1.69
2019-Q4	1.53	1.61	1.64	1.74	1.72
2020-Q1	1.30	1.41	1.44	1.58	1.59
2020-Q2	0.85	1.05	1.16	1.42	1.47

FRB **H.15** Market Yield on U.S. Treasury (UST) Securities at Constant Maturity, Quoted on an Investment Basis in Percent per Year
Staff Accessed , July 1, 2020 at: <https://www.federalreserve.gov/datadownload/Choose.aspx?rel=H15>

Monthly					
TIPS-05m	5	Year	Inflation Indexed	H.15 ID	RIFLGFCY05_XII_N.M
TIPS-07m	7				RIFLGFCY07_XII_N.M
TIPS-10m	10				RIFLGFCY10_XII_N.M
TIPS-20m	20				RIFLGFCY20_XII_N.M
TIPS-30m	30				RIFLGFCY30_XII_N.M
Month	TIPS-05m	TIPS-07m	TIPS-10m	TIPS-20m	TIPS-30m
2010-01	0.42	0.85	1.37	2.00	TIPS-30
2010-02	0.42	0.90	1.42	2.03	2.16
2010-03	0.56	1.08	1.51	1.98	2.15
2010-04	0.62	1.10	1.50	1.90	2.05
2010-05	0.41	0.86	1.31	1.72	1.83
2010-06	0.34	0.76	1.26	1.69	1.77
2010-07	0.34	0.73	1.24	1.80	1.87
2010-08	0.13	0.51	1.02	1.65	1.76
2010-09	0.13	0.46	0.91	1.58	1.66
2010-10	-0.32	0.02	0.53	1.32	1.44
2010-11	-0.21	0.17	0.67	1.44	1.61
2010-12	0.21	0.65	1.04	1.67	1.89
2011-01	0.06	0.62	1.06	1.70	1.97
2011-02	0.25	0.84	1.24	1.85	2.13
2011-03	-0.09	0.54	0.96	1.58	1.89
2011-04	-0.14	0.49	0.86	1.48	1.79
2011-05	-0.34	0.29	0.78	1.47	1.77
2011-06	-0.38	0.21	0.76	1.53	1.78
2011-07	-0.49	0.09	0.62	1.36	1.62
2011-08	-0.75	-0.36	0.14	0.81	1.10
2011-09	-0.72	-0.39	0.08	0.69	1.02
2011-10	-0.63	-0.28	0.19	0.72	0.99
2011-11	-0.85	-0.46	0.00	0.55	0.78
2011-12	-0.78	-0.44	-0.03	0.56	0.78
2012-01	-0.92	-0.55	-0.11	0.51	0.74
2012-02	-1.11	-0.69	-0.25	0.45	0.72
2012-03	-1.03	-0.57	-0.14	0.56	0.87
2012-04	-1.06	-0.65	-0.21	0.50	0.79
2012-05	-1.12	-0.79	-0.34	0.44	0.68
2012-06	-1.05	-0.82	-0.50	0.10	0.50
2012-07	-1.15	-0.92	-0.60	-0.01	0.39
2012-08	-1.19	-0.94	-0.59	0.06	0.47
2012-09	-1.47	-1.17	-0.71	0.02	0.44
2012-10	-1.47	-1.18	-0.75	-0.01	0.41
2012-11	-1.38	-1.13	-0.77	-0.06	0.35
2012-12	-1.40	-1.13	-0.76	0.00	0.33
2013-01	-1.39	-1.04	-0.61	0.20	0.48
2013-02	-1.39	-0.94	-0.57	0.19	0.57
2013-03	-1.43	-0.97	-0.59	0.19	0.62
2013-04	-1.38	-0.97	-0.65	0.07	0.48
2013-05	-1.14	-0.69	-0.36	0.35	0.72
2013-06	-0.59	-0.21	0.25	0.98	1.21
2013-07	-0.45	0.02	0.46	1.09	1.34
2013-08	-0.33	0.15	0.55	1.16	1.44
2013-09	-0.17	0.34	0.66	1.22	1.50
2013-10	-0.41	0.11	0.43	1.05	1.37
2013-11	-0.38	0.18	0.55	1.20	1.51
2013-12	-0.09	0.47	0.74	1.32	1.61
2014-01	-0.09	0.45	0.63	1.17	1.44
2014-02	-0.26	0.30	0.55	1.12	1.40
2014-03	-0.14	0.37	0.56	1.05	1.33
2014-04	-0.11	0.38	0.54	0.98	1.23
2014-05	-0.34	0.21	0.37	0.82	1.08
2014-06	-0.29	0.23	0.37	0.84	1.11
2014-07	-0.27	0.18	0.28	0.72	0.98
2014-08	-0.21	0.15	0.22	0.64	0.90
2014-09	0.10	0.38	0.46	0.81	1.05
2014-10	0.06	0.32	0.38	0.74	0.96
2014-11	0.14	0.37	0.45	0.77	0.99
2014-12	0.37	0.47	0.51	0.73	0.89
2015-01	0.17	0.24	0.27	0.50	0.66
2015-02	0.11	0.22	0.26	0.52	0.73
2015-03	0.04	0.23	0.28	0.55	0.73
2015-04	-0.26	-0.01	0.08	0.42	0.65
2015-05	-0.10	0.27	0.33	0.70	0.96
2015-06	0.05	0.39	0.50	0.89	1.13
2015-07	0.14	0.42	0.50	0.87	1.11
2015-08	0.31	0.49	0.56	0.87	1.08
2015-09	0.33	0.52	0.65	1.01	1.24
2015-10	0.21	0.39	0.57	0.98	1.22
2015-11	0.40	0.55	0.69	1.03	1.25
2015-12	0.46	0.59	0.73	1.06	1.26
2016-01	0.33	0.49	0.67	1.05	1.26
2016-02	0.14	0.30	0.47	0.85	1.09
2016-03	-0.03	0.16	0.34	0.73	0.99
2016-04	-0.22	-0.03	0.19	0.60	0.86
2016-05	-0.22	-0.04	0.21	0.64	0.86
2016-06	-0.27	-0.07	0.17	0.63	0.82
2016-07	-0.32	-0.16	0.04	0.42	0.61
2016-08	-0.17	-0.06	0.09	0.43	0.62
2016-09	-0.17	-0.05	0.12	0.47	0.64
2016-10	-0.26	-0.10	0.10	0.49	0.69
2016-11	-0.07	0.11	0.32	0.69	0.86
2016-12	0.15	0.36	0.56	0.89	1.04
2017-01	0.03	0.27	0.42	0.74	0.92
2017-02	0.01	0.29	0.40	0.73	0.93
2017-03	0.18	0.42	0.49	0.79	0.99
2017-04	0.08	0.28	0.39	0.72	0.91
2017-05	0.09	0.29	0.47	0.80	0.99
2017-06	0.14	0.32	0.46	0.75	0.93
2017-07	0.23	0.42	0.55	0.84	1.01
2017-08	0.16	0.35	0.43	0.74	0.93
2017-09	0.12	0.31	0.37	0.67	0.87
2017-10	0.25	0.42	0.50	0.77	0.94
2017-11	0.30	0.43	0.50	0.72	0.87
2017-12	0.42	0.48	0.50	0.68	0.80
2018-01	0.45	0.51	0.54	0.69	0.80
2018-02	0.63	0.73	0.76	0.89	0.99
2018-03	0.61	0.71	0.75	0.89	0.99
2018-04	0.65	0.72	0.74	0.85	0.93
2018-05	0.72	0.82	0.84	0.92	0.98
2018-06	0.71	0.76	0.79	0.87	0.93
2018-07	0.74	0.76	0.77	0.84	0.88
2018-08	0.79	0.79	0.79	0.86	0.92
2018-09	0.89	0.88	0.88	0.95	1.00
2018-10	1.01	1.03	1.04	1.14	1.21
2018-11	1.10	1.11	1.11	1.21	1.30
2018-12	1.08	1.04	1.02	1.11	1.19
2019-01	0.91	0.91	0.92	1.07	1.19
2019-02	0.73	0.76	0.80	0.96	1.10
2019-03	0.56	0.60	0.66	0.85	1.02
2019-04	0.49	0.54	0.60	0.79	0.97
2019-05	0.48	0.52	0.57	0.75	0.92
2019-06	0.28	0.32	0.37	0.59	0.79
2019-07	0.25	0.27	0.31	0.54	0.77
2019-08	0.11	0.07	0.04	0.25	0.49
2019-09	0.17	0.13	0.11	0.32	0.51
2019-10	0.12	0.12	0.15	0.36	0.55
2019-11	0.09	0.12	0.17	0.37	0.54
2019-12	0.06	0.09	0.14	0.35	0.52
2020-01	-0.09	-0.04	0.04	0.26	0.43
2020-02	-0.26	-0.20	-0.11	0.12	0.29
2020-03	-0.08	-0.13	-0.12	0.03	0.16
2020-04	-0.37	-0.44	-0.45	-0.28	-0.12
2020-05	-0.43	-0.45	-0.44	-0.26	-0.08
2020-06	-0.67	-0.62	-0.54	-0.28	-0.06

Monthly		5	Year	H.15 ID	RIFLGFCY05_N.M	
UST-07m	7	RIFLGFCY07_N.M				
UST-10m	10	RIFLGFCY10_N.M				
UST-20m	20	RIFLGFCY20_N.M				
UST-30m	30	RIFLGFCY30_N.M				
Month	UST-05m	UST-07m	UST-10m	UST-20m	UST-30m	
2010-01	2.48	3.21	3.73	4.50	4.60	
2010-02	2.36	3.12	3.69	4.48	4.62	
2010-03	2.43	3.16	3.73	4.49	4.64	
2010-04	2.58	3.28	3.85	4.53	4.69	
2010-05	2.18	2.86	3.42	4.11	4.29	
2010-06	2.00	2.66	3.20	3.95	4.13	
2010-07	1.76	2.43	3.01	3.80	3.99	
2010-08	1.47	2.10	2.70	3.52	3.80	
2010-09	1.41	2.05	2.65	3.47	3.77	
2010-10	1.18	1.85	2.54	3.52	3.87	
2010-11	1.35	2.02	2.76	3.82	4.19	
2010-12	1.93	2.66	3.29	4.17	4.42	
2011-01	1.99	2.72	3.39	4.28	4.52	
2011-02	2.26	2.96	3.58	4.42	4.65	
2011-03	2.11	2.80	3.41	4.27	4.51	
2011-04	2.17	2.84	3.46	4.28	4.50	
2011-05	1.84	2.51	3.17	4.01	4.29	
2011-06	1.58	2.29	3.00	3.91	4.23	
2011-07	1.54	2.28	3.00	3.95	4.27	
2011-08	1.02	1.63	2.30	3.24	3.65	
2011-09	0.90	1.42	1.98	2.83	3.18	
2011-10	1.06	1.62	2.15	2.87	3.13	
2011-11	0.91	1.45	2.01	2.72	3.02	
2011-12	0.89	1.43	1.98	2.67	2.98	
2012-01	0.84	1.38	1.97	2.70	3.03	
2012-02	0.83	1.37	1.97	2.75	3.11	
2012-03	1.02	1.56	2.17	2.94	3.28	
2012-04	0.89	1.43	2.05	2.82	3.18	
2012-05	0.76	1.21	1.80	2.53	2.93	
2012-06	0.71	1.08	1.62	2.31	2.70	
2012-07	0.62	0.98	1.53	2.22	2.59	
2012-08	0.71	1.14	1.68	2.40	2.77	
2012-09	0.67	1.12	1.72	2.49	2.88	
2012-10	0.71	1.15	1.75	2.51	2.90	
2012-11	0.67	1.08	1.65	2.39	2.80	
2012-12	0.70	1.13	1.72	2.47	2.88	
2013-01	0.81	1.30	1.91	2.68	3.08	
2013-02	0.85	1.35	1.98	2.78	3.17	
2013-03	0.82	1.32	1.96	2.78	3.16	
2013-04	0.71	1.15	1.76	2.55	2.93	
2013-05	0.84	1.31	1.93	2.73	3.11	
2013-06	1.20	1.71	2.30	3.07	3.40	
2013-07	1.40	1.99	2.58	3.31	3.61	
2013-08	1.52	2.15	2.74	3.49	3.76	
2013-09	1.60	2.22	2.81	3.53	3.79	
2013-10	1.37	1.99	2.62	3.38	3.68	
2013-11	1.37	2.07	2.72	3.50	3.80	
2013-12	1.58	2.29	2.90	3.63	3.89	
2014-01	1.65	2.29	2.86	3.52	3.77	
2014-02	1.52	2.15	2.71	3.38	3.66	
2014-03	1.64	2.23	2.72	3.35	3.62	
2014-04	1.70	2.27	2.71	3.27	3.52	
2014-05	1.59	2.12	2.56	3.12	3.39	
2014-06	1.68	2.19	2.60	3.15	3.42	
2014-07	1.70	2.17	2.54	3.07	3.33	
2014-08	1.63	2.08	2.42	2.94	3.20	
2014-09	1.77	2.22	2.53	3.01	3.26	
2014-10	1.55	1.98	2.30	2.77	3.04	
2014-11	1.62	2.03	2.33	2.76	3.04	
2014-12	1.64	1.98	2.21	2.55	2.83	
2015-01	1.37	1.67	1.88	2.20	2.46	
2015-02	1.47	1.79	1.98	2.34	2.57	
2015-03	1.52	1.84	2.04	2.41	2.63	
2015-04	1.35	1.69	1.94	2.33	2.59	
2015-05	1.54	1.93	2.20	2.69	2.96	
2015-06	1.68	2.10	2.36	2.85	3.11	
2015-07	1.63	2.04	2.32	2.77	3.07	
2015-08	1.54	1.91	2.17	2.55	2.86	
2015-09	1.49	1.88	2.17	2.62	2.95	
2015-10	1.39	1.76	2.07	2.50	2.89	
2015-11	1.67	2.02	2.26	2.69	3.03	
2015-12	1.70	2.04	2.24	2.61	2.97	
2016-01	1.52	1.85	2.09	2.49	2.86	
2016-02	1.22	1.53	1.78	2.20	2.62	
2016-03	1.38	1.68	1.89	2.28	2.68	
2016-04	1.26	1.57	1.81	2.21	2.62	
2016-05	1.30	1.60	1.81	2.22	2.63	
2016-06	1.17	1.44	1.64	2.02	2.45	
2016-07	1.07	1.33	1.50	1.82	2.23	
2016-08	1.13	1.40	1.56	1.89	2.26	
2016-09	1.18	1.46	1.63	2.02	2.35	
2016-10	1.27	1.56	1.76	2.17	2.50	
2016-11	1.60	1.93	2.14	2.54	2.86	
2016-12	1.96	2.29	2.49	2.84	3.11	
2017-01	1.92	2.23	2.43	2.75	3.02	
2017-02	1.90	2.22	2.42	2.76	3.03	
2017-03	2.01	2.30	2.48	2.83	3.08	
2017-04	1.82	2.10	2.30	2.67	2.94	
2017-05	1.84	2.11	2.30	2.70	2.96	
2017-06	1.77	2.01	2.19	2.54	2.80	
2017-07	1.87	2.13	2.32	2.65	2.88	
2017-08	1.78	2.03	2.21	2.55	2.80	
2017-09	1.80	2.03	2.20	2.53	2.78	
2017-10	1.98	2.20	2.36	2.65	2.88	
2017-11	2.05	2.23	2.35	2.60	2.80	
2017-12	2.18	2.32	2.40	2.60	2.77	
2018-01	2.38	2.51	2.58	2.73	2.88	
2018-02	2.60	2.78	2.86	3.02	3.13	
2018-03	2.63	2.77	2.84	2.97	3.09	
2018-04	2.70	2.82	2.87	2.96	3.07	
2018-05	2.82	2.93	2.98	3.05	3.13	
2018-06	2.78	2.87	2.91	2.98	3.05	
2018-07	2.78	2.85	2.89	2.94	3.01	
2018-08	2.77	2.84	2.89	2.97	3.04	
2018-09	2.89	2.96	3.00	3.08	3.15	
2018-10	3.00	3.09	3.15	3.27	3.34	
2018-11	2.95	3.04	3.12	3.27	3.36	
2018-12	2.68	2.75	2.83	2.98	3.10	
2019-01	2.54	2.61	2.71	2.89	3.04	
2019-02	2.49	2.57	2.68	2.87	3.02	
2019-03	2.37	2.47	2.57	2.80	2.98	
2019-04	2.33	2.43	2.53	2.76	2.94	
2019-05	2.19	2.29	2.40	2.63	2.82	
2019-06	1.83	1.95	2.07	2.36	2.57	
2019-07	1.83	1.93	2.06	2.36	2.57	
2019-08	1.49	1.55	1.63	1.91	2.12	
2019-09	1.57	1.64	1.70	1.97	2.16	
2019-10	1.53	1.62	1.71	2.00	2.19	
2019-11	1.64	1.74	1.81	2.13	2.28	
2019-12	1.68	1.79	1.86	2.16	2.30	
2020-01	1.56	1.67	1.76	2.07	2.22	
2020-02	1.32	1.42	1.50	1.81	1.97	
2020-03	0.59	0.78	0.87	1.26	1.46	
2020-04	0.39	0.55	0.66	1.06	1.27	
2020-05	0.34	0.53	0.67	1.12	1.38	
2020-06	0.34	0.55	0.73	1.27	1.49	

CERTIFICATE OF SERVICE

UG 389

I certify that I have, this day, served the foregoing document upon all parties of record in this proceeding by delivering a copy in person or by mailing a copy properly addressed with first class postage prepaid, or by electronic mail pursuant to OAR 860-001-0180, to the following parties or attorneys of parties.

Dated this 7th day of August, 2020 at Salem, Oregon



Kay Barnes

Public Utility Commission

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